

# **LOWER CLEARWATER EXCHANGE PROJECT**

## ***APPRAISAL STUDY***

Prepared by:



1630 23<sup>rd</sup> Avenue, Suite 1101-A  
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w [www.jub.com](http://www.jub.com)

***September 2011***

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## **ACKNOWLEDGEMENTS**

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None of this would have been possible without the work of Jerry Klemm to organize and focus the group toward a collaborative solution for the Lewiston Orchards Project.

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Finally, to all the stakeholders who attended the many workshops and provided valuable perspectives from federal, state and local agencies, and concerned citizens

All of the assistance is gratefully acknowledged.

## 1 SCOPE AND PURPOSE

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This Lower Clearwater Exchange Project (LCEP) Appraisal Study has been prepared for the Lewiston Orchards Irrigation District (LOID) and its LCEP partners in accordance with the US Bureau of Reclamation (Reclamation) standards under Reclamation's Rural Water Supply Program (RWSP). LOID was selected as the lead project sponsor for this appraisal study under the RWSP on behalf of and by its LCEP partners: the Lewiston Orchards Irrigation District (LOID), the Nez Perce Tribe (Tribe), the City of Lewiston, Idaho (City), Nez Perce County, Idaho (County), and the Lewis Clark Valley Chamber of Commerce (the Chamber). The purpose of the study is to determine if there is at least one viable alternative, including and/or distinct from the LCEP concept itself, that warrants more detailed investigation through a RWSP feasibility study, and to recommend to Reclamation if such study should be initiated.

The appraisal study is the first of two stages in an "appraisal investigation". An appraisal study evaluates and recommends if one or more alternatives warrant further consideration in a feasibility study. The second stage is completed by Reclamation in preparation of an appraisal report, which provides an ultimate recommendation on whether a feasibility study should be initiated.

### 1.1 REGULATORY PROCESS

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This Study is funded through Reclamation's Rural Water Supply Program, authorized and established by Title I of the Reclamation Rural Water Supply Act of 2006 (P.L. 109-451) and further defined as to administration and programmatic criteria at 43 CFR Part 404 (the Rule). The Rule establishes programmatic criteria for Reclamation's water resource planning process, which includes three levels of planning, starting with a preliminary assessment. The assessment helps determine the federal roles and desirability of potential partners to proceed to subsequent appraisal and feasibility analysis.

The appraisal study provides a preliminary survey of status quo (no action) problems and needs using existing information to explore conceptual solutions to water resource issues. The study process includes development and screening of options so only viable alternatives that meet project goals are carried forward into the more extensive feasibility analysis step. If a favorable recommendation is set forth in the resulting appraisal report, the process could proceed to a feasibility study of one or more alternatives. It is during the feasibility study process that engineering, operation and maintenance, cost

estimates, economics, as well as National Environmental Protection Act (NEPA) and the Endangered Species Act (ESA) impacts and other salient features of the alternative(s) under consideration are developed and evaluated.

### **1.1.1 REGULATORY AUTHORITY**

Reclamation is authorized to conduct this Study under the Reclamation Act of 1902 (P.L. 57-161, 32 Stat. 388, June 17, 1902). The Act, as amended and supplemented, authorizes Reclamation to manage and develop innovative water management tools and partnerships to meet the growing demand for water in the American west.

Reclamation is further authorized by Title I of the Rural Water Supply Act of 2006 (P.L. 109-451) to plan the design and construction of rural water supply projects through the conduct of appraisal investigations and feasibility studies.

### **1.1.2 REGULATORY REQUIREMENTS**

The appraisal study is held to several standards under the Bureau of Reclamation process. First, the study must meet the goals of the Rural Water Supply Program (RWSP), Rule 404.4:

- Assess and address urgent and compelling rural water supply needs that are not currently met by other programs.
- Promote and apply a regional or watershed perspective to water resources management in planning rural water supply projects.
- Develop solutions to address rural water supply needs that are cost effective, and that generate national net economic benefits as required under the “Economic Principles and Guidelines for Water and Related Land Resources” (Principles and Guidelines).
- Encourage partnership among rural communities, Indian tribes or tribal organizations, states or political subdivisions of state, water districts and associations, and other eligible entities to address rural water supply issues.
- Compliment other existing programs and authorities that address rural water supply issues and encourage collaboration between programs.

Two additional objectives must be satisfied due to their inclusion in the successful LCEP grant application prepared in response to the Funding Opportunity Announcement (FOA) No. R10SF80458:

- The extent to which the proposal demonstrates that project sponsors need financial assistance with the planning of a rural water supply project as demonstrated by readily available local and regional economic indicators.
- The extent to which the proposal demonstrates that the Rural Water Supply Study supports a state, tribal or local government’s water management priorities.

Additionally, the Rule establishes criteria that will be applied by Reclamation to, “Determine whether at least one of the alternatives identified is appropriate for further analysis through a feasibility study” (43 CRF Part 404.44). These criteria are:

- Identification of sufficient and viable water supply and water right to supply the service area.
- Positive effect on public health and safety.
- Ability to meet current and projected water demand.
- Environmental benefits.
- Regional or watershed perspective.
- Integrated water resources management.
- Enhanced water management flexibility.
- Long-term protection of water supply.
- Preliminary cost estimates.
- Cost effectiveness.
- Project sponsor capability to pay 100% of operations, maintenance, and replacement costs.

The Rural Water Rule offers additional prioritization criteria under Section 404.13, required for integration under the Directives and Standards Section 10.B. With exception to the items listed below, these are synonymous with Rule 404.4 “Goals,” Rule 404.44 “Criteria,” and specific Reclamation objectives:

- The extent to which Reclamation is uniquely qualified to plan, design and build the project (404.13.d).
- The extent to which a rural water supply project serves Indian Tribes that have non-existent or inadequate water systems (404.13.f).
- The extent to which a rural water supply project is ineligible for comprehensive funding (sufficient to fully fund planning and construction of the entire project) through other assistance programs (404.13.g).

- Whether a rural water supply project incorporates an innovative approach that effectively addresses water supply problems and needs, either by applying new technology or by employing a creative administrative or cooperative solution (404.13.i).

Further, Reclamation’s “Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies” require the following four tests of viability. Any alternative plan to be carried forward to a feasibility study must satisfy these tests:

- Acceptability to state and local entities and the public, and compatibility with existing laws, regulations, and public policies.
- Effectiveness in contributing to objectives.
- Efficiency as the most cost effective means of meeting objectives.
- Completeness in accounting for all necessary investments or other actions, including those by other federal and non-federal entities.

The Bureau of Reclamation will rely on the results of this Study to determine whether there is a federal objective with at least one alternative that can be recommended to be carried forward into a feasibility study. Reclamation’s supplemental instructions for Funding Opportunities Announcement (FOA) R11SF80307 provide additional requirements for an appraisal investigation that is utilized as a proposal to conduct a feasibility study. Although these objectives are not specific requirements of the RWSP, the ability of the appraisal to meet these objectives improves the competitiveness of the project.

According to the supplemental instructions, the investigation should describe the integration of program objectives:

- Energy Use and Water Consumption
- Renewable Energy
- Environmental Benefits
- Innovative Technologies and Approaches

## **1.2 PROJECT HISTORY**

---

The Lewiston Orchards Irrigation District (LOID) is a dual water purveyor committed to provide reliable water service for domestic, municipal, industrial, commercial, and non-commercial irrigation use. The project originated as a private development in the early 20<sup>th</sup> century. The dual system was installed with



funding and support from Reclamation in the 1940's. **Table 1.1** gives a breakdown of water source and typical uses of each system.

**Table 1.1 - LOID System Summary**

LOID Designation	Type	Source	Uses
Irrigation System	Non-Potable Water	LOP	Residential Lawn Care Stock Watering Agricultural Irrigation Fire Protection
Domestic System	Potable Water	Groundwater Wells	Drinking Water Indoor Residential Use

The LOID system serves the Lewiston Orchards area and is supplied by a surface water collection system owned by Reclamation known as the Lewiston Orchards Project (LOP). The LOP utilizes water storage reservoirs, and conveys water through a gravity system of open canals and piped sections to Mann Lake. The gravity conveyance system is primarily located on the Nez Perce Reservation. For a variety of reasons including, but not limited to watershed water quality, reservoir and canal conditions, climate change, and the ESA requirements, the LOID system is rarely provided with the water supply it requires. Summer water rationing and restrictions have become routine.

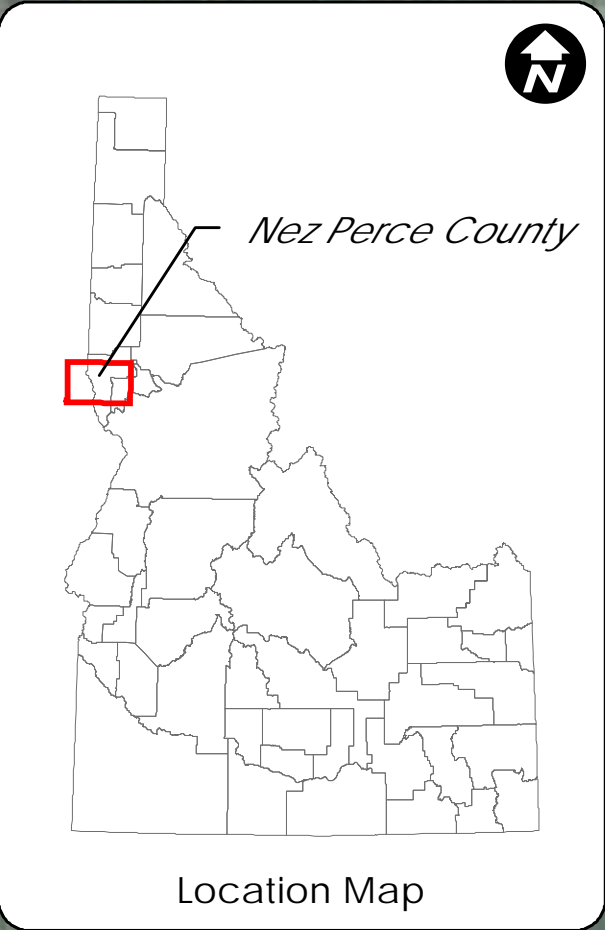
The issues necessitating the appraisal study are rooted in the water supply deficiencies of the LOP; in recurring Endangered Species Act (ESA) litigation between the Nez Perce Tribe and the United States. Issues of concern include environmental and cultural impacts of the LOP on ESA listed steelhead and ESA designated critical habitat in Sweetwater, Lapwai, and Webb Creeks, and impacts of the LOP on the Nez Perce Reservation and the Nez Perce people. Litigation is presently stayed in the Idaho Federal District Court to allow for this appraisal process.

### 1.2.1 SYSTEM DESCRIPTION AND STUDY CONTEXT

The LOID system serves the Lewiston Orchards area through two water systems. The non-potable system is supplied by the LOP, and the potable system is supplied by groundwater wells located throughout the District. **Figure 1.1** shows a vicinity map of the area, delineating the LOID service area and various components of the LOP. A 2010 Biological Opinion (Bi-op) prepared by NOAA describes authorization of the LOP:

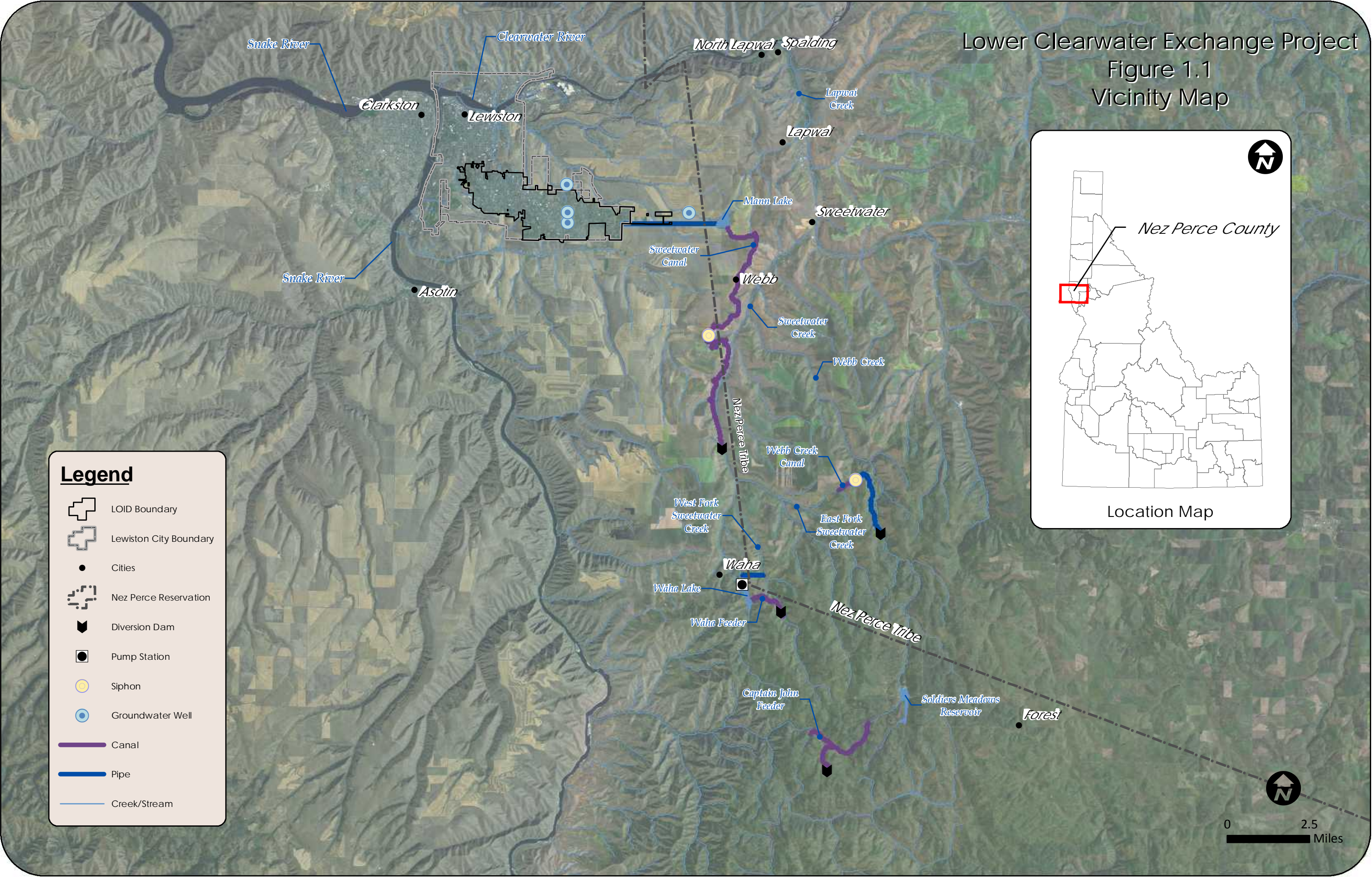


Lower Clearwater Exchange Project  
Figure 1.1  
Vicinity Map



**Legend**

- LOID Boundary
- Lewiston City Boundary
- Cities
- Nez Perce Reservation
- Diversion Dam
- Pump Station
- Siphon
- Groundwater Well
- Canal
- Pipe
- Creek/Stream





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*The LOP was authorized by the Act of July 31, 1946, (60 Stat. 717, Public Law 79-569). The purpose of the 1946 authorization was to repair and improve the water collection and distribution system for irrigation and industrial water supply.*

---

General references herein to “Water” are made within the context of the non-potable system and are not associated with services for drinking water provided by the District. A distinction is critical due to overlapping definitions between LOID and the state. Although LOID refers to their potable system as providing “Domestic” service, Idaho Code 42-111 defines “Domestic purposes” to include “Use of water in homes...livestock, and for any other purpose in connection therewith, including irrigation of up to one-half acre of land...” LOID, in contrast, refers to any use of the non-potable system as “Irrigation use.”

This Study will review the irrigation side of the LOID system, which provides water for non-potable uses only. For consistency with reviewing agency definitions, “Domestic” water is defined in accordance with Idaho Code throughout this Study

#### **OWNERSHIP AND RESPONSIBILITIES**

The LOID entered a contract with the United States, through Reclamation, in 1947. The Contract was amended in 1949. Within these contracts, Reclamation assumed ownership of the LOP and agreed to construct improvements and furnish irrigation water to areas within the District boundary. In turn, LOID reimbursed Reclamation over a 50-year period, and was responsible for system operation, maintenance, and upgrades. LOID currently owns and operates all capital improvements within its District boundaries, as distinct from LOP system components, which are owned by Reclamation. Under the agreement with Reclamation, LOID cannot expand its current service area.

The Contract entitles, “Each assessable acre of land in the District to an irrigation water supply not to exceed two and two-tenths (2.2) acre-ft” The Contract reserves a federal right to provide less than the maximum amount “On account of accidents, failure of the power supply, drought, inaccuracy in distribution, hostile diversion, prior or superior claims, or other causes, it is expected that there will occur at times a shortage in the quantity of water which will be available through the project works.”

### SERVICE AREA DESCRIPTION

The LOID area lies in the southern portion of the City of Lewiston, Idaho. The service area for the system covers approximately 4,000 acres on a plateau overlooking the northern portion of the City. Elevations within the District service area vary by 650 vertical feet.

The District utilizes the LOP to provide water for a variety of purposes, including non-commercial irrigation of vegetation, incidental non-commercial livestock watering, municipal and industrial uses, as well as other commercial and non-commercial agricultural use. Land areas within the District can generally be divided into four categories shown in **Figure 1.2**:

- Residential (non-commercial irrigation of vegetation)
- Commercial (Industrial water use)
- Agricultural (commercial and non-commercial irrigation including incidental non-commercial livestock watering)
- Public (Municipal water use)

In addition, the District is obligated under an agreement with the City of Lewiston to reserve 500 acre-ft of water in Mann Lake for fire suppression services within the District boundary delineated in **Figure 1.2**.

The potential for public contact with LOP supply is relatively high due to predominately residential use characteristics within the District. Although not intended for public contact and human consumption, the District cannot control how constituents utilize water supplied from the LOP.

### WATER SUPPLY INFRASTRUCTURE

Surface water collection for the LOP begins within the Craig Mountain watershed near the headwaters of Sweetwater Creek, Webb Creek, and Captain John Creek, located approximately 20 miles southeast of Lewiston. Sweetwater and Webb Creeks are tributaries of the Clearwater River, and Captain John Creek is a tributary of the Snake River. Water from Webb Creek and Captain John Creek is stored in Soldier's Meadow Reservoir and released as needed by LOID.

These flows run north in Webb Creek to the Webb Creek diversion dam, where water is diverted west to Sweetwater Creek via the Webb Creek canal. Flows are also collected from the west fork of Sweetwater Creek and stored in Waha Lake via the Waha feeder canal. This water is pumped from the lake back into the west fork, via the Sweetwater Springs tributary, as needed. The final diversion, Sweetwater diversion dam, directs water to Mann Lake via the Sweetwater canal. Water is drawn from Mann Lake



Lower Clearwater Exchange Project  
Figure 1.2  
District Land Use



0 2,200  
Feet



from an underground outlet works conduit pipeline penetrating the lake's upstream and downstream embankments. A map and operational schematic of this infrastructure is provided in **Figures 1.1 and 1.3**.

#### Lake Waha

Lake Waha is a natural lake used for off-stream storage. The lake is located approximately 15 miles southeast of Lewiston and west of the west fork of Sweetwater Creek.

#### Soldiers Meadow

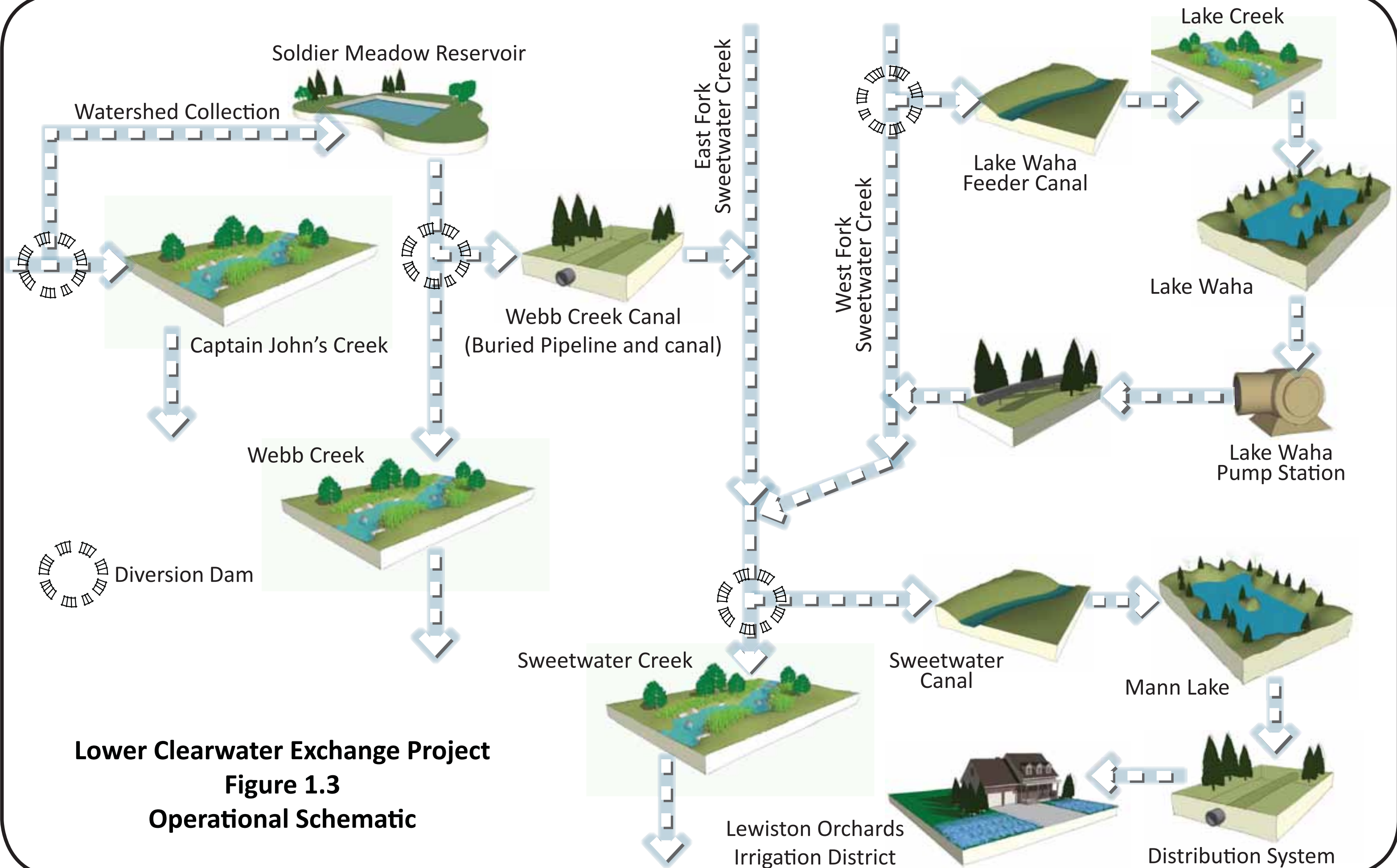
Soldier's Meadow Reservoir is located on Webb Creek approximately 20 miles southeast of Lewiston. In 1986, extensive repairs were completed on the dam, as part of Reclamation's Safety of Dams Program. The reservoir is owned by Reclamation and operated by LOID. Water is stored in this reservoir not only from Webb Creek, but from the diversion of water from Captain John Creek, a tributary of the Snake River rather than the Clearwater River.

#### Mann Lake (Reservoir A)

Mann Lake, synonymous with "Reservoir A" as named by Reclamation, is located approximately seven miles southeast of Lewiston. In 1999, Reclamation completed upgrades to the man-made reservoir under the Safety of Dams Program. At that time, the dam's operating elevation was restricted, effectively reducing the reservoir capacity by one-third, to 1,960 acre-ft (1800' elevation). Reclamation under latest analysis has lifted this restriction for an additional monitoring period to a capacity to 2,440 acre-ft (1804' elevation) and continues to monitor dam performance.

### 1.2.2 LITIGATION

Litigation over the LOP has an extensive history, beginning over 10 years ago. In 1998, Reclamation initiated ESA consultation with the National Marine Fisheries Service (NMFS) on the effects of ongoing operations and maintenance activities at Reclamation facilities in the Snake River Basin, upstream from Lower Granite Dam. ESA consultation specific to the LOP was suspended during the State of Idaho's Snake River Basin Adjudication (SRBA) negotiations, at which time replacement of the LOP with a new water source for LOID was under discussion. Those discussions were subsequently dropped from the SRBA process, and ESA consultation over the LOP resumed between Reclamation and NMFS.



In 2006, the NMFS completed the Biological Opinion (Bi-op 2006) for operation and maintenance of the Lewiston Orchards Project, recommending certain operations including minimum flows in Sweetwater Creek. The Nez Perce Tribe challenged the validity of the 2006 Bi-op and filed suit against both NMFS and Reclamation. In 2008, the US District Court of Idaho ruled in favor of the NPT, finding the 2006 Bi-op deficient, particularly as to effects of the LOP on ESA designated critical habitat for listed Snake River steelhead. The NPT, LOID, Reclamation, and NMFS then participated in a court-ordered mediation. A new Biological Opinion was to be written under a collaborative remand process, and the parties were ordered to simultaneously explore long-term LOP resolutions through the mediation process.

Separate from this process, LOID and the NPT began meeting on a regular basis with lower Clearwater River Basin region stakeholders during a series of meetings (Klemm Meetings) organized by Jerry Klemm of the Lewiston Chamber of Commerce, beginning in May 2008, to discuss long-term resolution of LOP issues. Discussion during these meetings culminated with a Memorandum of Understanding (MOU) concerning the LOP. The MOU was executed in July 2009 by LOID, the Nez Perce Tribe, the City of Lewiston, Lewiston Chamber of Commerce, and Nez Perce County. Although the MOU, provided in **Appendix A**, is not a legally binding document, it sets forth the direction and fundamental concepts the LCEP partners intend, in order to solve the water issues including water quality, quantity, and reliability, as well as other implications of the LOP and its present location on the Nez Perce Reservation, ESA, watershed, and habitat impacts. The three core project objectives of the MOU concept were to permanently resolve:

1. LOID water quantity and quality problems
2. ESA problems surrounding the LOP
3. Federal-Tribal Trust problems surrounding the LOP as a result of its predominant location on the Nez Perce Indian Reservation.

Concurrently with the mediation process, NMFS completed the 2010 Bi-op for operation and maintenance of the LOP. Within the 2010 Bi-op, NMFS summarized a proposed action for operation and maintenance of the LOP and established minimum stream flows in the watershed, including Sweetwater and Webb Creeks. The Tribe challenged the validity of the new Bi-op and filed suit in August 2010 under the ESA. Under the new case, the parties engaged in preliminary mediation, and in December 2010 agreed to a three-year stay of pending ESA litigation to allow for collaborative efforts to permanently resolve LOP issues and disputes. This RWSP appraisal investigation is the first step in that process.



### 1.2.3 RAMIFICATIONS OF NO ACTION

The ramifications of continued operations of the LOP through no action are extensive, consisting of direct consequences such as continued litigation over the project and unexploited opportunities to improve conditions within the District. These unexploited opportunities are based on intrinsic characteristics of water supply from the LOP. The items present unexploited opportunities to improve service within the District, and issues that remain under the No Action Alternative:

- **Weed Dispersal** – Open water surfaces present in LOP reservoirs and the gravity conveyance system create increased potential for weed dispersal within the District as seeds are collected within the open water surfaces and conveyed to the District.
- **Chemical Dispersal** – Open water surfaces present in LOP reservoirs and the gravity conveyance system create increased potential for chemical dispersal within the District. This potential is created via agricultural application of herbicides and pesticides adjacent to LOP components.
- **Public Contact** – The potential for public contact and human ingestion is high, as the District has no control over how constituents utilize water supplied from LOP.

Other study sections provide descriptions of the No Action Alternative water delivery system to provide needed quantities of water to LOID, to meet urgent present demand and rational projected future needs. Climate change impacts on no action watershed water supplies, timing, and rain/snow composition, are occurring already and are projected to continue in the future in ways that add to the risks and uncertainties of the No Action Alternative under this project and study.

Litigation and legal/political risks due to the location of the LOP on ESA designated critical habitat for ESA listed Snake River steelhead, and predominantly on the Nez Perce Reservation, with direct adverse impacts to the Reservation and the Nez Perce Tribe, present a significant portion of the risks and uncertainties of the No Action Alternative under this project. As to the ESA, this Study is being conducted during a three-year stay of litigation in the Idaho Federal District Court, involving a case brought by the Nez Perce Tribe against NOAA Fisheries and Reclamation over compliance of the LOP with Section 7 of the ESA. The Nez Perce Tribe has indicated that the following is a partial list of additional legal violations it believes arise from the location and operation of the LOP that the Tribe is willing to disclose at this point in time as a matter of describing the risks and uncertainties of the No Action Alternative under this project and appraisal study:

- **Breach of Trust Claims** – arising out of the fiduciary obligation of the United States and its agencies to federally recognized Indian tribes – against the United States and relevant agencies, for allowing the operation, under federal acquisition and ownership, of the LOP on and adjacent to the Nez Perce Reservation to harm the Tribe and its members, their health and welfare, natural resources, cultural resources, and religious practices.
- **Trespass Claims** – based on any missing rights of way required of the LOP under the 1947 Federal Contract with LOID, or otherwise.
- **Violation of the Religious Freedom Restoration Act** – for operations and water diversions of the LOP that physically interfere with Nez Perce time-immemorial religious practices in the Sweetwater watershed that are inextricably based on water.

#### **1.2.4 LCEP ORGANIZATION**

The LCEP group originated in the Klemm meetings and subsequent 2009 LCEP MOU. The LCEP MOU partners formed the core project collaborators, but were joined at monthly meetings and in open participation by a larger group of Clearwater regional stakeholders, and by political office representatives from the Idaho Federal Delegation and Regional State Legislators. Following successful grant application in September 2010 under Reclamation’s RWSP, the LCEP MOU partners, as well as other regional Clearwater stakeholders, met together with Reclamation as part of the study over a series of workshops, to identify and select potential alternatives to replace the LOP. The workshops were scheduled as follows:

- October Workshop – Establish Plan of Study
- November Workshop – Identify Objectives and Constraints
- December Workshop – Identify Alternatives and Evaluation Criteria
- February Workshop – Alternative Screening
- April Workshop – Alternative Selection

#### **LCEP ORGANIZATION AND DISCUSSION AUTHORITY**

The LCEP group for purposes of this Study was distinguished into two Stakeholder categories, with decision making authority as described by the following. Although the following entities were invited to attend LCEP workshops, the following lists do not indicate involvement, support, or opposition to this Study.

- Key Stakeholders – The Key Stakeholders were defined as the signatories of the 2009 LCEP MOU, and represent the driving force behind the appraisal investigation. The Key Stakeholders held decision making authority in the process.
  - City of Lewiston
  - Lewis Clark Valley Chamber of Commerce
  - Lewiston Orchards Irrigation District (LOID)
  - Nez Perce County
  - Nez Perce Tribe

Since the MOU was signed, the Lewiston Chamber of Commerce merged with the Clarkston Chamber of Commerce to form the Lewis Clark Valley Chamber of Commerce, serving the regions of Lewiston, Idaho and Clarkston, Washington.

- Stakeholders – Stakeholders represent both public and private interests in the lower Clearwater region that may be impacted by decisions of the LCEP. The Stakeholders did not hold decision making authority, but were encouraged to participate and provide input for consideration during the process.
  - Federal Agencies:
    - Bonneville Power
    - Bureau of Reclamation
    - Bureau of Indian Affairs (BIA)
    - Corps of Engineers
    - Elected Officials
    - Environmental Protection Agency (EPA)
    - National Oceanic & Atmospheric Administration (NOAA)
    - US Fish & Wildlife Service
  - State/Local Government:
    - City of Lapwai
    - District 7 Lawmakers
    - Idaho Department of Agriculture
    - Idaho Department of Environmental Quality (DEQ)
    - Idaho Department of Lands
    - Idaho Department of Water Resources (IDWR)
    - Idaho Fish & Game
    - Idaho Governor’s Office
    - Idaho State Historical Society
    - Office of Species Conservation (Governor’s Office)
  - Special Interest Groups:
    - Friends of Clearwater
    - Idaho Conservation League
    - Idaho Rivers United

- Northwest Power & Conservation Council
  - Trout Unlimited
  - University of Idaho – Waters of the West
- Commercial Entities:
  - Clearwater Paper
  - Clearwater Power
  - Avista Utilities
- Private Landowners:
  - Burt Teats
  - Private Landowners Adjoining the Lewiston Orchards Project
  - Schaub Ranch

The nature of the LCEP core project purposes lends itself additionally to the identification of two primary Stakeholders, the Nez Perce Tribe and the Lewiston Orchards Irrigation District. Decisions which did not satisfy the needs of these entities were not considered viable as they would by definition fail to meet one or more core project purposes. The remaining Key Stakeholders did not have issue with the preferred direction of the NPT and LOID. Therefore, unanimous consensus was the decision process utilized by the Key Stakeholders during the appraisal investigation process.

## PUBLIC INVOLVEMENT

Transparency is important to the LCEP group, as it recognized the importance of public participation to the process. A formal request for participation was sent to each identified Stakeholder. An example letter is included in **Appendix B**. A project website, available to the public, provided a library of project summary information. Finally, a press release was issued to notify the general public of the process, and to invite comment.

## 1.3 PLANNING OBJECTIVES

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The MOU establishes the objective of the LCEP Appraisal Investigation as one to explore and pursue the potential of constructing a water delivery system to provide the following three core project objectives:

- Creation of a reliable, quality water supply for the LOID.
- Permanent resolution of the Endangered Species Act issues surrounding the LOP.
- Permanent resolution of Federal-Tribal Trust issues surrounding the LOP.

### **1.3.1 RELIABLE, QUALITY WATER SUPPLY**

The first issue targeted by the MOU and therefore this Appraisal Study, is the creation of a reliable, quality water supply for LOID. The District currently lacks this supply for reasons including the following:

- Climatic impacts within the Craig Mountain watershed, including changes in annual snowpack and surface runoff that correlate with insufficient volume of supply to the District.
- Minimum ESA stream flows within Sweetwater and Webb Creeks, established in the proposed action of the 2010 Bi-op.
- Subsequent ESA litigation over the 2010 Bi-op currently on hold pending completion of this Study.
- Canal delivery limitations.
- Reservoir storage limitations on Mann Lake associated with the Safety of Dams Act that regulates maximum pool elevations, reducing reservoir capacity from 3,000 acre-ft. Reclamation has raised this restriction in 2010 for an operational monitoring period to allow 2,440 acre-ft (1804' elevation) of storage.

### **1.3.2 PERMANENT RESOLUTION OF ESA ISSUES ASSOCIATED WITH THE LOP**

Definition of permanent resolution of ESA issues surrounding the LOP is a sensitive issue due to recurring ESA litigation between Reclamation, NMFS and the Nez Perce Tribe, including most recently the 2010 Bi-op, for which litigation has been stayed by mutual agreement of the parties for a three-year period specifically to allow time for analysis and processing of the LCEP and alternatives through the RWSP. The following sections summarize each entity's position regarding this issue to ensure clear representation with this Study.

#### **NEZ PERCE TRIBAL DEFINITION REGARDING ESA ISSUES AND THE LOP**

The Nez Perce Tribe's position is that present and long-term adverse effects of the LOP on ESA listed Snake River steelhead, and on ESA designated critical habitat for that species, within the lower Lapwai Creek/Sweetwater watershed, represents an unacceptable status quo. The Tribe further emphasizes that the year-round cool water source offered by Sweetwater Springs is a unique thermal refuge for fish within the lower Clearwater River Basin watershed, and as a result is a critical and natural climate change resource, making the lower Lapwai Creek/Sweetwater watershed a particularly significant watershed restoration opportunity. The Nez Perce Tribe's position is that only the removal of the LOP from its present location in that watershed, as a federal action within the meaning of ESA Section 7, will provide permanent resolution of ESA issues surrounding the LOP (December Workshop). (The Tribe also

notes that the LOP diverts water from Captain John Creek, a tributary of the Snake River rather than the Clearwater River, though in lesser amounts and with less watershed impact.)

#### **BUREAU OF RECLAMATION DEFINITION REGARDING ESA ISSUES AND THE LOP**

Reclamation also recognizes the impact of the LOP on threatened Snake River Steelhead, and sees resolution of associated ESA issues as operations in accordance with the proposed action described in the 2010 Bi-op.

#### **LCEP DEFINITION REGARDING ESA ISSUES AND THE LOP**

Despite disagreement between the Tribe and Reclamation regarding resolution of the ESA issues associated with the LOP, it was mutually agreed that for the purpose of the process, each entity would accept a universal “LCEP” definition to move the project forward. The following excerpt from the MOU is restated here as that definition:

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*The streams affected by the LOP include Sweetwater Creek, Webb Creek, and Lapwai Creek, which provide critically important habitat for the Snake River Steelhead. Snake River Steelhead have been listed as threatened under the Endangered Species Act (ESA) since 1997 and the affected watershed also has been designated as a critical habitat for Snake River Steelhead under the ESA. Snake River Steelhead are of extraordinary cultural importance to the Nez Perce Tribe and its members. Due to the unique thermal flows of Sweetwater Springs, Sweetwater Creek is one of the most important Steelhead tributaries in the lower Clearwater River Subbasin.*

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As noted in the 2010 Bi-op, the LOP also diverts water in lesser amounts from Captain John Creek, a tributary of the Snake River. For purposes of this Study, permanent resolution of ESA issues associated with the LOP is defined as discontinued use of all facilities upstream of the Mann Lake canal inlet and replacement with a water supply system from a different water source.

### **1.3.3 PERMANENT RESOLUTION OF FEDERAL-TRIBAL TRUST ISSUES ASSOCIATED WITH THE LOP**

The definition of Federal-Tribal Trust issues associated with the LOP is described within the MOU:

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*The Nez Perce Tribe is concerned, and has been since the Federal government assumed ownership and control of the LOP on and adjoining the tribe’s Reservation, impairing water resources on the reservation, tribal fisheries, and Nez Perce cultural and religious uses of water, that the trust duty of the United States to the tribe has*

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*not been met. The tribe perceives this MOU and the objective described as an opportunity for the United States to fulfill that duty.*

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The NPT clarified during the appraisal process that any alternative which utilizes the LOP's gravity conveyance system primarily located on the Nez Perce Reservation, with its consequent impacts on the Nez Perce Tribe, its Reservation, and Nez Perce people, fails to permanently resolve Federal-Tribal Trust issues surrounding the LOP (December Workshop).

## 1.4 SCOPE OF WORK

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The scope of work for an appraisal investigation is generally defined by 43 CFR 404 as, "An analysis of domestic, municipal, and industrial water supply problems, needs and opportunities in the planning area, primarily using existing data... The purpose of an appraisal investigation is to determine if there is at least one viable alternative that warrants a more detailed investigation through a feasibility study." (43 CFR 404.2) Further, the "Reclamation Manual Directives and Standards" sets forth standards for coordination, consultation, and appraisal investigation content which have been incorporated into this Study.

### 1.4.1 RELATED STUDIES

Documentation relating to the LOP is extensive, dating back to the 1947 Federal Contract between LOID and Reclamation. The following list is not inclusive of all documentation since that period, but instead represents an inventory of the most pertinent reports to this Study, and therefore those most heavily referenced:

- Reclamation Website – Lewiston Orchards Project
- 1947 Contract between LOID and the United States through Reclamation
- 1972 Lewiston Orchards Irrigation District Engineering Report, Source of Supply Comparison – Hoffman and Fiske Consulting Engineers
- 1978 Lewiston Orchards Irrigation District Feasibility Report – Concrete Lining and Siphon Sweetwater Canal Clearwater River Pumping Plant and Pipe Line Two Million Gallon Storage Supply Main from Mann Lake – R.W. Engineering, Lewiston, ID
- 1992 Lewiston Orchards Irrigation District, Alternative Irrigation Water Supply Evaluation – Morrison Knudsen Corporation
- 2000 LOID Irrigation System Report – Carollo Engineers

- 2001 City of Lewiston and Lewiston Orchards Irrigation District, Water System Regionalization Study Phase III – Carollo Engineers
- 2009 LOID Clearwater Irrigation Pumping Station Study – J-U-B ENGINEERS, Inc.
- 2010 Biological Opinion – NMFS
- 2010 Biological Assessment – Reclamation

These reports are also supplemented with additional information from the Nez Perce Tribe, LOID, and Reclamation.

## 1.5 STUDY ORGANIZATION

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This Study is organized by the following sections:

**Executive Summary** – The Executive Summary captures the essence of the study and is written to provide a brief synopsis of the study conclusions and recommendations.

**Chapter 1 – Scope and Purpose** – The introductory chapter includes information on the regulatory process and requirements, project history, planning objectives, and the scope of work.

**Chapter 2 – Study Area and Project History** – Discussion within this section includes an inventory of social and economical, District, and environmental characteristics.

**Chapter 3 – Study Formulation** – This chapter begins with a process description utilized to brainstorm, screen, identify, and ultimately select the alternatives recommended for feasibility study.

**Chapter 4 – Technical Analysis** – Each of the identified alternatives are analyzed with respect to design criteria to establish preliminary sizing and a baseline for the economic analysis.

**Chapter 5 – Alternative Evaluation** – Each of the identified alternatives will be reviewed with specific respect to Reclamation evaluation criteria established per section 404.44 of the Rule. An evaluation of Net Economic Development (NED) is included for each alternative.

**Chapter 6 – Conclusions and Recommendations** – This Study concludes with a discussion of the alternatives that best meet the planning objectives.



## 2 STUDY AREA AND PROJECT HISTORY

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The study area is bounded by the Snake River to the west, Clearwater River to the north, Captain John Creek to the south, and the Lapwai Creek watershed on the Nez Perce Reservation to the east. LOID's service area is located near the confluence of the Clearwater and Snake rivers. The study area and LOID service area are delineated in **Figure 2.1**.

In general, the area is divided into two portions, the Lewiston area and the Craig Mountain watershed area, based on elevation, topography, and land characteristics. The Lewiston area is generally located north of Webb road and towards the confluence of the Clearwater and Snake rivers. This area is relatively populated and typically consists of flat, plateau type landforms. The Craig Mountain watershed area is located at the northern end of the Hells Canyon region. Highly dissected canyons are dominated by grassland slopes containing a mosaic of shrub field, riparian, and woodland habitats. The area is sparsely populated.

### 2.1 SOCIAL AND ECONOMIC CHARACTERISTICS

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The Lewiston area has a diverse cultural, social, and economic background. Interactions between Americans of European ancestry and the Nez Perce Tribe date back to the expedition of Lewis and Clark in 1805 and 1806. The City of Lewiston was founded in 1861, as a trade center serving the area gold rush on the Nez Perce Reservation.





The Snake River has always been a major transportation corridor in the area, providing linkage between the Inland Northwest and the Pacific Ocean via the Columbia River. A series of canals constructed in 1896 and 1915 initially allowed navigation between the Columbia and Snake rivers. Navigation to Lewiston was improved between 1961 and 1975 with construction of the Lower Snake River Project and a series of four dams that earned Lewiston distinction as Idaho's only seaport.

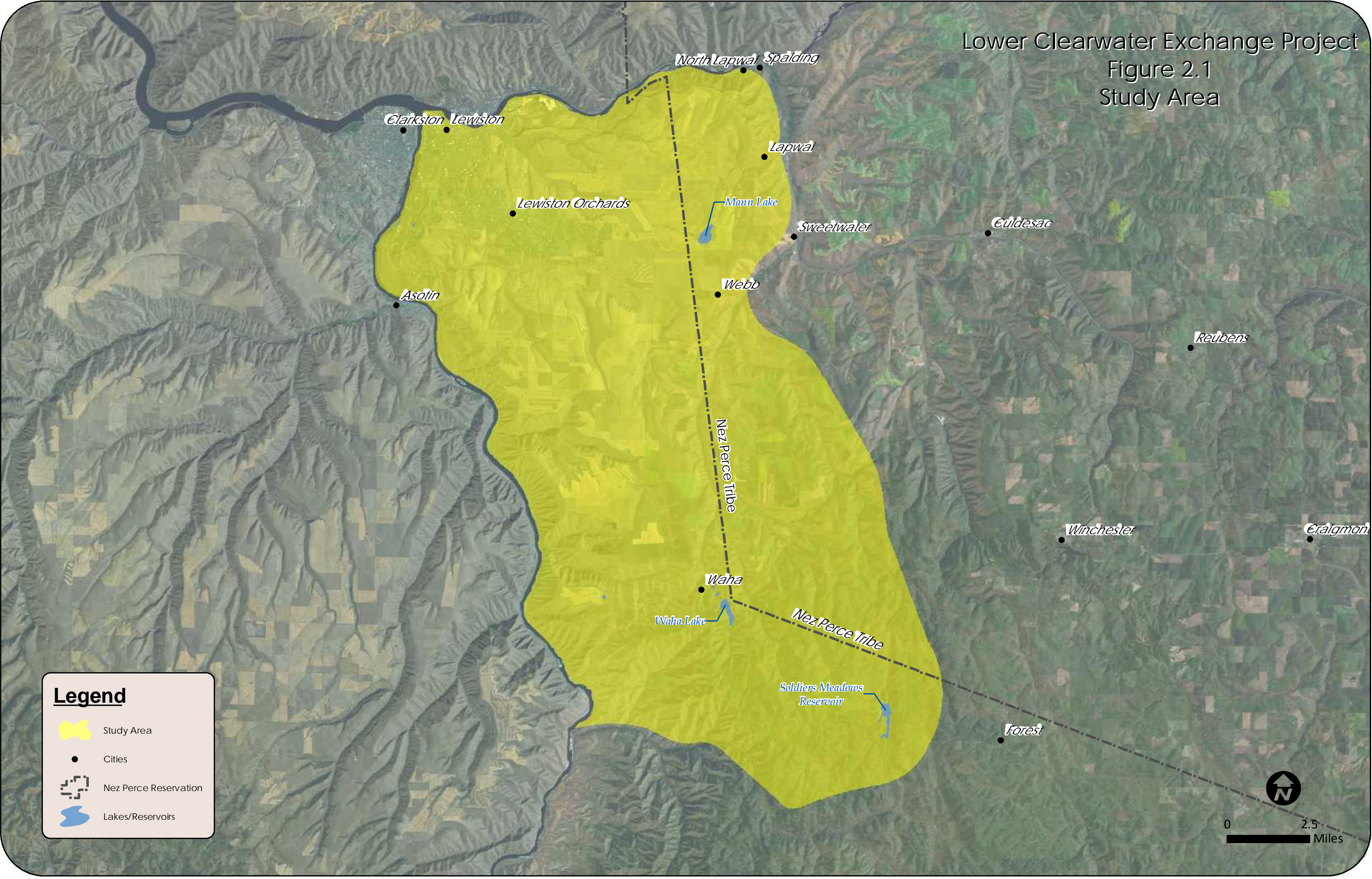
The City is one of four communities within the Quad City (Pullman, WA, Moscow, ID, Lewiston, ID and Clarkston, WA) population center. The area is a shopping district for rural communities ranging from Kooskia and Grangeville, Idaho to the Wallowas in Oregon.



Lower Clearwater Exchange Project  
Figure 2.1  
Study Area

**Legend**

-  Study Area
-  Cities
-  Nez Perce Reservation
-  Lakes/Reservoirs





### 2.1.1 CULTURAL BACKGROUND

A summary of the cultural and historical relationship of the Nez Perce Tribe and its people to their aboriginal territory, and to the critical importance of fish and water within that territory, which covers all of the study area, has been provided by the Tribe based on testimony submitted by the Nez Perce Tribe to the U.S. Senate Committee on Indian Affairs, on July 20, 2004. The Nez Perce Tribe has also provided a map of this territory, given for reference in **Appendix C**.

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*Since time immemorial, the Nez Perce people, the Nimiipuu, occupied a geographic area encompassing a large part of what is today Idaho, Washington and Oregon. The territory exclusively occupied by the Nez Perce, over 13 million acres, stretched from the continental divide forming the border between Idaho and Montana in the Bitterroot Mountains on the east, to the Blue Mountains of northeastern Oregon on the west.*

*Fishing locations extended well beyond the exclusively occupied area, and throughout the Clearwater River drainage, the Salmon, Weiser and Payette River drainages to Shoshone territory; the Snake River above Lewiston through Hells Canyon; the Imnaha, Grande Ronde and Wallowa drainages in the present states of Oregon and Washington; the Snake River below Lewiston to the confluence with the Columbia River; selected areas on the Columbia River to Celilo Falls; and the Willamette River. It is estimated that at or before 1855, various bands of Nez Perce occupied upwards of 130 villages and many more seasonal fishing camps throughout the area, with a total population of 4,500–5,000.*

*The region from which the Nez Perce obtained the great bulk of their subsistence resources was the Snake River drainage basin from roughly the mouth of the Weiser River downstream to the Palouse River, including the entire Salmon and Clearwater River tributary drainages. Sources of Nez Perce subsistence included fish, roots, berries and other plant products, and deer and other game.*

*Fish comprised up to one-half of the total food supply, with game and vegetable products comprising lesser amounts. The Nez Perce developed methods for drying and storing the seasonally abundant fish and plant resources. The cold months of winter were spent by the Nez Perce people in clusters of villages located along rivers and the lower courses of streams, which provided protected conditions and more moderate temperatures, as well as a source of food as stored foods diminished.*

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*The principal fish was the salmon, including sockeye (red fish or blueback salmon), chinook (quinnat or tyee salmon), and steelhead trout. In addition, the Nez Perce caught the cutthroat trout, Waha lake trout, the sturgeon, suckers, Dolly Varden and chiselmouth and the lamprey eel. These fish were caught throughout the Nez Perce aboriginal territory, including the Snake, Salmon and Clearwater Rivers and their tributaries, including but not limited to the Minam, Wallowa, Grande Ronde, Imnaha, Weiser, Selway, Tucannon, Lochsa, South, Middle and North Forks of the Clearwater, the Little Salmon, and their tributary streams and lakes.*

*Nez Perce attention turned to fishing for anadromous species in the spring when steelhead began to run in the rivers and streams. Sockeye salmon were first available in the Snake River in June and in the Clearwater River in July. Runs of chinook followed the sockeye and reached mountain streams by September, where they were also taken by the Nez Perce. Lamprey eel—considered a Nez Perce delicacy—and sea run suckers were plentiful in the Snake and Clearwater rivers by July, with at least one major eel spawning and catching area near present-day Asotin, Washington. Steelhead returned in the fall and tribal fish harvesting activities focused briefly on upstream locations before returning to the lower rivers. Steelhead and some salmon were taken through the winter to supplement the stores of dried fish.*

*Nez Perce fishers utilized a variety of equipment and techniques, each adapted to the conditions of the water and to the species, to harvest fish and freshwater shellfish. Dip nets, thrown nets, harpoons, spears, hooks, drift nets, seines, weirs, traps, walls, and other structures were all used by the Nez Perce.*

*The first recorded contact between Euroamericans and the Nez Perce occurred in September 1805, when the Lewis and Clark Expedition encountered Twisted Hair and other members of the Nez Perce Tribe shortly after they crossed the Rocky Mountains and descended down the west side of the Continental Divide into our country.*

*The Lewis and Clark journals note the existence of many Nez Perce Indian fishing places and fishing activities. For instance, William Clark's diary entry of September 15, 1805, notes that, "[w]e set out early, the morning cloudy, and proceeded on down the right side of the KoosKooskee [Clearwater] River, over steep points, rocky and bushy as usual, for 4 miles to an old Indian fishing place." The Nez Perce were generous, providing the expedition with food and other essential provisions. Even though the expedition arrived at a time when Nez Perce fishing activity was at a*

*relatively low ebb due to the time of year, the Lewis and Clark journals record on several occasions how the Indians provided salmon and other fish, both fresh and dried, for the expedition's use.*

*Other Euroamericans, particularly missionaries and their families, had contact with the Nez Perce following the Lewis and Clark expedition, and had occasion to comment upon the Tribe's use of the abundant fishery resource. For example, on May 1, 1837, Reverend Henry H. Spalding wrote that his mission at Lapwai had received over the past two months from the Nez Perce "plenty of fresh trout [possibly steelhead], usually weighing from 8 to 10 lbs." In September of that year, he visited one of the fisheries and observed the Indians catching "202 large salmon weighing from 10 to 25 lbs. These fisheries will always be of great importance to this mission [Lapwai]." He stated that "there were probably as many taken at 50 other stations in the Nez Perce country.*

*The Nez Perce also engaged in an extensive trade network from the Pacific Coast into the Northern Plains with other Indian tribes, as well as with the early non-Indian explorers such as Lewis and Clark, and dried fish was an important commodity. Dried salmon, salmon pemmican and salmon oil were among the items traded by the Nez Perce to other groups on the Northern Plains.*

*Nez Perce culture and subsistence activities revolved around the fish—most notably salmon—and water. Simply put, Nez Perce people defined, and define, themselves in terms of their association with, and relationship to, fish and water, and other natural elements. The testimony of tribal elders, together with that of expert anthropologists, establishes the values associated with fish and water to the Nez Perce people. Fish and water are materially and symbolically essential to Nez Perce people both in the present and the past; and declines in fish and water availability, primarily due to human environmental alteration and restrictions on access, have had devastating effects on our people and their culture.*

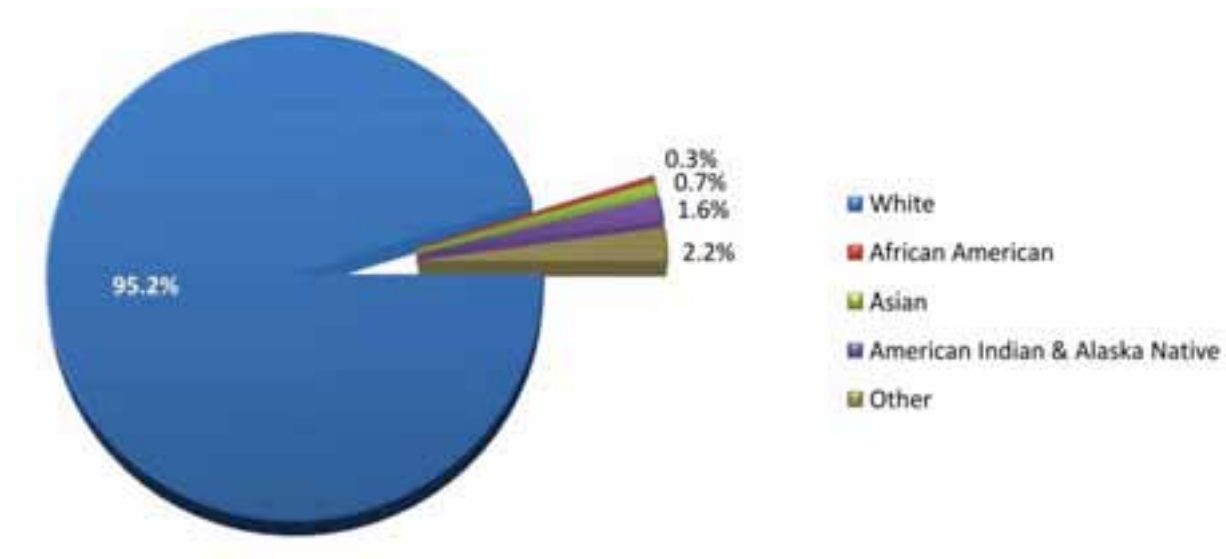
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### 2.1.2 SOCIAL AND ECONOMIC BACKGROUND

Lewiston is one of the oldest cities in the region, as well as the first capital of the Idaho Territory. Due to its long history, water and natural landforms have heavily influenced development patterns. The City has retained its historic character as the central market place of North Central Idaho.

The City of Lewiston is predominately white, as shown by the ethnicity chart given in **Figure 2.2**.

Figure 2.2 - LOID Ethnicity<sup>a</sup>



<sup>a</sup> Ethnic make-up is assumed to be consistent with the City of Lewiston.

Economic information with respect to LOID, Nez Perce Tribe, Nez Perce County, and State of Idaho is summarized from the 2000 Census in **Table 2.1**.

Table 2.1 - Economic Information

Study Area Economics					
	United States <sup>a</sup>	State of Idaho <sup>a</sup>	Nez Perce County <sup>a</sup>	LOID <sup>a</sup>	Nez Perce Tribe <sup>b</sup>
Median Household Income	41,851	37,570	36,409	36,868	30,710
Per Capita Income	21,587	17,841	18,544	19,041	14,768
Poverty Rate	12.4%	11.8%	12.2%	11.8%	24.1%
Average Household Size	2.59	2.69	2.40	2.37	2.47
Median Home Value	119,600	106,300	105,800	106,900	84,600
Unemployment Rate	9.3% <sup>d</sup>	8.0% <sup>c</sup>	6.2% <sup>c</sup>	6.1% <sup>c</sup>	27.4%

<sup>a</sup> Source: US Census Bureau. Census 2000 Summary File. Accessed 9 March, 2011. Data is assumed to be consistent with the City of Lewiston.

<sup>b</sup> Source: Nez Perce Tribe

<sup>c</sup> Source: Communications & Research, Idaho Department of Labor, 2009 Data. July 7, 2010.

<sup>d</sup> Source: US Bureau of Labor and Statistics, 2009 Data. Accessed 22 March, 2011.

### 2.1.3 MAJOR INDUSTRIES

Lewiston's main industries are centered in agriculture, healthcare, education, and paper and timber products. According to the Valley Vision website, the major employers in the valley are as follows:

- Clearwater Paper – A major supplier of tissue products to retail grocery stores, as well as other wood products.
- St. Joseph Regional Medical Center – A local non-profit hospital.
- ATK – A bullet manufacturer for CCI and Speer, the Lewiston facility emphasizes security and sporting products.

#### 2.1.4 RECREATION

The proximity of the area to Hells Canyon and the Clearwater and Snake rivers creates an environment conducive to a variety of recreational opportunities including salmon and steelhead fishing, and big game hunting for deer and elk. In 2009, the City of Lewiston was ranked by Outdoor Life Magazine as the best place to live in the nation for hunters and anglers.

## 2.2 DISTRICT CHARACTERISTICS

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The LOID area lies in the southern portion of the City of Lewiston. **Figure 2.3** provides a map of the District. The LOID service area is enclosed by two service boundaries: the irrigation boundary and the domestic boundary. Elevations within the District service area vary by 650 vertical feet. The LOID area encompasses a population of 18,500 inhabitants.

Under the 1947 contract between LOID and the United States through Reclamation, the irrigation boundary is static. The domestic boundary, however, is not subject to restriction from Reclamation, and may be altered by the LOID Board. At this time, although the boundaries are similar, the domestic boundary continues to expand on an annual basis.

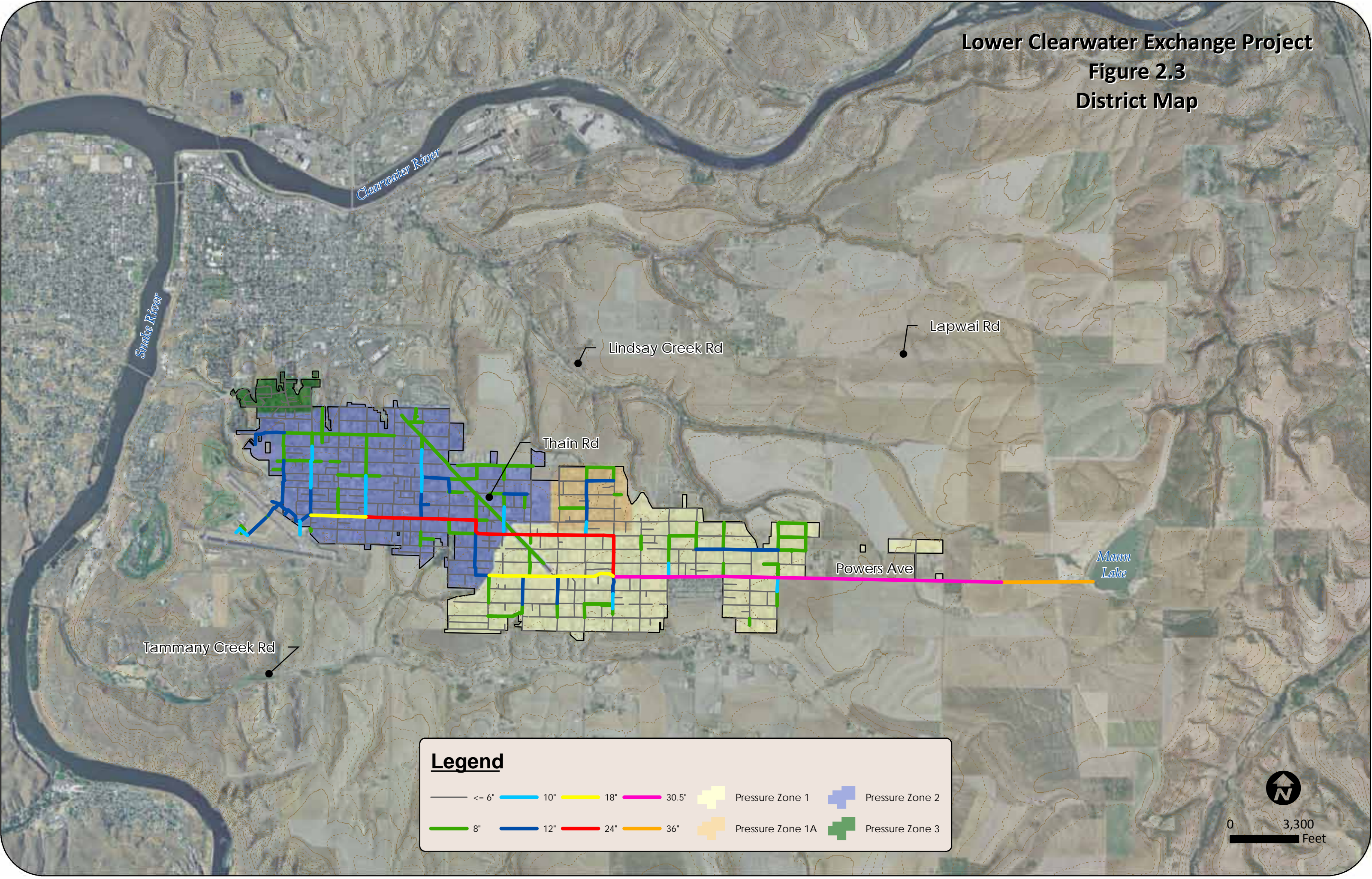
The LOID area was annexed in 1969 by the City of Lewiston, and as such, there are two separate domestic water systems within the City. LOID serves the area historically known as the “Lewiston Orchards.”

#### 2.2.1 POPULATION GROWTH AND DEMOGRAPHICS

Because the LOID irrigation boundary is static, population growth will not impact future water demands within this Study as land use is converted from agricultural to residential. Further, growth outside the District irrigation boundary will be served through the LOID Domestic System. Regardless, a presentation of population growth is helpful to understand community dynamics.



Lower Clearwater Exchange Project  
Figure 2.3  
District Map





An analysis of US Census Bureau data was conducted from 1960 to the present for the City of Lewiston and Nez Perce County. The analysis showed the areas have experienced exponential growth at an exponentially instantaneous rate ranging from 0.68% to 0.74%.

During development of the District's master plan, and following discussion with District personnel and the LOID board, an exponentially instantaneous growth rate of 0.70% is utilized to project growth based on historical patterns observed within the City of Lewiston and Nez Perce County. A graph depicting this projection is provided in **Figure 2.4**. The demographics of District growth are anticipated to mimic those within the existing service area, with predominately residential growth and negligible impact of commerce and industry.

### 2.2.2 HISTORIC WATER USE AND DELIVERY

Water demands provide a framework to understand system dynamics and pressures within existing and future infrastructure, and historical water delivery typically provides the most accurate indicator of water demands. For several reasons, however, LOID historic deliveries do not necessarily correlate with water demands:

- **Restrictions** – LOID manages available supply through water restrictions. During hot, dry years when demands are the highest, this method of managed delivery modifies use characteristics from demand to that of delivery.
- **Distribution Losses** – According to the draft LOID Irrigation Master Plan, the system experiences widespread low pressure issues during peak hour demands. A pressure drop during this period of 30 - 40 psi is correlated with the 30.5-inch transmission main on Powers Avenue from the Filter Plant to 22<sup>nd</sup> Street. As flows increase during high delivery periods to meet peak hour demands, headloss in this vicinity increases to 8-feet per 1,000-feet. This headloss is well above typical design guidelines of 5-feet per 1,000-feet, and results in a system "Bottleneck".

Until these issues are addressed the application of historical delivery as water demand should be made with extreme caution.

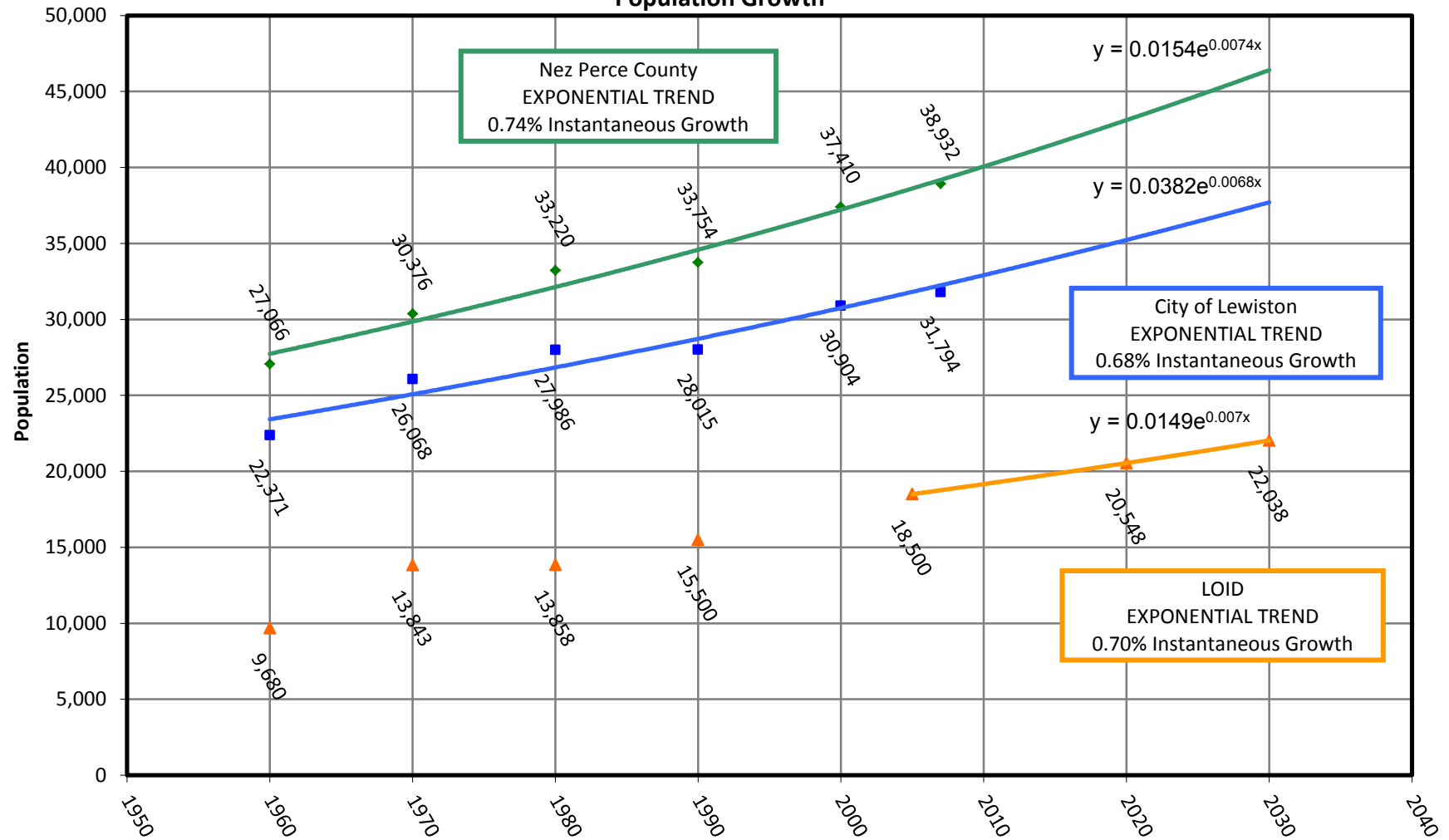
This Study utilizes historic water delivery records and SCADA (Supervisory Control and Data Acquisition) information provided by LOID to develop delivery trends for the irrigation system. The following terms are used to define water delivery:

**Average Day Delivery (ADD)** – The average volume of water delivered per day as calculated over the course of a year.

# Lower Clearwater Exchange Project

Figure 2.4

## Population Growth



**Maximum Day Delivery (MDD)** – The maximum daily volume of water delivered on an annual basis.

Maximum day and average annual data from the LOID filter plant flow meter from 1993-2010 is summarized by **Figure 2.5**. The meter is located on the discharge side of Mann Lake prior to distribution, and therefore represents system usage and pipe leakage, but not evaporation or seepage losses from Mann Lake or other LOP components such as open canals.

A maximum day diurnal curve is also provided by **Figure 2.6**. The curve was developed based on five-minute data provided by LOID from June 29, 2008 to coincide with the maximum day delivery. The observed diurnal curve provides a graphical representation of instantaneous flows recorded at the filter plant meter. The curves generally show a late night peak followed by a decrease in delivery and a second peak in the early morning. This shape correlates with typical irrigation patterns, where highest delivery occurs as residents begin handset irrigation after the work day, followed by decreased delivery during the midnight hours when automatic sprinkling is most prevalent. The second peak correlates with handset sprinkling in the early morning hours, followed by daytime lows during periods of minimal delivery.

LOID has historically utilized water restrictions to manage available supply during the irrigation season. Restrictions are implemented on an “As needed” basis based on remaining storage volumes. The benefits of restrictions are two-fold:

- **Supply Management** – Restrictions allow the District to conserve water during peak demand periods to extend the irrigation season.
- **Pressure Management** – The Powers Avenue mainline is characterized by high headloss during periods of peak demand. This headloss correlates with low pressure issues in the higher elevations of each pressure zone. Restrictions allow the District to manage system pressures by limiting flows during peak demand periods.

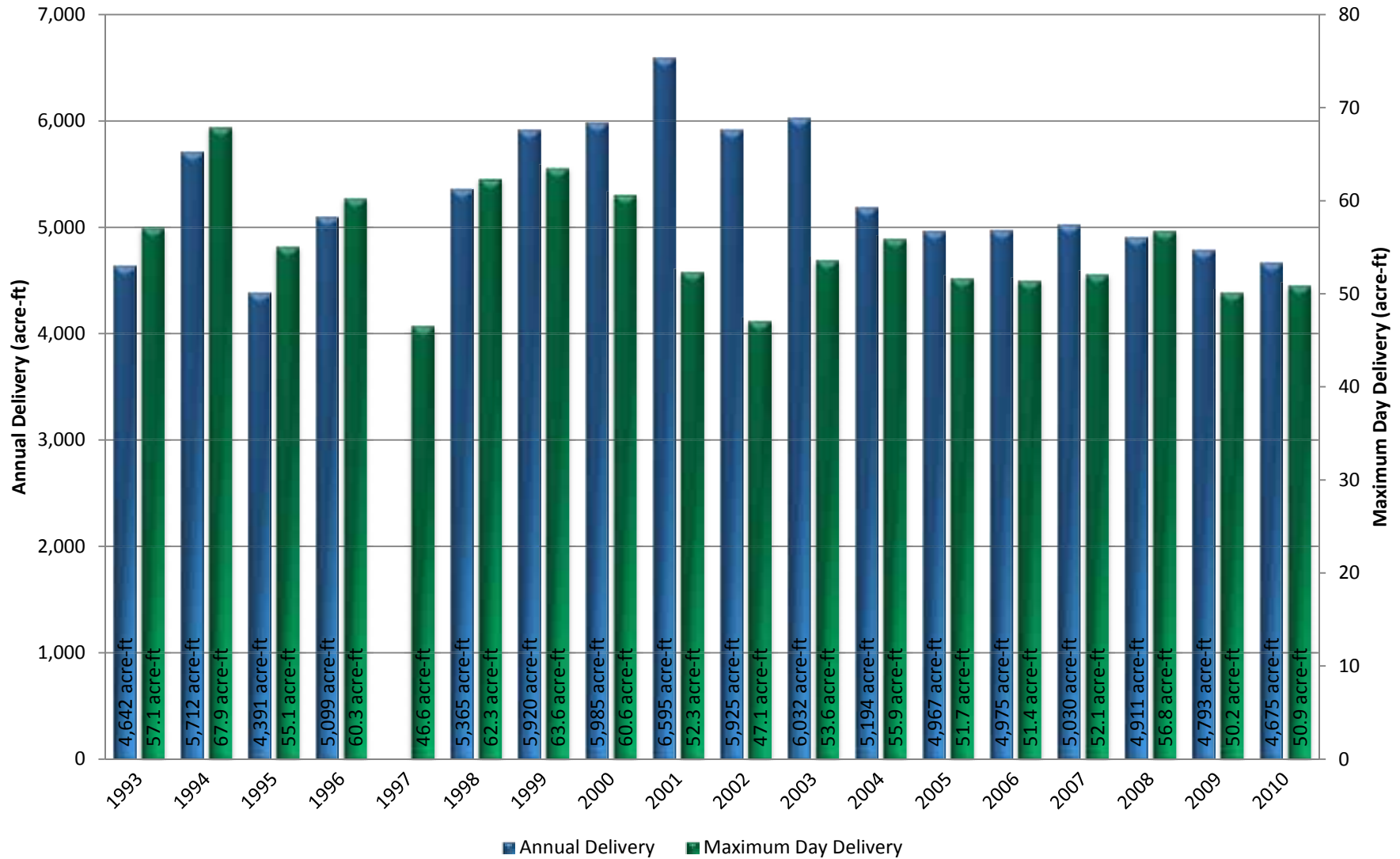
### 2.2.3 UNACCOUNTED WATER

Unaccounted water is commonly associated with the following:

- Authorized Fire Hydrant Use
- Flushing of Lines

# Lower Clearwater Exchange Project

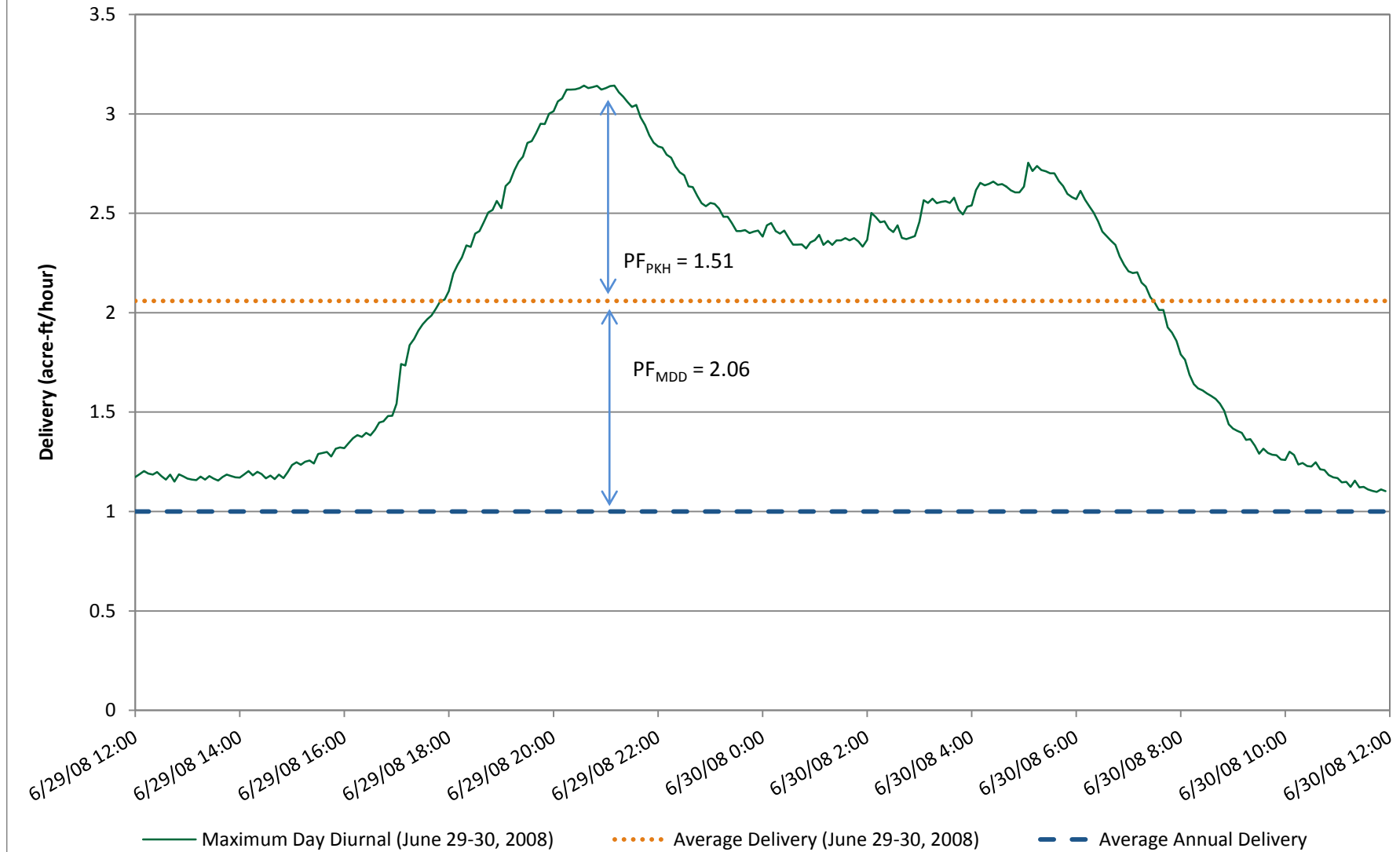
Figure 2.5  
Historical Delivery



# Lower Clearwater Exchange Project

Figure 2.6

## Maximum Day Diurnal Curve



- Hydrant Flow Tests
- Inaccurate Meters
- Distribution System Leakage
- Seepage and Evaporation from Open Reservoir Storage and Canals

The District currently meters nearly 20% of irrigation services, and as such, unaccounted water cannot be assessed for the system. The LOID irrigation system was installed prior to the domestic system, and it could be reasonably assumed that unaccounted water is greater than that observed on the domestic system for the following reasons:

- No financial incentive for residents to repair irrigation service leaks, as they are not charged on a unit basis.
- No ability for LOID operators to pinpoint leaks based on metered usage.

On the long term, LOID is moving forward to address these issues and anticipates an overall reduction in unaccounted water. Irrigation meters are being installed on an annual basis in an effort to meter the entire system. Even with these efforts, due to additional losses at Mann Lake associated with evaporation and leakage, it is unlikely that losses will be less than those observed in the domestic system, which has ranged from 15-20% in recent years.

#### **2.2.4 WATER CONSERVATION ACTIVITIES**

The District has been proactive to encourage water conservation throughout the service area as required to manage limited supply. The District has historically conserved water through the use of restrictions to limit periods residents are allowed to irrigate. In addition, the District promotes methods such as Xeriscaping and Water Wise landscaping, and provides presentations on installation and use of drip irrigation systems. Information regarding methods to match irrigation with the consumptive use of turf grasses is distributed to residents every year at the start of the irrigation season.

### **2.3 ENVIRONMENTAL CHARACTERISTICS**

Environmental characteristics of the study area help provide an understanding of the impacts of the LOP on its surroundings, as well as a framework of available resources to meet the needs of LOID patrons.

### 2.3.1 CLIMATE

The climate of the project area is heavily influenced by prevailing westerly winds and the Cascade and Rocky Mountain ranges. These winds influence most weather systems crossing the area (USACE 2002). The weather of the Lewiston area is relatively mild due to the City's low elevation and situation within the Clearwater and Snake River Valleys. The area is often referred to as the "Banana Belt" due to its mild winter climate. Based on a period of record from 1948-2010, average extreme temperatures range from a minimum of 42.5°F to a maximum of 63.2°F. Average annual precipitation is 12.8 inches (Western Regional Climate Center 2011).

The climate within the Craig Mountain watershed is more extreme, and reflective of higher elevations in the area. The most representative weather station for the area is located in Winchester, Idaho, approximately eight miles northeast of Soldier's Meadow Reservoir. Based on a climate summary from 1961-1990, average extreme temperatures range from a minimum of 32.9°F to a maximum of 56.3°F. Average annual precipitation is 25.6 inches (Western Regional Climate Center 2011).

The 2010 Bi-op documents an, "Apparent shift in climate conditions toward lower snow packs and hot, dry summers," in the area. The Bi-op also discusses that winter precipitation has shifted in recent decades from predominately winter snow to a higher percentage of winter rainfall, characteristic of changing precipitation patterns in the Pacific Northwest.

In April 2011, Reclamation published a report, "Reclamation Climate Change and Water" to assess risks develop mitigation strategies to ensure sustainable water resources management in light of global climate change. Within the report, Reclamation references work completed by Pacific Institute in 2009 and states that, "Agricultural lands requiring irrigation may increase by up to 40% due to climate change, and livestock water demands will increase significantly (Reclamation, 2011d).

### 2.3.2 WATER RESOURCES

Water resources are abundant within the project area, which lies within the lower Clearwater River Basin, of which the Craig Mountain watershed is a part; in close proximity to the Snake River; and above the Lewiston Basin Aquifer. The following sections will review supply, quality, and water rights of each of these sources.

### CRAIG MOUNTAIN SURFACE WATER RUNOFF

The particular watersheds of concern within respect to the LOP within the Craig Mountain watershed are the lower Lapwai Creek watershed, of which Sweetwater Creek (including Sweetwater Springs) and Webb Creek form a part, and the Captain John Creek drainage. The Sweetwater Creek watershed includes Webb Creek and drains the north face of Craig Mountain and flows north to meet Lapwai Creek near the town of Sweetwater, ultimately flowing to the Clearwater River near Spaulding. The Sweetwater Creek drainage is approximately 84 square miles and roughly 30% of the Lapwai Creek drainage (Bi-op 2006). The Captain John Creek drainage is approximately 20 to 25 square miles (Bi-op 2006). The creek flows over a natural falls approximately six miles from the mouth of the creek at the Snake River which prevents upstream fish migration.)

Reclamation holds several water rights in the Sweetwater watershed, summarized in **Table 2.2**. Early established water rights on the Project were adjudicated by the 1916 Siegrist Decree. In 1948, LOID deeded its water rights to the United States, pursuant to LOID's repayment contract with Reclamation. Reclamation holds state water rights for the LOP and complies with the state's administration of water rights, pursuant to Section 8 of the 1902 Reclamation Act. Project water rights are a combination of storage rights and instream flow rights. All of the water rights together are limited to the irrigation of a combined total of 3,848 acres in a single irrigation season. Although water rights are technically sufficient to meet Reclamation's contract with LOID to deliver 2.2 acre-ft of water within the District boundary, LOID is not provided with water sufficient to meet its needs due to several issues including:

- Endangered Species Act issues arising from listed species and designated critical habitat in the LOP area.
- LOP system reservoir and canal inefficiencies and limitations.
- Shifting climate change impacts.

The 2010 Bi-op also discusses climate change as, "The largest factor in changes to the hydrology in the action area..." Spring runoff occurs earlier and faster and summer base flows are lower than they were in previous decades. The 2010 Bi-op notes that although annual LOP diversions over 25 years of record from 1973 through 2000 averaged 8,695 acre-ft, this diversion rate has dropped significantly in recent years. Records from 2003 through 2008 indicate average diversion of 6,970 acre-ft. The Bi-op attributes this reduction to, "An apparent shift in climatic conditions toward lower snow packs and hot, dry summers."



**Table 2.2 - Reclamation Water Rights**

Type	Number & Source	Priority Date	Use	2010 Settlement Quantity	Notes
Diversion	85-00016 Sweetwater Creek	07-14-1904	Domestic Irrigation	55 cfs	This right and No. 85-04483 are limited to a total combined diversion rate of 55 cfs.
Diversion	85-02049 Waha Creek	05-26-1915	Domestic Irrigation	10 cfs	This water right and water right No. 85-02063 will be limited to a total combined diversion rate of 10 cfs.
Diversion	85-02063 Waha Creek	08-24-1923	Domestic Irrigation	10 cfs	This water right and water right No. 85-02049 will be limited to a total combined diversion rate of 10 cfs.
Diversion	85-02065 Webb Creek	01-30-1924	Domestic Irrigation	19 cfs	The period of use for irrigation water is limited to the irrigation season.
Diversion	85-02147 Captain John Creek	12-04-1934	Domestic Irrigation	6.3 cfs	The period of use for irrigation water is limited to the irrigation season.
Diversion	85-11087 West Fork Sweetwater Creek	05-26-1915	Domestic Irrigation	20 cfs	The period of use for irrigation water is limited to the irrigation season.
Storage	85-02146 Soldier's Meadow & Webb Creek	05-24-1922	Domestic Irrigation	2,000 acre-ft/year	The period of use for irrigation water is limited to the irrigation season.
Storage & Diversion	85-04483 Mann Lake	06-01-1907	Irrigation Stock Water Industrial Municipal Fire	10,500 acre-ft/year (storage) 55 cfs (diversion)	This right and No. 85-00016 are limited to a total combined diversion rate of 55 cfs.
Storage	85-15424 Waha Lake	12-01-1935	Domestic Irrigation	3497 acre-ft/year	The period of use for irrigation water is limited to the irrigation season.

The LCEP multi-government stakeholder group, in selecting and agreeing to use a 8500 AF replacement water right quantity for project and analytical purposes, beginning in 2009, intended to pursue a replacement water source and water system for LOID that would not only meet present water demand, but would provide for projected future needs. The Nez Perce Tribe in particular was agreeable to the 8500 AF concept on the particular basis that it would provide for future as well as present LOID water needs, and on the basis that it would be offset in terms of impact to the mainstream Clearwater River by the protection of existing Sweetwater watershed water rights as minimum stream flows in Webb, Sweetwater and lower Lapwai Creek under a water exchange concept. This is the fundamental concept of the LCEP effort.

Water quality from the Craig Mountain drainage is typical for a surface water collection system. Minor debris and suspended particles result in turbidity, but the water is of acceptable quality for irrigation purposes.

#### CLEARWATER RIVER

The Clearwater River flows westward from the Bitterroot Mountains along the Idaho-Montana border, joining the Snake River in Lewiston. The river and its tributaries are free-flowing, with exception to the North Fork of the Clearwater, which is regulated via the Dworshak Dam and Reservoir.

Records from the USGS gauge station near Spalding, Idaho indicates average annual discharge of 14,710 cfs for the period of record from 1971 through 2010. Average monthly flows from the same period are provided in **Figure 2.7**. Average monthly temperatures range from 37.8°F in the winter months to 56.1°F in the summer.

The Clearwater River Basin is included within the State of Idaho's Snake River Basin Adjudication (SRBA). As per discussion with IDWR, water is available for appropriation from the Clearwater River (Whiting 2011).

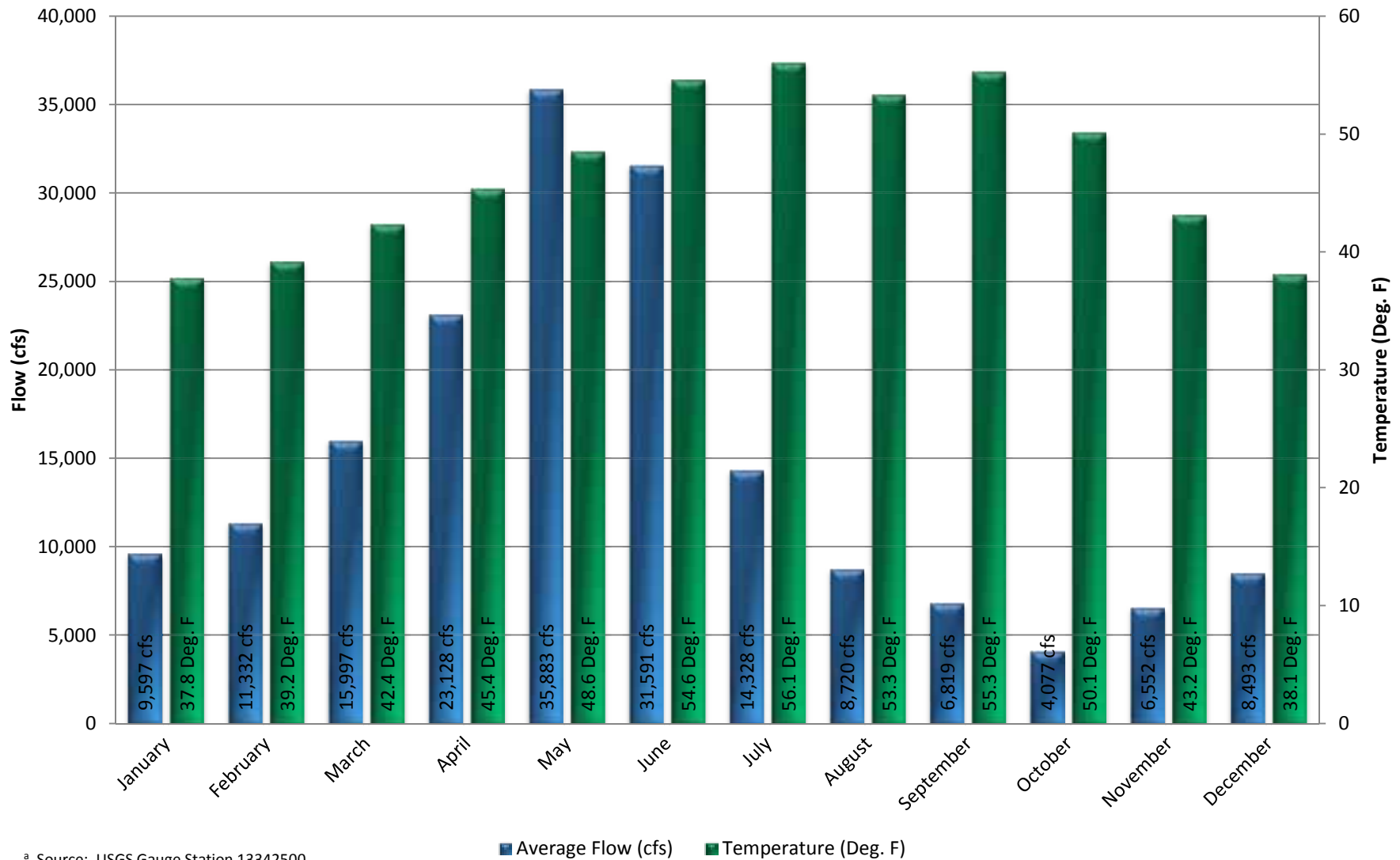
#### SNAKE RIVER

The Snake River forms the western boundary of the project area. The Snake is the principal tributary of the Columbia River, and the Lower Snake is extensively developed for hydroelectric power generation and navigation. The river is free-flowing downstream of the Hells Canyon dam to Asotin, where it meets slack water from Lower Granite Dam, the highest of the four lower Snake River dams.

Records from the USGS gauge station near Anatone, Washington indicates average annual discharge of 34,453 cfs for the period of record from 1959 through 2010. Average monthly flows from the same period are provided in **Figure 2.8**. Average monthly temperatures range from 38.3°F in the winter months to 71.6°F in the summer.

The State of Idaho's SRBA began in 1987 and includes the main stem Snake River. Per discussion with IDWR, relevant moratoriums have been lifted and water is now available for appropriation from the Snake River in the basin location relevant to the alternatives investigated in this report (Whiting 2011).

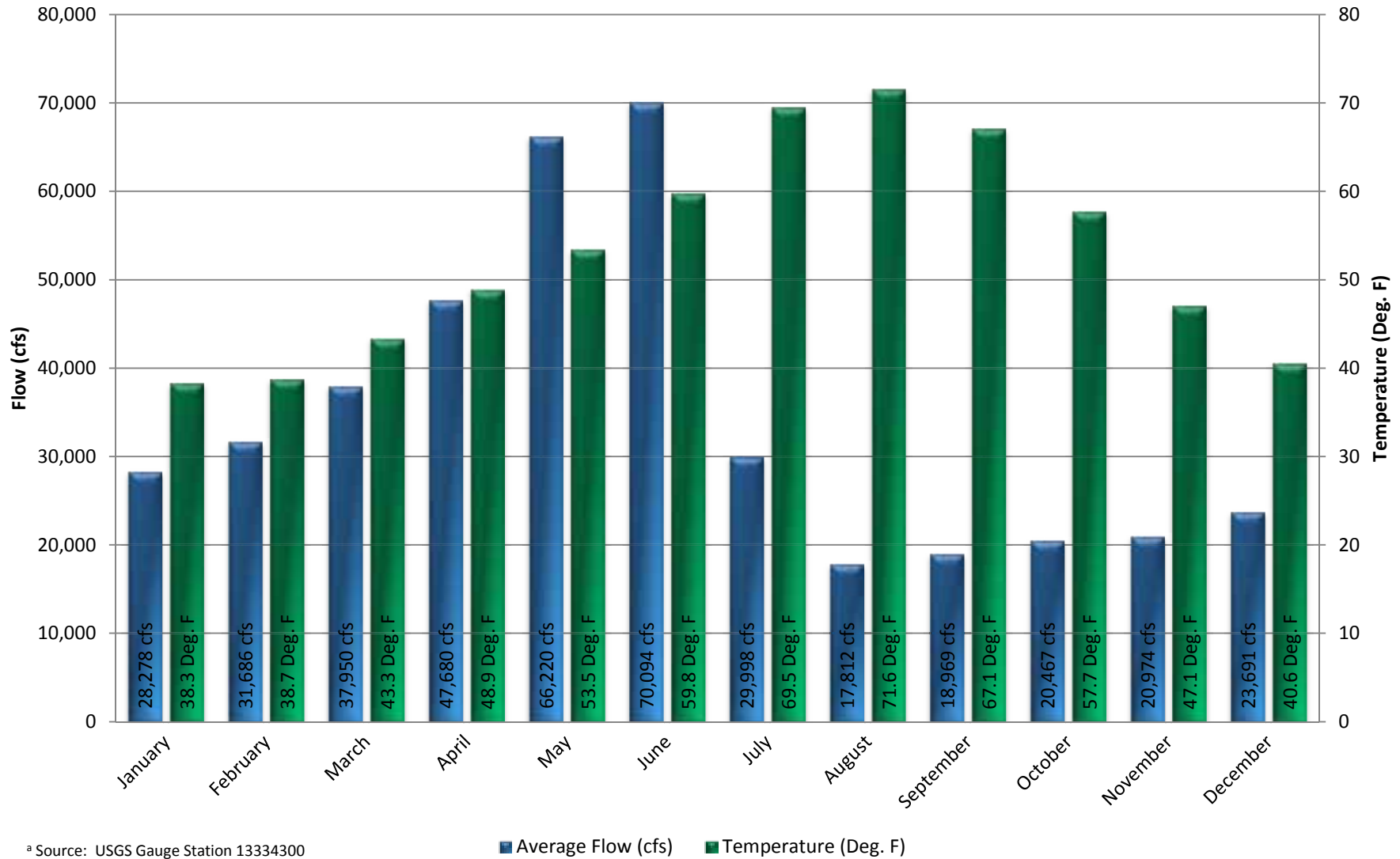
**Lower Clearwater Exchange Project**  
**Figure 2.7**  
**Clearwater River Flow Characteristics <sup>a</sup>**



# Lower Clearwater Exchange Project

Figure 2.8

## Snake River Flow Characteristics <sup>a</sup>



## GROUNDWATER

Groundwater sources from deep wells in the Lewiston area have a relatively long history of high productivity, and minimal drawdown. Extensive work by Hydrogeologist Dale Ralston has established a hydraulic connection between nearby river systems and the Lewiston Basin Aquifer (Ralston 2011).

The aquifer is relatively deep, and those wells penetrating the basin typically have a static water level elevation of 700 to 750 feet. Depending on design and construction, well drawdown can be on the order of 100 feet. Water level decline due to increased pumping within the Lewiston Basin Aquifer will likely be less than 30 feet (Ralston 2011).

The groundwater exhibits acceptable quality for domestic purposes, although hydrogen sulfide has been noted in some sources, and is associated with generally unpleasant aesthetic characteristics. Water temperatures from LOID wells are slightly elevated, ranging up to 90°F.

### 2.3.3 LAND USE

Land use within the District consists of a mixture of residential, agricultural, industrial, commercial, public, and municipal uses. Lands in the Craig Mountain watershed area affected by the LOP are owned and managed by a variety of entities, including the Bureau of Land Management, Reclamation, Idaho Department of Lands, the Nature Conservancy, and private interests. The Nez Perce Tribal ownership includes lands held in trust by the United State for the Tribe, lands held in fee by the Tribe, and lands held by individual Nez Perce Tribal members, both in fee and in trust. Agricultural lands are generally used for grazing and crop production at higher and lower elevations respectively.

### 2.3.4 BIOLOGICAL RESOURCES

Biological resources in the project area are abundant in both aquatic and terrestrial resources, largely due to sparse population density in the Craig Mountain watershed area. In general, biological resources are characterized by location within the project area and respective climates. The Craig Mountain watershed area is heavily influenced by elevation gradient, complex topography, and variable soil conditions. Those areas near the Lewiston area are typically of those associated with relatively developed communities. For this reason, the following discussion focuses on resources within the Craig Mountain watershed area.

## VEGETATION

Canyon grasslands within the Craig Mountain watershed are dominated by perennial bunch grass communities. Coniferous stands of canyon woodlands are generally dominated by Douglas fir with sporadic Ponderosa pine habitats (Mancuso 1994).

An inventory of plant species for Craig Mountain was completed by the Idaho Fish and Game Department in 1994 and identified at least 650 vascular plant species in the area, and further identified 77% of these as native.

## WILDLIFE

According to the Idaho Fish and Game website, the Craig Mountain watershed management area provides habitat to at least 133 birds, 47 mammals, ten reptiles, and seven amphibian species. The area is populated with large herds of Mule deer, Whitetail deer, and Rocky Mountain elk. Populations of black bear and mountain lions are also present in the area.

## AQUATIC LIFE

The Nez Perce Tribe's Department of Fisheries Resources Management (DFRM) completed a fish distribution analysis of Sweetwater Creek in 2004. Within the study, five species of fish were identified from 11 sites. The species included Speckled Dace (*rhinichthys osculus*), Paiute Sculpin (*cottus beldingi*), and Steelhead/Rainbow Trout (*oncorhynchus mykiss*). Of these, *o. mykiss* is a federally listed threatened species under the Endangered Species Act (ESA). The Sweetwater Creek watershed is also designated under the ESA as critical habitat for *o. mykiss*.

## 2.4 NEZ PERCE TRIBE REVIEW OF LOP IMPACTS ON THE LAPWAI CREEK/SWEETWATER WATERSHED

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The special significance of the lower Lapwai Creek/Sweetwater watershed, both from a watershed restoration perspective, and in terms of adverse status quo project effects on the Nez Perce Tribe and Nez Perce people, forms, in combination with LOID water needs, a main driver of the LCEP collaboration and of this Appraisal Study. A review of the following components provides additional background and history with respect to the LOP and Sweetwater watershed as provided to this Study by the Nez Perce Tribe:

- Cultural and Religious Significance
- Nez Perce Fisheries

- Water Resources
- Land Trust Assets

#### 2.4.1 CULTURAL AND RELIGIOUS SIGNIFICANCE

The Nez Perce Tribe has provided a direct and personal statement of the importance of the Lapwai/Sweetwater watershed from Emmit Taylor, Jr., a Nez Perce Tribal member whose family has lived in the area since time immemorial and who testified during a 2007 Federal Court proceeding regarding the importance of the Sweetwater watershed to his family and to Nez Perce people:

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*The Lapwai Creek watershed, in which Sweetwater Creek is a major tributary, historically has always been highly occupied by the Nez Perce people. A large part of the human occupation was due to the large fishery that occurred within this drainage. My family was allotted land at the mouth of Sweetwater Creek in the late 1800's and has resided there since that time. My father, uncles and many others who live on Sweetwater Creek talk about the large run of steelhead that ran up Sweetwater Creek. They always stated how they never had to go to the Clearwater River or other places such as Rapid River to catch the fish because all the fish they needed were right there in Sweetwater Creek. In Webb Creek, my 70 year old great Aunt remembers using gunny sacks to catch steelhead they were so thick.*

*Growing up I fished Sweetwater Creek extensively, catching many, many trout. Today my two oldest boys and my nephews fish the same places I did. I particularly remember the summer of 2003 when I watched them fish and there was barely a trickle of water running within Sweetwater Creek and they caught nothing. That summer landowners upstream stated they had never seen Sweetwater Creek so low and it was drying up in many places.*

*There is a great spiritual and cultural connection to Sweetwater Creek to the Nez Perce people and surrounding tribes. My father tells of how my grandmother stated the Nez Perce and tribes from all around us, including the Umatillas and Coeur d'Alenes, would travel specifically to Sweetwater Creek for its spiritual and physical healing powers. I remember as a boy witnessing my father laying in Sweetwater Creek for this very purpose. Oral history through my grandmother tells of Nez Perce people using the power of Sweetwater Creek in their medicine dances.*

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## 2.4.2 NEZ PERCE FISHERIES

The following summary from the Nez Perce Tribe discusses Nez Perce Department of Fisheries Resource Management information on the Sweetwater watershed, and the extraordinary potential benefits of watershed restoration:

*In modern times, the Nez Perce Tribe has paid particular attention to the survival and recovery needs of fish species in the Lower Lapwai/Sweetwater watershed, as that watershed represents a critical portion of the larger Lapwai Creek watershed, which the LCEP, if achieved, would significantly enhance. The cultural importance of fish species in this watershed to the Tribe, particularly anadromous species, cannot be overstated. In its modern efforts to address the needs of fish species, the Tribe has looked to the United States to honor its treaty and trust obligations to the Nez Perce Tribe, and has also used the framework and tools of federal statutes such as the Endangered Species Act (ESA) and the Northwest Power Act. The Nez Perce Tribe provided its perspective here, on the significance of the LCEP effort, through information provided by its Department of Fisheries Resource Management (DFRM) staff.*

*Hé-yey, Nez Perce for steelhead or rainbow trout (*Oncorhynchus mykiss*), are a culturally and ecologically significant resource of the Lapwai Creek watershed and comprise a portion of the federally listed Snake River Basin Steelhead distinct population segment (DPS). The majority of the Lapwai Creek drainage is federally identified as critical habitat for this DPS while also providing habitat for the federally listed Snake River Nacó'x, or fall chinook (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU). The Nez Perce Soil and Water Conservation District and the Nez Perce Tribe's DFRM, Watershed Division, are presently working on a comprehensive watershed strategy to support the continued existence of these and other aquatic species.*

*The Sweetwater watershed provides spawning and rearing habitat for the Clearwater River Lower Mainstem (CRLMA) population of the DPS. This particular steelhead population is required to achieve viable status (defined through abundance, population productivity or growth rate, population spatial structure, and life history/genetic diversity) for the DPS to be eligible for ESA delisting.*

*Precise adult steelhead abundance for this population is uncertain, but juvenile steelhead capture densities have been compiled from 2003-2009 electro-fishing surveys conducted throughout CRLMA spawning and rearing streams. Densities*



*from that section of Lapwai Creek upstream of Sweetwater and Webb Creek are among the highest recorded, with capture rates of up to 113 juvenile steelhead per 100 m<sup>2</sup>. Substantially lower juvenile steelhead densities have been recorded throughout the forty-three miles of stream habitat impacted by the LOP. The twenty-four miles of stream still accessible to steelhead are subject to greatly reduced flows and elevated summer water temperatures, while nineteen miles of stream habitat are rendered completely inaccessible by the LOP's Sweetwater Dam. The total watershed acreage presently drained by LOP-affected streams is 61,325 acres.*

*This dramatic reduction in juvenile steelhead density and quantity of habitat impaired is particularly significant in light of the unique thermal refuge functionality that would be served by Sweetwater Creek, if not for the LOP. Sweetwater Creek is fed by a large spring complex formed through subterranean discharge of Lake Waha. Prior to LOP impacts on Lake Waha, spring complex discharge was reported to range between 4.6 CFS and 6.1 CFS for the months of July to September. Recent studies have estimated that natural spring discharge during these summer months would be unlikely to fall below 3 CFS, and would potentially range as high as 10 CFS. Spring discharge water temperatures have been recorded to be relatively constant year-round, with a data range of 8.3° C to 10.6° C (46.9° F to 51.1° F). These are essentially optimal temperatures for steelhead rearing.*

*High summer water temperatures and low summer stream flows have been identified within regional fisheries inventories, watershed assessments, and subbasin assessments as being among the most significant limiting factors for steelhead production throughout the CRLMA population. There is no other spring or tributary within this population's rearing range that can provide either the high volume of cool summer flow or constant overwintering temperature that were historically provided and can still be provided, through restoration, by Sweetwater Creek. It would seem probable that the unique summer and winter refuge potential of Sweetwater Creek would allow for greater steelhead production than that currently found within the unaffected portions of Lapwai Creek; an un-diverted LOP action area thus could potentially provide among the highest rate of steelhead production within the CRLMA population.*

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### 2.4.3 WATER RESOURCES

The following summary from the Nez Perce Tribe discusses the interaction of local/regional water resources with the LOP, and the extraordinary potential benefits of watershed restoration:

*Much as discussed in the context of fisheries, the Nez Perce Tribe looks to the United States to honor its treaty and trust obligations with respect to the significant water resources existing within the Sweetwater watershed. In particular, the thermal refuge offered by Sweetwater Springs is unique within the lower Clearwater River subbasin, and offers extraordinary potential fish habitat under a successful LCEP project, and a cool water source that will only become more essential to fish survival and recovery needs as climate change alters water temperatures throughout the Columbia River basin.*

*The Nez Perce Tribe's present concerns with water resources in the LCEP project area can be captured with particular clarity by understanding the various water rights and water resource issues that were recognized, established and prioritized through the Snake River Basin Adjudication, 2004 Nez Perce Water Rights Settlement. Through that federal settlement, the Nez Perce Tribe surface and ground water rights were established throughout the lower Lapwai/Sweetwater watershed, among many other locations across the Nez Perce Reservation. These water rights, as with other on-Reservation tributary Nez Perce water rights (distinct from the Tribe's mainstem Clearwater water rights), were established through the SRBA decree with a priority date of June 11, 1855 (Nez Perce Treaty date), but with the Tribe's agreement to exercise its water rights in the tributaries without harm to water users holding priority dates prior to April 20, 2004.*

*Relevant SRBA decreed Nez Perce water rights exist as to groundwater in: West Fork Sweetwater Creek; East Fork Sweetwater Creek; Webb Creek; Sweetwater Creek; and Lapwai Creek subbasin. As to surface water, relevant SRBA decreed Nez Perce water rights exist as to: Webb Creek; West Fork Sweetwater Creek; East Fork Sweetwater Creek; Sweetwater Creek; and Lapwai Creek subbasin.*

*The SRBA decree also recognized water rights previously established under the Siegrist v. Lewiston-Sweetwater Irrigation Co. decree of June 12, 1916, which rights for the Tribe hold a priority date of June 11, 1855, with no subordination to any subsequent water rights. These rights are located in Lapwai Creek and Sweetwater Creek to serve six parcels of land on the Nez Perce Reservation. Though relatively small in total quantity, the Tribe's Siegrist water rights pose some incremental risk under certain water conditions to the water rights associated with the LOP that provide LOID's water needs, which are later in priority date.*

*The SRBA decree also established minimum stream flows, to be held by the State of Idaho in trust for the all citizens, on "B-list" streams recognized through the SRBA*

*Nez Perce settlement based on Nez Perce cultural and biological priority locations. B-list streams, unlike A-list streams which are located in relatively undeveloped Nez Perce priority locations, are located in relatively developed locations and hold minimum stream flows that are presently unsatisfied. The SRBA objective for these streams is to methodically take various restorative actions that will aid these priority streams and eventually meet the decreed minimum flows.*

*Of the eight B-list priority streams with decreed minimum flows in the Lapwai watershed, five lie within or are directly affected by the LOP: Webb Creek (14.2 CFS – 0.8 CFS seasonal); Sweetwater Creek (39.5 CFS – 4.7 CFS seasonal); East Fork Sweetwater Creek (6.5 CFS – 0.3 CFS seasonal); West Fork Sweetwater Creek (5.8 CFS – 0.3 CFS seasonal); and Lapwai Creek (209.0 CFS - 18.0 CFS seasonal). Watershed restoration objectives and measures for these critical streams – which include restoring flows, reducing stream temperatures and achieving fish passage – could be substantially met, and presently unsatisfied minimum stream flows could be substantially or entirely satisfied, though a successful LCEP effort.*

*An additional advantage of the LCEP effort is the opportunity to use the Idaho state water bank to lease or otherwise protect LOP water rights that would no longer be needed for diversion as a result of a successful LCEP effort. This would both protect those water rights from other appropriation, and could apply them to those presently unsatisfied minimum stream flows on SRBA B-list streams in the lower Lapwai/Sweetwater watershed. An additional presently unsatisfied minimum stream flow is located in the mainstem lower Clearwater River, established by the State of Idaho prior to the SRBA Nez Perce Settlement, and located between the mouth of Potlatch Creek and a point just upstream of the City of Lewiston. This minimum flow varies seasonally between 5910 CFS and 4498 CFS, and offers an additional opportunity to use the Idaho state water bank to protect LOP water rights left instream through a successful LCEP effort and simultaneously provide an incremental benefits to lower Clearwater watershed instream flow requirements.*

*A successful LCEP effort, by ending water diversions in the Sweetwater watershed, and establishing a new water right from a separate water source to provide improved water quantity and quality for LOID water needs, would have significant, cultural, and health and welfare, benefits for Nez Perce people. It would make Nez Perce treaty-based water rights recognized through the SRBA more reliable, and would therefore benefit the Nez Perce people and their water uses for all purposes, but particularly for cultural and religious purposes that have been unfulfilled for many decades as a result of the existence and operation of the LOP on the Nez*

*Perce Reservation. These cultural, and health and welfare, benefits to Nez Perce people have been recognized as a collateral benefit of the three core objectives of the LCEP effort, and as a benefit to Indian people that is recognized as significant under the federal Rural Water Supply Program Act.*

#### 2.4.4 LAND TRUST ASSETS

The Nez Perce Tribe provided a statement of LOP impacts on the Nez Perce Reservation and Nez Perce people and land trust assets. The statement is an excerpt of a letter from Nez Perce Chairman Samuel Penney provided to Bureau of Reclamation Commissioner Michael Conner on February 26, 2010:

*For the Nez Perce Tribe, the longer history of the LOP is a story of repeated and compounded injustice, from the early 20th century through today. It is typical of a pattern of resource exploitation across the West, where any natural resource an Indian tribe or its reservation may possess, once it is desired by non-Indians, is taken with the complicity and assistance of the United States, rather than being defended by the United States as the treaty-partner and trustee of the tribe. In broad summary, the LOP began with a land sale scheme based on diverting water from the Sweetwater Creek watershed on the Nez Perce Reservation to the dry bench land above Lewiston; it moved to the illegal condemnation of Nez Perce Reservation trust allotments needed for the diversion's construction works, in a state court in Lewiston in 1905-06 that had no subject matter or personal jurisdiction over the matter; "condemnations" conveniently done with no inclusion of the United States as legal owner and trustee of the allotments; to the construction of the diversion system to move scarce water from the Reservation to the planned "orchards" above Lewiston; to the fiscal failure of the original owners and assumption of the diversion system by LOID in 1922; to the fiscal incapacity of LOID to maintain the system and the assumption of the system by the United States, through Reclamation, in 1946. And through it all, the United States as the Tribe's trustee, not merely failed to rectify the legally void "condemnations" on which the LOP was and is based, but perpetuated that illegality to this day through federal ownership and operation.*

*The United States, as legal title holder to lands within the Nez Perce Reservation allotted to individual Nez Perce Indians, was obligated by law to hold those lands in trust for the benefit of individual Nez Perce Indian allottees (the beneficiaries). In 1905, non-Indian proponents of an irrigation canal for the "Lewiston Orchards" on the dry bench above Lewiston, initiated condemnation proceedings against Indian*



*trust allotments in state court in Nez Perce County. The proceedings sought to condemn lands useful for diversions works and reservoirs, specifically identified by their Nez Perce allotment number and by the name of the individual Nez Perce Indian allottees.*

*The state court lacked jurisdiction with respect to the Indian trust lands, and it lacked personal jurisdiction over the United States; further, as the legal title-holder to the lands, the United States was an indispensable party. That was the law at that time, and it was subsequently confirmed by the United States Supreme Court in *Minnesota v. United States*, 305 U.S. 382 (1939). What did the United States do to oppose these proceedings, in its role as title holder and trustee of these lands? Nothing. The state court, treating the Nez Perce allottees (including minor children) who failed to appear as being in default, proceeded to issue "findings of fact and conclusions of law" purporting to "condemn" those portions of the trust allotments desired for the diversion system.*

*The record reveals that in response to these legally void "condemnations", the Department of the Interior's Bureau of Indian Affairs (BIA) simply prepared deeds with new descriptions of the allotments. For example, the BIA, in preparing a deed for the heir of one of the allottees in 1911, simply inserted a new legal description of the allotment: "All of allotment 335...except that part condemned by the Lewiston Sweetwater Irrigation Company." In a deed BIA prepared in 1924 for a "non-competent Nez Perce allottee," that was approved by the allottee's "thumb mark," the BIA went one step further, first describing the allotment as "less 6.3 acres condemned by Lewiston Sweetwater Irrigation District December 18, 1905" and then inserting a clause that "there is reserved from the lands hereby granted a right-of-way thereon for ditches or canals constructed by authority of the United States."*

*Over time, LOID's revenue from the sale of bonds and assessment of water rates was a poor match for the maintenance expenses of the system, and in 1946, the "Sweetwater Ditch" and its storage reservoirs were transferred to and assumed by BOR on behalf of the United States, for operation as a federal irrigation project. The Secretary of the Interior was authorized by Public Law 79-569 "for purposes of irrigating lands and for purposes incidental thereto" to construct, operate and maintain the "Lewiston Orchards" project. Remarkably, the thirteen page BOR Regional Director's July 24, 1946 Report to Congress on the proposed project on which this authorization was based never once mentioned the Nez Perce Tribe or its Reservation. In the 1947 repayment contract between LOID and the United States/BOR, pursuant to that authority, the "Rights of Way" provision stated that*

*"All rights of way needed for the project and for ingress and egress thereto and as constructed and during the time the same is being constructed shall be secured by the District at its sole cost and expense. However, the United States will assist in securing rights of way over land within the Nez Perce Reservation...."*

*The United States in fact never secured valid rights of way over land within the Nez Perce Reservation. In several 1970s-era deeds, BIA simply excepted lands and in some cases newly described portions of the allotments as having been "sold" - e.g. "except 54.19 acres sold" - leaving the impression that arms-length transactions had occurred between willing buyers and the United States, when the acreages referred to were those illegally "condemned" in the 1906 state court proceedings. In 1979, the Realty Officer for the Northern Idaho Agency of the BIA documented the situation:*

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*I investigated title to Nez Perce allotments No. 263, 267, 268, 269, 302, 355 and 1948, which allotments surround [Mann's] Lake, on the old GLO plats no lake was showing. I found no evidence in BIA records of conveyance with consent of the owners or of the Secretary of the Interior, the trustee of this Indian land. I was given permission by the manager of LOID to search their office title records. I found that the lands had been taken by condemnation in a local court and that the United States was not a party to such action. Further research by me disclosed that the right-of-way for the canal from Craig Mountains to Mann's Lake over Indian trust land had been acquired in the same manner. These lands included Nez Perce trust allotments Nos. 475, 380, 382, 381, 1810, 85, 339, 341, 340, and 263.*

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*(Emphasis in original.)*

*As this same BIA official put it in an October 10, 1979 letter to the Portland BIA Area Office, this investigation "led to the finding of the gross irregularity of the [1906] condemnation action."*

*Instead of rectifying the situation at that time, the records document BIA's response. For one allotment, BIA issued a "Title Status Report" in 1979, purporting to have been effective in 1906: "This [title status] report is issued October 30, 1979, based upon the title as of the close of business on May 13, 1906. By condemnation proceedings dated May 14, 1906, and filed here...this parcel was conveyed to fee status." For another allotment, the BIA in 1979 made an "administrative correction" to a 1920's era probate file to fix a "clerical error" that "incorrectly describes Allotment 1948 as lots 11, 12, 13, 14, and 15..." and taking action to except a parcel of land at issue in the state court condemnation proceeding. More recently, as BIA has taken lands back into trust --that is, as lands are conveyed to*

*"The United States of America in Trust for the Nez Perce Tribe" --the United States has taken no action to remedy these title issues.*

*In response to a claim brought by an individual Indian allottee, the United States chose not to remedy the situation but instead to defend that claim based on a procedural statute of limitations defense, and thereafter administratively rejected other claims by individual allottees on the same grounds, while simultaneously acknowledging that the only basis for title to the LOP reservoir and canals are the illegal 1906 condemnation proceeding.*

*Much of this history has only recently been discovered. Some may remain still undiscovered. What cannot be contested is that the conduct of the United States throughout could not stand further from "the most exacting fiduciary standards" or the "fair and honorable dealings" owed to the Nez Perce Tribe and its people under well-established principles of Federal Indian law.*

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### 3 STUDY FORMULATION

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The development of this Study and potential alternatives to address the requirements identified in Chapter 1 was directed by the LCEP group. The following sections will review the process used to narrow potential alternatives to the three proposals which received the focus of technical analysis presented in the study. The overall process consisted of the following steps:

- Review Project Opportunities – Identify potential to improve conditions within the project area.
- Alternative Brainstorm – Brainstorm various projects to be analyzed within the study.
- Alternative Identification – Identify those projects and alternatives most likely to meet the objectives of the LCEP Group and the Rural Water Supply Program.
- Alternative Screening – Screen the identified projects and alternatives for technical analysis under this Study.
- Alternative Selection – Select the preferred alternative(s) to move forward in a feasibility study.

The alternative brainstorm, identification, and screening processes are visually depicted in **Figure 3.1**.

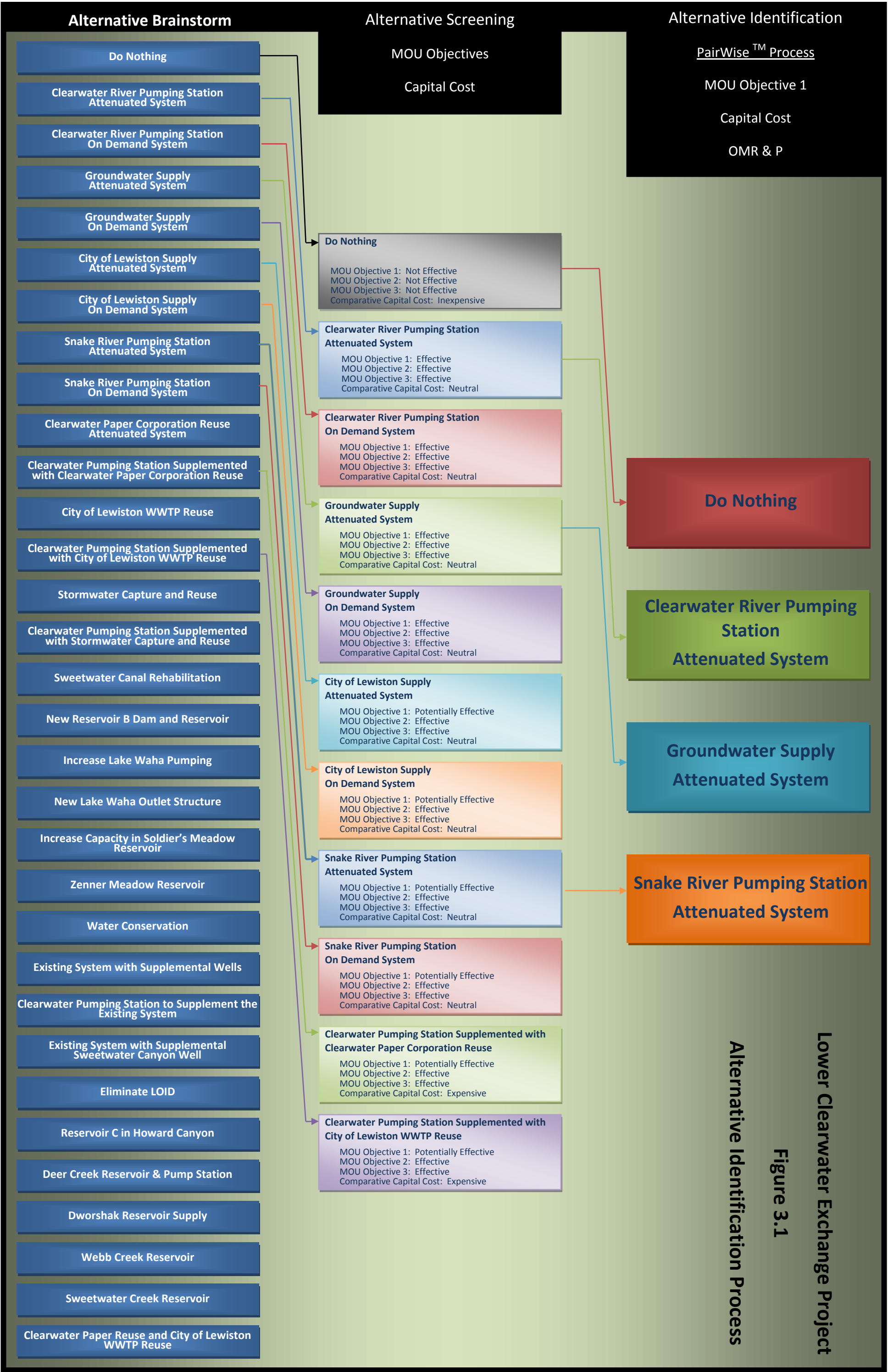
#### 3.1 PROJECT OPPORTUNITIES

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Numerous opportunities exist for this Study and resulting project to improve conditions within the project area. The LCEP group identified both direct and indirect opportunities for the project during the November 2010 workshop:

- Environmental
  - Improved fish habitat and water quality in lower Clearwater River basin.
  - Enhanced fisheries in Reservoirs/Lakes.
  - Potentially mitigated climate change by returning streams back to cooler temperatures.
  - Potential for aquifer recharge.
- Sociopolitical
  - Resolution of Tribal concerns as to historic and present impacts on Nez Perce people – improved relations between stakeholders.
  - Nez Perce Cultural restoration within Sweetwater Drainage.
  - Economic benefits – short term with construction and long term with restoration.





- Public education/understanding of the Lewiston Orchards Project.
- System
  - Provide more reliable water supply.
  - Expand water supply.
  - Reduced water loss associated with evaporation/seepage.
  - Provide supplemental system to Lewiston Orchards Project.
  - Reduce the sedimentation accumulation in Mann Lake.
- Alternative Resources
  - Water reuse opportunities – including stormwater or reuse from local mill.
    - Address NPDES point source discharge issues (i.e., temperature).
  - Opportunities for linkage to alternative energy resources – wind integration.

### 3.2 ALTERNATIVE BRAINSTORM

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During the December workshop, members of the LCEP Group brainstormed potential alternatives. All options were considered viable at this stage to move forward in the subsequent alternative identification step. The following alternatives are the results of the group's brainstorm, and are generally broken into four categories with similar characteristics for consideration within the subsequent alternative identification process:

- **No Action** – The alternative provides a baseline for alternative comparison.
  - **Continue operation of the existing LOP.** Water would continue to be supplied by the Craig Mountain watershed. Minimum ESA stream flow requirements must be satisfied prior to withdrawal for LOID irrigation purposes.
- **Conventional Supply** – These alternatives use conventional supply sources to replace the LOP. They are sized for delivery with either attenuation storage provided by Mann Lake, or for peak demands. No water treatment is required for implementation of these options.
  - **Clearwater River Pumping Station - Attenuated System** – Replace the LOP with a pumping station on the Clearwater River. Utilize Mann Lake as a large equalization reservoir.
  - **Clearwater River Pumping Station - On Demand System** – Replace the LOP with a pumping station on the Clearwater River and operate as an on demand system. Utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
  - **Groundwater Supply - Attenuated System** – Drill groundwater wells to replace the LOP and utilize Mann Lake as a large equalization reservoir.

- **Groundwater Supply - On Demand System** – Drill groundwater wells to replace the LOP. Operate the wells on demand, and utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
- **City of Lewiston - Attenuated System** – Use the City of Lewiston’s domestic water system to replace the LOP. Utilize Mann Lake as a large equalization reservoir.
- **City of Lewiston Supply - On Demand System** – Use the City of Lewiston’s domestic water system to replace the LOP. Operate the system on demand and utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
- **Snake River Supply - Attenuated System** – Build a pumping station on the Snake River to replace the LOP. Utilize Mann Lake as a large equalization reservoir.
- **Snake River Supply - On Demand System** – Build a pumping station on the Snake River to replace the LOP. Operate the system on demand, and utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
- **Eliminate LOID** – Eliminate the irrigation district. Water service would be provided by the City of Lewiston.
- **Dworshak Reservoir Supply** – Replace the LOP with construction of a pumping station and pipeline to feed Mann Lake from Dworshak Reservoir.
- **Reuse Systems** – These alternatives capitalized on water reuse to provide water supply for the District. The supplied water requires treatment and regulatory oversight.
  - **Clearwater Paper Corporation Reuse - Attenuated System** – Replace the LOP with treated reuse water from Clearwater Paper Corporation. Utilize Mann Lake as a large equalization reservoir.
  - **Clearwater Paper Corporation Reuse Supplemented with a Clearwater Pumping Station** – Replace the LOP with Clearwater Paper Corporation reuse water. Supplement additional water needs as required with a Clearwater River Pumping Station.
  - **City of Lewiston WWTP Reuse - Attenuated System** – Replace the LOP with reclaimed wastewater treatment plant (WWTP) discharge and utilize Mann Lake as large equalization reservoir.
  - **City of Lewiston WWTP Reuse Supplemented with a Clearwater Pumping Station** – Replace the LOP with City of Lewiston WWTP reuse. Supplement flows with a Clearwater River pumping station.
  - **Stormwater Capture and Reuse** – Replace the LOP with capture and treatment of City of Lewiston stormwater. Utilize Mann Lake as a large equalization reservoir.
  - **Clearwater Pumping Station Supplemented with Stormwater Capture and Reuse** – Replace the LOP with stormwater runoff in higher elevations only to minimize pumping head from

lower elevations in the City to the Orchards. Utilize flows to supplement a Clearwater River pumping station.

- **Clearwater Paper Reuse and City of Lewiston WWTP Reuse** – Replace the LOP with reuse from both Clearwater Paper Corporation and the City of Lewiston WWTP.
- **LOP Enhancement** – These alternatives would enhance to varying degrees the ability of the existing LOP to meet demands, either through LOP improvements, expansion, or source supplementation.
  - **Sweetwater Canal Rehabilitation** – Reduce leaking and evaporation in the LOP. Water savings could potentially off-set ESA obligations and facilitate continued LOP operations.
  - **New Reservoir B Dam and Reservoir** – Expand the LOP through construction of another reservoir south of Mann Lake to provide storage of excess flows during peak runoff. The new reservoir would be located on the Nez Perce Reservation with estimated storage capacity of 1,300 acre-ft.
  - **Increase Lake Waha Pumping** – Continue operation of the LOP and supplement water lost to meet ESA obligations by increasing water withdrawals from Lake Waha.
  - **New Lake Waha Outlet Structure** - Continue operation of the LOP and supplement water lost to meet ESA obligations by increasing water withdrawals from Lake Waha. Replace the pumping system with a new gravity outlet structure to eliminate the need to pump water out of Lake Waha.
  - **Increase Capacity in Soldier's Meadow Reservoir** – Expand the LOP through modification of Soldier's Meadow Dam and Spillway.
  - **Zenner Meadow Reservoir** – Expand with LOP with construction of a new reservoir at Zenner Meadow to capture additional runoff from the East Fork of Webb Creek. Utilize additional runoff to supplement water lost to meet ESA obligations.
  - **Water Conservation** – Implement water conservation measures within the District. Utilize water saved to meet minimum ESA stream flows.
  - **Existing System with Supplemental Groundwater Wells** – Continue use of the existing LOP and utilize groundwater wells off the Nez Perce Reservation to meet minimum ESA stream flows.
  - **Clearwater Pumping Station to Supplement the Existing System** – Continue use of the LOP and supplement flows with a Clearwater Pumping Station.
  - **Existing System with Supplemental Sweetwater Canyon Well** – Utilize a supplemental well located in Sweetwater Canyon to meet minimum ESA stream flows and continue use of the LOP.
  - **Reservoir C in Howard Canyon** – Utilize a new reservoir located in Howard Canyon in combination with the County Transportation Plan to improve access and recreation.



- **Deer Creek Reservoir and Pump Station** – Expand the LOP with construction of Deer Creek Reservoir. Pump flows to Soldier’s Meadow Reservoir and utilize to meet minimum ESA stream flows.
- **Webb Creek Reservoir** – Expand the LOP with construction of Webb Creek Reservoir. Utilize additional storage to meet minimum ESA stream flows.
- **Sweetwater Creek Reservoir** – Expand the LOP with construction of Sweetwater Creek Reservoir. Utilize additional storage to meet minimum ESA stream flows.

### 3.3 ALTERNATIVE IDENTIFICATION

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Alternative identification was also completed during the December workshop during a two-stage process:

- **Initial Identification** – The initial identification was completed in a three-tier comparison against the three core project objectives. Alternatives were evaluated as “Effective”, “Potentially Effective”, or “Not Effective.” Any alternatives designated “Not Effective” for one of three core project objectives was eliminated from further consideration. Eighteen alternatives remained during the initial identification.
- **Final Identification** – Final identification of alternatives was completed through a broad review of relative capital costs. Those options with a relatively high capital cost were generally eliminated.

Specific screening considerations for each alternative are provided in **Appendix D**, and general discussion within each broad alternative category follows:

#### 3.3.1 NO ACTION

The No Action Alternative is not effective in meeting the three core project objectives. No action is associated with continued failure to deliver 2.2 acre-ft of irrigation water to LOID constituents. No action would leave unresolved ESA litigation over impacts on the LOP on listed steelhead and designated critical habitat, as well as Nez Perce issues regarding historic and present adverse impacts of the LOP on the Tribe, its Reservation, and Nez Perce people.

From a cost standpoint, LOP infrastructure is in place and operational. The surface water collection system predominately uses gravity to feed Mann Lake, and is therefore relatively inexpensive in electrical power consumption to operate as compared with a pump station.

### 3.3.2 CONVENTIONAL SYSTEMS

The conventional systems were each ranked “Effective” or “Potentially Effective” with respect to the first core project objective – to provide a reliable, quality water supply for LOID. The main concerns with respect to this objective were unknowns associated with supply from the City of Lewiston and the system’s capacity to service the District. The alternatives were ranked “Effective” for core project objectives 2 and 3, due to replacement and decommissioning of the LOP from its present location associated with ESA and Nez Perce Reservation and Tribal-Trust issues.

The capital costs of conventional alternatives were generally identified as neutral, with a mid-range capital cost required for implementation. One exception was the Dworshak Supply Alternative which requires an extensive pump and piping system to feed Mann Lake, giving this option a negative rating with respect to the final criteria.

### 3.3.3 REUSE SYSTEMS

Potential water reuse opportunities received significant and detailed attention from the LCEP Group as a matter of exploring prudent and judicious use of water resources, as well as an opportunity to participate in national policy objectives regarding water reuse. Despite this, the unique water resource characteristics of the study area in north-central Idaho and the Clearwater River Basin, and the relative costs arising in that unique environment, generated numerous hurdles to a feasible water reuse alternative:

#### WATER TREATMENT

Depending on water source, varied levels of water treatment are required, the least stringent of which begins with stormwater reuse, and the most stringent ending with wastewater and industrial reuse. Due to the probability of public contact with reuse water, both at Mann Lake and at residential services, reuse treatment requirements would likely be extensive.

#### REGULATORY OVERSIGHT

Regulatory requirements for reuse would vary with respect to the water source. Although it is unclear how the Idaho Department of Environmental Quality (IDEQ) would regulate a residential land application system, wastewater must ultimately comply with IDAPA 58.01.17 (Moore 2011). Furthermore, recent trends show increasing regulatory oversight with time.

### LIABILITIES ASSOCIATED WITH RESIDENTIAL DELIVERY

Due to the nature of reuse within a residential distribution system, the District lacks control over how reuse water might be utilized. Despite efforts to educate the public, there is potential for human consumption of reuse water.

### COSTS

Due to costs of implementation and operations, reuse systems are typically utilized in locations where alternative water sources and new water appropriations are unavailable, such as Arizona, Nevada and Southern California. In Northern Idaho, water is readily available and relatively inexpensive, and it is typically difficult to justify a reuse project due to comparative cost.

Water reuse options were each ranked “Potentially Effective” with respect to core project objective one based on water quality and water quantity concerns. With the exception of Clearwater Paper water reuse and alternatives which supplemented a new alternative supply, it was also unlikely that any water reuse option could deliver sufficient supply for LOID’s needs.

Replacement of the LOP led to an “Effective” rating for core project objective two by eliminating its impact on ESA listed species and designated critical habitat. Nez Perce Tribe concerns associated with the insertion of potentially contaminated water onto the Reservation at Mann Lake generally made the alternatives only “Potentially Effective” with respect to the third core project objective.

Ultimately, the following water reuse alternatives were developed and considered but finally eliminated due to comparatively high capital, operational and regulatory costs of implementation:

**Clearwater Paper Reuse** - Early contact was made with Clearwater Paper Corporation, a local manufacturer of wood and tissue products to determine partnership potential for a water reuse project, as the mill discharges a significant volume of industrial wastewater into the Clearwater River. Several immediate concerns were associated with this alternative, including the impossibility of ensuring the long-term existence of a private corporation for contractual and delivery purposes. Additional concerns included water chemistry, water treatment requirements, and regulatory oversight. Despite these hurdles, the importance to the LCEP Group of fully exploring water reuse required thorough vetting of the alternative.

Following discussion with DEQ, however, it became apparent that the Corporation is not faced with current or pending permit issues, and therefore had little incentive to enter such a partnership. Further,

the Corporation's wastewater is characterized by lignin with substantial BOD, odor, high temperatures on the order of 100°F, and elevated dissolved solids (Moore 2011). Although it is unknown how a Clearwater Paper reuse system might be regulated, an industrial use permit would likely be required.

Subsequent to the alternative screening process, in March, 2011, Matt Van Vleet, Director of Corporate Communications, contacted Jerry Klemm of the LCEP and indicated the Corporation was not interested in a partnership to provide reuse water to LOID due to a variety of factors including increased liability (Klemm 2011).

**City of Lewiston Reuse** - Wastewater reuse alternatives involving the City of Lewiston were also thoroughly considered. During discussion with Dave Six, Water/Wastewater Services Manager for the City of Lewiston, it became evident that the City does not have current permit issues and does not produce enough wastewater to fully supply LOID water needs (Six 2011).

An alternate reuse system was considered to reduce both the capital cost of pipeline conveyance to Mann Lake and annual power costs associated with pumping from the City's outfall. This alternative consisted of a scalping plant located in the LOID district to remove, treat, and convey wastewater to Mann Lake before flows dropped to lower elevations. Two Sewer Districts are operated within the Orchards area, the Lewiston Orchards Sewer District (LOSD) and the Central Orchards Sewer District (COSD). The entities both gave a lukewarm reception to a potential partnership opportunity with LOID, and indicated they would not be willing to share in project costs (Metz 2011a). Lack of interest from these entities together with the comparative expense of water reuse supplementing an alternate source system made this reuse alternative impractical for further consideration.

Due to the RWSP's emphasis on water reuse opportunities, as well as potential federal funding opportunities, the alternatives to supplement an alternative water supply with water reuse from either City of Lewiston wastewater or Clearwater Paper industrial wastewater were retained for further consideration during the alternative screening process.

**Stormwater Reuse** - There were numerous obstacles associated with stormwater capture and reuse. First and foremost, the LOID district area lacks a developed stormwater system; a significant volume of runoff naturally infiltrates in lawns and drainages within the area. Further complicating efforts to implement a stormwater reuse alternative is the remaining area within the City of Lewiston with stormwater collection. These areas are located in lower elevations of the City, and would require significant pumping for conveyance to the LOID system. There is insufficient stormwater area within the



City to concentrate and deliver sufficient water for LOID, and the system would need to be supplemented with a separate alternative. Finally, during wet years when more stormwater would be available, the irrigation requirements are lower and vice-versa. The expense and logistics of a stormwater reuse system made the alternative impractical for further consideration.

### 3.3.4 LOP ENHANCEMENT

The alternatives to enhance the Lewiston Orchards Project with new infrastructure, water conservation, and supplemental supply were all dropped during the initial alternative identification and consideration process due to review against the three core project objectives. The alternatives were generally ranked “Neutral” with respect to core project objective one, partly due to unknown impacts of future climate change on Craig Mountain surface water collection, as well as the long-term implications of compliance with minimum stream flows for ESA critical habitat. All LOP enhancement alternatives received a “Not Effective” rating with respect to MOU objective two due to continued operation of the LOP at its present location in ESA designated critical habitat for listed steelhead on the Nez Perce Reservation. All LOP enhancement alternatives received a “Not effective” rating with respect to the third core project objective due to continued operation of the LOP gravity conveyance system and its location primarily on the Nez Perce Reservation and associated Tribal-Trust issues and implications. As a consequence, none of the LOP enhancement alternatives were found to merit further consideration during the secondary identification and consideration process for capital cost.

### 3.3.5 IDENTIFICATION SUMMARY

Eleven alternatives ultimately moved forward in the alternative screening process. Technical descriptions of each were developed for use during alternative screening, and are included for reference in **Appendix E**:

- No Action
- Clearwater River Pumping Station – Attenuated System
- Clearwater River Pumping Station – On Demand System
- Groundwater Supply – Attenuated System
- Groundwater Supply – On Demand System
- City of Lewiston Supply – Attenuated System
- City of Lewiston Supply – On Demand System

- Snake River Supply – Attenuated System
- Snake River Supply – On Demand System
- Clearwater Paper Corporation Water Reuse supplemented with a Clearwater River Pumping Station
- City of Lewiston Water Reuse supplemented with a Clearwater River Pumping Station

### 3.4 ALTERNATIVE SCREENING

Alternative screening was completed during the February workshop using a PairWise™ comparison process. The process is a risk assessment methodology developed by the Federal government after the 9/11 terrorist attack in New York to prioritize infrastructure improvements. It is a methodical way to utilize qualitative and quantitative data to sort and filter various alternatives.

The first step of the PairWise™ comparison was completed during the December workshop. The LCEP Group identified criteria that would be utilized to screen alternatives, and provided a weighting of relative importance with respect to each other. The criteria and weighting were further refined during the February workshop. **Table 3.1** summarizes the criteria used for the alternative screening.

**Table 3.1 - Evaluation Criteria**

Criteria	Weighting	Description
<b>MOU Objectives</b>		
Reliable & Quality Water Supply	5	Is the water supply both reliable and of sufficient quantity and quality? (Includes water rights)
Resolution of ESA Issues	5	Permanent resolution of ESA issues surrounding the Lewiston Orchards Project
Resolution of Tribal Trust	5	Permanent resolution of Federal-Tribal Trust issues surrounding the Lewiston Orchards Project
<b>Cost</b>		
Capital Cost	3	The initial capital cost of the alternative
Operations, Maintenance, and Replacement Cost	5	Annual operation, maintenance, and replacement costs of the alternative

Of the five evaluation criteria, those with the highest variability were selected for PairWise™ analysis. These were identified by the group as the ability to provide a reliable, quality water supply, capital costs, and operations, maintenance, and replacement costs. With exception of the water reuse alternatives, each of the identified alternatives were designated “Effective” with respect to the remaining criteria,

core project objectives two and three. A PairWise™ evaluation for these criteria would therefore not provide a distinguishable or differentiating value to the screening process.

Details of the PairWise™ process are provided in **Appendix F**, and final rankings are given in **Table 3.2**.

**Table 3.2 - PairWise™ Ranking**

Rank	Alternative	Total Score
	No Action	<b>0</b>
1	Clearwater Pumping Station - Attenuated System	<b>421</b>
2	Snake River Pump Station - Attenuated System	<b>401</b>
3	Groundwater Supply - Attenuated System	<b>369</b>
4	Clearwater Pumping Station - On Demand System	<b>323</b>
5	Groundwater Supply - On Demand System	<b>308</b>
6	City of Lewiston Supply - Attenuated System	<b>293</b>
7	Snake River Pump Station - On Demand System	<b>292</b>
8	City of Lewiston Supply - On Demand System	<b>226</b>
9	Water Reuse to Supplement Pumping Station <sup>a</sup>	<b>175</b>

<sup>a</sup> Two water reuse alternatives to supplement a pumping station were considered. Due to similar characteristics including cost, the alternatives were evaluated as one alternative and received an identical score.

The highest ranked alternatives were selected for technical analysis within this Study. The No Action Alternative was also retained as a matter of RWSP compliance and to provide a baseline comparison. The selected alternatives were:

- No Action
- Clearwater Pumping Station – Attenuated System
- Snake River Pumping Station – Attenuated System
- Groundwater Supply – Attenuated System

## 4 TECHNICAL ANALYSIS

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The technical analysis presents a description of required elements for alternative implementation. The analysis is prepared based on presently limited information with a resultant wide accuracy range. Analysis presented herein is subject to change based on a variety of conditions including operational parameters, land availability, and environmental concerns. The analysis is intended for use as a confirmation of the economic and technical viability of the project as well as to provide a preliminary budget as the project proceeds into the next planning phase, the feasibility study.

### 4.1 COMMON TECHNICAL ELEMENTS

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Each of the alternatives shares common characteristics including design criteria, analysis limitations, and unresolved issues. These common characteristics are summarized in the following sections.

#### 4.1.1 DESIGN CRITERIA AND ANALYSIS METHODS

Design criteria are necessary to ensure that each the delivery system meets the LOID's water use requirements and to facilitate a uniform comparison between the project alternatives. While some alternatives may require additional criteria due to restraints associated with implementation, efforts have been made to minimize use of criteria which may unduly bias one alternative with respect to another. The following paragraphs describe the common design criteria used for all of the alternatives.

- **Service Area** – All of the delivery system alternatives provide water to the same parcels and acreage. The irrigation boundary is static and not subject to growth. Growth outside the irrigation boundary will be served by the LOID domestic system.
- **Annual Water Supply** – The uniform annual water supply used in this Appraisal Study for all alternatives is 8,500 acre-ft. As an initial matter, this quantity was selected because it approximates, on a gross LOID acreage basis, the 2.2 acre-ft per acre water delivery entitlement established under the existing 1947 agreement between Reclamation and LOID.

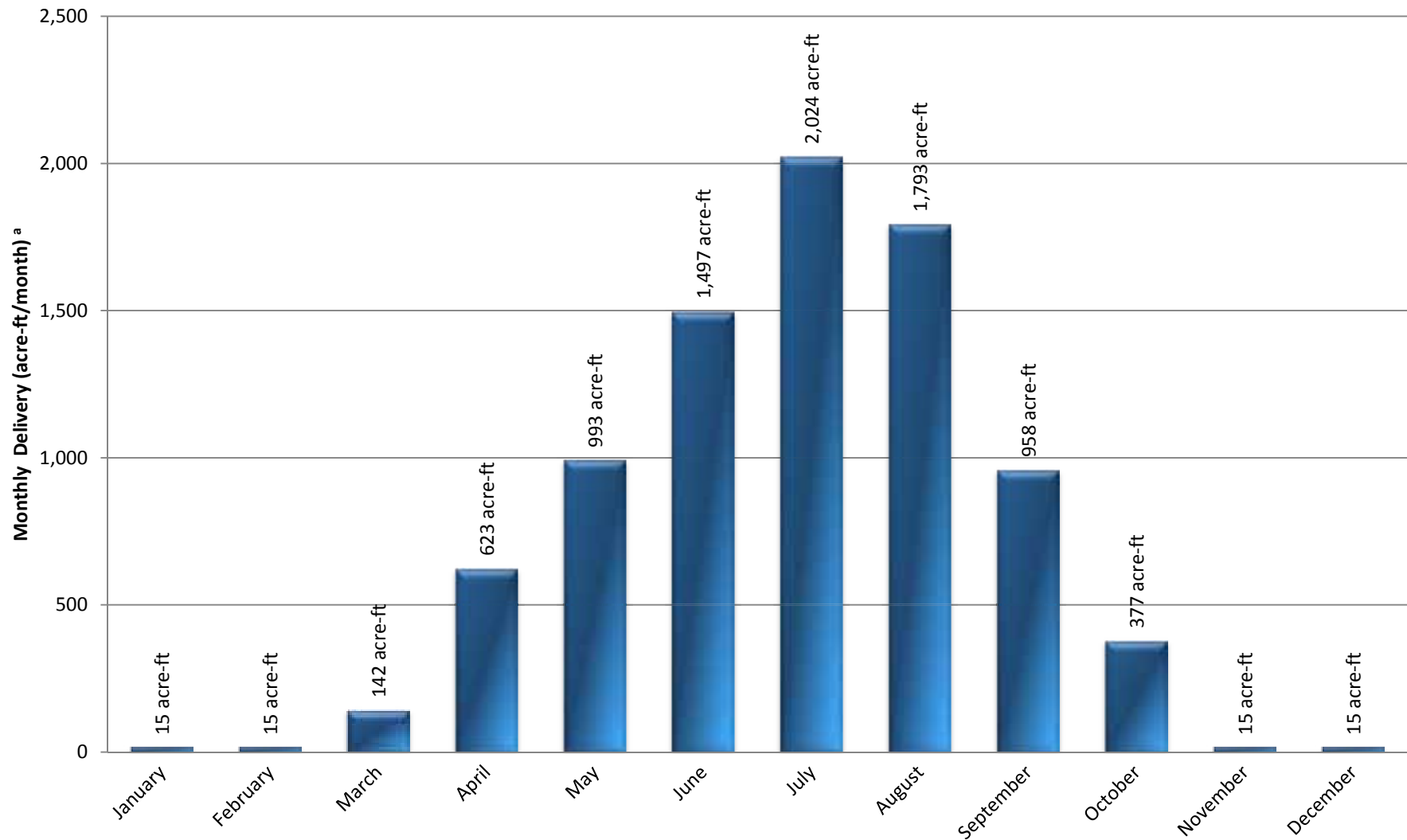
- **Monthly Irrigation Requirements** –

Design delivery was calculated by fitting the monthly consumptive use curve to an annual delivery volume of 8,500 acre-ft, see **Figure 4.1**.

# Lower Clearwater Exchange Project

Figure 4.1

Design Delivery <sup>a</sup>



<sup>a</sup> Reference **Appendix G** for discussion regarding design delivery development



- **Mann Lake Storage** – Each of the identified alternatives continues to utilize Mann Lake to provide operational water storage. Although the reservoir has a total capacity of 3,000 acre-ft at the maximum operating level elevation of 1,808 ft, this level was restricted in 1999 concurrently with Safety of Dams work on the reservoir. The restriction at that time reduced the reservoir’s total storage capacity to 1,960 acre-ft, elevation 1,800 feet.

In the spring of 2010, following a thorough evaluation of the reservoir, Reclamation allowed LOID to store an additional 480 acre-ft of water by raising the operating elevation to 1,804 feet. The dam was monitored to assess performance at the higher operating level. Correspondence with Reclamation indicates that while the conditional increase in operating level to elevation 1,804 will continue subject to monitoring for several more years, “This elevation could decrease in the future” (Pierko 2011). Therefore, the analysis in this RWSP appraisal investigation assumes the total storage capacity of the lake is 1,960 acre-ft under an operating elevation of 1,800 feet.

- **Fire Storage** – The District is obligated under an agreement with the City of Lewiston to reserve 500 acre-ft of water stored in Mann Lake for fire suppression purposes. Although this is a significant quantity of water, the function and operational capabilities of the Mann Lake outlet have not been tested below this storage level and it is unknown how effectively water can be withdrawn from the reservoir at relatively low pool elevations. Ensuring the water level in the reservoir remains high enough to ensure fire suppression water can be delivered is critical. For these reasons, it is not recommended that the fire storage requirement be reduced at this time. Leaving the fire storage at its current level and assuming a reservoir capacity of 1,960 acre-ft results in an operational capacity of 1,460 acre-ft.
- **Evaporation and Seepage** - Several attempts to document seepage in Mann Lake have been completed during various studies. According to the 1992 Morrison Knudsen report, in 1966, CH2M Hill estimated annual seepage and evaporative losses from Mann Lake at 1,800 acre-ft. The Morrison Knudsen report itself estimated that losses varied from 402 acre-ft in 1985 to 1,845 acre-ft in 1990.

The District currently utilizes two flow measurement devices to document inflow and outflow from the reservoir. A broad crested weir above the reservoir is measured once per day. A flow meter located at the filter plant near the reservoir is used to calculate water supplied to the District. Information from these sources suggests that annual losses have ranged from 187 acre-ft in 2007 to 727 acre-ft in 2008 (Metz 2011b). An estimated value of 500 acre-ft will be used for this analysis. Although these values provide a baseline for this Appraisal Study, a more detailed water balance should be completed in the future to quantify actual losses.

- **Maximum System Headloss** - Our experience suggests that limiting pipe head loss 5-ft per thousand feet of pipe provides a reasonable economic balance between the capital cost of buying the pipe and the capital cost of buying larger pumps to overcome headloss combined with higher long term energy costs. Pipe sizes outlined in this report are based on this criteria.

Additional economic pipe sizing evaluation should be completed during feasibility to verify sizes presented herein.

- **Annual Maintenance and Repairs** – Annual maintenance and repair costs are estimated based on a percentage of the installed cost of each item. Minimum and maximum percentages were assumed for each component to provide an estimated annual cost range. The average of the two values has been used as the estimated maintenance cost for each alternative. **Table 4.1** lists these percentages, based on common engineering guidelines.

**Table 4.1 - Annual Maintenance and Repair Percentages**

Cost Items	Annual Maintenance (% of installed cost)	
	Maximum	Minimum
Steel pipe	0.50%	0.25%
PVC pipe	0.75%	0.25%
Valves <sup>a</sup>	1.00%	0.50%
River Pump Stations		
1. Air Burst System <sup>a</sup>	1.5%	0.75%
2. Intake Pipe and Pump Wells	1.5%	0.5%
3. Concrete Pad and Fence	1.5%	0.5%
4. CMU Building	1.5%	0.5%
5. Pumps	5.0%	3.0%
6. Piping	1.5%	0.5%
7. Electrical	2.5%	1.5%
Flow Control Valves <sup>a</sup>	1.00%	0.50%
Flow Meters <sup>b</sup>	0.00%	0.00%
Telemetry <sup>a</sup>	3.00%	1.50%

Source: Jensen, 1983; Johnston and Robertson, 1991

<sup>a</sup> Annual maintenance and repair percentage estimate by JUB Engineers, Inc.

<sup>b</sup> Annual maintenance and repair percentage estimated based on Panametric product literature and solid-state nature of the product.

- **Electrical Rate Schedules** – Rate Schedules from Avista and Clearwater Power Company were utilized to estimate annual electrical costs. These rates are given in **Table 4.2**.

**Table 4.2 - Industrial Service Rates**

Description	Clearwater Schedule 2-7 Industrial Service Rate	Avista Schedule 21 Industrial Service Rate
Facility Charge	\$250	
Energy Charge	\$0.03970 per kWh	\$0.06502 per kWh (First 250,000 kWh) \$0.05607 per kWh (Over 250,000 kWh)
Demand Charge	\$5.75 per kW	\$325 (First 50 kW) \$4.25 per kW (Over 50 kW)
Primary Metered Discount	\$0.10 per kW (7.2kV or above)	
Minimum Annual Charge	\$125,000	\$660,000

#### 4.1.2 GENERAL ANALYSIS DISCUSSION

The action alternatives hold several similar characteristics, and an overview of several common analysis methods is provided. These should be considered in conjunction with the separate discussion provided for each action alternative in the subsequent text.

##### PRESSURE ZONE EVALUATION

The majority of the LOID's service area is located in two pressure zones, both of which are located well above any of the action alternative water sources. Several of the action alternatives connect to the central area of the existing distribution system near the transition between zones. A cursory evaluation was completed to determine whether the proposed system would be more electrically efficient if all of the water was pumped to the lower of the two pressure zones and a booster pump installed to lift water into the higher zones, then if all water was effectively pumped to Mann Lake. The evaluation suggested the electrical savings did not justify the additional cost of the booster pump station. Therefore, none of the action alternatives include a booster pump station between pressure zones.

For those action alternatives which discharge directly to the distribution system, pumps would be installed in conjunction with variable speed drive equipment to facilitate variable operational pressures.

##### DISTRIBUTION SYSTEM EVALUATION

Based on the linear nature of proposed piping and study level, a computer model of the pipe was not created; head loss calculations were completed using programmable calculators. Estimates of the impact on the existing distribution system omitted all piping smaller than 18 inch to simplify the existing system. Elevations were estimated using digital elevation models (DEM) and USGS 7.5 minute quadrangle maps. A Hazen Williams "C" value of 125 was used for steel pipe and 150 for PVC pipe.

**Table 4.3** provides a summary of design criteria common to each alternative.

**Table 4.3 - Common Design Criteria and Analysis Methods**

Description	Value
Annual Irrigation Supply	8,500 acre-ft
Monthly Irrigation Demand	Per <b>Figure 4.1</b>
Mann Lake Storage	1,960 acre-ft
Fire Storage	500 acre-ft
Operational Storage	1,460 acre-ft
Evaporation and Leakage	500 acre-ft/yr
Maximum System Headloss	5 ft/1000 ft
Annual Maintenance & Repairs	Per <b>Table 4.1</b>
Electrical Rate Schedules	Per <b>Table 4.2</b>

#### 4.1.3 ANALYSIS LIMITATIONS SUMMARY

Technical evaluations of each alternative were completed based on the common design criteria and analysis methods. The design criteria make assumptions that should receive further consideration in the subsequent feasibility study. Those assumptions include:

- Mann Lake storage capacity will remain at 1,960 acre-ft. This provides 1,460 acre-ft of operational storage with fire storage of 500 acre-ft.
- Mann Lake evaporation and seepage losses are 500 acre-ft per year.

#### 4.1.4 RISKS, UNCERTAINTIES, AND UNRESOLVED ISSUES

Replacement and modification of the existing LOP is inherent in each of the identified alternatives. Unresolved issues center on the process and impacts of modifying the LOP. These issues have been identified and are summarized herein for documentation purposes recognizing that at present the LCEP 2009 MOU defines default assumptions and concepts utilized by members of the LCEP group during the appraisal process,

- **Decommissioning of LOP components** – How will this be completed, and what are the impacts to adjacent landowners, including the Nez Perce Tribe?
  - Diversions
  - Canals and Piping
  - Access Roads
- **Sport Fisheries Management** – How would fisheries be managed at Soldier’s Meadow Reservoir, Waha Lake, and Mann Lake? What are the impacts of management on sport fisheries?
- **Watershed Restoration** – Broader Lapwai Creek watershed restoration is ongoing by and between the Nez Perce Tribe and various federal agencies. Details and specifics of watershed

restoration in the lower Lapwai/Sweetwater Creek watershed component directly impacted by the No Action Alternative remain to be developed.

- **Title Transfer** – Title transfer of some of the LOP property interests presently owned by Reclamation to the Bureau of Indian Affairs (BIA) in trust for the Nez Perce Tribe, or other federal or state agencies as part of the modification of the LOP, is an assumed criterion, but details and specifics remain to be developed.
  - Soldier’s Meadow Reservoir
  - Mann Lake
  - Captain John Diversion
  - Sweetwater Diversion
  - Webb Fork Diversion
  - Lake Waha
  - Canals and Roads
- **Water Rights** – Idaho Water Supply Bank of existing LOP water rights, in order to protect them by application to presently unsatisfied state minimum stream flows in Webb, Sweetwater, and Lapwai Creeks, and in the lower Clearwater River, is an assumed criterion, but details and specifics remain to be developed.
  - Lake Waha
  - Sweetwater Creek
  - Webb Creek
  - Captain John Creek

In addition, there are technically unresolved issues to be reviewed during feasibility:

- **System Connection** – If the proposed action alternative connects directly from the supply source to the existing distribution system, additional evaluation should be completed to access whether the discharge pipe should be connected to both pressure zones. The potential to reduce power demands by pumping to the lower pressure zone with feed from Mann Lake to the upper pressure zone should be vetted during feasibility.
- **Cultural Resources** – The Nezperce Tribe Cultural Resource Program completed preliminary cultural resource background research for the proposed action alternatives. The report, entitled “Lower Clearwater Exchange Project Background Research for Cultural Resources,” is provided in **Appendix H**. The report identifies previously documented historic properties, archeological sites, and ethnographic sites within one mile of the project corridor. Record searches were completed with the Idaho State Historic Preservation Office, and National Register of Historic Places. Review of Government Land office plat maps through the Bureau of Land Management was also completed.



The report identifies the following cultural resources within the project area:

- Seven historic buildings and structures
- Fourteen archeological sites
- Four traditional cultural properties

The report recommends cultural resource studies be completed for the project areas, including the following tasks:

- Inventory surveys for archeological and historic properties
- Ethnographic research to identify Nez Perce Tribe cultural properties

Further, the following research standards should be used:

- Secretary of Interior Standards for Cultural Resource Professionals
- Archeological Survey of Idaho forms
- ISHI forms
- Nez Perce Tribal Cultural Resource Program Standards
- Criteria defined in the National Register Bulletins 15 and 38

#### 4.1.5 COMMON ECONOMIC RAMIFICATIONS

Economic costs presented herein for each alternative have been presented as additive costs and do not incorporate savings from current operations and maintenance associated with the LOP. An estimated 2.67 full time equivalent (FTE) employees and two vehicles would be eliminated due to terminated operator of LOP reservoirs, diversion equipment, and the canal system. The estimated savings of those operations is \$250,000.

## 4.2 TECHNICAL DESCRIPTIONS

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The following sections provide technical information regarding the three action alternatives. The sections include specific discussion of the following:

- **Technical Screening** – Includes discussion of those items deemed most critical to the technical analysis with specific attention to water rights and power availability. A more detailed technical screening is provided in **Appendix E**.
- **Unresolved Issues** – This section will present a list of items which, while important to implementation of the alternative, are not critical to resolve within the appraisal process. Many of the unresolved issues will be more thoroughly vetted within a subsequent feasibility study.

- **Design Criteria and Technical Assumptions** – This information, together with common design criteria previously identified, provide the basis for analysis and conceptual design of each alternative.
- **Conceptual Design** – Based on the design criteria and technical assumptions, conceptual designs for each alternative were prepared and used to estimate project costs.
- **Capital, Operations and Maintenance Costs** – A preliminary planning level cost estimate is required to fully understand the capital, operations and maintenance costs associated with the potential alternatives. The Association for the Advancement of Cost Engineering (AACE) has identified an expected accuracy range of cost estimates associated with different classes of project definition and design. As defined by AACE, Class 5 estimates, commonly associated with appraisal studies, are typically within -50% to +100% of final project cost. Costs presented herein should therefore be utilized with caution, as the project definition is not yet sufficient to yield a more accurate estimate.

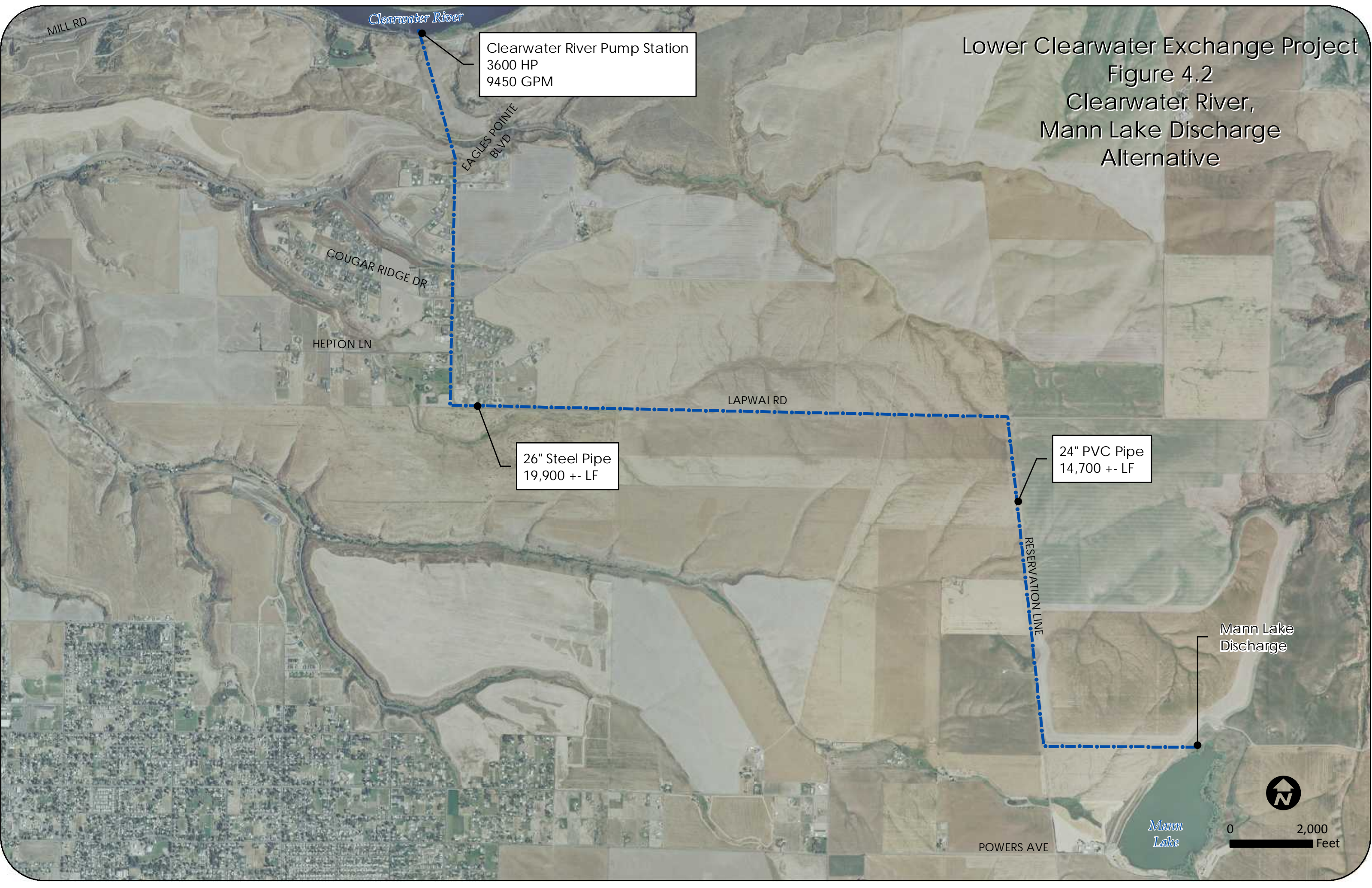
#### 4.2.1 CLEARWATER RIVER PUMPING STATION

The Clearwater River Pumping Station is a concept that has received attention in numerous studies including the 1972 Hoffman and Fiske, 1992 Morrison Knudsen, 2000 Carollo, and 2009 J-U-B reports.

The pump station would be located on the southern bank of the Clearwater River. The Clearwater River Action Alternative includes three preliminary system connection scenarios based on various pipe route options:

- **Mann Lake Discharge** – Water would be supplied from the Clearwater to Mann Lake in a single lift via the pipe route indicated in **Figure 4.2**. This action alternative does not provide equivalent service as other action alternatives that connect directly to the distribution system, as the size of the Powers Avenue main limits flows to the LOID system.
- **Mann Lake Discharge with Powers Avenue Upgrade** – Water would be supplied from the Clearwater to Mann Lake in a single lift via the pipe route indicated in **Figure 4.3**. The distribution pipe along Powers Avenue to 16<sup>th</sup> Street would be upgraded with a parallel pipe to provide equivalent service as other action alternatives that connect directly to the distribution system.
- **Distribution System Discharge** – Water would be supplied from the Clearwater in a single lift directly to the distribution system as shown on **Figure 4.4** near the intersection of Thain Road and Cedar Avenue. Mann Lake would be filled by pumping water through existing piping on Powers Avenue. Connection to the existing distribution system provides a new water supply near the center of the distribution system and appears to resolve some existing pressure and capacity issues.





Lower Clearwater Exchange Project  
Figure 4.2  
Clearwater River,  
Mann Lake Discharge  
Alternative

Clearwater River Pump Station  
3600 HP  
9450 GPM

EAGLES POINTE  
BLVD

COUGAR RIDGE DR

HEPTON LN

LAPWAI RD

26" Steel Pipe  
19,900 +/- LF

24" PVC Pipe  
14,700 +/- LF

RESERVATION LINE

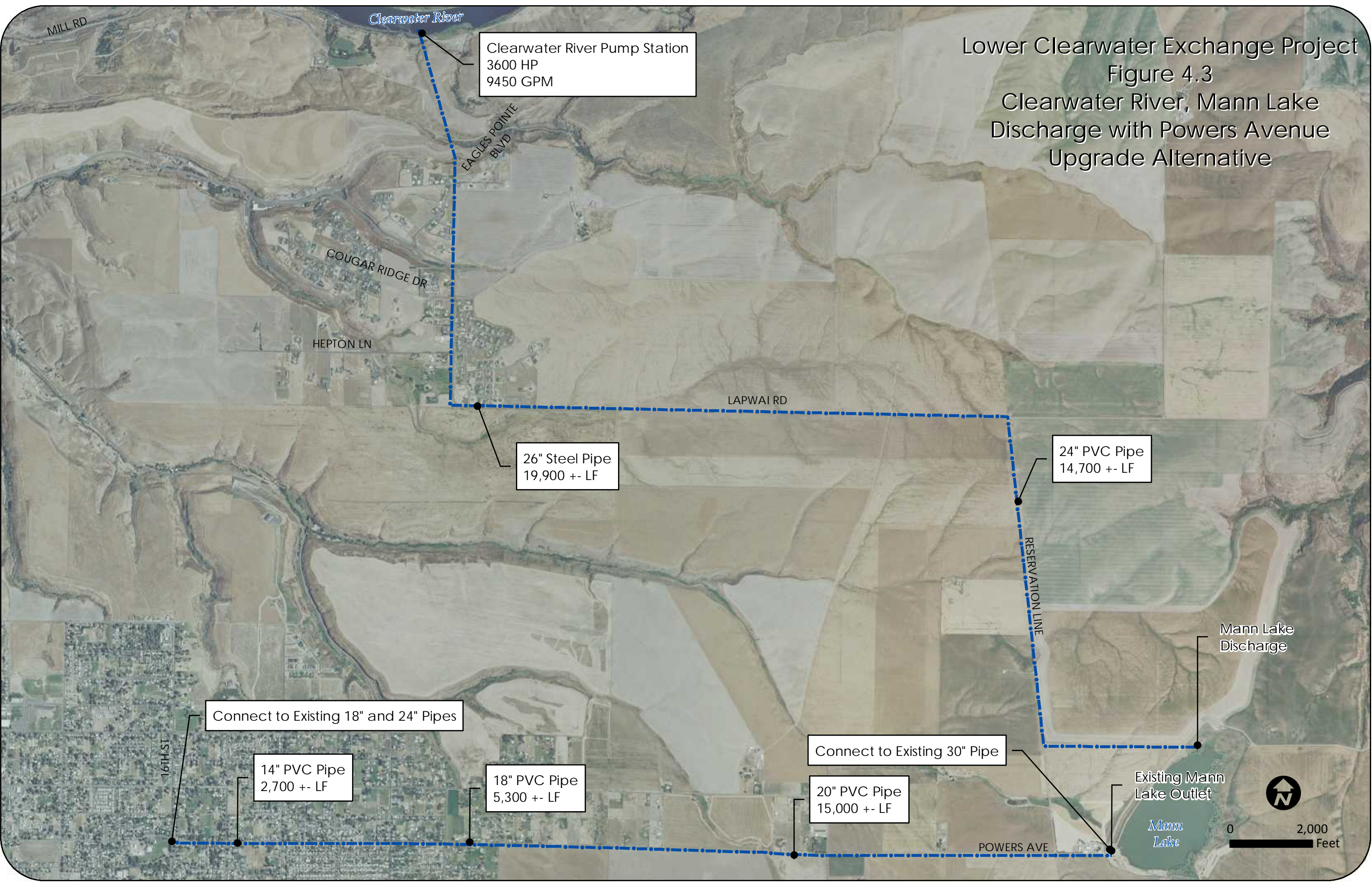
Mann Lake  
Discharge

Mann  
Lake



0 2,000  
Feet





Lower Clearwater Exchange Project  
Figure 4.3  
Clearwater River, Mann Lake  
Discharge with Powers Avenue  
Upgrade Alternative

Clearwater River Pump Station  
3600 HP  
9450 GPM

EAGLES POINTE  
BLVD

COUGAR RIDGE DR

HEPTON LN

LAPWAI RD

26" Steel Pipe  
19,900 +- LF

24" PVC Pipe  
14,700 +- LF

RESERVATION LINE

Mann Lake  
Discharge

Connect to Existing 18" and 24" Pipes

16TH ST

14" PVC Pipe  
2,700 +- LF

18" PVC Pipe  
5,300 +- LF

Connect to Existing 30" Pipe

20" PVC Pipe  
15,000 +- LF

POWERS AVE

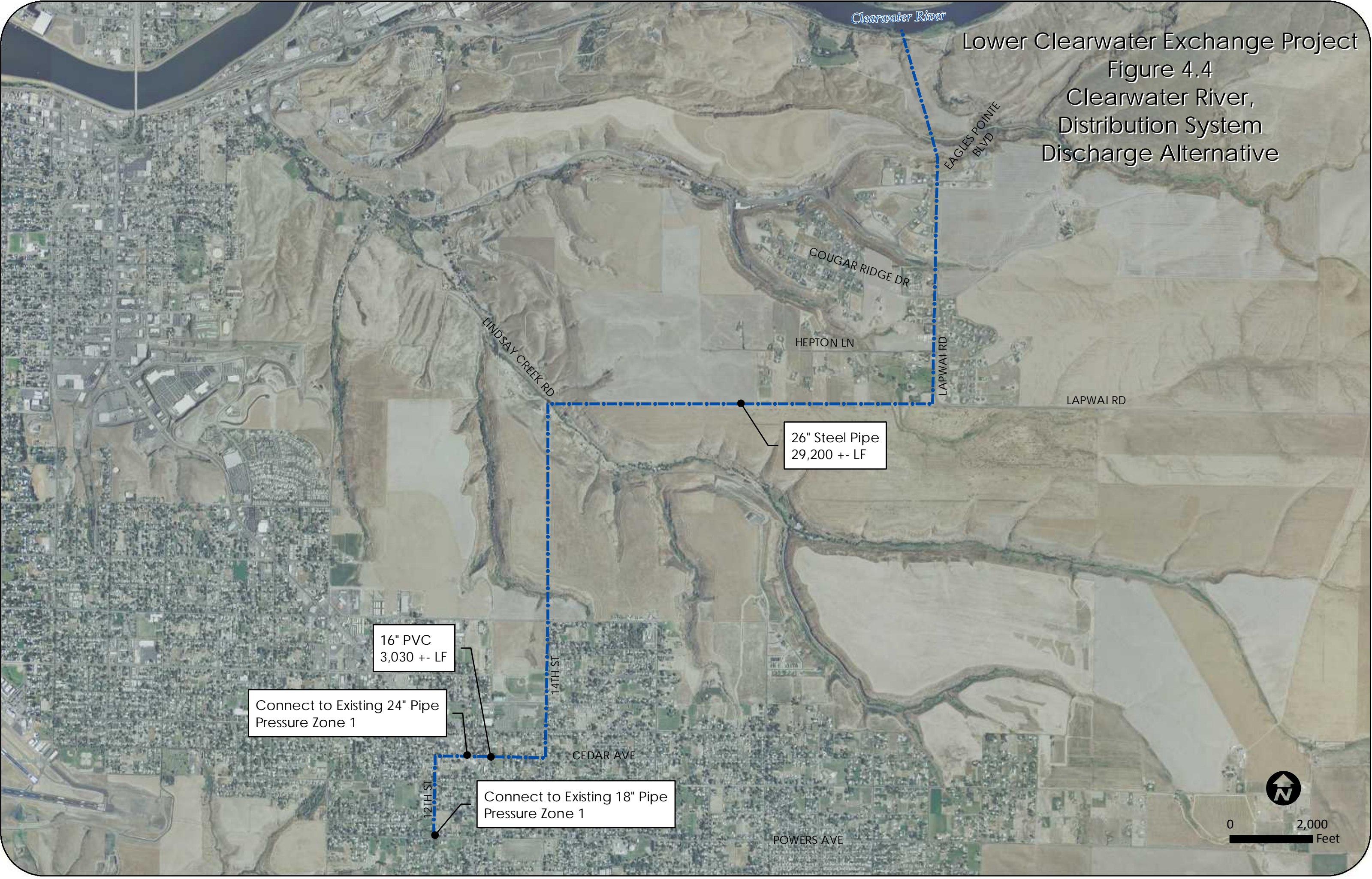
Existing Mann  
Lake Outlet  
Mann  
Lake



0 2,000  
Feet



Lower Clearwater Exchange Project  
Figure 4.4  
Clearwater River,  
Distribution System  
Discharge Alternative



26" Steel Pipe  
29,200 +/- LF

16" PVC  
3,030 +/- LF

Connect to Existing 24" Pipe  
Pressure Zone 1

Connect to Existing 18" Pipe  
Pressure Zone 1



0 2,000  
Feet



## TECHNICAL SCREENING

- Water Rights** – Water rights would be procured from the Clearwater River. Per discussion with the Idaho Department of Water Resources (IDWR), water is available for appropriation from the mainstem Clearwater River at the proposed point of withdrawal. The intended course of action is for protection of existing LOP water rights in the Sweetwater watershed via the Idaho Water Supply Bank, to meet unsatisfied Idaho minimum stream flows in Webb, Sweetwater and Lapwai Creeks; and in the mainstem Clearwater River. Water not diverted for the LOP from Webb and Sweetwater Creeks would be left instream and protected, reaching the Clearwater River via Lapwai Creek. A new water permit application would be submitted to IDWR by LOID. IDWR has stated in discussion that a water permit application premised on the protection for minimum stream flow beneficial use purposes of existing LOP upstream water rights would be viewed as particularly well-conceived (Whiting 2011). IDWR views the lower Clearwater River at the proposed diversion location as part of a single hydrological unit, for net effect purposes, with the lower Lapwai/Sweetwater Creek watershed.
- Power** – The pump station would be served by Clearwater Power Company (CPC), a non-profit electrical cooperative located near the site. The proposed site is located across the river from CPC's Spaulding sub-station, and a river crossing would be required to provide service. Discussion with Clearwater Power indicates the sub-station is sufficiently sized to serve the Clearwater Pump Station (Pfaff 2011).

## RISKS, UNCERTAINTIES, AND UNRESOLVED ISSUES

- Environmental and Cultural Mitigation** – Environmental and cultural mitigation measures, if required, will be identified in a subsequent NEPA process. Any potential seasonal restrictions on pumping which result from the NEPA process would impact pump station sizing and analysis presented herein.
- Property and Right-of-Way Acquisition** – Property and right-of-way must be acquired for the pump station and piping.
- Existing System Capabilities** - Further evaluation and modeling will be required to verify that if the new pipeline discharges to the existing distribution system the distribution system pressures required to move water back to Mann Lake do not exceed the capability of the existing system.
- Permitting** – Numerous permits would be required to complete the work. Those permits are listed in **Table 4.4**.

**Table 4.4 - Required Permits - Clearwater River Action Alternatives**

Agency	Permit Required
Corps of Engineers	Section 10
	Section 404
	Property Lease
State of Idaho	Stream Channel Alteration Permit
	Easement For Work Below Ordinary High Water
	Cultural Resources Survey
	IDWR Water Permit
Railroad	Pipeline Crossing
	Private Crossing Permit
	Property Lease
Nez Perce County	Permit to Use Public Right-of-way Utilities and Encroachments
	Building Permit
City of Lewiston	Right-of-way Use Permit
Private Property	Easements

#### DESIGN CRITERIA AND TECHNICAL ASSUMPTIONS

The following paragraphs outline the design criteria and technical assumptions used in development of the conceptual plans and costs.

- Operating Pressure** – Operating pressure in the system is currently established by the water level in Mann Lake less head loss in the existing distribution system. Currently, water users in many parts of the system experience inadequate operating pressure during high use periods. For the action alternatives connecting to the distribution system, operating pressures would slightly exceed current pressures during periods of low water use, as higher pressures are required to provide sufficient pressure to pump water through the existing system back to Mann Lake.

Mann Lake Discharge – No change in operating pressure will occur in the existing distribution system if the pumped water is discharged to Mann Lake without an upgrade of the Powers Avenue pipeline.

Mann Lake Discharge with Powers Avenue Upgrade – If the Powers Avenue pipeline is installed, water users could expect better pressure during high water use periods due to reduced system head losses.

Distribution System Discharge – If the proposed pipe discharges to the existing distribution system in a central location as proposed, head losses in the system would be reduced and water users could expect better water pressure during higher water use periods.

- **Intake Screens** – Intake screens will be designed and sized to meet NOAA Fisheries, United States Fish and Wildlife and Idaho Department of Fish and Game guidelines for anadromous and resident fish. The use of shoreline mounted traveling woven wire belt screens is anticipated for this site due to the relatively shallow river depth, high water velocities and the potential for ice and debris in the water. The screens would be mounted behind a heavy steel trash rack in a concrete structure. The screens would be sized to keep the water approach velocity below 0.4 feet per second. Screen openings would be 0.0938 inches or less for the woven wire screens.
- **Pumps** – The system has high volume and head requirements that will require the use of vertical turbine type pumps. Discharge pressure requirements at the pump station are expected to vary from around 1,068 feet (462 psi) at low flows to 1,214 feet (526 psi) at high flows. Pump and motor speeds would be held to 1,800 rpm or slower to minimize wear on the pump and column. Pump sizes have been limited to capacities that do not require more than 600 horsepower (hp) so low voltage (480 volt) motors and electrical equipment could be utilized. This results in a river pump station with six 600 hp pumps.

With six pumps, the loss of any one due to a pump or motor failure would reduce pumping capacity by 16.7%. It is anticipated the LOID could manage a 16.7% loss in maximum pumping capacity until pump or motor repairs could be completed.

- **Electrical Controls** - Where the pump station will discharge directly to Mann Lake, constant speed reduced voltage start electrical switchgear will likely be used, regardless of whether the Powers Avenue pipeline is installed. Where the pumps will discharge directly to the existing distribution system, variable speed drive equipment will be used to provide LOID control over operating pressure while meeting variable water demand. Variable speed drives would allow pumps to be brought on line without introducing significant pressure surges into the system. Limiting individual pumps to 600 hp would allow the use of low voltage (480 volt) variable speed drives and switchgear.
- **Pump Station Structure** – Pumps, piping and electrical equipment would be housed in a heated and ventilated enclosure for security, weather and freeze protection, and to reduce noise.
- **Flow Meter** – An ultrasonic or other suitable electronic flow meter would be installed on the pump station discharge to measure and record the pumping rate and volume.
- **Pipe Materials** – Anticipated pipe materials are steel and polyvinyl chloride (PVC). The steel pipe would be used at lower elevations where operating pressure exceeds the pressure capability of PVC pipe. Wall thickness of the steel pipe would vary with heavier walled pipe at lower elevations. In higher pressure areas and on steep slopes the pipe would be installed with all welded joints. Steel pipe would be provided with both a coating and lining to prevent corrosion. In lower pressure areas with reduced slopes the transition may be made to bell and spigot, gasketed joints to reduce installation cost.

The lower elevations of the conceptual pipe route include steep, rocky slopes. Where pipe is installed up these slopes special pipe anchoring and support methods may be required. Steel pipe provides the physical characteristics necessary for these installation methods.

Pipe installed above an elevation of approximately 1,440 feet is generally anticipated to be AWWA C905 PVC pipe. The pipe pressure class would vary depending on anticipated operating pressure.

- **Pipe Sizing** - A cursory hydraulic analysis was completed to determine approximate pipe sizes and pressure requirements using the Hazen-Williams equation as discussed within the design criteria and analysis methods.
- **Pipe Routing** – Without bisecting properties, pipe routes were selected to provide the most direct route, minimizing pipe length and cost. Road right-of-way was used where possible to minimize efforts to acquire pipeline easements. Where road right-of-ways were not available, pipelines are located along property lines to have the least impact on property use.
- **Pipe Grade** - The pipe alignment for the Clearwater River Pump Station rises rapidly from the river to a plateau where the grade levels off. Pipe installed along alignments that climb quickly from the pump station and then level off can be subject to damaging vacuum pressures should the pump station lose power or the pipeline have a major failure. It is anticipated that additional work will be required along this pipe alignment to protect the pipe from vacuum.
- **Valving** - The size and length of the proposed pipe corresponds with a considerable storage volume of water. The conceptual plan includes the installation of a number of strategically placed inline check valves along the pipe route to prevent the pipe from draining in the event of a pipe failure.

Where the pipeline connects directly to the existing distribution system, a check valve would be installed to allow continued use of Mann Lake and prevent water from being drained from Mann Lake in the event of a pipe failure. Additional check valves would likely be installed in strategic locations above significant residential and commercial development and at the crest of steep slopes.

Numerous isolation valves will be required for the Powers Avenue upgrade where the new pipeline connects to the existing distribution system.

- **Winter Operation** - The system would remain operational during the winter to refill Mann Lake. All equipment that could be subject to damage from freezing temperatures must be protected. This equipment includes, but is not limited to; traveling belt screens above the water line, pumps, pump discharge pipe and valves, filters and air and vacuum valves.
- **Existing Distribution System Evaluation** - A cursory evaluation of the main pipelines between Mann Lake and the locations where the proposed pipelines will connect was completed through review of pipes 18-inches and larger as discussed in the design criteria and analysis assumptions.

## TECHNICAL ANALYSIS AND PRELIMINARY SIZING CRITERIA

The location of the Clearwater River Pump Station was selected based on its proximity to Mann Lake and the distribution system, power availability, archeological and cultural considerations, and its vicinity to favorable pipe routes. No evaluation of the river channel to determine its stage discharge characteristics, thalweg (deepest channel) location and sedimentation characteristics has been undertaken to determine whether the site shown is suitable for the pump station. The final location of the pump station should be thoroughly evaluated to ensure it can operate at all anticipated river water levels with minimal sediment deposition in the intake structure.

Design criteria including monthly demands and operational storage are presented in **Table 4.1** and **Figure 4.1**. With this information, a water budget analysis was completed to establish the lowest acceptable Clearwater River Pump Station pumping capacity. Two primary criteria were key to sizing the pumping capacity. Those criteria are:

- Meeting monthly demand design criteria.
- Refilling Mann Lake.

Based on the monthly water volume requirements shown in **Figure 4.1**, and maximized use of the 1,460 acre-ft of operational storage available in Mann Lake, the minimum river pump station capacity was established. The water budget identified that Mann Lake storage would be depleted during the months of June, July, and August to augment pumping capacity, and a minimum river pumping capacity of 9,450 gpm (21.1 cfs) was established. This capacity can be satisfied with six 600 hp, 1,575 gpm pumps operating at maximum estimated head of 1,214 feet. A minimum efficiency of about 80.5% is required to provide sufficient flow without exceeding the motor name plate horsepower. Pumps from several manufacturers were identified with this capability.

With a river pump station capacity of 9,450 gpm, average discharge from Mann Lake would peak in July at approximately 5,300 gpm. Remaining fire suppression storage in Mann Lake at the end of August would be 500 acre-ft. In September, water requirements will typically drop below the pump station's 9,450 gpm capacity. The pump station could be used to refill Mann Lake within the capacity and pressure limits of the existing system.

- **Mann Lake Discharge Alternatives** - The initial concept is to refill Mann Lake quickly following the irrigation season and then shut the system down for the winter. Seepage and evaporation



losses and any water use over the winter would be replaced in the spring when irrigation water use was low.

- Distribution System Discharge Alternative** - If the supply is piped directly to the existing distribution system, the ability to quickly refill Mann Lake is more limited. Currently, maximum distribution system pressures occur when Mann Lake is full, water use is low and system pressure is at or near static, indicating a flat hydraulic grade line equivalent to the water surface elevation in Mann Lake. To fill Mann Lake via connection to the distribution system and back feed through the Powers Avenue mainline, the hydraulic grade line must be reversed, increasing the pressure above static levels throughout LOID's highest pressure zone. The largest pressure increases would occur where the new pipe connects to the existing distribution system, in the lower elevation areas of the highest pressure zone, and would decrease from the new connection towards Mann Lake. The pressure impacts can be minimized by refilling Mann Lake with one river pump over a period of several months. The slow rate of recharge correlates with minimal pressure loss, and under this refill scenario, the maximum increase in pressure above static level is estimated at less than 5 psi. In contrast, quicker recharge of Mann Lake using the entire capacity of the river pump station would require a significant increase in distribution system pressure to overcome pipe friction losses between the connection point and Mann Lake and is not feasible without extensive upgrades.

Suitable pumps to meet system design requirements of 1,575 gpm at design head of 1,214 feet will likely produce on the order of 1,900 gpm at anticipated low flow refill head. At this flow rate, pumping 1,460 ft to refill Mann Lake will take 174 days. Based on the 198 day irrigation season from April 1 through October 15, there are 167 days available to refill Mann Lake when minimal irrigation demand is anticipated. Partial refill of Mann Lake would take place during the months of April, May, September and October during periods of low water use. **Table 4.5** outlines the preliminary pump station sizing criteria.

**Table 4.5 - Preliminary Pump Station Sizing - Clearwater River Action Alternatives**

Description	Quantity
Vertical Turbine Pumps	(Six) 600 HP
Pump Design Capacity	1.575 GPM
Pump Design Head	1,214 Feet (526 psi)

**Table 4.6** outlines the piping requirements to convey water under each of the Clearwater River Action Alternatives.

**Table 4.6 - Preliminary Pipe Sizing - Clearwater River Action Alternatives<sup>a</sup>**

Description	Comments	Action Alternative		
		Mann Lake Discharge	Mann Lake Discharge Powers Avenue Upgrade	Distribution System Discharge
26" Steel	High Pressure Pipe	19,900 LF	19,900 LF	29,200 LF
24" PVC	Low Pressure Pipe	14,700 LF	14,700 LF	
20" PVC	Low Pressure Distribution Pipe		15,000 LF	
18" PVC	Low Pressure Distribution Pipe		5,300 LF	
16" PVC	Low Pressure Pipe			3,030 LF
14" PVC	Low Pressure Distribution Pipe		2,700 LF	

<sup>a</sup> See **Appendix G** for additional detail.

As shown within **Table 4.6**, the distribution system discharge alternative requires less total pipe, but a greater percentage of steel pipe due to high operational pressure at low elevations. Considerably more pipe is required for the Powers Avenue upgrade to provide the parallel pipe.

## CAPITAL, OPERATIONS AND MAINTENANCE COSTS

### CAPITAL COST

A construction cost estimate was prepared for each of the Clearwater River Action Alternatives. Material suppliers were contacted to obtain current prices for major system components including the intake screens, vertical turbine pumps, variable speed drives and steel pipe. The estimated cost of remaining materials and installation was generated from bid tabulations, materials priced for other projects, and engineering judgment.

The estimated cost for the Clearwater River, Mann Lake Discharge Alternative is shown in **Table 4.7**. This cost estimate does not include any parallel piping along Powers.

**Table 4.7 - Estimated Cost - Clearwater River Mann Lake Discharge Alternative<sup>a</sup>**

<b>Item No.</b>	<b>Description</b>	<b>Total (\$2011)</b>
1	Mobilization	\$787,000
2	River Pump Station	\$3,499,500
3	Penstock	\$4,788,930
4	Mann's Lake Structure	\$20,000
5	Road Repair	\$1,220,000
6	Miscellaneous	\$315,800
Subtotal		\$10,631,230
Planning Level Construction Contingency (25%)		\$2,657,808
Construction Total		\$13,289,038
Sales Tax (6.5%)		\$863,787
Design Engineering (10%)		\$1,328,904
Surveying		\$100,000
Geotechnical Services		\$150,000
Construction Management (10%)		\$1,328,904
Legal, Admin, Grant Admin Fees (10%)		\$1,328,904
Permit Acquisition		\$80,000
Land/Right-of-way Acquisition		\$200,000
Grand Total <sup>b</sup>		<b>\$18,669,536</b>

<sup>a</sup> Detailed cost estimates provided in **Appendix I**.

<sup>b</sup> Total does not include estimated \$3M for Feasibility and NEPA Study or estimated \$100,000 mitigation cost for diversion removal for each action alternative.

The estimated cost for the Clearwater River, Powers Avenue Upgrade Alternative is shown in **Table 4.8**.

**Table 4.8 - Estimated Cost - Clearwater River Powers Avenue Upgrade Alternative<sup>a</sup>**

<b>Item No.</b>	<b>Description</b>	<b>Total (\$2011)</b>
1	Mobilization	\$900,000
2	River Pump Station	\$3,499,500
3	Penstock	\$4,788,930
4	Powers Avenue Pipeline	\$1,406,200
5	Mann's Lake Structure	\$20,000
6	Road Repair	\$1,220,000
7	Miscellaneous	\$315,800
Subtotal		\$12,150,430
Planning Level Construction Contingency (25%)		\$3,037,608
Construction Total		\$15,188,038
Sales Tax (6.5%)		\$987,222
Design Engineering (10%)		\$1,518,804
Surveying		\$100,000
Geotechnical Services		\$150,000
Construction Management (10%)		\$1,518,804
Legal, Admin, Grant Admin Fees (10%)		\$1,518,804
Permit Acquisition		\$80,000
Land/Right-of-way Acquisition		\$200,000
Grand Total <sup>b</sup>		<b>\$21,261,672</b>

<sup>a</sup> Detailed cost estimates provided in **Appendix I**.

<sup>b</sup> Total does not include estimated \$3M for Feasibility and NEPA Study or estimated \$100,000 mitigation cost for diversion removal for each action alternative.

The estimated cost for the Clearwater River Pump Station and piping to the existing distribution system near the intersection Thain Road and Cedar Avenue is shown in **Table 4.9**.

**Table 4.9 - Estimated Cost - Clearwater River Pump Station, Distribution System Discharge Alternative<sup>a</sup>**

<b>Item No.</b>	<b>Description</b>	<b>Total (\$2011)</b>
1	Mobilization	\$807,600
2	River Pump Station	\$3,732,500
3	Penstock	\$5,732,150
4	Road Repair	\$403,200
5	Miscellaneous	\$227,000
Subtotal		\$10,902,450
Planning Level Construction Contingency (25%)		\$2,725,613
Construction Total		\$13,628,063
Sales Tax (6.5%)		\$885,824
Design Engineering (10%)		\$1,362,806
Surveying		\$100,000
Geotechnical Services		\$150,000
Construction Management (10%)		\$1,362,806
Legal, Admin, Grant Admin Fees (10%)		\$1,362,806
Permit Acquisition		\$80,000
Land/Right-of-way Acquisition		\$200,000
Grand Total <sup>b</sup>		<b>\$19,132,305</b>

<sup>a</sup> Detailed cost estimates provided in **Appendix I**.

<sup>b</sup> Total does not include estimated \$3M for Feasibility and NEPA Study or estimated \$100,000 mitigation cost for diversion removal for each action alternative.

## **OPERATIONAL COST**

Pumping water from the Clearwater River to either Mann Lake or the distribution system will require a considerable amount of electrical power and would become the major operating expense for the system. Power for the Clearwater River Pump Station would be supplied by the Clearwater Power Company (CPC) from an existing substation located across the Clearwater River to the north of the proposed site. The power supplied would fall under CPC's Schedule 2-7 Industrial Service rates provided in **Table 4.2**. Annual energy expenditures to pump 8,500 ft for LOID were estimated based on this cost schedule.



**Table 4.10.** provides estimated power costs associated with the Mann Lake Discharge Alternatives; electrical costs are the same regardless of whether the Powers Avenue upgrade is completed. Based on the LOID service area, the annual energy cost for the Mann Lake Discharge Alternatives is roughly \$155 per acre. The estimated annual energy cost to pump into the distribution system is shown in **Table 4.11**. Based on the LOID service area, the annual energy cost for the Clearwater River distribution system discharge alternative is roughly \$153 per acre. The minimum annual change under this billing schedule will be easily satisfied with anticipated usage.

Termination of operation of a number of LOP reservoirs, diversion equipment and a significant length of canal would eliminate 2.67 full time equivalent (FTE) and two vehicles totaling \$250,000, if the proposed system is constructed. Staff effort dedicated to operating the new system is anticipated to be one FTE and one vehicle totaling \$108,000.

**Table 4.10 - Estimated Annual Electrical Cost - Mann Lake Discharge Alternatives**

Month	Avg. Flow (gpm)	Avg. Head (ft)	Power (kWh)	Demand (kW)	Energy Cost	Demand Cost	Facilities Cost	Total Cost
Jan	1,715	1,068	313,224	421	\$12,435	\$2,421	\$250	\$15,106
Feb	1,715	1,068	282,912	421	\$11,232	\$2,421	\$250	\$13,902
Mar	2,336	1,073	428,544	749	\$17,013	\$4,307	\$250	\$21,570
Apr	4,706	1,103	858,960	1,551	\$34,101	\$8,918	\$250	\$43,269
May	7,241	1,154	1,427,736	2,495	\$56,681	\$14,346	\$250	\$71,277
June	9,450	1,214	1,897,920	2,636	\$75,347	\$15,157	\$250	\$90,754
July	9,450	1,214	1,961,184	2,636	\$77,859	\$15,157	\$250	\$93,266
Aug	9,450	1,214	1,961,184	2,636	\$77,859	\$15,157	\$250	\$93,266
Sept	8,809	1,195	1,741,680	2,636	\$69,145	\$15,157	\$250	\$84,552
Oct	4,336	1,097	813,192	1,420	\$32,284	\$8,165	\$250	\$40,699
Nov	1,715	1,068	303,120	421	\$12,034	\$2,421	\$250	\$14,705
Dec	1,715	1,068	313,224	421	\$12,435	\$2,421	\$250	\$15,106
Annual Consumption (kWh)								12,302,880
Annual Energy Cost								\$488,424
Annual Demand Cost								\$106,047
<b>Annual Total Cost</b>								<b>\$597,472</b>

**Table 4.11 - Estimated Annual Electrical Cost - Distribution System Discharge Alternative**

Month	Avg. Flow (gpm)	Avg. Head (ft)	Power (kWh)	Demand (kW)	Energy Cost	Demand Cost	Facilities Cost	Total Cost
Jan	1,715	1,072	313,968	422	\$12,465	\$2,427	\$250	\$15,141
Feb	1,715	1,072	283,584	422	\$11,258	\$2,427	\$250	\$13,935
Mar	2,336	1,074	429,288	750	\$17,043	\$4,313	\$250	\$21,605
Apr	4,706	1,096	853,200	1,540	\$33,872	\$8,855	\$250	\$42,977
May	7,241	1,140	1,410,624	2,465	\$56,002	\$14,174	\$250	\$70,426
June	9,450	1,192	1,863,360	2,588	\$73,975	\$14,881	\$250	\$89,106
July	9,450	1,192	1,925,472	2,588	\$76,441	\$14,881	\$250	\$91,572
Aug	9,450	1,192	1,925,472	2,588	\$76,441	\$14,881	\$250	\$91,572
Sept	8,809	1,179	1,717,920	2,588	\$68,201	\$14,881	\$250	\$83,332
Oct	4,336	1,097	813,192	1,421	\$32,284	\$8,171	\$250	\$40,704
Nov	1,715	1,072	303,840	422	\$12,062	\$2,427	\$250	\$14,739
Dec	1,715	1,072	313,968	422	\$12,465	\$2,427	\$250	\$15,141
Annual Consumption (kWh)								12,153,888
Annual Energy Cost								\$482,509
Annual Demand Cost								\$104,742
<b>Annual Total Cost</b>								<b>\$590,251</b>

#### MAINTENANCE COSTS

Annual maintenance costs for the Clearwater River Action Alternatives were estimated based on methodology described in the design criteria and analysis methods and are summarized in **Table 4.12**

**Table 4.12 - Estimated Annual Maintenance - Clearwater River Action Alternatives**

Mann Lake Discharge	Mann Lake Discharge Powers Avenue Upgrade	Distribution System Discharge
\$82,400	\$89,100	\$90,600

<sup>a</sup> (\$2011 Dollars)

#### 4.2.2 SNAKE RIVER PUMPING STATION

The Snake River Action Alternative is a concept that has recently received attention because of its proximity to the LOID service area and water right availability at the proposed withdrawal location. The pump station would be located on the east bank of the Snake River. The Snake River includes two

system connection scenarios based on various pipe route options. Both options discharge to the existing distribution system at the same point as the Clearwater River Distribution Discharge Alternative:

**Tammany Creek Road** – Water would be supplied from the Snake to the distribution system in a single lift via the pipe route indicated in **Figure 4.5**. The alignment follows Tammany Creek and remains at low elevations for much of its length. The option was selected for review due to the potential to install piping completely within existing public right-of-way.

- **Southport Avenue** – Water would be supplied from the Snake to the distribution system in a single lift via the pipe route indicated in **Figure 4.6**. The alignment provides the most direct and shortest route. A significant portion of the pipe could be installed in public right-of-way. Rapid elevation change from the pump station would allow minimized use of high pressure steel pipe.

#### TECHNICAL SCREENING

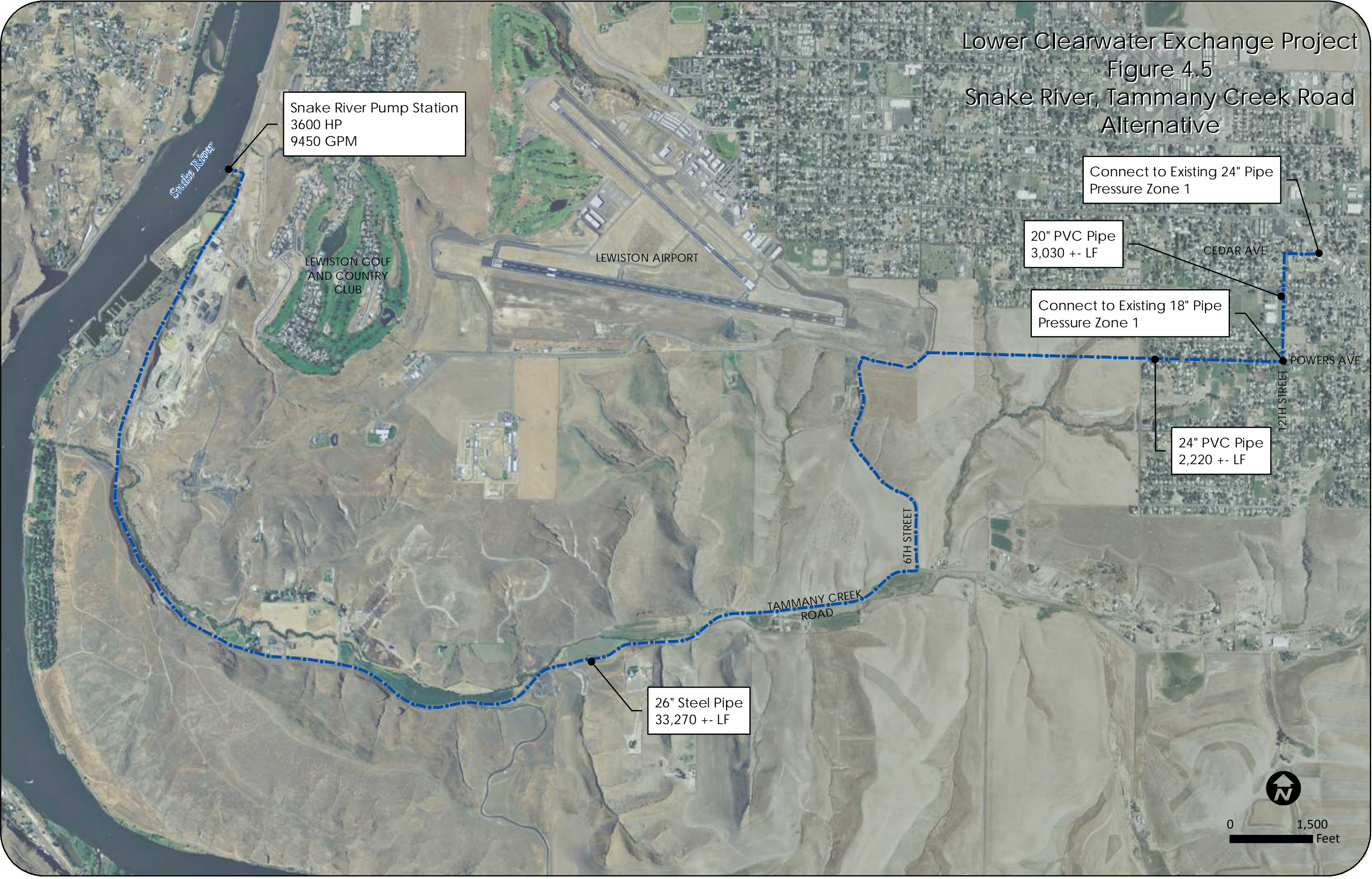
- **Water Rights** – Water rights would be procured from the Snake River. Per discussion with the Idaho Department of Water Resources (IDWR), water is available for appropriation from the mainstem Snake at the proposed point of withdrawal. The site is approximately 3.25 miles upstream from the confluence of the Snake and Clearwater Rivers and at a location in the Lower Granite Dam pool. The intended course of action is for protection of existing LOP water rights in the Sweetwater watershed via the Idaho Water Supply Bank, to meet unsatisfied Idaho minimum stream flows in Webb, Sweetwater and Lapwai Creeks; and in the mainstem Clearwater River. Water not diverted from the LOP from Webb and Sweetwater Creeks would be left instream and protected, reaching the Clearwater River, and then the Snake River, via Lapwai Creek. A new water permit application would be submitted to IDWR by LOID. IDWR has stated in discussion that a water permit application premised on the protection for minimum stream flow beneficial use purposes of existing LOP upstream water rights would be viewed as particularly well-conceived (Whiting 2011). IDWR views the Snake River at the proposed diversion location and the Sweetwater watershed as part of a single hydrological unit, for net effect purposes, with the lower Lapwai/Sweetwater Creek watershed.
- **Power** – The pump station would be served by Avista Corporation, a for profit electrical utility regulated by the Idaho Public Utilities Commission. Discussions with Avista suggest efforts to supply power to the proposed river pump station site would not be extensive. Avista has sufficient capacity in the existing power supply to serve the industrial sites in the area.

#### RISKS, UNCERTANITIES, AND UNRESOLVED ISSUES

- **Environmental and Cultural Mitigation** – Environmental and cultural mitigation measures, if required, will be identified in a subsequent NEPA process. Any seasonal restrictions on pumping which result from the NEPA process would impact pump station sizing and analysis presented herein.

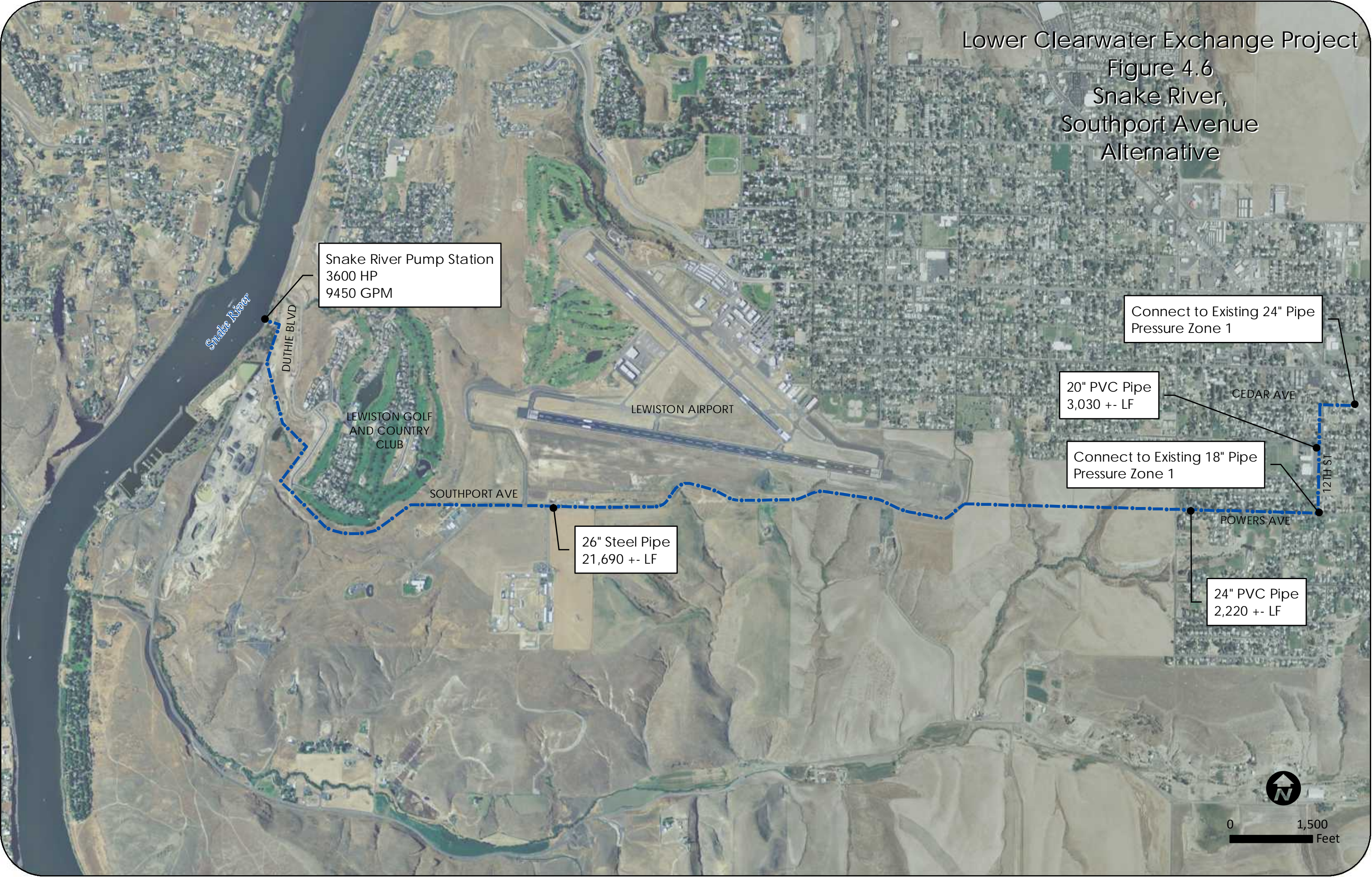


Lower Clearwater Exchange Project  
Figure 4.5  
Snake River, Tammany Creek Road  
Alternative





Lower Clearwater Exchange Project  
Figure 4.6  
Snake River,  
Southport Avenue  
Alternative





- **Property and Right-of-Way Acquisition** – Property and right-of-way must be acquired for the pump station and piping.
- **Existing System Capabilities** - Further evaluation and modeling will be required to verify that if the new pipeline discharges to the existing distribution system the distribution system pressures required to move water back to Mann Lake do not exceed the capability of the existing system.
- **Permitting** – Numerous permits would be required to complete the work. Those permits are shown in **Table 4.13**.

**Table 4.13 - Required Permits - Snake River Action Alternatives**

Agency	Permit Required
Corps of Engineers	Section 10
	Section 404
	Property Lease
State of Idaho	Stream Channel Alteration Permit
	Easement For Work Below Ordinary High Water
	Cultural Resources Survey
	IDWR Water Permit
Nez Perce County	Permit to Use Public Right-of-way Utilities and Encroachments
	Building Permit
City of Lewiston	Right-of-way Use Permit
	Building Permit
Private Property	Easements

#### DESIGN CRITERIA AND TECHNICAL ASSUMPTIONS

The following paragraphs outline the design criteria and technical assumptions used in development of the conceptual plans and costs.

- **Operating Pressure** – Operating pressure in the system is currently established by the water level in Mann Lake less head loss in the existing distribution system. Currently water users in many parts of the system experience inadequate operating pressure during high use periods. The proposed Snake River Action Alternatives discharge to the existing distribution system in a central location and would reduce head losses associated with supply in the Powers Avenue mainline during periods of high water use. During periods of low water use when Mann Lake is refilled, operating pressures would slightly exceed current pressures to provide sufficient head to pump water back to Mann Lake.
- **Intake Screens** – Intake screens will be designed and sized to meet NOAA Fisheries, United States Fish and Wildlife and Idaho Department of Fish and Game guidelines for anadromous and resident fish. The use of submerged passive stainless steel wedge wire screens with an air burst

back flush system is anticipated for this site. The slower moving, deeper waters in the Lower Granite Dam pool make the use of this type screen practical. The screens would be sized to keep the water approach velocity below 0.4 feet per second. Screen openings would be 0.0689 inches or less for the profile bar type screens. The screens would be connected to a steel pipe installed on the river bottom.

- **Pumps** – The system has high volume and head requirements that will require the use of vertical turbine type pumps. Discharge pressure requirements at the pump station are expected to vary from around 1,079 feet (467 psi) at low flows to 1,248 feet (540 psi) at high flows depending on the pipe route selected. Pump/motor speeds would be held to 1,800 rpm or slower to minimize wear on the pump and column. Pump sizes have been limited to capacities that do not require more than 600 hp so low voltage (480 volt) motors and electrical equipment could be utilized. This results in a river pump station with six 600 hp pumps.

With six pumps, the loss of any one due to a pump or motor failure would reduce pumping capacity by 16.7%. It is anticipated the LOID could manage a 16.7% loss in maximum pumping capacity until pump or motor repairs could be completed.

- **Electrical Controls** – Each pump would be used in conjunction with electrical variable speed drive equipment that would provide LOID control over operating pressure while meeting variable water demand. Variable speed drives would also allow pumps to be brought on line without introducing significant pressure surges into the system. Limiting individual pumps to 600 hp would allow the use of low voltage (480 volt) variable speed drives and switchgear.
- **Pump Station Structure** – Pumps, piping and electrical equipment would be housed in a heated and ventilated enclosure for security, weather and freeze protection, and to reduce noise.
- **Flow Meter** – An ultrasonic or other suitable electronic flow meter would be installed on the pump station discharge to measure and record the pumping rate and volume.
- **Pipe Materials** – Anticipated pipe materials are steel and polyvinyl chloride (PVC). The steel pipe would be used at lower elevations where operating pressure exceeds the pressure capability of PVC pipe. Wall thickness of the steel pipe would vary with heavier walled pipe at lower elevations. In higher pressure areas and on steep slopes the pipe would be installed with all welded joints. Steel pipe would be provided with both a coating and lining to prevent corrosion. In lower pressure areas with reduced slopes the transition may be made to bell and spigot, gasketed joints to reduce installation cost.

Pipe installed above an elevation of approximately 1,440 feet is generally anticipated to be AWWA C905 PVC pipe. The pipe pressure class would vary depending on anticipated operating pressure.

- **Southport Avenue Alternative** – The terrain associated with this alignment is characterized by steep and rocky slopes. Pipe installed via this route may require some special pipe anchoring and support methods. Steel pipe provides the physical characteristics necessary for these installation methods.

- **Pipe Sizing** - A cursory hydraulic analysis was completed to determine approximate pipe sizes and pressure requirements using the Hazen-Williams equation as discussed within the design criteria and analysis methods.
- **Pipe Routing** – Without bisecting properties, pipe routes were selected to provide the most direct route, minimizing pipe length and cost. Road right-of-way was used where possible to minimize efforts to acquire pipeline easements. Where road right-of-ways were not available, pipelines are located along property lines to have the least impact on property use.
- **Pipe Grade** - The pipe alignment for the Snake River Pump Station, Southport Avenue Alternative rises rapidly from the river to a plateau where the grade levels off. Pipe installed along alignments that climb quickly from the pump station and then level off can be subject to damaging vacuum pressures should the pump station lose power or the pipeline have a major failure. It is anticipated that additional work will be required along this pipe alignment to protect the pipe from vacuum.
- **Valving** - The size and length of the proposed pipe corresponds with a considerable storage volume of water. The conceptual plan includes the installation of a number of strategically placed inline check valves along the pipe route to prevent the pipe from draining in the event of a pipe failure.

Where the proposed pipeline connects directly to the existing distribution system, a check valve would be installed to allow continued use of Mann Lake and prevent water from being drained from Mann Lake the event of a pipe failure. Additional check valves would likely be installed in strategic locations above significant residential and commercial development and at the crest of steep slopes.

- **Winter Operation** - The system would remain operational during the winter to refill Mann Lake. All equipment that could be subject to damage from freezing temperatures must be protected. This equipment includes, but is not limited to; the pump discharge heads, pump discharge pipes and valves, filters, and air and vacuum valves.
- **Existing Distribution System Evaluation** - A cursory evaluation of the main pipelines between Mann Lake and the locations where the proposed pipelines will connect was completed through a review of pipes 18-inches and larger. As discussed in the design criteria and analysis assumptions.

#### TECHNICAL ANALYSIS AND PRELIMINARY SIZING CRITERIA

The location of the Snake River Pump Station was selected based on its proximity to the existing distribution system, power availability, archeological and cultural considerations and its vicinity to favorable pipe routes. No evaluation of the river channel beyond a review of existing river navigation charts was undertaken to determine any stage discharge relationships or sedimentation characteristics at the proposed pump station site. The site is located in the Lower Granite Dam pool and river

navigation charts suggest the river could reach a depth of 20 feet within 100 feet of the shoreline. A 20 foot depth would be sufficient to install the proposed passive wedge wire screens. Additional in-water evaluation work should be completed during design to establish the final pump station location.

Design criteria, including monthly demands and operational storage, are presented in **Table 4.3** and **Figure 4.1**. With this information, a water budget analysis was completed to establish the lowest acceptable Snake River Pump Station pumping capacity. Since the operational storage in Mann Lake and the proposed LOID water right would not change as a result of the different diversion location under this alternative, the water budget for the Snake River Pump Station results in the same 9,450 gpm (21.1 cfs) pumping capacity that was identified for the Clearwater River Pump Station.

This capacity can be satisfied with six 600 hp, 1,575 gpm pump. Each alternative however will have slightly different design parts:

- **Tammany Creek Road** – The longer Tammany Creek road alignment correlates with increased head loss and pump horsepower requirements. Maximum estimated head is 1,248 feet. Pumps with a minimum efficiency of 82.7% would be required to meet the design criteria without exceeding the motor nameplate horsepower. While operating at higher flow rates and lower head, the use of six 600 hp pumps along the Tammany Creek Road pipe route may require the pump motors to operate using a portion of their service factor.
- **Southport Avenue** – The shorter Southport Avenue alignment correlates with lower head loss and pump horsepower requirements. Maximum estimated head is 1,198 feet. Minimum efficiency of 80.5% is required to meet the design criteria without exceeding the motor nameplate horsepower. Pumps from several manufacturers were identified with this capability.

With a river pump station capacity of 9,450 gpm, average discharge from Mann Lake would peak in July at approximately 5,300 gpm. Remaining fire suppression storage in Mann Lake at the end of August would be 500 feet. In September water requirements will typically drop below the pump station's 9,450 gpm capacity and the pump station could be used to refill Mann Lake within the capacity and pressure limits of the existing system.

Both of the Snake River Action Alternatives discharge to the existing distribution system. Currently, maximum distribution system pressures occur when Mann Lake is full, water use is low and system pressure is at or near static, indicating a flat hydraulic grade line equivalent to the water surface elevation in Mann Lake. To fill Mann Lake via connection to the distribution system and back feed through the Powers Avenue mainline, the hydraulic grade line must be reversed, increasing the pressure



above static levels throughout LOID's highest pressure zone. The largest pressure increases would occur where the new pipe connects to the existing distribution system, in the lower elevation areas of the highest pressure zone, and would decrease from the new connection towards Mann Lake. The pressure impacts can be minimized by refilling Mann Lake with one river pump over a period of several months. The slow rate of recharge correlates with minimal pressure loss, and under this refill scenario, the maximum increase in pressure above static has been estimated at less than 5 psi. In contrast, quicker recharge of Mann Lake using the entire capacity of the river pump station would require a significant increase in distribution system pressure to overcome pipe friction losses between the connection location and Mann Lake and is not feasible without extensive upgrades.

Suitable pumps to meet system design requirements of 1,575 gpm at design head of 1,248 feet will likely produce on the order of 1,900 gpm at anticipated low flow refill head. At this flow rate, pumping 1,460 acre-ft to refill Mann Lake will take 174 days. Based on the 198 day irrigation season from April 1 through October 15 there are 167 days available to refill Mann Lake when minimal irrigation demand is anticipated. Partial refill of Mann Lake would take place during the months of April, May, September, and October during periods of low water use.

**Table 4.14** outlines the preliminary pump station sizing criteria for each of the Snake River actual alternatives.

**Table 4.14 - Preliminary Pump Station Sizing - Snake River Action Alternatives**

Description	Action Alternative	
	Tammany Creek Road	Southport Avenue
Vertical Turbine Pumps	(Six) 600 HP	(Six) 600 HP
Pump Design Capacity	1,575 GPM	1,575 GPM
Pump Design Head	1,248 ft (541 psi)	1,198 ft (519 psi)

**Table 4.15** outlines the piping requirements to convey water under each of the Snake River Action Alternatives.

**Table 4.15 - Preliminary Pipe Sizing - Snake River Action Alternatives<sup>a</sup>**

Description	Comments	Action Alternative	
		Tammany Creek Road	Southport Avenue
26" Steel	High Pressure Pipe	33,270 LF	21,690 LF
20"/24" PVC	Low Pressure Pipe	5,250 LF	5,250 LF

<sup>a</sup> See **Appendix G** for additional detail.

As shown within **Table 4.15**, the Southport Avenue Alternative requires less high pressure steel pipe due to lower operational pressures at high elevations. Considerably more pipe is required for the Tammany Creek Road Alternative.

## CAPITAL COST AND OPERATIONS AND MAINTENANCE COSTS

### CAPITAL COST

A construction cost estimate was prepared for each of the Snake River Action Alternatives. Material suppliers were contacted to obtain current prices for major system components including the intake screens, vertical turbine pumps, variable speed drives and steel pipe. The estimated cost of remaining materials and installation was generated from bid tabulations, materials priced for other projects, and engineering judgment.

The estimated cost for the Snake River, Southport Avenue Alternative alignment is shown in **Table 4.16**.

**Table 4.16 - Estimated Cost - Snake River Southport Avenue Alternative<sup>a</sup>**

Item No.	Description	Total (\$2011)
1	Mobilization	\$699,200
2	River Pump Station	\$3,405,700
3	Penstock	\$4,869,930
4	Road Repair	\$494,000
5	Miscellaneous	\$190,400
Subtotal		\$9,659,230
Planning Level Construction Contingency (25%)		\$2,414,808
Construction Total		\$12,074,038
Sales Tax (6.5%)		\$784,812
Design Engineering (10%)		\$1,207,404
Surveying		\$100,000
Geotechnical Services		\$150,000
Construction Management (10%)		\$1,207,404
Legal, Admin, Grant Admin Fees (10%)		\$1,207,404
Permit Acquisition		\$80,000
Land/Right-of-Way Acquisition		\$200,000
Grand Total <sup>b</sup>		<b>\$17,011,061</b>

<sup>a</sup> Detailed cost estimates provided in **Appendix I**.

<sup>b</sup> Total does not include estimated \$3M for Feasibility and NEPA Study or estimated \$100,000 mitigation cost for diversion removal for each action alternative.

The estimated cost for the Snake River, Tammany Creek Road Alternative is shown in **Table 4.17**. The higher cost of the Tammany Creek Road Alternative is due to greater pipe length at lower elevation, anticipated rock excavation, and extensive road repair work.

**Table 4.17 - Estimated Cost - Snake River Tammany Creek Road Alternative<sup>a</sup>**

Item No.	Description	Total (\$2011)
1	Mobilization	\$979,600
2	River Pump Station	\$3,185,700
3	Penstock	\$7,487,570
4	Road Repair	\$1,343,000
5	Miscellaneous	\$229,100
Subtotal		\$13,224,970
Planning Level Construction Contingency (25%)		\$3,306,243
Construction Total		\$16,531,213
Sales Tax (6.5%)		\$1,074,529
Design Engineering (10%)		\$1,653,121
Surveying		\$100,000
Geotechnical Services		\$150,000
Construction Management (10%)		\$1,653,121
Legal, Admin, Grant Admin Fees (10%)		\$1,653,121
Permit Acquisition		\$80,000
Land/Right-of-Way Acquisition		\$200,000
Grand Total <sup>b</sup>		<b>\$23,095,105</b>

<sup>a</sup> Detailed cost estimates provided in **Appendix I**.

<sup>b</sup> Total does not include estimated \$3M for Feasibility and NEPA Study or estimated \$100,000 mitigation cost for diversion removal for each action alternative.

## OPERATIONAL COST

Pumping water from the Snake River will require considerable electrical power and would become a major operating expense for the system. Power for the Snake River Pump Station would be supplied by Avista from existing power lines in the area. The power supplied would likely fall under Avista's Schedule 21 rates given in **Table 4.2**.

Based on this cost schedule the annual energy cost to pump 8,500 ft for LOID for each Snake River Action Alternative is given in **Table 4.18** and **Table 4.19**.

**Table 4.18 - Estimated Annual Electrical Cost - Southport Avenue Alternative**

Month	Avg. Flow (gpm)	Avg. Head (ft)	Power (kWh)	Demand (kW)	Energy Cost	Demand Cost	Total Cost
Jan	1,715	1,079	318,432	436	\$20,092	\$1,966	\$22,057
Feb	1,715	1,079	287,616	436	\$18,364	\$1,966	\$20,330
Mar	2,336	1,091	435,984	762	\$26,683	\$3,351	\$30,034
Apr	4,706	1,112	866,160	1,564	\$50,803	\$6,760	\$57,563
May	7,241	1,151	1,424,760	2,490	\$82,124	\$10,695	\$92,819
June	9,450	1,198	1,872,720	2,601	\$107,241	\$11,167	\$118,408
July	9,450	1,198	1,935,144	2,601	\$110,741	\$11,167	\$121,908
Aug	9,450	1,198	1,935,144	2,601	\$110,741	\$11,167	\$121,908
Sept	8,809	1,188	1,730,880	2,601	\$99,288	\$11,167	\$110,455
Oct	4,336	1,113	825,096	1,442	\$48,501	\$6,241	\$54,742
Nov	1,715	1,079	308,160	436	\$19,516	\$1,966	\$21,482
Dec	1,715	1,079	318,432	436	\$20,092	\$1,966	\$22,057
Annual Consumption (kWh)							12,258,528
Annual Energy Cost							\$714,186
Annual Demand Cost							\$79,576
Annual Total Cost							\$793,761

Based on the LOID service area, the annual energy cost for the Southport Avenue Alternative is roughly \$205 per acre.

Based on the LOID service area, the annual energy cost for the Tammany Creek Road Alternative is roughly \$213 per acre.



**Table 4.19 - Estimated Annual Electrical Cost - Tammany Creek Road Alignment**

Month	Avg. Flow (gpm)	Avg. Head (ft)	Power (kWh)	Demand (kW)	Energy Cost	Demand Cost	Total Cost
Jan	1,715	1,091	319,920	430	\$20,175	\$1,940	\$22,115
Feb	1,715	1,091	288,960	430	\$18,439	\$1,940	\$20,379
Mar	2,336	1,098	438,216	766	\$26,808	\$3,368	\$30,176
Apr	4,706	1,126	876,240	1,583	\$51,368	\$6,840	\$58,209
May	7,241	1,182	1,462,704	2,619	\$84,251	\$11,243	\$95,495
June	9,450	1,248	1,950,480	2,709	\$111,601	\$11,626	\$123,227
July	9,450	1,248	2,015,496	2,709	\$115,246	\$11,626	\$126,872
Aug	9,450	1,248	2,015,496	2,709	\$115,246	\$11,626	\$126,872
Sept	8,809	1,233	1,927,440	2,677	\$110,309	\$11,490	\$121,799
Oct	4,336	1,125	833,280	1,456	\$48,960	\$6,301	\$55,260
Nov	1,715	1,091	309,600	430	\$19,597	\$1,940	\$21,537
Dec	1,715	1,091	319,920	430	\$20,175	\$1,940	\$22,115
Annual Consumption (kWh)							12,757,752
Annual Energy Cost							\$742,177
Annual Demand Cost							\$81,879
Annual Total Cost							\$824,056

The Snake River Action Alternatives would meet the minimum annual charge specified in Table 4.2 if the full water right is utilized. On years with above average precipitation, minimum annual charges may not be satisfied through electrical demand.

Staff effort dedicated to operating the Snake River Pump Station system is anticipated to be one FTE and one vehicle totaling \$108,000.

#### **MAINTENANCE COSTS**

Annual maintenance costs for the Snake River Action Alternatives were estimated based on methodology described in the design criteria and summarized in **Table 4.1**.

**Table 4.20 - Estimated Annual Maintenance - Snake River Action Alternatives<sup>a</sup>**

Southport Avenue	Tammany Creek Road
\$79,400	\$91,000

<sup>a</sup> (\$2011 Dollars)

#### 4.2.3 TAMMANY CREEK ROAD WELL FIELD

The Tammany Creek Road Well Field concept was developed because it provides a potential water supply that is closer to the LOID service area thereby reducing the length of pipe required, eliminates in-river work and the need for intake screens, and avoids culturally and/or biologically sensitive areas along the rivers. Well sites along Tammany Creek Road were selected because of the proximity to the LOID area and potential to penetrate the Lewiston Basin Regional Aquifer. The vicinity is also located at lower elevation which provides shallower static water levels, reduced well depths and more pump options. The well locations are shown in **Figure 4.7** along with the proposed pipe alignment, which follows portions of the Snake River Action Alternative alignments. The well field would connect to the existing distribution system and provide a new water supply near the center of the distribution system. Water from the wells would discharge into a common manifold and pump to the distribution system in a single lift from the well sites. Six wells were selected to provide a similar level of reliability to river pump stations that contained six pumps.

A hydrologic review of the groundwater source was completed by Ralston Hydrologic Services in March, 2011. The report, "Evaluation of Groundwater Development Potential for LOID Irrigation Water from the Regional Aquifer in the Lewiston Basin, Idaho," is provided in **Appendix J**. The report identified that current groundwater use in the basin is well below historical groundwater use levels, and that existing static water levels suggest the regional aquifer is hydraulically connected to the Snake and possibly Clearwater Rivers. The aquifer should be capable of meeting LOID's water needs with limited water level decline.

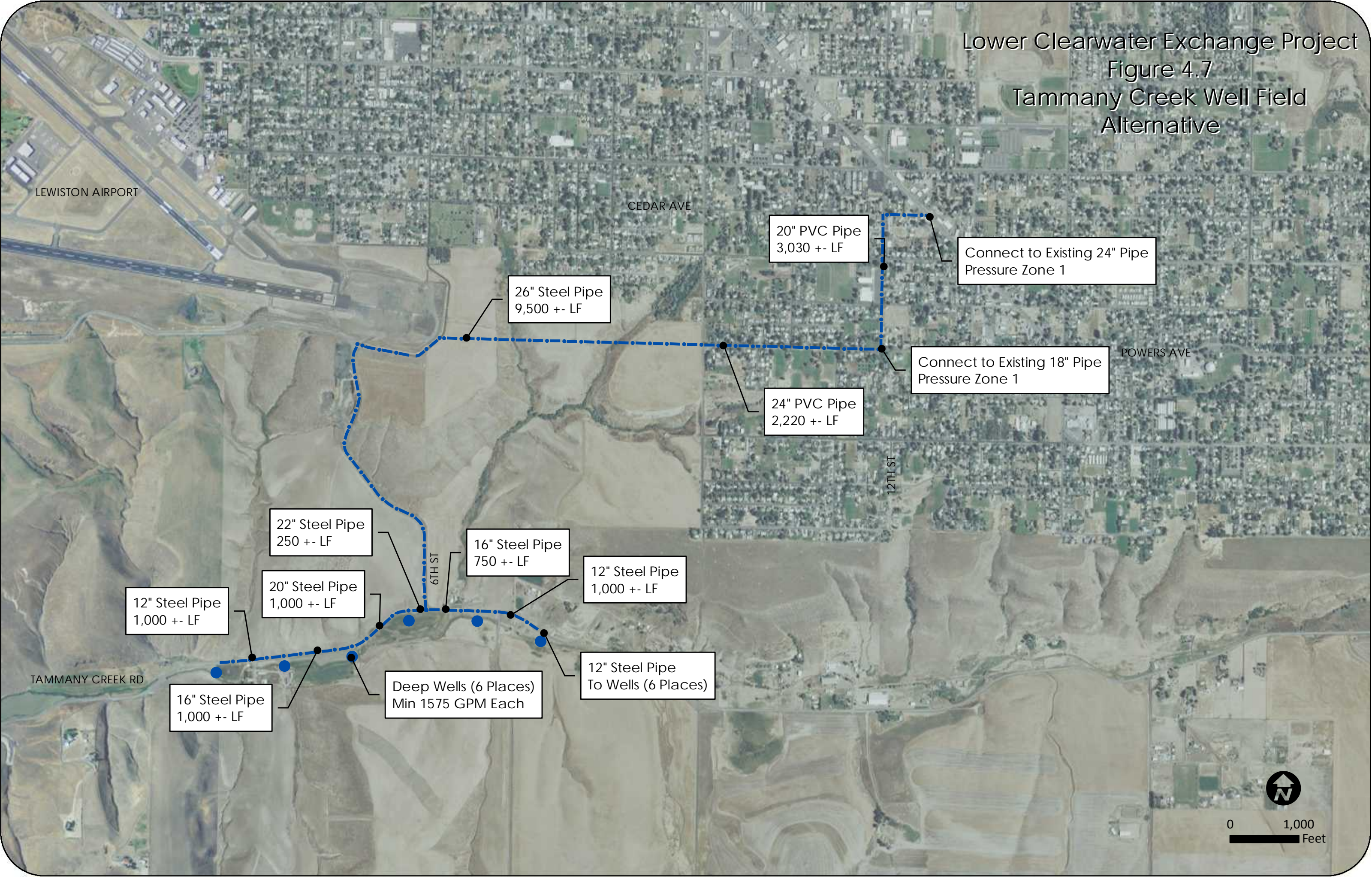
Ralston's evaluation suggested drilling the wells in the Tammany Creek Valley area south of the Lewiston Airport. The area was selected because the lower elevation valley area results in shallower well depths, water producing zones in this area occur at higher elevations and the area is relatively distant from other large production wells.

#### TECHNICAL SCREENING

- **Water Rights** – The proposed wells would pump from the regional aquifer which static water levels suggest is hydraulically connected to the Snake River. IDWR has stated in discussion that groundwater is available for appropriation at this location. As with the Clearwater and Snake River Alternatives, the intended course of action is the protection of existing LOP water rights via the Idaho Water Supply Bank, to meet unsatisfied Idaho minimum stream flows in Webb, Sweetwater and Lapwai Creeks; and in the mainstem Clearwater River. Water not diverted for



Lower Clearwater Exchange Project  
Figure 4.7  
Tammany Creek Well Field  
Alternative





the LOP from Webb and Sweetwater Creeks would be left instream and protected, reaching the Clearwater River, and then the Snake River, via Lapwai Creek. A new water permit application would be submitted to IDWR by LOID. IDWR has stated in discussion that a water permit application premised on the protection for minimum stream flow beneficial use purposes of existing LOP upstream water rights would be viewed as particularly well-conceived (Whiting 2011).

- **Power** – The well sites would be served by Avista Corporation, a for profit electrical utility regulated by the Idaho Public Utilities Commission. Discussions with Avista suggest that while they have power lines in the area; some rebuilding of the lines would be required to provide the capacity required for the well pumps.

#### RISKS, UNCERTANITIES, AND UNRESOLVED ISSUES

- **Environmental and Cultural Mitigation** – Environmental and cultural mitigation measures, if required, will be identified in a subsequent NEPA process. Any restrictions on well location which result from the NEPA process would impact well pump sizing and analysis presented herein.
- **Property and Right-of-Way Acquisition** – Property and right-of-way must be acquired for the wells and piping.
- **Existing System Capabilities** - Further evaluation and modeling will be required to verify that if the proposed new wells discharges to the existing distribution system the distribution system pressures required to move water back to Mann Lake do not exceed the capability of the existing system.
- **Permitting** – Permitting for the well field option is likely to be less complex than for the river pump station alternatives. Permits that would be required are listed in **Table 4.21**:

**Table 4.21 - Required Permits - Tammany Well Field Alternative**

Agency	Permit Required
State of Idaho	Well Drilling Permits IDWR Water Permit
Nez Perce County	Permit to Use Public Right-of-Way Utilities and Encroachments Building Permit
City of Lewiston	Right-of-Way Use Permit
Private Property	Easements



- **Long Term Aquifer Decline** – The Ralston report identifies that due to the hydraulic connection with the Snake River, the aquifer should be capable of meeting LOID’s water needs with limited water level decline. Regardless, the actual impact of withdrawals is not certain until the well field is installed and operated for an extended period of time. The potential for aquifer decline present risk associated with implementation of the alternative.

#### DESIGN CRITERIA AND TECHNICAL ASSUMPTIONS

The following paragraphs outline the design criteria and technical assumptions used in development of the conceptual plans and costs.

- **Operating Pressure** – Operating pressure in the system is currently established by the water level in Mann Lake less head loss in the existing distribution system. Currently water users in many parts of the system experience inadequate operating pressure during high use periods. The Groundwater Action Alternative discharges to the existing distribution system in a central location and would reduce head losses associated with supply in the Powers Avenue mainline during periods of high water use. During periods of low water use when Mann Lake is refilled, operating pressures would slightly exceed current pressures to provide sufficient head to pump water back to Mann Lake.
- **Pumps** – The system has high volume and head requirements that will require the use of turbine type pumps. Wells drilled at the proposed locations along Tammany Creek Road should penetrate the Lewiston Basin Aquifer, and pumping water levels of approximately 670 feet below the ground surface are anticipated. At this operational depth, use of vertical turbine pumps is practical. Discharge pressure requirements at the wells are expected to vary from around 1,173 feet (508 psi) at low flows to 1,240 feet (537 psi) at high flows. Pump and motor speeds would be held to 1,800 rpm or slower to minimize wear on the pump and column. Pump sizes have been limited to capacities that do not require more than 600 hp so low voltage (480 volt) motors and electrical equipment could be utilized.

With six wells, the loss of any one due to a pump or motor failure would reduce pumping capacity by 16.7%. It is anticipated the LOID could manage a 16.7% loss in maximum pumping capacity until pump or motor repairs could be completed.

- **Electrical Controls** – Each well pump would be used in conjunction with electrical variable speed drive equipment that would provide the LOID control over operating pressure while meeting variable water demand. Variable speed drives will also allow the well pumps to be brought on line without introducing significant pressure surges into the system. Limiting individual pumps to 600 hp would allow the use of low voltage (480 volt) variable speed drives and switchgear.
- **Wellhouse Structure** – Each well, pump motor, piping and electrical equipment would be housed in a heated and ventilated enclosure for security, weather and freeze protection, and to reduce noise.

- **Flow Meter** – An ultrasonic or other suitable electronic flow meter would be installed on each well discharge to measure and record the pumping rate and volume.
- **Pipe Materials** – Anticipated pipe materials are steel and polyvinyl chloride (PVC). The steel pipe would be used at lower elevations where operating pressure exceeds the pressure capability of PVC pipe. Wall thickness of the steel pipe would vary with heavier walled pipe used at lower elevations. In higher pressure areas and on steep slopes the pipe would be installed with all welded joints. Steel pipe would be provided with both a coating and lining to prevent corrosion. In lower pressure areas with reduced slopes the transition may be made to bell and spigot, gasketed joints to reduce installation cost.

Pipe installed above an elevation of approximately 1,440 feet is generally anticipated to be AWWA C905 PVC pipe. The pipe pressure class would vary depending on anticipated operating pressure.

- **Pipe Sizing** - A cursory hydraulic analysis was completed to determine the approximate pipe sizes and pressure requirements was completed using the Hazen-Williams equation as discussed within the design criteria and analysis methods
- **Pipe Routing** – Without bisecting properties, pipe routes were selected to provide the most direct route possible, minimizing pipe length and cost. Road right-of-way was used where possible to minimize efforts to acquire pipeline easements.
- **Valving** - The size and length of the proposed pipe corresponds with a considerable storage volume of water. The conceptual plan includes the installation of a number of strategically placed inline check valves along the pipe route to prevent the pipe from draining in the event of a pipe failure.

Where the proposed pipeline connects directly to the existing distribution system, a check valve would be installed to allow continued use of Mann Lake, and prevent water from being drained from Mann Lake in the event of a pipe failure. Additional check valves would likely be installed in strategic locations above significant residential and commercial development and at the crest of steep slopes.

- **Winter Operation** - The system would remain operational during the winter to refill Mann Lake. All equipment that could be subject to damage from freezing temperatures must be protected. This equipment includes, but is not limited to; the pump discharge heads, pump discharge pipes and valves, filters, and air and vacuum valves.
- **Existing Distribution System Evaluation** - A cursory evaluation of the main pipelines between Mann Lake and the locations where the proposed pipelines will connect was completed through a review of pipes 18-inches and larger. As discussed in the design criteria of analysis assumptions.

### TECHNICAL ANALYSIS AND PRELIMINARY SIZING CRITERIA

Design criteria including monthly demands and operational storage are presented in **Table 4.3** and **Figure 4.1**. With this information, a water budget analysis was completed to establish the lowest acceptable well field capacity. Since the operational storage in Mann Lake and the proposed LOID water right would not change as a result of this alternative diversion location, the water budget for the well field option results in the same 9,450 gpm (21.1 cfs) pumping capacity that was identified for both the Clearwater River Pump Station and the Snake River Pump Station.

Information contained in the Ralston Hydrologic Services report suggests large production wells would need to be drilled to near or below sea level an estimated well depth of 1,025 feet. Pumping water level information was also contained in the report and indicated that the average pumping water level elevation of wells with the Lewiston Basin Aquifer is about 670 feet. This water level elevation was used to calculate power requirements for the wells. Construction cost estimates were based on the construction of six 16 inch diameter wells cased to a depth of 680 feet.

The Ralston Hydrologic Services report discusses the characteristics of LOID's existing wells located on the plateau that forms the Orchards. Five criteria are noted by Ralston with respect to the potential groundwater source location:

1. The well field should be drilled to penetrate the Lewiston Basin Aquifer. The wells should therefore be located west of the eastern aquifer boundary located between LOID Wells No. 2 and No. 4.
2. The wells should be located at sufficient distance from each other and other production wells to minimize well interference effects.
3. Lower well depths should be considered to minimize capital costs of drilling and facilitate use of line-shaft turbine pumps.
4. Drilling sites must be sufficient to accommodate drilling equipment and water waste during construction.
5. The wells should fit in LOID's overall plan for source development.

To address each of these criteria, Ralston recommends drilling the well field in the Tammany Creek area shown in **Figure 4.7**. The proposed wells would be located at ground elevations ranging from approximately 1,025 to 1,120 feet. This capacity can be satisfied with six wells having a minimum capacity of 1,575 gpm at the maximum estimated operating head of 1,240 feet. Pumps with a minimum efficiency of about 82.1% would be required to meet the design criteria without exceeding the motor

nameplate horsepower. While operating at higher flow rates and lower head, the use of 600 hp pumps may require the pump motors to operate using a portion of their service factor. Further, assumptions made regarding well capacity and pumping levels may be incorrect and more or less horsepower could be required at each site. If additional horsepower is required at any of the wells the addition of a booster pump or the use of higher horsepower pumps may be necessary. The use of pumps in excess of 600 hp requires use of medium voltage (2,300 or 4,160 volt) electrical equipment if the motors are to be used with variable speed drives, thereby increasing the estimated cost of the Groundwater Action Alternative.

With a well field capacity of 9,450 gpm, average discharge from Mann Lake would peak in July at approximately 5,300 gpm. Remaining fire suppression storage in Mann Lake at the end of August would be 500 feet. In September, water requirements will typically drop below the well field's 9,450 gpm capacity and the well field could be used to refill Mann Lake within the capacity and pressure limits of the existing system.

The proposed Tammany Creek well field will connect directly to the existing distribution. Currently, maximum distribution system pressures occur when Mann Lake is full, water use is low and system pressure is at or near static, indicating a flat hydraulic grade line equivalent to the water surface elevation in Mann Lake. To fill Mann Lake via connection to the distribution system and back feed through the Powers Avenue mainline, the hydraulic grade line must be reversed, increasing the pressure above static levels throughout LOID's highest pressure zone. The largest pressure increases would occur where the new pipe connects to the existing distribution system, in the lower elevation areas of the highest pressure zone, and would decrease from the new connection towards Mann Lake. The pressure impacts can be minimized by refilling Mann Lake with one well over a period of several months. The slow rate of recharge correlates with minimal pressure loss, and under this refill scenario the maximum increase in pressure above static has been estimated at less than 5 psi. In contrast, quicker recharge of Mann Lake using the entire capacity of the well field would require a significant increase in distribution system pressure to overcome pipe friction losses between the connection location and Mann Lake and is not feasible without extensive upgrades.

Suitable pumps to meet system design requirements of 1,575 gpm at design head of 1,240 feet will likely produce on the order of 1,900 gpm at anticipated low flow refill head. At this flow rate, pumping 1,460 ft to refill Mann Lake will take 174 days. Based on the 198 day irrigation season (April 1 through October 15) there are 167 days available to refill Mann Lake when minimal irrigation demand is



anticipated. Partial refill of Mann Lake would take place during the months of April, May, September, and October during periods of low water use.

**Table 4.22** outlines the preliminary well field sizing criteria.

**Table 4.22 - Preliminary Sizing - Tammany Well Field**

Description	Quantity
Vertical Turbine Pumps	(Six) 600 HP
Pump Design Capacity	1,575 GPM
Pump Design Head	1,240 Feet (537 psi)

**Table 4.23** outlines the piping requirements to convey water to the existing distribution system along the alignment shown in **Figure 4.7**.

**Table 4.23 - Preliminary Pipe Sizing - Tammany Well Field<sup>a</sup>**

Description	Quantity
High Pressure Pipe	14,400 LF, 26" to 12" Steel
Low Pressure Pipe	5,250 LF, 24"/20" PVC

<sup>a</sup> See Appendix G for additional detail.

## **CAPITAL COST AND OPERATIONS AND MAINTENANCE COSTS**

### **CAPITAL COST**

A construction cost estimate was prepared for the Tammany Well Field Action Alternative. Material suppliers and a well drilling contractor were contacted to obtain current prices for major system components including the wells, line shaft turbine pumps, variable speed drives and steel pipe. The estimated cost of remaining materials and installation was generated from bid tabulations, materials priced for other projects, and engineering judgment.

The estimated cost for the Tammany Well Field and piping to the existing distribution system is shown in **Table 4.24**.

**Table 4.24 - Estimated Cost - Tammany Well Field Alternative<sup>a</sup>**

Item No.	Description	Total (\$2011)
1	Mobilization	\$1,184,900
2	Well Completion	\$11,025,200
3	Penstock	\$2,995,610
4	Road Repair	\$525,000
5	Miscellaneous	\$265,200
Subtotal		\$15,995,910
Planning Level Construction Contingency (25%)		\$3,998,978
Construction Total		\$19,994,888
Sales Tax (6.5%)		\$1,299,668
Design Engineering (10%)		\$1,999,489
Surveying		\$100,000
Geotechnical Services		\$150,000
Construction Management (10%)		\$1,999,489
Legal, Admin, Grant Admin Fees (10%)		\$1,999,489
Permit Acquisition		\$80,000
Land/Right-of-Way Acquisition		\$200,000
Grand Total <sup>b</sup>		<b>\$27,823,021</b>

<sup>a</sup> Detailed cost estimates provided in **Appendix I**.

<sup>b</sup> Total does not include estimated \$3M for Feasibility and NEPA Study or estimated \$100,000 mitigation cost for diversion removal for each action alternative.

## OPERATIONAL COST

Pumping water from the Tammany Well Field will require considerable electrical power, and would become the major operating expense for the system. Power for the Tammany Well Field would be supplied by Avista. The power supplied would likely fall under Avista's Schedule 21 rates which are shown in **Table 4.2**.

Based on this energy cost schedule, the annual energy cost to pump 8,500 ft for LOID was estimated as shown in **Table 4.25**.

**Table 4.25 - Estimated Annual Electrical Cost - Tammany Well Field**

Month	Avg. Flow (gpm)	Avg. Head (ft)	Power (kWh)	Demand (kW)	Energy Cost	Demand Cost	Total Cost
Jan	1,715	1,173	344,472	463	\$21,552	\$2,080	\$23,632
Feb	1,715	1,173	311,136	463	\$19,683	\$2,080	\$21,763
Mar	2,336	1,177	470,208	822	\$28,602	\$3,606	\$32,208
Apr	4,706	1,191	927,360	1,674	\$54,235	\$7,227	\$61,462
May	7,241	1,214	1,502,136	2,625	\$86,462	\$11,269	\$97,731
June	9,450	1,240	1,938,240	2,692	\$110,915	\$11,554	\$122,468
July	9,450	1,240	2,002,848	2,692	\$114,537	\$11,554	\$126,091
Aug	9,450	1,240	2,002,848	2,692	\$114,537	\$11,554	\$126,091
Sept	8,809	1,237	1,802,880	2,692	\$103,325	\$11,554	\$114,878
Oct	4,336	1,194	884,616	1,546	\$51,838	\$6,683	\$58,521
Nov	1,715	1,173	333,360	463	\$20,929	\$2,080	\$23,009
Dec	1,715	1,173	344,472	463	\$21,552	\$2,080	\$23,632
Annual Consumption (kWh)							12,864,576
Annual Energy Cost							\$748,167
Annual Demand Cost							\$83,320
<b>Annual Total Cost</b>							<b>\$831,487</b>

Based on the LOID service area, the annual energy cost for the Tammany Well Field Alternative will be roughly \$215 per acre.

The Tammany Well Field Alternative would meet the minimum annual charge specified in **Table 4.2** if the full water right is utilized. On years with above average precipitation, minimum annual charges may not be satisfied through electrical demand.

Staff effort dedicated to operating the well system is anticipated to be one FTE and one vehicle totaling \$108,000.

#### MAINTENANCE COSTS

Annual maintenance costs for the Groundwater Action Alternative were estimated based on methodology described in the design criteria and summarized in **Table 4.26**.

**Table 4.26 - Estimated Annual Maintenance - Groundwater Action Alternative<sup>a</sup>**

<b>Tammany Creek Well Field</b>
\$128,737

<sup>a</sup> (\$2011 Dollars)

## 5 ALTERNATIVE EVALUTION

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The alternative evaluation is completed for the following viable alternatives:

- Clearwater River Action Alternatives
- Snake River Action Alternatives
- Groundwater Action Alternatives

This Chapter initially provides discussion regarding the No Action Alternative, providing a basis and summary of how no action fails to meet the objectives of this Study. Next, the evaluation provides a review of quantitative and qualitative data of each viable alternative with respect to the regulatory requirements of the Rural Water Program as identified in Chapter 1:

- Reclamation Study Goals and Objectives
- Rural Water Program Criteria
- Rural Water Prioritization Criteria
- Reclamation Tests of Viability
- Specific Reclamation Objectives

This chapter will conclude with an evaluation of alternatives with respect to LCEP objectives and criteria established during the process.

### 5.1 NO ACTION SUMMARY

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The ramifications of continued operation of the LOP through no action are extensive, consisting of direct consequences and unexploited opportunities presented in Chapter 1. Further, the risks of future climate change and ESA requirements present enormous and unknown hurdles for the District.

**Table 5.1** provides a matrix of discussion throughout this Study that is used to evaluate the risks, uncertainties, and ramifications of no action.



**Table 5.1 - Study Development of No Action Alternative Issues**

Summary Description	Study Location
Litigation history	1.2.2
Ramifications of No Action	1.2.3
Inability to provide reliable, quality water supply	1.3.1
Inability to provide permanent resolution of ESA issues associated with the LOP	1.3.2
Inability to provide permanent resolution of Federal-Tribal Trust issues associated with the LOP	1.3.3
Failure of No Action to qualify as an identified alternative	3.3.1
Cost of No Action	<b>Appendix K</b>

## 5.2 RECLAMATION STUDY GOALS AND OBJECTIVES

The goals of the Rural Water Supply Program are set forth in Section 404.4 of the Rural Water Rule, and additional Reclamation objectives are found the grant application criteria for this Study and in Section 404.13 of the Rule. In this subsection, these overarching goals and objectives are described with respect to core project objectives, across all alternatives which met those objectives. In subsection 5.2 below, specific Rule Section 404.44 criteria, and Reclamation Directives and Standards, are applied specifically to the Study's viable alternatives.

### 5.2.1 URGENT AND COMPELLING WATER NEEDS

#### CURRENT WATER USE

##### Domestic, Commercial, Municipal and Industrial (DCMI) Baseline Water Use

LOID serves approximately 18,500 citizens and provides water, non-commercial irrigation of landscape vegetation, incidental non-commercial livestock watering, municipal, and industrial uses, as well as other non-commercial agricultural use. The District serves about 60 percent of the residents of Lewiston, Idaho. Current populations of the City and County are shown on **Figure 2.4** as approximately 33,000 and 40,000 residents, respectively.

The Craig Mountain water supply prior to Reclamation's overhaul of the system served both domestic and irrigation needs. It was deemed unsafe for human consumption without treatment. It was at this time that Reclamation introduced a dual delivery system to the LOP service area.

The terms of Reclamation's September 10, 1947, repayment contract entitle each assessable acre of land in the LOID to an irrigation water supply not to exceed 2.2 acre-ft per acre measured at the point of

delivery to each operating unit. The contract recognizes that there may be periods where the full irrigation amount may not be available and allows for the LOID to determine a lesser but uniform amount of irrigation water to be furnished based on water supply. All active capacity of the Project storage facilities is contracted to the LOID.

The value of 8,500 acre-ft approximates the entitlement on a gross LOP static acreage basis of 3,848 acres. This value has its basis in the Lowry-Johnson method to arrive at a calculated water deficit for projected crop water use (primarily orchards, truck gardens, and hay) using Lewiston area precipitation data and system losses of 30 percent (Reclamation 1945a). If the same calculations were to be performed today applying updated methods to the 1945 land use parameters, the resulting average deficit would more likely be in the range of 2.5 acre-ft per acre (Allen 2007), see **Appendix G** for additional detail. Other than system inefficiency, the study area parameters are either not applicable to current and future use scenarios, or can be refined using more relevant periods of record and location-specific land use data.

Reclamation has collected detailed hydrologic data for the LOP area since 2003 in support of ESA activities. Records of water use are most reliable from 1993 to present due to a change in LOID's accounting methods. However, these recent historical delivery records do not provide an accurate indicator of present and future LOID water needs. The LOP has not delivered 8,500 acre-ft of water to LOID in recent years, as evidenced by repeated water rationing within the District. LOID routinely utilizes restrictions to meet water requirements within the District. Annual deliveries more commonly approximate 5,500 acre-ft.

#### Ecosystem Water Use

Water withdrawal from Sweetwater, Webb, and Captain John Creeks by LOID was restricted by contracted water rights, physical limitations of the LOID system, and water availability until 2006. In 2004 and 2005, LOID voluntarily provided some surface flows at the Sweetwater Diversion. After 2006, operations were altered to include minimum flows. Under the terms of the current agreement, an additional 90 acre-ft of water are made available annually to the natural system.

#### FUTURE NEEDS

Each of the proposed alternatives will allow LOID to improve water delivery, quality, and service for its patrons, effectively addressing the District's rural water supply needs as well as providing the potential to serve projected study area growth over the project's planning horizon.

### Potential Climate Change Impacts

Reclamation, the Bonneville Power Administration, and the Corps of Engineers collaborated to adopt climate change and hydrologic datasets to better understand how potential changes in supply due to climate change may affect reservoir operations in the Columbia River Basin (Reclamation 2011d). Output from Global Climate Models was spatially downscaled and bias corrected, then provided to the stakeholders for use in their long-term planning models for several subbasins, including the Snake River subbasin upstream of the study area. For the Clearwater watershed and the study area tributaries in particular, the climate change modeling would need to be calibrated and climate change projections evaluated for results specific to the watershed. This modeling effort was not performed for this appraisal study. This discussion relies upon the modeling results for the Snake River subbasin upstream of the study area. These data and projections are preliminary. No future use scenarios associated with this appraisal study include these climate change modeling results.

Because the projections were selected at the Columbia River Basin scale, most of the projections were skewed toward wetter conditions in the future when viewed from the Snake River basin scale. The Snake River basin upstream of the study area is projected to experience warmer (0.5 to about 2 degrees Fahrenheit (°F) warmer in the 2020s scenarios and 1°F to 3°F in the 2040s scenarios) and wetter conditions in some cases (5 percent decrease to 10 percent increase in the 2020s and a 5 percent decrease and 15 percent increase in the 2040s) (Reclamation 2011d).

The modeled inflow hydrology indicated a shift in the timing of the peak flow and volume for the studied portion of the Snake subbasin. The timing of peak inflow shifted a month earlier from June to May. Flow volume increased above historical flows in the earlier, cool season part of the year (January to April) and decreased in the summer and fall seasons. This shift in timing and increase in inflow volume earlier in the year resulted in an increase in the end-of-month storage earlier in the year and a decrease in stored volume later in the irrigation season. In the driest climate scenarios, the end-of-month storage volume was less than historical conditions and reservoirs were unable to completely refill until January or February of the following year. This pattern is indicative of a greater need for stored water during the high demand summer season (Reclamation 2011d) to maintain current use scenarios.

Several flow locations were evaluated along the Snake River and in general, flow volumes increased in the winter months and decreased slightly during the warmer summer months. A decrease in surface water delivery also occurred in the latter part of the irrigation season or warmer months. This decrease

in instream flow in the late summer to early fall months would result in less water available for natural flow diversions (Reclamation 2011d).

The seasonality of runoff is also projected to change. Warming is expected to lead to more rainfall-runoff during the cool season rather than snowpack accumulation. In the upper Snake subbasin, there is generally little projected change in April-July runoff through the 2070s, but the impact to the Clearwater subbasin was not specifically studied. This suggests that, although projected warming would serve to diminish April 1 snowpack, there is enough projected precipitation increase to offset this warming effect and sustain April-July runoff (Reclamation 2011d).

As described and further explained in Section 5.3.4, the protection of flows from Sweetwater Spring in the Sweetwater Creek drainage offers an unusual opportunity to affect climate change effects on water temperature by ending irrigation diversion and retaining for instream flow purposes flows from the largest year-round cool-water spring in the lower Clearwater River subbasin. Additional restoration of flows to Lapwai subbasin of the Clearwater will help mitigate the impacts of climate change. Natural variation in flow, rather than human-induced, will help reduce low flow and increased water temperature concerns. Increasing complexity in channels is expected to increase productivity and offer refuge for aquatic species. Improved floodplain connectivity will decrease flood impacts, increase localized groundwater recharge, and positively impact water quality constituents, including temperature, dissolved oxygen, and nutrients.

### **5.2.2 WATER RESOURCES MANAGEMENT PERSPECTIVE**

The LCEP action alternatives meet the Rural Water Program Section 404.2 definition of a regional or watershed perspective in all respects, as “An approach to rural water supply planning directed at meeting the needs of geographically dispersed localities across a region or a watershed that will take advantage of economies of scale and foster opportunities for partnerships. This approach also takes into account the interconnectedness of water and land resources, encourages the active participation of all interested groups, and uses the full spectrum of technical disciplines in activities and decision-making.

In each alternative, the innovative concept of a water exchange is used; between an interconnected new water source, whether Snake River, Clearwater River or groundwater, and a sensitive upstream tributary watershed with restoration potential, done via a new high-efficiency intake piping system that provides needed water use for LOID, with simultaneous protection of water rights through beneficial use



minimum stream flows in the upstream tributaries, ending adverse ESA impacts and adverse impacts to the Nez Perce Tribe, its people and its Reservation.

All of the alternatives would render the existing diversions, canals, and dams in the Sweetwater Creek watershed unnecessary, resulting in direct, increased stream flows for ESA listed steelhead in those watersheds and providing fish passage above the existing Sweetwater Dam to additional, historic, high-quality Snake River steelhead habitat. The watershed restoration component of each alternative, by rendering the existing LOP unnecessary, would significantly increase stream flow throughout 24 miles of steelhead spawning and rearing habitat in the lower Lapwai Creek watershed. Anadromous salmonid passage would be provided to an additional 19 miles of tributary habitat. Cool water refugia, unsurpassed by and unlike any other identified within the lower Clearwater River subbasin, would be restored to a stream channels below the unique Sweetwater Springs outflow; providing varied levels of reduced water temperature to at least 17 miles of tributary habitat. Hydrological function would be returned to a more natural and functional state, improving channel morphology, floodplain connectivity, and riparian vegetative density while alleviating impacts of extreme instantaneous flow variability on stream biota.

The broad, multi-governmental set of no action problems all of the alternatives address, involve LOID and its constituents, who comprise a majority of the population of the City of Lewiston. The action alternatives also address adverse impacts on and near the Nez Perce Reservation that have resulted in recurring multi-agency ESA litigation for nearly a decade over the water needs of ESA listed steelhead and ESA designated critical habitat as well as adverse cultural, religious and other water use impacts on the Nez Perce Tribe and its people, resulting from the predominant location of the existing LOP gravity conveyance system on the Nez Perce Reservation. The comprehensive resolution embodied by the action alternatives takes advantage of the unique overlap of both problems and interests among all of the LCEP governmental partners – as well as federal and state programs and authority priorities, to resolve all problems and interests simultaneously. A set of issues that attracts the support of governmental entities throughout the lower Clearwater Basin, and federal and state political offices throughout the State of Idaho would be comprehensively and permanently addressed.

### 5.2.3 NET ECONOMIC BENEFIT

Reclamation completed an “Economic Analysis for the Lower Clearwater Exchange Project” to study National Economic Development (NED) benefits that accrue as a result of the proposed federal action. A

complete copy of the analysis is provided in **Appendix K**, and includes a study of the following quantified and unquantified benefits:

- Untreated Residential Water Supply/Sufficient Water Delivery
- Recreation
- Endangered Species/Watershed Restoration
- Tribal Trust Asset Issues
- Water Quality
- Water Distribution
- Unemployed Labor

The analysis also reviewed the following costs associated with the action alternatives:

- Design and Construction
- Operations and Maintenance
- Interest During Construction
- Power
- Reclamation Costs
- Safety of Dams (SOD) Monitoring
- Recreation
- Cultural
- Water Rights

Assumptions associated with Reclamation's analysis are given in **Table 5.2**.

**Table 5.2 - Reclamation NED Analysis Assumptions**

<b>Description</b>	<b>Assumption</b>
Untreated Residential Water Supply	Value = \$287/ft
Recreation	Value = \$49/12-Hour Day
Analysis Period	50 Years
Interest Rate	4.125%
NEPA Preparation	\$3 Million/Action Alternative
Diversion Mitigation	\$100,000/Action Alternative

**Table 5.3** gives a summary of total quantified and unquantified benefits, and **Table 5.4** provides a summary of costs from the Reclamation Study.

**Table 5.3 - Quantified and Unquantified Benefits**

Benefit Description	Alternative Benefit (\$ Million, 2011 Dollars)						
	No Action	Alternative B Clearwater River Pumping Station Mann Lake Discharge	Alternative B1 Clearwater River Pumping Station Mann Lake Discharge Powers Avenue Pipeline Upgrade	Alternative C Clearwater River Pumping Station Distribution System Discharge	Alternative D Snake River Pumping Station Tammany Creek Road Pipeline	Alternative E Snake River Pumping Station Southport Avenue Pipeline	Alternative F Tammy Road Well Field
<b>Quantified Benefits</b>							
Untreated Residential Water Supply <sup>a</sup>			\$0.86 M	\$0.86 M	\$0.86 M	\$0.86 M	\$0.86 M
Recreation <sup>a</sup>	\$0.14 M	\$0.14 M	\$0.14 M	\$0.14 M	\$0.14 M	\$0.14 M	\$0.14 M
<b>Total Quantified Benefits<sup>a</sup></b>	<b>\$0.14 M</b>	<b>\$0.14 M</b>	<b>\$1.0 M</b>	<b>\$1.0 M</b>	<b>\$1.0 M</b>	<b>\$1.0 M</b>	<b>\$1.0 M</b>
<b>Unquantified Benefits<sup>b</sup></b>							
Endangered Species/Watershed Restoration	x	+	+	+	+	+	+
Tribal Trust Asset Issues	x	+	+	+	+	+	+
Water Quality	x	+	+	+	+	+	+
Water Distribution	x	x	+	+	+	+	+
Unemployed Labor	x	N/A	N/A	N/A	N/A	N/A	N/A

Source: Reclamation, 2011

<sup>a</sup> 2011 Dollars

<sup>b</sup> Key:

x = No Change/Not Evaluated

+ = Positive Benefit

N/A = Not Applicable

Table 5.4 - Appraisal Level Cost

Description	Appraisal Level Cost (\$ Million, 2011 Dollars)						
	No Action	Alternative B Clearwater River Pumping Station Mann Lake Discharge	Alternative B1 Clearwater River Pumping Station Mann Lake Discharge Powers Avenue Pipeline Upgrade	Alternative C Clearwater River Pumping Station Distribution System Discharge	Alternative D Snake River Pumping Station Tammany Creek Road Pipeline	Alternative E Snake River Pumping Station Southport Avenue Pipeline	Alternative F Tammy Road Well Field
<b>Direct Project Costs</b>							
Design & Project Construction <sup>a</sup>		\$21.8 M	\$24.3 M	\$22.2 M	\$26.2 M	\$20.1 M	\$30.9 M
Interest During Construction	\$0.0 M	\$1.06 M	\$1.19 M	\$1.09 M	\$1.28 M	\$0.98 M	\$1.51 M
Annual Maintenance	\$0.07 M	\$0.08 M	\$0.09 M	\$0.09 M	\$0.09 M	\$0.70 M	\$0.13 M
Annual Operations	\$0.25 M	\$0.22 M	\$0.22 M	\$0.22 M	\$0.22 M	\$0.22 M	\$0.22 M
Annual Power	\$0.02 M	\$0.60 M	\$0.6 M	\$0.6 M	\$0.8 M	\$0.8 M	\$0.8 M
<b>Present Value of Direct Project Costs <sup>b</sup></b>	\$6.57 M	\$45.56 M	\$47.76 M	\$45.80 M	\$58.82 M	\$52.30 M	\$67.02 M
<b>Indirect Project Costs</b>							
Reclamation Annual Costs <sup>c</sup>	\$0.50 M	\$0.0 M	\$0.0 M	\$0.0 M	\$0.0 M	\$0.0 M	\$0.0 M
Annual Recreation	\$0.07 M	\$0.1 M	\$0.1 M	\$0.1 M	\$0.1 M	\$0.1 M	\$0.1 M
<b>Present Value of Recreation Costs</b>	\$1.58 M	\$1.6 M	\$1.6 M	\$1.6 M	\$1.6 M	\$1.6 M	\$1.6 M
Cultural Impacts	Significant	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
<b>Present Value of Total Costs</b>	\$8.15 M	\$47.14 M	\$49.34 M	\$47.37 M	\$60.39 M	\$53.88 M	\$68.60 M
<b>Equivalent Annual Cost</b>	<b>\$0.4 M</b>	<b>\$2.2 M</b>	<b>\$2.3 M</b>	<b>\$2.3 M</b>	<b>\$2.9 M</b>	<b>\$2.6 M</b>	<b>\$3.3 M</b>

Source: Reclamation, 2011

<sup>a</sup> Includes an additional \$3 Million for Feasibility and NEPA Study, and \$100,000 mitigation cost for diversion removal for each action alternative

<sup>b</sup> The cost of major equipment replacement is not included in appraisal level costs

<sup>c</sup> Reclamation's annual costs for each action alternative were incorporated into annual operations line item

Reclamation's analysis continues with review of regional impacts. The analysis utilizes a model to assess the creation of economic impacts associated with the action alternatives and finds that, "For this Study, regional economic impacts are created primarily through construction investments which bring economic activity into the region." The analysis concludes that the greatest impact to the region is associated with the highest construction cost which leads to the most spending.



Finally, Reclamation completes an “Ability to pay threshold” analysis using an EPA affordability threshold as a generally accepted cost of utilities. The threshold for water supply is 2.5% of the median household income. Reclamation assigns all project costs including capital and operational costs over the planning period, to the number of active accounts. A summary of the analysis is given in **Table 5.5**, which shows that each of the action alternatives is below the ability to pay threshold.

**Table 5.5 - Ability to Pay Threshold**

Description	Annual Ability to Pay (2011 Dollars)					
	Alternative B Clearwater River Pumping Station Mann Lake Discharge	Alternative B1 Clearwater River Pumping Station Mann Lake Discharge Powers Avenue Pipeline Upgrade	Alternative C Clearwater River Pumping Station Distribution System Discharge	Alternative D Snake River Pumping Station Tammany Creek Road Pipeline	Alternative E Snake River Pumping Station Southport Avenue Pipeline	Alternative F Tammy Road Well Field
Current potable water payment <sup>a</sup>	\$344	\$344	\$344	\$344	\$344	\$344
Total Annual Cost <sup>b</sup>	\$356	\$373	\$358	\$456	\$407	\$518
Total Water Payment	\$700	\$717	\$702	\$800	\$751	\$862
<b>Ability to Pay Threshold <sup>c</sup></b>	below	below	below	below	below	below

Source: Reclamation, 2011

<sup>a</sup> Average Annual Household Usage at 2010 cost of \$43.50 per 100 feet<sup>3</sup>

<sup>b</sup> Based on 100% of calculated capital and operational cost over the planning period

<sup>c</sup> Based on Nez Perce County Median Household Income of \$42,919, the ability to pay threshold is \$1,073

#### 5.2.4 PARTNERSHIPS AMONG RURAL COMMUNITIES, TRIBES, AND STATE POLITICAL SUBDIVISIONS

The appraisal study process has focused on partnerships between all interested and affected entities within the project area to address the rural water supply issues of the LOP. The open format of study workshops facilitated dialogue between a variety of entities including the Nez Perce Tribe, LOID, Reclamation, and other federal, state, and private representatives. The resultant action alternatives represent the culmination of input from various partners throughout the process to address the rural water supply issues of this Study.

The LCEP partnership MOU forms the foundation of the broad, consensus-based lower Clearwater Basin collaboration on which the LCEP effort is based. Signatory partners include the LOID, the Nez Perce Tribe, the City of Lewiston, Nez Perce County and the Lewis Clark Valley Chamber of Commerce (combining the perspectives, interests and resources of Lewiston, Idaho and Clarkston, Washington). All of these regional government entities signed the LCEP MOU in June 2009 because, in ways unique and specific to each, the LCEP objectives describe a set of status quo problems that are problematic for each, and provides a conceptual comprehensive solution that is consistent with the water management priorities of each, meeting the particular needs and interests of each entity.

Beyond these regional governments, there is widespread support for the LCEP effort and objectives throughout the State of Idaho, encountered no opposition to date. The LCEP objective has been publicly supported by political office representatives from the Idaho Federal Delegation and Regional State Legislators as well as the Governor of Idaho. The LCEP partners have also received formal letters of support from the University of Idaho's Waters of the West Program, in Moscow, Idaho, from NOAA Fisheries' Northwest Regional Office, the Clearwater Basin Collaborative in Orofino, Idaho, and from the Columbia River Inter-Tribal Fish Commission in Portland, Oregon.

Additionally, representatives from Clearwater Power Company in Lewiston, Idaho, Avista, the Idaho Department of Fish and Game, the Idaho Governor's Office, and Trout Unlimited have been active participants in LCEP collaboration and monthly meetings.

### 5.2.5 COMPLEMENTED PROGRAMS AND AUTHORITIES

The LCEP Group has shown commitment toward program collaboration since the Klemm meetings. The LCEP project objectives, and the fundamental water exchange concept on which they are based, are described as the subject of unanimous collaboration and consensus on the lower Clearwater region: city, county, irrigation district, Indian tribe, commerce chambers, and local non-governmental agencies, power companies and assisting state agencies such as Idaho Fish and Game. It is therefore unsurprising that the LCEP objectives, providing for LOID water needs from a replacement source with no net mainstem river effects while simultaneously restoring flows to an important tributary watershed, include both positive environmental and tribal effects. The following are regional programs and authorities that would be complemented by the action alternatives.

**NORTHWEST POWER AND CONSERVATION COUNCIL: COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM**

Successful construction of the final action alternative will simultaneously achieve components of several objectives provided by the Clearwater Subbasin Management Plan, adopted into the Northwest Power and Conservation Council's (Council's) Columbia River Basin Fish and Wildlife Program (FWP) in 2005. Objectives and strategies were identified on a subbasin-wide scale and those applicable to Sweetwater Creek include the following:

- Increase anadromous fish productivity and production, and life stage specific survival through habitat improvement.
- Restore adequate flows where hydrographs have been altered.
- Cooperate with user groups where hydrographs have been altered by high surface withdrawals.
- Reduce the number of artificially blocked streams by 2017.
- Reduce water temperatures to levels meeting applicable water quality standards for life stage specific needs of anadromous and native resident fish.

The LCEP will address a specific issue identified in the planning process for prioritization: Intensive water use resulting in substantial reductions in habitat availability or condition pertains specifically to LOID water use within the Potential Management Unit identified as PR-4 (Council, 2005, p 83).

**NEZ PERCE TRIBE: LAPWAI CREEK WATERSHED ECOLOGICAL RESTORATION STRATEGY**

Removal of the existing LOP infrastructure through the LCEP will immediately address limiting factors to ESA listed steelhead in lower Sweetwater Creek that have been identified in the Lapwai Creek restoration strategy which are; flow, water temperature, and habitat complexity. Another immediate effect will be removal of the fish passage barrier that separates lower Sweetwater Creek from upper Sweetwater Creek. The lower Sweetwater Creek Assessment Unit was identified as the number two priority for restoration in the entire Lapwai Creek watershed

The Nez Perce Tribe and Nez Perce (County) Soil and Water Conservation District developed the Lapwai Creek restoration strategy collaboratively in 2007 and updated the document in 2009. In addition, they have independently and cooperatively implemented the Council's FWP in the watershed under contracts with the Bonneville Power Administration (Project Numbers 1999-017-00 and 2002-070-00 respectively).

### **MULTI-GOVERNMENT (FEDERAL, STATE, TRIBAL): DRAFT SNAKE RIVER SALMON AND STEELHEAD RECOVERY PLANS FOR IDAHO**

NOAA Fisheries' Idaho State Habitat Office initiated drafting of recovery plans for Snake River listed species in partnership with the Idaho Governor's Office of Species Conservation. The plans are the products of a collaborative process involving other federal agencies, state agencies, tribes, local governments, and the public. To ensure consistency in goals, strategies, and actions, and to avoid duplication of effort, the process integrated planning for Federal ESA recovery, and the Northwest Power and Conservation Council's subbasin planning process, and implementation of Idaho's watershed management and salmon recovery efforts.

The overall goal for recovery plans is to achieve conditions for each Distinct Population Segment (DPS) so that it no longer needs protection under the ESA because it no longer is in danger of extinction or likely to become endangered within the foreseeable future. A delisting decision will include consideration of the current extinction risk of the listed species and whether factors for decline that lead to the listing have been addressed so they no longer limit the viability. The Interior Columbia Technical Recovery Team (ICTRT, 2005) recommends that that all Major Population Groups (MPG) in a Distinct Population Segment (DPS) be viable before being considered at low risk of extinction and a candidate for delisting.

The ICTRT made determinations for the Snake River steelhead DPS and the respective MPGs recognizing desired future status and the current status. The desired future status is a description of the recovery plan objective for a MPG that meets the minimum viability requirements based on the ICTRT (2005) viability criteria. The minimum viability requirements are the minimum combination of populations within a MPG that must be at viable status for that MPG to satisfy the ICTRT criteria. The populations included in a MPG recovery plan objective were selected based on unique sets of characteristics, such as run timing, importance as core production areas, management opportunities, and feasibility to monitor status. The recommended objectives or desired future status that NOAA Fisheries presents in the draft recovery plans represent the shortest routes to MPG viability.

The Snake River Steelhead DPS has six Major Population Groups, including the Clearwater River MPG, with six populations, four of which are identified as the minimum to achieve viability. The populations include the following: Lower Clearwater mainstem (A-run only), Lolo Creek (A and B-run), Lochsa River (B-run), and the South Fork Clearwater River (intermediate sized population, B-run). Steelhead in the Lapwai Creek watershed are included in the minimum needed to achieve viability for the Lower



Clearwater mainstem population. The LCEP will contribute to meeting the minimum viability for the Lower Clearwater mainstem steelhead population of the Clearwater River MPG of the Snake River steelhead DPS.

**MULTI-GOVERNMENT (STATE, TRIBAL, LOCAL): INTERIM DRAFT – LAPWAI CREEK WATERSHED WORK PLAN, 2004**

Prepared for B-list Streams under Mediator's Term Sheet Submitted to SRBA Court in SRBA Consolidated Subcase 03-10022 and SRBA Consolidated Subcase 67-13701

Work plans were developed for Snake River Basin Adjudication B-listed streams. These documents were developed by local work groups under the coordination of Idaho Department of Water Resources staff. The following is from the interim draft work plan developed for Lapwai Creek, Section 7.2.1 measures to protect and restore flow:

- Provide flow to meet the decreed minimum stream flow and benefit aquatic resources. Of special importance within the Lapwai Creek watershed is the high priority restoration need related to water use in the western portions of the watershed (NW Power and Conservation Council 2005) referring to water use and irrigation in the Lapwai Creek watershed primarily attributable to LOID.
- Implement restoration measures including water conservation and management measures, consolidation of diversions, annual, seasonal, and dry year leases on a willing seller-willing buyer basis through the Idaho Water Bank, conservation easements and other mechanisms can be used to provide flows to meet the decreed minimum stream flow and benefit aquatic resources in this stream.

**IDAHO DEPARTMENT OF FISH AND GAME (IDFG): FISHERIES MANAGEMENT PLAN 2007-2012**

The following IDFG objectives and programs are complemented by the LCEP objectives.

- **Objective:** Maintain and improve fish habitat and water quality within the Clearwater drainage.
- **Program:** Continue working with land management agencies (Forest Service, Bureau of Land Management, State Department of Lands) and private land owners to inform, educate, and assist with land management planning for protecting fish habitat and water quality. Emphasize the need for riparian habitat protection and enhancement. Encourage containment of sediment production areas, including old mining sites. Oppose land use activities that degrade quality of natural production areas.
- **Program:** Evaluate effectiveness of hypolimnetic aeration projects in Winchester and Waha lakes.

## NEZ PERCE COUNTY, IDAHO: COMPREHENSIVE PLAN, ADOPTED 1998

The following components from the Nez Perce County Comprehensive Plan are complemented by the LCEP and its objectives.

- **Water Resources:** Nez Perce County contains a large portion of the Lewiston Basin Aquifer. This natural underground water supply was designated a sole source aquifer by the U.S. Environmental Protection Agency October 3, 1988. The Lewiston Basin Aquifer covers approximately 400 square miles of Western North-Central Idaho and Southeastern Washington. In order to receive this designation an underground water supply (aquifer) or aquifer system must supply 50 percent or greater of an area's drinking water. Groundwater supplies approximately 68 percent of the drinking water for population within the Lewiston Basin.

The Lewiston Basin aquifer is principally replenished (recharged) by stream flow infiltration from portions of the Clearwater River, Lapwai Creek, Snake River, and Asotin Creek. It is for this reason that surface water quality must be protected to maintain the Lewiston Basin's drinking water quality. The importance of high quality sources of drinking water is obvious. Given the general abundance of water, the county's continued concern will be with the quality of its waters.

Pollution prevention must be the first step in improvement of the quality of Nez Perce County's surface and ground waters. Performance standards, applicable to all types of development that could have a deleterious effect on the water, should be established to reduce or prevent further pollution.

- **Goal Statement:** To manage Nez Perce County's natural resources so as to provide for future as well as present needs.
- **Policies:** Nez Perce County should encourage water and soil conservation measures through cooperation with the Natural Resource Conservation Service, the Clearwater Resource Conservation and Development Area, the Nez Perce Tribe, the Lewiston Orchards Irrigation District, and similar entities.

### 5.2.6 FINANCIAL NEED

The analysis of economic indicators show that over 10% of the City population and therefore the LOID service area is classified at poverty levels. Median household income is lower than both state and national levels. The data shows that residents within the project area cannot financially support the costs of planning, design, and construction of the proposed project alternatives without financial assistance. As given in Chapter 2, and as provided under application to the RWSP, consistent with the requirement of Rule Section 404.13.c., economic indicators of both LOID and the Tribe depict present financial limitations and need for assistance.

## **5.2.7 MULTIPLE GOVERNMENT WATER MANAGEMENT PRIORITIES**

The LCEP project and its objectives have been clearly identified -- and have been publicly committed to - as priorities by a broad coalition of regional government entities. The LCEP partner MOU indicates the breadth of the lower Clearwater Basin collaboration and consensus: Signatory partners include the Nez Perce Tribe, the City of Lewiston, Idaho, Nez Perce County, and the Lewis Clark Valley Chamber of Commerce (encompassing both Clarkston, Washington and Lewiston, Idaho). For these governments and governmental entities, the project and its objectives address a set of recurring status quo problems that affect each in a unique way, and describe a comprehensive, permanent resolution concept that is consistent with the water management priorities of each.

Beyond these signatory governmental entities, there is widespread political/governmental support for the project and its objectives throughout the State of Idaho: it has been publicly supported by political office representatives from the Idaho Federal Delegation and Regional State Legislators as well as the Governor of the State of Idaho.

## **5.3 RURAL WATER PROGRAM CRITERIA**

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In addition to the Reclamation study goals and objectives, the Rural Water Rule establishes specific criteria in Section 404.44.c that Reclamation will use to determine whether at least one of the alternatives identified in the study is appropriate for further analysis through a feasibility study. The scope of this Study and broader goals and project objectives have been discussed previously; each of the proposed viable alternatives will be independently assessed in this subsection with respect to the Section 404.44.c criteria.

### **5.3.1 WATER SUPPLY AND WATER RIGHTS**

All of the viable action alternatives would provide an equivalent volume of water supply (8,500 acre-ft) to LOID and its constituents. A discussion of each with respect to the criterion follows:

#### **CLEARWATER RIVER ACTION ALTERNATIVES**

The Clearwater River provides a reliable supply source for LOID. Per discussion with the Idaho Department of Water Resources (IDWR), water is available from the mainstem Clearwater River at the proposed point of withdrawal for each Clearwater River Action Alternative. As discussed in Chapter 4, a new water permit application would be submitted to IDWR by LOID. IDWR has stated that a water

permit application premised on the protection for minimum stream flow beneficial use purposes of existing LOP upstream water rights would be viewed as particularly well-conceived (Whiting 2011). IDWR views the Clearwater River at the proposed diversion location as part of a single hydrological unit, for net effect purposes, with the lower Lapwai/Sweetwater Creek watershed.

#### **SNAKE RIVER ACTION ALTERNATIVES**

The Snake River provides a reliable supply source for LOID. Per discussion with the IDWR, water is available from the mainstem Snake River at the proposed point of withdrawal for each Snake River Action Alternative. As discussed in Chapter 4, a new water permit application would be submitted to IDWR by LOID. IDWR has stated that a water permit application premised on the protection for minimum stream flow beneficial use purposes of existing LOP upstream water rights would be viewed as particularly well-conceived (Whiting 2011). IDWR views the Snake River at the proposed diversion location as part of a single hydrological unit, for net effect purposes, with the lower Lapwai/Sweetwater Creek watershed.

#### **GROUNDWATER ACTION ALTERNATIVES**

The Lewiston Regional Aquifer provides sufficient supply and reliability to satisfy system delivery requirements, as discussed in Chapter 4. Static water levels from the aquifer suggest a hydraulic connection to the Snake River. IDWR has stated that groundwater is available for appropriation at the proposed points of withdrawal. A new water permit application would be submitted to IDWR by LOID. IDWR has stated that a water permit application premised on the protection for minimum stream flow beneficial use purposes of existing LOP upstream water rights be viewed as particularly well-conceived (Whiting 2011).

#### **5.3.2 PUBLIC HEALTH AND SAFETY**

Although water quality from any of the action alternatives will differ from that provided through the LOP surface water collection system, the supply will have generally similar aesthetic qualities that are appropriate for both sport fisheries within Mann Lake and distribution for residential non-potable water use. Each of the action alternatives, via use of Mann Lake, improves the ability of the District to provide fire flows to the system through a more reliable source than the LOP.

For all action alternatives, the improvements in public health and safety would result through replacement of no action LOP water diversions from the Sweetwater watershed. These are identical across all action alternatives, through replacement the existing no action water source and include:



- Open surface water canals would be replaced under all alternatives with enclosed pipeline systems. This would remove all human dangers from open canal accidents and from potential failures of canals in the future, particularly in steep gradient locations of the no action system. All such dangers on the Nez Perce Reservation and to Nez Perce people would be eliminated.
- Watershed restoration of the lower Lapwai/Sweetwater Creek watershed would occur under all alternatives, and would result in increased stream flows, fish and wildlife habitat improvements, with human benefits throughout the watershed as a result. This is particularly true of Nez Perce Reservation areas of the no action water system, and cultural and religious water uses by Nez Perce people, which have been adversely impacted for over 100 years and could be improved and restored.
- Open canals would no longer be used and canal leakage, which under the no action system presently supports invasive plant species, including on the Nez Perce Reservation, would be eliminated.
- Incremental water quality improvement would result in less no action watershed debris in the LOID distribution system.
- The risk associated with public contact and human consumption of non-potable water may be reduced through improved water quality.
- Open canals would no longer be used and a new closed pipe system would not be exposed to the potential of noxious and nuisance weed dispersal from the LOP to the District service area and will be reduced through improved water quality.
- Open canals would no longer be used and a new closed pipe system will not be exposed to runoff from cattle and livestock waste, from ground and aerial applied herbicides, or pesticides and fertilizer.

#### **CLEARWATER RIVER ACTION ALTERNATIVES**

The Clearwater River would provide higher water quality for LOID than the no action LOP system. During periods of high flows associated with spring runoff and high turbidity, LOID could shut down the pumping station. Although this operational scenario is dependent on a number of factors including environmental considerations, deferred power management, water demand, system capacities, and pump station capacity, the flexibility to withdraw on a year round basis has potential to improve water quality for LOID.

#### **SNAKE RIVER ACTION ALTERNATIVES**

The Snake River would provide higher water quality for LOID than the no action LOP system. During periods of high flows associated with spring runoff and high turbidity, LOID could shut down the pumping station. Although this operational scenario is dependent on a number of factors including

environmental considerations, deferred power management, water demand, system capacities, and pump station capacity, the flexibility to withdraw on a year round basis has potential to improve water quality for LOID.

#### GROUNDWATER ACTION ALTERNATIVES

Groundwater from the Lewiston Basin Aquifer is of high water quality that is acceptable for drinking water. This action alternative offers the most impact to public health and safety due to the potential to tie the wells to LOID's domestic system for use as drinking water. Over the last ten years, LOID has relied on three wells to provide potable water service. At times during that period, two of these wells have been out of service at the same time, and LOID was required to purchase water from the City of Lewiston. The groundwater action alternative has significant potential to improve system redundancy and meet potable water demands in an emergency situation when other LOID wells are out of service, thereby improving public health and safety.

#### 5.3.3 ABILITY TO MEET DEMANDS

##### FUTURE NEEDS

Analysis indicates that, with careful management, the future needs of the LOID service area can be met by the LCEP project design criterion of 8,500 acre-ft of water. Under all of the alternatives considered, an additional 3,000 acre-ft of water above current typical deliveries will be available annually to LOID. Therefore, 8,500 acre-ft of water is used in this Study for all alternatives as a rational quantity for purposes of appraisal level preliminary design analysis and attendant cost estimates.

The population and number of accounts within District boundaries are projected to increase by as much as 9,000 residents, as extrapolated from **Table 2.4** and irrigation water use will be offset by increased subdivision and the resultant increase in total impervious surface area. Based on a land assessment reported in 1992, the gross LOP static acreage 3,792 acres (digitized acreage vs. District reported acreage of 3,848 acres) had already been reduced by 943 acres due to construction of roadways, buildings, driveways, et al. (Morrison & Knudsen 1992). Current land use estimates place this figure at as much as 30 percent of the gross static acreage today. Projections of impervious surface through the 50-year planning horizon have not been performed but can be expected to be at least one-third to one-half of the total original LOP acreage.

LOID has been installing meters using grant funds from Reclamation provided under the WaterSMART program. This conservation effort is expected to result in significant "end of pipe" water savings for the

District. Results are already evident, and a tiered block pricing system is under consideration to further promote efficient use of water.

Expansion of the District has been considered but not pursued to the limited availability of water and resultant risks and uncertainties surrounding ability to reliably deliver water to its patrons. Requests for addition to the system have been turned down by the LOID Board (Metz 2011a). The domestic water boundary, however, which is independent of the LOP boundaries, has been expanded to meet ongoing population growth. LOID has recently begun study of a new well installation to fulfill increasing DCMI and irrigation water demand outside of the LOP boundaries. Thus, the constraints of the current Craig Mountain water supply, canal and reservoir condition limitations, and Sweetwater Creek watershed ESA requirements have resulted in lopsided service to the LOID patrons.

#### ADDITIONAL FUTURE NEED CONSIDERATIONS

The District and study area are trending toward urbanization and relatively increasing population density, with resulting additional domestic, municipal and industrial water uses. Since 1993, the District population is estimated to have increased by approximately 1,500 residents (**Figure 2.4**) and the number of LOID accounts has increased as land within the District has been subdivided.

In keeping with the study objectives, and with respect to its water demand and water use aspects, this Study is aimed specifically at the present and projected future water needs of the LOID District within defined District boundaries. All viable alternatives expand the benefits and opportunities presented in each case by taking a water exchange/watershed perspective that addresses watershed restoration and Indian reservation components aimed at the environmental, cultural and spiritual needs of Nez Perce Tribe. Other project sponsors, the City of Lewiston, Nez Perce County, and the Lewis Clark Valley Chamber of Commerce, hold broad interests in the project, its study and the viable alternatives, that cross all components and all benefits. As a primary matter, the LOID District population represents a majority of the population of the City and slightly less than half the population of the County, and so the risks and uncertainties to the LOID District of the No Action Alternative carry significant weight as well for these LCEP partner sponsors.

The project, this Study, and the viable alternatives additionally, however, present a potential link to future, additional benefits for the City and County that are intentionally beyond the scope of the present study. City and County water needs are based on DCMI future growth scenarios. Using the information presented in **Figure 2.4**, population in Nez Perce County is projected to increase by 25,000 residents

during this project's 50-year planning horizon. Although the area is rich in water, both surface and groundwater supplies are located approximately 1,000 feet below the surface elevation and would require pumping regardless of the source used.

The County's comprehensive plan is currently undergoing revision, in part due to recent events where water, once again, is the source of conflict. The portion of the study area immediately to the east of the LOID service area is the primary anticipated growth area in the County. There are geographic constraints to growth to the north and west. In the absence of a communal water supply for this area, domestic exempt wells may be used to serve both DCMI and landscape irrigation needs. The County's growth area may rely on either the shallow (in or near the Lindsay Creek critical groundwater management area) or deep (Lewiston Basin) aquifers. Existing residents with shallow wells have voiced concerns at public forums regarding their wells running dry under limited future growth scenarios (Thomkins 2011). During high-growth periods in the early 2000s in nearby eastern Washington and southern and eastern Idaho, many issues arose due to relatively unrestricted proliferation of domestic exempt wells.

The study's proposed viable alternatives may in the future provide options for some or all LCEP stakeholders to cooperatively address the projected future study area growth – beyond LOID District growth and beyond the immediate objectives of this project and study -- through system expansions or even future phases after decades of operation.

#### 5.3.4 ENVIRONMENTAL BENEFITS

The water exchange concept is integral and identical across all of the action alternatives; providing for rural water needs from a downstream viable water source while simultaneously protecting an instream flow of upstream tributary water rights. The environmental benefits of increased tributary stream flows, meeting state-held minimum stream flows, and watershed restoration with fish and Nez Perce cultural/religious benefits in the Lapwai Creek watershed are discussed as to those aspects below.

Of eight state-held priority streams with decreed minimum flows in the Lapwai watershed, five lie within or are directly affected by the no action LOP water system: Webb Creek (14.2 CFS – 0.8 CFS seasonal); Sweetwater Creek (39.5 CFS – 4.7 CFS seasonal); East Fork Sweetwater Creek (6.5 CFS – 0.3 CFS seasonal); West Fork Sweetwater Creek (5.8 CFS – 0.3 CFS seasonal); and Lapwai Creek (209.0 CFS - 18.0 CFS seasonal). Watershed restoration objectives and measures for these critical streams – which include restoring flows, reducing stream temperatures and achieving fish passage – could be significantly



improved and presently unsatisfied minimum stream flows could be substantially or entirely satisfied, though any of the action alternatives. This would occur by using the Idaho Water Supply Bank to lease or otherwise protect LOP water rights that would no longer be needed for diversion. This would both protect those water rights from other appropriation, and would apply them to presently unsatisfied state-held minimum stream flows on these streams. An additional presently unsatisfied state-held minimum stream flow – pre-dating the 2005 Nez Perce - SRBA settlement – is located in the mainstem lower Clearwater River between the mouth of Potlatch Creek and a point just upstream of the City of Lewiston. This minimum flow varies seasonally between 5,910 CFS and 4,498 CFS, and offers an additional opportunity to use the Idaho Water Supply Bank to protect LOP water rights that would be left instream through implementation of an action alternative and would provide an incremental benefits to mainstem lower Clearwater flows.

The lower Lapwai/Sweetwater watershed that would benefit from the water exchange/watershed restoration aspects of each of the alternatives is environmentally critical portion of the larger Lapwai Creek watershed, tributary to the Clearwater River. Steelhead (*Oncorhynchus mykiss*) are an ecologically significant resource of the Lapwai Creek watershed and comprise a portion of the federally listed Snake River Basin Steelhead distinct population segment (DPS). The majority of the Lapwai Creek drainage is federally identified as critical habitat for this DPS while also providing habitat for the federally listed Snake River fall chinook (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU). The Nez Perce (County) Soil and Water Conservation District and the Nez Perce Tribe's Department of Fisheries Resource Management, Watershed Division, are presently working on a comprehensive watershed strategy to support the continued existence of these and other aquatic species.

The Sweetwater watershed provides spawning and rearing habitat for the Clearwater River Lower Mainstem (CRLMA) population of the DPS. This particular steelhead population is required to achieve viable status (defined through abundance, population productivity or growth rate, population spatial structure, and life history/genetic diversity) for the DPS to be eligible for ESA delisting.

Juvenile steelhead capture densities have been compiled from 2003-2009 electro-fishing surveys conducted throughout CRLMA spawning and rearing streams. Densities from that section of Lapwai Creek upstream of Sweetwater and Webb Creek are among the highest recorded, with capture rates of up to 113 juvenile steelhead per 100m<sup>2</sup>. Substantially lower juvenile steelhead densities have been recorded throughout the forty-three miles of stream habitat impacted by the LOP. The twenty-four miles of stream still accessible to steelhead below the Sweetwater Dam are subject to greatly reduced

flows and elevated summer water temperatures, while nineteen miles of stream habitat are rendered completely inaccessible by the Dam. The total watershed acreage presently drained by LOP-affected streams is 61,325 acres.

A particularly significant environmental restoration aspect of the action alternatives is restoration through ending water diversion from Sweetwater Creek as fed by a large spring complex – Sweetwater Spring – formed through subterranean discharge of Lake Waha. This spring provides a unique cool-water thermal refuge functionality in Sweetwater Creek, but for the no action impacts of the LOP water diversion system. Prior to LOP impacts on Lake Waha, Sweetwater Spring discharge was reported to range between 4.6 CFS and 6.1 CFS for the months of July to September. Recent studies have estimated that natural spring discharge during these summer months would be unlikely to fall below 3 CFS, and would potentially range as high as 10 CFS. Spring discharge water temperatures have been recorded to be relatively constant year-round, with a data range of 8.3° C to 10.6° C (46.9° F to 51.1° F). These are essentially optimal temperatures for steelhead rearing. This aspect of environmental restoration available through the action alternatives and their water exchange approach to provide LOID's rural water needs is essentially unique. Given climate change trends in the Snake River Basin generally, and particularly at elevations such as the Craig Mountain water supply of the No Action Alternative, this aspect of the action alternatives also represents a genuine opportunity to implement a project with a climate change aspect to it; protecting and preserving a much-needed year-round cool-water source within the lower Clearwater River subbasin. High summer water temperatures and low summer stream flows have been identified within regional fisheries inventories, watershed assessments, and subbasin assessments as being among the most significant limiting factors for steelhead production throughout the CRLMA population. There is no other spring or tributary within this population's rearing range that can provide either the high volume of cool summer flow or constant overwintering temperature that is historically provided and can still be provided, through restoration, by Sweetwater Spring.

Linked to the broad study concept of environmental benefits, Reclamation's Directives and Standards Section 10.B.4.b.vi also requires a "Brief analysis of potential environmental, cultural resources, and social impacts of the alternatives that affect the potential for further study and project implementation," and that brief analysis is offered here. The second issue, potential cultural resource impacts, is addressed in the cultural survey of all of the action alternatives prepared under contract with the Nez Perce Tribe's Cultural Resource Program and under the direction of the Tribe's Tribal Historic Preservation Officer, and can be reviewed in **Appendix H**.

The other two issues, potential environmental and social impacts, vary somewhat under the alternatives, and also overlap with issues addressed elsewhere. As to environmental impacts, all of the alternatives would entirely replace the no action water source in the lower Lapwai/Sweetwater Creek watershed. All would in that respect have identical environmental restoration benefits. All would have equivalent positive potential impacts in restoring minimum stream flows and habitat in that watershed. All could be used to protect existing LOP water rights through the Idaho Water Supply Bank to help meet state-minimum stream flows in Webb, Sweetwater and Lapwai Creeks, and incrementally in the main Clearwater as well.

Social impacts under all of the alternatives are unique with respect to the Nez Perce Tribe, its people and its Reservation. As discussed in earlier sections of the study, and as discussed above with respect to the governmental priority of the project overall to the Nez Perce Tribe, all the alternatives, by entirely replacing water diversions and the no action water system on and affecting the Nez Perce Reservation, would have profound effects on Nez Perce people. Cultural and religious use of water by Nez Perce people would be unaffected by no action LOID system diversions for the first time since the early 20<sup>th</sup> century. Increased flows in the restored watershed would be protected through beneficial use to meet state-held minimum stream flows in the watershed, but they would also increase the reliability of Nez Perce water rights and would improve the health and welfare of Nez Perce people on the Reservation.

Another environmental benefit, open canals would no longer be used and a new closed pipe system will not be exposed to aerial spraying or runoff from ground applied herbicides, pesticides, or fertilizer and runoff from cattle and livestock waste. All alternatives will greatly reduce the present delivery of noxious and nuisance weed seeds to patron properties.

### 5.3.5 REGIONAL OR WATERSHED PERSPECTIVE AND BENEFITS

All of the action alternatives involve an identical regional watershed perspective by integrating water source replacement with the lower Lapwai/Sweetwater Creek watershed, as a matter of fundamental water exchange concepts and regional benefits. LCEP conversations with Idaho State Water Resources Department indicate that replacement water sources from any of the action alternative sources would be viewed as contained within a single hydrological unit of the Snake/Clearwater basin area for purposes of assessing net watershed effects (Whiting 2011).

All of the action alternatives meet the Rural Water Program Section 404.2 definition of a “Regional or watershed perspective” in all respects, as “An approach to rural water supply planning directed at

meeting the needs of geographically dispersed localities across a region or a watershed that will take advantage of economies of scale and foster opportunities for partnerships. This approach also takes into account the interconnectedness of water and land resources, encourages the active participation of all interested groups, and uses the full spectrum of technical disciplines in activities and decision-making.”

In each alternative, the innovative concept of a water exchange is used between an interconnected new water source and a sensitive upstream tributary watershed with restoration potential, done via a new high-efficiency intake piping system that provides water use for LOID. The action alternatives provide simultaneous protection of water rights through beneficial use minimum stream flows in the upstream tributaries, ending adverse ESA impacts and adverse impacts to the Nez Perce Tribe, its people, and its Reservation.

All of the alternatives would render the existing diversions, canals, and dams in the Sweetwater Creek watershed unnecessary, resulting in direct, increased stream flows for ESA listed steelhead in those watersheds and providing fish passage above the existing Sweetwater Dam to additional, historic, high-quality Snake River steelhead habitat. The watershed restoration component of each alternative, by rendering the existing LOP unnecessary, would significantly increase stream flow throughout 24 miles of steelhead spawning and rearing habitat in the lower Lapwai Creek watershed. Anadromous salmonid passage would be provided to an additional 19 miles of tributary habitat. Cool water refugia, unsurpassed by and unlike any other identified within the lower Clearwater River subbasin, would be restored to a stream channels below the unique Sweetwater Springs outflow; providing varied levels of reduced water temperature to at least 17 miles of tributary habitat. Hydrological function would be returned to a more natural and functional state, improving channel morphology, floodplain connectivity, and riparian vegetative density while alleviating impacts of extreme instantaneous flow variability on stream biota.

The broad, multi-governmental set of no action problems all of the alternatives address, involve LOID and its constituents, who comprise a majority of the population of the City of Lewiston. The action alternatives also address adverse watershed impacts on and near the Nez Perce Reservation that have resulted in recurring multi-agency ESA litigation for nearly a decade over the water needs of ESA listed steelhead and ESA designated critical habitat as well as adverse cultural, religious and other water use impacts on the Nez Perce Tribe and its people, resulting from the predominant location of the existing LOP gravity conveyance system on the Nez Perce Reservation. The comprehensive resolution embodied by the action alternatives takes advantage of the unique overlap of both problems and interests among



all of the LCEP governmental partners, as well as federal and state program and authority priorities to resolve all problems and interests simultaneously. A set of issues that has attracted the support of governmental entities throughout the lower Clearwater Basin, and federal and state political offices throughout the State of Idaho would be comprehensively and permanently addressed.

### **5.3.6 INTEGRATED WATER RESOURCES MANAGEMENT**

All of the action alternatives, as a result of their identical water exchange fundamentals, possess nearly identical aspects of integrated water resources management. In each case, the governmental water management priorities of multiple local, tribal, state agencies are furthered by the core project objectives of providing needed water supplies to the LOID area with greatly improved efficiency and increased water conservation; while simultaneously offering watershed restoration benefits to upstream tributaries through water banking and protection of water rights through beneficial use to meet state-held minimum stream flows; and in the particular case of the Nez Perce Tribe, meeting unique water resource priorities involving cultural and religious, non-consumptive uses of water that have been impaired by the no action diversion/canal system since the early 20<sup>th</sup> century.

All of the alternatives approach the provision of needed water for LOID through a water exchange based mechanism which in its tributary water rights and stream flow protection aspects can be integrated and complementary of multiple other governmental water resource management efforts. The several tribal, state, county, local, and federal programs and authorities existing in the lower Clearwater subbasin that were previously discussed as complemented programs and authorities within the meaning of the core RWSP goals also represent water resource management priorities and plans that would be integrated and furthered by all of the alternatives, given their identical termination of water diversion from sensitive upstream Clearwater tributaries and consolidation of water supply. They merit repetition in this subsection:

#### **NORTHWEST POWER AND CONSERVATION COUNCIL: COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM**

Action alternatives would simultaneously achieve components of several objectives provided by the Clearwater Subbasin Management Plan, adopted into the Northwest Power and Conservation Council's (Council's) Columbia River Basin Fish and Wildlife Program (FWP) in 2005. Objectives and strategies were identified on a subbasin-wide scale and those applicable to Sweetwater Creek include the following:

- Increase anadromous fish productivity and production, and life stage specific survival through habitat improvement.
- Restore adequate flows where hydrographs have been altered.
- Cooperate with user groups where hydrographs have been altered by high surface withdrawals.
- Reduce the number of artificially blocked streams by 2017.
- Reduce water temperatures to levels meeting applicable water quality standards for life stage specific needs of anadromous and native resident fish.

Action alternatives would address a specific issue identified in the planning process for prioritization; intensive water use resulting in substantial reductions in habitat availability or condition pertains specifically to LOID water use within the Potential Management Unit identified as PR-4. (NW Power and Conservation Council 2005)

#### **NEZ PERCE TRIBE: LAPWAI CREEK WATERSHED ECOLOGICAL RESTORATION STRATEGY**

Removal of the existing LOP infrastructure through any of the action alternatives would immediately address limiting factors to ESA listed steelhead in lower Sweetwater Creek that have been identified in the Lapwai Creek restoration strategy which are: flow, water temperature, and habitat complexity. Another immediate effect will be removal of the fish passage barrier that separates lower Sweetwater Creek from upper Sweetwater Creek. The lower Sweetwater Creek Assessment Unit was identified as the number two priority for restoration in the entire Lapwai Creek watershed.

The Nez Perce Tribe and Nez Perce (County) Soil and Water Conservation District developed the Lapwai Creek restoration strategy collaboratively in 2007 and updated the document in 2009. In addition, they have independently and cooperatively implemented the Council's FWP in the watershed under contracts with the Bonneville Power Administration (Project Numbers 1999-017-00 and 2002-070-00 respectively).

#### **MULTI-GOVERNMENT (FEDERAL, STATE, TRIBAL): DRAFT SNAKE RIVER SALMON AND STEELHEAD RECOVERY PLANS FOR IDAHO**

NOAA Fisheries' Idaho State Habitat Office initiated drafting of recovery plans for Snake River listed species in partnership with the Idaho Governor's Office of Species Conservation. The plans are the products of a collaborative process involving other federal agencies, state agencies, tribes, local governments, and the public. To ensure consistency in goals, strategies, and actions, and to avoid duplication of effort, the process integrated planning for Federal ESA recovery, and the Northwest

Power and Conservation Council's subbasin planning process, and implementation of Idaho's watershed management and salmon recovery efforts.

The overall goal for recovery plans is to achieve conditions for each Distinct Population Segment (DPS) so that it no longer needs protection under the ESA because it no longer is in danger of extinction or likely to become endangered within the foreseeable future. A delisting decision will include consideration of the current extinction risk of the listed species and whether factors for decline that lead to the listing have been addressed so they no longer limit the viability. The Interior Columbia Technical Recovery Team (ICTRT, 2005) recommends that all Major Population Groups (MPG) in a Distinct Population Segment (DPS) be viable before being considered at low risk of extinction and a candidate for delisting.

The ICTRT made determinations for the Snake River steelhead DPS and the respective MPGs recognizing desired future status and the current status. The desired future status is a description of the recovery plan objective for a MPG that meets the minimum viability requirements based on the ICTRT (2005) viability criteria. The minimum viability requirements are the minimum combination of populations within a MPG that must be at viable status for that MPG to satisfy the ICTRT criteria. The populations included in a MPG recovery plan objective were selected based on unique sets of characteristics, such as run timing, importance as core production areas, management opportunities, and feasibility to monitor status. The recommended objectives or desired future status that NOAA Fisheries presents in the draft recovery plans represent the shortest routes to MPG viability.

The Snake River Steelhead DPS has six Major Population Groups, including the Clearwater River MPG, with six populations, four of which are identified as the minimum to achieve viability. The populations include the following: Lower Clearwater mainstem (A-run only), Lolo Creek (A and B-run), Lochsa River (B-run), and the South Fork Clearwater River (intermediate sized population, B-run). Steelhead in the Lapwai Creek watershed are included in the minimum needed to achieve viability for the Lower Clearwater mainstem population. Any of the action alternatives, through lower Lapwai Creek watershed restoration, would contribute to meeting the minimum viability for the Lower Clearwater mainstem steelhead population of the Clearwater River MPG of the Snake River steelhead DPS.

#### MULTI-GOVERNMENT (STATE, TRIBAL, LOCAL): INTERIM DRAFT – LAPWAI CREEK WATERSHED WORK PLAN, 2004

Prepared for B-list Streams under Mediator's Term Sheet Submitted to SRBA Court in SRBA Consolidated Subcase 03-10022 and SRBA Consolidated Subcase 67-13701.

Work plans were developed for Snake River Basin Adjudication B-listed streams. These documents were developed by local work groups under the coordination of Idaho Department of Water Resources staff. The following is from the interim draft work plan developed for Lapwai Creek, Section 7.2.1 measures to protect and restore flow:

- Provide flow to meet the decreed minimum stream flow and benefit aquatic resources. Of special importance within the Lapwai Creek watershed is the high priority restoration need related to water use in the western portions of the watershed (NW Power and Conservation Council 2005) referring to water use and irrigation in the Lapwai Creek watershed primarily attributable to LOID.
- Implement restoration measures including water conservation and management measures, consolidation of diversions, annual, seasonal, and dry year leases on a willing seller-willing buyer basis through the Idaho Water Supply Bank, conservation easements and other mechanisms can be used to provide flows to meet the decreed minimum stream flow and benefit aquatic resources in this stream.

#### IDAHO DEPARTMENT OF FISH AND GAME (IDFG): FISHERIES MANAGEMENT PLAN 2007-2012

The following IDFG objectives and programs are complemented by all of the alternatives with respect to their watershed restoration aspects.

- **Objective:** Maintain and improve fish habitat and water quality within the Clearwater drainage.
- **Program:** Continue working with land management agencies (Forest Service, Bureau of Land Management, State Department of Lands) and private land owners to inform, educate and assist with land management planning for protecting fish habitat and water quality. Emphasize the need for riparian habitat protection and enhancement. Encourage containment of sediment production areas, including old mining sites. Oppose land use activities that degrade quality of natural production areas.
- **Program:** Evaluate effectiveness of hypolimnetic aeration projects in Winchester and Waha lakes.

#### NEZ PERCE COUNTY, IDAHO: COMPREHENSIVE PLAN, ADOPTED 1998

The following components from the Nez Perce County Comprehensive Plan are complemented by the action alternatives, even including the Groundwater Alternative, with respect to their watershed flow restoration aspects and net zero or positive flow effects on the mainstem Snake and Clearwater Rivers.

- **Water Resources:** Nez Perce County contains a large portion of the Lewiston Basin Aquifer. This natural underground water supply was designated a sole source aquifer by the U.S. Environmental Protection Agency October 3, 1988. The Lewiston Basin Aquifer covers approximately 400 square miles of Western North-Central Idaho and Southeastern Washington. In order to receive this designation an underground water supply (aquifer) or aquifer system must supply 50 percent or greater of an area's drinking water. Groundwater supplies approximately 68 percent of the drinking water for population within the Lewiston Basin.

The Lewiston Basin aquifer is principally replenished (recharged) by stream flow infiltration from portions of the Clearwater River, Lapwai Creek, Snake River, and Asotin Creek. It is for this reason that surface water quality must be protected to maintain the Lewiston Basin's drinking water quality. The importance of high quality sources of drinking water is obvious. Given the general abundance of water, the county's continued concern will be with the quality of its waters.

Pollution prevention must be the first step in improvement of the quality of Nez Perce County's surface and ground waters. Performance standards, applicable to all types of development that could have a deleterious effect on the water, should be established to reduce or prevent further pollution.

- **Goal Statement:** To manage Nez Perce County's natural resources so as to provide for future as well as present needs.
- **Policies:** Nez Perce County should encourage water and soil conservation measures through cooperation with the Natural Resource Conservation Service, the Clearwater Resource Conservation and Development Area, the Nez Perce Tribe, the Lewiston Orchards Irrigation District, and similar entities.

### 5.3.7 WATER MANAGEMENT FLEXIBILITY

In a similar fashion to other Rule 404.44.c water management criteria, the fundamental aspect of all the action alternatives as a water exchange – by providing for LOID's rural water supply needs from a more plentiful replacement water source, while simultaneously restoring and protecting flows and water rights in upstream tributaries within a single hydrologically-connected watershed – allows all action alternatives to enhance water management flexibility and local control, and under all alternatives, to implement state water banking to protect tributary water sources. It is unsurprising that LCEP conversations with Idaho Water Resources Department indicated that department staff found the concept of "Consolidating" water diversions away from sensitive tributaries and to main watershed-linked water sources to be a positive water management concept. State staff indicated that they consider the entire project area encompassing all alternatives as part of a single hydrological unit for purposes of net water flow effects.



Implementation of any of the action alternatives will provide LOID with increased water management flexibility. Current limitations and restrictions of the No Action Alternative water system and supply would be lifted for LOID, and when combined with high-efficiency delivery via piping system, and increased water conservation implementation by LOID, would allow LOID control of a new 8,500 acre-foot water right to “Control its destiny” in respect of present water needs and projected future water needs and uses.

An additional benefit of the Groundwater Supply Alternative is increased redundancy for the LOID domestic system. The wells would be drilled to meet domestic water standards and could therefore be brought on-line as required for various domestic water purposes.

Simultaneously with LOID control of an 8,500 acre-ft water right under all action alternatives, existing no action LOP water rights as previously described culminate, in total volume, in a 10,500 acre-ft water storage right at Mann Lake. Under the water exchange concept common to all of the action alternatives, these no action system water rights would be protected from diversion and new appropriation through use of the Idaho Water Supply Bank, and beneficial use to meet state-held minimum stream flows in the lower Lapwai Creek watershed.

Five state-held minimum stream flows lie within or are directly affected by the no action LOP water system: Webb Creek (14.2 CFS – 0.8 CFS seasonal); Sweetwater Creek (39.5 CFS – 4.7 CFS seasonal); East Fork Sweetwater Creek (6.5 CFS – 0.3 CFS seasonal); West Fork Sweetwater Creek (5.8 CFS – 0.3 CFS seasonal); and Lapwai Creek (209.0 CFS – 18.0 CFS seasonal). The flexibility offered through all of the alternatives, by replacing the no action water source within the same hydrological unit for net water effect purposes, means that mainstem river stream flows will be unchanged or incrementally positive, while stream flows in these upstream tributaries will be significantly improved. The Idaho Water Supply Bank also allows a fundamental requirement of water right protection to occur without new appropriation or consumptive use of the tributary water rights that will no longer be required for LOID use under all action scenarios. The Idaho Water Supply Bank also offers an additional opportunity; an additional presently unsatisfied state-held minimum stream flow is located in the mainstem lower Clearwater River between the mouth of Potlatch Creek and a point just upstream of the City of Lewiston. This minimum flow varies seasonally between 5,910 CFS and 4,498 CFS, and offers an additional opportunity to use the Idaho Water Supply Bank flexibly to protect the no action LOP water rights under all of the action alternative scenarios.

### 5.3.8 WATER SUPPLY PROTECTION

Implementation of proposed alternatives will result in water supply protection of ESA listed critical habitat within the Craig Mountain drainage.

As reflected in the Reclamation Directives and Standards, long-term protection of water supplies is to a large extent an aspect of the environmental benefits of an action alternative; which have been previously discussed. All of the action alternatives, however, as conceptual water exchanges, have as one of their most fundamental aspects the protection of overall/net source water supplies and the significant improvement and protection of sensitive tributary water supplies. Whereas water under the No Action Alternative is provided with low efficiency, and with high adverse environmental impacts in the lower Lapwai Creek watershed – and above that with reliability and certainty risks for LOID water needs – each of the action alternatives is premised on the concept of high-efficiency delivery, conservation-minded rural water use, and legal protection of the no action LOP water rights that would remain instream and improve tributary flows.

LOID would control a new 8,500 ft water right under all action alternatives. Existing no action LOP water rights as previously described, culminate, in total volume, in a 10,500 ft water storage right at Mann Lake. Under the water exchange concept common to all of the action alternatives, these no action system water rights would be protected from diversion and new appropriation through use of the Idaho Water Supply Bank, and beneficial use to meet state-held minimum stream flows in the lower Lapwai Creek watershed. The exact mechanism within the Idaho Water Supply Bank remains to be determined, but LCEP conversations with the state to date have encouraged the concept and there is precedent in other Idaho regions for using the water bank to meet minimum stream flows – thereby serving the double purpose of protection of flows leased or contributed and satisfaction, partial or complete, of important minimum stream flows. In a comprehensive watershed perspective under all of the action alternatives, the protected stream flows would very significantly improve flows in Webb, Sweetwater and Lapwai Creeks. They would incrementally add to mainstem Clearwater River flows, given that at that point in the watershed river volume is enormous; but in key water exchange concept, they would ensure that the new diversion of an 8,500 ft water right from the mainstem Clearwater would not have a net negative effect on mainstem river flows, and that a significant tributary watershed could be restored.

The no action state-held minimum stream flows that lie within or are directly affected by the no action LOP water system are: Webb Creek (14.2 CFS – 0.8 CFS seasonal); Sweetwater Creek (39.5 CFS – 4.7 CFS seasonal); East Fork Sweetwater Creek (6.5 CFS – 0.3 CFS seasonal); West Fork Sweetwater Creek (5.8 CFS – 0.3 CFS seasonal); and Lapwai Creek (209.0 CFS – 18.0 CFS seasonal). An additional presently unsatisfied state-held minimum stream flow is located in the mainstem lower Clearwater River between the mouth of Potlatch Creek and a point just upstream of the City of Lewiston. This minimum flow varies seasonally between 5,910 CFS and 4,498 CFS, and offers an additional opportunity to use the Idaho Water Supply Bank flexibly to protect the no action LOP water rights under all of the action alternative scenarios.

### 5.3.9 CAPITAL COST

Capital costs are presented in Chapter 4 and summarized in **Table 5.3**.

### 5.3.10 NET ECONOMIC BENEFITS

The result of Reclamation's economic analysis shows that economic impacts associated with the action alternatives are created primarily through construction investments. The greatest impact is therefore associated with the Groundwater Action Alternative, as it has the highest capital cost. In general, each of the action alternatives will result in increased economic activity due to operational, maintenance, and power costs that are significantly higher than current expenditures associated with the LOP.

### 5.3.11 OM & R COSTS

Annual operations, maintenance, and replacement costs associated with implementation of the proposed alternatives are presented in Chapter 4 and summarized in **Table 5.4**. Reclamation's economic analysis shows that implementation of any of the action alternatives is within LOID patron's ability to pay threshold. Although these costs are significant, they must be supported by LOID patrons.

## 5.4 RURAL WATER PRIORITIZATION CRITERIA

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The Rural Water Rule offers additional prioritization criteria under Section 404.13, required for integration under the Directives and Standards Section 10.B. With exception to the items listed below, these are synonymous with Rule 404.4 "Goals," Rule 404.44 "Criteria," and specific Reclamation objectives:

- The extent to which Reclamation is uniquely qualified to plan, design and build the project (404.13.d).
- Whether a rural water supply project helps meet applicable requirements established by law (404.13.e).
- The extent to which a rural water supply project serves Indian tribes that have non-existent or inadequate water systems (404.13.f).
- The extent to which a rural water supply project is ineligible for comprehensive funding (sufficient to fully fund planning and construction of the entire project) through other assistance programs (404.13.g).
- Whether a rural water supply project incorporates an innovative approach that effectively addresses water supply problems and needs, either by applying new technology or by employing a creative administrative or cooperative solution (404.13.i).

These remaining criteria are discussed below:

Reclamation, through Commissioner Connor, has twice identified the RWSP to LCEP partners and supporters as a potential fit for the LCEP project concept. Commissioner Connor responded to Nez Perce Chairman Samuel Penney by letter on March 26, 2010, and indicated the potential of the RWSP to meet the objective of the Tribe and its LCEP partners to reach a comprehensive resolution of status quo problems. Commissioner Connor later replied to then Idaho Congressman Minnick on June 24, 2010, after the Congressman had sent a letter of June 1, 2010, to the Commissioner in support of the LCEP partners and their objective and identified the RWSP as a potential vehicle for comprehensive resolution of status quo problems surrounding the LOP. While the LCEP partners intend to continue to try to utilize any and all sources of funding, there appear to be no other or overlapping federal programs that could fund the planning, design and construction of this project. Additionally, Reclamation's unique qualifications for assistance stem from its extended ownership and accumulated knowledge of the existing LOP project system and components, and of LOID and its water needs: no other federal agency possesses its qualifications based on its special relationship and expertise.

The LCEP and its objectives are aimed at resolving a nearly unique set of legal requirements, as has been discussed previously but merits restatement. Federal ESA legal requirements for ESA listed Snake River steelhead and ESA designated critical within the watershed impacted by the no action LOP system would be efficiently and comprehensively met by a replacement water source. Legal requirements for water provision to LOID by Reclamation under the existing September 10, 1947 Federal Contract would also be efficiently met through a replacement water source that would end the no action risks and uncertainties

of the present watershed water supply. Federal-Tribal Fiduciary and Treaty-based obligations to Indian tribes, recognized by Reclamation as part of its agency mission, would be met by a replacement water source that did not divert water from the Nez Perce Reservation: the risks and uncertainties of the legal implications of the no action LOP system in respect of its impacts on the Nez Perce Tribe, its people, and its Reservation and resources would be comprehensively ended under this project and its objectives. Additionally, as previously explained at length, the project and its objectives complement multiple governmental programs and authorities in the Clearwater River region; all of which are based on legal requirements particular to those governmental entities and their programs and goals. Also, the LCEP and its objectives address conflicts associated with a federal reclamation project in a comprehensive approach supportive of the congressional purposes of, and the congressional authorization of grants under, Public Law 111-11, Subtitle F, SECURE Water (also known as the SECURE Water Act, passed on March 30, 2009).

The LCEP project and objectives would have significant positive effects on the Nez Perce Tribe, its people, and its Reservation and natural and cultural resources. The predominant location of the LOP gravity conveyance system on the Nez Perce Reservation, under various early 20<sup>th</sup> century ownerships, and since 1946 under federal ownership, has been and continues to be a source of multiple adverse impacts on the Tribe and its people and resources, and a matter of grave concern to the Tribe that has resulted in policy-level discussions between the Tribe and Reclamation officials. The LCEP would have multiple benefits for the Nez Perce Tribe, and water supply reliability is among them. The Tribe holds on-Reservation Winters water rights in the watershed that would be restored under project objectives and any viable alternative. Those rights are a result of establishment, recognition, and decree through the 2005 Nez Perce–SRBA water rights settlement. The rights are for multiple tribal uses, including domestic, residential and municipal uses, and were agreed through the SRBA settlement to do no harm to existing water uses in tributary stream locations. As a result, through the LCEP replacement water source for LOID water needs, the Tribe’s Winters rights in these tributaries would be made more reliable, benefiting the Nez Perce Tribe and its people, culture and religion, which is so heavily based on water and fish. Non-consumptive cultural and religious use of water in the LOP-affected Reservation watershed is an extraordinary priority for the Tribe and Nez Perce people. The no action LOP diversion system has impaired Nez Perce cultural and religious uses of water for over 100 years, and the ending of that harm through a replacement water source for LOID would be extraordinarily significant for the Tribe and its people.



Finally, potential linkages of this project, as a pump-storage concept, with developing wind integration renewable energy strategies in the Pacific Northwest, and with LOID water conservation improvements are discussed. Above and beyond that, as referenced in Rule Section 404.13.i., the LCEP project and objectives are intended to be and do represent a “Creative cooperative solution” to “Water supply problems and needs.” The broad governmental and non-governmental collaboration and consensus in the lower Clearwater region, and politically across the State of Idaho, has been discussed. Beyond that, the foundational concept of a water exchange is a creative, innovative approach to water management that is an increasingly favored strategy across the Northwest. The fundamental concept of providing a needed rural water supply from consolidated mainstem river flows, while at the same time ending upstream water diversions from a more fragile tributary watershed, and in net effect having no effect on mainstem stream flows, is the essence of a water exchange, and the core concept of the LCEP project and its objectives. In the LCEP instance, those twin elements of rural water supply and tributary restoration through water exchange and mainstem consolidation are made even more innovative, and cooperative, with the element of tribal cultural and reservation impacts that would be addressed at the same time. The governmental partners, and their supporters, working on this project and its objectives, representing the unanimous view of the lower Clearwater region, have chosen to address a unique set of problems in a comprehensive way that will keep all of the parties out of court and working towards a goal that meets all everyone’s needs.

## 5.5 TESTS OF VIABILITY

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Reclamation’s “Economic and Environmental Principals and Guidelines for Water and Related Land Resources Implementation Studies” require four tests of viability for any alternative plan to be carried forward to a feasibility study.

The first of these tests requires acceptability to state and local entities and the public. The alternative must be compatible with existing laws, regulations, and public policies. The LCEP is supported by key stakeholders, representing the City of Lewiston, the Lewis Clark Valley Chamber of Commerce, Lewiston Orchards Irrigation District, Nez Perce County, and the Nez Perce Tribe. In addition, numerous representatives attended LCEP workshops including those from five federal agencies, eight state and local agencies, representatives from three elected officials, two private landowners and one commercial entity. Concerns from these groups have been documented, addressed as appropriate, and identified

for resolution at a future date as required. Implementation of the alternatives will be compatible with existing laws, with specific attention to the NEPA process required during the feasibility study.

The second test of viability regards effectiveness in contributing to project objectives. These objectives are clearly defined within the MOU, and all alternatives have been thoroughly vetted against these purpose statements. The proposed alternatives effectively satisfy the following:

- Creation of a reliable, quality water supply for LOID.
- Permanent resolution of the Endangered Species Act issues surrounding the LOP.
- Permanent resolution of Federal-Tribal Trust issues surrounding the LOP

The Reclamation's third test requires efficiency as the most cost effective means of meeting project objectives. Project costs were heavily weighted throughout the identification and screening processes. Only the most cost effective alternatives with respect to both capital, and OM&R costs were allowed by the group to move forward. As previously noted, the group also pursued various alternatives to reduce power costs through infrastructure such as inline generation.

The final test of viability is identified as completeness in accounting for all necessary investments or other actions, including those by other federal and non-federal entities. This Study has been completed to the fullest extent possible based on existing information and previous studies. Unresolved issues have been identified to ensure resolution as appropriate in subsequent phases of planning and design.

## **5.6 SPECIFIC RECLAMATION OBJECTIVES**

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Reclamation's supplemental instructions for Funding Opportunity Announcement R11SF80307, provides additional requirements for an appraisal investigation that is utilized as a proposal to conduct a feasibility study. The following sections review integration of the following program objectives:

- Energy Use and Water Consumption
- Renewable Energy
- Environmental Benefits
- Innovative Technologies and Approaches

### **5.6.1 ENERGY USE AND WATER CONSUMPTION**

Each of the action alternatives would increase energy use as the supply for LOID moves from gravity to pumped source. Despite this shift, the LCEP group has made concentrated efforts to diminish the ultimate impact of this change.

#### **HIGH EFFICIENCY EQUIPMENT**

The use of high efficiency pump motors for each of the action alternatives should be thoroughly reviewed as the design process moves forward to feasibility. This level of analysis is not appropriate at this level appraisal study, and should be carefully analyzed in the future to understand the impacts of cost and energy consumption associated with implementation.

#### **WATER CONSERVATION EFFORTS**

Replacement of the LOP with any of the action alternatives will significantly decrease water lost through leakage in the canal system. LOID has sought funding opportunities via the Water Conservation and Field Services Program and Water Smart Program to leverage LOID resources for the most efficient use of the water supplies through an aggressive meter installation project. This project is paramount to effectively manage the dwindling supply of water available from the LOP. Meters will allow LOID to measure, monitor, and report water use at each delivery point within the system. Additionally, meters will empower patrons to manage their water allocations of 2.2 ft per acre, as meters allow accountability. The information gathered from these meters will assist LOID Management to eliminate wasteful and ineffective water applications throughout the District.

The irrigation metering project, once completed, is estimated to save almost 1,000 acre-ft within the District boundaries. The gain in water would come directly from the implementation and monitoring of irrigation meters. The desired outcome is three-fold:

- Increased water delivery efficiency through proactive water management will stretch District resources through the length of the growing season.
- More equitable distribution and accounting of available water.
- Reduced distribution system inefficiencies associated with existing leaks and deteriorated infrastructure that can be located and repaired through review of meter readings.

To date, the District has installed 635 auto read meters and 613 manual read meters.

In addition to meter installation efforts, water restrictions have historically been implemented across the District to manage an insufficient water supply. Restrictions are enforced through water “Copping,” or water “Policing,” where employees drive through the District in LOID vehicles looking for violators of the water restriction schedule.

In an effort to mitigate costs associated with water policing, the LOID Board and Management have embraced water conservation outreach. In 2007, the District hired a Water Conservation Education Specialist as a temporary position. This employee arranged for educational classes offered at no cost to the patrons. Classes included small acre irrigation and drip irrigation for landscapes and gardens. In addition, LOID distributed a water conservation kit that included a hose timer, rain gauge, moisture meter, and helpful tips to meeting attendees. LOID partnered with the Nez Perce County Extension Service for materials and expertise. The Conservation Education Specialist was available to meet with irrigators to answer questions and provide assistance with their conservation efforts. The program began to change the culture of the District from water “Policing” to one of conservation education with the understanding that most people do not intentionally over water and are intrinsically motivated to change their water practices given the knowledge to do so.

The LOID Board approved the position again in 2008. The program was expanded to include radio talk shows and television talk shows. LOID personnel report significant positive feedback for the program from District constituents. In 2009, LOID actively participated in radio and television interviews. In 2010, LOID funded a weekly newspaper ad campaign, sponsored a booth at the Home and Garden Expo, hosted an educational class on water-wise landscaping and drip irrigation, and redesigned the website with information directed at water use and conservation measures. The District continues to demonstrate their commitment to water conservation education even though the District has not experienced a shortage of water since 2008.

#### RENEWABLE ENERGY

The LCEP group met with Bonneville Power Administration (BPA) representatives to hear their intentions to pursue Wind Integration initiatives that may include contractual linkages to, among others, water pump storage projects – whether large or small – such as the LCEP action alternatives would entail. The LCEP group heard from BPA that Wind Integration issues are of the highest priority within the Department of Energy and that Secretarial-level direction is guiding BPA’s exploration of Wind Integration initiatives that would involve linkage to projects based on their ability to store and use power with flexibility, could aid in balancing the unstored unpredictabilities of wind power generation.

Wind Integration difficulties have become one of the most significant energy issues in the Pacific Northwest. The LCEP group through its Chair Jerry Klemm is maintaining contact with BPA and intends to pursue this potential renewable energy linkage for any LCEP action alternative, as the LCEP project moves forward from appraisal to feasibility analysis.

As previously discussed, the LCEP group made concerted efforts to review renewable energy options such as inline power generation, but those proved cost-ineffective within the context of the action alternative design fundamentals.

### **ENVIRONMENTAL BENEFITS**

This appraisal process has focused on environmental benefits provided by the project through the second project objective, permanent resolution of ESA issues. Environmental benefits are more thoroughly discussed in the Rural Water Criteria section of this chapter.

### **INNOVATIVE TECHNOLOGIES AND APPROACHES**

The LCEP group spent considerable time and resources to investigate the potential for water reuse to be utilized in some fashion as one of the action alternatives. Based on the unique water resources characteristics of north-central Idaho and the Snake-Clearwater Basin, water reuse proved impractical as a matter of cost, availability and quantity as compared with available mainstem surface water resources and available groundwater. Ultimately, the cost of implementing water reuse did not allow them to move forward as viable action alternatives. A thorough discussion of the water reuse vetting process is included in Chapter 3.

The LCEP action alternatives in their multi-governmental water-exchange approach to resolving regional and watershed problems and needs are innovative in approach. As referenced in Rule Section 404.13.i., the LCEP project is intended to be a “creative cooperative solution” to “water supply problems and needs.” The broad governmental and non-governmental collaboration and consensus in the lower Clearwater region, and politically across the State of Idaho, has been discussed. Beyond that, the foundational concept of a water exchange is creative, innovative approach to water management that is an increasingly favored water supply strategy across the Northwest. The fundamental concept of providing a needed rural water supply from consolidated, available mainstem river flows, while at the same time ending upstream water diversions from a fragile tributary watershed, and in net effect having no effect on mainstem stream flows, is the essence of a water exchange, and the core concept of the LCEP project and its objectives. In the LCEP instance, those twin element of rural water supply and



tributary restoration through water exchange and mainstem consolidation are made even more innovative, and cooperative, with the element of Nez Perce Tribal, cultural and reservation impacts that would be addressed at the same time. The LCEP governmental partners, and their supporters, working on this project and its objectives, representing the unanimous multi-governmental perspective of the lower Clearwater region, have chosen to address a unique set of problems in a comprehensive way that will keep all of the parties out of court and working towards a goal that meets all their needs.

## 6 CONCLUSIONS AND RECOMMENDATIONS

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Following extensive review of the action alternatives, key stakeholders of the LCEP group gave careful consideration to those alternatives meriting further review within a feasibility study. Each of the action alternatives satisfies LCEP objectives as well as Reclamation goals, objectives, and criteria. The following sections highlight the rationale for retaining each alternative recommended for feasibility:

### 6.1 NO ACTION ALTERNATIVE

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Although the No Action Alternative does not meet the objectives established for this Study, it has been retained to provide a baseline comparison with the actual alternatives.

### 6.2 CLEARWATER RIVER ACTION ALTERNATIVES

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At this level of analysis, the Clearwater River appears to provide a reliable surface water source for LOID. As thoroughly vetted in Chapter 4, the alternative warrants further consideration and study within a feasibility analysis. Both pipe alignments to discharge to Mann Lake with the Powers Avenue Upgrade and the Distribution System Discharge provide improved service to LOID patrons, both in water pressure and volume. It should be noted that the Clearwater River Action Alternatives were the most favored of the alternatives recommend for feasibility study by the key stakeholder group.

### 6.3 SNAKE RIVER ACTION ALTERNATIVES

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At this level of analysis, the Snake River appears to provide a reliable surface water source for LOID. As thoroughly vetted in Chapter 4, the alternative warrants further consideration and study within a feasibility analysis. Due to the lower capital cost and ease of construction, it is recommended that the Southport Avenue pipe alignment move forward and the Tammany Creek Road Alternative receive further consideration only if property cannot be acquired for the Southport Avenue Alternative. Regardless of the final pipe alignment, the alternative each provides improved service to LOID patrons, both in water pressure and volume.

## 6.4 TAMMANY WELL FIELD ALTERNATIVE

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At this level of analysis, the Tammany Well Field appears to provide a reliable groundwater source for LOID. As thoroughly vetted in Chapter 4, the alternative warrants further consideration and study within a feasibility analysis. Although the alternative is associated with the highest overall capital cost, it also provides a unique source from the surface water alternatives with potentially lower environmental and cultural impact. The alternative provides improved service to LOID patrons, both in water pressure and volume.

## 7 REFERENCES

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- AACE International. 2005 "Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries." *AACE International Recommended Practice No. 18R-97*.
- Allen, Richard and Clarence Robison. 2007 "Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho." *University of Idaho*. <http://www.kimberly.uidaho.edu/ETIdaho>
- Chandler, Clint, Emmitt Taylor, Jr., and Rebecca Lloyd. 2002-2003. "Inventory, Monitoring, and Evaluation of Streams within the Lapwai Creek and the Big Canyon Creek Watersheds." *Technical Report, Project No. 199901700* (et al.), 28 electronic pages, (BPA Report DOE/BP-00004497-4)
- Idaho Fish and Game Website. "Craig Mountain Wildlife Management Areas." Accessed 14 March, 2011. <http://fishandgame.idaho.gov/cms/wildlife/wma/craig/>
- Klemm, Jerry. Personal Communication with Amy Uptmor regarding Clearwater Paper Corporation Reuse Opportunities. 23 March 2011.
- Lewis Clark Valley Chamber of Commerce. <http://www.lcvalleychamger.org>
- Mancuso, Michael and Robert Moseley. 1994. "Vegetation Description, Rare Plant Inventory, and Vegetation Monitoring for Craig Mountain, Idaho." *Idaho Department of Fish and Game*. Boise, Idaho.
- Metz, Barney. "RE: Water Reuse Conference Call." Email Correspondence with Key Stakeholders. 23 March 2011a.
- "RE: Water Loss Calcs.xls" Email Correspondence with Cory Baune. 17 February 2011b.
- Moore, Thomas. Personal Communication with Cory Baune and Amy Uptmor. 20 January, 2011.
- Morrison Knudsen Corporation. 1992. "Final Report – Lewiston Orchards Irrigation District – Alternative Irrigation Water Supply Evaluation."
- Nez Perce Tribe and Nez Perce (County) Soil and Water Conservation District. 2009. "Lapwai Creek Watershed Ecological Restoration Strategy. Sweetwater, Idaho."
- Northwest Power and Conservation Council. 2005. "Clearwater Subbasin Management Plan". *Columbia River Basin Fish and Wildlife Program*. Portland, Oregon
- NMFS. 2006. "Endangered Species Act – Section 7 Formal Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Operation and Maintenance of the Lewiston Orchards Project." *National Marine Fisheries Service, Northwest Region*, Portland, OR. [https://pcts.nmfs.noaa.gov/pls/pcts-pub/pcts\\_upload.summary\\_list\\_biop?p\\_id=10028](https://pcts.nmfs.noaa.gov/pls/pcts-pub/pcts_upload.summary_list_biop?p_id=10028)
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- 2010. “Endangered Species Act – Section 7 Formal Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Operation and Maintenance of the Lewiston Orchards Project.” *National Marine Fisheries Service, Northwest Region*, Portland, OR. [https://pcts.nmfs.noaa.gov/pls/pcts-pub/sxn7.pcts\\_upload.download?p\\_file=F12790/200906062\\_lewiston\\_orchards\\_04-15-2010.pdf](https://pcts.nmfs.noaa.gov/pls/pcts-pub/sxn7.pcts_upload.download?p_file=F12790/200906062_lewiston_orchards_04-15-2010.pdf)
- Pfaff, Doug. Personal Communication with Cory Baune. 2011
- Pierko, Julia. “RE: Mann Lake Report” Email Correspondence with Cory Baune. 8 March 2011.
- Ralston, Dale. 2011. “Evaluation of Ground Water Development Potential for LOID Irrigation Water from the Regional Aquifer in the Lewiston Basin, Idaho.”
- Rural Water Rule. 43 CFR Part 404. Filed 11/14/2008.
- Six, Dave. Personal Communication with Cory Baune. January, 2011.
- Thompkins, Allison. RE: Future growth scenarios in Nez Perce County and the Nez Perce Comprehensive Plan. Phone Communication with Julia Pierko, Reclamation. 1 September 2011.
- United States Army Corps of Engineers. 2002. “Lower Snake River Juvenile Salmon Migration Feasibility Study.” *Final Feasibility Report/Environmental Impact Statement*.
- United States Census Bureau. “Census 2000 Summary File.” *American FactFinder*. <http://factfinder2.census.gov>. Accessed 9 March, 2011.
- United States Department of the Interior Bureau of Reclamation. 1945a. “Lewiston Orchards Project,” Project Planning Report Nos. 1-5.7-0 and 1-5.7-1.
- 1947b “Repayment Contract between the Lewiston Orchards Irrigation District and the United States.”
- .1983c. “Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies.”
- .2011d “SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water.”
- 2011e Bureau of Reclamation Website. “Lewiston Orchards Project” [http://www.usbr.gov/projects/Project.jsp?proj\\_Name=Lewiston%20Orchards%20Project](http://www.usbr.gov/projects/Project.jsp?proj_Name=Lewiston%20Orchards%20Project). Accessed 9 March, 2011.
- United States Geological Survey. 2011. “Water Q&A: Water use at home.” *Department of the Interior, United States Geological Survey*. <http://ga.water.usgs.gov/edu/qahome.html#HDR3>.
- Western Regional Climate Center. <http://www.wrcc.dri.edu/> Accessed 10 March, 2011.
- Whiting, Geoff. “RE: Snake River Water Rights” Email Correspondence with Cory Baune, et al. 10 January, 2011.



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# *APPENDIX A*

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MOU

**MEMORANDUM OF UNDERSTANDING CONCERNING THE LEWISTON  
ORCHARDS PROJECT AMONG THE LEWISTON ORCHARDS IRRIGATION  
DISTRICT, THE NEZ PERCE TRIBE, NEZ PERCE COUNTY, THE CITY OF  
LEWISTON AND THE LEWISTON CHAMBER OF COMMERCE**

This Memorandum of Understanding (MOU) is executed in counterpart on the dates set out below by the Lewiston Orchards Irrigation District (LOID), the Nez Perce Tribe (Tribe), Nez Perce County (County), the City of Lewiston (City) and the Lewiston Chamber of Commerce (Chamber). These entities are collectively referred to below as the Parties.

**I. PREAMBLE.**

A. The Lewiston Orchards Project (LOP) is owned and operated by Reclamation and managed through contract with LOID. The LOP is located within and diverts water from Sweetwater Creek, Webb Creek and Captain John Creek to service the LOID area. Most of the LOP is located within the Nez Perce Reservation. Federal ownership of the LOP dates to a 1947 contract between the Bureau of Reclamation (Reclamation) and LOID. Under that federal contract, the United States acquired ownership of what had been a private irrigation system, including associated irrigation water rights.

B. The streams affected by the LOP include Sweetwater Creek, Webb Creek, and Lapwai Creek, which provide critically important habitat for Snake River steelhead. Snake River steelhead have been listed as threatened under the Endangered Species Act (ESA) since 1997, and the affected watershed also has been designated as critical habitat for Snake River steelhead under the ESA. Snake River steelhead are of extraordinary cultural importance to the Nez Perce Tribe and its members. Due to the unique thermal flows of Sweetwater Springs, Sweetwater Creek is one of the most important steelhead tributaries in the lower Clearwater River Subbasin.

C. For a variety of reasons, including but not limited to watershed water quality, canal conditions, climate change, and Endangered Species Act requirements, LOID is rarely provided with the water supply it requires. Summer water rationing and restrictions have become routine. LOID perceives this MOU and its objective as an opportunity to achieve the water quantity, quality, and reliability standards it requires, and views as fulfillment of the federal obligations explicit and implicit in the 1947 LOP contract between the United States and LOID.

D. As a fiduciary, the United States and all of its agencies owe a trust duty to all federally recognized Indian Tribes. This trust relationship has been described as "one of the primary cornerstones of Indian law," and has been compared to the relationship existing under the common law of trusts, with the United States as trustee, tribes as beneficiaries, and property and

natural resources managed by the United States as the trust corpus. The Nez Perce Tribe is concerned, and has been since the federal government assumed ownership and control of the LOP on and adjoining the Tribe's Reservation, impairing water resources on the Reservation, tribal fisheries, and Nez Perce cultural and religious uses of water, that the trust duty of the United States to the Tribe has not been met. The Tribe perceives this MOU and the objective described as an opportunity for the United States to fulfill that duty.

E. Most of the Parties to this MOU participated in a prior effort to resolve issues surrounding the LOP during the Nez Perce-SRBA Mediation. In 2005, the final Nez Perce SRBA Settlement Agreement did not resolve LOP issues but instead explicitly preserved those issues for future resolution by the affected stakeholders. This MOU and the project described in it represent the concept and objective preserved by the Nez Perce-SRBA Agreement.

F. ESA consultation on the LOP dates to 1998, when NOAA Fisheries consulted with BOR on its operations above Lower Granite Dam on the Snake River. After several years with varied delays, a final ESA Section 7 BiOp on the LOP was issued by NOAA on March 1, 2006. The Tribe brought suit under the Administrative Procedure Act and the ESA challenging the validity of the BiOp. On April 7, 2008, Judge Winnill of the Idaho federal district court ruled in favor of the Tribe, finding the BiOp invalid predominantly on the basis of the LOP's adverse modification or destruction of ESA-designated critical habitat for Snake River steelhead. The parties to the case, *Nez Perce Tribe v. NOAA Fisheries and Bureau of Reclamation*, then engaged in mediation and signed a two-year interim agreement which encompassed: 1) renewed ESA consultation involving good-faith collaboration between the Tribe, NOAA and Reclamation, with a new NOAA BiOp due January 31, 2010; 2) improved stream flows in Webb and Sweetwater Creeks to benefit listed steelhead during the new consultation; and 3) good-faith discussion of long-term LOP operations, including a "global resolution" of LOP issues -- the focus of this MOU.

G. In early 2008 a Lewiston area stakeholder group was formed at the initiation of the Lewiston Chamber of Commerce. The Stakeholder Group formally met in May 2008 and has met on a monthly basis in Lewiston ever since, and now includes all Parties to this MOU, as well as representatives of Idaho state and federal political offices. The Stakeholder Group has also enlisted the technical and advisory assistance of University of Idaho Law School Professor Barbara Cogens and the Waters of the West program.

H. From its initial meeting, the Stakeholder Group agreed to focus its efforts on the pursuit of a new Clearwater River intake system where water from the Clearwater would be pumped to the LOID service area, and the existing LOP system on the Nez Perce Reservation would be rendered unnecessary. The Clearwater concept is founded on an intentional effort to resolve the three-part ESA, LOID water quantity/quality, and Nez Perce federal trust issues described above and further below. The Stakeholder Group and the Parties believe that a collateral, fourth, benefit would be a multi-year stimulus to the Lewiston area economy and job creation.

I. The Parties believe that the net environmental impact of a new Clearwater system would be enormously positive. Direct, increased stream flows for ESA-listed steelhead in the Sweetwater/Lapwai watershed; fish passage beyond the existing Sweetwater Dam into several miles of additional, historic, high-quality Snake River steelhead habitat; cessation of existing Craig Mountain water diversions which because of canal leakage are highly inefficient in delivery of water to LOID; replacement by a Clearwater system that would be highly efficient (>95%) in water delivery to LOID; with a net result, based on restored Lapwai/Clearwater flows, of no increase in water diverted from the Clearwater River itself. For these reasons, among others, the Parties are confident in their ability to comply with all applicable environmental laws.

J. The Bureau of Reclamation is not a signatory to this MOU so as to avoid any appearance of intent to act beyond its statutory authorities, such as by seeking federal funding or the transfer of federal facilities. Acting within its statutory authorities, however, Reclamation intends to assist the MOU Parties in any way it can, including providing information to the Parties with respect to those future steps described in Section IV below.

## **II. PURPOSE**

By entering into this MOU, the Parties desire to set forth in general terms the collaborative effort that they are undertaking to develop a comprehensive resolution of the issues raised by operation of the LOP. The issues specifically targeted by this effort are three: creation of a reliable, quality water supply for LOID; permanent resolution of the ESA issues surrounding the LOP; and permanent resolution of federal-tribal trust issues surrounding the LOP. The parties intend to explore and pursue the steps necessary to develop a new Clearwater River intake system (Clearwater system) as a new diversion point for LOID's water supply, and the transfer of existing LOP interests to the Tribe, along the following elements of understanding and to the extent of their authorities. As an additional benefit, the Parties anticipate and intend that development of the Clearwater system would provide a positive economic stimulus to the Lewiston area. As described below, certain parties have authorization limitations in this pursuit, and will be expected by the other Parties to do no more than act to the extent of their authorization.

## **III. ELEMENTS OF UNDERSTANDING.**

### **A. Pursuit of Clearwater system for LOID.**

#### **I. Elements of Clearwater system**

- The Clearwater system would be designed and constructed to provide 8500 acre feet (AF) per year of Clearwater River water to the LOID service area, with Mann Lake used for water storage to a capacity of 2500 AF.
- The Clearwater system would be owned and operated by LOID.

- The Clearwater system would be capable of being expanded in the future, under separate project(s), to serve additional L.OID and/or City needs.
  - L.OID will seek a 8500 AF/year water right from the Clearwater River from the Idaho Department of Water Resources to be used in conjunction with the system. The other parties will support L.OID's application for a Clearwater River water right to the extent practicable.
  - A "L.OID Clearwater Irrigation Pumping Study" prepared for the Parties by J-U-B Engineers, Inc., in order to provide a preliminary assessment of the Clearwater system engineering issues, is attached as Exhibit A.
2. Funding for Clearwater system.
- The Parties propose to pursue primary funding for design and construction of the Clearwater system from the United States Congress.
  - The cost of any future expansion of the intake system to serve additional L.OID and/or City needs would be the financial responsibility of L.OID or the City.
- B. Disposition of Existing LOP Facilities and Water Rights.

As part of the comprehensive resolution, the Parties intend to pursue the transfer of the current L.OID water diversion system above the Mann Lake outlet works, including all water rights and any reservoir storage rights or rights to lake level maintenance, to the Tribe.

1. This proposed transfer would include the following elements:
- The Tribe would work with Reclamation to ensure that LOP-associated water rights are perfected through the pending SRBA adjudication.
  - Upon Congressional authorization for the transfer, the Tribe would seek and the Parties would support to the extent practicable a transfer of the LOP water rights to the Tribe to be used for multiple-use at the discretion of the Tribe.
    - Such uses will not injure any existing water rights of any person diverting within the watershed.
    - One mechanism for protection of such uses would include rental of such water rights through the state water bank or water banks.
    - The Tribe's intended purpose is that the transferred water rights be preserved and used instream to benefit fish and fish habitat in the Lapwai Creek watershed.



2. The Parties intend that the federal appropriation sought for the Clearwater system would include funds for the repair and/or removal of components of the LOP system prior to transfer to the Tribe. An engineering plan will be developed for this purpose.

3. Mann Lake. The Tribe will exercise management control of the Mann Lake fishery on the Nez Perce Reservation. The Tribe will maintain, for non-tribal members, non-Indians and tribal members, existing opportunities for fishing and access to fishing; the Tribe will not prohibit or restrict any non-tribal member or non-Indian access to fishing unless such access is also denied to tribal members as a result of measures that may be necessary in the future to protect the fishery. The requirement of a tribal fishing license is not a restriction under this provision. As to water storage in Mann Lake, the Tribe and LOID will enter into an operational MOA that will address in detail the storage of Clearwater River water in Mann Lake, including but not limited to operations, maintenance, repairs and liability.

4. Waha and Soldiers Meadow Fisheries. The Tribe will engage on a government-to-government basis with the State of Idaho, in keeping with the existing State/Tribe cooperative fish and wildlife management agreement, in the preparation of an MOA to develop cooperative Annual Operating Plans for the Waha and Soldiers Meadow fisheries and reciprocal State and tribal licensing for fishing at both bodies of water.

#### **IV. FUTURE STEPS**

A. The Parties intend to explore and take those steps necessary to fulfill this MOU over the coming months. This following list of future steps is not exclusive, and other steps and actions may be developed or recognized as necessary to the process.

1. Finalize the Clearwater intake system preliminary engineering study.

2. Initiate any required National Environmental Policy Act (NEPA) process, including preparation of an Environmental Assessment (EA) to determine whether the project, as anticipated, merits a finding of no significant impact (FONSI), or whether an Environmental Impact Statement (EIS) may be required.

3. Obtain a final determination of the feasibility of increased Mann Lake water storage as an element of the Clearwater system.

4. Seek funding for the Clearwater system from a spectrum of sources, including appropriate conservation entities and State of Idaho fish habitat fund sources

5. Seek favorable Clearwater system future power costs for LOID through discussion with BPA and others.

6. Prepare an application for a LOID Clearwater River water right to be used in conjunction

with Clearwater system. File the application at a time to be selected by consensus of the Parties.

7. Prepare in consultation with Idaho state and federal political offices and representatives, draft federal legislation authorizing federal funding for the design and construction of the Clearwater system, and transfer of the existing LOP system interests, including necessary repair or removal.

## **V. NOTICES.**

A. The Parties agree to use the following points of contact as defaults in the case of communication necessary to carry out the purposes of this MOL.

1. Lewiston Orchards Irrigation District:  
Barney Metz  
General Manager  
208.746.8236  
barneymetz@loid.net
2. Nez Perce Tribe:  
Darren Williams  
Staff Attorney, Office of Legal Counsel  
208.843.7355  
darrenw@nezperce.org
3. City of Lewiston:  
Don Roberts  
City Attorney  
208.746.7948  
droberts@cityoflewiston.org
4. Lewiston Chamber of Commerce  
Jerry Klemm  
Director  
208.743.5450  
jgklemm@cableone.net
5. Nez Perce County  
Ron Wittman  
Commissioner  
208.799.3090  
rwittman@co.nezperce.id.us

## **VI. GENERAL PROVISIONS.**

A. Nothing in this MOU constitutes a waiver of the sovereign immunity of the Tribe, the City or the County. This MOU does not create any enforceable rights among the Parties or with third parties.

B. This MOU may not be used in any legal proceeding and nothing in this MOU shall be read as an admission against interest or a determination of a legal issue by any Party in any forum.

C. The Parties may sign this MOU in counterpart. The effective date of this MOU is the date of the latest signature below.

D. This MOU may be modified or supplemented with the unanimous written consent of the authorized representatives of the Parties.

E. Any Party may withdraw from this MOU with 30 days notice.

**AUTHORIZED APPROVALS:**

**LEWISTON ORCHARDS IRRIGATION DISTRICT**

BY: Frank Maresca  
FRANK MARESCA, PRESIDENT

DATE: 7/16/09

**NEZ PERCE TRIBE**

BY: Samuel N. Penney  
SAMUEL N. PENNEY, CHAIRMAN


DATE: 7-17-09

BY: McCoy Oatman  
MCCOY OATMAN, SECRETARY

DATE: 7/17/09

**NEZ PERCE COUNTY**

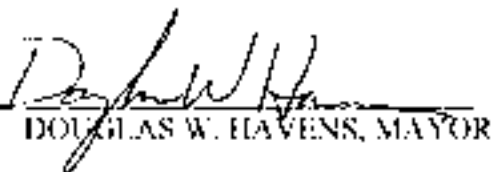
BY:

  
RONALD WITTMAN, ACTING CHAIRMAN

DATE: 7-17-09

CITY OF LEWISTON

BY:

  
DOUGLAS W. HAVENS, MAYOR

DATE: 7/17/09

LEWISTON CHAMBER OF COMMERCE

BY:

  
ALLEN PHILLIPS, CHAIRMAN

DATE: 7/13/2009

BY:

  
JERRY KLEMM, DIRECTOR

DATE: 7/13/09

---

# ***APPENDIX B***

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## **Public Participation**



## LOWER CLEARWATER EXCHANGE PROJECT

**Jerry Klemm, LCEP Chairman**  
p 208.743.5450 c 208.750.6432  
e hgklemm@cableone.net

**Cory Baune, Study Coordinator**  
p 208.746.9010 c 208.816.0515  
e cbaune@jub.com

November 11, 2010

Mr. Gary Macfarlane  
Friends of Clearwater  
PO Box 9241  
Moscow, ID 83843

RE: Lower Clearwater Exchange Project Appraisal Investigation: Request for Participation

Dear Mr. Macfarlane:

You have been identified as a potential Stakeholder in the Lower Clearwater Exchange Project Appraisal Investigation by the Lower Clearwater Exchange Project (LCEP) group. The LCEP group's objective is to explore and pursue the potential of constructing an irrigation system to provide the following:

- Creation of a reliable, quality water supply for the Lewiston Orchards Irrigation District (LOID).
- Permanent resolution of the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project.
- Permanent resolution of federal-tribal trust issues surrounding the Lewiston Orchards Project (LOP).

The current system of irrigation for the patrons of LOID (the Lewiston Orchards Project) draws water from Craig Mountain through a gravity fed system primarily located on the Nez Perce Reservation. For a variety of reasons including watershed water quality, canal conditions, climate change, and ESA requirements, the current LOID system is rarely provided with the water supply it requires and has operated under rationing and water restrictions over the past several years as demand for water has exceeded water availability. System operation has been the subject of litigation between the Nez Perce Tribe, NOAA, and the Bureau of Reclamation regarding the hydrological effects of the LOP on ESA listed steelhead and it's designated critical habitat in Sweetwater, Lapwai, and Webb creeks.

In July 2009, a Memorandum of Understanding (MOU) was executed by LOID, the Nez Perce Tribe, the Lewiston Chamber of Commerce, Nez Perce County, and the City of Lewiston. Although the MOU is not a legally binding document, it does set forth the direction to solve the water quality, water quantity, reliability, habitat and federal-tribal trust issues of the current LOP system.

Currently, the signers of the MOU are completing an appraisal investigation to evaluate if there is an alternative that meets the objective of the group. The investigation is funded by the Bureau of Reclamation's Rural Water Supply Program to provide an analysis for water supply problems, needs and opportunities based primarily on existing data. After the appraisal investigation is complete and if a viable alternative is identified, this process will move forward with a more detailed feasibility report and NEPA.

As part of the process, we are seeking participation and input from stakeholders. Given the potential ramifications of the investigation, active participation and input from a broad array of stakeholders will lead to a well reasoned and supportable alternative. Further, working with stakeholders at this early

## LOWER CLEARWATER EXCHANGE PROJECT

**Jerry Klemm, LCEP Chairman**  
p 208.743.5450 c 208.750.6432  
e hgklemm@cableone.net

**Cory Baune, Study Coordinator**  
p 208.746.9010 c 208.816.0515  
e cbaune@jub.com

stage in the process provides an opportunity for all interested parties to understand the background and provide input into the decisions. We invite your participation and input in the decision making process as the appraisal investigation moves forward.

A series of workshops for the appraisal investigation are planned at the Clearwater Region Fish & Game office, 3316 16<sup>th</sup> Street in Lewiston, Idaho:

### **November Workshop: Identify Objectives & Constraints**

November 15, 2010

10:00 a.m. – 2:00 p.m.

*Discussion will include problems and opportunities, constraints and assumptions*

### **December Workshop: Identify Alternatives and Evaluation Criteria**

December 16, 2010

8:30 a.m. – 12:00 p.m.

*Brainstorm ten alternatives for technical review, and identify evaluated criteria*

### **February Workshop: Alternative Screening**

February 3, 2011

8:30 a.m. – 3:00 p.m.

*Review technical summaries and selected three (3) options for detailed evaluation*

### **April Workshop: Alternative Selection**

April 7, 2011

*Select an alternative, if appropriate, for further analysis in a feasibility report*

If you wish to attend the workshops, we encourage you to reserve the above dates. The information provided in each workshop will build upon the last and attendance of each of the workshops is important for continuity.

Throughout this process a variety of methods will be used to allow open communication. Periodic emails will be utilized to keep you informed of progress. In addition, meeting minutes and other pertinent information will be posted for your convenience at: <http://www.loid.net>.

Prior to the Spring workshops, technical information will be shared with you to provide information regarding each of the alternatives. One-page summaries from the 10 alternatives identified in the December workshop, and more detailed alternatives selected in the February workshop will be distributed prior to the February and April workshops respectively. You may provide input on these alternatives prior to or at each respective workshop for consideration during the decision making process

Regardless of the method by which you choose to be involved in the process, we encourage you to stay involved in the appraisal investigation and feel free to direct any specific input, questions, comments or concerns to Jerry Klemm, LCEP Chairman or Cory Baune, Study Coordinator.

## LOWER CLEARWATER EXCHANGE PROJECT

**Jerry Klemm, LCEP Chairman**  
p 208.743.5450 c 208.750.6432  
e hgklemm@cableone.net

**Cory Baune, Study Coordinator**  
p 208.746.9010 c 208.816.0515  
e cbaune@jub.com

On behalf of the MOU signatories, thank you for your time and input as we delve into issues surrounding the Lewiston Orchards Project.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jerry Klemm", with a stylized, flowing script.

Jerry Klemm  
LCEP Chairman

Attachment

# NORTHWEST

## Plea agreement

Rape charges reduced

— PAGE 6D

INSIDE:

Inside

Northwest: 2D

Obituaries: 5D

THE LEWISTON TRIBUNE

WEDNESDAY, FEBRUARY 9, 1994

# Tribes' suit against LOID put on hold

Parties involved buy time to find new source of water

BY ERIC BARKER  
OF THE TRIBUNE

The Nez Perce Tribe agreed to shelve its lawsuit over the Lewiston Orchards Irrigation District for three years while interested parties explore options to find a new water source for LOID patrons.

The tribe, U.S. Bureau of Reclamation and National Oceanic and Atmospheric Administration recently reached an agreement that will see more water stay in Webb and Sweetwater creeks and could

pave the way for LOID water to be drawn from the lower Clearwater River.

"I think it's a positive move. It definitely clears the plate for at least two of the parties, well all three of them, where they can concentrate more on looking for a solution without going to litigation and that is a big plus," said Jerry Klemm of the Lewis Clark Valley Chamber of Commerce.

Klemm is chairman of a collaborative group seeking a solution to a tangle of problems associated

with the LOID water delivery system — diversion of water places steelhead at risk, the reservoir sits partially on tribal land without compensation and it doesn't deliver enough water to satisfy irrigation demand. Members of the collaborative group include the tribe, LOID, city of Lewiston, Nez Perce County and the chamber.

Last year they signed a memorandum of understanding that outlined a plan that would build a pumping station on the Clearwater River and transfer the old system to the tribe. An initial engineering study said it would cost \$11 million

to \$20 million and about \$481,000 to \$730,000 to operate each year. But it would also end diversions from the creeks and ensure enough water for Lewiston Orchards residents to keep their lawns and pastures green during hot summer months.

The MOU was born out of a 2007 lawsuit in which the tribe challenged a biological opinion from the federal fisheries agency that said the irrigation system did not threaten steelhead. Judge B. Lynn Winnell of Boise sided with the

> See LOID, Page 5D

## LOID: Agency issued new biological opinion last year

• Continued from PAGE 1B

tribe. He ordered more water to stay in the creeks but also directed parties to start seeking a long-term solution.

Last year, NOAA fisheries issued a new biological opinion that left more water in the creeks. The tribe argued it was still not enough to protect fish and sued again. The agreement puts that lawsuit on hold.

Tribal chairman McCoy Oatman said the parties want a solution that satisfies all of their needs.

"Our federal and state elected officials are very supportive of this approach. We appreciate the pledge of reclamation and NOAA have made in this agreement to assist these efforts and we believe significant progress can be made in the next three years."

LOID manager Barney Metz said the litigation delay is a good move in terms of the effort to find a long-term solution, but the portion that dictates more water be diverted for fish could be difficult.

"We are reluctant to give up additional water that patrons are footing the bill to get, but it's part of the process and we will continue to work toward a resolution."

The agreement calls for an additional 90 acre-feet of water to be used for in-stream flows. Metz said over the course of a year that might not amount to much but if it is used in midsummer, when irrigation demand is high, it could lead to further shortages.

During the next three years, Less Stark of the Bureau of Reclamation said, the parties would con-

tinue a process looking at a Clearwater pumping station as well as other alternative water sources including the Snake River and ground wells. If the Clearwater source emerges as the best alternative, as parties expect it will, a more detailed study will be conducted that

could lead to a recommendation to Congress to fund the project.

"Congress would have to authorize and fund the project," she said.

Barber may be contacted at [ebarker@landrenew.com](mailto:ebarker@landrenew.com) or at (208) 846-2273.

### Thank You

*To all of our wonderful clients and friends for all of the cards, treats and goodies over the holidays. We appreciate all of you.*



*The Staff and Doctors of*  
**Riverview  
Animal Clinic**

509-758-5022 • 24 HOURS ON CALL



## Public Involvement

*As part of the Appraisal process, we are seeking participation and input.*

Given the potential ramifications of the investigation, active participation and input from a broad array of stakeholders will lead to a well reasoned and supportable alternative. Further, working with stakeholders at this early stage in the process provides an opportunity for all interested parties to understand the background and provide input into the decisions. We invite your participation and input in the decision making process as the Appraisal Investigation moves forward.



## Learn More

The next workshop for the Appraisal Investigation is planned for:

### April Workshop: Alternative Selection

April 7, 2011

8:30 a.m. - 3:00 p.m.

Clearwater Regional Fish & Game Office,  
3316 16<sup>th</sup> Street, Lewiston, ID

*Select an alternative, if appropriate, for further analysis in a feasibility report*



## Go Online

More information is available online at:

[www.LOID.net](http://www.LOID.net)

- Click on the Irrigation Button
- Select the Lower Clearwater Exchange Project button

## LOWER CLEARWATER EXCHANGE PROJECT



**Lewiston**  
CHAMBER

## LCEP Purpose

*The objective of the Lower Clearwater Exchange Project Appraisal Investigation is to:*

- *Explore and pursue the potential of constructing an irrigation system to provide a reliable, quality water supply for the Lewiston Orchards Irrigation District (LOID).*
- *To permanently resolve the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project (LOP).*
- *To find a permanent resolution of Federal-Tribal trust issues surrounding the LOP.*

LOID, the Lewiston Chamber of Commerce, The Nez Perce Tribe, Nez Perce County, and the City of Lewiston executed a Memorandum of Understanding in July, 2009 that outlines the efforts of the group and the three objectives listed above. Although the MOU is not a legally binding document it does set forth the direction the group is heading in trying to solve the water quality, water quantity, reliability, and habitat issues of the current LOID system.

## LCEP Project Background



*The current system of irrigation for the patrons of LOID draws water from Craig Mountain. The system utilizes storage in Waha Lake, and Soldier's Meadow Reservoir, and conveys water through a gravity system to Mann Lake. The gravity conveyance system is primarily*

*located on the Nez Perce Reservation. For a variety of reasons, LOID system is rarely provided with the water supply it requires.*

*“creation of a reliable, quality water supply”*

## Appraisal Process

*An Appraisal Investigation is a preliminary survey of problems and needs that uses existing information to explore conceptual solutions to identi-*



*fied water resource issues. The Appraisal Investigation process includes development and*

*screening of alternatives so only viable alternatives that meet project goals are carried forward into the more extensive feasibility analysis step. It is during the feasibility study process that engineering, operation and maintenance, cost estimates, economics, as well as, National Environmental Protection Act (NEPA) and ESA impacts and other salient features of the alternative(s) under consideration, are developed and evaluated.*

Currently, the signers of the MOU are completing an Appraisal Investigation to evaluate if there is an alternative that meets the objectives of the group and addresses the needs of all stakeholders. The investigation is funded by the Bureau of Reclamation's Rural Water Supply Program to provide an analysis for water supply problems, needs and opportunities based primarily on existing data.

After reviewing the existing data and careful evaluation of all objectives and constraints, the LCEP group will select alternatives for consideration as well as any additional alternatives presented by the group for a brief technical summary.

### Identifying Alternatives

The group will screen the selected alternatives and consider the three most viable alternatives for a detailed analysis. After the analysis has been reviewed, the group will then select the preferred alternative(s) for the Appraisal Investigation. If an acceptable alternative(s) is identified after the Appraisal Investigation is complete, this process may move forward with a more detailed feasibility report and Environmental Review (NEPA).

### Decisions

The nature of the Appraisal lends itself to the identification of two primary Stakeholders; the Nez Perce Tribe, and the Lewiston Orchards Irrigation District. Unanimous consensus is the decision process that will be utilized by the Key Stakeholders to accept the Appraisal Investigation.

*“Addressing the needs of all stakeholders”*



# LOWER CLEARWATER EXCHANGE PROJECT

**Subject: OCTOBER WORKSHOP: PLAN OF STUDY MEETING MINUTES**

**Date: October 28, 2010**

## **Attendees:**

MOU Signatory Attendees:  
(Key Stakeholders)

- ☐ City of Lewiston
- ☒ Lewiston Chamber of Commerce
- ☒ Lewiston Orchards Irrigation District (LOID)
- ☐ Nez Perce County
- ☒ Nez Perce Tribe

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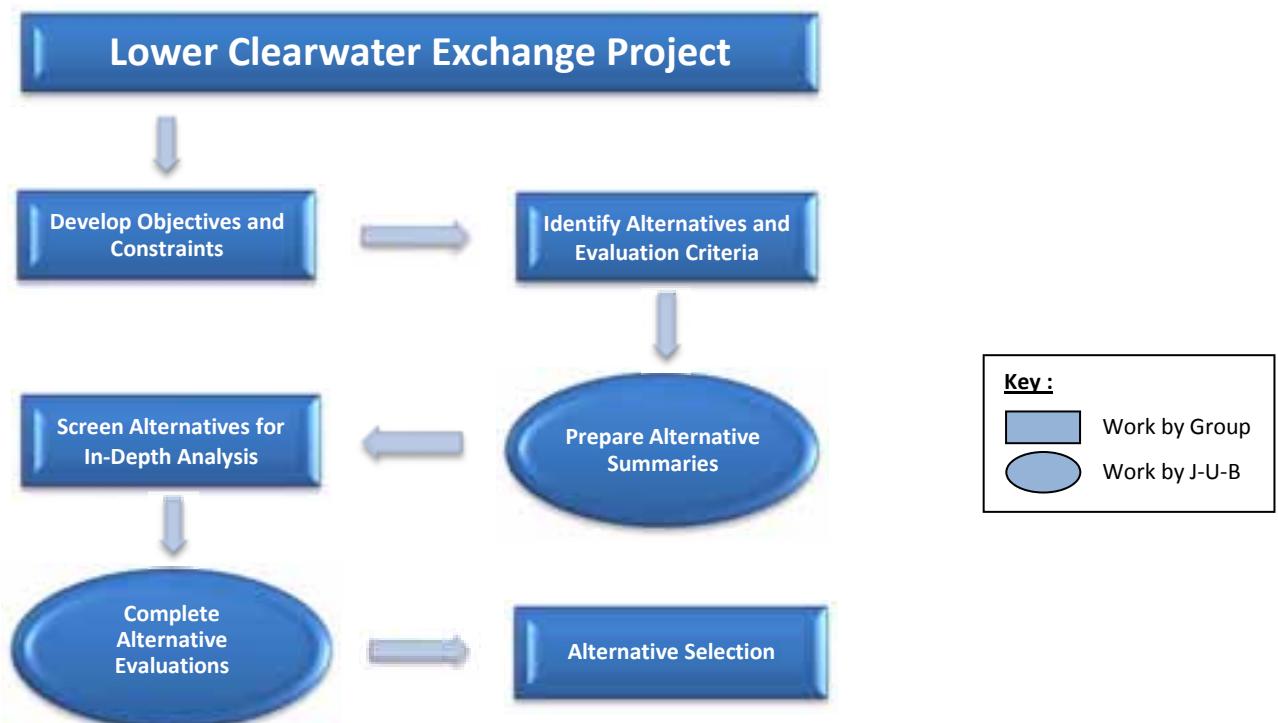
**Purpose of the Meeting:** *Develop a Plan of Study (POS) for the LCEP Appraisal Investigation. Review LCEP Purpose, structure, schedule and required decisions. Discuss potential stumbling blocks and other project related issues.*

---

## **LCEP Purpose:**

1. Creation of reliable, quality water supply for LOID.
2. Permanent resolution of the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project (LOP).
3. Permanent resolution of federal-tribal trust issues surrounding the LOP.

## **Structure:**



**Purpose of Meetings:**

1. November Workshop – Identify Objectives and Constraints
  - a. Identify planning objectives
  - b. Define problems and opportunities
  - c. Document assumptions
2. December Workshop – Identify Alternatives and Evaluation Criteria
  - a. Develop ten alternatives for summary
  - b. Identify five to seven evaluation criteria
3. February Workshop – Alternative Screening
  - a. Select three preferred alternatives
4. April Workshop – Alternative Selection
  - a. Identify preferred alternative

**Identify Interested and Affected Parties (Stakeholders):**

Federal Agencies:

- Bonneville Power
- Bureau of Reclamation
- Bureau of Indian Affairs (BIA)
- Corps of Engineers
- Elected Officials
- Environmental Protection Agency (EPA)
- National Oceanic & Atmospheric Administration (NOAA)
- US Fish & Wildlife Service \*

State/Local Government:

- City of Lapwai
- District 7 Lawmakers
- Idaho Department of Agriculture \*
- Idaho Department of Environmental Quality (DEQ)
- Idaho Department of Land
- Idaho Department of Water Resources
- Idaho Fish & Game
- Idaho Governor's Office
- Idaho State Historical Society \*
- Office of Species Conservation (Governor's Office)

Special Interest Groups:

- Friends of Clearwater
- Idaho Conservation League
- Idaho Rivers United
- Northwest Power & Conservation Council
- Trout Unlimited
- University of Idaho – Waters of the West

Commercial Entities:

- Clearwater Paper
- Clearwater Power

Private Landowners:

- Bert Teats
- Private Landowners Adjoining the Lewiston Orchards Project
- Schaub Ranch

\* These parties were identified by J-U-B following the meeting as additional interested & affected parties.

**Define Roles:**

1. MOU Signatories have decision making authority.
  - a. LOID and the Nez Perce Tribe must reach consensus – these are the primary parties and must be in agreement for critical decisions.
  - b. The Group would prefer to see consensus with all MOU Signatories; therefore, if LOID and the Nez Perce Tribe reach consensus then an effort should be made to gather consensus from the other MOU Signatories.
2. Concern was expressed that the City of Lewiston is an MOU signer but has not participated in the previous meeting and the initial participants are no longer with the City. Should they be considered as an equal with the other Signatories?
  - a. Jerry Klemm will talk to the City about their participation intent.
3. Interested and affected parties are encouraged to participate and provide input for the Appraisal Investigation.
  - a. It is important to communicate with these groups to build consensus and educate. Do these parties want to learn about the project? Do they have any direct concerns that can be addressed?
    - i. It is the BOR's policy to encourage public participation – it is not required by law.
    - ii. J-U-B will provide a framework for how the communication will be handled in the POS.
  - b. J-U-B will prepare a brief project summary letter for Jerry to sign and distribute to identify the process, & invite participation

**Goals:**

1. Broad Stakeholder support – Per Lesa this is something the Feds look for in funded projects
2. Consensus based support, fully explored study, stumbling blocks addressed
3. Funding
4. Build on existing info
5. Provide foundation for purpose at each meeting
6. Get the study done
7. Provide reliable future water supply



**Ground Rules:**

1. Listen with respect
2. Maintain a positive outlook
3. Stay on topic
4. Commit to coming to workshops prepared
5. Follow through on assignments
6. Provide a useful record – capture decisions approved by the group
7. Provide a unified message

**Stumbling Blocks:**

1. Buy in from Partners/Interested Parties (Stakeholders)
2. How decisions are made
3. Technical Issues
  - a. Power costs
  - b. Control of fisheries
  - c. Lack of technical data - leading to assumptions that may or may not be correct.
  - d. Level of reservoir A storage.
4. Project Funding
5. Non unified message
6. Acceptance of technical advice
7. Ability to separate the process from the litigation process
8. Outside group issues
  - a. Environmental
  - b. Other
9. Group role misconceptions
10. Response to outside questions
11. Authority/Empowerment to make decisions – Decisions must be made at each workshop to allow appraisal completion on schedule.
  - a. LOID, the Nez Perce Tribe, and the Chamber of Commerce felt that they had the authority to make decisions so long as the base proposal did not change. Any significant changes would have to go back before their respective boards. This extended review will result in a delay of schedule.

**Develop Plan of Study (POS):**

1. Homework for the group
  - a. Review framework for how the report will go together

**Housekeeping:**

1. Technical reports
  - a. J-U-B needs copies of pertinent reports for summary in the appraisal investigation. They will share a spreadsheet of available reports, and request documentation as needed.

- b. Bureau of Reclamation and Nez Perce Tribe will talk to Duane Meacham, Solicitor for the Bureau of Reclamation regarding which reports from the SRBA process can be shared and at what level.

**Title of Report:**

1. Lower Clearwater Exchange Project Appraisal Study – Is this name appropriate, or does it convey appearance of pre-determined solution?
  - a. All members agreed that this title should remain for consistency with previous work.

**Future Meetings:**

- November 15, 2010 10:00am – 2:00pm
- December 16, 2010 8:30am – 12:30pm
- February 3, 2011 8:30am – 3:00pm
- April 7, 2011 8:30am – 3:00pm
- Draft Study due out in May 2011
- The LCEP will meet after 2pm on Nov 15th to discuss
  - \$50k held by the Denver Technical Services Center
  - \$50k held by the Bureau of Reclamation from NOAA

**Action Items:**

Complete:	Item:	By:
<input type="checkbox"/>	Determine the City's intent to participate	Jerry Klemm
<input type="checkbox"/>	Provide a framework for how the communications will be handled in the POS.	J-U-B
<input type="checkbox"/>	Prepare a brief project summary letter for Jerry to sign. Identify the process, and invite participation.	J-U-B
<input type="checkbox"/>	Review framework for how the report will go together	LCEP Group
<input type="checkbox"/>	Review spreadsheet of prior reports and provide information as requested.	LCEP Group
<input type="checkbox"/>	Determine which reports from the SRBA process can be shared and at what level per discussion with Duane Meacham, solicitor for the Bureau of Reclamation.	BOR & Nez Perce Tribe

**Next Meeting: November 15, 2010 at 10:00am, Clearwater Region Fish & Game Office**

Please contact J-U-B ENGINEERS immediately if there are any corrections, additions, and/or deletions to the meeting minutes.

**Attendance:**

MOU Stakeholders:

- ☒ Jerry Klemm, Lewiston Chamber of Commerce
- ☒ JoAnn Cole Hansen, LOID
- ☒ Earl McGeophegan, LOID
- ☒ Barney Metz, LOID
- ☒ Jerry Northrup, LOID
- ☒ Clint Chandler, Nez Perce Tribe DRRM
- ☒ Dave Cummings, Nez Perce Tribal Attorney
- ☒ Al Kersich, Nez Perce Tribe
- ☒ Darren Williams, Nez Perce Tribe

Federal Agencies

- ☒ Lesa Stark, Bureau of Reclamation

State/Local Government

- ☒ Mitch Silvers, Senator Crapo's Office
- ☒ Peter Stegner, Senator Crapo's Office

Commercial Entities

- ☒ Doug Pfaff, Clearwater Power

Meeting Facilitators:

- ☒ Cory Baune, J-U-B ENGINEERS, Inc.
- ☒ Amy Uptmor, J-U-B ENGINEERS, Inc.

# LOWER CLEARWATER EXCHANGE PROJECT

FINAL

**Subject: NOVEMBER WORKSHOP: Identify Objectives & Constraints – Meeting Minutes**

**Date: November 15, 2010 10:00 a.m. to 1:30p.m.**

## **Attendees:**

MOU Signatory Attendees:  
(Key Stakeholders)

- ☐ City of Lewiston
- ☒ Lewiston Chamber of Commerce
- ☒ Lewiston Orchards Irrigation District (LOID)
- ☒ Nez Perce County
- ☒ Nez Perce Tribe

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**Purpose of the Meeting:** *Brainstorm and document objectives, opportunities, problems and constraints of the LCEP Appraisal Investigation. Identify assumptions and potential limitations of the analysis.*

---

**Introduction:** Jerry Klemm provided an introduction and asked for an introduction from those in attendance. The meeting was recorded to assist in the preparation of the meeting minutes. No objections to recording the meeting were made.

## **LCEP Purpose**

- Creation of reliable, quality water supply for LOID.
- Permanent resolution of the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project (LOP).
- Permanent resolution of federal-tribal trust issues surrounding the LOP.

Cory Baune asked if any modification or clarification of identified LCEP purposes is needed. Clarification was made that the word “trust” refers to legal concept of the word, not the relationship concept.

The LCEP’s Memorandum of Understanding (MOU) addresses the trust issue and could be utilized to clarify the definition of trust.

## **Review October Workshop**

- Re-cap – Cory Baune provided a general overview of the meeting and reviewed the information presented
- Meeting Minutes – No other corrections were made to the previous meeting minutes. Those in attendance of the meeting will continue to be listed on the last page of the meeting minutes.

- Action Items – Jerry Klemm followed up on the City of Lewiston participating in the LCEP meetings. At this point the City wants to be involved, but clarification is still needed regarding City representation.
  - See also action items at end of these meeting minutes.

#### **Review Plan of Study**

- Key Stakeholders received a copy of the LCEP Plan of Study via email prior to the meeting. Cory provided an overview of the study.
- The Plan of Study is in draft form at this time. LOID referenced the bottom paragraph and requested some changes to wording. After a brief discussion of the changes and the amount of scrutiny for wording, it was decided wording concerns should be addressed. The Tribe suggested that reference to the MOU wording may be a solution to the paragraph description.
- The BOR asked how participants will make comments and the documents to be placed on the website. LOID discussed options for the website and receiving public submissions from the LCEP's website.
- The Key Stakeholders should provide comments on the Plan of Study by 11/19/10 for incorporation into the final by the end of the month.

#### **November Workshop Goals**

- Discuss and document objectives of the LCEP Group to provide a framework for subsequent analysis.
- Identify direct and indirect opportunities to be addressed and developed.
- Determine potential problems and constraints of the investigation.
- Identify potential limitations of the analysis to manage group expectations.

**Objectives** – Discuss and document objectives of the LCEP Group to provide a framework for subsequent analysis. Not all of the objectives will be addressed in the Appraisal Investigation.

- Lewiston Orchards Project Asset Objectives
  - Removal and the transfer of BOR's Lewiston Orchards Project assets to BIA in trust for the Tribe.
    - Note: Mann Lake would remain in operation by LOID under contract with the Tribe after title transfer.
  - Determine what would happen with the existing canals and canal roads.
- Environmental Objectives
  - Improved watershed management for fisheries – The group clarified that managed operation of Soldier's Meadows is not a natural condition, therefore the qualifier "improved" was utilized.
  - Support acceptable fisheries in Reservoir/Lakes.
  - Determine level of watershed restoration.
  - Tie water quality with water resources.
- Appraisal Investigation Objectives
  - Find at least one alternative acceptable to the LCEP group.
  - Assess annual water supply at 8,500 acre-feet to meet maximum observed demands.



- Possible expansion of the irrigation boundaries.
  - Involve Stakeholders in the process.
  - Determine other issues that need to be resolved.
- Exchange Project Objectives
  - Mitigate power costs – long term and short term mitigation.
  - Maintain water quality for LOID.

**Opportunities** – Identify direct and indirect opportunities to be addressed and developed. The Appraisal Investigation may be used to highlight considerations for the feasibility study.

- Environmental
  - Improved fish habitat and water quality.
  - Enhanced fisheries in Reservoirs/Lakes.
  - Potentially mitigated climate change by returning streams back to cooler temperatures.
  - Potential for aquifer recharge.
- Sociopolitical
  - Resolution of Tribal concerns – improved relations between stakeholders.
  - Cultural restoration within Sweetwater Drainage.
  - Economic benefits – short term with construction and long term with restoration.
  - Public education/understanding of the Lewiston Orchards Project.
- System
  - Provide more reliable water supply.
  - Expand water supply.
  - Reduced water loss associated with evaporation/seepage.
  - Provide supplemental system to Lewiston Orchards Project.
  - Reduce the sedimentation accumulation in Mann Lake.
- Alternative Resources
  - Water reuse opportunities – including storm water or reuse from local mill.
    - Address NPDES point source discharge issues (i.e., temperature).
  - Opportunities for linkage to alternative energy resources – wind integration.

**Problems and Constraints** – Determine potential problems and constraints of the investigation.

- Water Rights
  - There must be zero net loss of water volume in the system – rights may not be expanded.
  - Water right priorities and flow limitations from Clearwater River (potential seasonal limitations on water intake pending NEPA process).
  - Secondary issues with illegal withdrawals from the creeks with increased water flows.
  - Timing of supply – when LOID needs water, so does everyone else. (i.e., environment)
  - Procurement of water rights for pumping, whether from the aquifer or river.
- Environmental
  - NEPA process
  - Drawdown of Mann Lake.
  - Increased need to manage fishing from streams due to improved fish habitats.

- Localized flood issues in the Sweetwater drainage with relaxed management due to accumulated distribution of sediments resulting from past management.
  - Protection of fisheries.
  - Other environmental constraints.
- Operational
  - Irrigation delivery for fire flows currently provided at Mann Lake.
  - Maintenance during peak demands.
  - Power outage during peak demand.
  - Power demand availability – LOID will need to pump water at the same time people demand electrical for air conditioning.
  - Operational and maintenance responsibilities associated with Mann Lake, Waha, and Soldiers Meadows including fisheries and water levels.
  - County road across Soldiers Meadows Dam – What will happen to road and clarification of ownership for county road maintenance? The MOU concept is for no on-the-ground changes.
- Technical
  - Technical design of the intake on the Clearwater.
  - Land easements, right-of-way, and land purchases.
  - Landowner objections.
- Sociopolitical
  - Acceptance of project by LOID patrons, and Nez Perce leadership.
  - Acceptance of project by general community and stakeholders.
  - Cultural resources depending where the project is located.
  - Current litigation.
  - Unforeseen regulatory issues.
- Economic
  - Power Costs
  - Cost share (funding) – both for feasibility stage and construction.
  - Funding – short term (capital) and long term (operation and maintenance).

**Assumptions** – Identify potential limitations of the analysis to manage group expectations. What assumptions the Appraisal Investigation will do? Cory Baune addressed this as a global look at the exchange project and not a detailed report. Expectations of details were discussed, and it was noted that the investigation will culminate with a range of costs. It is important for the group to understand the context of these costs, and discuss them as such with outsiders to avoid misrepresentation.

- Missing Data
  - Assumptions will be required to account for missing data.
  - Investigation may not resolve all issues, but will attempt to identify them.
  - Mann Lake storage capacity.
  - Non-construction costs including design, land acquisition, powers, studies, etc...
  - Definition of environmental impact and additional data needed (Clearwater vs. Sweetwater).

- Timing
  - Inflation rates of the project based on actual construction date.
- LCEP Direction
  - Leadership of MOU parties will provide continuity of decisions and commitment.

**December Workshop** – The December Workshop is scheduled for Thursday, December 16, 2010 from 8:30 a.m. to 3:00 p.m.

- Agenda preview for December Workshop – Identify alternatives and evaluation criteria, brainstorm alternatives, select ten alternatives for summary, and develop five to seven evaluation criteria.

#### Future Meetings

- December 16, 2010            8:30am – 3:00pm
- February 3, 2011            8:30am – 3:00pm
- April 7, 2011                8:30am – 3:00pm
- Draft Study due out in May 2011

#### Action Items:

Complete:	Item:	Workshop:	By:	Deadline
<input type="checkbox"/>	Determine the City's intent to participate.	October	Jerry Klemm	
<input checked="" type="checkbox"/>	Provide a framework for how the communications will be handled in the POS.	October	J-U-B	
<input checked="" type="checkbox"/>	Prepare a brief project summary letter for Jerry to sign. Identify the process, and invite participation.	October	J-U-B	
<input type="checkbox"/>	Review framework for how the report will go together.	October	LCEP Group	11/19/10
<input type="checkbox"/>	Review spreadsheet of prior reports and provide information as requested.	October	LCEP Group	
<input type="checkbox"/>	Determine which reports from the SRBA process can be shared and at what level per discussion with Duane Meacham, solicitor for the Bureau of Reclamation.	October	BOR & Nez Perce Tribe	
<input type="checkbox"/>	Include the MOU on the LCEP Website.	November	J-U-B & LOID	
<input type="checkbox"/>	Include Jerry Klemm and Cory Baune's email contact information on the LCEP website.	November	J-U-B & LOID	
<input type="checkbox"/>	Include Meeting Minutes on the LCEP Website	November	J-U-B & LOID	

**Next Meeting: December 16, 2010 at 8:30 a.m., ~~Clearwater Region Fish & Game Office~~ Lewiston Community Center, 1424 Main Street (meeting location updated subsequent to workshop)**

Please contact J-U-B ENGINEERS immediately if there are any corrections, additions, and/or deletions to the meeting minutes.

**Meeting Attendance:**

• **Key Stakeholders:**

- ☐ Chandler, Clint - Nez Perce Tribe
- ☒ Clark, Bob - LOID
- ☒ Cole Hansen, JoAnn - LOID
- ☒ Cummings, Dave - Nez Perce Tribe
- ☐ Kersich, Al - Nez Perce Tribe
- ☒ Kinzer, Melissa - LOID
- ☒ Klemm, Jerry – Lewiston Chamber of Commerce
- ☒ McGeoghegan, Earl - LOID
- ☒ Metz, Barney - LOID
- ☒ Northrup, Jerry - LOID
- ☒ Taylor, Emmitt - Nez Perce Tribe
- ☒ Williams, Darren - Nez Perce Tribe
- ☒ Whiting, Geoff – Nez Perce Tribe
- ☒ Zenner, Doug – Nez Perce County

• **Stakeholders**

*Federal Agencies*

- ☒ Faler, Mike - US Fish & Wildlife Service
- ☒ Mabe, Dave - NOAA
- ☒ Pierko, Julia - Bureau of Reclamation
- ☒ Stark, Lesa - Bureau of Reclamation
- ☒ Turner, Richard - Corps of Engineers

*State/Local Government/Elected Officials*

- ☒ Brodie, Katie - Idaho Governors' Office
- ☒ DuPont, Joe - ID Fish & Game
- ☒ Fales, Jason - ID DEQ
- ☒ Hanna, Mike - Senator Jim Risch's Office
- ☒ Hohle, Janet - Office of Species Conservation
- ☒ Lillibridge, Bill - ID Soil & Water Conservation
- ☒ Sila, Jay - ID Dept of Lands
- ☒ Silvers, Mitch - Senator Crapo's Office
- ☒ Stegner, Peter - Senator Crapo's Office

*Commercial Entities*

- ☒ Hagen, Dave, Clearwater Power
- ☐ Pfaff, Doug - Clearwater Power

*Private Landowners*

- ☒ Hobbs, Bill, Schaub Ranch
- ☒ Teats, Burt

*Meeting Facilitators:*

- ☒ Cory Baune, J-U-B ENGINEERS, Inc.
- ☒ Amy Uptmor, J-U-B ENGINEERS, Inc.

# LOWER CLEARWATER EXCHANGE PROJECT

## FINAL

**Subject: DECEMBER WORKSHOP: Identify Alternatives & Evaluation Criteria – Meeting Minutes**

**Date: December 16, 2010 8:30 a.m. to 3:00 p.m.**

### Attendees:

MOU Signatory Attendees:  
(Key Stakeholders)

- ☐ **City of Lewiston**
- ☒ **Lewiston Chamber of Commerce**
- ☒ **Lewiston Orchards Irrigation District (LOID)**
- ☒ **Nez Perce County**
- ☒ **Nez Perce Tribe**

*NOTE: Italicized text was added to the meeting minutes following the February Workshop based on recollected discussion from the December Workshop. These additions were completed by J-U-B on request from the BOR.*

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**Purpose of the Meeting:** *Brainstorm and select alternatives for technical summary. Brainstorm and select evaluation criteria to be used in subsequent alternative screening.*

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**Introduction:** Jerry Klemm provided an introduction and asked for an introduction from those in attendance. The meeting was recorded to assist in the preparation of the meeting minutes. No objections to recording the meeting were made.

### LCEP Purpose

- Creation of reliable, quality water supply for LOID.
- Permanent resolution of the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project (LOP).
- Permanent resolution of federal-tribal trust issues surrounding the LOP.

### Review November Workshop

- Cory Baune provided a general overview of the meeting and reviewed the information presented.
- Objectives – Discussion and documentation of LCEP group objectives
- Opportunities – Identify direct and indirect opportunities to be addressed and developed
- Problems and Constraints – Determine potential problems and constraints of the investigation
- Assumptions – Identify potential limitations of the analysis.
- Meeting Minutes – No corrections were made to the November Meeting Minutes and were accepted by the group.



**LOP Alternatives** – The group reviewed the draft alternatives provided by J-U-B prior to the meeting and brainstormed additional ideas developed by the LCEP group.

1. **Do Nothing** – Continue operation of the existing LOP. Water will continue to be supplied by the Craig Mountain watershed. Minimum ESA stream flow requirements must be satisfied prior to withdrawal to the LOID.
2. **Clearwater River Pumping Station-Attenuated System** – Replace the LOP with a pumping station on the Clearwater River. Utilize Mann Lake as a large equalization reservoir.
3. **Clearwater River Pumping Station-On-Demand System** – Replace the LOP with a pumping station on the Clearwater River and operate as an on-demand system. Utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
4. **Groundwater Supply-Attenuated System** – Drill groundwater wells to replace the LOP and utilize Mann Lake as a large equalization reservoir.
5. **Groundwater Supply-On-Demand System** – Drill groundwater wells to replace the LOP. Operate the wells on-demand, and utilize a new, smaller storage facility off of the reservation to provide minimize equalization storage.
6. **City of Lewiston-Attenuated System** – Use the City of Lewiston’s domestic water system to replace the LOP. Utilize Mann Lake as a large equalization reservoir.
7. **City of Lewiston Supply-On-Demand System** – Use the City of Lewiston’s domestic water system to replace the LOP. Operate the system on-demand and utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
8. **Snake River Supply-Attenuated System** – Build a pumping station on the Snake River to replace the LOP. Utilize Mann Lake as a large equalization reservoir.
9. **Snake River Supply-On-Demand System** – Build a pumping station on the Snake River to replace the LOP. Operate the system on-demand, and utilize a new, smaller storage facility off of the reservation to provide minimal equalization storage.
10. **Clearwater Paper Corporation Reuse-Attenuated System** – Replace the LOP with treated reuse water from Clearwater Paper Corporation. Utilize Mann Lake as a large equalization reservoir.
- 10a. **Clearwater Pumping Station Supplemented with Clearwater Paper Corporation Reuse** – Replace the LOP with Clearwater Paper Corporation reuse water. Supplement additional water needs as required with a Clearwater River Pumping Station.
11. **City of Lewiston WWTP Reuse-Attenuated System** – Replace the LOP with reclaimed wastewater treatment plant (WWTP) discharge and utilize Mann Lake as large equalization reservoir.
- 11a. **Clearwater Pumping Station Supplemented with City of Lewiston WWTP Reuse-Attenuated System** – Replace the LOP with City of Lewiston WWTP reuse. Supplement flows with a Clearwater River pumping station.
12. **Stormwater Capture and Reuse** – Replace the LOP with capture and treatment of City of Lewiston stormwater. Utilize Mann Lake as a large equalization reservoir.
- 12a. **Clearwater Pumping Station Supplemented with Stormwater Capture and Reuse** – Replace the LOP with stormwater runoff in higher elevations only to minimize pumping head from lower elevations in the City to the Orchards. Utilize flows to supplement a Clearwater River pumping station.

13. **Sweetwater Canal Rehabilitation** – Reduce leaking and evaporation in the LOP. Water savings could potentially off-set ESA obligations and facilitate continued LOP operations.
14. **New Reservoir B Dam and Reservoir** – Expand the LOP through construction of another reservoir south of Mann Lake to provide storage of excess flows during peak runoff. Reservoir is located on the reservation and has estimated storage capacity of 1,300 Acre-feet.
15. **Increase Lake Waha Pumping** – Continue operation of the LOP and supplement water lost to meet ESA obligations by increasing water withdrawals from Lake Waha.
16. **New Lake Waha Outlet Structure** - Continue operation of the LOP and supplement water lost to meet ESA obligations by increasing water withdrawals from Lake Waha. Replace the pumping system with a new gravity outlet structure to eliminate the need to pump water out of Lake Waha.
17. **Increase Capacity in Soldier's Meadow Reservoir** – Expand the LOP through modification of Soldier's Meadow Dam and Spillway.
18. **Zenner Meadow Reservoir** – Expand with LOP with construction of a new reservoir at Zenner Meadow to capture additional runoff from the East Fork of Webb Creek. Utilize additional runoff to supplement water lost to meet ESA obligations.
19. **Water Conservation** – Implement water conservation measures within the District. Utilize water saved to meet minimum ESA stream flows.
20. **Existing System with Supplemental Groundwater Wells** – Continue use of the existing LOP and utilize groundwater wells off of the reservation to meet minimum ESA stream flows.
21. **Clearwater Pumping Station to Supplement the Existing System** – Continue use of the LOP and supplement flows with a Clearwater Pumping Station.
22. **Existing System with Supplemental Sweetwater Canyon Well** – Utilize a supplemental well located in Sweetwater Canyon to meet minimum ESA stream flows and continue use of the LOP.
23. **Eliminate LOID** – Eliminate the irrigation district. Water service would be provided by the City of Lewiston.
24. **Reservoir C in Howard Canyon** – Utilize a new reservoir located in Howard Canyon in combination with the County Transportation Plan to improve access and recreation.
25. **Deer Creek Reservoir and Pump Station** – Expand the LOP with construction of Deer Creek Reservoir. Pump flows to Soldier's Meadow Reservoir and utilize to meet minimum ESA stream flows.
26. **Dworshak Reservoir Supply** – Replace the LOP with construction of a pumping station and pipeline to feed Mann Lake from Dworshak Reservoir.
27. **Webb Creek Reservoir** – Expand the LOP with construction of Webb Creek Reservoir. Utilization additional storage to meet minimum ESA stream flows.
28. **Sweetwater Creek Reservoir** - Expand the LOP with construction of Sweetwater Creek Reservoir. Utilization additional storage to meet minimum ESA stream flows.
29. **Clearwater Paper Reuse and City of Lewiston WWPT Reuse** – Replace the LOP with reuse from both Clearwater Paper Corporation and the City of Lewiston WWTP.

### Alternative Screening

- Initial Screening - The following methodology was utilized to screen alternatives to the most viable options. The subsequent matrix was populated by the LCEP group. Any alternatives which were designed "Not Effective" for one of three MOU objectives were eliminated. Eighteen options remained following the initial screening, and were not evaluated during the secondary screening.



Not effective



Potentially Effective



Effective

- Secondary Screening – Discussion included removing options that could be eliminated based on other criteria to rank the remaining options. Final screening was completed through a broad review of relative capital costs based on the following methodology. Those options with a relatively high capital cost were eliminated; eleven options were selected following this screening.



Negative (Expensive)

The Alternative has a relatively high capital cost























Neutral

















The Alternative has a mid-range capital cost











Positive (Inexpensive)













The Alternative has a relatively low capital cost











Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
1. Do Nothing				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Not effective, system historically uses restrictions to manage a finite supply.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – Infrastructure is in place and operational. An effective, low cost option.</li> </ul>			
2. Clearwater River Pumping Station-Attenuated System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from the Clearwater to serve the system.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The Clearwater Pump Station, Attenuated System serves as the baseline for gross capital costs evaluation. Cost is therefore equivalent.</li> <li>NOTE: This raises additional questions and assumptions regarding NOAA and Marine Fisheries concerns over the effects of withdrawals from the Clearwater River.</li> </ul>			
3. Clearwater River Pumping Station-On-Demand System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from the Clearwater to serve the system. The on-demand system will be slightly less reliable than an attenuated system due to the impact of an extended shut-down period, but overall, the alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative will require larger pumps, larger transmission pipeline, and additional storage as compared with the Clearwater Pump Station, Attenuated System. From a gross cost analysis, however, capital costs will be equivalent.</li> <li>NOTE: This raises additional questions and assumptions regarding NOAA and Marine Fisheries concerns over the effects of withdrawals from the Clearwater River.</li> </ul>			
4. Groundwater Supply-Attenuated				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Wells located in the highly productive Lewiston Basin Aquifer could meet irrigation demands. The long-term impacts of this magnitude of pumping on aquifer recharge are unknown, but overall, this alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping station, Attenuated System.</li> </ul>			
5. Groundwater Supply-On-Demand System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Wells located in the highly productive Lewiston Basin Aquifer could meet</li> </ul>			













Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
	<p><i>irrigation demands. The long-term impacts of this magnitude of pumping on aquifer recharge are unknown, but overall, this alternative is effective.</i></p> <ul style="list-style-type: none"> <li>• <i>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping station, Attenuated System.</i></li> </ul>			
<b>6. City of Lewiston Supply-Attenuated System</b>				
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – The alternative is potentially effective due to questions regarding available capacity to supply LOID water needs.</li> <li>• <i>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping Station, Attenuated System. The City would likely use the same source, the Clearwater River. Distribution and system capacity upgrades would be required.</li> </ul>			
<b>7. City of Lewiston Supply-On-Demand System</b>				
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – The alternative is potentially effective due to questions regarding available capacity to supply LOID water needs.</i></li> <li>• <i>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping Station, Attenuated System. The City would likely use the same source, the Clearwater River. Distribution and system capacity upgrades would be required.</li> </ul>			
<b>8. Snake River Supply-Attenuated System</b>				
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – Potentially effective, the impacts of the adjudication process on the Lower Snake River are unknown. If water rights are available, this alternative becomes a viable option.</i></li> <li>• <i>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• Capital Cost – The alternative may require more transmission pipe than the Clearwater option, but can likely be connected within the distribution system. The existing pipe could be used to back-feed Mann Lake. From a gross cost analysis, capital costs will be equivalent.</li> <li>• <i>NOTE: Water temperatures from the Snake River are warmer than the Clearwater River.</i></li> </ul>			
<b>9. Snake River-On-Demand System</b>				
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – Potentially effective, the impacts of the adjudication process on the Lower Snake River are unknown. If water rights are available, this alternative becomes a viable option.</i></li> <li>• <i>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• Capital Cost – The alternative may require more transmission pipe than the Clearwater option, but</li> </ul>			















Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
	can likely be connected within the distribution system. The existing pipe could be used to back-feed Mann Lake. The alternative will require larger pumps, larger transmission pipeline, and additional storage as compared with the Clearwater Pump Station, Attenuated System. From a gross comparative cost analysis, capital costs will be equivalent.			
<b>10. Clearwater Paper Corporation Reuse-Attenuated System</b>				
	<ul style="list-style-type: none"> <li>• MOU Objective 1 - Concerns were discussed regarding dependency on a company that could go out of business. Additional concern was raised regarding water quality issues, and supply dependability. Discussion is required with Clearwater Paper to identify available water and discharge permit issues. What are the ramifications to Clearwater Paper if LOID cannot accept all annual discharge? What are reliability issues associated with mill shutdown periods? Overall, the alternative is potentially effective pending answers to these questions.</li> <li>• MOU Objective 2 – <i>Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• MOU Objective 3 – <i>The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater.</i></li> <li>• Capital Cost – <i>Requires industrial wastewater treatment and significant infrastructure, in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. There may be potential for a partnering opportunity with Clearwater Paper if they have discharge permit issues. There is also potential for federal funding assistance. Regardless, of assistance opportunities, the overall capital cost is higher than the Clearwater Pump Station, Attenuated System.</i></li> </ul>			
<b>10a. Clearwater Pumping Station Supplemented with Clearwater Paper Corporation Reuse</b>				
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – <i>This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. The quantity of available wastewater for reuse from Clearwater Paper remains unknown. Concerns remain regarding water quality and supply dependability issues associated with Clearwater Paper; therefore, this alternative is potentially effective with respect to a reliable, quality water supply.</i></li> <li>• MOU Objective 2 – <i>Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• MOU Objective 3 – <i>The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater.</i></li> <li>• Capital Cost – <i>Requires industrial wastewater treatment and significant infrastructure, in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. There may be potential for a partnering opportunity with Clearwater Paper if they have discharge permit issues. There is also potential for federal funding assistance. The alternative requires construction of duplicated infrastructure to treat industrial wastewater and pump from the Clearwater. Overall, capital cost is high as compared to the Clearwater Pump Station, Attenuated System.</i></li> <li>• NOTE: Despite expensive capital costs, this alternative was retained due to potential funding opportunities associated with the alternative.</li> </ul>			















Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
<b>11. City of Lewiston WWTP Reuse-Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The available flows from the City WWTP are unknown. Although it is unlikely there is sufficient wastewater to meet the needs of LOID, this alternative is ranked as potentially effective until additional information from the City is obtained. In addition, there are water quality concerns associated with treated wastewater. It is unknown if the City has any discharge permit issues.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with municipal wastewater.</li> <li>Capital Cost - Requires municipal wastewater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction will be more extensive to route flows to Mann Lake. There is potential for federal funding assistance, but regardless of this opportunity, the overall capital cost is grossly higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			
<b>11a. Clearwater Pumping Station Supplemented with City of Lewiston WWTP Reuse-Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. The quantity of available wastewater for reuse from the City WWTP remains unknown. There are additional concerns regarding water quality. The alternative is therefore potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with municipal wastewater.</li> <li>Capital Cost - Requires municipal wastewater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction will be more extensive to route flows to Mann Lake. The alternative requires construction of duplicate infrastructure to treat municipal wastewater and pump from the Clearwater. Overall, capital cost is high as compared to the Clearwater Pump Station, Attenuated System alone.</li> <li>NOTE: Despite expensive capital costs, this alternative was retained due to potential funding opportunities associated with alternative.</li> </ul>			
<b>12. Stormwater Capture and Reuse</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Due to unknowns associated with the alternative, it is rated as potentially effective. It is unlikely that the existing stormwater system produces enough discharge to meet irrigation demands. Limited precipitation may be problematic. During wet weather periods when more water is available, there is a lower irrigation requirement, and vice-versa. Water quality is also a concern.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann</li> </ul>			











Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
	<i>Lake associated with treated stormwater.</i> <ul style="list-style-type: none"> <li>Capital Cost - Costs would be significant to capture and treat stormwater.</li> </ul>			
<b>12a. Clearwater Pumping Station Supplemented with Stormwater Capture and Reuse</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. Timing of this shut-down is likely to occur during low season flow periods typically associated with limited precipitation. Supplementation of the Clearwater Pump Station with stormwater capture and reuse may not provide a reliable water supply for the District. The alternative is therefore potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with treated stormwater.</li> <li>Capital Cost – Requires stormwater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction to route flows to Mann Lake would be extensive; therefore, the overall capital cost is grossly higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			
<b>13. Sweetwater Canal Rehabilitation</b>				Not evaluated
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective pending the impact of rehabilitation on canal leakage. There is potential that associated efforts could off-set water designated for ESA flows and climate conditions.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>14. New Reservoir B Dam and Reservoir</b>				Not evaluated
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			

Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
<b>15. Increase Lake Waha Pumping</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – The alternative is not effective in providing a reliable water supply for LOID, as it does not provide a new water source or additional storage.</i></li> <li>• <i>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>• <i>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>• <i>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</i></li> </ul>			
<b>16. New Lake Waha Outlet Structure</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 - This alternative is not effective in providing a reliable water supply for LOID, as it does not provide a new water source or additional storage.</i></li> <li>• <i>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>• <i>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>• <i>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</i></li> </ul>			
<b>17. Increase Capacity in Soldier's Meadow Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – The alternative is potentially effective in providing a reliable water supply through increased capacity that could be utilized during periods when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</i></li> <li>• <i>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>• <i>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>• <i>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</i></li> </ul>			
<b>18. Zenner Meadow Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – The alternative is potentially effective by providing additional storage which could be utilized when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</i></li> <li>• <i>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>• <i>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>• <i>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</i></li> </ul>			

Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
<b>19. Water Conservation</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective depending on the effectiveness of a water conservation program to reduce system demands. Available supply would remain a function of climate conditions and minimum stream flows.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> <li>NOTE: Water conservation is encouraged as an element to all the alternatives.</li> </ul>			
<b>20. Existing System with Supplemental Wells</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative would be effective by utilizing supplemental wells to off-set supply deficiencies associated with climatic conditions and minimum in-stream flows.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>21. Clearwater Pumping Station to Supplement the Existing System</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative would be effective by utilizing the Clearwater Pump Station to supplement the existing system.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>22. Existing System with Supplemental Sweetwater Canyon Well-</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective at providing a reliable water supply, pending the impact of future climatic conditions on surface water collection.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			



Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
<b>23. Eliminate LOID</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Currently the City of Lewiston’s infrastructure cannot meet the LOID irrigation demands. The City would need to expand their infrastructure. The alternative is therefore potentially effective.</li> <li>MOU Objective 2 – <i>Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>MOU Objective 3 – <i>Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>Capital Cost – Expensive due to additional infrastructure required for domestic water treatment.</li> </ul>			
<b>24. Reservoir C in Howard Canyon</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 - This option is the same concept as Reservoir B, except the reservoir is located off the Reservation. <i>Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</i></li> <li>MOU Objective 2 – <i>Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>MOU Objective 3 – <i>Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>25. Deer Creek Reservoir and Pump Station</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – <i>The alternative is potentially effective by providing additional storage which could be utilized when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</i></li> <li>MOU Objective 2 – <i>Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>MOU Objective 3 – <i>Not effective, this alternative is expansion of the LOP and is not acceptable to the Tribe.</i></li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>26 Dworshak Reservoir Supply</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – <i>Effective, sufficient water is available from Dworshak Reservoir to meet LOID needs. Water quality is acceptable for irrigation.</i></li> <li>MOU Objective 2 – <i>Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>MOU Objective 3 – <i>Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>Capital Cost – Expensive, the alternative requires significant pipeline to convey water to Mann Lake, and must cross several significant drainages.</li> </ul>			

Alternative	Initial Screening – MOU Objectives			Secondary Screening
	MOU Objective 1	MOU Objective 2	MOU Objective 3	
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal- Tribal Trust Issues	Gross Comparative Capital Cost
<b>27. Webb Creek Reservoir-</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</i></li> <li>• <i>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>• <i>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>• <i>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</i></li> </ul>			
<b>28. Sweetwater Creek Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</i></li> <li>• <i>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</i></li> <li>• <i>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</i></li> <li>• <i>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</i></li> </ul>			
<b>29. Clearwater Paper Reuse and City of Lewiston WWTP Reuse</b>				
	<ul style="list-style-type: none"> <li>• <i>MOU Objective 1 – Potentially effective, although the alternative partially relies on supply from a private entity that may not exist in the future. There are additional concerns regarding water quality issues associated with both sources.</i></li> <li>• <i>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</i></li> <li>• <i>Capital Cost – Expensive, requires industrial wastewater and municipal wastewater treatment infrastructure in addition to similar pumping requirements of the Clearwater River Pump Station. Wastewater must be conveyed from two separate locations with significant piping.</i></li> </ul>			

*Note:* Those alternatives retained for technical summary have been shaded in the above table.

- Clarification Regarding Permanent Resolution of ESA Issues Associated with the LOP – The Tribe indicated that even if their case prevails regarding current litigation over minimum ESA stream flows, such a discussion will not provide permanent resolution of ESA/LOP issues due to critical habitat of the area. The Tribe feels that continued use of the LOP in any fashion creates issue with the ESA.
  - Sweetwater Dam – The Tribe discussed that removal of the Sweetwater Dam is not proposed under the Reclamation’s current LOP operations concept, but the dam blocks 20 miles of streams. Even if passage through the dam were provided, this would not resolve ESA issues associated with the LOP.
  - Title Transfer Process – The Tribe discussed title transfer under the LCEP MOU concept, which would likely include the following:
    - Removal of Captain John’s Diversion
    - Removal of the Sweetwater Diversion
    - Removal of the Webb Fork Diversion
    - Soldier’s Meadow Reservoir and Mann Lake Reservoir would remain. The July 2009 LCEP MOU concept is in essence that recreational use opportunities, including fishing, at these water bodies would be unchanged for non-Indian and Indian users, and that any details of fisheries management or licensing issues would be discussed and resolved through government-to-government meetings between the Tribe and State Fish and Game during the feasibility study phase of an LCEP-based alternative.
- Clarification Regarding Permanent Resolution of Federal-Tribal Trust Issues Surrounding the LOP – The Tribe indicated that any alternative which utilizes the LOP fails to resolve Tribal trust issues. With the exception of continued water storage use of Mann Lake, the Tribe is not willing to consider alternatives which utilize the LOP during the appeal investigation process.
- The Clearwater Paper/City of Lewiston WWTP options to supplement the Clearwater Pumping Station were retained due to potential to secure federal water reuse funding sources with this type of project.
- General Discussion
  - Power Costs – There was general discussion that discounts for significant power users are no longer offered.
  - Operation of Mann Lake – There was discussion regarding what would happen to Mann Lake under any of the scenario’s which utilize a separate storage facility. Under this situation, there is no guarantee that water would be provided to the Lake.

#### **Evaluation Criteria**

- The following evaluation criteria were presented to the LCEP Group for identification and weighting for use during the alternative identification process scheduled for the February Workshop:
  - Reliable Water Supply (MOU Objective 1)
  - Quality Water Supply (MOU Objective 1)
  - Resolution of ESA Issues (MOU Objective 2)
  - Resolution of Tribal Trust (MOU Objective 3)
  - Capital Cost
  - Operation, Maintenance, and Replacement Cost (OM&R)

- Net Environmental Benefit
- Environmental Energy

The group discussed that the split of MOU Objective 1 into two categories creates additional emphasis on the objective. These criteria were therefore combined. Environmental energy criteria, the impact of energy consumption and associated carbon footprint, were incorporated into the OM&R criteria.

Finally, the criteria were weighted for relative importance on a scale of 1-5 with 5 being the most important. The final criteria and weighting were identified as follows:

No.	Criteria	Weighting	Description
	<b>MOU Objectives</b>		
1	Reliable & Quality Water Supply	5	Is the water supply both reliable and of sufficient quantity? Any quality? (Includes Water Rights)
3	Resolution of ESA Issues	5	Permanent resolution of ESA issues surrounding the Lewiston Orchards Project
4	Resolution of Tribal Trust	5	Permanent resolution of federal-trust issues surrounding the Lewiston Orchards Project
	<b>Cost</b>		
5	Capital Cost	3	The initial capital cost of the alternative
6	Operation, Maintenance & Replacement Cost	5	Annual operation, maintenance, and replacement costs of the alternative
	<b>Environmental</b>		
7	Net Benefits	5	Ability of the alternative to improve environmental conditions & regional watershed perspective. Minimize Cultural Impacts

Weighting Key: 5 = Most Important; 1 = Least Important

**February Workshop** – The February Workshop is scheduled for Thursday, February 3, 2011 from 8:30 a.m. to 3:00 p.m.

- Agenda preview for February Workshop – Select three (3) preferred alternatives for analysis.

**Action Items:**

Complete:	Item:	Workshop:	By:	Deadline	Notes
<input type="checkbox"/>	Determine the City's intent to participate.	October	Jerry Klemm		
<input checked="" type="checkbox"/>	Provide a framework for how the communications will be handled in the POS.	October	J-U-B		
<input checked="" type="checkbox"/>	Prepare a brief project summary letter for Jerry to sign. Identify the process, and invite participation.	October	J-U-B		
<input type="checkbox"/>	Review framework for how the report will go together.	October	LCEP Group	11/19/10	Plan of study approval <input checked="" type="checkbox"/> LOID <input checked="" type="checkbox"/> Tribe <input checked="" type="checkbox"/> Chamber <input type="checkbox"/> BOR
<input type="checkbox"/>	Review spreadsheet of prior reports and provide information as requested.	October	LCEP Group		
<input type="checkbox"/>	Determine which reports from the SRBA process can be shared and at what level per discussion with Duane Meacham, solicitor for the Bureau of Reclamation.	October	BOR & Nez Perce Tribe		
<input checked="" type="checkbox"/>	Include the MOU on the LCEP Website.	November	J-U-B & LOID		
<input checked="" type="checkbox"/>	Include Jerry Klemm and Cory Baune's email contact information on the LCEP website.	November	J-U-B & LOID		
<input checked="" type="checkbox"/>	Include Meeting Minutes on the LCEP Website	November	J-U-B & LOID		
<input type="checkbox"/>	Review alternative summaries prior to February workshop	December	Key Stakeholders	2/3/11	
<input type="checkbox"/>	Discuss potential for reuse with Clearwater Paper	December	Jerry Klemm		
<input type="checkbox"/>	Determine availability of Snake River Water Rights	December	Geoff Whiting		
<input type="checkbox"/>	Clarify public participation requirements of Rural Water Program	December	BOR		
<input type="checkbox"/>	Provide clarification regarding how a regional watershed perspective might be used in the area as part of the analysis	December	BOR		

**Next Meeting: February 3, 2011 8:30 a.m. – 3:00 p.m., Clearwater Region Fish & Game Office**

Please contact J-U-B ENGINEERS immediately if there are any corrections, additions, and/or deletions to the meeting minutes.



## Meeting Attendance:

### MOU Stakeholders:

- ☐ Chandler, Clint - Nez Perce Tribe DRRM
- ☒ Clark, Bob - LOID
- ☒ Cole Hansen, JoAnn - LOID
- ☒ Cummings, Dave - Nez Perce Tribal Attorney
- ☒ Kersich, Al - Nez Perce Tribe
- ☒ Kinzer, Melissa - LOID
- ☒ Klemm, Jerry – Lewiston Chamber of Commerce
- ☒ McGeoghegan, Earl - LOID
- ☒ Metz, Barney - LOID
- ☒ Northrup, Jerry - LOID
- ☒ Taylor, Emmitt - Nez Perce Tribe
- ☐ Williams, Darren - Nez Perce Tribe
- ☒ Whiting, Geoff – Nez Perce Tribe
- ☒ Zenner, Doug – Nez Perce County

### Federal Agencies

- ☒ Brege, Dale - NOAA
- ☐ Faler, Mike - US Fish & Wildlife Service
- ☒ LaFrance, Greg – BIA Northern Idaho Agency
- ☐ Mabe, Dave - NOAA
- ☒ Morigeau, Michael – BIA Northern Idaho Agency
- ☒ Pierko, Julia - Bureau of Reclamation
- ☐ Stark, Lesa - Bureau of Reclamation
- ☐ Turner, Richard - Corps of Engineers

### State/Local Government/Elected Officials

- ☐ Brodie, Katie - Idaho Governors' Office
- ☐ DuPont, Joe - ID Fish & Game
- ☐ Fales, Jason - ID DEQ
- ☒ Hand, Robert - ID Fish & Game
- ☐ Hanna, Mike - Senator Jim Risch's Office
- ☒ Hohle, Janet - Office of Species Conservation
- ☐ Lillibridge, Bill - ID Soil & Water Conservation
- ☐ Sila, Jay - ID Dept of Lands
- ☒ Silvers, Mitch - Senator Crapo's Office
- ☒ Stegner, Peter - Senator Crapo's Office

### Commercial Entities

- ☐ Hagen, Dave - Clearwater Power
- ☐ Pfaff, Doug - Clearwater Power

### Private Landowners

- ☐ Hobbs, Bill - Schaub Ranch
- ☐ Teats, Bert

### Meeting Facilitators:

- ☒ Baune, Cory - J-U-B ENGINEERS, Inc.
- ☒ Ensor, Doug - J-U-B ENGINEERS, Inc.
- ☒ Uptmor, Amy - J-U-B ENGINEERS, Inc.

# LOWER CLEARWATER EXCHANGE PROJECT

FINAL

**Subject: FEBRUARY WORKSHOP: Alternative Screening – Meeting Minutes**

**Date: February 3, 2011 8:30 a.m. to 3:00 p.m.**

## **Attendees:**

MOU Signatory Attendees:  
(Key Stakeholders)

- ☐ City of Lewiston
- ☒ Lewiston Chamber of Commerce
- ☒ Lewiston Orchards Irrigation District (LOID)
- ☒ Nez Perce County
- ☒ Nez Perce Tribe

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**Purpose of the Meeting:** *Select preferred alternatives for technical analysis.*

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**Introduction:** Jerry Klemm provided an introduction and asked for an introduction from those in attendance. The meeting was recorded to assist in the preparation of the meeting minutes. No objections to recording the meeting were made.

## **LCEP Purpose**

- Creation of reliable, quality water supply for LOID.
- Permanent resolution of the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project (LOP).
- Permanent resolution of Federal-Tribal trust issues surrounding the LOP.

## **Housekeeping**

- Report Background Chapters
  - Texts identified during November Plan of Study development are required.
  - Schedule-Background investigation substantially complete December 30, and finalized following alternatives screening (Mid March).
  - Receipt of materials is delaying completion.

## Review December Workshop

- Cory Baune provided a general overview of the meeting and reviewed the information presented.
  - Identify alternatives – the group brainstormed various potential alternatives.
  - Eliminate alternatives based on alignment with MOU objectives.
  - Final screening based on order of magnitude capital cost.
- General Discussion Regarding Selection Process:
  - Capital Cost comparisons were completed using the Clearwater River Pump Station, attenuated system as a baseline. Capital costs are therefore comparative to the Clearwater Pump Station. If the alternative is grossly more expensive than Clearwater River Pumping Project then it was considered a negative capital cost evaluation. Lesa Stark requested that more detail regarding this process be provided in the final report.
  - ESA Problem Statement - Lesa Stark stated concerns regarding the key stakeholders differing opinions on ESA issues associated with the Lewiston Orchards Project. She discussed that it is a delicate subject due to pending litigation between BOR and the Tribe. The Tribe felt that the issue was defined in the MOU, and that irreconcilable differences about ESA compliance between the Tribe and BOR are one of the three core problems the LCEP MOU partners are trying to permanently resolve. The Tribe noted that the Reclamation's opinion regarding the Bi-op is an example of the irreconcilable ESA disagreement between BOR and the Tribe that is one of the core project problems the LCEP MOU partners are trying to permanently resolve. More detail may be needed to define the parties' positions within the study text, and a careful write-up of permanent resolution of ESA issues is needed to satisfy involved parties.
    - Reclamation's opinion – Bi-op meets needs of the ESA.
    - Tribe Opinion – The MOU discusses “permanent resolution” of ESA issues, and no operation of LOP offers permanent resolution. The Tribe noted that it has previously explained that any operation of the LOP as it is located, on ESA designated critical habitat, diverting water from creeks used by an ESA listed species, blocking upstream passage for an ESA listed species, will remain a controversial federal action requiring recurring ESA Section 7 consultation with NOAA Fisheries and open to legal challenges from the Tribe and/or potentially environmental groups.
    - LCEP Definition – BOR suggested that additional time be spent on the group's definition of permanent resolution to ESA issues associated with the LOP. The Tribe noted that this has been done in earlier meetings.

- Do Nothing Alternative
  - Tribal attorneys discussed the importance of explaining consequences, risks, and costs of the “do nothing” alternative in the appraisal investigation as set forth in Rural Water Program regulations.
- Clearwater River Pump Station Alternatives
  - Tribal attorneys indicated that per their discussion with the Idaho Department of Water Resources, water is available from the Clearwater River and the agency is generally receptive to consolidation of water withdrawals to mainstream rivers and away from lower flow/more sensitive tributaries. The proposed right of 8,500 acre-feet is less than the existing right of 10,500 acre-feet. The new right therefore may be considered restorative.
- Clearwater Paper Corporation Reuse Alternatives
  - Reuse Quality Concerns
    - December Workshop, Neutral Rating for MOU Objective No. 3 – this rating is due to lower water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater. This could create issues associated with permanent resolution of Federal-Tribal trust due to the location of the Lake on the reservation and associated impact of water quality.
    - Industrial Wastewater from Clearwater Paper Corporation has high BOD/TSS/odor/color/temperature.
    - Concerns were voiced regarding livestock and downstream human consumption of industrial wastewater, as well as liability incurred by all parties.
  - Reuse Availability
    - Jerry Klemm stated he made several attempts to contact Clearwater Paper and their lack of response may indicate lack of corporate interest. Jerry also discussed dewatering of hillside springs that is completed to stabilize the area behind the mill. This dewatering may have sufficient quality, but quantity is unknown.
    - Cory Baune indicated he was able to contact a representative from the mill. Clearwater Paper doesn’t have any current or pending water quality issues associated with their permit, meaning they are meeting NPDES requirements to discharge into the Clearwater River. Cory believes Clearwater Paper will politely decline the request from LCEP due to liability issues. He discussed the Clearwater Paper discharge water and explained it does have an odor, dark color, and water temperature is warm. Cory indicated that Clearwater Paper is

in process of preparing a formal response regarding the LCEP request, which will be reviewed by the corporate office. Although the permit limits plant discharge, the actual volume of discharge from the mill remains unknown.

- Reuse Reliability
  - Barney Metz stated concerns with the longevity and reliability of the company. LOID has extreme concerns regarding long term source reliability of Clearwater Paper over this Project's planning horizon.
- Reuse Selection
  - Despite the negative rating assigned to the alternative based on relatively high capital cost, the option to supplement Clearwater River Pump Station flows with reuse option was retained as Federal funding may be able to absorb costs of treatment infrastructure.
- Existing System with Supplemental Sweetwater Canyon Well.
  - Clarification regarding MOU Objective 3 – This alternative does not provide resolution of the MOU objective because it continues to rely on the gravity conveyance system located on the reservation.
- Elimination of duplicate (LOID or City) systems was reviewed and discussed.
- Gravity flow from Snake River – Oxbow has approximately the same pool elevation as Mann Lake; therefore a gravity system must feed from at least Brownlee Reservoir to be viable.

#### **Review Evaluation Criteria**

- Evaluation criteria were identified and ranked by the LCEP group during the December workshop for use in alternative screening.
- BOR indicated they are comfortable with discussion to get through December workshop, but are concerned that discussion from prior workshops needs to be included in the study and not rolled up or over summarized.

#### **December Meeting Minute Approval**

- Julia Pierko indicated concern with losing some of the detailed discussion regarding benefits of the criteria options.
- Lesa Stark felt the minutes did not capture the discussion, the methodology, and reasoning, and how the criteria was applied.



- The Tribe supported the BOR comments and requested additional detail and explanations within the final study to capture how alternatives were identified and to explain why an alternative failed to meet the criteria.
- J-U-B will add detail to the meeting minutes regarding discussion and methodology used to identify alternatives. The Tribe and BOR indicated formal comments on the minutes would be submitted.

### Review Action Items

- **City's Intent to Participate-** Jerry Klemm discussed that the City receives information from the LCEP but has chosen not to participate in the meetings. The City of Lewiston stated support for the project and doesn't feel they need to have an active role at this point. This item will be marked as complete on the action item list.
- **Plan of Study Review-** Approval from the BOR has not been received. BOR will provide an email to J-U-B to the effect that they approve the POS as a living document.
- **Release of SRBA Documents-** The BOR and Tribal Attorneys discussed the release of SRBA documents that may or may not aid the appraisal study and how or who should determine if they would be a benefit to this process. Tribal attorneys stated the difference between the SRBA concept and the LCEP concept was to not use Mann Lake as a primary storage and configure separate storage off of the Reservation, as well as to link water supply to the City system. The Carollo report was completed in 2000 during the SRBA process and was/is not confidential. Concerns with SRBA document confidentiality were also discussed:
  - The Tribe indicated that the most pertinent SRBA documents consist of a series of comments on the Carollo report, and comments on comments.
  - The Tribe will discuss the issue with Duane Meacham and determine if there is a way to let J-U-B determine what might be beneficial to the appraisal study.
- The regional perspective and other rural water program priorities will be discussed on Feb. 4, 2011, as they are necessary to address for study completeness.
- **Potential for Reuse from Clearwater Paper-** A statement from Clearwater Paper regarding their interest in the project and potential for reuse has been requested. Per discussion with Clearwater Paper, the statement is in review with upper management and is forthcoming.
- **Public Comment-** BOR has clarified their public participation requirements. A 14-day public comment period will be completed by BOR at the front end of the 90-day appraisal report period. J-U-B is working with LOID to develop a brochure, publish an article in the newspaper, and incorporate information on the website.
  - Jerry Klemm asked if there was a way to track the number of hits to the webpage on LOID's website. Barney Metz will look into this and report back to the group.

- **Clarification Regarding a Regional Watershed Perspective** – This and other Rural Water Program priorities will be addressed by the BOR during the key stakeholder meeting on February 4, to ensure study completeness

### Alternative Summaries

- The Alternative Summaries provided by J-U-B prior to the workshop were reviewed
- **General Comments**
  - BOR requested that Socio-Political screening should be incorporated into each of the alternative summaries. Opinions of cost will not be provided for the alternative summaries selected during the December workshop, only for the identified alternatives selected during the February workshop.
  - The next set of criteria (required for compliance with the Rural Water Program) will be more detailed as more of the alternatives are removed as possible options. There was general discussion regarding addition of social, cultural, and political aspects to the criteria developed during the December workshop.
  - MOU Concept – The Tribe encouraged consistency with the MOU concept whenever possible, as all entities have previously accepted the document as describing the objective/purpose of the parties' effort.
  - Reservoir Losses – There is limited information regarding reservoir losses from Mann Lake. J-U-B indicated that while evaporation and use can be quantified, leakage is a larger issue to estimate due to a lack of available information. At this time, leakage is unknown despite gross attempts by J-U-B to estimate losses. A logical assumption will be applied until the feasibility study is completed. BOR's latest Mann Lake study was stated to be released within a few days, but does not contain an estimate of losses.
  - Power Concerns- It was discussed that Bonneville is looking for power projects that can be integrated with the unpredictability of wind power generation. Wind patterns in this area make generation unpredictable. There was additional discussion that the carbon footprints of the pumping alternatives are larger than the current gravity fed system and that needs to be documented in the report as an important component of the Rural Water Supply Program.
  - Operations of LOP infrastructure under alternative scenarios
    - Members of the LCEP group requested clarification regarding management of various LOP components.
  - Lake Waha Management

- How is the Waha water right currently protected? Currently, landowners take have no water right from Waha, as LOID has the 100% rights on withdrawal from the lake. Although private withdrawals occur, they are not legal.
- If the LOP is decommissioned, several changes would occur with respect to the Lake Waha Water Rights and Management:
  - (1) Water rights need to be protected to prevent new appropriation of water left instream.
  - (2) Diversion of water into the lake would stop.
  - (3) Pumping of water from the Lake would cease.
  - (4) Waha would be fed only by natural springs.
- The Waha Water Right could potentially divert back to the State Department of Lands or be transferred to the Tribe by the State as is described in the MOU. Waha is considered a natural lake and water rights may be held by the State and current land owners.
- Property below the natural high water mark may revert to the State.
- After a brief discussion on this issue it was agreed this issue could be addressed at a later date as part of the feasibility study, as the issue does not impact the alternatives analysis. In other words, it is a constant/identical issue under any alternative that meets the three MOU objectives. It should be flagged as an outstanding issue to be addressed in the feasibility study. The Tribe indicated that the MOU concept includes transfer of all water rights to the Tribe with the lease of those rights to the State Water Bank for application to state-held minimum stream flows and thereby protection from appropriation.
- Soldier's Meadow Management -
  - Tribal management plans of the reservoir are conceptual, as reflected in the MOU, and will not be finalized in the immediate future. They would be resolved during feasibility study.
  - Property interests would likely be transferred from the BOR to the BIA.
- Mann Lake Management
  - It is unclear how various alternative scenarios would impact lake levels.
  - Currently, Mann Lake is utilized to provide fire flow for the City of Lewiston.

- Diversions – the MOU concept assumes removal of the Captain John’s, Webb Creek, and Sweetwater Diversions.
- Pipes and Canals – the MOU assumes abandonment of the collection system piping and canal system.
- Sport Fisheries Management – This is an unresolved issue to be resolved at a later date, most efficiently during feasibility study, through government to government discussion between the Tribe and the State Fish and Game. The MOU concepts are the present placeholder: the core idea is that recreational fishing opportunities at Mann Lake, Soldiers Meadow, and Waha would remain unchanged for all non-Indian or Indian fishermen. Sport fishery management may need to be added to the unresolved issues in the appraisal investigation.
- **Do Nothing Alternative**
  - **Water Reliability** – Due to the impact of historical water restrictions on water demand, the analysis should focus on water “need” not “demand”, as need may likely be higher than demand.
    - During wet years, LOID can meet patron irrigation demands, but during wet years, the demand is lower.
    - During dry years, restrictions are used to manage supply and meet demands, but fall short of meeting needs.
    - Future water availability is unknown due to unpredictable weather and seasonal changes. Water collection changes based a changing climate and unique circumstances of each season.
  - **Cultural Importance** – The cultural significance of the Sweetwater Creek drainage to the Tribe and Nez Perce people should be added to Socio-political screening.
  - **Operations**- The LOP is a gravity fed system and easy to operate as compared with a mechanical system.
  - **Infrastructure**- The infrastructure is in place and capital expenditures are not required to implement the alternative. The Tribe noted that current system costs should be assessed as part of the No-Action alternative.
  - **Silt Accumulation** – Jerry Klemm asked if there was a way to relate silt accumulation under the do-nothing alternative to what could be accumulated in Mann Lake out of the pump station scenarios. He wondered if silt accumulation is an issue in the current system.

- Barney Metz felt silt accumulation is a minor concern but it does exist. Usage of silt settling pond between the canal and inlet to Mann Lake are effective in reducing sediment accumulation.
- **Economics/Expansion of LOID Boundary** – Jerry Klemm asked if a correlation could be made regarding the impact of a static irrigation boundary on local economics and population growth. Does limited water impact the local economy by limiting growth? The appraisal investigation will not consider growth outside the District Boundary as the boundary is set by federal law. In addition, the Board policy is to reject requests for annexation and expansion of the irrigation boundary. The boundary is static, predominantly build-out and cannot be expanded without approval from the federal government. Therefore, the proposed alternatives may not significantly impact the local economy through increased water availability and development outside of the District.
- **Impact Area** – The impact area should be expanded to include Captain John's Creek and the Lapwai Creek drainage. The Lapwai Creek drainage includes Sweetwater Creek, Webb Creek, and the Lower Lapwai drainage.

#### **Clearwater Pump Station-Attenuated System**

- **Project Scope** - The pumping details and water availability has not yet been defined but may be impacted by ESA issues on the Clearwater.
- **Water Rights Clarification**- The concept discussed by the Tribe with IDWR is not transfer of right, but a protection of existing LOP water rights via the state water bank and minimum stream flows, from new appropriation. The net effect of a new project on stream flows in the Clearwater, from IDWR's perspective a single hydrological unit; will be considered by IDWR during the process.
  - ESA/NEPA issues that would be associated with depletion of the Lower Clearwater are anticipated to be addressed by establishing that existing LOP water rights to be protected are larger in quantity than the new Clearwater right; therefore, there would be no net depletion.
  - From conversations with IDWR and the State AG's office, the preferred approach is a new water right due to fewer objections than a transfer process.
  - Zero net loss within the hydrological unit is the preferred approach but is not required by IDWR.
  - Participation in water banking of existing water rights to be left instream has been recommended by conversations with the State as part of the process.



- Tribal attorneys discussed that water rights from Sweetwater may not be transferable. Water is available for appropriation and Idaho Department of Water Resources will look very carefully at the effects of the appropriation.
  - The water right summary provided is not accurate and needs some additional clarification or summary. This will be provided by the Tribe's attorneys based on IDWR conversations.
- **Water Banking-** Use of water banking has been recommended and encouraged during discussion with regulatory agencies.
- **Environmental-** There are unanswered questions for water withdrawals from the Clearwater River. Discussion included the changing flows of the river associated with shut down of Dworshak Reservoir and other seasonal impacts with Steelhead runs. The definition of seasonal flow limitations has not been identified. It generally correlates with late, low season flows. Additional ESA issues may be identified due to impacts of operations on critical habitat in the Clearwater drainage, they are intended to be addressed by a no-net-effect approach based on existing rights protected that are larger in quantity than the new water right.
- **Minimum Flow Criteria of Clearwater River** - From a combined perspective, the percentage of water that would be withdrawn from the river is minor compared to the percentage of water being taken from the Lapwai drainage.
- **Storage-** Does Mann Lake have enough storage to handle periods of shut-down? The feasibility study will address those issues and questions once the ESA issues are defined, and the pumping station can be sized accordingly.
- **Operational Highlights-** Pumping would occur year-round with a period to facilitate shut-down for maintenance and repairs. The lowest demand and reservoir level would occur in December. Reservoir water level fluctuation may be more drastic with the new system especially if used to its full storage capacity. Current carry-over maintained in Mann Lake would no longer be needed as withdrawals from the Clearwater will be more reliable than the surface water system. Reservoir water loss from seepage will become more critical due to pumping costs associated with loss compensation.

#### **Clearwater Pumping Station-On Demand**

- **Mann Lake-** Mann Lake would be eliminated from the system. Associated management of Mann Lake is currently an unresolved issue. The Socio-political impacts of this alternative may need to include loss of recreational site.

#### **Groundwater Supply Alternatives**

- **Lewiston Basin Aquifer-** The Lewiston Basin Aquifer offers good supply and reliability. The eastern aquifer boundary is located somewhere between the LOID Well #4 at Hereth Park and LOID Well #2 at the Filter Plant. Well #2 is in a different aquifer and there are questions

regarding recharge and reliability of that aquifer. The well(s) would be placed on the west side of the District, which is not ideal for connection to existing infrastructure feeding Mann Lake. Despite the apparent reliability of the aquifer, anticipated withdrawals associated with the alternative cause concern due to the potential for long-term aquifer decline and impact to existing wells. At least some of the wells would likely be designed for use as back-up to the LOID domestic supply.

- **Environment-** The alternative has limited environmental impact.
- **Water Quality and Reliability-** The groundwater quality is sufficient for irrigation. Unresolved issues of long-term reliability may be an issue with pulling a large amount of water out of the aquifer over a long period of time.
- **Economics-** Electrical costs would be similar to the Clearwater River pumping costs due to similar water levels. Overall operational costs would also be similar.
- **Sport Fisheries Impact-** Water pumped to Mann Lake may impact fisheries because the groundwater lacks nutrients present in the current water supply. Groundwater temperature on the order of 80-95°F may also impact fisheries.

#### **Groundwater Supply-On Demand System**

- Requires water storage to replace Mann Lake.

#### **City of Lewiston Supply Alternatives**

- **Water Availability-** The City is finishing their Master Plan, and system capacities are therefore unknown. It is reasonable to assume that the LOID irrigation water supply/demand could not be met without significant improvements to the City's existing system. The existing connection between LOID and the City of Lewiston can provide about 1,000 gpm. This is insufficient to meet peak demands.
- **Economics-** Distribution system upgrades will be required to supply the District. The upgrades will be located in residential and commercial areas of existing infrastructure. In addition, water supplied through the City's domestic line must be treated a current cost of 50 cents per 100 cubic feet. Rough calculations indicate that treatment costs alone would add approximately one million dollars per year to the LOID operational budget. To avoid the treatment cost, a separate system for untreated water could be put in place, but this concept would be similar to the Clearwater Pumping Station. The Clearwater Pumping Station would be a less expensive alternative because transmission pipeline would be constructed across farmland rather than through developed property.

#### **Snake River Pump Station Alternatives**

- **Infrastructure** – The pump station location is preliminary, as is the pipe alignment. Additional consideration of these components is required and routing that may be considered. The figure

shows one potential pipeline route located up Tammany Creek Road to feed into the LOID system. Infrastructure placement will need definition if the alternative is retained for consideration at the appraisal level.

- **Operational** – The impacts of Snake River flow augmentation on the alternative should be considered.
- **Water Rights** - The Tribe indicated that the water rights statement provided in the summary is not accurate and should be revised. Per discussion between the Tribe and IDWR, water is available for appropriation from the Snake River, and the Tribe suggested that J-U-B follow-up the discussion with IDWR. LOID indicated that Asotin County PUD is marketing their senior water rights on Snake River, but the rights come at a high price. It is unclear if a senior Washington right can be transferred for use in Idaho. There are more upstream water users with senior rights than on the Clearwater.
- **Water Quality**- Water quality issues may impact maintenance on the pumps but would be sufficient for irrigation purposes.
- **Capital Cost** -Pipe routing work will need more detail if this option is considered viable. Overall project costs are similar to the Clearwater River pumping station.

#### **Water Reuse to Supplement Pumping Station**

- **Clearwater Paper Industrial Wastewater Reuse**- The mill does not appear to be a viable source for reasons discussed during review of the December workshop and recorded above.
- **City of Lewiston Wastewater Treatment Plant Reuse**- Additional treatment would be required with associated chemicals costs.
- Both reuse facilities still would require pumping to get it to Mann Lake, as well as on-going treatment and permitting.
- **Environmental**- There will be impact to sport fisheries in Mann Lake due to constituent concentrations in the wastewater.
- **Public Perception**- It was mentioned the public may have a “yuck” factor which would impact recreation, and may be a difficult “sell” to LOID patrons.

#### **Alternative Screening**

- **Pairwise Process**
  - Risk Assessment Methodology
    - Developed after 9/11 to prioritize infrastructure improvements.

- Pairwise is a methodical way to utilize qualitative and quantitative data to rank, sort and filter various alternatives.
  - 1. Develop and rank evaluation criteria.
  - 2. Evaluate Alternatives with respect to criteria.
- J-U-B demonstrated the process using qualitative information to purchase a car.

#### **LCEP Pairwise Analysis**

- J-U-B proposed a pairwise analysis of the alternatives based on the evaluation criteria identified by the group during the December workshop. These include:
  - 3 MOU Objectives
  - Capital Cost
  - OM&R
  - Environmental

As the alternate identification was completed using 3 MOU objectives, it was proposed that the 3 remaining criteria (Capital cost, OM&R, and Environmental) be utilized to screen the alternatives.

- General Discussion
  - **Socio-Economic Criteria** – BOR initially felt that socio-economic criteria should be considered during the pairwise process in addition to the criteria identified during the December workshop.
  - **Process concerns** – Some members expressed concern over the delineation between a guess and an educated presumption during population of the pairwise matrix. Regardless, it was agreed that the exercise provides a numeric valve for an alternative versus a “gut reaction” elimination. It gives credit to why a particular option was not effective.
  - **Sport Fisheries Management**- The Fish & Game expressed concern that sport fisheries in Mann Lake would be neglected in the proposed comparison.
  - **MOU Objectives**- The MOU weighting is the same but each alternative doesn’t meet each of those needs in an equivalent manner. The ESA issues identified in the MOU are specific to the LOP but may remain an issue for some alternatives.
- **Final Selection**- Ultimately, due to time constraints, BOR and the Tribe proposed that the Environmental Criteria should be removed from the level of the screening process, and that the alternatives should be reviewed based on the comparative Capital and

OM&R costs summary provided by J-U-B. An Environmental Pairwise comparison could not sufficiently capture or differentiate the LCEP group's concerns at this point. The other MOU partners present agreed to proceed in this way at this point in the screening process. The Pairwise analysis was presented, reviewed, & agreed upon by the LCEP group, the final results of which are attached to these minutes. The following alternatives were selected to move ahead for Technical Analysis based on their rank during the pairwise process:

- Clearwater Pumping Station-Attenuated System
- Snake River Pumping Station-Attenuated System
- Groundwater Supply-Attenuated System
- In addition, the Do-Nothing Alternative must be carried forward to provide a baseline for the Rural Water Program.

**April Workshop** – The April Workshop is scheduled for Thursday, April 7, 2011 from 8:30 a.m. to 3:00 p.m.

- Agenda preview for April Workshop – Select alternatives for feasibility report.



**Action Items:**

Complete:	Item:	Workshop:	By:	Deadline	Notes
<input checked="" type="checkbox"/>	Determine the City's intent to participate.	October	Jerry Klemm		See February workshop notes
<input type="checkbox"/>	Review framework for how the report will go together.	October	LCEP Group	11/19/10	Plan of study approval <input checked="" type="checkbox"/> LOID <input checked="" type="checkbox"/> Tribe <input checked="" type="checkbox"/> Chamber <input type="checkbox"/> BOR
<input type="checkbox"/>	Review spreadsheet of prior reports and provide information as requested.	October	LCEP Group		
<input type="checkbox"/>	Determine which reports from the SRBA process can be shared and at what level per discussion with Duane Meacham, solicitor for the Bureau of Reclamation.	October	BOR & Nez Perce Tribe		
<input checked="" type="checkbox"/>	Review alternative summaries prior to February workshop	December	Key Stakeholders	2/3/11	
<input checked="" type="checkbox"/>	Discuss potential for reuse with Clearwater Paper	December	Jerry Klemm		See February workshop notes
<input checked="" type="checkbox"/>	Determine availability of Snake River Water Rights	December	Geoff Whiting		See February workshop notes
<input checked="" type="checkbox"/>	Clarify public participation requirements of Rural Water Program	December	BOR		See February workshop notes
<input type="checkbox"/>	Provide clarification regarding how a regional watershed perspective might be used in the area as part of the analysis	December	BOR	2/4/11	
<input type="checkbox"/>	Provide revisions to the December meeting minutes	February	LCEP Group	2/11/11	<u>Comments Received</u> <input type="checkbox"/> LOID <input type="checkbox"/> Tribe <input type="checkbox"/> BOR
<input type="checkbox"/>	Check website and determine if there is a way to track number of hits to the LCEP page	February	LOID		
<input type="checkbox"/>	Provide Pairwise Analysis for MOU 1 for review by LCEP Group	February	J-U-B		

**Next Meeting: April 7, 2011 8:30 a.m. – 3:00 p.m., Clearwater Region Fish & Game Office**

Please contact J-U-B ENGINEERS immediately if there are any corrections, additions, and/or deletions to the meeting minutes.

## Meeting Attendance:

### MOU Stakeholders:

- ☒ Chandler, Clint - Nez Perce Tribe DRRM
- ☒ Clark, Bob - LOID
- ☒ Cole Hansen, JoAnn - LOID
- ☒ Havens, Doug – Nez Perce County
- ☒ Cummings, Dave - Nez Perce Tribal Attorney
- ☒ Kersich, Al - Nez Perce Tribe
- ☒ Kinzer, Melissa - LOID
- ☒ Klemm, Jerry – Lewiston Chamber of Commerce
- ☒ McGeoghegan, Earl - LOID
- ☒ Metz, Barney - LOID
- ☒ Northrup, Jerry - LOID
- ☐ Taylor, Emmitt - Nez Perce Tribe
- ☐ Williams, Darren - Nez Perce Tribe
- ☒ Whiting, Geoff – Nez Perce Tribe
- ☐ Zenner, Doug – Nez Perce County

### Federal Agencies

- ☒ Brege, Dale - NOAA
- ☐ Faler, Mike - US Fish & Wildlife Service
- ☒ LaFrance, Greg – BIA Northern Idaho Agency
- ☐ Mabe, Dave - NOAA
- ☐ Morigeau, Michael – BIA Northern Idaho Agency
- ☒ Pierko, Julia - Bureau of Reclamation
- ☒ Stark, Lesa - Bureau of Reclamation
- ☐ Turner, Richard - Corps of Engineers

### State/Local Government/Elected Officials

- ☐ Brodie, Katie - Idaho Governors' Office
- ☒ DuPont, Joe - ID Fish & Game
- ☐ Fales, Jason - ID DEQ
- ☐ Hand, Robert – ID Fish & Game
- ☒ Hanna, Mike - Senator Jim Risch's Office
- ☒ Hohle, Janet - Office of Species Conservation
- ☐ Lillibridge, Bill - ID Soil & Water Conservation
- ☐ Sila, Jay - ID Dept of Lands
- ☐ Silvers, Mitch - Senator Crapo's Office
- ☒ Stegner, Peter - Senator Crapo's Office

### Commercial Entities

- ☐ Hagen, Dave - Clearwater Power
- ☐ Pfaff, Doug - Clearwater Power

### Private Landowners

- ☐ Hobbs, Bill - Schaub Ranch
- ☐ Teats, Bert

### Meeting Facilitators:

- ☒ Baune, Cory - J-U-B ENGINEERS, Inc.
- ☐ Ensor, Doug - J-U-B ENGINEERS, Inc.
- ☒ Uptmor, Amy - J-U-B ENGINEERS, Inc.

# LOWER CLEARWATER EXCHANGE PROJECT

**Subject: APRIL WORKSHOP: Alternative Selection – Meeting Minutes**

**Date: April 7, 2011 8:30 a.m. to 3:00 p.m.**

## **Attendees:**

MOU Signatory Attendees:  
(Key Stakeholders)

- ☐ City of Lewiston
- ☒ Lewiston Chamber of Commerce
- ☒ Lewiston Orchards Irrigation District (LOID)
- ☒ Nez Perce County
- ☒ Nez Perce Tribe

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**Purpose of the Meeting:** *Select alternative(s) to move forward within the Feasibility Study.*

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**Introduction:** Cory Baune provided an introduction and asked for an introduction from those in attendance. The meeting was recorded to assist in the preparation of the meeting minutes. No objections to recording the meeting were made.

## **LCEP Purpose**

- Creation of reliable, quality water supply for LOID.
- Permanent resolution of the Endangered Species Act (ESA) issues surrounding the Lewiston Orchards Project (LOP).
- Permanent resolution of Federal-Tribal trust issues surrounding the LOP.

## **Review February Workshop**

- Cory Baune provided a general overview of the meeting and reviewed the information presented.
  - Review Alternative Summaries
  - Screen Alternatives – Criteria
    - MOU Objectives 2 and 3 were satisfied by each alternative and therefore were not evaluated under the PairWise™ process.

- Costs were utilized as the basis of the PairWise™ comparison. A PairWise™ Matrix for both capital and operations and maintenance costs was completed during the workshop.
- The PairWise™ comparison for MOU Objective 1 was completed following the February workshop and distributed to key stakeholders for review and comment.

Criteria	Weighting	Description
<b>MOU Objectives</b>		
Reliable & Quality Water Supply	5	Is the water supply both reliable and of sufficient quantity? Any quality? (Includes Water Rights)
Resolution of ESA Issues	5	Permanent resolution of ESA issues surrounding the Lewiston Orchards Project
Resolution of Tribal Trust	5	Permanent resolution of federal-trust issues surrounding the Lewiston Orchards Project
<b>Cost</b>		
Capital Cost	3	The initial capital cost of the alternative
Operations, Maintenance, and Replacement Cost	5	Annual operation, maintenance, and replacement costs of the alternative

- Screen Alternatives - PairWise™ Comparison
  - The alternatives with the highest score were ranked in order of score with respect to the criteria. The three alternatives with the highest rank were screened for technical analysis.
  - The inclusion of MOU Objective 1 subsequent to the meeting did not alter the ranking of alternatives.

Alternative	MOU 1	OM&R	Capital Cost	Score	Rank
Do Nothing	0	0	0	0	
Clearwater Pumping Station - Attenuated System	155	170	96	421	1
Snake River Pump Station - Attenuated System	140	165	96	401	2
Groundwater Supply - Attenuated System	145	140	84	369	3
Clearwater Pumping Station - On Demand System	110	135	78	323	4
Groundwater Supply - On Demand System	115	115	78	308	5
City of Lewiston Supply - Attenuated System	130	100	63	293	6
Snake River Pump Station - On Demand System	95	125	72	292	7
City of Lewiston Supply - On Demand System	95	80	51	226	8
Water Reuse to Supplement Pumping Station	95	50	30	175	9

- Alternatives for technical analysis
  - Clearwater River Pumping Station – Attenuated System
  - Snake River Pumping Station – Attenuated System
  - Groundwater Supply – Attenuated System

### Housekeeping

- ✓ Plan of Study Approval - BOR
- ✓ Request for Information
- ✓ Release of SRBA Documents
- ✓ Clarification Regarding Regional Watershed Perspective
- ✓ Revisions to December Meeting Minutes



- ✓ PairWise™ Analysis for MOU 1
- ☐ Number of “Hits” on LCEP Page - LOID indicated that the number of hits can be tracked. Activity appears to be concentrated at times when there are key stakeholder discussions. There is no way to quantify how much activity might be from general public, but LOID has not received any calls regarding LCEP efforts. Website activity is therefore assumed to be primarily confined to those involved in the process.

## Appraisal Process

- ✓ Identify Stakeholders (October)
- ✓ Identify Objectives & Constraints (November)
- ✓ Alternative Brainstorm (December)
- ✓ Alternative Identification & Evaluation Criteria (December)
- ✓ Alternative Screening (February)
- ✓ Identify Unresolved Issues
- ☐ Alternative Selection (April)
- ☐ Finalize Draft Study
  - BOR NED Analysis, including Do Nothing Alternative
- ☐ Comment Period
- ☐ Finalize Study
- ☐ BOR Appraisal Report
- Net Economic Development (NED) Analysis – by BOR
  - Reclamation indicated that Steve Piper, an economist from BOR, is prepared to perform the Economic Analysis beginning April 18. The Analysis will be completed per Reclamations “Principles and Guidelines.” It will use methodologies of standard economic practices used by BOR.
  - No Action Alternative – There was extensive discussion regarding the components of the No Action Alternative to be included within the analysis.
    - The Tribe pointed out that project cost of the No Action Alternative should include the cost of the environmental compliance and the Endangered Species

Act. The Tribe will provide a quantification of these costs for use by the Reclamation economist.

- O&M costs of maintenance for the reservoir dams, canal, and pipe structure should be included within the No Action Economic Analysis. Rough costs with clearly delineated assumptions are sufficient for the analysis.
- The Principals and Guidelines (P&G's) are currently being updated to a P&R's document. Subsequent updates to the Appraisal Study must comply with the most recent guidance; the NED may need re-evaluation at a later date to incorporate any changes to the P&G's.
- Incorporate Years of Construction into NED Analysis
- Utilize NPCC Power Cost Projections

### **Rural Water Supply Program (RESP) Objectives**

*"The purpose of an appraisal study investigation is to determine if there is at least one viable alternative that warrants a more detailed investigation through a feasibility study."  
(43 CFR 404.2)*

### **Alternative Identification Summary**

- The alternatives previously underwent extensive review to identify the lowest cost options meeting the three MOU Objectives. Therefore, alternatives are inherently similar and are the most cost effective options for full LOP replacement.

### **Unresolved Issues**

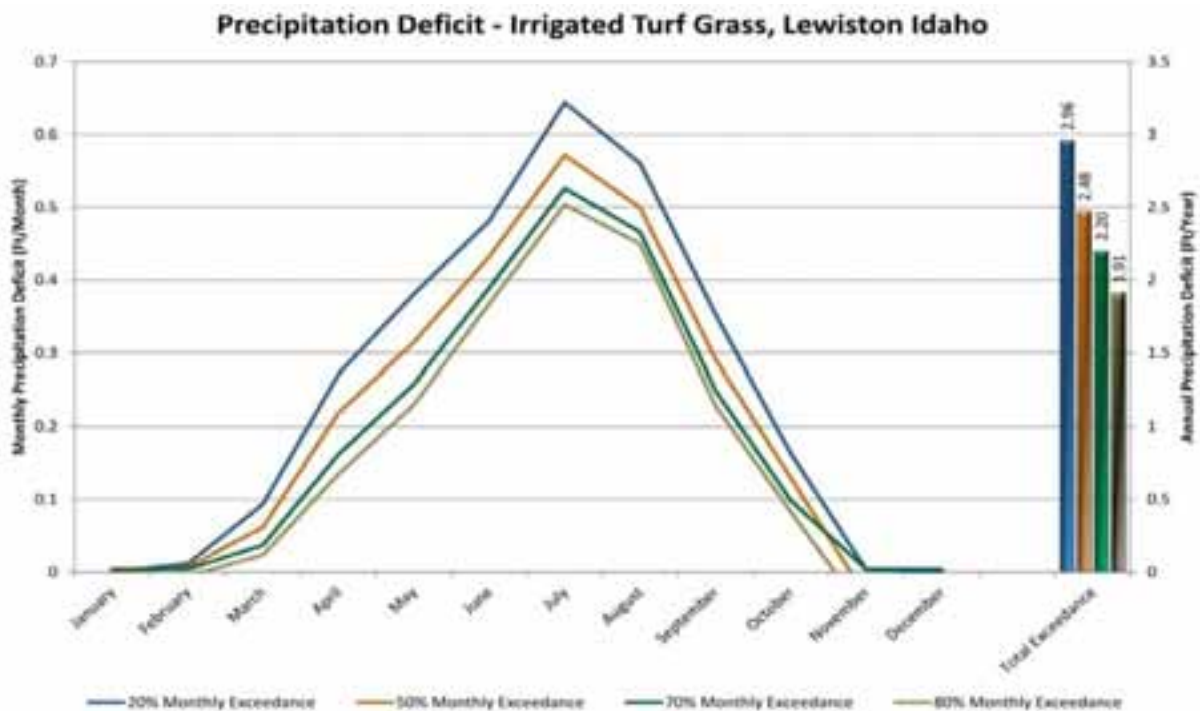
- Unresolved issues are those which will not be resolved within the appraisal process. Some level of assumptions may still be required to complete the economic analysis.
- Decommissioning of LOP Components (diversions, canals and piping, and access roads) – How will this be completed, and what are the impacts?
  - The Tribe described the MOU concept:
    - Soldier's Meadow Reservoir will remain.
    - Water would not be diverted from Captain John's Creek, Webb Creek, or Sweetwater Creek.
  - The concept is subject to change as the project develops, but can be used as the basis of assumptions as required for the Appraisal Study.

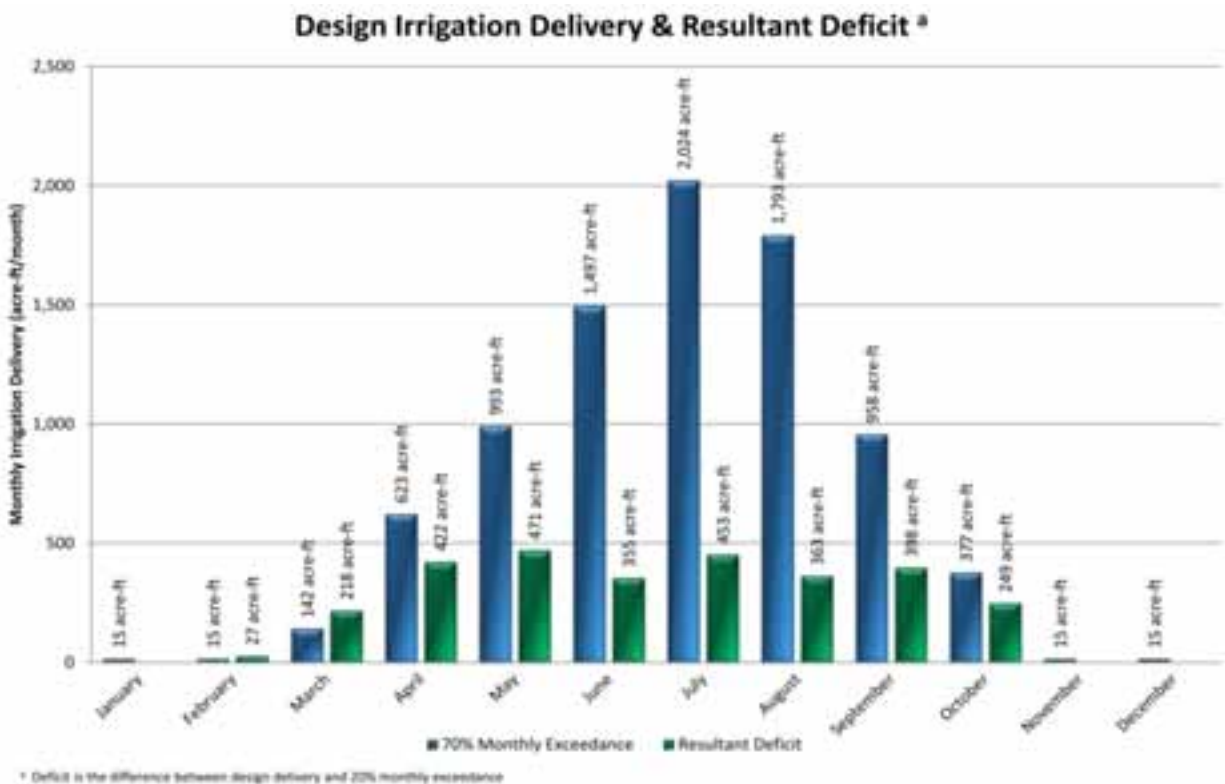
- NED Impacts – Appraisal Study – Reclamation suggested that although the cost of decommissioning is similar for all alternatives, leaving the cost out of the analysis may be problematic and skew results as compared with the No Action Alternative.
- Sport Fisheries Management (Soldier's Meadow, Waha Lake, Mann Lake)
  - Idaho Fish and Game discussed the economic benefits of fisheries at Soldier's Meadow. It was felt that some level of benefit would be provided if the reservoir was operated at a higher water level to benefit fisheries as opposed to historical operations for irrigation delivery. The Tribe indicated that although management strategies are in preliminary stages, the reservoir would likely be operated to optimize downstream resident fisheries, and not sport fisheries within the reservoir itself.
  - The assumption is for no significant change in sport fisheries management following implementation of the LCEP. Under this assumption, economic costs are not required; there is no difference between the "No Action" and "Identified" Alternatives.
- Title Transfer – (Soldier's Meadow, Mann Lake Captain John Diversion, Webb Fork Diversion, Lake Waha, canals, and roads)
  - There are no significant costs associated with the title transfer process; therefore, economic costs are not required with respect to these components.
  - Other land ownerships – LOID indicated there is property within the Craig Mountain area that was acquired by LOID after the 1947 agreement with BOR. This property will remain und LOID ownership.
- Operations, maintenance, and replacement costs of the LOP components analyzed und the NED will not consider who pays what prior to or following title transfer. For example, the cost of maintenance for the Soldier's Meadow dam is considered a "wash" between the "No Action" and "Identified" alternatives, because maintenance requirements are identical under the Safety of Dams Act, regardless of the responsible agency.
- County Road Maintenance over Soldier's Meadow Reservoir – The County currently maintains the road under agreement with BOR; following title transfer, the County would maintain the road under a new agreement with the controlling agency.
- Private Landowner Right-of-Way – Private landowner right-of-way would remain following title transfer. BOR right-of-way may be eliminated following title transfer.
- Protection of Existing Water Rights (Lake Waha, Sweetwater creek, Webb Creek, Captain John Creek).

- There was discussion regarding the need to quantify the benefits of these water rights for the economic analysis. The Tribe felt that the LCEP will benefit steam flows, thereby providing an economic benefit. Reclamation will discuss this with the economist and identify if the costs should be quantified.
- Mann Lake Management – An agreement will be developed within the Feasibility Study between the Tribe and LOID to continue to store water within the reservoir.
- Although Mann Lake provides economic benefits to the LCEP, the benefit is captured within the costs portion of the technical analysis. Operations, maintenance, and replacement costs should also be included for the dam.

### Common Technical Elements

- Annual Irrigation Supply – 8,500 acre-ft = 2.2 ft/acre. Analysis completed to determine how this compares with commonly accepted design guidelines:
  - Analysis completed for irrigated turf grass which is representative of the Orchards area.
  - 2.2 ft. correlates with a 70% exceedance period – seven years of ten a deficit will remain, three years of ten the consumptive use of the grass is satisfied.
  - Supply assumption does not exceed design guidelines, and a deficit will remain.





- No adjustment was made to account for impervious surfaces within the District.
- Mann Lake Storage
  - The original capacity of Mann Lake was 3,000 acre-ft. This was reduced in 1999 to 1,960 acre-ft. following the Safety of Dams Act. The water level restriction was temporarily raised in 2010 to 2,440 acre-ft.
  - The LCEP analysis uses the more conservative value of 1,960 acre-ft.
  - Impacts to Analysis:
    - No impact to pipe size
    - 20% greater horsepower is required then the higher storage volume of 2,440 acre-ft. This requires the addition of an additional pump and appurtenant equipment which are negligible costs at this level of analysis.
    - If the storage had impacted the penstock pipe size from the river, this would impact the technical analysis.
    - 2009 Clearwater Pumping Study – The Tribe noted that within the previous report, the differences in Mann Lake storage had a significant impact on project



costs. J-U-B clarified that the 2009 study was predicated under operational scenarios of 2,000 to 3,000 acre-ft. of storage, and therefore used different design criteria. The 2009 study reported a significant difference in costs between the two scenarios because the design criteria resulted in a difference of required penstock size.

- Feasibility Study – The level of storage within Mann Lake will be more critical during the Feasibility Study.
- Dam Safety Report – The Tribe requested a copy of the report, discussed at the February workshop as nearly final. Reclamation indicated they would look into what reports can be released and what reports currently remain in the draft stage.
  - LOID indicated that the performance of the dam under the first year of increased storage was not ideal. Due to wet weather patterns, the reservoir was operated a full pool for a longer period of time than anticipated. There was extensive leakage behind the dam. LOID explained that although there are no concerns with the integrity of the secondary dam, both Reclamation and LOID have legitimate concerns regarding long-term operations of the reservoir at full pool. It is a high hazard dam and performance evaluations will continue by Reclamation and LOID staff.
  - The Tribe feels that there are deficiencies within the original dam safety report and indicated concern that these deficiencies may have not been addressed. The Tribe also indicated that they have a right to any available information on the dam as they consider title transfer of the reservoir.
- Fire Storage – The technical analysis was completed based on continued provision of 500 acre-ft. of storage per the City/LOID agreement.
  - The history behind this contract is unknown.
  - 500 acre-ft. is a significant volume of water for a City the size of Lewiston.
  - J-U-B discussed that it would be premature to arbitrary to reduce the volume of water reserved for fire flow from the current contract. Unknowns such as the design of the outlet structure and the ability to draw down the lake impact fire service potential.
  - This issue will be flagged for further review within the Feasibility Study.
- Evaporation and Leakage – Evaporation and leakage from Mann Lake is unknown, but has ranged from 1,800 acre-ft. reported in a 1966 CH2M report to 402 acre-ft. in 1985 which was reported in a 1992 MK study. Recent LOID data indicates current evaporation and leakage on the order of 500 acre-ft., which was used as the basis for the Appraisal Study.

- Impacts – Evaporation and leakage do not impact supply and will serve to reduce the volume of delivery to District patrons only. Other impacts to delivery include pipe losses within the distribution system.
- Design Criteria Summary

Description	Value
Annual Irrigation Supply	8,500 acre-ft (2.2 ft/acre)
Monthly Irrigation Delivery	Per Figure
Mann Lake Storage	1,960 acre-ft
Fire Storage	500 acre-ft
Evaporation and Leakage	500 acre-ft/yr

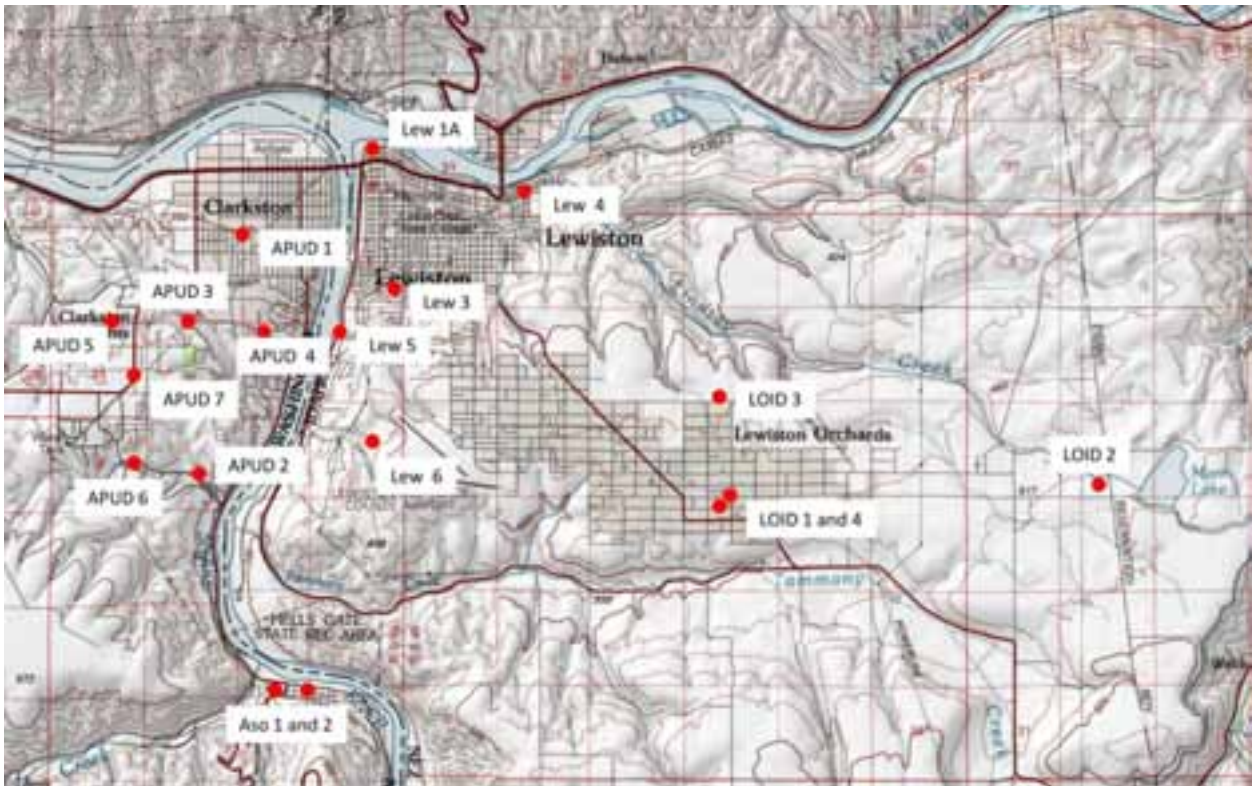
### Snake River Pumping Station

- General
  - Power Supply by Avista – Power rate projections have not been available.
  - Direct connection to middle of system allows better pressure and service during high demands.
    - Use distribution system to feed back and fill Mann Lake during periods of lower demand.
    - Concept to pump to Zone 2 and boost to Zone 1 and fill Mann Lake as required did not show an economic benefit as compared to pumping all flows to Zone 1.
  - Fish screening – NOAA suggested that J-U-B discuss fish screening and standards with Jeff Brown.
  - Feasibility Level Issues
    - Environmental Mitigation
    - Property and Right-of-Way Acquisition
    - Permitting
    - Mann Lake Storage
    - Mann Lake Leakage

- Southport Avenue Route
  - Shortest, most direct route to LOID system.
  - Quicker elevation rise correlates with less high pressure pipe.
  - Pipeline installed across dams on top of ground.
  - Considerations for rock blasting and excavations have been included but are preliminary as no geotechnical evaluation has been completed.
  - Requires more extensive landowner coordination where pipe is not installed within county road right-of-way.
  - Airport building restrictions may limit development potential within the area to the benefit of the project.
- Tammany Creek Road Pipe Route
  - Requires more, higher class pipe.
  - Construction completed within road right-of-way.

#### **Tammany Creek Groundwater Well Field**

- General – Hydrogeologic Summary – Lewiston Basin Aquifer (Dr. Dale Ralston).
  - The Lewiston Basin Aquifer is a highly productive and reliable aquifer.
  - Hydraulic connections between rivers and aquifers:
    - Snake River – Near Chief Timothy
    - Snake River – South of Asotin
  - Significant Users of the Aquifer (Figure on following page)
    - Asotin County PUD
    - City of Lewiston
    - LOID
  - History
    - LOID – started using groundwater for domestic use in 1980's.



- Asotin County PUD is withdrawing less water than in the past; this was attributed by Tim Simpson to the transition of the area from agriculture to residential use.
- Proposed Withdrawal, LCEP = 2,700 Million Gallons.
  - Long-term Aquifer drawdown anticipated at less than 30 ft.
  - Long-term Aquifer response unknown – the siltation of Lower Granite Pool has potential to impact aquifer recharge.
  - Target well depth is 200 ft. below sea level.

### Clearwater River Pumping Station

- General
  - Power supply by Clearwater Power.
  - Pipe Route – Follows Lapwai Road.
  - Requires piping upgrades for an equivalent system to Snake River and Well Field Alternatives.

- Powers Avenue Pipeline currently limits distribution capacity.
- Equivalent system facilitates economic comparison due to equivalent level of service. Turf grass is not a valued crop and a quantified economic benefit is therefore difficult to assess.
- Without upgrade, District may still require restrictions to manage peak delivery.
- Feasibility level issues
  - Environmental Mitigation
  - Property and Right-of-Way Acquisition
  - Permitting
  - Mann Lake Storage
  - Mann Lake Leakage

### **Cultural Resources Review**

- Completed by Nez Perce Tribe Cultural Resources Program.
  - Investigated previously documented sites.
    - SHPO Record Search
    - THPO Record Search
    - NRHP Online Database
    - Government Land Office Plat Maps
    - Windshield Survey
  - Cultural resource findings with respect to survey:
    - Five Historical Sites
    - 14 Archaeological Sites
    - Due to sensitive nature of cultural resources, there may be some areas that are not publicly disclosed, but may be communicated directly to Reclamation.
  - Feasibility Level Issues.



- Complete cultural resource studies including inventory surveys of archaeological and historical properties, and traditional cultural properties.

### Preliminary Capital Costs

- Preliminary Capital Costs were presented:

Alternative	Preliminary Capital Costs (Year 2011 Costs - \$ Million)		
	Construction	Non-Construction	Total
Snake River			
Southport Avenue	\$ 10.6	\$ 4.4	\$ 15.0
Tammany Creek Road	\$ 14.2	\$ 5.8	\$ 20.0
Groundwater Wells	\$ 19.0	\$ 7.5	\$ 26.5
Clearwater River	\$ 13.2	\$ 5.3	\$ 18.5

### Alternative Selection

- The purpose of an appraisal study investigation is to determine if there is at least one viable alternative that warrants a more detailed investigation through a feasibility study.
- Reclamation recommended leaving all viable alternatives on the table for consideration during feasibility

### Schedule

Draft Appraisal for Review and Comment	May 2 – May 20
Submit Final Appraisal Investigation to BOR	June 1
BOR Appraisal Report	June 1 – October 19

**Action Items:**

Complete:	Item:	Workshop:	By:	Deadline	Notes
<input checked="" type="checkbox"/>	Determine the City's intent to participate.	October	Jerry Klemm		See February workshop notes
<input checked="" type="checkbox"/>	Review framework for how the report will go together.	October	LCEP Group	11/19/10	Plan of study approval <input checked="" type="checkbox"/> LOID <input checked="" type="checkbox"/> Tribe <input checked="" type="checkbox"/> Chamber <input checked="" type="checkbox"/> BOR
<input checked="" type="checkbox"/>	Review spreadsheet of prior reports and provide information as requested.	October	LCEP Group		
<input checked="" type="checkbox"/>	Determine which reports from the SRBA process can be shared and at what level per discussion with Duane Meacham, solicitor for the Bureau of Reclamation.	October	BOR & Nez Perce Tribe		
<input checked="" type="checkbox"/>	Review alternative summaries prior to February workshop	December	Key Stakeholders	2/3/11	
<input checked="" type="checkbox"/>	Discuss potential for reuse with Clearwater Paper	December	Jerry Klemm		See February workshop notes
<input checked="" type="checkbox"/>	Determine availability of Snake River Water Rights	December	Geoff Whiting		See February workshop notes
<input checked="" type="checkbox"/>	Clarify public participation requirements of Rural Water Program	December	BOR		See February workshop notes
<input type="checkbox"/>	Provide clarification regarding how a regional watershed perspective might be used in the area as part of the analysis	December	BOR	2/4/11	
<input type="checkbox"/>	Provide revisions to the December meeting minutes	February	LCEP Group	2/11/11	<u>Comments Received</u> <input checked="" type="checkbox"/> LOID <input checked="" type="checkbox"/> Tribe <input checked="" type="checkbox"/> BOR
<input type="checkbox"/>	Check website and determine if there is a way to track number of hits to the LCEP page	February	LOID		
<input type="checkbox"/>	Provide Pairwise Analysis for MOU 1 for review by LCEP Group	February	J-U-B		
<input type="checkbox"/>	Provide Website Activity Summary to LCEP Group	April	LOID		
<input type="checkbox"/>	Quantify annual environmental cost of compliance associated with the "No Action" Alternative	April	Tribe	4/15/11	
<input type="checkbox"/>	Identify if the benefits of water right protection should be quantified within the economic analysis	April	BOR	4/15/11	
<input type="checkbox"/>	Report of District water conservation efforts	April	LOID		
<input type="checkbox"/>	Identify scope and status of available reports regarding Mann Lake	April	BOR		
<input type="checkbox"/>	Discuss planned fish screening devices with Jeff Brown/NOAA	April	J-U-B		
<input type="checkbox"/>	Identify study deadlines and reviews with City and County to identify critical dates and timeframes	April	Jerry Klemm		

## Meeting Attendance:

### MOU Stakeholders:

- ☐ Chandler, Clint - Nez Perce Tribe DRRM
- ☒ Clark, Bob - LOID
- ☒ Cole Hansen, JoAnn - LOID
- ☒ Havens, Doug – Nez Perce County
- ☒ Cummings, Dave - Nez Perce Tribal Attorney
- ☒ Kersich, Al - Nez Perce Tribe
- ☒ Kinzer, Melissa - LOID
- ☒ Klemm, Jerry – Lewiston Chamber of Commerce
- ☒ McGeoghegan, Earl - LOID
- ☒ Metz, Barney - LOID
- ☒ Northrup, Jerry - LOID
- ☒ Taylor, Emmitt - Nez Perce Tribe
- ☐ Williams, Darren - Nez Perce Tribe
- ☒ Whiting, Geoff – Nez Perce Tribe
- ☐ Zenner, Doug – Nez Perce County

### Federal Agencies

- ☒ Brege, Dale - NOAA
- ☐ Faler, Mike - US Fish & Wildlife Service
- ☐ LaFrance, Greg – BIA Northern Idaho Agency
- ☐ Mabe, Dave - NOAA
- ☐ Morigeau, Michael – BIA Northern Idaho Agency
- ☒ Pierko, Julia - Bureau of Reclamation
- ☐ Stark, Lesa - Bureau of Reclamation
- ☐ Turner, Richard - Corps of Engineers

### State/Local Government/Elected Officials

- ☐ Brodie, Katie - Idaho Governors' Office
- ☒ Carlton, Scott – Congressman Labrador
- ☒ DuPont, Joe - ID Fish & Game
- ☐ Fales, Jason - ID DEQ
- ☐ Hand, Robert – ID Fish & Game
- ☒ Hanna, Mike - Senator Jim Risch's Office
- ☒ Hohle, Janet - Office of Species Conservation
- ☐ Lillibridge, Bill - ID Soil & Water Conservation
- ☐ Sila, Jay - ID Dept of Lands
- ☒ Silvers, Mitch - Senator Crapo's Office
- ☒ Stegner, Peter - Senator Crapo's Office

### Commercial Entities

- ☐ Hagen, Dave - Clearwater Power
- ☐ Pfaff, Doug - Clearwater Power

### Private Landowners

- ☐ Hobbs, Bill - Schaub Ranch
- ☐ Teats, Bert

### Meeting Facilitators:

- ☒ Baune, Cory - J-U-B ENGINEERS, Inc.
- ☐ Ensor, Doug - J-U-B ENGINEERS, Inc.
- ☒ Uptmor, Amy - J-U-B ENGINEERS, Inc.
- ☒ Weatherly, Gary - J-U-B ENGINEERS, Inc.

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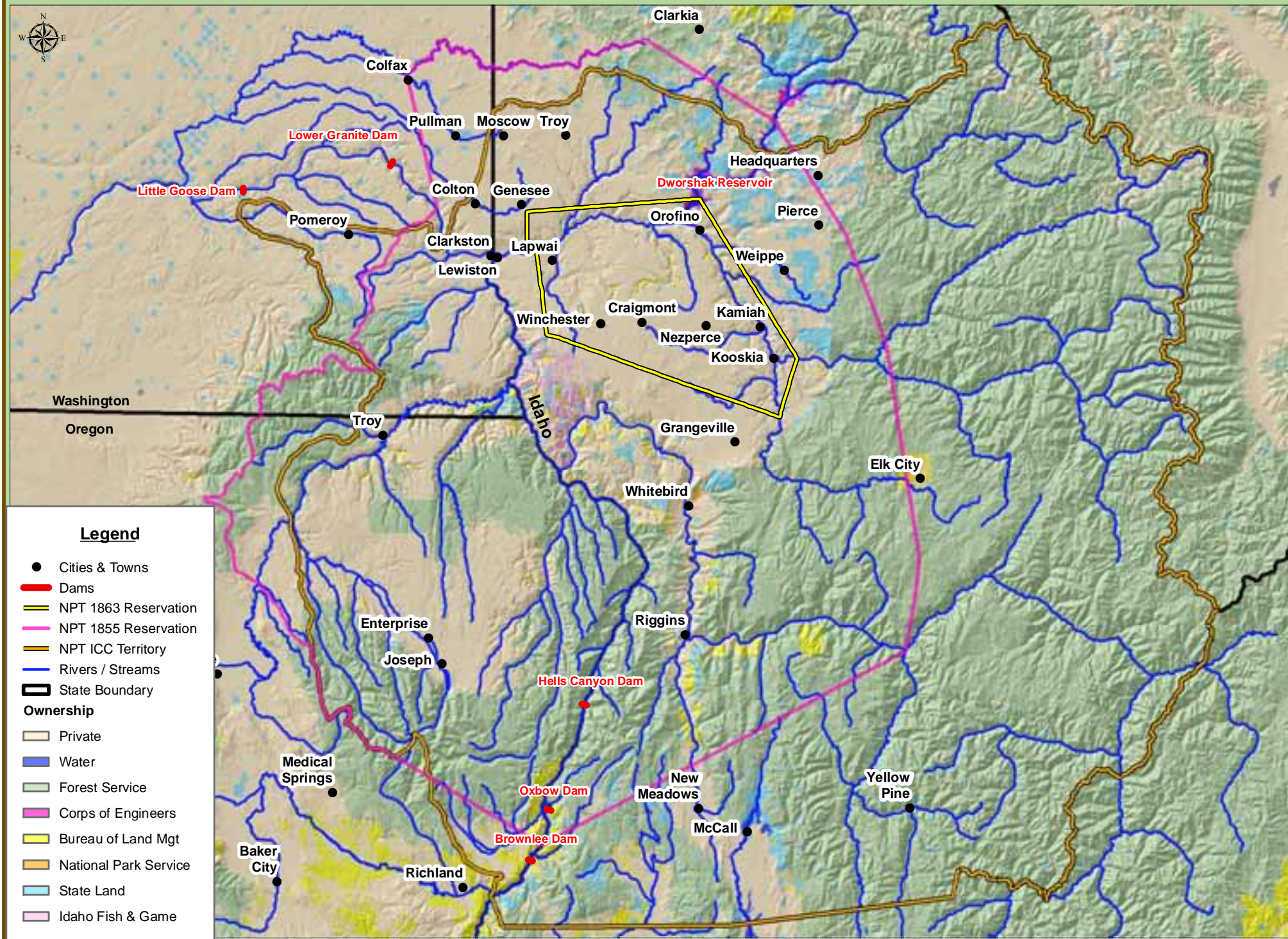
# ***APPENDIX C***

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## **Nez Perce Tribal Territory**



# Territory of the Nez Perce Tribe



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# ***APPENDIX D***

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## **Alternative Identification**



## Alternative Identification

Initial Identification - The following methodology was utilized to identify alternatives to the most viable options. The subsequent matrix was populated by the LCEP group. Any alternatives which were designed “Not Effective” for one of three MOU objectives were eliminated. Eighteen options remained following the initial screening, and were not evaluated during the secondary identification.



Not Effective



Potentially Effective



Effective

Secondary Identification – Discussion included removing options that could be eliminated based on other criteria to rank the remaining options. Final screening was completed through a broad review of relative capital costs based on the following methodology. Those options with a relatively high capital cost were eliminated; eleven options were selected following the secondary identification process.



Negative (Expensive)

The alternative has a relatively high capital cost



















Neutral





















The alternative has a mid-range capital cost



















Positive (Inexpensive)









The alternative has a relatively low capital cost

Alternative	Initial Identification			Secondary Identification
	MOU Objective 1 Reliable Quality Water Supply	MOU Objective 2 Permanent Resolution of ESA Issues	MOU Objective 3 Permanent Resolution of Federal-Tribal Trust Issues	Gross Comparative Capital Cost
<b>Do Nothing</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Not effective, system historically uses restrictions to manage a finite supply.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – Infrastructure is in place and operational. An effective, low cost option.</li> </ul>			
<b>Clearwater River Pumping Station - Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from the Clearwater to serve the system.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The Clearwater Pump Station, Attenuated System serves as the baseline for gross capital costs evaluation. Cost is therefore equivalent.</li> <li>NOTE: This raises additional questions and assumptions regarding NOAA and Marine Fisheries concerns over the effects of withdrawals from the Clearwater River.</li> </ul>			
<b>Clearwater River Pumping Station – On Demand System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from the Clearwater to serve the system. The on-demand system will be slightly less reliable than an attenuated system due to the impact of an extended shut-down period, but overall, the alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative will require larger pumps, larger transmission pipeline, and additional storage as compared with the Clearwater Pump Station, Attenuated System. From a gross cost analysis, however, capital costs will be equivalent.</li> <li>NOTE: This raises additional questions and assumptions regarding NOAA and Marine Fisheries concerns over the effects of withdrawals from the Clearwater River</li> </ul>			
<b>Groundwater Supply - Attenuated</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Wells located in the highly productive Lewiston Basin Aquifer could meet irrigation demands. The long-term impacts of this magnitude of pumping on aquifer recharge are unknown, but overall, this alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping station, Attenuated System.</li> </ul>			







Alternative	Initial Identification			Secondary Identification
Groundwater Supply – On Demand System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Wells located in the highly productive Lewiston Basin Aquifer could meet irrigation demands. The long-term impacts of this magnitude of pumping on aquifer recharge are unknown, but overall, this alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping station, Attenuated System.</li> </ul>			
City of Lewiston Supply - Attenuated System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective due to questions regarding available capacity to supply LOID water needs.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping Station, Attenuated System. The City would likely use the same source, the Clearwater River. Distribution and system capacity upgrades would be required.</li> </ul>			
City of Lewiston Supply – On Demand System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective due to questions regarding available capacity to supply LOID water needs.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping Station, Attenuated System. The City would likely use the same source, the Clearwater River. Distribution and system capacity upgrades would be required.</li> </ul>			
Snake River Supply - Attenuated System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective, the impacts of the adjudication process on the Lower Snake River are unknown. If water rights are available, this alternative becomes a viable option.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative may require more transmission pipe than the Clearwater option, but can likely be connected within the distribution system. The existing pipe could be used to back-feed Mann Lake. From a gross cost analysis, capital costs will be equivalent.</li> <li>NOTE: Water temperatures from the Snake River are warmer than the Clearwater River.</li> </ul>			
Snake River – On Demand System				
















Alternative	Initial Identification			Secondary Identification
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective, the impacts of the adjudication process on the Lower Snake River are unknown. If water rights are available, this alternative becomes a viable option.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative may require more transmission pipe than the Clearwater option, but can likely be connected within the distribution system. The existing pipe could be used to back-feed Mann Lake. The alternative will require larger pumps, larger transmission pipeline, and additional storage as compared with the Clearwater Pump Station, Attenuated System. From a gross comparative cost analysis, capital costs will be equivalent</li> </ul>			
Clearwater Paper Corporation Reuse - Attenuated System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 - Concerns were discussed regarding dependency on a company that could go out of business. Additional concern was raised regarding water quality issues, and supply dependability. Discussion is required with Clearwater Paper to identify available water and discharge permit issues. What are the ramifications to Clearwater Paper if LOID cannot accept all annual discharge? What are reliability issues associated with mill shutdown periods? Overall, the alternative is potentially effective pending answers to these questions.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater.</li> <li>Capital Cost – Requires industrial wastewater treatment and significant infrastructure, in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. There may be potential for a partnering opportunity with Clearwater Paper if they have discharge permit issues. There is also potential for federal funding assistance. Regardless, of assistance opportunities, the overall capital cost is higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			
Clearwater Paper Corporation Reuse				










Alternative	Initial Identification			Secondary Identification
<b>Supplemented with a Clearwater Pumping Station</b>	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. The quantity of available wastewater for reuse from Clearwater Paper remains unknown. Concerns remain regarding water quality and supply dependability issues associated with Clearwater Paper; therefore, this alternative is potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater.</li> <li>Capital Cost – Requires industrial wastewater treatment and significant infrastructure, in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. There may be potential for a partnering opportunity with Clearwater Paper if they have discharge permit issues. There is also potential for federal funding assistance. The alternative requires construction of duplicated infrastructure to treat industrial wastewater and pump from the Clearwater. Overall, capital cost is high as compared to the Clearwater Pump Station, Attenuated System.</li> <li>NOTE: Despite expensive capital costs, this alternative was retained due to potential funding opportunities associated with the alternative.</li> </ul>			
<b>City of Lewiston WWTP Reuse – Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The available flows from the City WWTP are unknown. Although it is unlikely there is sufficient wastewater to meet the needs of LOID, this alternative is ranked as potentially effective until additional information from the City is obtained. In addition, there are water quality concerns associated with treated wastewater. It is unknown if the City has any discharge permit issues.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with municipal wastewater.</li> <li>Capital Cost - Requires municipal wastewater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction will be more extensive to route flows to Mann Lake. There is potential for federal funding assistance, but regardless of this opportunity, the overall capital cost is grossly higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			
<b>City of Lewiston WWTP Reuse Supplemented</b>				


















Alternative	Initial Identification			Secondary Identification
with a Clearwater Pumping Station	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. The quantity of available wastewater for reuse from the City WWTP remains unknown. There are additional concerns regarding water quality. The alternative is therefore potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with municipal wastewater.</li> <li>Capital Cost - Requires municipal wastewater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction will be more extensive to route flows to Mann Lake. The alternative requires construction of duplicate infrastructure to treat municipal wastewater and pump from the Clearwater. Overall, capital cost is high as compared to the Clearwater Pump Station, Attenuated System alone.</li> <li>NOTE: Despite expensive capital costs, this alternative was retained due to potential funding opportunities associated with alternative.</li> </ul>			
Stormwater Capture and Reuse				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Due to unknowns associated with the alternative, it is rated as potentially effective. It is unlikely that the existing stormwater system produces enough discharge to meet irrigation demands. Limited precipitation may be problematic. During wet weather periods when more water is available, there is a lower irrigation requirement, and vice-versa. Water quality is also a concern.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with treated stormwater.</li> <li>Capital Cost - Costs would be significant to capture and treat stormwater.</li> </ul>			
Clearwater Pumping Station Supplemented				


























Alternative	Initial Identification			Secondary Identification
<b>with Stormwater Capture and Reuse</b>	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. Timing of this shut-down is likely to occur during low season flow periods typically associated with limited precipitation. Supplementation of the Clearwater Pump Station with stormwater capture and reuse may not provide a reliable water supply for the District. The alternative is therefore potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with treated stormwater.</li> <li>Capital Cost – Requires stormwater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction to route flows to Mann Lake would be extensive; therefore, the overall capital cost is grossly higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			
<b>Sweetwater Canal Rehabilitation</b>				Not evaluated
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective pending the impact of rehabilitation on canal leakage. There is potential that associated efforts could off-set water designated for ESA flows and climate conditions.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>New Reservoir B Dam and Reservoir</b>				Not evaluated
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			

Alternative	Initial Identification			Secondary Identification
<b>Increase Lake Waha Pumping</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• MOU Objective 1 –The alternative is not effective in providing a reliable water supply for LOID, as it does not provide a new water source or additional storage.</li> <li>• MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>• MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>• Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>New Lake Waha Outlet Structure</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• MOU Objective 1 - This alternative is not effective in providing a reliable water supply for LOID, as it does not provide a new water source or additional storage.</li> <li>• MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>• MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>• Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Increase Capacity in Soldier's Meadow Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – The alternative if potentially effective in providing a reliable water supply through increased capacity that could be utilized during periods when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</li> <li>• MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>• MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>• Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Zenner Meadow Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – The alternative is potentially effective by providing additional storage which could be utilized when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</li> <li>• MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>• MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>• Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Water Conservation</b>				Not evaluated.

















Alternative	Initial Identification			Secondary Identification
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective depending on the effectiveness of a water conservation program to reduce system demands. Available supply would remain a function of climate conditions and minimum stream flows.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> <li>NOTE: Water conservation is encouraged as an element to all the alternatives.</li> </ul>			
<b>Existing System with Supplemental Groundwater Wells</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative would be effective by utilizing supplemental wells to off-set supply deficiencies associated with climatic conditions and minimum in-stream flows.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Clearwater Pumping Station to Supplement the Existing System</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative would be effective by utilizing the Clearwater Pump Station to supplement the existing system.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Existing System with Supplemental Sweetwater Canyon Well</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective at providing a reliable water supply, pending the impact of future climatic conditions on surface water collection.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			









Alternative	Initial Identification			Secondary Identification
<b>Eliminate LOID</b>				
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – Currently the City of Lewiston’s infrastructure cannot meet the LOID irrigation demands. The City would need to expand their infrastructure. The alternative is therefore potentially effective.</li> <li>• MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>• MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>• Capital Cost – Expensive due to additional infrastructure required for domestic water treatment.</li> </ul>			
<b>Reservoir C in Howard Canyon</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• MOU Objective 1 - This option is the same concept as Reservoir B, except the reservoir is located off the Reservation. Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>• MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>• MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>• Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Deer Creek Reservoir and Pump Station</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – The alternative is potentially effective by providing additional storage which could be utilized when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</li> <li>• MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>• MOU Objective 3 – Not effective, this alternative is expansion of the LOP and is not acceptable to the Tribe.</li> <li>• Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost</li> </ul>			
<b>Dworshak Reservoir Supply</b>				
	<ul style="list-style-type: none"> <li>• MOU Objective 1 – Effective, sufficient water is available from Dworshak Reservoir to meet LOID needs. Water quality is acceptable for irrigation.</li> <li>• MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>• MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>• Capital Cost – Expensive, the alternative requires significant pipeline to convey water to Mann Lake, and must cross several significant drainages.</li> </ul>			
<b>Webb Creek Reservoir</b>				Not evaluated.









Alternative	Initial Identification			Secondary Identification
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
Sweetwater Creek Reservoir				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
Clearwater Paper Reuse and City of Lewiston WWTP Reuse				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective, although the alternative partially relies on supply from a private entity that may not exist in the future. There are additional concerns regarding water quality issues associated with both sources.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – Expensive, requires industrial wastewater and municipal wastewater treatment infrastructure in addition to similar pumping requirements of the Clearwater River Pump Station. Wastewater must be conveyed from two separate locations with significant piping.</li> </ul>			









Alternative	Initial Identification			Secondary Identification
	MOU Objective 1  Reliable Quality Water Supply	MOU Objective 2  Permanent Resolution of ESA Issues	MOU Objective 3  Permanent Resolution of Federal-Tribal Trust Issues	Gross Comparative Capital Cost
<b>Do Nothing</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Not effective, system historically uses restrictions to manage a finite supply.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – Infrastructure is in place and operational. An effective, low cost option.</li> </ul>			
<b>Clearwater River Pumping Station - Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from the Clearwater to serve the system.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The Clearwater Pump Station, Attenuated System serves as the baseline for gross capital costs evaluation. Cost is therefore equivalent.</li> <li>NOTE: This raises additional questions and assumptions regarding NOAA and Marine Fisheries concerns over the effects of withdrawals from the Clearwater River.</li> </ul>			
<b>Clearwater River Pumping Station – On Demand System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from the Clearwater to serve the system. The on-demand system will be slightly less reliable than an attenuated system due to the impact of an extended shut-down period, but overall, the alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative will require larger pumps, larger transmission pipeline, and additional storage as compared with the Clearwater Pump Station, Attenuated System. From a gross cost analysis, however, capital costs will be equivalent.</li> <li>NOTE: This raises additional questions and assumptions regarding NOAA and Marine Fisheries concerns over the effects of withdrawals from the Clearwater River</li> </ul>			
<b>Groundwater Supply - Attenuated</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Wells located in the highly productive Lewiston Basin Aquifer could meet irrigation demands. The long-term impacts of this magnitude of pumping on aquifer recharge are unknown, but overall, this alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping station, Attenuated System.</li> </ul>			

























Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
<b>Groundwater Supply – On Demand System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Wells located in the highly productive Lewiston Basin Aquifer could meet irrigation demands. The long-term impacts of this magnitude of pumping on aquifer recharge are unknown, but overall, this alternative is effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping station, Attenuated System.</li> </ul>			
<b>City of Lewiston Supply - Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective due to questions regarding available capacity to supply LOID water needs.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping Station, Attenuated System. The City would likely use the same source, the Clearwater River. Distribution and system capacity upgrades would be required.</li> </ul>			
<b>City of Lewiston Supply – On Demand System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective due to questions regarding available capacity to supply LOID water needs.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The capital cost on a gross scale is equivalent to the Clearwater Pumping Station, Attenuated System. The City would likely use the same source, the Clearwater River. Distribution and system capacity upgrades would be required.</li> </ul>			
<b>Snake River Supply - Attenuated System</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective, the impacts of the adjudication process on the Lower Snake River are unknown. If water rights are available, this alternative becomes a viable option.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative may require more transmission pipe than the Clearwater option, but can likely be connected within the distribution system. The existing pipe could be used to back-feed Mann Lake. From a gross cost analysis, capital costs will be equivalent.</li> <li>NOTE: Water temperatures from the Snake River are warmer than the Clearwater River.</li> </ul>			

Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
Snake River – On Demand System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective, the impacts of the adjudication process on the Lower Snake River are unknown. If water rights are available, this alternative becomes a viable option.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – The alternative may require more transmission pipe than the Clearwater option, but can likely be connected within the distribution system. The existing pipe could be used to back-feed Mann Lake. The alternative will require larger pumps, larger transmission pipeline, and additional storage as compared with the Clearwater Pump Station, Attenuated System. From a gross comparative cost analysis, capital costs will be equivalent</li> </ul>			
Clearwater Paper Corporation Reuse - Attenuated System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 - Concerns were discussed regarding dependency on a company that could go out of business. Additional concern was raised regarding water quality issues, and supply dependability. Discussion is required with Clearwater Paper to identify available water and discharge permit issues. What are the ramifications to Clearwater Paper if LOID cannot accept all annual discharge? What are reliability issues associated with mill shutdown periods? Overall, the alternative is potentially effective pending answers to these questions.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater.</li> <li>Capital Cost – Requires industrial wastewater treatment and significant infrastructure, in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. There may be potential for a partnering opportunity with Clearwater Paper if they have discharge permit issues. There is also potential for federal funding assistance. Regardless, of assistance opportunities, the overall capital cost is higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			













Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
Clearwater Paper Corporation Reuse Supplemented with a Clearwater Pumping Station				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. The quantity of available wastewater for reuse from Clearwater Paper remains unknown. Concerns remain regarding water quality and supply dependability issues associated with Clearwater Paper; therefore, this alternative is potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with industrial wastewater.</li> <li>Capital Cost – Requires industrial wastewater treatment and significant infrastructure, in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. There may be potential for a partnering opportunity with Clearwater Paper if they have discharge permit issues. There is also potential for federal funding assistance. The alternative requires construction of duplicated infrastructure to treat industrial wastewater and pump from the Clearwater. Overall, capital cost is high as compared to the Clearwater Pump Station, Attenuated System.</li> <li>NOTE: Despite expensive capital costs, this alternative was retained due to potential funding opportunities associated with the alternative.</li> </ul>			
City of Lewiston WWTP Reuse – Attenuated System				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The available flows from the City WWTP are unknown. Although it is unlikely there is sufficient wastewater to meet the needs of LOID, this alternative is ranked as potentially effective until additional information from the City is obtained. In addition, there are water quality concerns associated with treated wastewater. It is unknown if the City has any discharge permit issues.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with municipal wastewater.</li> <li>Capital Cost - Requires municipal wastewater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction will be more extensive to route flows to Mann Lake. There is potential for federal funding assistance, but regardless of this opportunity, the overall capital cost is grossly higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			















Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
City of Lewiston WWTP Reuse Supplemented with a Clearwater Pumping Station				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. The quantity of available wastewater for reuse from the City WWTP remains unknown. There are additional concerns regarding water quality. The alternative is therefore potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with municipal wastewater.</li> <li>Capital Cost - Requires municipal wastewater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction will be more extensive to route flows to Mann Lake. The alternative requires construction of duplicate infrastructure to treat municipal wastewater and pump from the Clearwater. Overall, capital cost is high as compared to the Clearwater Pump Station, Attenuated System alone.</li> <li>NOTE: Despite expensive capital costs, this alternative was retained due to potential funding opportunities associated with alternative.</li> </ul>			
Stormwater Capture and Reuse				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Due to unknowns associated with the alternative, it is rated as potentially effective. It is unlikely that the existing stormwater system produces enough discharge to meet irrigation demands. Limited precipitation may be problematic. During wet weather periods when more water is available, there is a lower irrigation requirement, and vice-versa. Water quality is also a concern.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with treated stormwater.</li> <li>Capital Cost - Costs would be significant to capture and treat stormwater.</li> </ul>			











Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
<b>Clearwater Pumping Station Supplemented with Stormwater Capture and Reuse</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – This alternative addresses reliability concerns associated with the Clearwater River and ESA issues that may force a shut-down period. Timing of this shut-down is likely to occur during low season flow periods typically associated with limited precipitation. Supplementation of the Clearwater Pump Station with stormwater capture and reuse may not provide a reliable water supply for the District. The alternative is therefore potentially effective with respect to a reliable, quality water supply.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – The alternative is potentially effective at resolving federal – tribal trust issues due to tribal concerns regarding low water quality and potentially higher temperatures in Mann Lake associated with treated stormwater.</li> <li>Capital Cost – Requires stormwater treatment and significant infrastructure in addition to similar pumping requirements and infrastructure required for the Clearwater Pump Station. Pipeline construction to route flows to Mann Lake would be extensive; therefore, the overall capital cost is grossly higher than the Clearwater Pump Station, Attenuated System.</li> </ul>			
<b>Sweetwater Canal Rehabilitation</b>				Not evaluated
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective pending the impact of rehabilitation on canal leakage. There is potential that associated efforts could off-set water designated for ESA flows and climate conditions.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>New Reservoir B Dam and Reservoir</b>				Not evaluated
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			

Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
<b>Increase Lake Waha Pumping</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 –The alternative is not effective in providing a reliable water supply for LOID, as it does not provide a new water source or additional storage.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>New Lake Waha Outlet Structure</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 - This alternative is not effective in providing a reliable water supply for LOID, as it does not provide a new water source or additional storage.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Increase Capacity in Soldier's Meadow Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative if potentially effective in providing a reliable water supply through increased capacity that could be utilized during periods when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Zenner Meadow Reservoir</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective by providing additional storage which could be utilized when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			



Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
<b>Water Conservation</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective depending on the effectiveness of a water conservation program to reduce system demands. Available supply would remain a function of climate conditions and minimum stream flows.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> <li>NOTE: Water conservation is encouraged as an element to all the alternatives.</li> </ul>			
<b>Existing System with Supplemental Groundwater Wells</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative would be effective by utilizing supplemental wells to off-set supply deficiencies associated with climatic conditions and minimum in-stream flows.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Clearwater Pumping Station to Supplement the Existing System</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative would be effective by utilizing the Clearwater Pump Station to supplement the existing system.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Existing System with Supplemental Sweetwater Canyon Well</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective at providing a reliable water supply, pending the impact of future climatic conditions on surface water collection.</li> <li>MOU Objective 2 – The alternative is potentially effective by maintaining minimum in-stream flows of Sweetwater Creek.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			

Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
<b>Eliminate LOID</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Currently the City of Lewiston’s infrastructure cannot meet the LOID irrigation demands. The City would need to expand their infrastructure. The alternative is therefore potentially effective.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – Expensive due to additional infrastructure required for domestic water treatment.</li> </ul>			
<b>Reservoir C in Howard Canyon</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 - This option is the same concept as Reservoir B, except the reservoir is located off the Reservation. Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
<b>Deer Creek Reservoir and Pump Station</b>				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – The alternative is potentially effective by providing additional storage which could be utilized when run-off exceeds the combined discharge of minimum stream flows and the capacity of Sweetwater Canal.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, this alternative is expansion of the LOP and is not acceptable to the Tribe.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost</li> </ul>			
<b>Dworshak Reservoir Supply</b>				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Effective, sufficient water is available from Dworshak Reservoir to meet LOID needs. Water quality is acceptable for irrigation.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – Expensive, the alternative requires significant pipeline to convey water to Mann Lake, and must cross several significant drainages.</li> </ul>			

Alternative	Initial Identification			Secondary Identification
	MOU Objective 1	MOU Objective 2	MOU Objective 3	Gross Comparative Capital Cost
	Reliable Quality Water Supply	Permanent Resolution of ESA Issues	Permanent Resolution of Federal-Tribal Trust Issues	
Webb Creek Reservoir				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
Sweetwater Creek Reservoir				Not evaluated.
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective if the alternative allowed LOID to capitalize on periods when flows in excess of the minimum in-stream requirements are available, but Mann Lake is at capacity.</li> <li>MOU Objective 2 – Not effective, means potential litigation. If both the Tribe and LOID are not satisfied the solution is not effective.</li> <li>MOU Objective 3 – Not effective, relies on continued use of the LOP on the Reservation.</li> <li>Capital Cost – The alternative failed to reach the secondary screening and was not evaluated for capital cost.</li> </ul>			
Clearwater Paper Reuse and City of Lewiston WWTP Reuse				
	<ul style="list-style-type: none"> <li>MOU Objective 1 – Potentially effective, although the alternative partially relies on supply from a private entity that may not exist in the future. There are additional concerns regarding water quality issues associated with both sources.</li> <li>MOU Objective 2 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>MOU Objective 3 – Effective, the LOP would no longer be utilized to serve LOID.</li> <li>Capital Cost – Expensive, requires industrial wastewater and municipal wastewater treatment infrastructure in addition to similar pumping requirements of the Clearwater River Pump Station. Wastewater must be conveyed from two separate locations with significant piping.</li> </ul>			

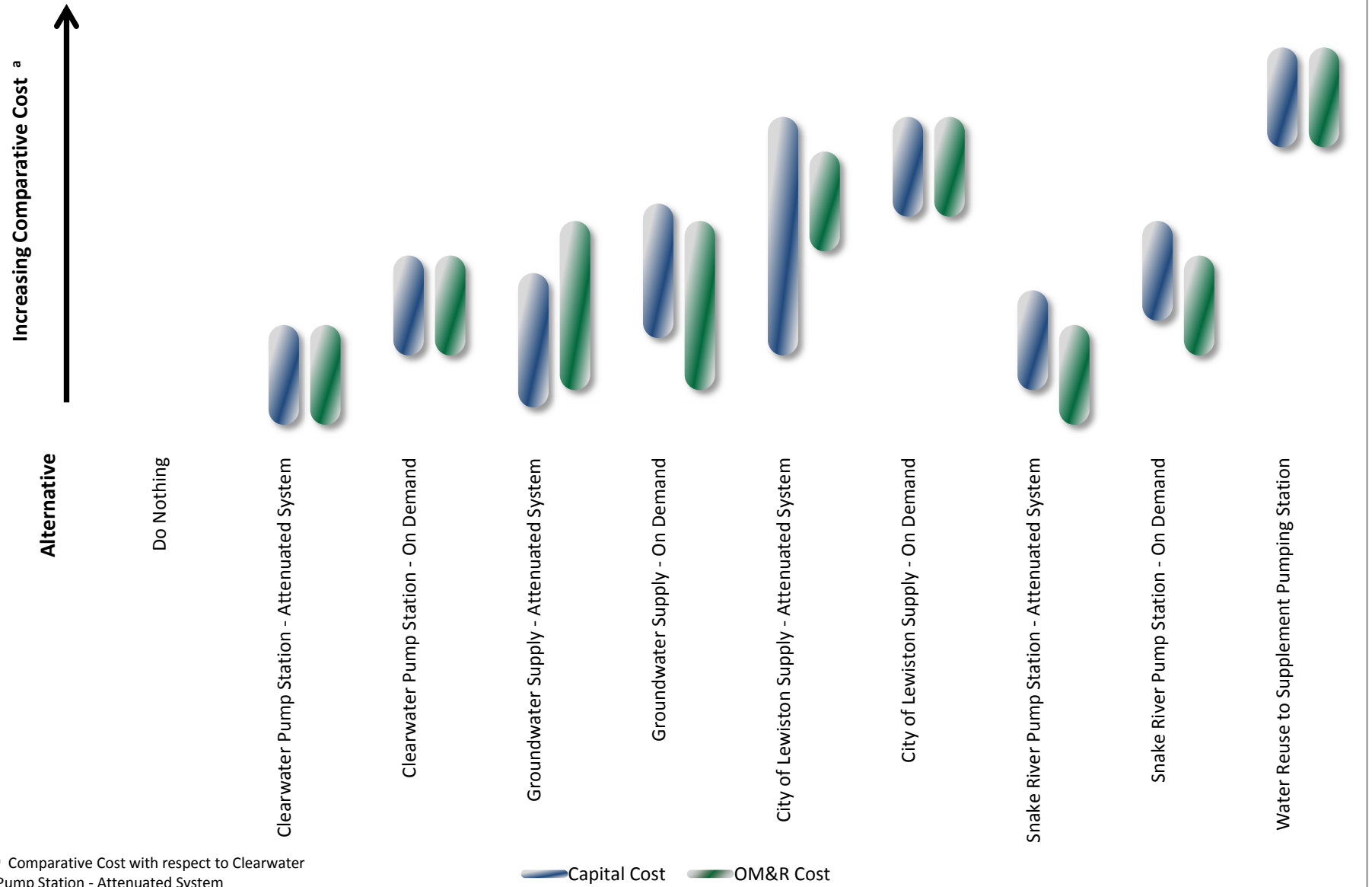
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# ***APPENDIX E***

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## **Technical Descriptions**

## Lower Clearwater Exchange Project Comparative Cost Summary



## TECHNICAL DESCRIPTIONS

The following technical descriptions were prepared to capture technical issues and other considerations associated with each alternative. They were not prepared as comparative documents to relate aspects of one alternative with respect to another. The summaries do not capture benefits, disadvantages, or issues which may arise due to implementation of the alternative with specific respect to those items associated with decommissioning of the Lewiston Orchards Project.

## COMPARATIVE CAPITAL COST

The comparative capital cost is based on use of the Clearwater Pumping Station – Attenuated System providing baseline Capital, Operations, Maintenance, and Replacement costs.



# Do Nothing Alternative

## TECHNICAL SCREENING

The “Do Nothing” alternative consists of continued use of the Lewiston Orchards Project infrastructure. Initially, the Lewiston Orchards Irrigation District (LOID) would continue operations of the project in compliance with the National Marine Fisheries Service (NMFS) Biological opinion. The alternative is included to outline the consequences of continued use of LOP infrastructure.

The “Do Nothing” alternative does not address the LCEP purpose statements. A quantitative assessment of the “Do Nothing” alternative requires assumptions of future climate conditions and precipitation. In light of minimum in-stream flows required under the Biological opinion, it can be qualitatively stated that the “Do Nothing” alternative will provide diminished irrigation supply to LOID patrons with respect to historical volumes. Further, the alternative does not address ESA or Tribal Trust issues associated with the LOP.

### WATER AVAILABILITY

- The future of water availability is uncertain due to undefined impacts of climate change and associated impact on water availability
- Resolution of current litigation regarding ESA issues associated with the LOP may impact future water availability
- The system is finite and while effective in delivery during wet years, is ineffective in delivery during dry years

### OPERATIONS

- Requires continued water conservation to manage available supply
- Gravity fed system is easier to operate than mechanical system

### INFRASTRUCTURE CONSIDERATIONS

- Continued maintenance and repair of existing canals and reservoir infrastructure is required

### ECONOMICS

- Continues to capitalize on benefits of gravity system and associated power savings
- Limited additional capital cost required due to existing infrastructure

### ENVIRONMENTAL

- Impacts of the LOP on critical habitat within the Sweetwater Drainage, including Captain John Creek, Lake Waha, and Soldier’s Meadow

### SOCIO-POLITICAL

- Continued use of system does not address cultural resource concerns of the Tribe

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-Feet
Maximum Supply Condition	Equivalent to Maximum Month Demand
Fire Storage	500 Acre-Feet
Supply Period	January - December
Attenuation Storage	2,500 Acre-Feet

Impact of Climate Change  
Resolution of Environmental Litigation  
Impact on Critical Habitat  
Mann Lake Reservoir Leakage

# Clearwater Pumping Station – On Demand System

## TECHNICAL SCREENING

*A Clearwater River pumping station would satisfy each of the LCEP purpose statements by providing a new irrigation supply for LOID. The pumping station, located along the Clearwater River would utilize a high pressure transmission main from the Clearwater to the District boundary, and would be sized to provide on-demand supply with minimal storage.*

*The system would be sized to meet maximum flows over a limited period of time on the order of two weeks with storage to meet daily and hourly peaks. A longer period of time and associated flow attenuation correlates with a larger storage facility, but smaller pumps to meet system demands. The impact of the NEPA process on this alternative is significant; if pumping from the Clearwater is not allowed during a portion of the irrigation season, storage must be increased to meet irrigation demand.*

### WATER AVAILABILITY

- Water rights must be procured from the Clearwater River. Water is available for appropriation through a new permit. IDWR will pay particular attention to the relative magnitude of the requested rights versus existing LOP water rights.

### OPERATIONS

- LOID will need to pump water at the same time there is a relatively high demand.
- The timeframe of supply with the pump station offline is limited.
- Pump Stations have inherent operational complexity.

### INFRASTRUCTURE CONSIDERATIONS

- Right-of-way must be obtained to construct the pipeline from the pump station to the storage facility.
- Requires construction of a storage reservoir for flow attenuation.
- Fire flow storage must be maintained at minimum pressure and storage volume in accordance with Idaho Code and City of Lewiston Agreement.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Potential impacts of the NEPA process and seasonal flow limitations.
- Water Protection of Clearwater Drainage.

### SOCIO-POLITICAL

- Requires preservation of cultural resources of the Clearwater River.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 acre-feet
Maximum Day Demand	To Be Determined
Attenuation Storage	Sufficient for 2-week maximum demand
Fire Storage	500 Acre-feet
Pumping Period	January - December

Water Right Priority Implications  
Pipeline Right-of-way Acquisition  
Reservoir Property Acquisition  
Fire Flow Coordination  
Funding Sources  
Seasonal Flow Limitations  
Mann Lake Reservoir Leakage

# Clearwater Pumping Station – Attenuated System

## TECHNICAL SCREENING

*A Clearwater River pumping station would satisfy each of the LCEP purpose statements by providing a new irrigation supply for LOID. The pumping station, located along the Clearwater River would utilize a high pressure transmission main from the Clearwater to the District boundary, and would utilize Mann Lake to help meet peak demands.*

*The system would capitalize on storage capacity of Mann Lake to reduce peak flows over an extended period of time. The resultant pump station would be smaller than an on-demand system, although additional capacity must be provided to offset anticipated losses associated with reservoir evaporation and leakage.*

### WATER AVAILABILITY

- Water rights must be procured from the Clearwater River. Water is available for appropriation through a new permit. IDWR will pay particular attention to the relative magnitude of the requested rights versus existing LOP water rights.

### OPERATIONS

- System operation with the pump station offline may be problematic.
- Pump stations have inherent operational complexity.

### INFRASTRUCTURE CONSIDERATIONS

- Right-of-way must be obtained to construct the pipeline from the pump station to the storage facility.
- Impact of Reservoir Leakage on available water supply.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Potential impacts of the NEPA process and seasonal flow limitations.
- Water protection of Clearwater Drainage.

### SOCIO-POLITICAL

- Requires preservation of cultural resources of the Clearwater River.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Supply Condition	Equivalent to maximum month demand
Fire Storage	500 Acre-feet
Pumping Period	January – December
Attenuation Storage	2,500 Acre-feet

Water Right Priority Implications  
Right-of-way Acquisition  
Funding Sources  
Seasonal Flow Limitations  
Sport Fisheries Management of LOP  
Mann Lake Reservoir Leakage

# Groundwater Supply – On Demand System

## TECHNICAL SCREENING

*Replacement of the Lewiston Orchards Project with groundwater supply would satisfy each of the LCEP purpose statements. The Lewiston Orchards Irrigation District is located above the highly productive Lewiston Basin Aquifer, and multiple groundwater wells could be utilized as a new irrigation supply source for the District.*

*The system would be sized to meet maximum flows over a limited period of time on the order of two weeks with storage to meet daily and hourly peaks. A longer period of time and associated flow attenuation correlates with a larger storage facility, but fewer wells to meet system demands.*

*Recent drilling activity by LOID and others has shown that the aquifer is capable of producing wells on the order of 1,000 to 2,000 gpm. The depth of the well is dependent on well location and static water level, but would likely range on the order of 1,500 to 2,000 feet below ground surface. Depending on final well locations, water will be supplied near the point of use, reducing the need for storage.*

### WATER AVAILABILITY

- New water rights with new priorities must be obtained from IDWR.

### OPERATIONS

- LOID will need to pump water at the same time there is a relatively high demand.
- The timeframe of supply with the groundwater wells offline is limited.
- Complexity of groundwater well operations.

### INFRASTRUCTURE CONSIDERATIONS

- Property must be acquired for well construction.
- Deep well construction and pump selection for Lewiston Basin Aquifer can be problematic.
- Fire flow storage must be maintained at minimum pressure and storage volume in accordance with Idaho Code and City of Lewiston Agreement.
- Requires construction of a storage reservoir for flow attenuation.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Limited Environmental Impact.
- Unknown impact to surface water.

### SOCIO-POLITICAL

- Potential for groundwater wells to impact aquifer drawdown and water levels in existing wells.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Day Demand	To Be Determined
Attenuation Storage	Sufficient for 2-week maximum demand
Fire Storage	500 Acre-feet
Pumping Period	January - December

Water Right Acquisition  
Aquifer Drawdown Impact  
Property Acquisition  
Fire Flow Coordination  
Funding Sources  
Mann Lake Leakage

# Groundwater Supply – Attenuated System

## TECHNICAL SCREENING

*Replacement of the Lewiston Orchards Project with groundwater supply would satisfy each of the LCEP purpose statements. The Lewiston Orchards Irrigation District is located above the highly productive Lewiston Basin Aquifer, and multiple groundwater wells could be utilized as a new irrigation supply source for the District.*

*The system would capitalize on storage capacity of Mann Lake to reduce peak flows over an extended period of time. Fewer wells would be required than an on-demand system, although additional capacity must be provided to off-set anticipated losses associated with reservoir evaporation and leakage.*

*Recent drilling activity by LOID and others has shown that the aquifer is capable of producing wells on the order of 1,000 to 2,000 gpm. The depth of the well is dependent on well location and static water level, but would likely range on the order of 1,500 to 2,000 feet below ground surface. Depending on final well locations, water will be supplied near the point of use, reducing the need for storage.*

### WATER AVAILABILITY

- New water rights with new priorities must be obtained from IDWR.

### OPERATIONS

- System operation with the groundwater wells offline may be problematic.
- Complexity of groundwater well operations.

### INFRASTRUCTURE CONSIDERATIONS

- Property must be acquired for well construction.
- Deep well construction and pump selection for Lewiston Basin Aquifer can be problematic.
- Impact of reservoir leakage on available water supply.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Limited Environmental Impact.
- Unknown impact to surface water.

### SOCIO=POLITICAL

- Potential for groundwater wells to impact aquifer drawdown and water levels in existing wells.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Supply Condition	Equivalent to maximum month demand
Fire Storage	500 Acre-feet
Pumping Period	January – December
Attenuation Storage	2,500 Acre-feet

Water Right Acquisition  
Aquifer Drawdown Impact  
Property Acquisition  
Funding Sources  
Mann Lake Leakage

# City of Lewiston Supply – On Demand System

## TECHNICAL SCREENING

*Supply provided by the City of Lewiston would satisfy each of the LCEP purpose statements by providing a new irrigation supply source for LOID. Multiple connections between the City domestic and LOID irrigation system would be required. It is unknown what additional capacity the City has in its system, but it is unlikely that irrigation service can be provided to LOID without significant system expansion.*

*The City system must be sufficient to meet maximum flows over a limited period of time on the order of two weeks with storage to meet daily and hourly peaks. A longer period of time and associated flow attenuation correlates with a larger storage facility, but smaller pumps to meet system demands.*

### WATER AVAILABILITY

- Per discussion with the City, the system has additional capacity to provide LOID irrigation flows, although the scope of the capacity has not been identified.
- Maximum irrigation demand occurs at the same period as maximum City demand.

### OPERATIONS

- Operational dependency on City Supply.

### INFRASTRUCTURE CONSIDERATIONS

- Fire flow storage must be maintained at minimum pressure and storage volume in accordance with Idaho Code and City of Lewiston Agreement.
- City Booster Pumps and distribution pipe must be upgraded to provide LOID irrigation flows.

### ECONOMICS

- Requires treatment of irrigated water to domestic water standard to utilize existing City infrastructure.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Limited environmental impact depending on required upgrades to City system.

### SOCIO-POLITICAL

- Limited socio-political impacts.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Day Demand	To Be Determined
Attenuation Storage	Sufficient for 2-week maximum demand
Fire Storage	500 Acre-feet
Pumping Period	January - December

Available City System Capacity  
Fire Flow Coordination  
City Distribution System Upgrades  
Funding Sources



# City of Lewiston Supply – Attenuated System

## TECHNICAL SCREENING

*Supply provided by the City of Lewiston would satisfy each of the LCEP purpose statements by providing a new irrigation supply source for LOID. Multiple connections between the City domestic and LOID irrigation system would be required. It is unknown what additional capacity the City has in its system, but it is unlikely that irrigation service can be provided to LOID without significant system expansion.*

*The City system must be sufficient to meet anticipated demands over an extended period of time. An attenuated system would capitalize on storage capacity of Mann Lake to reduce peak flows when the City system is under maximum demands. Required infrastructure is diminished due to attenuation in Mann Lake which would allow the City system to operate at a consistent flow throughout the year.*

### WATER AVAILABILITY

- Per discussion with the City, the system has additional capacity to provide LOID irrigation flows, although the scope of the capacity has not been identified.

### OPERATIONS

- Operational dependency on City Supply.
- Impacts of operations on Snake River flow augmentation programs.

### INFRASTRUCTURE CONSIDERATIONS

- City Booster Pumps and distribution pipe must be upgraded to provide LOID irrigation flows.

### ECONOMICS

- Requires treatment of irrigated water to domestic water standard to utilize existing City infrastructure.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Limited environmental impact depending on required upgrades to City system.

### SOCIO-POLITICAL

- Limited socio-political impacts.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Supply Condition	Equivalent to maximum month demand
Fire Storage	500 Acre-feet
Pumping Period	January – December
Attenuation Storage	2,500 Acre-feet

Available City System Capacity  
Fire Flow Coordination  
City Distribution System Upgrades  
Funding Sources  
Mann Lake Leakage

# Snake River Pump Station – On Demand System

## TECHNICAL SCREENING

*A Snake River pumping station would satisfy each of the LCEP purpose statements by providing a new irrigation supply for LOID. The pumping station, located along the Snake River would utilize a high pressure transmission main from the river to the District boundary, and would be sized to provide on-demand supply with minimal storage.*

*The system would be sized to meet maximum flows over a limited period of time on the order of two weeks with storage to meet daily and hourly peaks. A longer period of time and associated flow attenuation correlates with a larger storage facility, but smaller pumps to meet system demands. The impact of the NEPA process on this alternative is significant; if pumping from the Snake is not allowed during a portion of the irrigation season, storage must be increased to meet irrigation demand. Further, the impact of water right priorities on the Snake River is unknown.*

### WATER AVAILABILITY

- Water rights must be procured from the Snake River. Water is available for appropriation through a new permit. IDWR will pay particular attention to the relative magnitude of the requested rights versus existing LOP water rights.
- Upstream users may object to new Snake River water rights.

### OPERATIONS

- The timeframe of supply with the pump station offline is limited.
- Impacts of operations on Snake River flow augmentation programs.

### INFRASTRUCTURE CONSIDERATIONS

- Right-of-way must be obtained to construct the pipeline from the pump station to the storage facility.
- Requires construction of a storage reservoir for flow attenuation.
- Fire flow storage must be maintained at minimum pressure and storage volume in accordance with Idaho Code and City of Lewiston Agreement.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Potential impacts of the NEPA process and seasonal flow imitations.

### SOCIO-POLITICAL

- Requires preservation of cultural resources of Snake River.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 acre-feet
Maximum Day Demand	To Be Determined
Attenuation Storage	Sufficient for 2-week maximum demand
Fire Storage	500 Acre-feet
Pumping Period	January - December

Water Right Priority Implications  
Pipeline Right-of-way Acquisition  
Reservoir Property Acquisition  
Fire Flow Coordination  
Funding Sources  
Seasonal Flow Limitations

# Snake River Pump Station – Attenuated System

## TECHNICAL SCREENING

*A Snake River pumping station would satisfy each of the LCEP purpose statements by providing a new irrigation supply for LOID. The pumping station, located along the Snake River would utilize a high pressure transmission main from the river to the distribution system, and would utilize Mann Lake to help meet peak demands.*

*The system would capitalize on storage capacity of Mann Lake to reduce peak flows over an extended period of time. The resultant pump station would be smaller than an on-demand system, although additional capacity must be provided to offset anticipated losses associated with reservoir evaporation and leakage.*

*The impact of the previous Snake River Basin Adjudication (SRBA) on the pump station is unknown, but will likely limit available water rights based on prior claims.*

### WATER AVAILABILITY

- Water rights must be procured from the Snake River. Water is available for appropriation through a new permit. IDWR will pay particular attention to the relative magnitude of the requested rights versus existing LOP water rights.
- Upstream users may object to new Snake River water rights.

### OPERATIONS

- System operation with the pump station offline may be problematic.
- Impacts of operations on Snake River flow augmentation programs.

### INFRASTRUCTURE CONSIDERATIONS

- Right-of-way must be obtained to construct the pipeline from the pump station to the storage facility.
- Impact of Reservoir Leakage on available water supply.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Potential impacts of the NEPA process and seasonal flow limitations.

### SOCIO-POLITICAL

- Requires preservation of cultural resources of Snake River.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Supply Condition	Equivalent to maximum month demand
Fire Storage	500 Acre-feet
Pumping Period	January – December
Attenuation Storage	2,500 Acre-feet

Water Right Priority Implications  
Right-of-way Acquisition  
Funding Sources  
Seasonal Flow Limitations  
Mann Lake Leakage

# Water Reuse to Supplement Pumping Station

## TECHNICAL SCREENING

*A reuse project is attractive due to the conservation water resources. Such a project would alleviate concerns regarding withdrawals from the Clearwater River during summer periods of low flow, and water reuse could be utilized to offset required irrigation supply. Two potential sources of reuse in the area include the City of Lewiston Wastewater Treatment Plant and the Clearwater Paper Corporation, a local paper products manufacturer.*

*The system would capitalize on storage capacity of Mann Lake to reduce peak flows over an extended period of time. The resultant pump station and reuse facilities would be smaller than an on-demand system, although additional capacity must be provided to off-set anticipated losses associated with reservoir evaporation and leakage.*

### WATER AVAILABILITY

- Water rights must be procured from the Clearwater River.
- Average annual flows at the Wastewater Treatment Plant are unknown.
- The availability of water from Clearwater Paper Corporation is unknown.

### OPERATIONS

- Treatment requirements of reuse water are undefined.

### INFRASTRUCTURE CONSIDERATIONS

- Requires construction of both a reuse facility and a pumping station.
- Right-of-way must be obtained to construct the pipeline from the pump station to the storage facility.
- Right-of-way must be obtained to construct the pipeline from the reuse facility to the storage facility.
- Impact of Reservoir Leakage on available water supply.

### ECONOMICS

- Project Funding – Short Term Capital Cost.
- Operation, Maintenance, & Replacement – Long Term Costs.

### ENVIRONMENTAL

- Impacts of reuse water on fisheries in Mann Lake.

## UNRESOLVED ISSUES

### DESIGN CRITERIA

Item	Criteria
Annual Supply	8,500 Acre-feet
Maximum Supply Condition	Equivalent to maximum month demand
Fire Storage	500 Acre-feet
Pumping Period	January – December
Attenuation Storage	2,500 Acre-feet

Water Right Priority Implications  
Unknown Reuse Availability  
Right-of-way Acquisition  
Funding Sources  
Impact of Reuse on Fisheries  
Mann Lake Leakage

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# ***APPENDIX F***

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## **PairWise™ Analysis**

MOU Objective 1		Weighting									5	
	Do Nothing	Clearwater Pumping Station - Attenuated System	Clearwater Pumping Station - On Demand System	Groundwater Supply - Attenuated System	Groundwater Supply - On Demand System	City of Lewiston Supply - Attenuated System	City of Lewiston Supply - On Demand System	Snake River Pump Station - Attenuated System	Snake River Pump Station - On Demand System	Water Reuse to Supplement Pumping Station	Sum	Weighted Total
Do Nothing												
Clearwater Pumping Station - Attenuated System			4	3	4	4	4	4	4	4	31	155
Clearwater Pumping Station - On Demand System		2		2	2	3	4	3	3	3	22	110
Groundwater Supply - Attenuated System		3	4		4	3	4	3	4	4	29	145
Groundwater Supply - On Demand System		2	4	2		2	3	2	4	4	23	115
City of Lewiston Supply - Attenuated System		2	3	3	4		4	2	4	4	26	130
City of Lewiston Supply - On Demand System		2	2	2	3	2		2	3	3	19	95
Snake River Pump Station - Attenuated System		2	3	3	4	4	4		4	4	28	140
Snake River Pump Station - On Demand System		2	3	2	2	2	3	2		3	19	95
Water Reuse to Supplement Pumping Station		2	3	2	2	2	3	2	3		19	95

#### Scoring

- 1 Lower Reliability and/or Quality Water Supply  
5 Higher Reliability and/or Quality Water Supply



OMR & P		Weighting									5	
	Do Nothing	Clearwater Pumping Station - Attenuated System	Clearwater Pumping Station - On Demand System	Groundwater Supply - Attenuated System	Groundwater Supply - On Demand System	City of Lewiston Supply - Attenuated System	City of Lewiston Supply - On Demand System	Snake River Pump Station - Attenuated System	Snake River Pump Station - On Demand System	Water Reuse to Supplement Pumping Station	Sum	Weighted Total
Do Nothing												
Clearwater Pumping Station - Attenuated System			4	4	4	5	5	3	4	5	34	170
Clearwater Pumping Station - On Demand System		2		3	4	4	4	2	3	5	27	135
Groundwater Supply - Attenuated System		2	3		4	4	4	2	4	5	28	140
Groundwater Supply - On Demand System		2	2	2		4	4	2	2	5	23	115
City of Lewiston Supply - Attenuated System		1	2	2	2		4	2	3	4	20	100
City of Lewiston Supply - On Demand System		1	2	2	2	2		1	2	4	16	80
Snake River Pump Station - Attenuated System		3	4	4	4	4	5		4	5	33	165
Snake River Pump Station - On Demand System		2	3	2	4	3	4	2		5	25	125
Water Reuse to Supplement Pumping Station		1	1	1	1	2	2	1	1		10	50

Scoring

1 More Expensive  
5 Less Expensive

Capital Cost		Weighting									3	
	Do Nothing	Clearwater Pumping Station - Attenuated System	Clearwater Pumping Station - On Demand System	Groundwater Supply - Attenuated System	Groundwater Supply - On Demand System	City of Lewiston Supply - Attenuated System	City of Lewiston Supply - On Demand System	Snake River Pump Station - Attenuated System	Snake River Pump Station - On Demand System	Water Reuse to Supplement Pumping Station	Sum	Weighted Total
Do Nothing												
Clearwater Pumping Station - Attenuated System			4	4	4	4	4	3	4	5	32	96
Clearwater Pumping Station - On Demand System		2		3	3	4	4	2	3	5	26	78
Groundwater Supply - Attenuated System		2	3		3	4	4	3	4	5	28	84
Groundwater Supply - On Demand System		2	3	3		4	4	2	3	5	26	78
City of Lewiston Supply - Attenuated System		2	2	2	2		4	2	3	4	21	63
City of Lewiston Supply - On Demand System		2	2	2	2	2		1	2	4	17	51
Snake River Pump Station - Attenuated System		3	4	3	4	4	5		4	5	32	96
Snake River Pump Station - On Demand System		2	3	2	3	3	4	2		5	24	72
Water Reuse to Supplement Pumping Station		1	1	1	1	2	2	1	1		10	30

Scoring

1 More Expensive  
5 Less Expensive

# PairWise™ Process

The PairWise™ Comparison is a methodical way of sorting and filtering through a myriad of different project elements. The method was adapted from a similar process used in the Risk Assessment Methodology for Water (RAM-W™), developed by Sandia National Laboratories. First, a list of criteria was brainstormed by the LCEP Group. Each criterion on the list was systematically compared in importance to each of the other criterion, resulting in a weighting factor for each criterion. Then the identified alternatives were evaluated against each criterion with a score assigned to each. The result is an ordered ranking of alternatives from least to most viable that can be used as the basis to screen the various options.

This process has many advantages for the LCEP Group:

- Ranking and weighting is completed in an open, informal format; the LCEP Group comes away feeling that their voice and input has been heard
- The process provides a systematic approach to deal with the overwhelming number of decisions and factors that must be considered when prioritizing project needs
- The process is supportable and can be easily documented so that future second-guessing by non-participants is minimized
- Qualitative and quantitative information can be used in combination to make decisions.

## EVALUATION CRITERIA

The results of the criteria ranking showed that most criteria have similar importance, with the three MOU objectives and operations, maintenance, and replacement costs receiving the highest rank. The capital cost was ranked as the least critical.

### MOU Objective 1 – Reliable, Quality Water Supply

The primary issue involved in satisfaction of MOU Objective 1 is to provide sufficient irrigation delivery to satisfy the agreement between the BOR and LOID and provide 2.2 acre-feet of water over the irrigation season. This water must be of acceptable quality to be delivered for residential irrigation purposes through the District's existing distribution system.

### MOU Objective 2 – Permanent Resolution of ESA Issues Associated with the LOP

Each of the alternatives inherently assume that the LOP will be replaced. Although the MOU Objective 2 was identified as an important criterion, it was not utilized in the PairWise™ process as each alternative would be scored in a similar fashion with respect to the objective.

### MOU Objective 3 – Permanent Resolution of Federal-Tribal Trust Issues Associated with the LOP

Each of the alternatives addressed federal-tribal trust issues through replacement of the LOP. The tribe noted some concern regarding use of Mann Lake to store reuse water on the reservation. Ultimately, although MOU Objective 3 was identified as an important criterion, it was not utilized in the PairWise™ process as each alternative would be scored in a similar fashion with respect to the objective.

### Capital Cost

The capital cost criteria was utilized to review the initial capital investment of each of the alternatives. It was anticipated by the group that the potential exists for a significant portion of the capital costs to be covered through federal funding opportunities.

### Operations, Maintenance, and Replacement Costs (OM&R)

The OM&R criteria was used to evaluate the long-term annual costs associated with alternative implementation. Those alternatives requiring lower annual inputs to utilize and maintain the system scored higher with the PairWise™ process.

### **PAIRWISE™ COMPARISON**

Following reviews of technical summaries and comparative costs with respect to both capital, and operations, maintenance, and replacement costs, a comprehensive ranking of each alternative was performed. **Table 1** shows a summary of the scoring for each alternative. The full spreadsheet showing the results of the PairWise™ comparison is attached.

The total score for each of the alternatives consisted of the sum of the weighted scores for each criterion. **Table 1** reflects how each individual alternative was ranked with respect to each criterion, as well as the overall score.

**PAIRWISE™ SUMMARY**

The comparison showed the highest ranking alternative was the Clearwater Pumping Station – Attenuated System, followed by the Snake River and Groundwater Supply – Attenuated Systems.

**TABLE 1 - PAIRWISE™ COMPARISON**

Alternative	MOU 1	OM&R	Capital Cost	Score	Rank
Do Nothing	0	0	0	0	
Clearwater Pumping Station - Attenuated System	155	170	96	421	1
Snake River Pump Station - Attenuated System	140	165	96	401	2
Groundwater Supply - Attenuated System	145	140	84	369	3
Clearwater Pumping Station - On Demand System	110	135	78	323	4
Groundwater Supply - On Demand System	115	115	78	308	5
City of Lewiston Supply - Attenuated System	130	100	63	293	6
Snake River Pump Station - On Demand System	95	125	72	292	7
City of Lewiston Supply - On Demand System	95	80	51	226	8
Water Reuse to Supplement Pumping Station	95	50	30	175	9

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# ***APPENDIX G***

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## **Water Supply and Delivery**



# **LEWISTON ORCHARDS IRRIGATION DISTRICT** **CLEARWATER RIVER, MANN LAKE DISCHARGE ALTERNATIVE**

Flow Rate 9450 gpm

## **CLEARWATER RIVER PUMP STATION - STA 0+00**

River Elevation	740 ft
Pump TDH	1214 ft
Pump Station Miscellaneous Losses	-10 ft
Pump Station Hydraulic Grade Line (HGL)	1944 ft
Pump Station Pressure (psi)	521 psi

## **CLEARWATER RIVER PUMP STATION TO EAGLES POINT BLVD**

Pipe Length	3800 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	15.4 ft

## **EAGLES POINT BLVD - STA 38+00**

Elevation	1420 ft
HGL Available =	1944.0 - 15.4 1928.6 ft
Pressure	220.2 psi

## **EAGLES POINT BLVD TO HEPTON LN**

Pipe Length	4200 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	17.0 ft

## **HEPTON LN - STA 80+00**

Elevation	1425 ft
HGL Available =	1928.6 - 17.0 1911.7 ft
Pressure	210.7 psi

## **HEPTON LN TO STEEL TO PVC TRANSITION**

Pipe Length	11900 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	48.1 ft

## **STEEL TO PVC TRANSITION - STA 199+00**

Elevation	1560 ft
HGL Available =	1911.7 - 48.1 1863.6 ft
Pressure	131.4 psi

## **STEEL TO PVC TRANSITION TO LAPWAI RD, RESERVATION LINE**

Pipe Length	2870 ft
Pipe Diameter	24 in
C Value	150
Headloss (hf)	12.2 ft

## **LAPWAI RD, RESERVATION LINE - STA 227+70**

Elevation	1662 ft
HGL Available =	1863.6 - 12.2 1851.3 ft
Pressure	82.0 psi

## **LAPWAI RD, RESERVATION LINE TO MANN LAKE**

Pipe Length	11830 ft
Pipe Diameter	24 in
C Value	150
Headloss (hf)	50.4 ft

## **MANN LAKE - STA 346+00**

Elevation	1791 ft
HGL Available =	1851.3 - 50.4 1801.0 ft
Pressure	4.3 psi

# LEWISTON ORCHARDS IRRIGATION DISTRICT

## CLEARWATER RIVER, DISTRIBUTION SYSTEM DISCHARGE ALTERNATIVE

Flow Rate 9450 gpm

### CLEARWATER RIVER PUMP STATION - STA 0+00

River Elevation	740 ft
Pump TDH	1192 ft
Pump Station Miscellaneous Losses	-10 ft
Pump Station Hydraulic Grade Line (HGL)	1922 ft
Pump Station Pressure (psi)	512 psi

### CLEARWATER RIVER PUMP STATION TO EAGLES POINT BLVD

Pipe Length	3800 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	15.4 ft

### EAGLES POINT BLVD - STA 38+00

Elevation	1420 ft
HGL Available =	1922.0 - 15.4 1906.6 ft
Pressure	210.7 psi

### EAGLES POINT BLVD TO LAPWAI RD

Pipe Length	5450 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	22.0 ft

### LAPWAI RD - STA 92+50

Elevation	1425 ft
HGL Available =	1906.6 - 22.0 1884.6 ft
Pressure	199.0 psi

### LAPWAI RD TO LINDSAY RD

Pipe Length	9300 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	37.6 ft

### LINDSAY RD - STA 185+50

Elevation	1560 ft
HGL Available =	1884.6 - 37.6 1847.0 ft
Pressure	124.3 psi

### LINDSAY RD TO CEDAR AVE - THAIN RD

Pipe Length	10650 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	43.0 ft

### THAIN RD - STA 292+00

Elevation	1499 ft
HGL Available =	1847.0 - 43.0 1804.0 ft
Pressure	132.0 psi

### CEDAR AVE TO 12TH AND POWERS CONNECTION POINT

Pipe Length	3030 ft
Pipe Diameter	16 in
C Value	150
Headloss (hf)	11.1 ft

### CONNECTION POINT - STA 322+30

Elevation	1505 ft
HGL Available =	1804.0 - 11.1 1792.9 ft
Pressure	124.6 psi

**LEWISTON ORCHARDS IRRIGATION DISTRICT**  
**SNAKE RIVER, TAMMANY CREEK ROAD ALTERNATIVE**

Flow Rate 9450 gpm

**SNAKE RIVER PUMP STATION - STA 0+00**

River Elevation	720 ft
Pump TDH	1248 ft
Pump Station Miscellaneous Losses	-10 ft
Pump Station Hydraulic Grade Line (HGL)	1958 ft
Pump Station Pressure (psi)	536 psi

**SNAKE RIVER PUMP STATION TO SAGEBRUSH LN**

Pipe Length	12165 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	49.2 ft

**SAGEBRUSH LN - STA 12+165**

Elevation	1048 ft
HGL Available =	1958.0 - 49.2
Pressure	1908.8 ft
	372.7 psi

**SAGEBRUSH LN TO 6TH STREET**

Pipe Length	11240 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	45.4 ft

**6TH STREET - STA 234+05**

Elevation	1082 ft
HGL Available =	1908.8 - 45.4
Pressure	1863.4 ft
	338.3 psi

**6TH STREET TO SOUTHPORT AVE**

Pipe Length	4445 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	18.0 ft

**SOUTHPORT AVE - STA 278+50**

Elevation	1421 ft
HGL Available =	1863.4 - 18.0
Pressure	1845.4 ft
	183.7 psi

**SOUTHPORT AVE TO POWERS AVE AND 10TH  
STEEL TO PVC PIPE TRANSITION**

Pipe Length	5220 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	21.1 ft

**STEEL TO PVC PIPE TRANSITION - STA 330+70**

Elevation	1440 ft
HGL Available =	1845.4 - 21.1
Pressure	1824.3 ft
	166.4 psi

**PIPE TRANSITION TO POWERS AVE AND 12TH**

Pipe Length	2220 ft
Pipe Diameter	24 in
C Value	150
Headloss (hf)	9.5 ft

**POWERS AVE AND 12TH (6450 gpm TO CEDAR AVE AND 12TH) - STA 352+90**

Elevation	1520 ft
HGL Available =	1824.3 - 9.5
Pressure	1814.9 ft
	127.7 psi

**CEDAR AVE AND THAIN RD**

Pipe Length	3030 ft
Pipe Diameter	20 in
C Value	150
Headloss (hf)	15.5 ft

**CEDAR AVE AND THAIN RD - STA 383+20**

Elevation	1505 ft
HGL Available =	1814.9 - 15.5
Pressure	1799.4 ft
	127.5 psi

# **LEWISTON ORCHARDS IRRIGATION DISTRICT** **SNAKE RIVER SOUTHPORT AVENUE ALTERNATIVE**

Flow Rate 9450 gpm

## **SNAKE RIVER PUMP STATION - STA 0+00**

River Elevation	720 ft
Pump TDH	1198 ft
Pump Station Miscellaneous Losses	-10 ft
Pump Station Hydraulic Grade Line (HGL)	1908 ft
Pump Station Pressure (psi)	514 psi

## **SNAKE RIVER PUMP STATION TO SOUTHPORT AVE**

Pipe Length	8850 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	35.8 ft

## **SOUTHPORT AVE / PIPE INTERSECTION - STA 88+50**

Elevation	1400 ft
HGL Available =	1908.0 - 35.8 1872.2 ft
Pressure	204.4 psi

## **SOUTHPORT AVE TO EAST END OF RUNWAY**

Pipe Length	7280 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	29.4 ft

## **EAST END OF RUNWAY - STA 161+30**

Elevation	1421 ft
HGL Available =	1872.2 - 29.4 1842.8 ft
Pressure	182.6 psi

## **EAST END OF RUNWAY TO TRANSITION FROM STEEL TO PVC PIPE AT POWERS AVE AND 10TH**

Pipe Length	5560 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	22.5 ft

## **TRANSITION FROM STEEL TO PVC (POWERS RD AND 10TH) - STA 216+90**

Elevation	1440 ft
HGL Available =	1842.8 - 22.5 1820.3 ft
Pressure	164.6 psi

## **PIPE TRANSITION TO POWERS AVE AND 12TH**

Pipe Length	2220 ft
Pipe Diameter	24 in
C Value	150
Headloss (hf)	9.5 ft

## **(9450 gpm EAST TO CEDAR AVE AND 12TH) - STA 239+10**

Elevation	1520 ft
HGL Available =	1820.3 - 9.5 1810.9 ft
Pressure	125.9 psi

## **POWERS AVE AND 12TH TO CEDAR AVE AND THAIN RD**

Pipe Length	3030 ft
Pipe Diameter	20 in
C Value	150
Headloss (hf)	15.5 ft

## **CEDARS AVE AND THAIN RD - STA 269+40**

Elevation	1505 ft
HGL Available =	1810.9 - 15.5 1795.4 ft
Pressure	125.7 psi

# LEWISTON ORCHARDS IRRIGATION DISTRICT TAMMANY CREEK WELL FIELD ALTERNATIVE

West Well Flow Rate 1575 gpm

## WEST WELL SITE - STA 0+00

Ground Elevation	990 ft
Water Surface Elevation	670 ft
Lift	320 ft
Column Loss	26.4 ft
Pump TDH	1240 ft
Pump Station Miscellaneous Losses	-10 ft
Pump Station Hydraulic Grade Line (HGL)	1893.6 ft
Pump Station Pressure (psi)	391 psi

### West Well To 2nd Well

Flow Rate 1575 gpm	
Pipe Length	1000 ft
Pipe Diameter	12 in
C Value	125
Headloss (hf)	6.3 ft

## Well 2 - STA 10+00

Elevation	1014 ft
HGL Available =	1893.6 - 6.3
	1887.3 ft
Pressure	378.0 psi

### Well 2 To Well 3

Flow Rate 3150 gpm	
Pipe Length	1000 ft
Pipe Diameter	16 in
C Value	125
Headloss (hf)	5.6 ft

## Well 3 - STA 20+00

Elevation	1038 ft
HGL Available =	1887.3 - 5.6
	1881.7 ft
Pressure	365.2 psi

### Well 3 To Well 4

Flow Rate 4725 gpm	
Pipe Length	1000 ft
Pipe Diameter	20 in
C Value	125
Headloss (hf)	4.0 ft

## Well 4 - STA 30+00

Elevation	1062 ft
HGL Available =	1881.7 - 4.0
	1877.6 ft
Pressure	353.1 psi

### WELL 4 TO TAMMANY CREEK RD AND 6TH STREET

Flow Rate 6300 gpm	
Pipe Length	250 ft
Pipe Diameter	22 in
C Value	125
Headloss (hf)	1.1 ft

## TAMMANY CREEK RD AND 6TH STREET - STA 32+50

Elevation	1082 ft
HGL Available =	1877.6 - 1.1
	1876.6 ft
Pressure	344.0 psi

### 6TH STREET TO SOUTHPORT AVE

Flow Rate 9450 gpm	
Pipe Length	4445 ft
Pipe Diameter	26 in

C Value	125
Headloss (hf)	18.0 ft

Southport Ave - STA 76+95

Elevation	1421 ft
HGL Available =	1876.6 - 18.0      1858.6 ft
Pressure	189.4 psi

SOUTHPORT AVE TO POWERS AVE AND 10TH

STEEL TO PVC PIPE TRANSITION

Flow Rate 9450 gpm	
Pipe Length	5220 ft
Pipe Diameter	26 in
C Value	125
Headloss (hf)	21.1 ft

STEEL TO PVC PIPE TRANSITION - STA 129+15

Elevation	1440 ft
HGL Available =	1858.6 - 21.1      1837.5 ft
Pressure	172.1 psi

PIPE TRANSITION TO POWERS AVE AND 12TH

Flow Rate 9450 gpm	
Pipe Length	2220 ft
Pipe Diameter	24 in
C Value	150
Headloss (hf)	9.5 ft

POWERS AVE AND 12TH (6450 gpm TO CEDAR AVE AND 12TH) - STA 151+35

Elevation	1520 ft
HGL Available =	1837.5 - 9.5      1828.0 ft
Pressure	133.3 psi

POWERS AVE AND 12TH TO CEDAR AVE AND THAIN RD

Flow Rate 6450 gpm	
Pipe Length	3030 ft
Pipe Diameter	20 in
C Value	150
Headloss (hf)	15.5 ft

CEDAR AVE AND THAIN RD - STA 181+65

Elevation	1505 ft
HGL Available =	1828.0 - 15.5      1812.6 ft
Pressure	133.2 psi



# MEMORANDUM

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**DATE:** September 8, 2011

**TO:** Design File

**CC:** Amy Uptmor

**FROM:** Cory R. Baune

**SUBJECT:** LCEP – Water Needs Assessment and Demand Estimates

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## WATER NEEDS ASSESSMENT

In July 2009, a memorandum of understanding was signed by key stakeholders of the LCEP group, including the Nez Perce Tribe and LOID. Within the document, the entities agreed to a supply volume of water, 8,500 acre-ft as an “element of understanding” of the new system. This volume of water represents the volume of water agreed to between Reclamation and LOID, 2.2 ft, applied over the District acreage, 3,848 acres.

### Water Needs Background

In 1945, Reclamation completed a Project Planning Report No. 1-5.7-1 that reviewed, among other analysis, the water requirements and consumptive use of the Project. The 1945 report recommended delivery of 2.2 acre-ft per acre predicated on the following assumptions:

- Use of the Lowry-Johnson Method (circa 1942) to determine consumptive use
- Weather data for Lewiston, Idaho
- Adjustment in maximum temperatures to account for climatic differences between Lewiston and the project area
- Adjusted growing season of 204 days
- Rainfall records from 1878-1943
- Runoff losses are offset by soil moisture retention in preceding years
- Winter consumptive use is similar to the Boise, Idaho vicinity as adjusted for climatological differences with Lewiston, Idaho
- Estimated losses within the canal delivery system

### Available Data

Since Reclamation completed their report in 1945, the University of Idaho completed a study, “Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho”, in 2007. The study is used in conjunction with an ET Idaho website, updated in 2009, that provides site specific information at 123 weather stations located throughout the state of Idaho. The information includes precipitation deficit and consumptive use requirements of 49 various land covers and crops. Precipitation deficit is synonymous with irrigation demand, and represents

the amount of water required by a given crop. The report discusses that, “ET and net irrigation water requirement calculations are intended for use in design and management of irrigation systems, for water rights management, and consumptive water rights transfers and for hydrologic studies.”

Precipitation deficit is the difference between evapotranspiration and the precipitation stored in the root zone and evaporation layer. Calculations are based on the standardized Penman-Monteith method which considers the impact of surface wetting by irrigation and precipitation on total evapotranspiration. The precipitation deficit considers the amount of infiltrated gross precipitation which remains in the root zone for evaporation and transpiration, accounting for surface runoff and deep percolation. Solar radiation and dew point are estimated from air temperature and wind speed data collected at the regional weather station at the Lewiston Airport.

#### Additional Assumptions

- Impervious area – documented within the 1992 MK study to be approximately 943 acres
- Distribution system leakage – not documented, but leakage within the domestic system ranges from 15-20%. As the irrigation system was installed prior to the domestic system, it could be reasonable assumed that unaccounted water is greater than that observed on the domestic system, as there is no financial incentive for residents to repair irrigation leaks.

#### Annual Water Requirement

**Table 1** summarizes the estimates of irrigation demand within the LOP based on three assumption scenarios:

**Table 1 - Estimated Annual Water Requirement**

Description/Assumption	Estimated Annual Water Requirement (Acre-ft)		
	Scenario 1	Scenario 2	Scenario 3
LOP Acreage	3,848	3,848	3,848
Impervious Area (Acres)	N/A	943 <sup>a</sup>	943 <sup>a</sup>
Water Loss	N/A	N/A	15% <sup>b</sup>
Exceedance Percentage (ft water/acre/year)			
20% (2.95)	11,337	8,559	9,842
35% (2.73)	10,514	7,937	9,128
50% (2.52)	9,691	7,316	8,413
69% (2.20)	8,467	6,392	7,351
80% (2.02)	7,769	5,865	6,745

<sup>a</sup> Estimated impervious area as documented within 1992 MK study

<sup>b</sup> Water losses within the irrigation system are unknown, and it is unlikely that losses will be less than those observed in the domestic system, which has ranged from 15-20%

Data from the ET Idaho website was used to establish the monthly precipitation deficit, or net irrigation requirement of irrigated turf grass in the Lewiston area. Turf grass was selected as the crop used to calculate water requirements because the vast majority of the LOID's water use is on lawns and pastures. Pasture has an annual water requirement very similar to that of turf grass and, as future development occurs, pasture and the few small areas of agricultural crops still grown in the LOID area are likely to transition to turf grass.

The precipitation deficit and corresponding consumptive water use of turf grass varies depending on weather conditions. The ET Idaho precipitation deficit information was generated using historical weather data from 1978-2008, and provides precipitation deficit information on a monthly basis. This data was used to estimate monthly water requirements for LOID. Design delivery was calculated by fitting the monthly precipitation deficit curve to an annual delivery volume of 8,500 acre-ft. A summary of data from the ET Idaho website which was utilized to create this curve is provided in **Table 2**.

**Table 2 - Precipitation Deficit Data**

Month	Precipitation Deficit (mm/day)		
	20% Exceedance	50% Exceedance	80% Exceedance
January	0.01	-0.01	-0.03
February	0.12	0.7	-0.06
March	0.92	0.61	0.23
April	2.76	2.22	1.37
May	3.74	3.09	2.26
June	4.89	4.39	3.73
July	6.33	5.62	4.95
August	5.51	4.91	4.42
September	3.58	2.96	2.32
October	1.60	1.27	0.81
November	0.03	-1.34	-0.59
December	0.00	-0.14	-0.39

Based on impervious area of 943 acres and estimated water loss of 15% within the distribution system (Scenario 3 in **Table 1**), delivery of 8,500 acre-ft approximately corresponds with the average annual precipitation deficit (50% exceedance).

#### Evaporation and Seepage

Several attempts to document seepage in Mann Lake have been completed during various studies. According to the 1992 Morrison Knudsen report, in 1966, CH2M Hill estimated annual seepage and evaporative losses from Mann Lake at 1,800 acre-ft. The Morrison Knudsen report itself estimated that losses varied from 402 acre-ft in 1985 to 1,845 acre-ft in 1990.

The District currently utilizes two flow measurement devices to document inflow and outflow from the reservoir. A broad crested weir above the reservoir is measured once per day. A flow meter located at the filter plant near the reservoir is used to calculate water supplied to the District. Information from these sources suggests that annual losses have ranged from 187 acre-ft in 2007 to 727 acre-ft in 2008. A chart of seepage loss data provided by the District is displayed in **Table 3**.

**Table 3 - Mann Lake Seepage Losses**

Year	Inflow (Acre-ft) <sup>a</sup>	Outflow (Acre-ft) <sup>b</sup>	Losses (Acre-ft) <sup>c</sup>
2005	5,117	4,967	151
2006 <sup>d</sup>	--	--	--
2007	5,217	5,030	187
2008	5,640	4,912	727
2009	5,640	5,306	334

Source: LOID Records

<sup>a</sup> As measured once per day at the broad crested weir above Mann Lake

<sup>b</sup> As measured per the filter plant flow meter

<sup>c</sup> Losses include evaporation and seepage

<sup>d</sup> Erroneous data from 2006 was removed from the data set

Based on review of the data provided in **Table 3**, a design assumption on the order of 500 acre-ft per year for total evaporation and seepage was selected. Although this value provides a baseline for the Appraisal Study, a more detailed water balance should be completed in the future to quantify actual losses.

### Design Delivery

The design criteria for this Study was established early in the process based on delivery of 2.2 ft/acre. These calculations were completed utilizing straight-line interpolation of the data presented in **Table 2** for the irrigation period from March through October, and the delivery area of 3,848 acres. Over the winter period from November through February, evaporation from Mann Lake was assumed to be negligible, and losses of 15 acre-ft were applied to account for seepage from the lake. The corresponding delivery curve provided in **Figure 1** forms the basis of design, and represents water delivered from Mann Lake to the District.

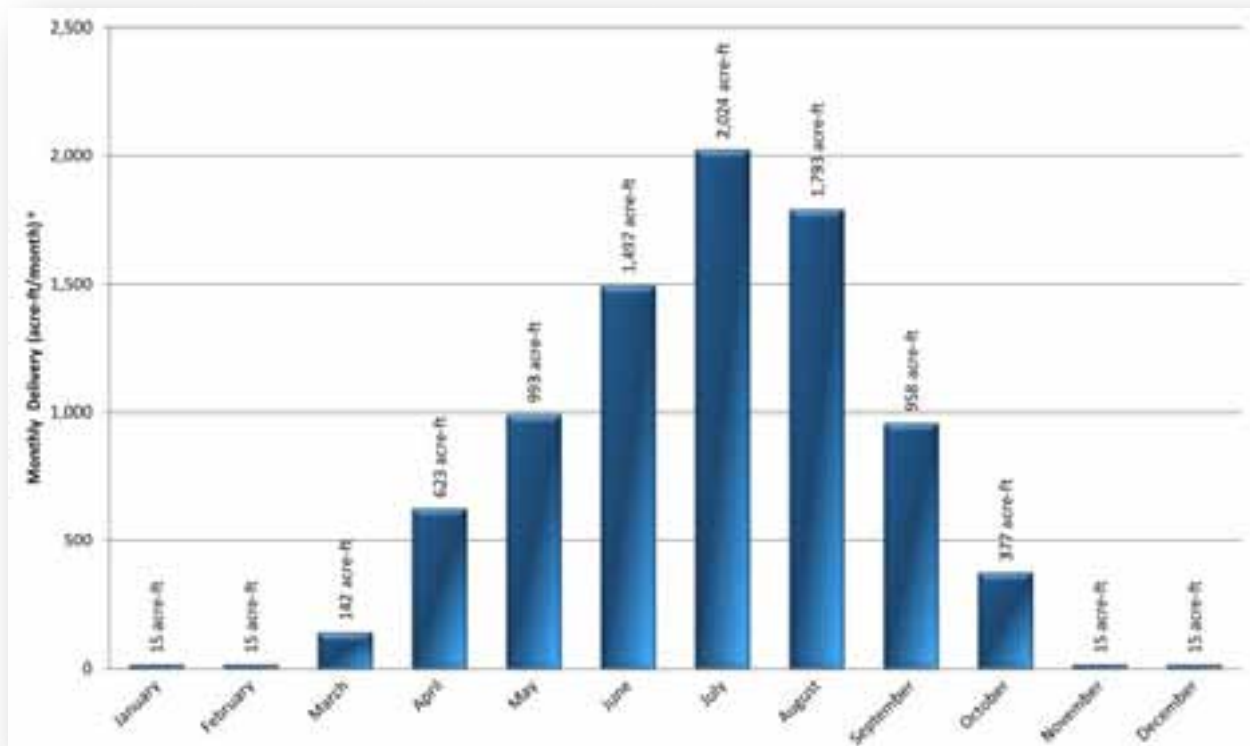


Figure 1 - Design Delivery

### Conclusion

Based on the above analysis (Scenario 3 in **Table 1**) accounting for impervious area at 943 acres and 15% system distribution losses, 8,500 acre-ft water delivered to the LOP will provide for the average irrigation demand (50% exceedence) of the LOP. It should be noted that additional impervious area has been added since 1992, but detailed information of the additional impervious area is not readily available. It should further be noted that the estimate of distribution system losses cannot be verified at this time due to lack of meters in the irrigation system. As the project moves forward to Feasibility, the actual increase in impervious area and actual distribution system losses should be developed and irrigation demand exceedence should be recalculated.

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# ***APPENDIX H***

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## **Cultural Resources**



# Lower Clearwater Exchange Project Background Research for Cultural Resources

## **Report No. 11-NPT-05**

Nez Perce Tribe Cultural Resource Program  
PO Box 365, Lapwai, Idaho

Jessica Glindeman and Patrick Baird  
April 5, 2011

### **Introduction**

J-U-B Engineers, Inc., and the Nez Perce Tribe Office of Legal Counsel requested the assistance of the Nez Perce Tribe Cultural Resource Program (CRP) to conduct preliminary cultural resource background research for the proposed Lower Clearwater Exchange Project (LCEP). The LCEP will end LOID diversion of water from the Lower Lapwai/Sweetwater Creek watersheds and replacing it with an alternative water system from a different water source. The LCEP objectives are 1) to provide water to the Lewiston Orchards Irrigation District (LOID), while 2) permanently resolve recurring Endangered Species Act, and 3) resolve federal-tribal fiduciary issues.

The CRP conducted research to identify known cultural resources and historic properties that might be affected by the LCEP, as part of the current Appraisal Investigation of the LCEP and alternatives under the Bureau of Reclamations Rural Water Supply Program (RWSP). The project proponents identified four project alternatives, including one route to connect Mann Lake with the Clearwater River, two routes to connect Mann Lake with the Snake River, and one alternative based on new ground water/well areas within LOID that would also connect to Mann Lake.

### **Methodology**

The CRP attempted to identify all previously documented historic properties, archaeological sites, and ethnographic sites within 1.0 mile of the proposed project corridors. CRP staff conducted a record search with the Idaho State Historic Preservation Office (SHPO). Since Mann Lake, the eastern end of the project, is on the Nez Perce Indian Reservation, so CRP staff also conducted a record search with the Tribal Historic Preservation Office (THPO) and the National Register of Historic Places (NRHP) online database.

The CRP reviewed Government Land Office (GLO) Plat Maps through the Bureau of Land Management (BLM) website and cultural resource reports on file at the THPO concerning the project areas for archaeological, historical, ethnographic, and traditional cultural properties. CRP staff also conducted a “windshield survey” of the proposed project routes to identify historic structures or other resources not included in the SHPO record search. The CRP did not conduct archaeological fieldwork or surveys during this research.

### **Results**

Between March 21 and March 28, 2011, the CRP conducted background research including the review of historic GLO plat maps, cultural resource literature, including archaeological reports and ethnographic

studies, and the NRHP database. Because of the compressed timeline of the project (three weeks from signed contract to report due date), the reports have not been completely reviewed. Reports on file with the THPO were reviewed, but CRP staff has not been able retrieve reports on file with the SHPO. This will be completed for the final draft of this report.

This report lists all documented cultural resources (Tables 1 and 2), and any known or suspected ethnographic or traditional properties (Table 3), and all previous cultural resource project within 1.0 mile of the project area identified by the ASI record search in Appendix A.

CRP staff conducted a record search with the SHPO on March 22, 2011 (Record search number ASI # 11170). Results from the record search with the Idaho SHPO office included 43 cultural resource reports (Appendix A). A total of 5 historical sites (Table 1) and 14 archaeological sites (Table 2) were identified through the record search.

The CRP reviewed THPO literature and maps to identify any documented ethnographic or traditional properties (Table 3). Ethnographic cultural sites and Traditional Cultural Properties (TCPs) were both identified to be within the projects area of potential effect (APE). Additionally, a historic Nez Perce trail is located within all of the proposed project areas, and directly coinciding with the Snake River pipeline route.

On April 1, 2011, the CRP staff conducted a windshield survey of all proposed pipeline routes. Many potential historic homes were observed on Burrell Avenue. Additionally, two potentially historic buildings were observed on Southport Avenue near the Lewiston airport. Photographs and GPS locations were taken at each location. Further research will be conducted on these properties in the next phase of this project.

Government Land Office (GLO) Plat Maps were reviewed through the Bureau of Land Management (BLM) website. No historic structures or other features were identified on the maps, except for the names of property owners. The CRP reviewed the following plats: T26N R5W Section 35, T35N R4W Sections 5, 6, 8, 16, and 17, and T35N R6W Sections 12, 13, 14, 23, 24, and 25.

### **National Register Sites**

The NRHP is a nationwide listing of important historic properties that meet criteria defined by the Secretary of Interior and the National Park Service. "The NRHP contains a wide range of historic property types, reflecting the diversity of the nation's history and culture. Buildings, structures, and sites; groups of buildings, structures or sites forming historic districts; landscapes; and individual objects are all included in the Register if they meet the criteria specified in the National Register's Criteria for Evaluation (36 CFR 60.4). Such properties reflect many kinds of significance in architecture, history, archeology, engineering, and culture" (Parker and King 1998:1).

Three properties are listed on the NRHP within 1.0 mile of the proposed project areas: the Snake River Archaeological District, and the archaeological sites 10NP151 and 10NP143. Site 10NP 143, called Hatwai or *Aht'wy*, is the oldest known archaeological site on the Nez Perce Indian Reservation and one of the oldest sites in Idaho. Intermittent occupations by ancestral Nez Perce date from 10,800 BP

(Before Present) to the 1800s. Lewis and Clark noted Nez Perces living at this site in 1805-1806. Site 10NP151, also called Hasotino, is a contributing element to the Snake River Archaeological District. This site was occupied as far back as 4000 BP. The Snake River Archaeological District is the is a multiple-property listing of archaeological sites on both sides of the Snake River from Asotin, Washington, to China Gardens, on the Oregon border.

The Steamboat Jean is listed on the NRHP, although the boat is not currently moored at the listed address at the Hells Gate Marina. Ten historic buildings in Lewiston, Idaho are listed on the NRHP, but none are within 1.0 mile of the project area. In Washington, the Grace Memorial Church in Asotin is listed on the NRHP, but the project will not have any effect on this property.

### **Historic Buildings and Structures**

The CRP is waiting for additional information from the SHPO about the two historic structures and two historic houses determined eligible for NRHP listing by the Idaho SHPO (Table 1). CRP staff also identified several historic homes along Burrell Avenue and two historic structures near the Lewiston Airport that may require additional investigation during the next phase of the project. It is unlikely that any of these properties would be adversely affected by the project.

**Table 1** Previously identified historic buildings and structures

IHSI No.	Type	Name	NRHP Status
69-14221	Structure	Steamboat Jean	Listed
69-15661	Building	Hillcrest Apartments	Eligible
69-17936	Structure	Reservoir "A" Dam	Eligible
69-18068	Building	House - 1111 Powers Ave.	Eligible
45AS110	Building	Grace Presbyterian Church (Asotin)	Listed

### **Archaeological Sites**

The SHPO record search revealed 14 Precontact archaeological sites and 5 historic sites within 1-mile of the project areas. Three of the Precontact sites are listed on the National Register of Historic Places; 10NP142, 10NP151, and the Snake River Archaeological District. The data received from the SHPO and THPO record search are organized (Table 2) by site number, description, and National Register of Historic Places status. Numerous Precontact village sites camps, burials, and pictograph sites have been documented within the 1.0 mile buffer for the project area.

Most of the previously recorded archaeological sites are located near the Snake and Clearwater Rivers. While large habitation sites are expected along major rivers and tributaries, resource procurement and other site types are found in other environmental settings. It is anticipated that additional archaeological sites will be identified through inventory surveys in the next phase of the project, as most of the project area has not been previously surveyed.

**Table 2** Previously identified archaeological sites.

Site Number	Description	National Register Status
10NP109	Excavated Burials	Eligible
10NP110	Excavated Burials	Eligible
10NP131	Excavated Burials	Eligible
10NP143	Village	Listed
10NP144	Village/Camp Site	Eligible
10NP151	Village-Ca. 4000 BP Housepits, Burials, Stone Tools	Listed
10NP287	Rock shelter with Pictographs	Eligible
10NP292	Cores, Projectile Points, Pestles, Hammerstones, Unifaces	Eligible
10NP336	Flakes, Cobble Tools, Points, Elk Bone	Eligible
10NP351	3 bone fragments	Eligible
10NP353	Projectile Point	Eligible
45AS26	Snake River Archaeological District	Listed
45AS204	Excavated Burials	Eligible

### **Traditional Cultural Properties**

Traditional Cultural Properties (TCPs) are historic sites with “traditional significance” to living communities. The sites relate to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. Four Nez Perce ethnographic sites have been identified in published literature within the 1.0 mile buffer for the project area (Table 3). Because of their sensitive nature, these locations are not shown on the project map (Figure 1). Additional research is needed to determine the extent of these properties and potential adverse effects of the project on them.

The results of any studies will be provided directly to the Bureau of Reclamation in recognition of the federal government responsibility to keep the information confidential.

**Table 3** Previously identified TCP sites

Name	Type	NRHP Status
<i>Poho spa</i>	Traditional Cultural Property	Undetermined
	Traditional Cultural Property	Unevaluated
<i>. Snime ? yi. wewi</i>	Precontact Village	Undetermined
	Precontact Camp	Undetermined

### **Recommendations for additional cultural resource work.**

Background research has identified five historic buildings and structures, 14 archaeological sites, and four traditional cultural properties within one mile of the proposed project corridors. Reports obtained from the Idaho SHPO and Nez Perce THPO indicate that most of the project areas have not been

previously surveyed for cultural resources. Most of the surveys focus on the Snake and Clearwater Rivers and historic buildings, with limited project-specific surveys scattered around the project areas. In addition, many of these studies were completed in the 1960s and 1970s, when documentation standards were very different than today.

Cultural resource studies should be completed for all the project areas. These studies should include inventory surveys for archaeological and historic properties, as well as ethnographic research to identify traditional cultural properties important to the Nez Perce Tribe. The researchers must meet the Secretary of Interior standards for cultural resource professionals. All archaeological sites should be documented using standard Archaeological Survey of Idaho (ASI) forms, while historic buildings and structures should be documented using ISHI forms. Ethnographic resources will be documented to standards established by the Nez Perce Tribe Cultural Resource Program.

The researchers should make recommendations of eligibility for listing on the NRHP using criteria defined in Bulletins 15 and 38. The researchers should also include recommendations for additional research needs and mitigation measures where appropriate.

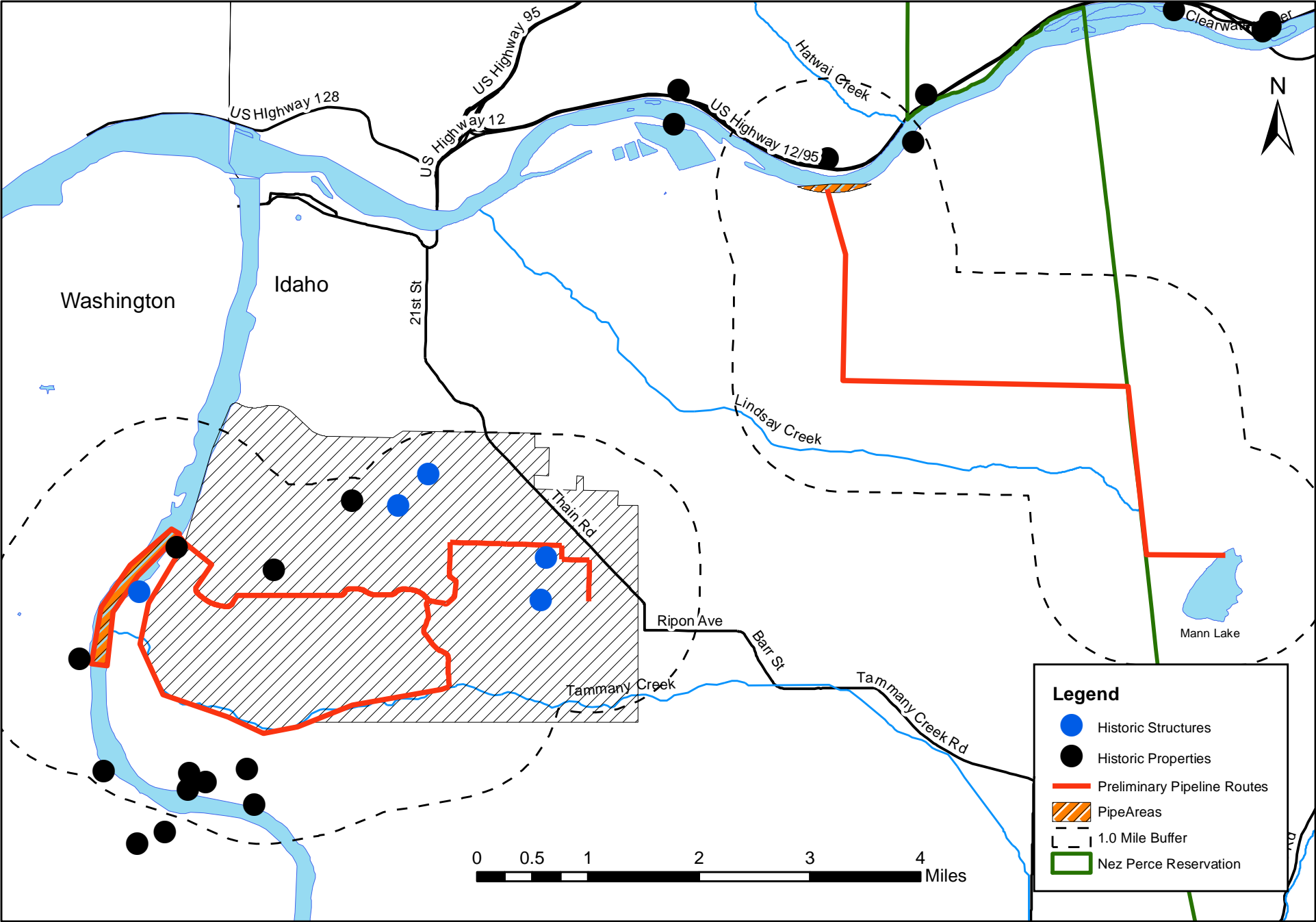
#### **Citations**

Parker, Patricia L., and Thomas F. King

- 1998 Guidelines for Evaluating and Documenting Traditional Cultural Properties. *National Register Bulletin 38*. National Park Service, Washington, D.C.

Figure 1

LCEP - Results of Cultural Resource Background Research  
Nez Perce Tribe Cultural Resource Program





## Appendix A

**Previous cultural resource studies within 1.0 mile of the project areas provided by the Idaho SHPO (Record search number ASI # 11170).**

Intensive pedestrian surveys utilize 30 meter (100 feet) transect spacing or less. Reconnaissance surveys include windshield, intuitive, or pedestrian transects spaced more than 30 meters apart.

Legal	Report Number	Title	Author	Year	Agency Name	Project Number	Intensive	Recon
35N4W16 35N4W17	1998/782	Proposed structural modifications to Reservoir "A" Dam. BOR, Boise, Idaho.	Leicht, R.	1998	Bureau of Reclamation (BOR)		20	
35N4W16	2008/245	McGhee Elementary/Centennial Elementary SR2S, Lewiston. Idaho Department of Transportation, Boise, ID.	Johnson, J.	2008	Idaho Transportation Department (ITD)	A010(987)	10	
35N5W15	2007/156	Cultural Resource Survey for the Proposed 1416 Alder Avenue Housing Project. Moscow, Id.	Sappington, R.	2006	Indian Community Block Program		2	
35N5W16 35N5W17 35N5W18	1996/116	Proposed Bryden Avenue Expansion Project. Idaho Transportation Dept.	Polk, Michael	1995	ITD	DPI-0060(001)	4	0
35N5W16	1996/855	Home Development.	McFarland, Sandi	1995	Sandi McFarland		1	0
35N5W17	2001/922	Proposed Lamm Cell Tower Site. Walsworth & Associates, Ketchum, ID.	Taylor Walsworth, C.	2001	Other		1	
35N5W17	2007/853	Tullamore Senior Apartment Complex, Lewiston	Mauser, L.	2007	Housing and Urban Development (HUD)		4	
35N5W18	1994/396	A Cultural Resources Survey of the Proposed Bryden Canyon Road Project, Nez Perce County, Idaho. Sagebrush Archaeological Consultants, Ogden, Utah.	Polk, Michael	1994	ITD	DPI-0060(001)	118	0
35N5W18 35N6W13	1999/829	Environmental Assessment: Lewiston-Nez Perce Regional County Airport, Runway Safety Area Expansion. Terracon, Dallas, TX.	Procter, R.	1999	Misc.		39	44
35N5W18	2008/245	McGhee Elementary/Centennial Elementary SR2S, Lewiston. Idaho Department of Transportation, Boise, ID.	Johnson, J.	2008	ITD	A010(987)	10	
35N5W2	2001/579	Albright Aggregate Source Expansion. Idaho Transportation Department.	Sappington, R.L.	1998	ITD		16	

Legal	Report Number	Title	Author	Year	Agency Name	Project Number	Intensive	Recon
35N5W22	2001/942	Howards Cell Tower Site, UbiquiTel Site: SPO4XC124, 1414 1/2 Ripon Avenue, Lewiston, Idaho. Plateau Investigations, Pullman, Washington.	Harder, D.	2001	Other		1	
35N5W8	1996/838	Turnberry At Village Green.	McFarland, Sandi	1996	Sandi McFarland		1	0
35N5W8	1999/741	Troon Apartments. BIA.	McFarland, S.	1999	HUD			5
35N5W9	2005/299	Proposed Community Park for the City of Lewiston. University of Idaho, Moscow, ID.	Sappington, L.	2004	Other		305	
35N6W13 35N6W14 35N6W23 35N6W25 35N6W26	1989/5090	Stylistic Locales & Ethnographic Groups: Petroglyphs of the Lower Snake River. Occasional Papers of the ISU Museum, No. 23.	Nesbitt, Paul	1968			0	0
35N6W13 35N6W14 35N6W23 35N6W25 35N6W26 35N5W26 35N5W34 36N5W35	2001/904	Corps of Engineers Dredge Material Management Study, Lewiston Levee Modifications, Asotin & Whitman Counties, Washington and Nez Perce County, Idaho. NWAA, Seattle, WA.	Mauser, L., L. Norman	1999	Army Corps of Engineers (ACE)		40	
35N6W14 35N6W23 35N6W26	1989/5642	Letter report to Corps of Engineers regarding Tammany Creek Marina, Hell's Gate State Park, April 16, 1973. University of Idaho.	Rice, David	1973	ACE		0	0
35N6W14	1998/790	Results of Archaeological Investigations at the Proposed Settling Pond for Atlas Sand and Rock Company, Hells Gate State Park, Lewiston, Idaho. University of Idaho, Moscow, Idaho.	Sappington, R.	1997	ACE			
35N6W14 35N6W23	2003/463	Hells Gate State Park Modernizations, 2003. Corps of Engineers.	Sappington, R.L.	2003	ACE		40	
35N6W14	2006/443	Hells Gate Park Kiosk Move. Corps of Engineers.	Tracy, R.	2006	ACE		1	
35N6W23	1996/261	Hells Gate Access Road. Corps of Engineers.	Tracy, Ray	1996	ACE		1	0

Legal	Report Number	Title	Author	Year	Agency Name	Project Number	Intensive	Reconn
35N6W23	1999/826	Dredging and Disposal of Dredged Materials at Hells Gate State Park. University of Idaho, Moscow.	Sappington, R. L.	1998	Idaho Department of Parks and Recreation		3	
35N6W23 35N5W23	2002/226	Hell's Gate State Park Vegetation Plots. Corps of Engineers, Walla Walla District.	Keith, M.	2002	ACE		9	
35N6W25	1989/5089	Archaeological Survey and Test, Asotin Dam Reservoir Area, Southeastern Washington. Washington State University, Pullman.	Nelson, Charles and David Rice	1969			0	0
35N6W25	1999/735	Hells Gate State Park Trail Reconstruction and Maintenance, 1999. Corps of Engineers, Walla Walla Dist., WA.	Keith, M.	1999	ACE		10	
35N6W25 35N6W26	2003/533	Hells Gate Habitat Management Unit Trail Benches, 2003. Corps of Engineers.	Tracy, R.	2003	Corps of Engineers	03-LoGr-009	1	
35N6W25 35N6W26	2003/536	Hells Gate Habitat Management Unit Avista Utilities Pole Replacement 2003. Corps of Engineers.	Tracy, R.	2003	ACE	02-LoGr-028	4	
35N6W26 36N5W25	1989/5991	Testing in the Little Goose Reservoir and the Lower Granite Reservoir. Laboratory of Anthropology, University of Idaho.	Sappington, Lee	1985	ACE, Walla Walla	9/30/1986	15	0
35N6W26	1998/800	Hells Gate Seeding Project, 1997. Corps of Engineers, Walla Walla, Washington.	Tracy, R.	1997	ACE		6	
36N5W25 36N5W34 36N5W35 36N5W36	1989/2297	Archaeological Reconnaissance of the Shoreline of Lower Granite Dam Reservoir, Washington & Idaho. U of I Anthropological Research. Manuscript Series No. 55.	Gurcke, Karl , R. L. Sappington, Diana Rigg, and Ruthann Knudson	1979			0	0
36N5W25 36N5W34 36N5W35 36N5W36	1989/6507	The 1978 Clearwater River Study. U of I Anthropological Research Manuscript Series, No. 82.	Stapp, Darby, Edgar Bryan, and Diana Rigg	1984			0	0
36N5W25	1991/893	Henderson Truck Plaza Acquisition. Nez Perce Tribe.	Webb, Chris	1991	Nez Perce Tribe		25	0

Legal	Report Number	Title	Author	Year	Agency Name	Project Number	Intensive	Recon
36N5W25	1996/662	Aht'wy Cultural Survey. Nez Perce Cultural Resource Program.	Lyon, Jason	1996	Nez Perce Cultural Resource Program (NPTCRP)	96-NPT-2	3	0
36N5W25	1998/789	Results of Archaeological Test Investigations in the Vicinity of the Nez Perce Express II at AHT'WY PLAZA, Nez Perce Indian Reservation, North Central Idaho. University of Idaho, Moscow, Idaho.	Sappington, R.	1998	University of Idaho			
36N5W25 36N5W26 36N5W35	2000/875	Aht'wy to Lewiston Wastewater Treatment Survey. Nez Perce Tribe, Lapwai, ID.	Lyon, J.	2000	NPTCRP	00-NPT-1	1	
36N5W25	2001/954	Roy Busch. NRCS.	Gribble, R.	2001	National Resource Conservation Service	NRCS013410	1	
36N5W25	2005/178	The Archaeology of Hatwai (10-NP-143) and the Southeastern Columbia Plateau. Contract between the Idaho Division of Highways and the State Historic Preservation Office.	Ames, K.	1990	ITD			
36N5W25 36N5W35	2005/181	Lower and Upper Goose Pasture River Access Roads Reconditioning Update. Corps of Engineers, Walla Walla District.	Tracy, R.	2004	ACE		2	
36N5W25	2006/447	UbiquiTel New Tower Site. Plateau Investigations, Pullman, WA.	Harder, D.	2006	Other	SPO3UB075	1	
36N5W26	1994/716	Hatwai Creek Demonstration Project and Waha Picnic Area. Nez Perce National Forest.	Schacher, Cindy L.	1994	Nez Perce National Forest	94-SCS-1	5	0
36N5W26 36N5W35	2003/9	Clearwater Power Company's Proposed Spaulding Substation and 115kV Transmission Line, Nez Perce County. Prepared by Plateau Investigations, Pullman, WA.	Harder, D.	2002	Other		3	
36N5W35	2003/462	Lower Goose Pasture Tree Planting 2003. Corps of Engineers.	Tracy, R.	2003	ACE		4	

## Appendix B

June 30, 2011

### Introduction

J-U-B Engineers, Inc., and the Nez Perce Tribe Office of Legal Counsel requested the assistance of the Nez Perce Tribe Cultural Resource Program (CRP) to conduct additional cultural resource background research for the proposed Lower Clearwater Exchange Project (LCEP). J-U-B Engineers, Inc., proposed two alternative routes to their original project design (Map 2). In response to this alteration the J-U-B Engineers has requested assistance from the CRP to conduct research to identify any known cultural resources or historic properties that might be affected by the LCEP's alternative routes.

### Results

The CRP staff conducted a record search with the Idaho SHPO office on June 29, 2011 (Record search number ASI# 11313). Results from the record search with the SHPO office included additional information not revealed in the original record search conducted in April, 2011. A total of 4 new cultural resource reports (Table 4) and 2 historic buildings were identified (Table 5). The Idaho SHPO record search showed no archaeological sites within 1-mile of the LCEP's alternative routes.

Legal	Report No.	Title	Author	Year	Agency Name	Project No.	Intensive	Reconn
35N5W16	2010/300	Evaluation of Historic Buildings Adjacent to the City of Lewiston's Proposed Lewiston Partnership Project. EWU, Cheney, WA.	Emerson, S.	2010	Idaho Transportation Department	A011(516)	2	
35N5W23	1998/842	Perda Berenson. NRCS.	Preston, K.	1998	NRCS	NRCS982320	1	
35N5W4	2001/938	UbiquiTel Site: SPO4XC123, 700 Lindsay Creek Road, Lewiston, Idaho. Plateau Investigations, Pullman, Washington.	Harder, D.	2001	Other		1	
35N5W9	2009/342	City of Lewiston Community Park. Lee Sappington, Moscow, ID.	Sappington, L.	2004	Other		305	

**Table 4.** Previous cultural resource studies within 1-mile radius of project areas provided by Idaho SHPO (Record search number ASI#11313)

IHSI No.	Type	Name	NRHP Status
69-18060	Building	Birch Ave. house - 1732	Eligible
69-18075	Building	1412 Alder Avenue	Eligible

**Table 5.** Previously identified historic buildings.

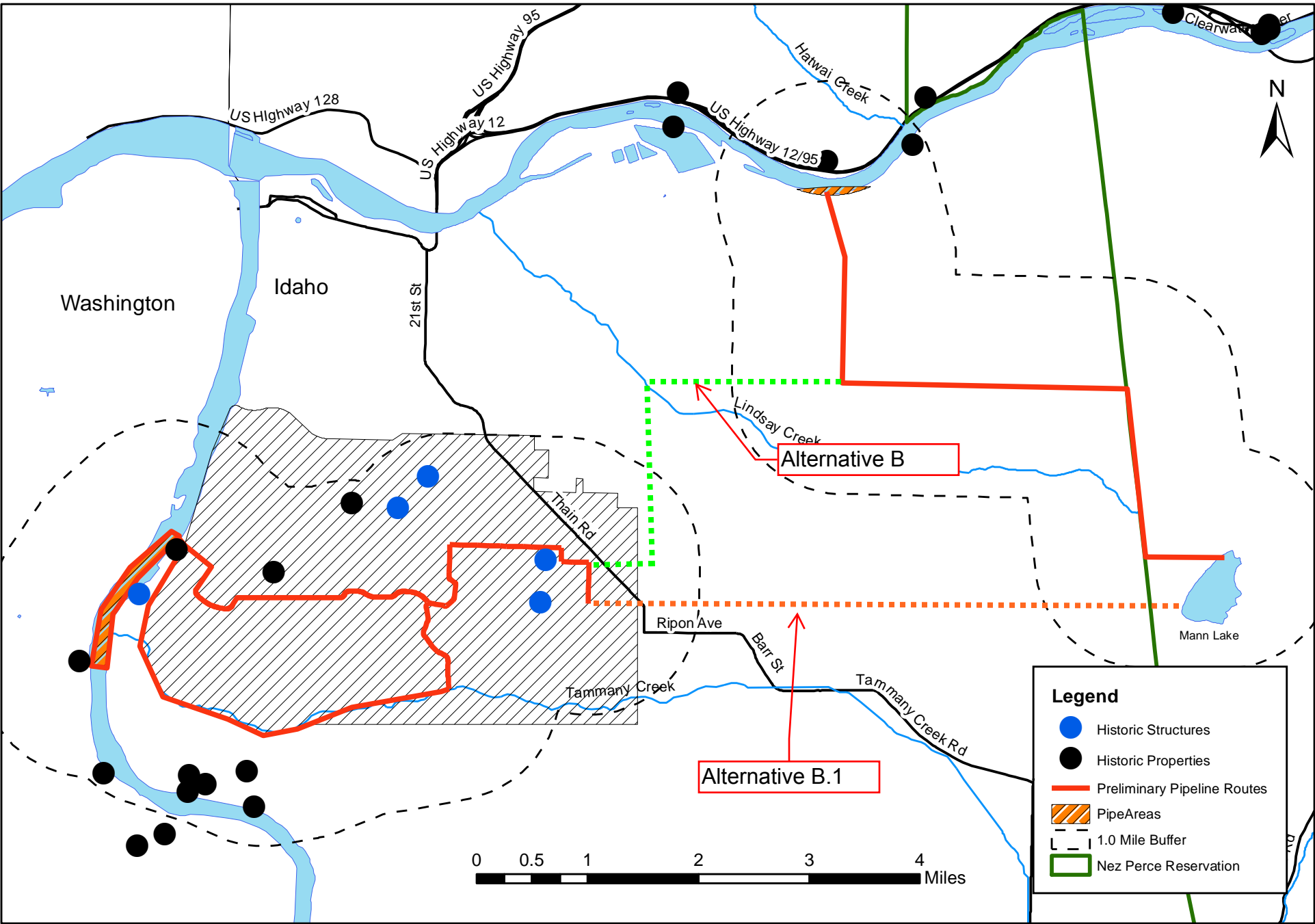
### **Conclusions and Recommendations**

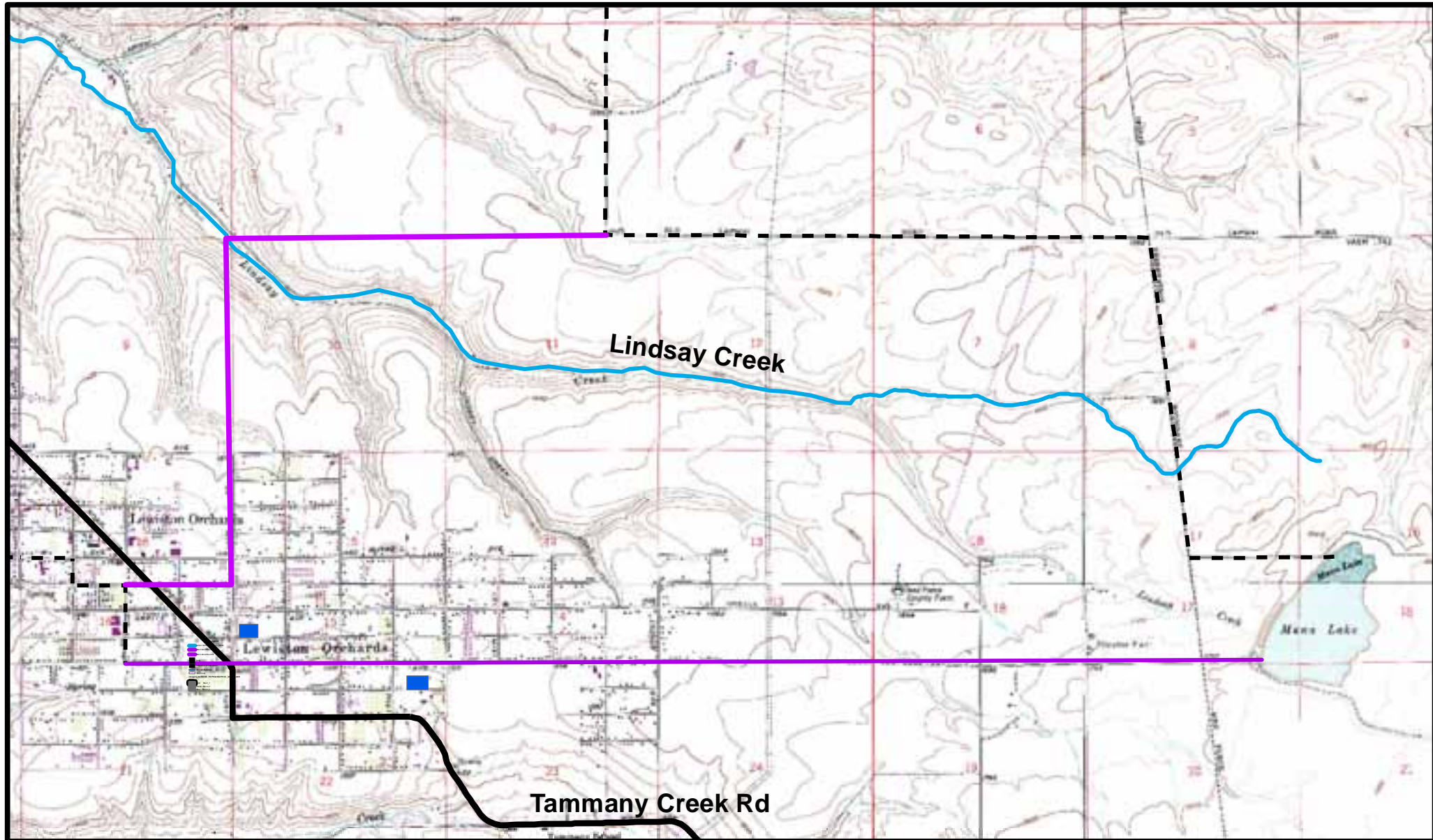
Cultural resource studies should be completed for all the project areas. These studies should include inventory surveys for archaeological and historic properties, as well as ethnographic research to identify traditional cultural properties important to the Nez Perce Tribe.



Figure 1

LCEP - Results of Cultural Resource Background Research  
Nez Perce Tribe Cultural Resource Program





**Legend**

- Alternative Route C
- Alternative Route B
- Preliminary Pipe Routes
- Historic Buildings



USGS 7.5' Quadrangle  
Lewiston Orchards South [1971]  
Lewiston Orchards North [1971]  
NAD83, UTM Zone 11

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# ***APPENDIX I***

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## **Detailed Cost Estimates**

<b>FEATURE:</b> <b>Alternative B - Clearwater River Pump Station - Mann Lake Discharge</b>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>				
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b>		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b>		
			<b>FILE:</b> \\wswfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake				
<b>Civil</b>							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<b>River Pump Station</b>					
		Concrete River Pump Station Structure		1	LS	\$187,000.00	\$187,000.00
		Mechanical Fish Screens		4	EA	\$49,400.00	\$197,600.00
		600 HP Pump Unit		6	EA	\$110,000.00	\$660,000.00
		Switchgear		6	EA	\$130,000.00	\$780,000.00
		Pump/Electrical Equipment Structure		1	LS	\$241,500.00	\$241,500.00
		Structure Electrical/HVAC		1	LS	\$75,000.00	\$75,000.00
		Electrical Service*		1	LS	\$500,000.00	\$500,000.00
		Intake Pipe and Pump Cans		1	LS	\$210,000.00	\$210,000.00
		Discharge Pipeing and Valves		6	EA	\$20,200.00	\$121,200.00
		Surge Anticipation/Pump Control Valving		1	LS	\$92,000.00	\$92,000.00
		Flow Meter		1	LS	\$12,000.00	\$12,000.00
		Excavation/Backfill		1	LS	\$56,200.00	\$56,200.00
		Dewatering		1	LS	\$318,000.00	\$318,000.00
		Site Improvements		1	LS	\$40,000.00	\$40,000.00
		Fencing		1	LS	\$9,000.00	\$9,000.00
		* Preliminary estimate from Clearwater Power Company					
		<b>Penstock</b>					
		26", 42 ksi Steel Pipe, 3/8" wall		160	FT	\$235.00	\$37,600.00
		26", 42 ksi Steel Pipe, 5/16" wall		290	FT	\$175.00	\$50,750.00
		26", 42 ksi Steel Pipe, 1/4" wall		2,150	FT	\$155.00	\$333,250.00
		26", 42 ksi Steel Pipe, 3/16" wall		670	FT	\$155.00	\$103,850.00
		26", 42 ksi Steel Pipe, 10 ga. Wall		16,630	FT	\$126.00	\$2,095,380.00
		24" DR 25 PVC Pipe		14,700	FT	\$68.00	\$999,600.00
		Rock Excavation		3,500	FT	\$100.00	\$350,000.00
		Fittings		1	LS	\$200,000.00	\$200,000.00
		Valving		1	LS	\$30,000.00	\$30,000.00
		Railroad Utility Crossing		1	LS	\$70,000.00	\$70,000.00
		Railroad Access Crossing		1	LS	\$20,000.00	\$20,000.00
		Bedding		34,600	FT	\$3.00	\$103,800.00
		Air/Vacuum Release Valve		1	LS	\$70,000.00	\$70,000.00
		<b>SUBTOTAL THIS SHEET</b>					<b>\$7,963,730.00</b>
<b>QUANTITIES</b>			<b>PRICES</b>				
BY		CHECKED	BY		CHECKED		
DATE PREPARED		PEER REVIEW / DATE	DATE PREPARED		PEER REVIEW / DATE		

<b>FEATURE:</b> <b>Alternative B - Clearwater River Pump Station - Mann Lake Discharge</b>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>				
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b>		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b>		
			<b>FILE:</b> \\wswfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake				
<b>Civil</b>							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<b>Penstock (cont.)</b>					
		Surge Tank and Piping		1	LS	\$220,000.00	\$220,000.00
		Pipe Slope Anchoring		1	LS	\$45,000.00	\$45,000.00
		Cathodic Protection		1	LS	\$59,700.00	\$59,700.00
		<b>Mann Lake Structure</b>					
		Discharge Structure		1	LS	\$15,000.00	\$15,000.00
		Site Improvements		1	LS	\$5,000.00	\$5,000.00
		<b>Miscellaneous</b>					
		Mobilization		1	LS	\$787,000.00	\$787,000.00
		ACP Road Repair		44,800	SQYD	\$20.00	\$896,000.00
		Gravel Road/Shoulder Repair		54,000	SQYD	\$6.00	\$324,000.00
		Hydroseeding		1	LS	\$40,000.00	\$40,000.00
		SCADA System		1	LS	\$125,000.00	\$125,000.00
		Traffic Control		1	LS	\$93,200.00	\$93,200.00
		Trench Safety		1	LS	\$57,600.00	\$57,600.00
		<b>Subtotal</b>					
		Planning Level Construction Contingency(25%)		1	LS	\$2,657,808.00	\$2,657,808.00
		<b>Construction Total</b>					
		Sales Tax (6.5%)		1	LS	\$863,787.00	\$863,787.00
		Design Engineering (10%)		1	LS	\$1,328,904.00	\$1,328,904.00
		Surveying		1	LS	\$100,000.00	\$100,000.00
		Geotechnical Services		1	LS	\$150,000.00	\$150,000.00
		Construction Management		1	LS	\$1,328,904.00	\$1,328,904.00
		Legal, Admin, Grant Admin Fees, Misc (10%)		1	LS	\$1,328,904.00	\$1,328,904.00
		Permit Acquisition		1	LS	\$80,000.00	\$80,000.00
		Land/Right of Way Acquisition		1	LS	\$200,000.00	\$200,000.00
		<b>Project Total</b>					\$18,670,000.00
		<b>SUBTOTAL THIS SHEET</b>					
<b>QUANTITIES</b>			<b>PRICES</b>				
BY	CHECKED		BY	CHECKED			
DATE PREPARED	PEER REVIEW / DATE		DATE PREPARED	PEER REVIEW / DATE			

<b>FEATURE:</b>			<b>PROJECT:</b>					
<b>Alternative B.1 - Clearwater River Pump Station - Mann Lake Discharge with Main on Powers Ave.</b>			<b>Lewiston Orchards Project, Idaho Lower Clearwater Exchange Appraisal Investigation</b>					
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b>			<b>Appraisal</b>
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b>			<b>Apr-11</b>
			<b>FILE:</b> \\wswfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake					
<b>Civil</b>								
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		<b>River Pump Station</b>						
		Concrete River Pump Station Structure		1	LS	\$187,000.00	\$187,000.00	
		Mechanical Fish Screens		4	EA	\$49,400.00	\$197,600.00	
		600 HP Pump Unit		6	EA	\$110,000.00	\$660,000.00	
		Switchgear		6	EA	\$130,000.00	\$780,000.00	
		Pump/Electrical Equipment Structure		1	LS	\$241,500.00	\$241,500.00	
		Structure Electrical/HVAC		1	LS	\$75,000.00	\$75,000.00	
		Electrical Service*		1	LS	\$500,000.00	\$500,000.00	
		Intake Pipe and Pump Cans		1	LS	\$210,000.00	\$210,000.00	
		Discharge Pipeing and Valves		6	EA	\$20,200.00	\$121,200.00	
		Surge Anticipation/Pump Control Valving		1	LS	\$92,000.00	\$92,000.00	
		Flow Meter		1	LS	\$12,000.00	\$12,000.00	
		Excavation/Backfill		1	LS	\$56,200.00	\$56,200.00	
		Dewatering		1	LS	\$318,000.00	\$318,000.00	
		Site Improvements		1	LS	\$40,000.00	\$40,000.00	
		Fencing		1	LS	\$9,000.00	\$9,000.00	
		* Preliminary estimate from Clearwater Power Company						
		<b>Penstock</b>						
		26", 42 ksi Steel Pipe, 3/8" wall		160	FT	\$235.00	\$37,600.00	
		26", 42 ksi Steel Pipe, 5/16" wall		290	FT	\$175.00	\$50,750.00	
		26", 42 ksi Steel Pipe, 1/4" wall		2,150	FT	\$155.00	\$333,250.00	
		26", 42 ksi Steel Pipe, 3/16" wall		670	FT	\$155.00	\$103,850.00	
		26", 42 ksi Steel Pipe, 10 ga. Wall		16,630	FT	\$126.00	\$2,095,380.00	
		24" DR 25 PVC Pipe		14,700	FT	\$68.00	\$999,600.00	
		Rock Excavation		3,500	FT	\$100.00	\$350,000.00	
		Fittings		1	LS	\$200,000.00	\$200,000.00	
		Valving		1	LS	\$30,000.00	\$30,000.00	
		Railroad Utility Crossing		1	LS	\$70,000.00	\$70,000.00	
		Railroad Access Crossing		1	LS	\$20,000.00	\$20,000.00	
		Bedding		34,600	FT	\$3.00	\$103,800.00	
		Air/Vacuum Release Valve		1	LS	\$70,000.00	\$70,000.00	
		<b>SUBTOTAL THIS SHEET</b>					<b>\$7,963,730.00</b>	
<b>QUANTITIES</b>			<b>PRICES</b>					
<b>BY</b>		<b>CHECKED</b>	<b>BY</b>		<b>CHECKED</b>			
<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>	<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>			







<b>FEATURE:</b> <b>Alternative C - Clearwater River Pump Station - Distribution System Discharge</b>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>				
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b> <b>Appraisal</b>		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b> <b>Apr-11</b>		
			<b>FILE:</b> \\wswfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake				
<b>Civil</b>							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<b>River Pump Station</b>					
		Concrete River Pump Station Structure		1	LS	\$187,000.00	\$187,000.00
		Mechanical Fish Screens		4	EA	\$49,400.00	\$197,600.00
		600 HP Pump Unit		6	EA	\$110,000.00	\$660,000.00
		Switchgear		6	EA	\$155,000.00	\$930,000.00
		Pump/Electrical Equipment Structure		1	LS	\$241,500.00	\$241,500.00
		Structure Electrical/HVAC		1	LS	\$95,000.00	\$95,000.00
		Electrical Service*		1	LS	\$500,000.00	\$500,000.00
		Intake Pipe and Pump Cans		1	LS	\$210,000.00	\$210,000.00
		Discharge Pipeing and Valves		6	EA	\$20,200.00	\$121,200.00
		Surge Anticipation/Pump Control Valving		1	LS	\$23,000.00	\$23,000.00
		Filters		6	EA	\$22,000.00	\$132,000.00
		Flow Meter		1	LS	\$12,000.00	\$12,000.00
		Excavation/Backfill		1	LS	\$56,200.00	\$56,200.00
		Dewatering		1	LS	\$318,000.00	\$318,000.00
		Site Improvements		1	LS	\$40,000.00	\$40,000.00
		Fencing		1	LS	\$9,000.00	\$9,000.00
		* Preliminary estimate from Clearwater Power Company					
		<b>Penstock</b>					
		26", 42 ksi Steel Pipe, 3/8" wall		160	FT	\$235.00	\$37,600.00
		26", 42 ksi Steel Pipe, 5/16" wall		290	FT	\$175.00	\$50,750.00
		26", 42 ksi Steel Pipe, 1/4" wall		4,590	FT	\$155.00	\$711,450.00
		26", 42 ksi Steel Pipe, 3/16" wall		8,180	FT	\$155.00	\$1,267,900.00
		26", 42 ksi Steel Pipe, 10 ga. Wall		15,980	FT	\$126.00	\$2,013,480.00
		24" DR 25 PVC Pipe		3,030	FT	\$56.00	\$169,680.00
		Rock Excavation		5,400	FT	\$100.00	\$540,000.00
		Fittings		1	LS	\$284,000.00	\$284,000.00
		Valving		1	LS	\$30,000.00	\$30,000.00
		Railroad Utility Crossing		1	LS	\$70,000.00	\$70,000.00
		Railroad Access Crossing		1	LS	\$20,000.00	\$20,000.00
		Bedding		32,230	FT	\$3.00	\$96,690.00
		<b>SUBTOTAL THIS SHEET</b>					<b>\$9,024,050.00</b>
<b>QUANTITIES</b>			<b>PRICES</b>				
BY		CHECKED	BY		CHECKED		
DATE PREPARED		PEER REVIEW / DATE	DATE PREPARED		PEER REVIEW / DATE		

<b>FEATURE:</b> <b>Alternative C - Clearwater River Pump Station - Distribution System Discharge</b>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>					
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b>			<b>Appraisal</b>
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b>			<b>Apr-11</b>
			<b>FILE:</b>					\\wsfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake
<b>Civil</b>								
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		<b>Penstock (cont.)</b>						
		Air/Vacuum Release Valve		1	LS	\$63,000.00	\$63,000.00	
		Surge Tank and Piping		1	LS	\$220,000.00	\$220,000.00	
		Pipe Slope Anchoring		1	LS	\$70,000.00	\$70,000.00	
		Cathodic Protection		1	LS	\$87,600.00	\$87,600.00	
		<b>Miscellaneous</b>						
		Mobilization		1	LS	\$807,600.00	\$807,600.00	
		ACP Road Repair		16,350	SQYD	\$20.00	\$327,000.00	
		Gravel Road/Shoulder Repair		12,700	SQYD	\$6.00	\$76,200.00	
		Hydroseeding		1	LS	\$24,000.00	\$24,000.00	
		SCADA System		1	LS	\$125,000.00	\$125,000.00	
		Traffic Control		1	LS	\$45,700.00	\$45,700.00	
		Trench Safety		1	LS	\$32,300.00	\$32,300.00	
		<b>Subtotal</b>						
		Planning Level Construction Contingency(25%)		1	LS	\$2,725,613.00	\$2,725,613.00	
		<b>Construction Total</b>						
		Sales Tax (6.5%)		1	LS	\$885,824.00	\$885,824.00	
		Design Engineering (10%)		1	LS	\$1,362,806.00	\$1,362,806.00	
		Surveying		1	LS	\$100,000.00	\$100,000.00	
		Geotechnical Services		1	LS	\$150,000.00	\$150,000.00	
		Construction Management		1	LS	\$1,362,806.00	\$1,362,806.00	
		Legal, Admin, Grant Admin Fees, Misc (10%)		1	LS	\$1,362,806.00	\$1,362,806.00	
		Permit Acquisition		1	LS	\$80,000.00	\$80,000.00	
		Land/Right of Way Acquisition		1	LS	\$200,000.00	\$200,000.00	
		<b>Project Total</b>					\$19,132,000.00	
		<b>SUBTOTAL THIS SHEET</b>						
<b>QUANTITIES</b>			<b>PRICES</b>					
BY		CHECKED	BY		CHECKED			
DATE PREPARED		PEER REVIEW / DATE	DATE PREPARED		PEER REVIEW / DATE			

<b>FEATURE:</b> <b>Alternative D - Snake River Pump Station - Tammany Creek Road Pipe Route</b>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>				
			<b>WOID:</b>		<b>ESTIMATE LEVEL: Appraisal</b>		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL: Apr-11</b>		
			<b>FILE:</b> \\wsfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake				
<b>Civil</b>							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<b>River Pump Station</b>					
		Passive Fish Screens		1	LS	\$450,000.00	\$450,000.00
		600 HP Pump Unit		6	EA	\$110,000.00	\$660,000.00
		Switchgear		6	EA	\$155,000.00	\$930,000.00
		Pump/Electrical Equipment Structure		1	LS	\$241,500.00	\$241,500.00
		Structure Electrical/HVAC		1	LS	\$95,000.00	\$95,000.00
		Electrical Service*		1	LS	\$80,000.00	\$80,000.00
		Intake Pipe and Pump Cans		1	LS	\$210,000.00	\$210,000.00
		Discharge Pipeing and Valves		6	EA	\$20,200.00	\$121,200.00
		Surge Anticipation Valve		1	LS	\$23,000.00	\$23,000.00
		Filters		6	EA	\$22,000.00	\$132,000.00
		Flow Meter		1	LS	\$12,000.00	\$12,000.00
		Excavation/Backfill		1	LS	\$157,000.00	\$157,000.00
		Site Improvements		1	LS	\$65,000.00	\$65,000.00
		Fencing		1	LS	\$9,000.00	\$9,000.00
		*Preliminary estimate from Avista Utilities					
		<b>Penstock</b>					
		26", 42 ksi Steel Pipe, 3/8" wall		6,520	FT	\$235.00	\$1,532,200.00
		26", 42 ksi Steel Pipe, 5/16" wall		11,230	FT	\$175.00	\$1,965,250.00
		26", 42 ksi Steel Pipe, 1/4" wall		9,900	FT	\$155.00	\$1,534,500.00
		26", 42 ksi Steel Pipe, 3/16" wall		2,620	FT	\$155.00	\$406,100.00
		26", 42 ksi Steel Pipe, 10 ga. Wall		2,800	FT	\$126.00	\$352,800.00
		24" DR 25 PVC Pipe		2,220	FT	\$109.00	\$241,980.00
		20" DR 25 PVC Pipe		3,030	FT	\$76.00	\$230,280.00
		Rock Excavation		4,000	FT	\$100.00	\$400,000.00
		Fittings		1	LS	\$452,000.00	\$452,000.00
		Valving		1	LS	\$47,500.00	\$47,500.00
		Bedding		38,320	FT	\$3.00	\$114,960.00
		<b>SUBTOTAL THIS SHEET</b>					<b>\$10,463,270.00</b>
<b>QUANTITIES</b>			<b>PRICES</b>				
<b>BY</b>		<b>CHECKED</b>	<b>BY</b>		<b>CHECKED</b>		
<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>	<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>		

<b>FEATURE:</b> <div style="background-color: yellow; padding: 5px; text-align: center;"> <b>Alternative D - Snake River Pump Station - Tammany Creek Road Pipe Route</b> </div>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>				
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b> <b>Appraisal</b>		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b> <b>Apr-11</b>		
			<b>FILE:</b> \\wsfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\CRPS Mann Lake				
<b>Civil</b>							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<b>Penstock (cont.)</b>					
		Air/Vacuum Release Valve		1	LS	\$98,000.00	\$98,000.00
		Connection to Existing Piping		1	LS	\$100,000.00	\$100,000.00
		Cathodic Protection		1	LS	\$12,000.00	\$12,000.00
		<b>Miscellaneous</b>					
		Mobilization		1	LS	\$979,600.00	\$979,600.00
		ACP Road Repair		59,300	SQYD	\$20.00	\$1,186,000.00
		Gravel Road/Shoulder Repair		20,300	SQYD	\$6.00	\$121,800.00
		Hydroseeding		1	LS	\$15,000.00	\$15,000.00
		SCADA System		1	LS	\$125,000.00	\$125,000.00
		Traffic Control		1	LS	\$50,500.00	\$50,500.00
		Trench Safety		1	LS	\$38,600.00	\$38,600.00
		<b>Subtotal</b>					
		Planning Level Construction Contingency(25%)		1	LS	\$3,306,243.00	\$3,306,243.00
		<b>Construction Total</b>					
		Sales Tax (6.5%)		1	LS	\$1,074,529.00	\$1,074,529.00
		Design Engineering (10%)		1	LS	\$1,653,121.00	\$1,653,121.00
		Surveying		1	LS	\$100,000.00	\$100,000.00
		Geotechnical Services		1	LS	\$150,000.00	\$150,000.00
		Construction Management		1	LS	\$1,653,121.00	\$1,653,121.00
		Legal, Admin, Grant Admin Fees, Misc (10%)		1	LS	\$1,653,121.00	\$1,653,121.00
		Permit Acquisition		1	LS	\$80,000.00	\$80,000.00
		Land/Right of Way Acquisition		1	LS	\$200,000.00	\$200,000.00
		<b>Project Total</b>					\$23,060,000.00
		<b>SUBTOTAL THIS SHEET</b>					
<b>QUANTITIES</b>			<b>PRICES</b>				
<b>BY</b>		<b>CHECKED</b>	<b>BY</b>		<b>CHECKED</b>		
<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>	<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>		



<b>FEATURE:</b> <div style="background-color: yellow; padding: 5px; text-align: center;"> <b>Alternative E - Snake River Pump Station - Southport Ave. Pipe Route</b> </div>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>						
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b>		<b>Appraisal</b>		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b>		<b>Apr-11</b>		
			<b>FILE:</b> \\wsfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\SNPS Southport						
<b>Civil</b>									
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
		<b>River Pump Station</b>							
		Passive Fish Screens		1	LS	\$450,000.00	\$450,000.00		
		600 HP Pump Unit		6	EA	\$110,000.00	\$660,000.00		
		Switchgear		6	EA	\$155,000.00	\$930,000.00		
		Pump/Electrical Equipment Structure		1	LS	\$241,500.00	\$241,500.00		
		Structure Electrical/HVAC		1	LS	\$95,000.00	\$95,000.00		
		Electrical Service*		1	LS	\$80,000.00	\$80,000.00		
		Intake Pipe and Pump Cans		1	LS	\$210,000.00	\$210,000.00		
		Discharge Pipeing and Valves		6	EA	\$20,200.00	\$121,200.00		
		Surge Anticipation Valve		1	LS	\$23,000.00	\$23,000.00		
		Surge Tank and Piping		1	LS	\$220,000.00	\$220,000.00		
		Filters		6	EA	\$22,000.00	\$132,000.00		
		Flow Meter		1	LS	\$12,000.00	\$12,000.00		
		Excavation/Backfill		1	LS	\$157,000.00	\$157,000.00		
		Site Improvements		1	LS	\$65,000.00	\$65,000.00		
		Fencing		1	LS	\$9,000.00	\$9,000.00		
		*Preliminary estimate from Avista Utilities							
		<b>Penstock</b>							
		26", 42 ksi Steel Pipe, 3/8" wall		1,550	FT	\$235.00	\$364,250.00		
		26", 42 ksi Steel Pipe, 5/16" wall		2,320	FT	\$175.00	\$406,000.00		
		26", 42 ksi Steel Pipe, 1/4" wall		3,200	FT	\$155.00	\$496,000.00		
		26", 42 ksi Steel Pipe, 3/16" wall		2,620	FT	\$155.00	\$406,100.00		
		26", 42 ksi Steel Pipe, 10 ga. Wall		12,000	FT	\$126.00	\$1,512,000.00		
		24" DR 25 PVC Pipe		2,220	FT	\$109.00	\$241,980.00		
		20" DR 25 PVC Pipe		3,030	FT	\$76.00	\$230,280.00		
		Rock Excavation		8,000	FT	\$100.00	\$800,000.00		
		Fittings		1	LS	\$126,000.00	\$126,000.00		
		Valving		1	LS	\$37,500.00	\$37,500.00		
		Bedding		26,940	FT	\$3.00	\$80,820.00		
		<b>SUBTOTAL THIS SHEET</b>					<b>\$8,106,630.00</b>		
<b>QUANTITIES</b>			<b>PRICES</b>						
<b>BY</b>		<b>CHECKED</b>	<b>BY</b>			<b>CHECKED</b>			
<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>	<b>DATE PREPARED</b>			<b>PEER REVIEW / DATE</b>			

<b>FEATURE:</b> <b>Alternative E - Snake River Pump Station - Southport Ave. Pipe Route</b>			<b>PROJECT:</b> <b>Lewiston Orchards Project, Idaho</b> <b>Lower Clearwater Exchange Appraisal Investigation</b>				
			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b> Appraisal		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b> Apr-11		
			<b>FILE:</b> \\wsfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\SNPS Southport				
<b>Civil</b>							
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		<b>Penstock (cont.)</b>					
		Air/Vacuum Release Valve		1	LS	\$77,000.00	\$77,000.00
		Cathodic Protection		1	LS	\$65,000.00	\$65,000.00
		Pipe Slope Anchoring		1	LS	\$15,000.00	\$15,000.00
		Connection to Existing Piping		1	LS	\$12,000.00	\$12,000.00
		<b>Miscellaneous</b>					
		Mobilization		1	LS	\$699,200.00	\$699,200.00
		ACP Road Repair		21,700	SQYD	\$20.00	\$434,000.00
		Gravel Road/Shoulder Repair		6,500	SQYD	\$6.00	\$39,000.00
		Hydroseeding		1	LS	\$24,000.00	\$24,000.00
		SCADA System		1	LS	\$125,000.00	\$125,000.00
		Traffic Control		1	LS	\$14,400.00	\$14,400.00
		Trench Safety		1	LS	\$27,000.00	\$27,000.00
		<b>Subtotal</b>					
		Planning Level Construction Contingency(25%)		1	LS	\$2,414,808.00	\$2,414,808.00
		<b>Construction Total</b>					
		Sales Tax (6.5%)		1	LS	\$784,812.00	\$784,812.00
		Design Engineering (10%)		1	LS	\$1,207,404.00	\$1,207,404.00
		Surveying		1	LS	\$100,000.00	\$100,000.00
		Geotechnical Services		1	LS	\$150,000.00	\$150,000.00
		Construction Management		1	LS	\$1,207,404.00	\$1,207,404.00
		Legal, Admin, Grant Admin Fees, Misc (10%)		1	LS	\$1,207,404.00	\$1,207,404.00
		Permit Acquisition		1	LS	\$80,000.00	\$80,000.00
		Land/Right of Way Acquisition		1	LS	\$200,000.00	\$200,000.00
		<b>Project Total</b>					\$16,990,000.00
		<b>SUBTOTAL THIS SHEET</b>					
<b>QUANTITIES</b>			<b>PRICES</b>				
<b>BY</b>		<b>CHECKED</b>	<b>BY</b>		<b>CHECKED</b>		
<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>	<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>		

<b>FEATURE:</b>			<b>PROJECT:</b>				
Alternative F - Tammany Road Well Field			Lewiston Orchards Project, Idaho Lower Clearwater Exchange Appraisal Investigation				
<b>Civil</b>			<b>WOID:</b>		<b>ESTIMATE LEVEL:</b> Appraisal		
			<b>REGION:</b>		<b>UNIT PRICE LEVEL:</b> Apr-11		
			<b>FILE:</b> \\wswfiles\public\projects\JUB\21-10-012-Lower Clearwater Exchange Project - LOID\21-10-012-Engineer\Report\Cost Estimates\LCCEP Cost Estimates - Detailed Sheets.xlsx\SNPS Southport				
<b>PLANT ACCOUNT</b>	<b>PAY ITEM</b>	<b>DESCRIPTION</b>	<b>CODE</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT PRICE</b>	<b>AMOUNT</b>
		<b>Wells</b>					
		Deep Wells		6	EA	\$1,304,000.00	\$7,824,000.00
		600 HP Pump Unit		6	EA	\$242,000.00	\$1,452,000.00
		Switchgear		6	EA	\$155,000.00	\$930,000.00
		Discharge Piping and Valves		6	EA	\$20,200.00	\$121,200.00
		Flow Meter		6	LS	\$8,000.00	\$48,000.00
		Pump/Electrical Equipment Structure		6	LS	\$60,000.00	\$360,000.00
		Structure Electrical/HVAC		6	LS	\$25,000.00	\$150,000.00
		Electrical Service*		1	LS	\$80,000.00	\$80,000.00
		Site Improvements		6	EA	\$10,000.00	\$60,000.00
		*Preliminary estimate from Avista Utilities					
		<b>Penstock</b>					
		26", 42 ksi Steel Pipe, 1/4" wall		3,680	FT	\$155.00	\$570,400.00
		26", 42 ksi Steel Pipe, 3/16" wall		2,620	FT	\$155.00	\$406,100.00
		26", 42 ksi Steel Pipe, 10 ga. Wall		2,800	FT	\$126.00	\$352,800.00
		22", 42 ksi Steel Pipe, 1/4" wall		250	FT	\$134.00	\$33,500.00
		20", 42 ksi Steel Pipe, 3/16" wall		1,000	FT	\$123.00	\$123,000.00
		16", 42 ksi Steel Pipe, 3/16" wall		1,750	FT	\$100.00	\$175,000.00
		12", 42 ksi Steel Pipe, 10 ga. Wall		2,300	FT	\$57.00	\$131,100.00
		24" DR18 PVC Pipe		2,220	FT	\$109.00	\$241,980.00
		20" DR21 PVC Pipe		3,030	FT	\$76.00	\$230,280.00
		Rock Excavation		2,000	FT	\$100.00	\$200,000.00
		Fittings		1	LS	\$312,000.00	\$312,000.00
		Valving		1	LS	\$49,500.00	\$49,500.00
		Bedding		19,650	FT	\$3.00	\$58,950.00
		Air/Vacuum Release Valve		1	LS	\$56,000.00	\$56,000.00
		Cathodic Protection		1	LS	\$43,000.00	\$43,000.00
		Connection to Existing System		1	LS	\$12,000.00	\$12,000.00
		<b>SUBTOTAL THIS SHEET</b>					<b>\$14,020,810.00</b>
<b>QUANTITIES</b>			<b>PRICES</b>				
<b>BY</b>		<b>CHECKED</b>	<b>BY</b>		<b>CHECKED</b>		
<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>	<b>DATE PREPARED</b>		<b>PEER REVIEW / DATE</b>		



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# ***APPENDIX J***

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## **Hydrologic Study**

# *RHS* Ralston Hydrologic Services, Inc.

GROUND WATER CONSULTING AND EDUCATION

1122 East B Street, Moscow, ID USA 83843

Voice and FAX 208-883-0533, E-mail [ralston@moscow.com](mailto:ralston@moscow.com)

## EVALUATION OF GROUND WATER DEVELOPMENT POTENTIAL FOR LOID IRRIGATION WATER FROM THE REGIONAL AQUIFER IN THE LEWISTON BASIN, IDAHO



Prepared for J-U-B Engineers, Inc.

Lewiston, Idaho

March 2011





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## **INTRODUCTION**

The purpose of this report is to provide an analysis of the potential to use ground water as the supply source for irrigation water for the Lewiston Orchards Irrigation District (LOID) located in Lewiston, Idaho. This is one of the alternatives identified as part of the Lower Clearwater Exchange Project. In this alternative, ground water pumped from the regional aquifer under the Lewiston Basin would serve as the replacement of the present surface water source that includes Waha Lake and Soldier Meadows Reservoir.

Deep wells presently provide the domestic water supply for LOID, the Asotin Public Utilities District (APUD) in Clarkston, Washington, the City of Asotin, Washington and part of the domestic supply for the City of Lewiston, Idaho (Figure 1). A few private wells are completed in the regional aquifer with the majority completed in shallower water producing zones.

Three primary questions are addressed in this report. First, what impacts on the aquifer, such as water-level decline, could be anticipated with the development and operations of LOID irrigation wells in the regional aquifer? Second, what is the potential for successful development of the LOID irrigation wells? Third, where should the LOID irrigation wells be located and what are the primary construction issues? Additional questions, such as water rights and the economic feasibility of well development, are not addressed in this report.

Information for this report has been drawn from published reports and maps and from well operational data from LOID, APUD and the City of Lewiston. The references of particular importance are the Ralston Hydrologic Services reports pertaining to the design and construction of the existing LOID wells (#1, #2, #3 and #4) and the planned construction of LOID well #5, all used for the LOID domestic supply system. These reports plus support geologic and hydrologic documents are cited where necessary. The University of Idaho thesis prepared by Gary Stevens in 1994 under the direction of Dr. Ralston is of particular importance because the appendices include well discharge and water-level data on LOID, APUD and Lewiston wells from the 1960's into the early 1990's. The data from obtained from LOID, APUD and the City of Lewiston are used to update the Stevens water level and well discharge data from the early 1990's to the present.

## **HYDROGEOLOGIC SETTING**

The LOID service area is located within the Lewiston Basin, which is a broad synclinal trough underlain to considerable depth by layers of basalt and sediments of the Columbia River Basalt Group. The geologic units extend into eastern Washington including the Clarkston and Asotin areas and Chief Timothy Park which is located west of Clarkston along the Snake River. The Lewiston Hill is the northern boundary of the basin; this feature includes the steep northern flank of the syncline and several small faults. A northeast-southwest trending fault separates the basin from the uplifted Craig Mountain to the south. The structural basin is dominated by an east-west trending syncline that forms a shallow bowl. The confluence of the Snake and Clearwater Rivers is near the lowest portion of the structural basin.

The primary formations of interest within the Columbia River Basalt Group in the Lewiston Basin are the Saddle Mountains Formation, the Wanapum Formation and the Grande Ronde Formation. A geologic analysis of cutting samples from LOID well #4 resulted in the following stratigraphic interpretation.

<b>Depth range in feet</b>	<b>Geologic Unit</b>
0 to 423	Saddle Mountains Formation
423 to 456	Sweetwater Interbed
456 to 640	Priest Rapids Member of the Wanapum Formation
640 to 680	Vantage Interbed equivalent
680 to 1625	Grande Ronde Formation

The Grande Ronde Formation, which is the host geologic unit for the regional aquifer, has been divided into four stratigraphic units based on residual magnetic polarity in the rock. From bottom to top these are R1 (Tgr1 – lower reversed polarity unit), N1 (Tgn1 – lower normal polarity unit), R2 and N2. The N2 unit is not present in the Lewiston basin. Outcrop areas for the remaining three units in Idaho are shown on Figure 2. The R2 (Tgr2) unit includes the uppermost portion of the Grande Ronde Formation. As is shown on Figure 2, this unit outcrops along the lower reach of Lapwai Creek, along the Clearwater River for some distance below the confluence with Lapwai Creek and along the Snake River above Asotin. Unit N1 (Tgn1) underlies R2 and outcrops along Sweetwater Creek, Lapwai Creek above the confluence with Sweetwater Creek, along the Clearwater River near and above the mouth of Lapwai Creek and along the Snake river south of Asotin. The R1 unit underlies N1 and also outcrops along the Snake River further south from Asotin. The R1 (Tgr1) outcrops along the Snake River near the confluence of the Grande Ronde River and in a short reach of the upper portion of Lapwai Creek.

The regional ground-water flow system in the Grande Ronde Formation within the Lewiston basin has been well documented for much of the area (Cohen and Ralston, 1980; Stevens, 1994). The dominant area of recharge for the regional ground-water flow system within the Grande Ronde Formation is believed to be located south of Asotin along the Snake River. The northward dip of the rocks is greater than the gradient of the Snake River thus resulting in the three Grande Ronde units outcropping in the river with the lowest unit further south than the upper two units. Figure 2 shows the outcrop areas of the three units near the river. The primary discharge area for the aquifer is believed to be west of Clarkston near Chief Timothy Park where the geologic structures that form the Lewiston grade cross the Snake River.

All of the larger production wells in the Lewiston Basin penetrate and obtain ground water from the Grande Ronde Formation. Ground water is obtained from zones of fracturing located primarily at contacts between individual basalt flows. The total yield of a given well is the sum of the yields of each of the flow contact aquifers penetrated by the screened or open-hole portions of the well. Most of the private wells are shallower and are completed in either the Saddle Mountains or the Wanapum Formations. The general pattern is that deeper wells have lower ground-water levels than shallow wells.

Information on the deep public supply wells that penetrate and obtain ground water from the Grande Ronde Formation of the Columbia River Basalts is presented in Table 1. Not all of the wells are presently in use. The table was created based on information from Stevens (1994) and from the water supply entities. Table 1 includes wells for LOID, APUD and the City of Lewiston. Locations of the wells are shown on Figure 1. The majority of the listed in Table 1 have ground-water levels approximately at the elevation of the Snake and Clearwater Rivers (680 to 740 feet). The static water levels in these wells are near the elevation of the Snake and Clearwater River because the regional aquifer within the Grande Ronde Formation is hydraulically connected to the Snake and probably the Clearwater River.

Table 1 Information on Selected Wells in the Lewiston Basin								
		Static	Pumping			Well		Water
		Depth to	Depth to	Surface	Well	Bottom	Specific	Level
Well No.	Discharge	Water	Water	Elevation	Depth	Elevation	Capacity	Elevation
	(gpm)	(ft)	(ft)	(ft)	(ft)	(ft)	(gpm/ft)	(ft)
APUD #1	2950	186	241	850	970	-120	54	711
APUD #2		69		793	1958	-127		724
APUD #3	3500	266	414	999	1100	-104	24	733
APUD #4		155		876	840	36		721
APUD #5	2235	420	525	1147	1330	-183	21	707
APUD #6	3225	287	333	993	1069	-76	70	731
APUD #7	2900	450	567	1180	1340	-160	25	716
LOID #1		851		1554				703
LOID #2	500	501	900	1742	1957	-215	1	1241
LOID #3	660	695	1312	1419	2617	-1198	1	724
LOID #4	1100	847	870	1566	1625	-59	47	719
Lew #1A		42		730	735	-5		688
Lew #2		20		735	275	460		715
Lew #3		108		837	600	237		729
Lew #4		15		743	358	385		728
Lew #5		128		855	600	255		727
Lew #6	1330	565	572	1306	1791	-485	190	741

One of the wells listed in Table 1 has a water-level elevation that is higher than the normal range for the regional aquifer. Well LOID #2 is almost 2,000 feet deep and is completed in the Grande Ronde Formation but has a water level elevation that is about 500 feet higher than wells that obtain water from the regional aquifer. The available information indicates that the aquifer that provides water for LOID #2 well is structurally isolated from the regional aquifer system to the west (Stevens, 1994).

A large number of private wells exist within the Lewiston basin. Most of these wells are considerably shallower than the wells that penetrate the regional aquifer. The



wells also have higher ground-water elevations than the typical range for the regional aquifer in the Grande Ronde Formation.

Cohen and Ralston (1980) have identified a hydraulic boundary within the regional aquifer in the Clarkston area. They found that APUD wells #5 and #6 did not respond within one day to the pumping of well APUD #1. Cohen and Ralston postulate that a northwest-southeast trending, near vertical dike in the layered basalt isolates wells #5 and #6 from the remaining APUD wells. As is demonstrated in a later section, all of the APUD wells including #5 and #6 show a water-level response to the 1975 filling of the reservoir behind Lower Granite Dam.

## **WATER BALANCE OF THE REGIONAL AQUIFER**

### **Introduction**

All ground-water systems, prior to well development, are in a state of dynamic equilibrium with natural recharge approximately equal to natural discharge. Ground-water levels are relatively stable with small changes associated with changes in recharge amounts. The withdrawal of water from wells creates an in-balance in the ground-water system. Water levels within the aquifer decline with the initiation of pumping until the amount of withdrawal from wells is balanced by a decrease in the natural discharge rate and/or an increase in natural recharge rate.

The regional aquifer within the Lewiston Basin would have been in a state of dynamic equilibrium prior to well development. As described above, the primary recharge area for the regional aquifer is believed to be located south of Asotin where the dipping flow contact zones within the Grande Ronde basalt outcrop in the channel of the Snake River. The primary discharge area for the aquifer is believed to be west of Clarkston near Chief Timothy Park where the geologic structures that form the Lewiston grade cross the river and provide a higher vertical hydraulic conductivity zone for water movement. The hydraulic connection between the regional aquifer and the discharge area along the Snake River was demonstrated by Cohen and Ralston (1980) by identifying a water level change in APUD wells associated with the filling the reservoir above Lower Granite Dam in February 1975. The water-level records from deep wells during this period are presented in a later section of the report.

In the case of the Lewiston basin, the cone of water-level depression within the regional aquifer from operation of the pumping wells would have grown until the area of water-level decline reached the discharge area along the Snake River near Chief Timothy Park and/or the recharge area along the Snake River south of Asotin. The decreased ground-water levels in the Chief Timothy area would have decreased discharge to the river whereas the decreased ground-water levels near the recharge reach of the river south of Asotin would have resulted in increased recharge to the aquifer. If the water-level decline in the Chief Timothy Park area is sufficient, this ground-water discharge area would become a ground-water recharge area.

### **Analysis of Ground-Water Withdrawal Data**

Ground-water withdrawal data are available from a number of sources. Stevens (1994) includes monthly pumping amounts for the period of 1961-1991 for individual

wells operated by APUD, LOID and the City of Lewiston. Additionally, data were obtained from the individual water supply entities.

Annual pumpage data were provided for APUD wells for the period of 1960 through 2010 by Tim Simpson of APUD (personal communication, 2011). Stevens (1994) presents withdrawal data for LOID well #1 during the period of from 1982 to 1992. Pumpage from LOID well #2 are not included because this well is not completed in the regional aquifer. LOID pumpage data for wells #3 and #4 for 2008 and 2009 were provided by Amy Uptmor of J-U-B Engineers (personal communication, 2011). Well LOID #1 has not been used since the 1990's. Annual ground-water withdrawal data were obtained from the City of Lewiston wells for the years 2000 through 2010 (Bill Ingram, personal communication, 2011). Pumpage data from Lewiston well #4 are not included since this well is not believed to be completed in the regional aquifer.

A plot of total annual withdrawal from the APUD wells for the period of 1960 through 2010 is shown on Figure 3 along with LOID and City of Lewiston data for years for which data are available. Several observations from a review of Figure 3 are presented below.

- APUD has been and continues to be the largest pumper from the regional aquifer in the Lewiston Basin followed by LOID and the City of Lewiston. Withdrawal data from 2008 and 2009 indicate that APUD pumped about 71 and 73 percent respectively of the total of APUD, LOID and Lewiston. LOID pumpage was about 12 percent for both years while Lewiston pumpage was 17 and 15 percent of the total withdrawal for 2008 and 2009 respectively. Prior to 1980, APUD pumped more than 90 percent of the total withdrawal from the regional aquifer.
- Ground-water withdrawal from the regional aquifer by APUD has decreased from the 1960's to the 2010's. The highest annual pumpage by APUD was at 3,199 million gallons (MG) in 1961 and the lowest was 1,261 MG in 1993. Tim Simpson of APUD describes the reason for the decrease as follows (email, March 1, 2011). *"The land use during those decades (1960's and 1970's) was much different. There were a lot of orchards and truck farms up until the early 1980's. Our peak day in the late 70's was 22 to 27 mgd (million gallons per day). Now our peak is almost half at 13 mgd. With more development and more homes came less water use."* The average annual withdrawal by APUD from the regional aquifer during the period of 2000 through 2010 was 1,563 MG.
- The combined withdrawal from the regional aquifer by APUD LOID and the City of Lewiston in 2008 and 2009 is about 30 percent less than the maximum pumpage by APUD in 1961.

### **Analysis of Water-Level Data**

The water-level data from wells completed in the regional aquifer are analyzed to respond to several questions. First, is there evidence that long-term water-level decline has occurred associated with the relatively large withdrawals from the aquifer? Second, is there evidence of a ground-water response to the filling of the pool behind Lower Granite Dam on the Snake River in February 1975? Third, is there a response pattern

associated with the decrease in the withdrawal from the aquifer from a high in the early 1960's to a lower combined pumping rate starting in the 1980's?

Water-level data are available for production wells completed in the regional aquifer for varying periods of time. Most of the historic water-level data were taken by employees of the water supply entities, generally using airlines, as part of normal weekly operational activities. The accuracy of the water-level data is about plus or minus about 5 feet because of the precision of the pressure gages used to collect the air line readings. More recent data from LOID are based on transducer readings and are more accurate. Most of the water level data are for APUD wells with a smaller array of data for the LOID and City of Lewiston wells. Additionally, a few water-level measurements were obtained for area production wells by the U.S. Geological Survey. These measurements were obtained using a steel take or an electric tape and are accurate to about 0.1 feet. The data were taken from the U.S. Geological Survey web site.

### **APUD Wells**

Measurements of ground-water levels for the APUD wells are available starting in 1961. Stevens included water-level data from the APUD production wells for the period of 1961 into 1992 as an appendix to his 1994 report. Tim Simpson of APUD provided tabulated water-level data from 1993 into 2011 (personal communication, 2011). All of these data were input into a spreadsheet and hydrographs were constructed. Hydrographs for APUD wells are presented as follows: well #1 as Figure 4; well #2 as Figure 5; well #3 as Figure 6; well #4 as Figure 7; well #5 as Figure 8; and well #7 as Figure 9. There are insufficient data points to prepare a hydrograph for well #6 because it was not included in the Stevens (1994) data set and because a limited number of measurements have been taken since 1993. The highest water levels shown on the figures represent static or non pumping conditions. The lower levels represent measurements taken during pumping or shortly after the pump was turned off. All of the hydrographs are for the time period of 1960 through 2010. The vertical scale on all of the figures is the same with a range in water-level elevations from 610 feet to 750 feet. Discussion of each APUD well includes water-level measurements obtained from the U.S. Geological Survey website when available.

Water-level data are available for well #1 except for the time period of about 1966 to 1975 (Figure 4). Except for two early measurements, the static water-level elevation of well #1 has been below 720 feet. Reasons why the measurements in February and May of 1961 are higher than the remainder of the record are not known. Non-pumping water-level measurements in the early 1960's are lower than for the remainder of the record. APUD pumping was greatest in 1961 and the 1960's decade was prior to filling of the reservoir behind Lower Granite Dam on the Snake River. The static water levels appear to be the slightly higher in the late 1970's and early 1980's than after about 1990. This sort of observation is limited because of the relative inaccuracy of the air-line measurements. There does not appear to be any long-term rate of decline evident in the hydrograph for well #1.

Water-level data are available for well #2 for the period from late 1961 into 1980 (Figure 5). Ground-water levels prior to 1975 appear to show a decline pattern from a high of 723 feet elevation in 1962 to a high of 717 feet in 1972. However, this

observation is limited because of the accuracy of the air-line measurements. Ground-water levels increased starting in 1975 to with the last measurements in 1980 higher than the any prior measurements. Cohen and Ralston (1980) interpreted this change to represent the filling of the reservoir behind Lower Granite Dam. The water-level increase in this period could have also been related to reduced ground-water withdrawal by APUD.

Limited water-level data are available for well #3 for the period from late 1961 into 2005 with major time gaps from 1964 to 1971, from 1972 to 1988 and from 1992 to 2001 (Figure 6). The reported water-level elevations after August 2003 do not appear to be valid and likely represent problems with the airline in this well. The only conclusion that can be drawn from the well #3 hydrograph is that static water-levels in the period from 1988 to 1992 were higher than in the 1960's or 1970's when data are available. Possible reasons for this include the filling of the reservoir behind Lower Granite Dam and the reduced pumping after the 1960's by APUD.

The well #4 water-level record is reasonably complete for the period of July 1961 into November 2001 (Figure 7). Ground-water levels are approximately uniform prior to 1975 then show a rise from 1975 to about 1980 with perhaps a slight decline rate after 1980. There is no detectable change in water level in well #4 reflecting the decreased pumping amounts from the 1960's into the 1970's. The water-level rise from 1975 to 1980 likely reflects filling the pool behind Lower Granite Dam on the Snake River. Two water-level measurements were obtained from the U.S. Geological Survey website for APUD well #4. These have been converted to water-level elevation and are as follows: a water-level elevation of 721 feet on August 22, 1961 and a water-level elevation of 724 feet on February 24, 1984. These measurements tend to fit the water-level elevation data based on air line measurements presented in Figure 7.

Water-level data are available for well #5 for the period from late 1961 into 2011 with data gaps from November of 1974 to June of 1977 and from September of 1988 to November of 1995 (Figure 8). The hydrograph for well #5 has a stair-step pattern with lowest water levels prior to 1975. The higher water levels starting in 1977 may be the combined effect of filling the reservoir and a decrease in the APUD pumping rate. There appears to be an additional increase in water levels in the mid 1980's. Possible reasons for this are unknown. Two water-level measurements were obtained from the U.S. Geological Survey website. These have been converted to water-level elevation and are as follows: a water-level elevation of 700 feet on February 2, 1961 and a water-level elevation of 727 feet on February 24, 1984. These measurements tend to fit the water-level elevation data based on air line measurements presented in Figure 8.

While APUD data are not available for well #6, there are two depth- to-water measurements that were obtained from the U.S. Geological Survey website. These measurements have been converted to water-level elevation and are as follows: a water-level elevation of 724 feet on March 16, 1961 and a water-level elevation of 732 feet on February 18, 1983. The water level was about 8 feet higher in 1983 than in 1961 probably because of the reduced pumpage of APUD in 1983 relative to 1961 and also the filling of the pool behind Lower Granite Dam in 1975.

Well #7 water-level data start in 1977 with intermittent measurements into 1981, a data gap until 1987 and then frequent measurements into 2011 (Figure 9). There is little to be learned from the hydrograph except that the few static measurements in 1978 and 1980 are lower than static measurements after about 1990.

### **Asotin Wells**

The U.S. Geological Survey website included several measurements each for the two wells that provide water for the City of Asotin. Both of these wells are believed to be completed in the regional aquifer. Water-level elevation data from the first well are as follows: a water-level elevation of 726 feet on March 3, 1961 and a water-level elevation of 752 feet on February 17, 1983. Similar data for the second well are as follows: a water-level elevation of 727 feet on May 18, 1961 and a water-level elevation of 735 feet on February 17, 1983. In both cases, the water-level elevation in the regional aquifer under the City of Asotin was higher in 1983 than in 1961.

### **Lewiston Wells**

Stevens (1994) includes water level data for City of Lewiston wells. Well #1A is completed in the regional aquifer. The hydrograph for well #1A (Figure 10) shows a water-level pattern similar to the APUD wells with a significant rise between 1974 and 1976, likely related to the filling of the reservoir behind Lower Granite Dam. With the exception of well #4, the other Lewiston wells have limited water-level data that generally follow the pattern of the APUD wells. Lewiston well #4 shows water-level decline from the 1960's into the early 1980's and is not believed to be completed in the regional aquifer.

### **LOID Wells**

A hydrograph is presented for LOID well #2 regardless of the fact that this well is not completed within the regional aquifer. Water-level data are available for the LOID well #2 from 1986 to 1993 from Stevens (1994) and starting in 2007 as provided by Amy Uptmor of J-U-B Engineers (personal communication, 2011). The hydrograph for LOID well #2, presented in Figure 11, is based on airline data prior to 1993 and pressure transducer data after 2007. The graph shows a rapid decline in ground-water levels in from 1986 to 1989, a large data gap and then mostly readings taken when the pump was operating after 2007. The water-level decline shown for well #2 reflects that this well is not completed in the regional aquifer.

The hydrograph for LOID well #3 illustrates the very large amount of drawdown that occurs when the well is being operated (Figure 12). There appears to be an annual fluctuation in static ground-water levels but no pattern of water-level decline.

Water-level data for LOID well #4 show a varying static water level and the much smaller drawdown than well #3 (Figure 13). No pattern of water-level decline is evident in the several year time period when data are available.

### **Water-Level Contour Map**

A water-level contour map was constructed by Stevens (1994) using static levels in 1988. The map, presented as Figure 14, shows a cone of depression is present just south of the confluence of the Snake and Clearwater Rivers as a result of withdrawal of

water from production wells completed in the regional aquifer. The locations of specific contours are somewhat in question because water-level elevations based on airline measurements were used in construction of the map. However, the water-level depiction is logical in that it shows a lowering of ground-water levels near the center of pumpage.

### **LOID Irrigation Demand**

J-U-B Engineers provided an estimate of the annual and monthly demand for the LOID irrigation system (Amy Uptmor, personal communication, 2011). The annual estimated demand is 8,500 acre-feet with monthly demand ranging from 14 acre-feet (February) to 1,295 acre-feet (summer months). These monthly estimates include consideration of use of Mann Lake for temporary storage to meet peak demand periods. The annual demand of 8,500 acre-feet per year is equal to 2,769 MG per year.

The estimated LOID irrigation demand needs to be compared to present and historical withdrawals from the regional aquifer to be meaningful. Table 2 is a summary of historical withdrawal from the regional aquifer as compared to the addition of an LOID irrigation demand on the aquifer. City of Asotin pumpage data are missing from the table but are not believed to be large enough to impact conclusions from the analysis. Total withdrawal from the aquifer for 1961, 1971 and 1991 include data taken from Stevens (1994) for LOID domestic wells and Lewiston wells and from Tim Simpson (personal communication, 2011) for the APUD wells. Total withdrawal numbers for 2008 and 2009 are based on data provided by APUD, LOID and the City of Lewiston. The table shows that the total withdrawal in 2009 is about 30 percent less than the withdrawal by APUD in 1961. The line in Table 2 entitled “Future with 2009” provides an estimate of total including the estimate for LOID irrigation. Initiation of LOID irrigation pumping from the aquifer will be more than a doubling of the current (2009) pumping rate and about a 57 percent increase from the withdrawal rate that occurred in 1961.

Table 2 Comparison of Withdrawals from the Region Aquifer

Year	APUD	LOID Domestic	Lewiston	Asotin	LOID Irrigation	Total
1961	3199 MG	0	0		0	3201 MG
1971	1849 MG	0	126 MG		0	1975 MG
1991	1411 MG	181 MG	30 MG		0	1622 MG
2008	1608 MG	281 MG	381 MG		0	2270 MG
2009	1664 MG	266 MG	334 MG		0	2264 MG
Future with 2009	1664 MG	266 MG	334 MG		2769 MG	5033 MG



## **Water Balance Discussion**

Two factors are of particular importance to a discussion of the water balance for the regional aquifer within the Lewiston Basin associated with the potential initiation of withdrawal of LOID irrigation water from wells.

- First, water-level data from wells completed in the regional aquifer under the City of Clarkston and the western portion of the City of Lewiston provide proof that aquifer is hydraulically connected to the Snake River. Hydrographs from numerous wells show a rise in water level that is associated with the filling of the reservoir behind Lower Granite Dam in February of 1975. The hydraulic connection of the aquifer to the river serves to minimize long-term water-level decline associated with present pumpage or anticipated future increases in withdrawal. LOID well #2 is not completed in the regional aquifer and the hydrograph for this well shows considerable water-level decline.
- Second, historic withdrawals from the aquifer in 1961 by APUD were about 30 percent higher than the combined 2009 withdrawal by APUD, LOID domestic and the City of Lewiston. This means that historic water-level data can be used to infer the magnitude of water-level change that would occur if the LOID irrigation demand was supplied by wells completed in the regional aquifer.

Ground-water levels in the regional aquifer in the Lewiston Basin have remained approximately stable during the last 10 years. This indicates that the regional aquifer is in a state of dynamic equilibrium; natural recharge is equal to withdrawals by wells plus natural discharge. The amount of recharge to the aquifer system under current pumping conditions has not been determined.

The more than doubling of the pumping rate by the initiation of LOID withdrawal for irrigation will necessarily result in some water-level decline. Increasing ground-water withdrawals would result in sufficient water-level decline to bring the system back into balance by either increasing the rate of natural recharge and/or decreasing the rate of natural discharge. The limited data on water-level patterns in the early 1960's suggests that the additional water-level decline would be in terms of tens of feet. It is unlikely that the additional water-level decline would be more than 30 feet.

## **LOCATION AND DESIGN OF LOID IRRIGATION WELLS**

### **Introduction**

A group of wells will be needed to supply the LOID irrigation demand. Amy Uptmor (personal communication, 2011) indicated that a design maximum flow rate of 9,450 gpm will be needed to meet the demand. The target yield per well would be 3,150 gpm if three wells are used, 2,365 gpm if four wells are used and 1,890 gpm if five wells are used. In addition, the approach should include some redundancy. Placement of the wells likely would be along a pipeline with well spacing determined by hydraulic interference effects.

Problems have occurred with the use of submersible pumps in deep, large yield production wells, such as the existing LOID wells. The operation of the LOID irrigation wells would be simpler and less costly if line-shaft turbine pumps could be installed. To

this end, construction of the wells at lower elevation where the static and pumping water levels would be higher is a major consideration. In addition, special effort should be extended to improve the alignment of the boreholes or install larger diameter pump chamber casing to allow installation of line-shaft turbine pumps

### **Location Criteria**

The location criteria for the LOID irrigation well field are as follows.

- 1) The wells should penetrate the regional aquifer within the Grande Ronde Formation. The regional aquifer underlies the western portion of the LOID service area and extends across the Snake River into the Clarkston and Asotin area. The eastern boundary of the regional aquifer exists between LOID #4 and LOID #2 but the exact location is not known. The northern boundary of the regional aquifer is approximately the Clearwater River. The southern aquifer boundary is not known but likely is south of the Tammany area. The yield characteristics of new wells completed in regional aquifer should be good if formation damage caused by drilling is minimized. The yield obtained by the new well will depend upon the number of basalt flow contact zones that are penetrated by the well and the fracture characteristics of each zone. The new LOID irrigation wells drilled in the regional aquifer should have a specific capacity that exceeds 20 gpm/ft (gallons per minute per foot of drawdown). This means that drawdown within the well would be about 100 feet at a pumping rate of 2,000 gpm.
- 2) The LOID irrigation wells should be located at sufficient distances from each other and from existing LOID or other production wells to minimize well interference effects (water-level decline caused by operation of another production well). Some well interference will occur regardless of where the LOID irrigation wells are located within the regional aquifer. The amount of well interference that occurs between wells depends on the distance between wells, the aquifer characteristics and the individual pumping rates. The available information indicates that well interference should be less than 20 feet if the new well is located at least 400 to 500 feet away from another production well.
- 3) To the extent possible, lower elevation drill sites should be selected for the LOID irrigation wells. Selection of lower elevation drill sites serves several purposes. Since the water producing zones are approximately horizontal, drilling at lower elevations tends to minimize the required well depth. This results in lower well construction costs. For example, the surface seal and the pump chamber casing would not need to extend as deep because the ground-water level would be closer to land surface. The static depth to water is minimized at lower elevation drill sites. This allows the more efficient use of line-shaft turbine pumps in the wells.
- 4) Issues associated with well construction are important relative to selection of drilling sites. The drilling sites need to be large enough to accommodate the drilling rig, support equipment, a waste-water control pond and must have a means to dispose of water generated during drilling. The discharge amount during drilling can exceed several thousand gallons per minute if a direct air rotary rig is used. The site also needs to have a water supply source for drilling

operations. The distance to homes and businesses need to be sufficient to allow drilling to occur without exceeding noise restrictions.

- 5) The drill sites need to be selected to fit into the overall plan for development of a well field for the LOID irrigation supply.

### **Well Field Location**

The best general area for the LOID irrigation well field is along the west end of the Tammany Creek Valley, generally south of the airport (Figure 15). This area was selected for the following reasons. First, the valley allows access to lower elevation land which will result in less drilling depth and a static water level that is closer to land surface. Second, water producing zones in the Grande Ronde basalt at this site occur at higher elevations than at locations to the north because the area is located on the southern limb of the syncline. This means that the wells will not need to be as deep because the elevation of any specific flow contact zone is higher at this locale than at sites to the north. Third, the selected area is relatively distant from other major production wells. The closest production wells are City of Lewiston well #6 and LOID well #4. Both of these wells are more than 1.5 miles away from the selected area. Fourth, the target has a low density of development with few homes that might be impacted from well construction activities. Also, the existing drainages offer opportunity for disposal of wastewater generated during well drilling.

The LOID irrigation wells should be located at sites where the land elevation is approximately 1,200 feet or lower (Figure 15). The floor of Tammany Valley ranges in elevation from about 1,160 along the east margin to about 1,000 feet along the west margin of the target area. The approximate static depth to water would be about 500 feet if the wells were drilled at an elevation of 1,200 feet and about 400 feet if the wells were drilled at an elevation of about 1,100 feet.

### **Well Design Factors**

The design of wells included in the LOID irrigation supply system depends on the subsurface geology, the anticipated hydraulic characteristics of the water producing zones, the anticipated static depth to water and the target well yield. These topics are explored in the following paragraphs.

### **Subsurface Geology**

Knowledge of the sequence of geologic units through which the wells must penetrate aids in selection of a well design. Well construction is much more complex if hard units, such as basalt, are underlain by soft or perhaps caving units such as sand. Information on the subsurface geology within the target area for the LOID irrigation wells is available from logs from several nearby wells.

- City of Lewiston well #6 is located west of the airport with a surface elevation of about 1,306 feet. The location of this well is shown on Figure 1. The well driller's report indicates that basalt was penetrated over most of the borehole depth. Sedimentary zones were penetrated in the depth ranges of 300 to 420 feet (logged as clay, sand and broken basalt) and 484 to 510 (logged as sand or sand

with broken basalt). The sedimentary zones are in the elevation intervals of 796 to 822 feet and 886 to 1,003 feet.

- The well driller's report for a domestic well drilled in the NW NE of section 19 for David Van Buren in 2004 provides additional geologic information for the target area selected for the LOID irrigation well field. This well appears to penetrate the upper portion of the Grande Ronde basalt and has a reported depth to water of 574 feet. The well elevation would be about 1,294 feet if the water-level elevation is about the same as the other regional aquifer wells (about 720 feet). If this is correct, then the sedimentary interbed (logged as shale and sandstone) would be in the elevation interval of 897 to 1,126 feet. This agrees in general with the data from Lewiston well #6.
- Information from several domestic wells drilled in section 20 shows that the sedimentary interbed is present at land surface in the Tammany Valley. For example, the Bud English well penetrated what is logged as overburden to a depth of 140 at the location described as the NW SE of section 20. Based on an estimated well elevation of 1,100 feet, the elevation of the bottom of the sedimentary interbed would be about 960 feet.

The available information suggests that wells drilled at an elevation of about 1,200 feet would penetrate basalt underlain by a sedimentary interbed which is in turn underlain by basalt. Drill sites at elevations less than 1,100 feet might start in the sedimentary interbed, which lessens the complexity of construction of the well.

### **Aquifer Characteristics**

Production wells completed within the regional aquifer typically have been drilled down until a suitable yield has been obtained. The APUD wells extend to an average elevation of about 100 feet below sea level. These wells are all highly productive with discharge rates ranging from 2,200 to 3,500 gpm (Table 1). LOID well #4 extends to an elevation of approximately 60 feet below sea level and presently yields about 1,100 gpm. LOID wells #2 and #3 extend down to elevations of -215 and -1,158 feet, yet have relatively low yields. The poor yield characteristics of LOID wells #2 and #3, as shown on Table 1, is in part due to formation damage caused by invasion of drilling mud into the fractures in the basalt.

The hydraulic characteristics of the aquifer at each individual well site can vary considerably. However, experience within the regional aquifer has proven that production wells that yield thousands of gallons per minute can be drilled at a number of locations within the regional aquifer.

A yield between 2,000 and 3,000 gpm per well can be anticipated at the target site if the correct drilling techniques are used and the borehole extends to a depth at least to sea level or possibly several hundred feet below sea level. Thus, a well constructed a drill pad at about 1,200 feet elevation would need to 1,200 to 1,400 feet deep.

### **Well Construction Components**

Well construction consists of installing the three main components of a well: 1) the pump chamber casing; 2) the seal on the outside of the pump chamber or other casing;

and 3) the screen or open-hole portion which allows water to enter the well. These components are discussed in the following paragraphs.

The pump chamber casing is designed to hold the pump. The diameter of the pump chamber casing is selected based on the pump to be used, which in turn is controlled by the desired and attainable yield. The Ground-Water Manual (Bureau of Reclamation, 1995) provides the following guidance for the selection of the pump chamber diameter. The recommended casing diameters are based on the typical diameter of pump bowls used for the given ranges in yield. Larger diameter pump chamber casing may be used if alignment of the well is an issue, particularly if line-shaft turbine pumps are to be used.

Well Yield (gpm)	Pump Chamber Diameter (inches)
300 to 1,500	12
1,500 to 3,000	16
2,000 to 5,000	20
3,000 to 5,000	24
4,000 to 8,000	28

The depth of the pump chamber normally is controlled by the maximum anticipated location of the pump. A pump chamber which allows 200 feet of drawdown has been sufficient for most of the APUD wells and for LOID well #4. This means that the pump chamber would extend to 200 feet below the static water level. Assuming a static level elevation of 720 feet, the pump chamber casing would extend to an elevation of 520 feet. For a site where the well head elevation is 1,200 feet, the length of the pump chamber casing would be 680 feet.

A seal is installed surrounding the upper casing in a well in order to keep surface and near-surface contaminants from entering the well and to eliminate any hydraulic connection of shallow and deeper aquifers. The best approach is to install the grout seal to the full depth of the pump chamber casing.

A production well should be designed to allow the entry of water with the minimum friction loss. The most efficient well completion is a stable, uncased hole. The next most efficient completion is placement of a wire wrapped or louvered screen opposite the producing zones. The percent open area for the wire-wrapped screen can be as great as 35 percent with a maximum of about 20 percent for louvered screen. Factory or field slotted casing typically provides less than three percent open area for water entry to the well and should not be used. The LOID irrigation wells should be open hole or completed with wire-wrapped, stainless steel screen.

Additional strings of casing may be needed to accommodate site geologic conditions. The presence of sedimentary interbeds within the sequence of basalt flows is a typical problem within the Lewiston Basin. For example, LOID well #4 has 20-inch diameter casing to 457 feet and 18 inch diameter casing from 444 feet to 866 feet. A section of 16-inch diameter casing and screen was placed in the well in the depth range of 853 feet to 1,267 feet. The lower portion of the well from 1,267 feet to the bottom at 1,625 feet was left open hole. The grout seal was placed around the 20-inch diameter

casing from 0 to 265 feet with an additional grout seal around the 18-inch diameter casing in the depth range of 856 to 866 feet to prevent interconnection of water producing zones that have considerably different water levels. Part of the need for extra strings of casing was because of the presence of sedimentary interbeds between basalt flows.

### **Alternative Well Designs**

Two aspects of well field site selection will reduce the construction and operating costs of the LOID irrigation wells. First, construction of the wells at lower elevation reduces the required well depths and reduces the complexity of the drilling process. It also allows use of line-shaft turbine pumps which likely will result in lower operating costs. Second, placement of the wells at a low enough elevation to start the drilling directly in the sedimentary interbed simplifies the sequence of drilling and/or the selection of drilling methodology used on the wells. The target area for well construction identified above allows the wells to be constructed at an elevation of 1,200 feet or lower. Selection of well sites on the floor of Tammany Valley below about 1,100 feet elevation may allow the wells to penetrate directly into the sedimentary interbed without the overlying basalt layer.

Construction of a well at about 1,200 feet elevation within the target area would involve the following steps. The example given is for placement of a 16-inch diameter pump chamber casing. Placement of 20 or 24 inch diameter pump chamber casing would require that all drill hole and casing dimensions be increased by 4 or 8 inches respectively.

- Construct a 20-inch diameter borehole to approximately 680 feet. If an air rotary drilling rig is used, temporary casing may have to be installed to penetrate the sedimentary interbed. This may require that the upper portion of the well be drilled at 22 or 24 inches in diameter to facilitate the placement of 20-inch diameter casing through the sediments. This portion of the well can be drilled using direct mud drilling technology.
- Place a 16-inch diameter casing to full depth equipped with a cement float shoe.
- Install the cement-bentonite grout outside of the 16-inch casing to land surface using the cement float shoe. Pull any temporary casing that was installed.
- Drill a nominal 16-inch diameter open hole in basalt using an air rotary drilling rig to a depth of about 1,200 to 1,400 feet depending on the productivity of the aquifers penetrated in the basalt.
- Install wire-wrapped, stainless steel screen and associated blank casing in the well from 10 feet above the bottom of the 16-inch diameter casing to the full well depth. About 100 feet of screen would be installed opposite water-producing zones. The casing/screen diameter can be 10 or 12 inch.
- Develop and test pump the completed well.

Construction of a well along the floor of Tammany Valley at an elevation of about 1,100 feet would involve the following steps. Again, the example involves placement of a 16-inch diameter pump chamber casing.



- Construct a 20-inch diameter borehole to approximately 580 feet. If an air rotary drilling rig is used, temporary 20-inch diameter casing would need to be installed down to the bottom of the sedimentary interbed. A nominal 20-inch diameter borehole would be drilled in basalt to the target depth of 580 feet.
- Place a 16-inch diameter casing to full depth equipped with a cement float shoe.
- Install the cement-bentonite grout outside of the 16-inch casing to land surface using the cement float shoe. Pull any temporary casing that was installed.
- Drill a nominal 16-inch diameter open hole in basalt using an air rotary drilling rig to a depth of about 1,100 to 1,300 feet depending on the productivity of the aquifers penetrated in the basalt.
- Install wire-wrapped, stainless steel screen and associated blank casing in the well from 10 feet above the bottom of the 16-inch diameter casing to the full well depth. About 100 feet of screen would be installed opposite water producing zones. The casing/screen diameter can be 10 or 12 inch.
- Develop and test pump the completed well.

The peak demand of the LOID irrigation system probably will require construction of five to six wells. Some of the wells likely would yield more than 2,500 gpm. Thus, it is possible that four wells would meet the peak demand under most circumstances. The fifth and sixth wells would provide some degree of redundancy.

## **CONCLUSIONS AND RECOMMENDATIONS**

Three primary questions are posed in the introduction to this report. First, what impacts on the aquifer, such as water-level decline, could be anticipated with the development and operations of LOID irrigation wells in the regional aquifer? Second, what is the potential for successful development of the LOID irrigation wells? Third, where should the LOID irrigation wells be located and what are the primary construction issues? Answers to these questions are provided below.

### **Aquifer Impacts**

The regional aquifer in the Lewiston Basin is the target for development of irrigation wells for LOID. The available hydrologic information indicates that there is a hydraulic connection between the aquifer and the Snake River. The ground-water levels in 2011 in the aquifer are higher than they were in 1961 shortly after the initiation of pumping by APUD. This is mostly because the filling of the reservoir behind Lower Granite Dam resulted in a general increase in ground-water levels.

Ground-water withdrawal from the aquifer peaked at about 3,200 MG/year. Present (2009) withdrawals are about 2,300 MG/year. Development of the LOID irrigation supply from ground water, combined with existing uses, would result in a total withdrawal of about 5,000 MG/year. More than doubling of the present pumping rate by the initiation of LOID withdrawal for irrigation will necessarily result in some water-level decline. Increasing ground-water withdrawals would result in sufficient water-level decline to bring the system back into balance by either increasing the rate of natural recharge and/or decreasing the rate of natural discharge. The limited data on water-level

patterns in the early 1960's suggests that the additional water-level decline would be in terms of tens of feet. It is unlikely that the additional water-level decline would be more than 30 feet.

### **Well Development Potential**

Information from existing wells indicates that there is a high probability that LOID irrigation wells in the yield range of 2,000 to 3,000 gpm each can be constructed within the target area identified. The wells would need to extend down to sea level or possible 100 to 200 feet below sea level to be successful. Also, formation damage caused by drilling would have to be minimized. Specifically, a mud rotary rig should not be used to drill the lower portions of the wells. A well field that includes five or six wells will be needed to meet the anticipated peak demand for the LOID irrigation system.

### **Well Location and Construction Issues**

Two aspects of well field site selection will reduce the construction and operating costs of the LOID irrigation wells. First, construction of the wells at lower elevation reduces the required well depths and reduces the complexity of the drilling process. It also allows use of line-shaft turbine pumps and lower operating costs. Second, placement of the wells at a low enough elevation to start the drilling directly in the sedimentary interbed simplifies the sequence of drilling and/or the selection of drilling methodology used on the wells. The target area for well construction identified in the Tammany Valley allows the wells to be constructed at an elevation of 1,200 feet or lower. Selection of well sites on the floor of Tammany Valley at about 1,100 feet elevation or lower may allow the wells to penetrate directly into the sedimentary interbed without the overlying basalt layer.

The best general area for the LOID irrigation well field is along the west end of the Tammany Creek Valley, generally south of the airport. This area was selected for the following reasons. First, the valley allows access to lower elevation land which will result in less drilling depth and a static water level that is closer to land surface. Second, producing zones in the Grande Ronde basalt at this site occur at higher elevations than at locations to the north because the rocks dip to the north since the area is located on the southern limb of the syncline. Third, the selected area is relatively distant from other major production wells. Fourth, the target has a low density of development with few homes that might be impacted from well construction activities. Also, the existing drainages offer opportunity for disposal of wastewater generated during well drilling.

## **REFERENCES CITED**

- Bureau of Reclamation, 1995, Ground Water Manual: U.S. Department of the Interior, Water Resources Publications LLC, Highlands Ranch, CO.
- Cohen, P. and D. Ralston, 1980, Reconnaissance Study of the “Russell” Basalt Aquifer in the Lewiston Basin of Idaho and Washington: Idaho Water Resources Research Institute, Moscow, Idaho
- Ingram, Bill, 2011, Personal Communication, City of Lewiston, Lewiston, Idaho.
- Simpson, Tim, 2011, Personal Communication, APUD, Clarkston, Washington.
- Stevens, G. R., 1994, Evaluation of the Groundwater Resources within the Lewiston Basin: M.S. Thesis, University of Idaho.
- Uptmor, Amy, 2011, Personal Communication, J-U-B Engineers, Lewiston, Idaho.



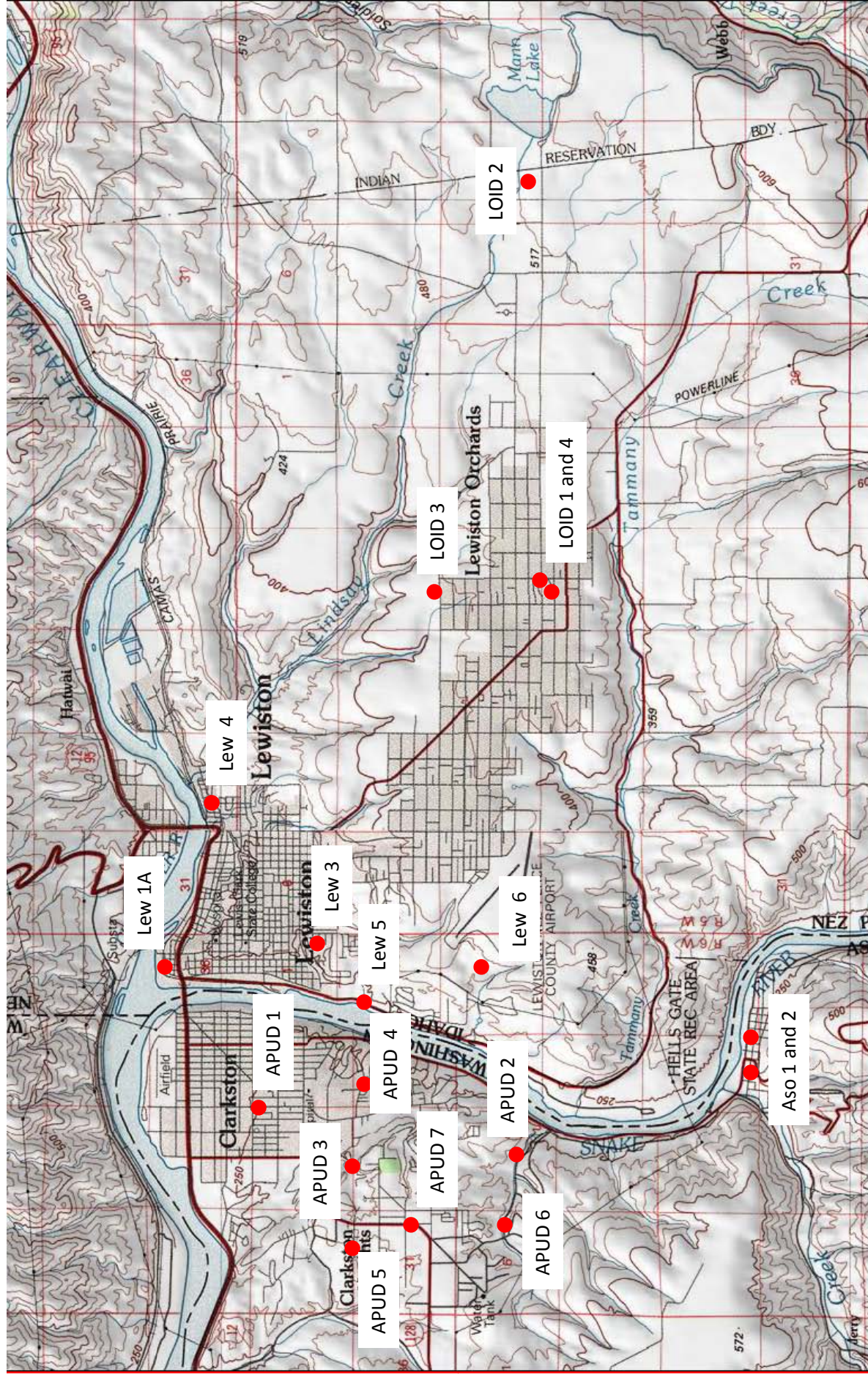


Figure 1 Map Showing Locations of Major Production Wells



### Columbia River Basalt Group

Saddle Mountains Formation

Wanapum Formation

Grande Ronde Formation

N2 magnetostratigraphic unit

R2 magnetostratigraphic unit

N1 magnetostratigraphic unit

R1 magnetostratigraphic unit

Imnaha Formation

### Grande Ronde Units



Tgr2



Tgn1



Tgr1

Units wells are screened to:

LOID 2: Tgr1 and Tgn1

LOID 3: Tgr1, Tgn1, and Tgr2

LOID 4: Tgn1 and Tgr2

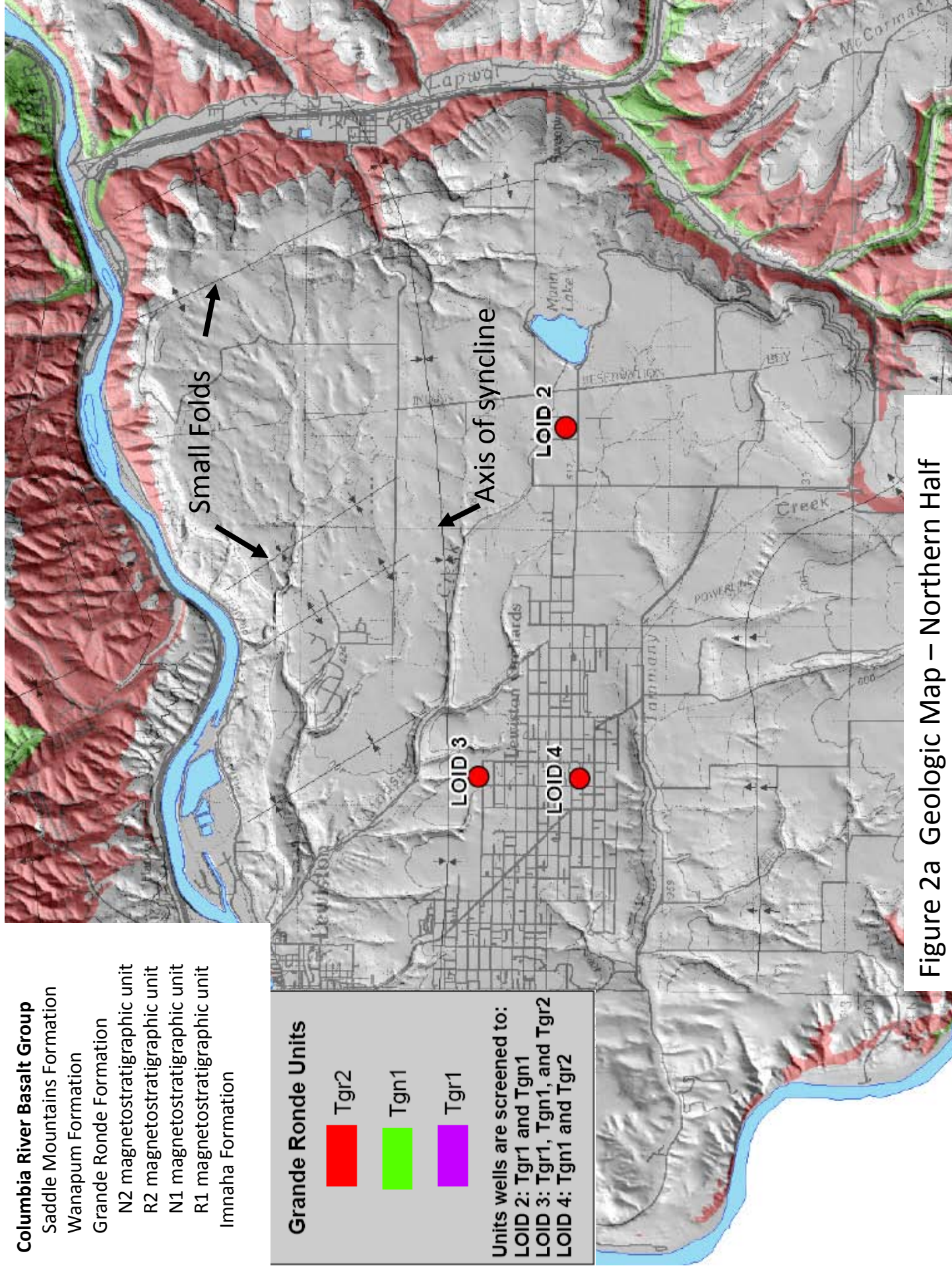


Figure 2a Geologic Map – Northern Half



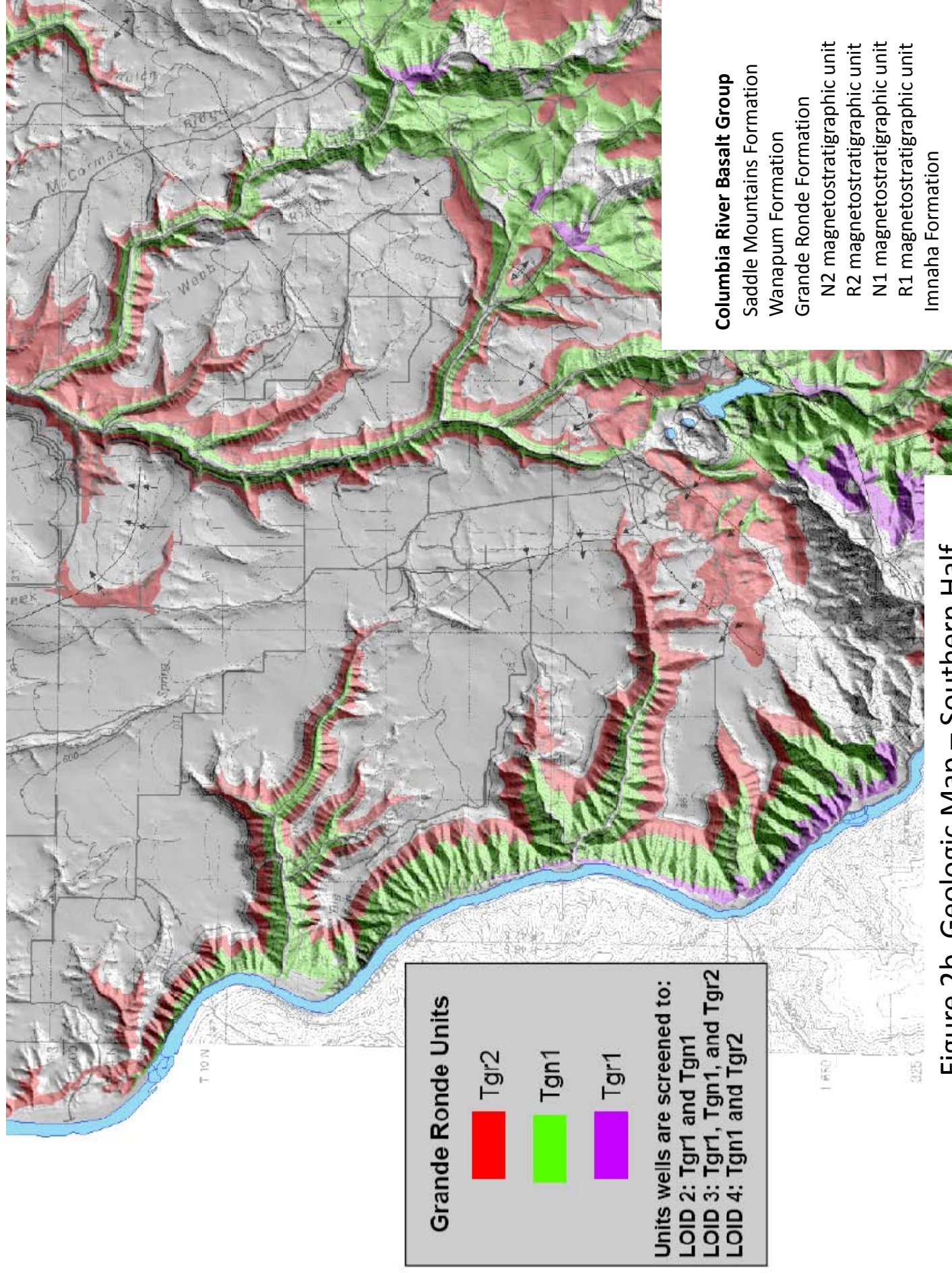


Figure 2b Geologic Map – Southern Half



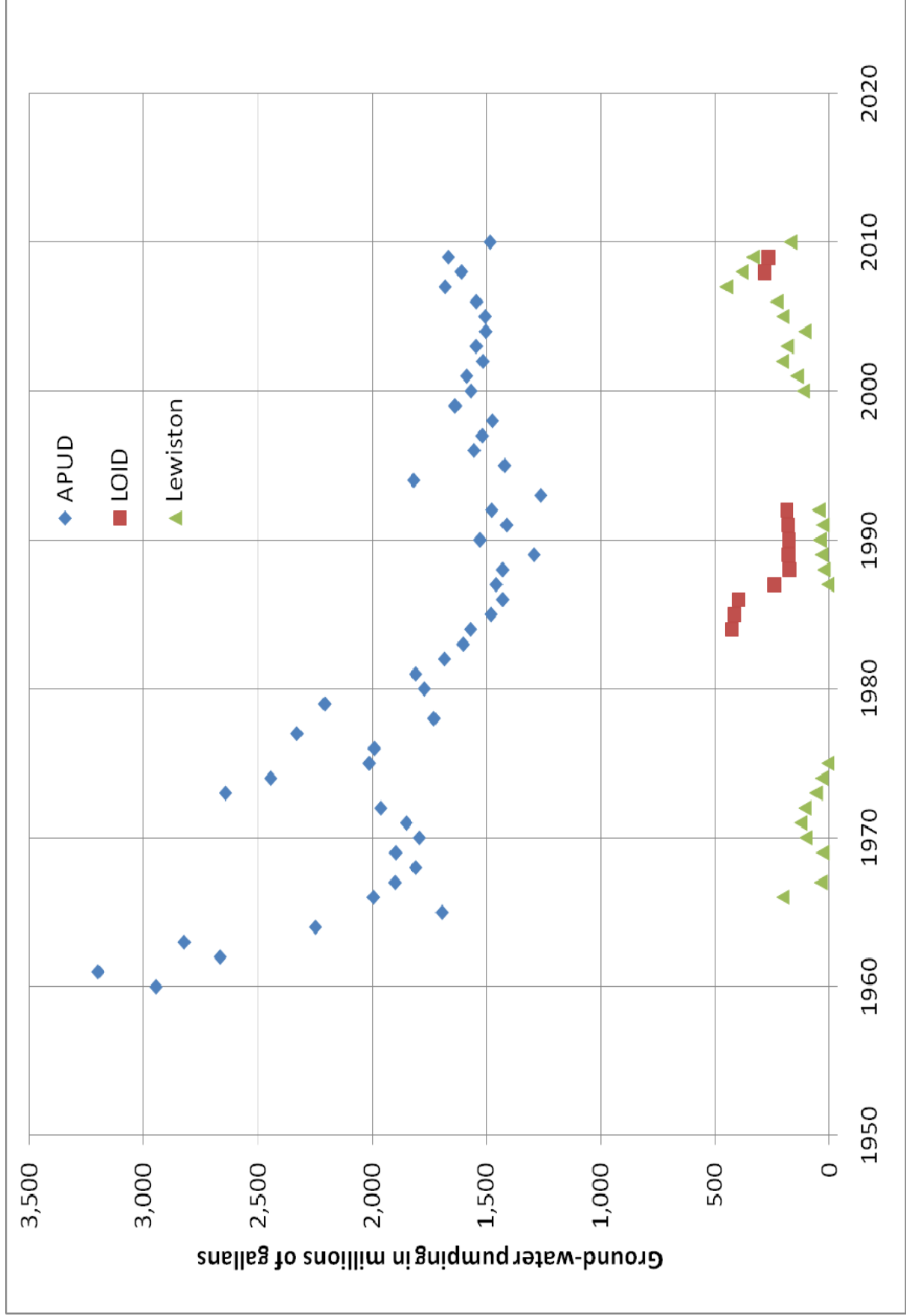


Figure 3 Annual Pumping of APUD, LOID and the City of Lewiston from the Regional Aquifer

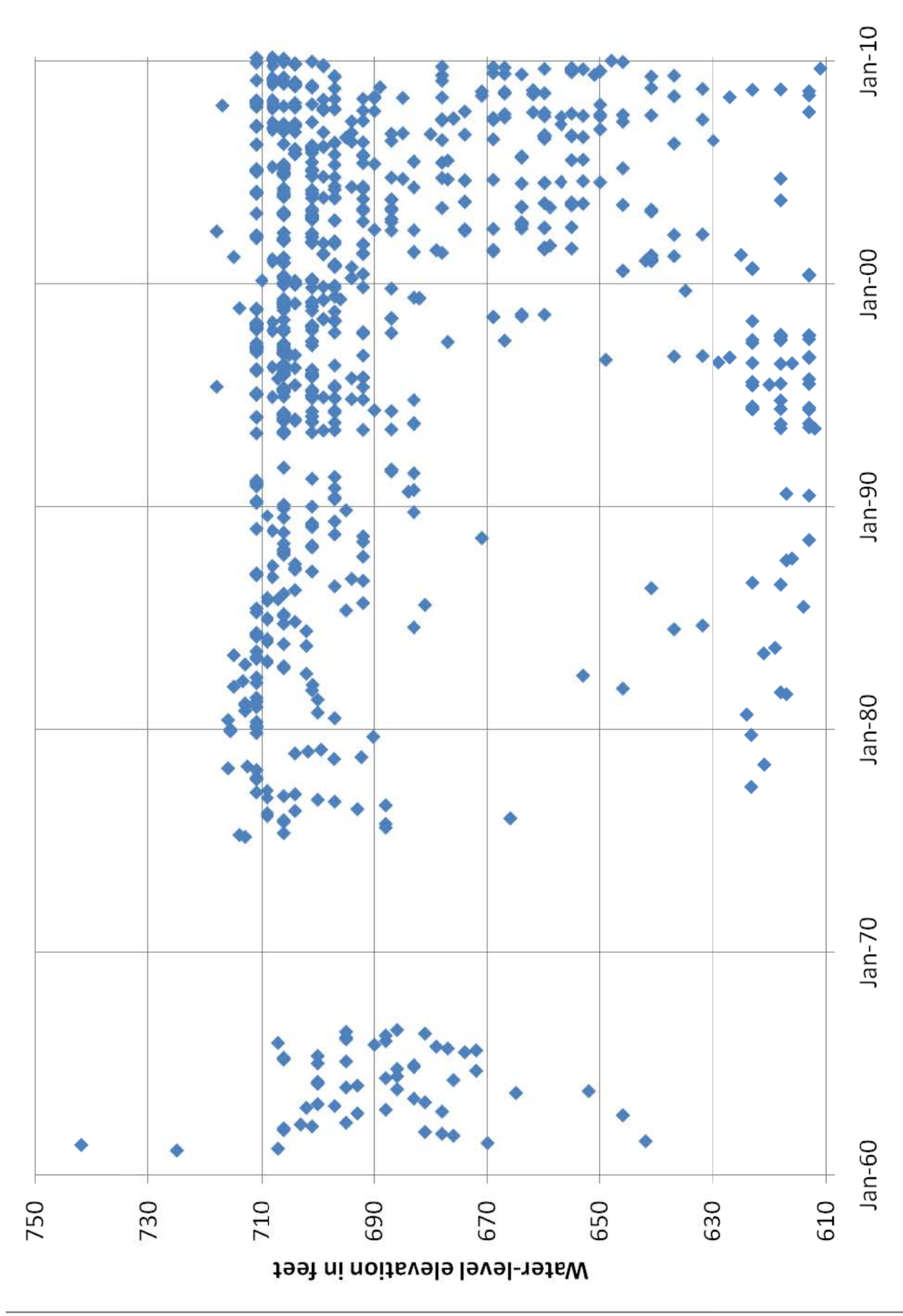


Figure 4 Hydrograph for APUD Well #1

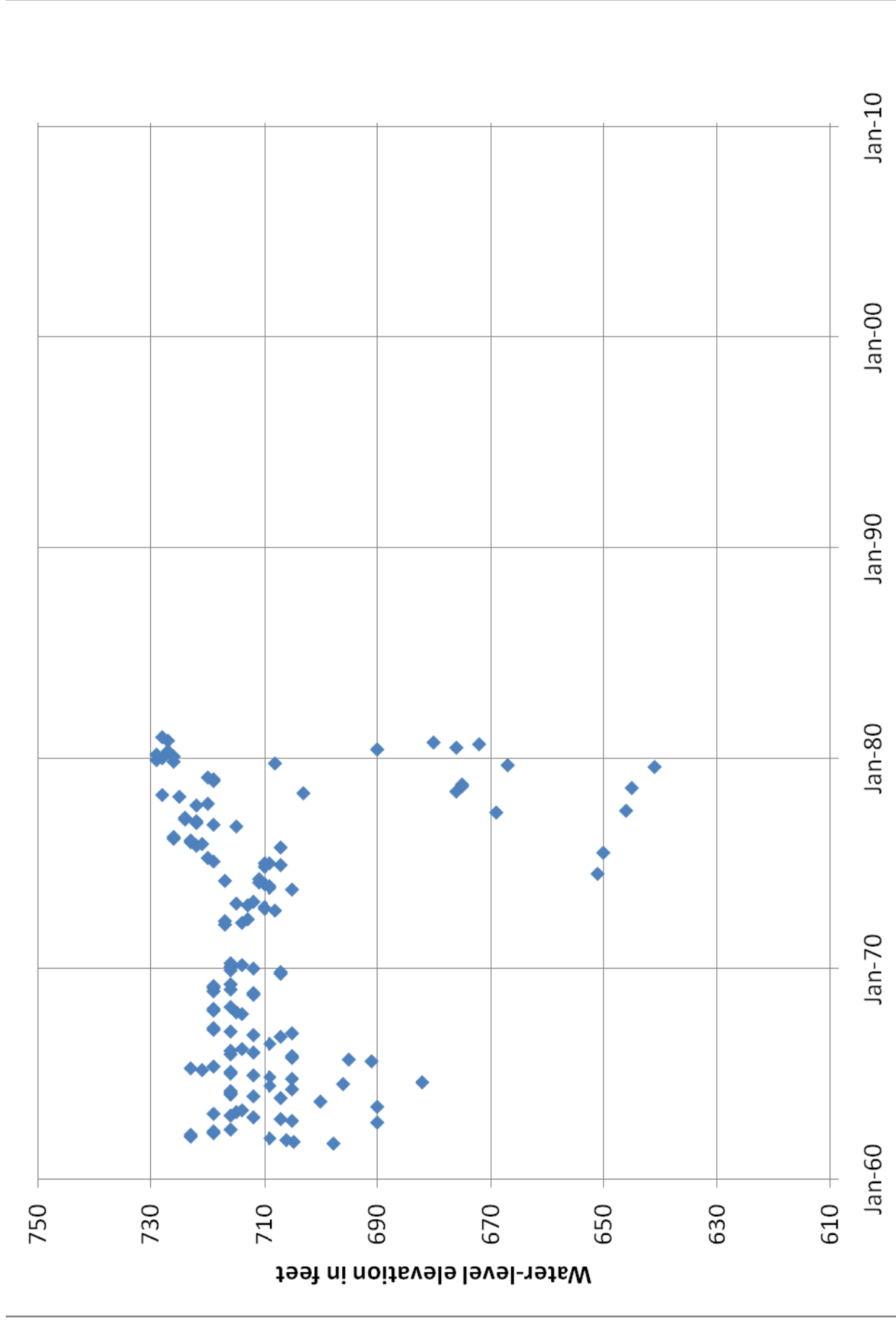


Figure 5 Hydrograph for APUD Well #2

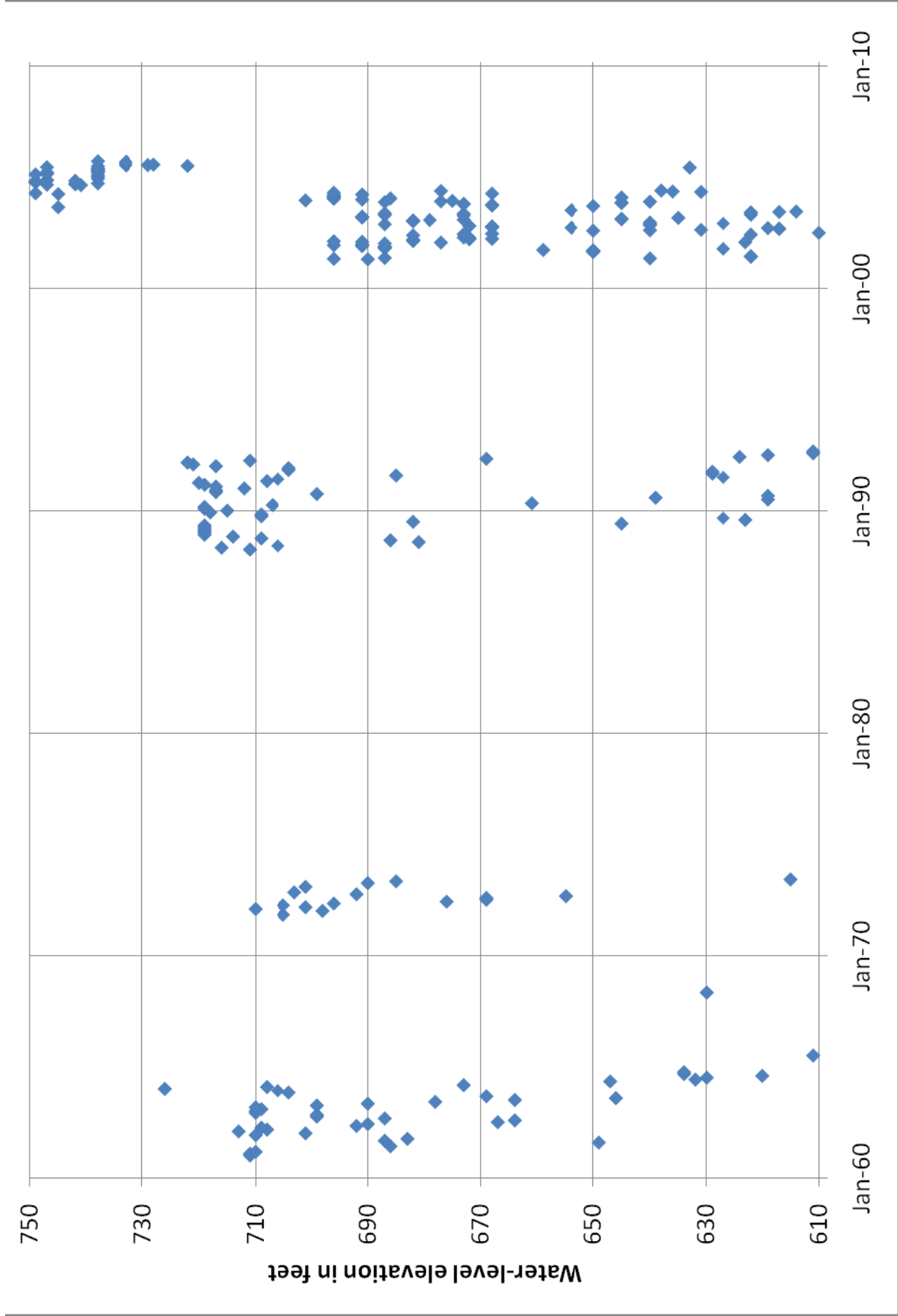


Figure 6 Hydrograph for APUD Well #3

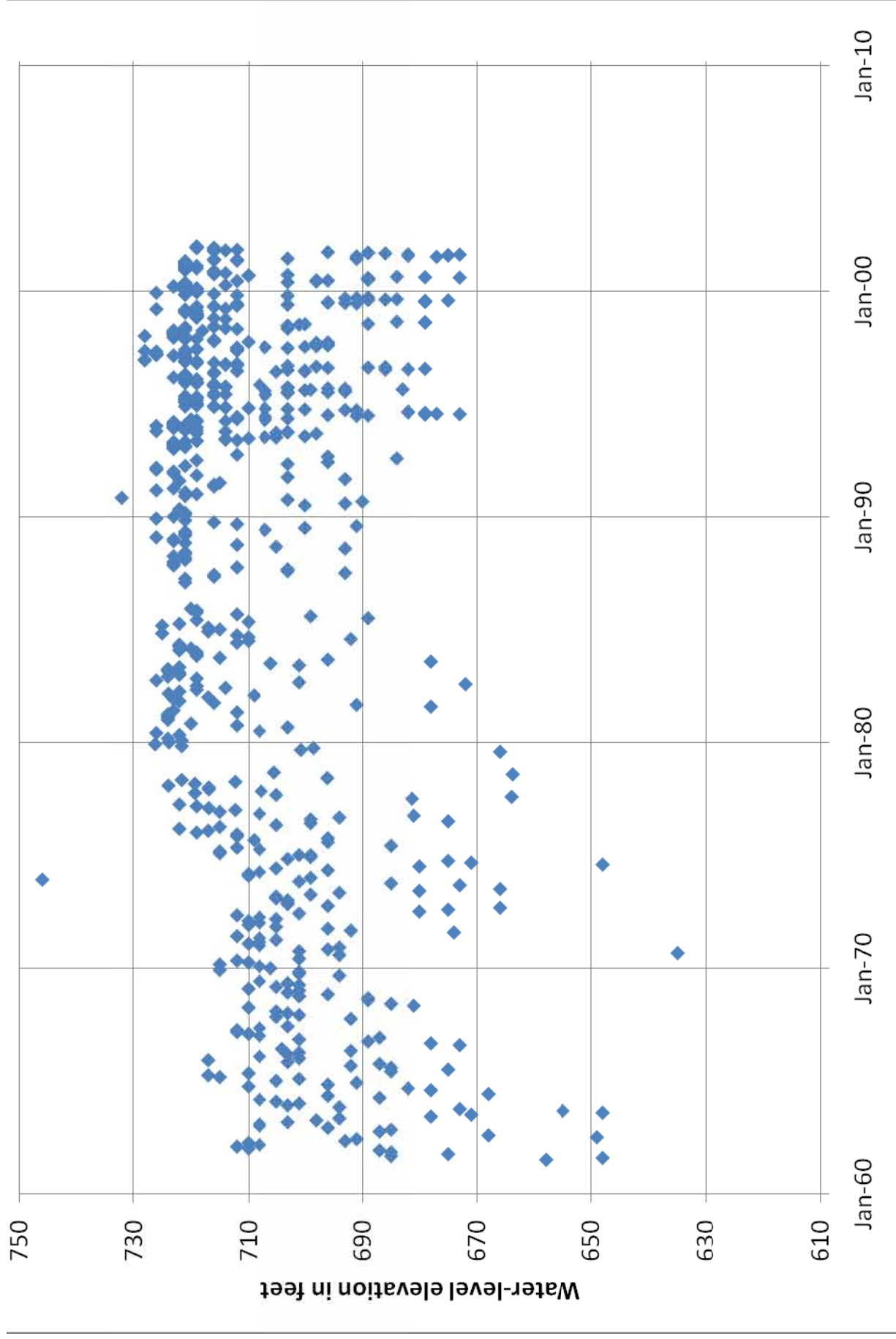


Figure 7 Hydrograph for APUD Well #4

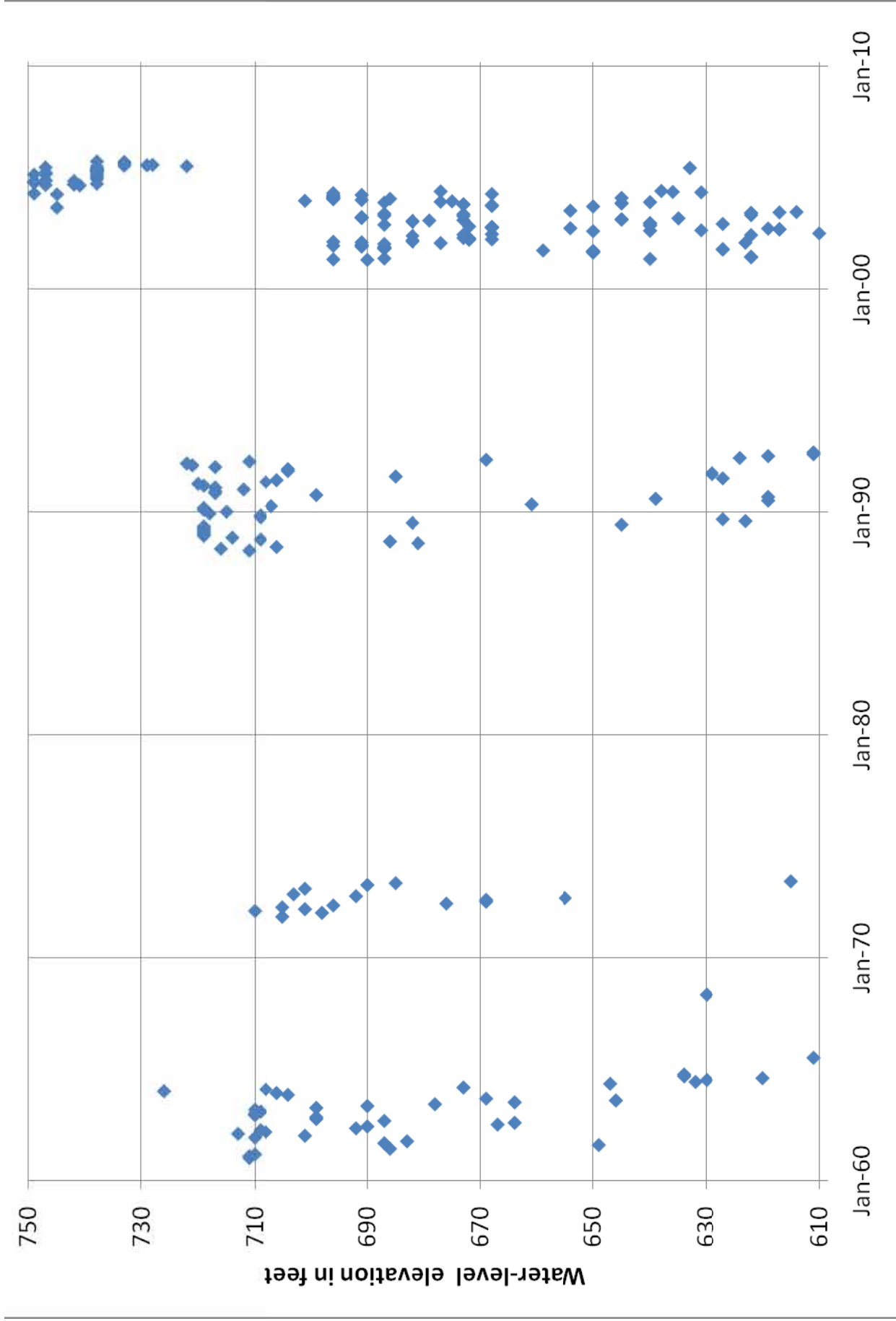


Figure 8 Hydrograph for APUD Well #5



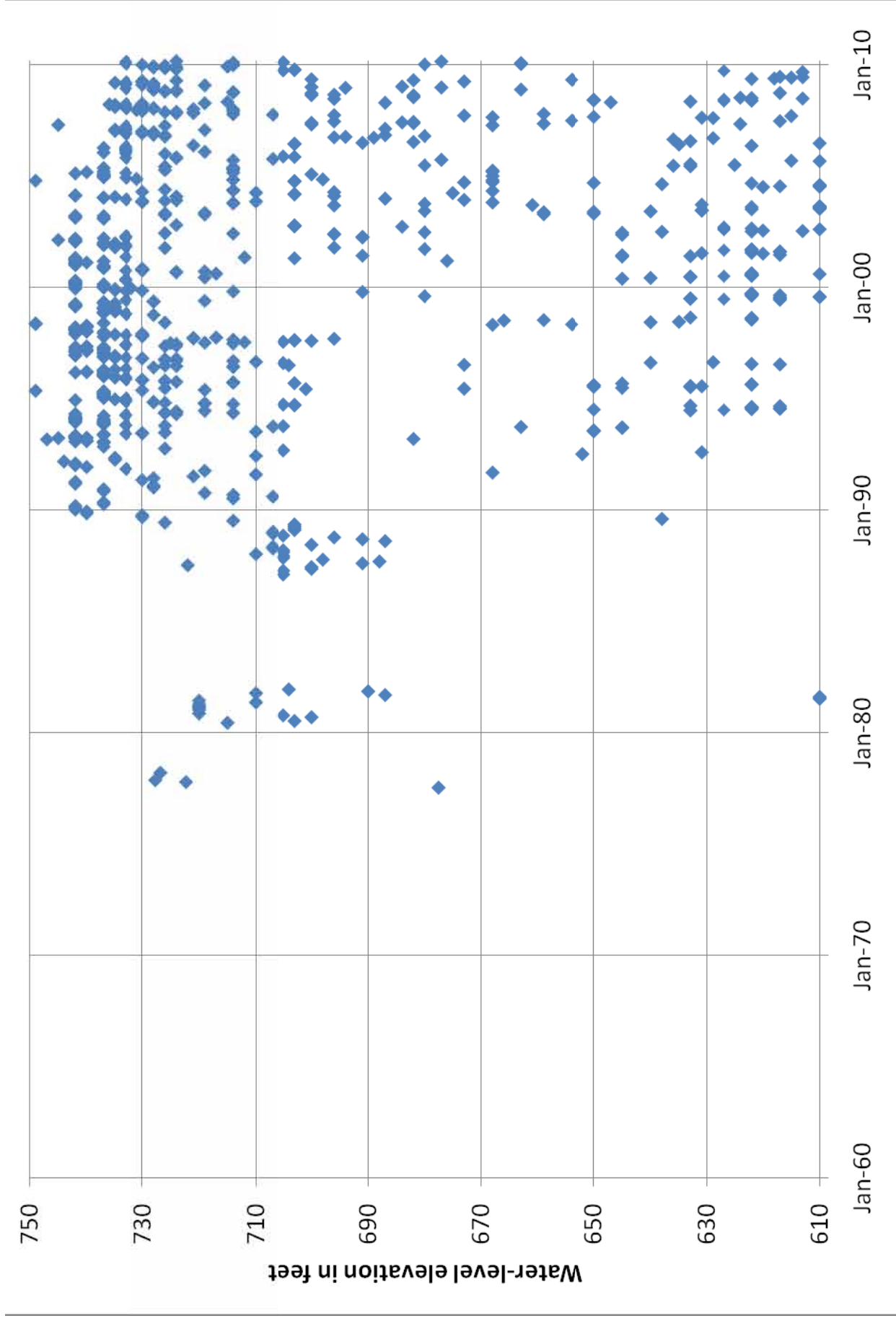


Figure 9 Hydrograph for APUD Well #7

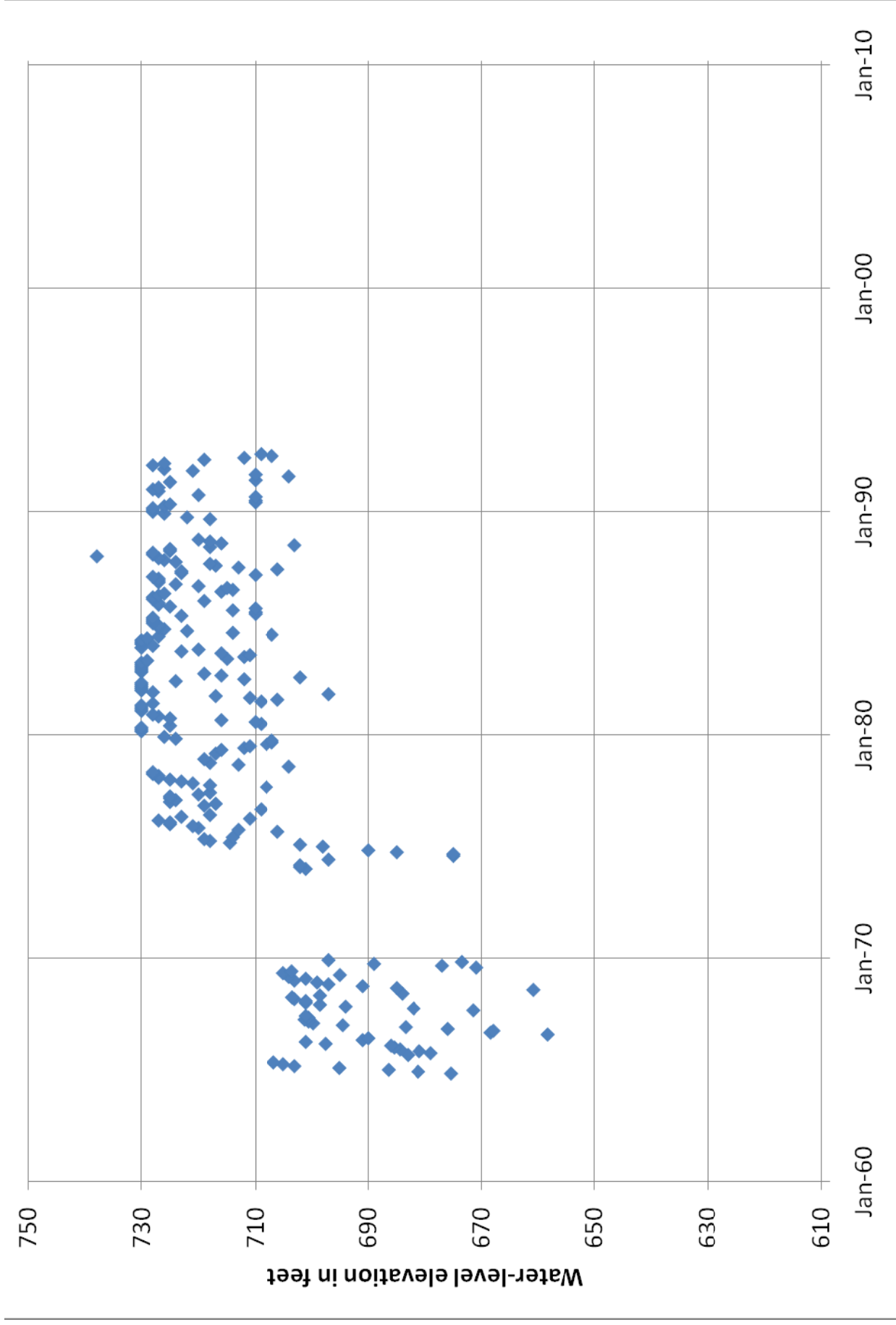


Figure 10 Hydrograph for Lewiston Well #1A

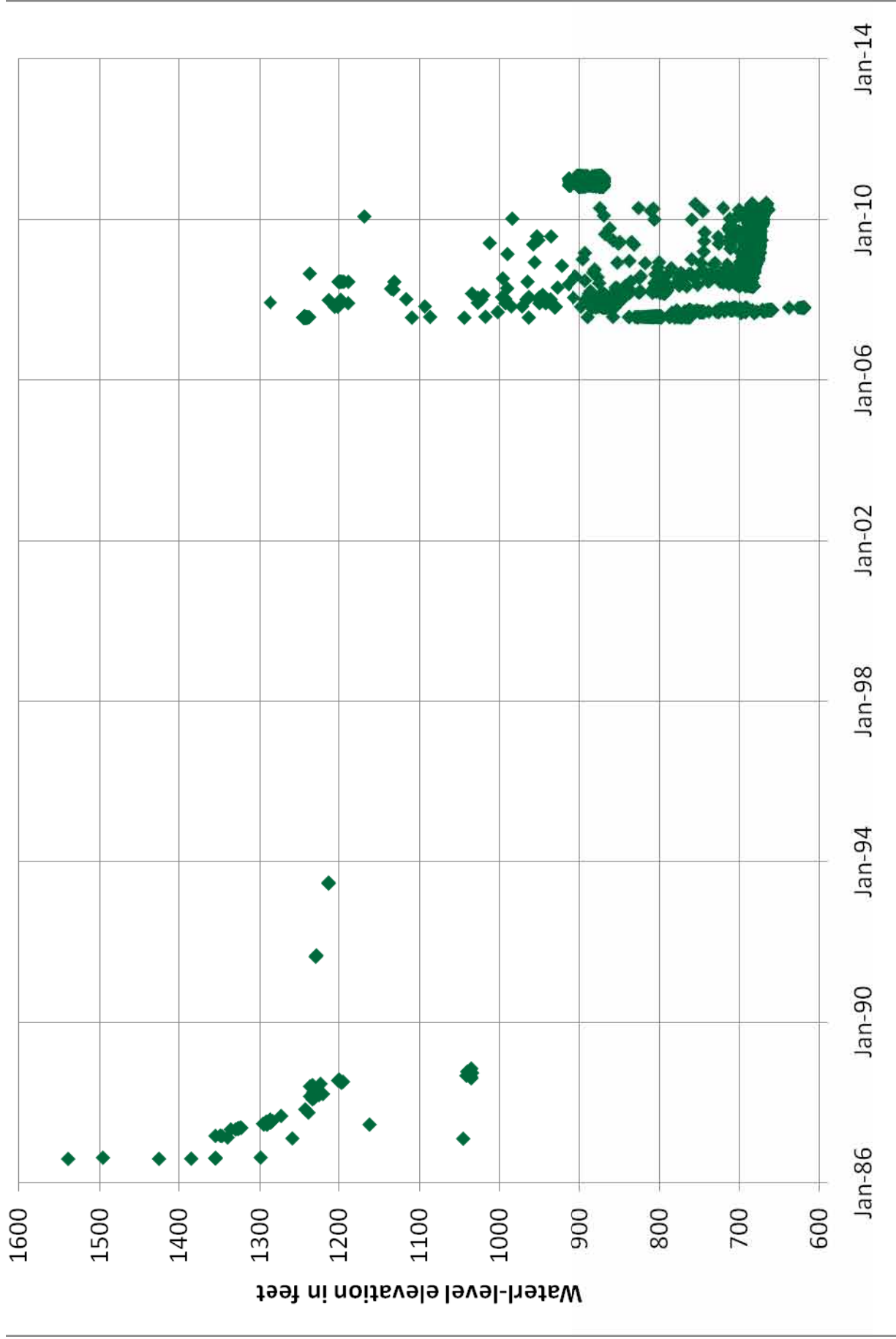


Figure 11 Hydrograph for LOID Well #2

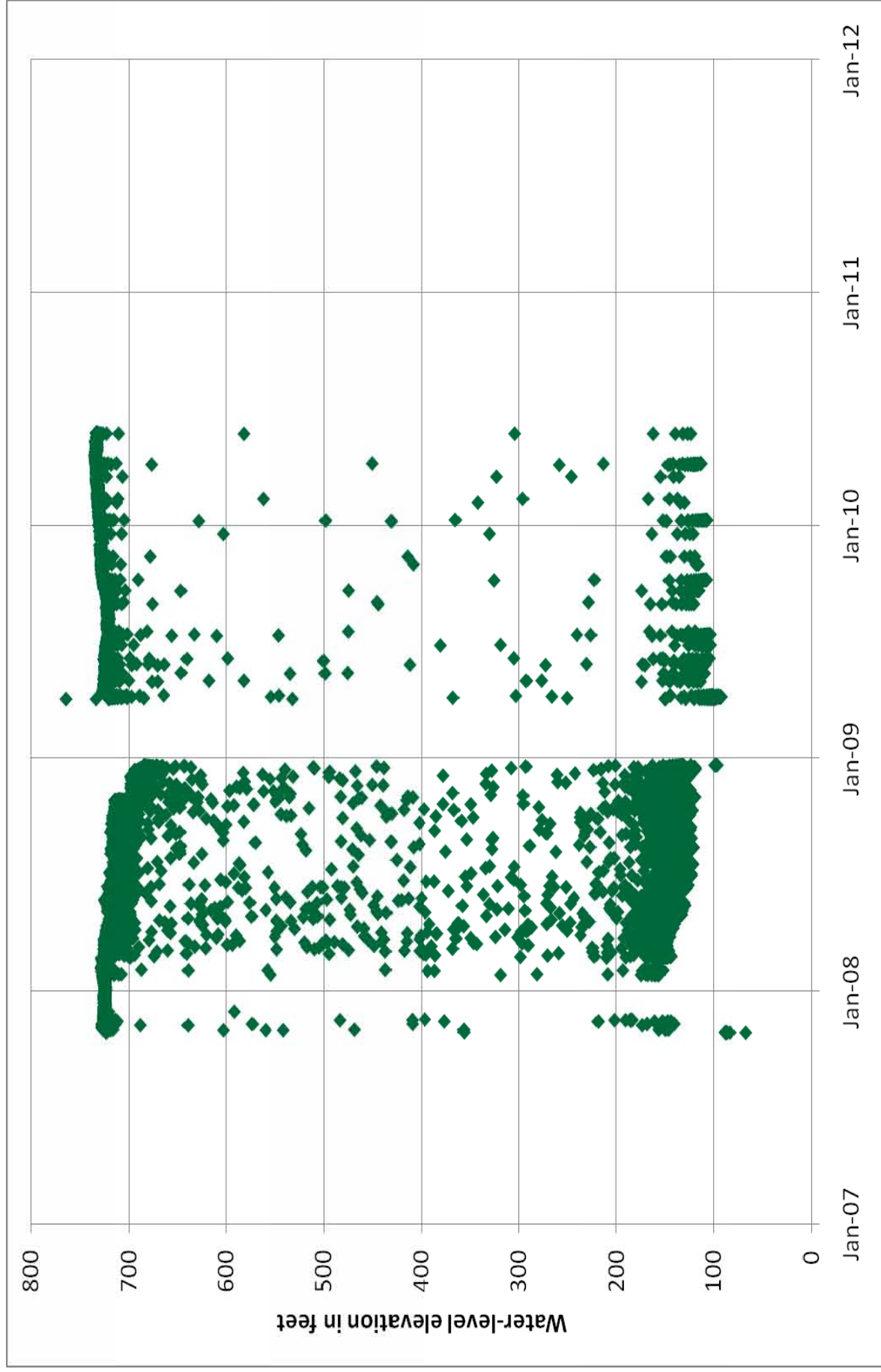


Figure 12 Hydrograph LOID Well #3

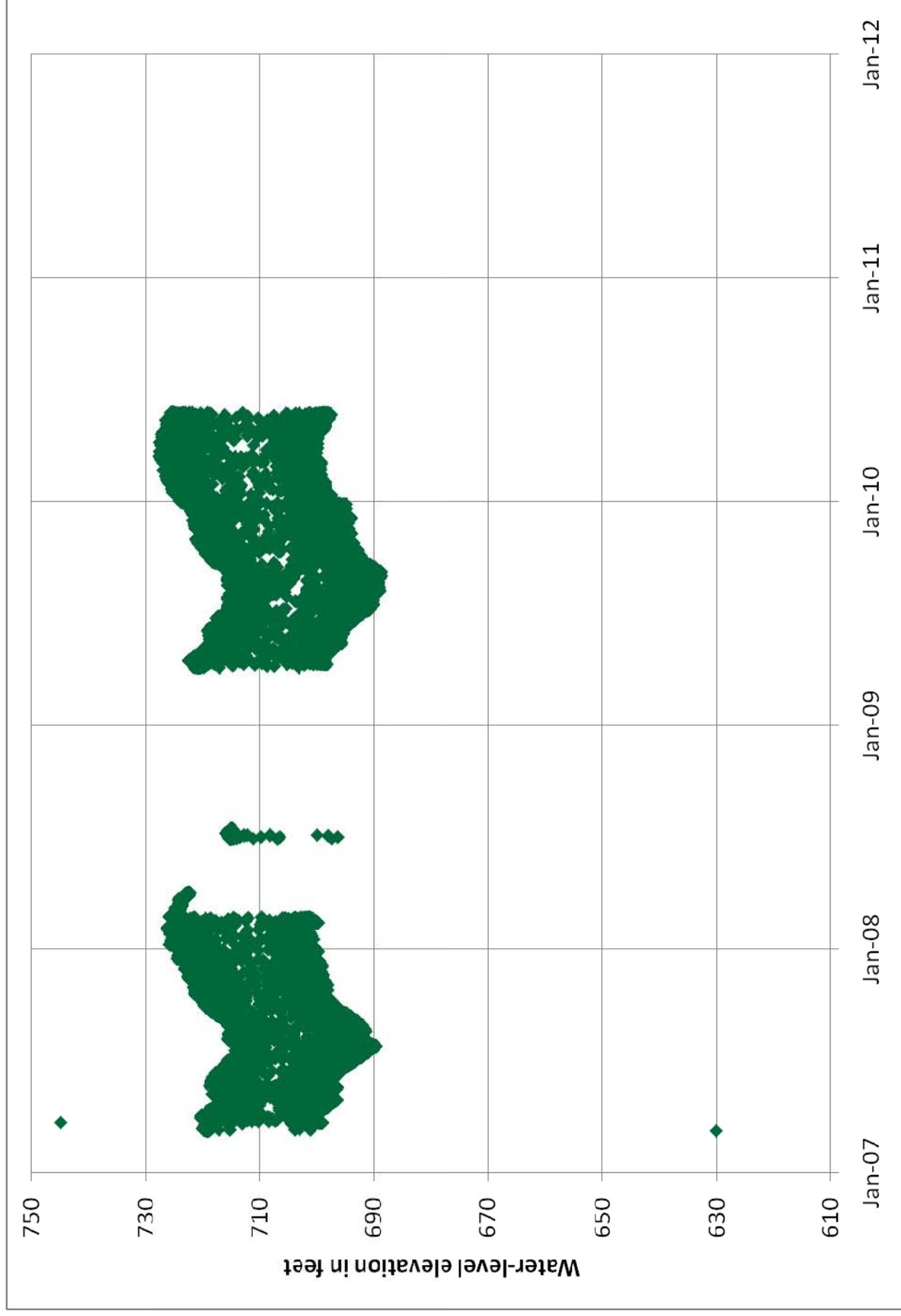


Figure 13 Hydrograph for LOID Well #4

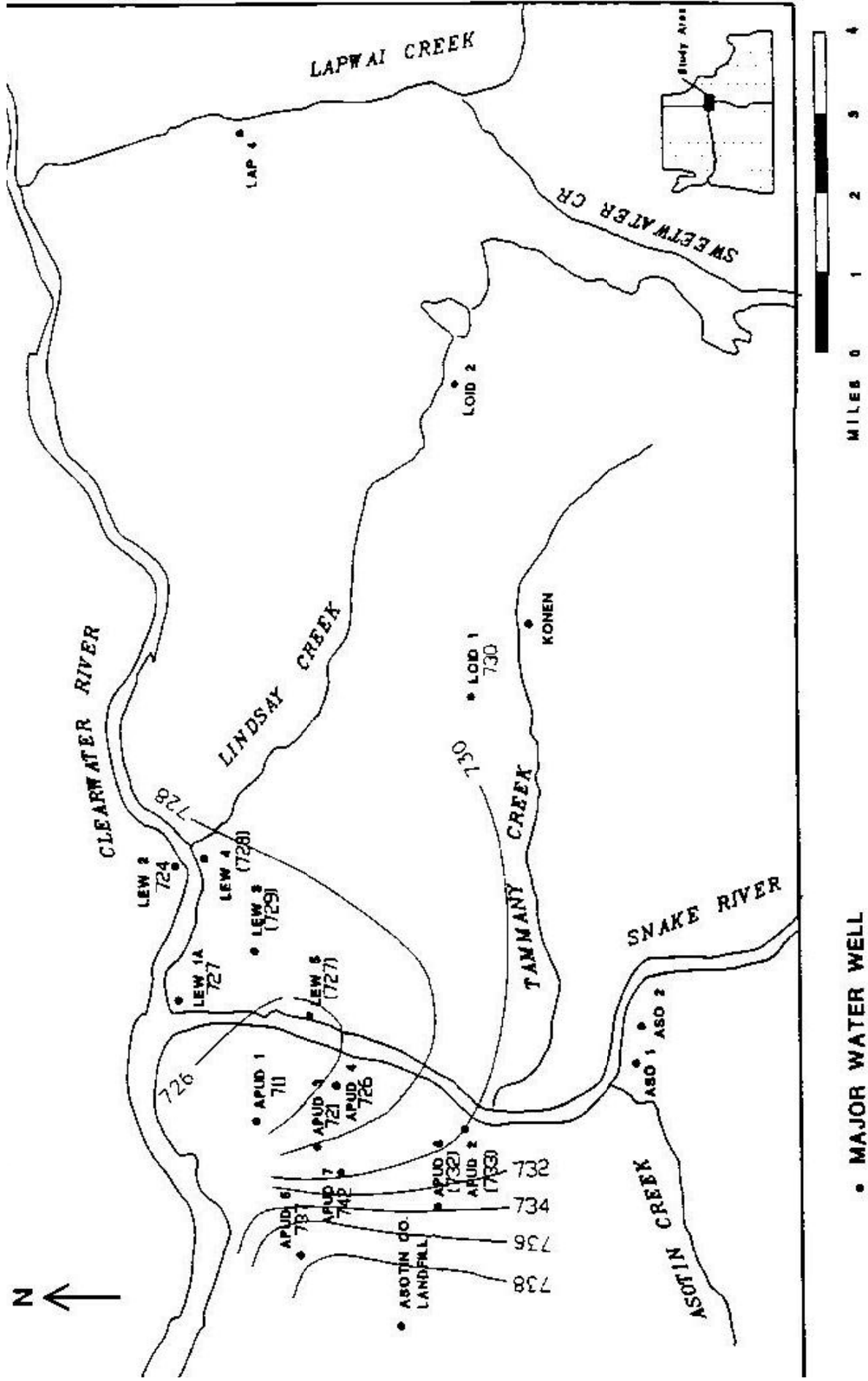


Figure 14 Water-Level Contour Map of Static Levels in 1988 (Stevens, 1994)



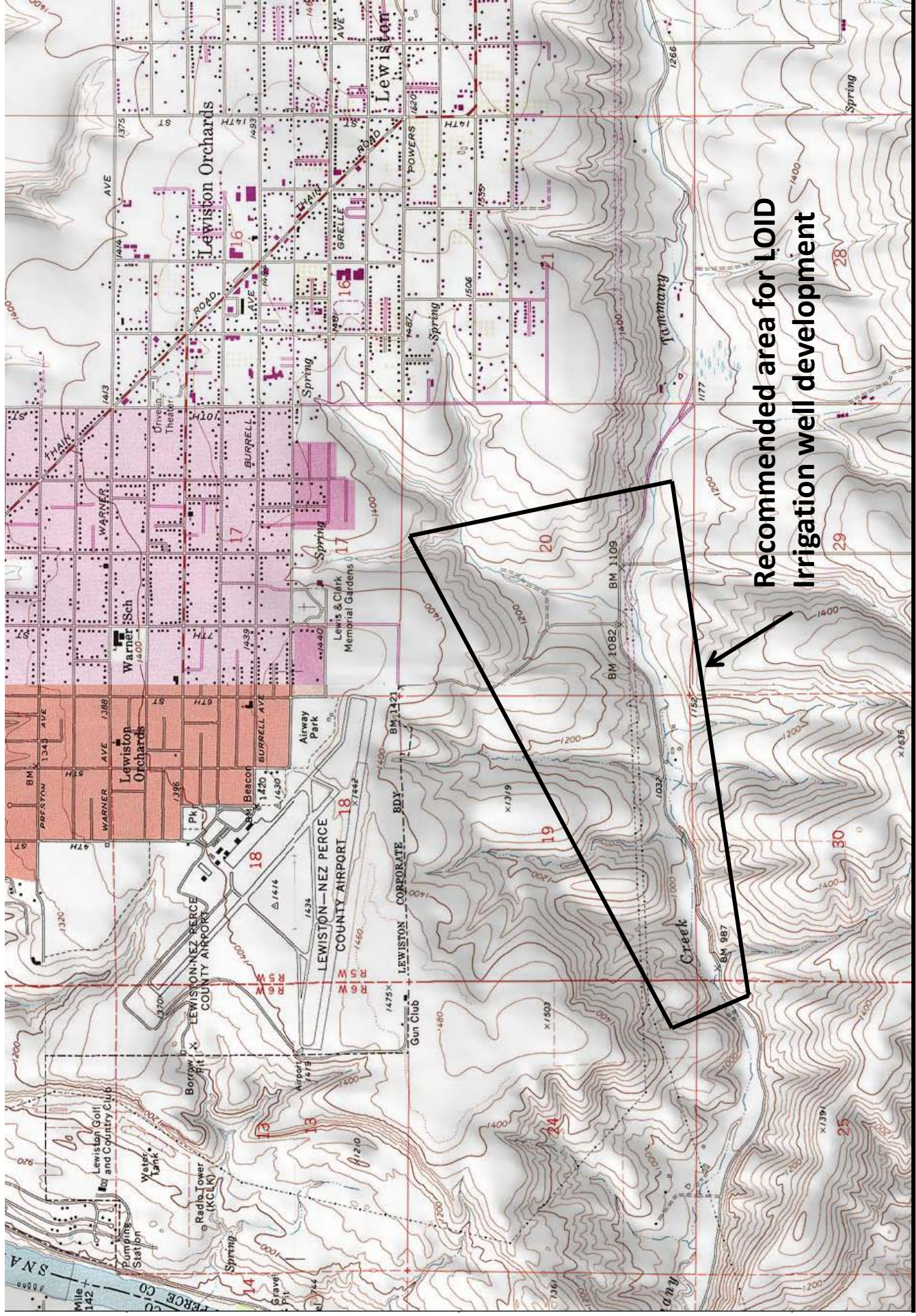


Figure 15 Location Map Showing Recommended Area for Construction of LOID Irrigation Wells



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# ***APPENDIX K***

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## **Reclamation Economic Analysis**

# RECLAMATION

*Managing Water in the West*

## **Economic Analysis for the Lower Clearwater Exchange Project**



U.S. Department of the Interior  
Bureau of Reclamation  
Technical Service Center  
Denver, Colorado

June 2011

## **Mission Statements**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

**BUREAU OF RECLAMATION**  
**Technical Service Center, Denver, Colorado**  
**Economics and Resource Planning Group, 86-68212**

## **Economic Analysis for the Lower Clearwater Exchange Project**

**Lewiston Orchards Irrigation District**  
**Pacific Northwest Region**

\_\_\_\_\_  
Prepared: Dawn Munger  
Natural Resource Economist, Economics and Resource Planning Group 86-68212

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Date

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Peer Review: Steve Piper  
Natural Resource Economist, Economics and Resource Planning Group 86-68212

\_\_\_\_\_  
Date

REVISIONS					
Date	Description	Prepared	Checked	Technical Approval	Peer Review
5/26/11	1st Draft	dm	dm		
6/10/11	Final Draft	dm	dm		

<b>NED ANALYSIS.....</b>	<b>5</b>
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Untreated Residential Water Supply/ Sufficient Water Delivery .....	6
Recreation .....	7
Endangered Species/ Watershed Restoration.....	7
Tribal Trust Assets .....	8
Water Quality .....	8
Distribution .....	8
Unemployed Labor .....	8
<b>COSTS .....</b>	<b>9</b>
Design/Construction.....	9
Operations and Maintenance.....	10
Interest During Construction (IDC) .....	10
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## **ECONOMIC ANALYSIS**

The purpose of the LCEP Appraisal Level Investigation is to evaluate the potential for various alternatives to provide a reliable and good quality water supply to LOID, to resolve ESA issues, and to address Federal/Tribal trust issues. The ESA and Tribal trust issues are not evaluated from an economic standpoint, except to the extent that alternative elements that address these concerns have differing benefits and costs.

Under the RWSP, the alternatives must relate to the P&Gs. According to the P&Gs (pg. 8), “four accounts are established to facilitate evaluation and display of the effects of the alternatives. These accounts are: national economic development (NED), environmental quality (EQ), regional economic development (RED), and other social effects (OSE). These four accounts encompass all significant effects of a plan on the human environment as required by the National Environmental Policy Act of 1969 (NEPA). They also encompass social well-being as required by Section 122 of the Flood Control Act of 1970.” The NED account is the only account that is required at the feasibility level of analysis. Other information that is required by law or that will have a material bearing on the decision-making process should be included in one of the other accounts or in some other appropriate format used to organize information on effects.

### **NED ANALYSIS**

National Economic Development (NED) benefits are a measure of benefits that accrue to the Nation as a result of a Federal action. In this study, it is assumed that the appraisal level benefits across all of the action alternatives included in the cost-effectiveness analysis are the same.<sup>1</sup> The P&Gs (pg. 9) allow for a cost effectiveness analysis to show the viability and ranking of the alternatives based on the incremental benefits an alternative produces. Therefore, a cost-effectiveness analysis is used to determine the ranking of alternatives in terms of the cost of generating the same benefit. Table 1 shows the ranking of the alternatives from least cost to highest cost in terms of the calculated present value (PV) of total project costs.<sup>2</sup>

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<sup>1</sup> Alt. B does not provide the same level of benefits as the other action alternatives and, therefore, was not included in the cost effectiveness analysis but is discussed as an alternative.

<sup>2</sup> See Table 3 for explanation of costs.

**Table 1: Cost Effectiveness Analysis Results**

<b>Alternative</b>	<b>PV of Total Costs</b>
Alt. C - Clearwater River Pump Station-Distribution System Discharge	<b>\$47,374,000</b>
Alt. B1 - Clearwater River Pump Station-Mann Lake - Powers Ave Pipeline	<b>\$49,340,000</b>
Alt. E - Snake River Pump Station-Southport Ave. Pipe Route	<b>\$53,874,000</b>
Alt. D - Snake River Pump Station-Tammany Creek Road Pipe Route	<b>\$60,394,000</b>
Alt. F - Tammany Road Well Field	<b>\$68,595,000</b>

## **BENEFITS**

Benefits common to all action alternatives as well as the No Action alternative, as defined by the LCEP stakeholders, are described below. Benefit categories include both “traditional” NED benefits specifically described in the P&Gs and other benefit categories which may not be specifically mentioned.

### **Untreated Residential Water Supply/ Sufficient Water Delivery**

The action alternatives included in the cost effectiveness analysis would provide a source of 8,500 AF annually to the LOP with high efficiency via piping conveyance to be used primarily for landscape watering. Under all of the action alternatives, an additional 3,000 AF of water above current typical deliveries would be available annually to the LOP.

The No Action alternative would use the existing gravity system, which introduces losses at the reservoirs and canals due to evaporation and seepage. The action alternatives would utilize a pipe conveyance system, eliminating losses due to Lake Waha and Soldiers Meadow Reservoirs, and the conveyance system. Losses due to Mann Lake evaporation and seepage would still occur in alternatives A-F. Losses for all action alternatives are estimated to be in the range of 15-20 percent after the LOID filter plant flow meter, as described in Section 2.2.3, *Unaccounted Water*. Due to elimination of two reservoirs and open canal conveyance, more water would reach the distribution system and residential and municipal water users under the action alternatives than

under the No Action alternative, albeit with varying amounts of losses. The current replacement value of wholesale water in the area is \$287/AF<sup>3</sup> for a total annual value of \$861,000, which is over and above the benefit value provided by the current water supply.

## **Recreation**

All of the alternatives would maintain three reservoirs (Soldiers Meadow Reservoir, Lake Waha, and Mann Lake) for recreational use. It is assumed at this appraisal study level, consistent with statements made in the MOU, that none of the alternatives would negatively impact recreation visitation at these reservoirs. Idaho Fish and Game's (IDFG's) (2005 IDF&G Creel Survey and 2003 Idaho Sport Fishing Economic Report) states that approximately 34,400 angler hours<sup>4</sup> were derived from Lake Waha, Soldiers Meadow and Mann Lake Reservoirs.

The value for angler activities was based on an October 2003 National Park Service Report<sup>5</sup> which examined recreation use values by region from a large number of independent studies. These values, which represent consumer surplus, were indexed to April 2011 using the Implicit Price Deflator (IPD) for Gross Domestic Product. This research sets the values at approximately \$49.00 for those angler-based activities that occur in Pacific coast area states.

Benefits were derived using this value rather than expenditures presented from the Creel Survey because expenditures are the costs or prices paid by the anglers for fishing-related items. Benefits represent the value of utility that anglers receive from fishing.

It is also assumed that recreation would not be impacted by the diversion of water from the Clearwater River or Snake River.

## **Endangered Species/ Watershed Restoration**

The diversion of water from the Clearwater River or Snake River would result in less than 0.5 percent diversion of their respective mainstream flows, with no net depletion effect, as a result of allowing up-stream tributary water rights to be left instream and protected from appropriation via state water banking and application of flows to presently unmet minimum stream flows in Webb, Sweetwater, and Lapwai Creeks, as well as the lower Clearwater River, and then the Snake River.

It is assumed the additional water supply received under the action alternatives selected by the LCEP stakeholders would resolve all ESA litigation and eliminate any potential future costs associated with ESA litigation.

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<sup>3</sup> Bureau of Reclamation, Office of Program and Policy Services, 2006 M&I Water Rate Survey Data.

<sup>4</sup> DuPont, Joe, Clearwater Region Fishery Manager, IDF&G. Email Communication, April 18, 2011.

<sup>5</sup> Kaval, Pam and John Loomis. October 2003. Updated Outdoor Recreation Use Values with Emphasis on National Park Recreation. Department of Agricultural and Resource Economics, Colorado State University, Fort Collins, CO 80523.

The action alternatives would eliminate the LOP's water diversions from the Lapwai/Sweetwater/Webb basin. Watershed restoration could be partially accomplished by this action.

### **Tribal Trust Assets**

The action alternatives would eliminate all Federal-Tribal trust issues specific to the Lewiston Orchard Project by eliminating the water diversions and associated title issues, and any future costs associated with Federal/Tribal trust litigation.

### **Water Quality**

The LCEP stakeholder group stated that the use of Clearwater River or Snake River water would provide a positive impact overall. This impact is not directly associated with the delivered irrigation water itself. Rather, it is due to anticipated positive impacts from the elimination of settling ponds for sediment.

### **Distribution**

Under alternatives B-F, excluding B1, there would be no costs associated with distribution. Alternative B1 includes a distribution cost for an added pipeline from Mann Lake to the existing distribution system. This added feature makes Alternative B1 equivalent to alternatives C-F in its ability to deliver water.

### **Unemployed Labor**

The P&Gs indicate that benefits from direct use of unemployed labor in areas of substantial and persistent unemployment during project construction can be claimed as a national economic development benefit. According to the P&Gs, this is due to the dynamic nature of unemployment situations. Adjacent Clearwater County qualifies as such an area, also referred to as a labor surplus area (LSA). <http://www.doleta.gov/programs/pdf/laborsurplus2011.pdf>. The quantification of these benefits is beyond the scope of an appraisal level study.

**Table 2: Appraisal Level Quantified and Unquantified Benefits Associated with the Lower Clearwater Exchange Project**

Description	Alt. A - No Action	Alt. B - Clearwater River Pump Station-Mann Lake Discharge	Alt. B1 - Clearwater River Pump Station-Mann Lake Discharge-Powers Ave Pipeline	Alt. C - Clearwater River Pump Station-Distribution System Discharge	Alt. D - Snake River Pump Station-Tammany Creek Road Pipe Route	Alt. E - Snake River Pump Station-Southport Ave. Pipe Route	Alt. F - Tammany Road Well Field
Benefits							
Untreated Residential Water Supply/ Sufficient Water Delivery	\$0	\$0	\$861,000	\$861,000	\$861,000	\$861,000	\$861,000
Recreation	\$141,000	\$141,000	\$141,000	\$141,000	\$141,000	\$141,000	\$141,000
Endangered Species/Watershed Restoration	no change	positive	positive	positive	positive	positive	positive
Tribal Trust Assets	not evaluated	positive	positive	positive	positive	positive	positive
Water Quality	no change	positive	positive	positive	positive	positive	positive
Distribution	no change	none	positive	positive	positive	positive	positive
Unemployed Labor	none	NA	NA	NA	NA	NA	NA
Total Quantified Benefits	\$141,000	\$141,000	\$1,002,000	\$1,002,000	\$1,002,000	\$1,002,000	\$1,002,000

## COSTS

### Design/Construction

Appraisal level design/construction cost estimates were provided by the LCEP stakeholders for all the action alternatives and were based on conceptual layouts using past reports' basis of costs and/or vendor-supplied quotes. These are total project costs which include non-contract costs.

The project costs shown in Table 3 are rounded to the nearest \$1,000 and are in April 2011 dollar values. The present value and annual equivalent costs were estimated using Reclamation's Plan Formulation and Evaluation Rate of 4.125 percent and a 50-year period of analysis.

To conform to Reclamation cost analysis procedures, estimated feasibility, value engineering, and NEPA document preparation costs were added to the action alternative design/construction costs provided by the LCEP stakeholders (\$3 million for each action alternative), and mitigation for removal of diversions (\$100,000 for each action alternative).

### **Operations and Maintenance**

Maintenance costs for the No Action alternative were based on 2010 actual expenditures provided by LOID to the stakeholder group. Operating costs were based on current staff and equipment for the No Action alternative.

The action alternative maintenance costs are based on an anticipated decreased need for staff and equipment and are assumed to be the same across the action alternatives.

O&M costs for 2010 could not be indexed to April 2011 because the 2011 O&M Index is not yet available.

### **Interest During Construction (IDC)**

The construction schedules to complete the action alternatives were assumed to require 2 years. These include preconstruction activities such as right-of-way acquisitions and necessary infrastructure relocations. IDC is charged on all Federal expenditures over the estimated construction period. IDC measures the Federal Government's opportunity cost for project funding during the construction period in lieu of using the funds for other projects. It represents the interest revenue that Federal funds could generate elsewhere, as stated in the Water Supply Act of 1958. Reclamation's current Plan Formulation and Evaluation rate of 4.125 percent was used for IDC calculation. Because the construction schedule is appraisal level (the actual number of years depends on Congressional authority and appropriations), the number of years included in the calculation is only an estimate.

### **Power**

For the No Action alternative, the cost of power was based on billings from Clearwater Power for the pump at Lake Waha in 2010. Lake Waha is an off stream lake used for storage. Water is pumped from it during the irrigation season.

The action alternatives power costs were estimated based on pumping 8,500 AF using power rates provided Clearwater Power (for Clearwater River operations), and Avista Utilities (for Snake River and well options). The energy costs for alternatives A-F were updated to represent the estimated real costs of power for the 50-year period of analysis.



## **Reclamation**

Annual Reclamation costs are based on actual project expenditures from 2007-2010, not including litigation costs. These costs averaged approximately \$500,000 for the No Action alternative. Through the period of analysis, these costs will taper off due to certain elements being phased out, such as water quality monitoring. The action alternatives would likely incur no direct Reclamation costs, due to the replacement of the diversion system. All costs would be reassigned to the operations category as arranged in Table 3 regardless of which entity actually performs the work. This approach is assumed to be consistent across the action alternatives.

## **Safety of Dams (SOD) Monitoring**

The costs for SOD monitoring are included under operations. At this appraisal level of study, SOD work is assumed to be the same across all of the alternatives A-F regardless of which entity actually performs the work.

## **Recreation**

All of the alternatives would maintain three reservoirs (Soldiers Meadow Reservoir, Lake Waha, and Mann Lake) for recreational use. Idaho Fish & Game spends approximately \$72,000 annually to maintain these fisheries.<sup>6</sup> Recreation costs are assumed to remain constant at this appraisal level of study, regardless of which entity actually performs the work.

## **Cultural**

The action alternatives would end use of the LOP's diversion system and associated properties within the Nez Perce Reservation, with the exception of Mann Lake water storage in Alternatives A-F. The MOU states that continued use of Mann Lake for water storage would remain acceptable to the Nez Perce Tribe, thus effectively eliminating the cultural impacts of the existing project. It is assumed that impacts of the action alternatives would be minimized.

## **Water Rights**

The cost associated with the purchase or transfer of water rights to either the Clearwater River or Snake River may include only a small amount for filing fees and/or meeting time associated with all the alternatives. Therefore, no costs are included under this category for the appraisal level analysis.

Table 3 summarizes and totals the costs described above.

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<sup>6</sup> DuPont, Joe, Clearwater Region Fishery Manager, IDF&G. Email Communication, April 20, 2011

**Table 3: Appraisal Level Costs Associated with the Lower Clearwater Exchange Project**

Description	Alt. A - No Action	Alt. B - Clearwater River Pump Station- Mann Lake Discharge	Alt. B1 - Clearwater River Pump Station- Mann Lake Discharge- Powers Ave Pipeline	Alt. C - Clearwater River Pump Station- Distribution System Discharge	Alt. D - Snake River Pump Station- Tammany Creek Road Pipe Route	Alt. E - Snake River Pump Station- Southport Ave. Pipe Route	Alt. F - Tammany Road Well Field
Costs							
Design/Construction*		\$21,770,000	\$24,342,000	\$22,232,000	\$26,160,000	\$20,090,000	\$30,923,000
Interest During Construction	\$0	\$1,063,000	\$1,189,000	\$1,086,000	\$1,277,000	\$981,000	\$1,510,000
Annual Maintenance	\$65,200	\$82,000	\$89,000	\$91,000	\$91,000	\$70,000	\$129,000
Annual Operations	\$250,000	\$217,000	\$217,000	\$217,000	\$217,000	\$217,000	\$217,000
Annual Power	\$19,000	\$597,000	\$597,000	\$590,000	\$824,000	\$794,000	\$831,000
PV of Total Construction, IDC, OMR&E Costs	\$6,569,000	\$45,564,000	\$47,763,000	\$45,797,000	\$58,817,000	\$52,298,000	\$67,019,000
BOR Annual Costs**	\$500,000	\$0	\$0	\$0	\$0	\$0	\$0
Annual Recreation	\$72,000	\$72,000	\$72,000	\$72,000	\$72,000	\$72,000	\$72,000
PV of Recreation Costs	\$1,577,000	\$1,577,000	\$1,577,000	\$1,577,000	\$1,577,000	\$1,577,000	\$1,577,000
Cultural Impacts	significant	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
PV of Total Costs	\$8,145,000	\$47,141,000	\$49,340,000	\$47,374,000	\$60,394,000	\$53,874,000	\$68,595,000
Annual Equivalent	\$387,000	\$2,242,000	\$2,346,000	\$2,252,000	\$2,872,000	\$2,562,000	\$3,262,000
*Added line items for Feasibility and NEPA (\$3 million for each action alternative) and Mitigation for removal of system from Tribal land (\$100,000 for each action alternative)							
**Reclamation's annual costs were incorporated into the <i>Operations</i> line item							

## **REGIONAL IMPACT ANALYSIS**

### **Impact Region**

It was determined by the LCEP stakeholders that the impact region for construction would consist of Nez Perce County, Idaho County, and Clearwater County in Idaho and Asotin County in Washington. This impact region represents the economy surrounding the LOP and the impact on it from construction of the action alternatives. The impact region used in the economic analysis is not the necessarily the same as the study area, nor is it used in the Ability to Pay threshold analysis described below.

The economic impact region is a group of counties that allow economic evaluation of impacts in a smaller region than an entire state or river basin. The region was determined by the LCEP stakeholders using proximity to construction, construction expenditures, and possible employment which could be affected by the alternatives. It should be noted that other categories such as potential improvements to recreation/angler visitation are possible to evaluate, but were not quantifiable at the time the appraisal level analysis was being completed. Therefore, changes in recreation expenditures and other categories were not captured in this appraisal level regional economic analysis.

The size of the impact region used in a regional economic impact analysis is important because the magnitude of impacts will increase as the size of the impact region increases. For example, the economic impacts on the four-county region of Nez Perce, Idaho, Clearwater, and Asotin from the project's construction expenditures would be larger than the economic impacts on just the three-county area of Nez Perce, Idaho, and Clearwater with those same expenditures. This is the result of differences in the leakages that occur for different impact regions. With the inclusion of Asotin County, the four-county region would be more diverse than the three-county region, in that it has more different types of businesses and industry which can supply a wider variety of goods and services. The three-county region has less diversity, and thus does not have the variety of businesses that the four-county region may have. Therefore, consumers and businesses must go outside the three-county region to purchase some of the inputs that may not be available. This represents a leakage of expenditures, which reduces the economic impact of activities within the three-county region compared to the four-county region. The same holds true when using individual counties as the economic impact region. An individual county may not have the capacity to absorb all of the impacts, and those impacts to surrounding counties would not be accounted for due to those counties not being in the defined economic region.

### **Regional Impact Model**

The regional impacts from construction expenditures associated with the defined alternatives are analyzed using the IMPLAN (Impact Analysis for Planning) model, an input-output (I-O)

modeling framework first developed by the U.S. Forest Service.<sup>7</sup> The IMPLAN model uses the U.S. Department of Commerce national input-output model to estimate flows of commodities used by industries and commodities produced by industries. The data used in this analysis are 2007 IMPLAN data and structural matrices. Social accounts are included in the IMPLAN database for each region of consideration. Social accounts represent the flow of commodities to industry from producers and consumers as well as consumption of the factors of production from outside the region. Social accounts are converted into input-output accounts and the multipliers for each industry within the region, which considers the multiple effects of changes in spending described below. The percentages of expenditures in each category that would remain within the region and expenditures that would flow outside the region are also accounted for with the IMPLAN model.

Regional models are prepared to provide a detailed picture of a regional economy and predict the impacts of potential changes to a regional economy, in this case, the construction activity which would result from the action alternatives. I-O models are used to estimate changes in employment and income brought on by changes in outputs or final demand. I-O analysis is based on the interdependence of production and consumption sectors in a regional area. Industries must purchase inputs from other industries for use in the production of outputs which are sold either to other industries or final consumers. Thus, a set of I-O accounts can be thought of as a "snapshot" of an impact area's economic structure. Flows of industrial inputs can be traced via the I-O accounts to show linkages between the industries composing the regional economy. The accounts are also transformed into a set of simultaneous equations that permit the estimation of economic impacts (changes in employment, income, etc.) resulting from changes in purchases of goods and services within the impact area due to the project's construction. Economy wide regional impacts, measured as changes in jobs and income, of each potential operational change can be measured by applying the direct effects of construction expenditures to the model.

This analysis takes into account only the construction expenditures assumed for the alternatives, not long-term effects of the project. The construction expenditures were broken down by sectors in the economy that correspond to the IMPLAN Model's economic sectors.

### **Model Input/direct effects**

Regional model construction consisted of determining regional I-O models which represent the economy surrounding LOID and the construction of the action alternatives. As previously defined, the impact region used in the IMPLAN model consists of Nez Perce, Idaho, and Clearwater counties in Idaho and Asotin County in Washington.

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<sup>7</sup> Minnesota IMPLAN Group, Inc. April 1999. IMPLAN Pro 2.0.1025: User's Guide, Analysis Guide, and Data Guide. <http://www.implan.com>

The design/construction costs presented in Table 3 are assumed to be the construction-related direct costs that are associated with each alternative. For this level of analysis, it is assumed that all of the construction expenditures occur within the impact region. These are the costs that are entered into the IMPLAN model to estimate the impacts that may occur within the impact region. These effects will generate the indirect and induced impacts when run through the regional economic model.

The IMPLAN model contains 440 sectors of the economy. The direct costs were broken down into categories and distributed into the IMPLAN sector that best corresponded to the expenditure category. The model's Regional Purchase Coefficient (RPC) was used to estimate the amount of expenditures that would be spent locally. This is considered to be new money spent in the region from the various construction activities or the direct economic impacts generated by these actions. The model inflates or deflates the costs accordingly to adjust all costs to a common base year. In the model, the costs were converted to 2007 dollars because the model uses 2007 data. However, the impacts were subsequently indexed using the Implicit Price Deflator for Gross Domestic Product Index.<sup>8</sup> These impacts are presented in April 2011 dollars in Table 5.

## Results

For this study, regional economic impacts are created primarily through construction investments which bring economic activity into the region. There are some payments to landowners for rights-of-way and/or land acquisition, and payments for legal services, design engineering, etc. which are also included as contributors to the increased economic activity in the region.

Direct, indirect, induced, and total impacts are reported in terms of sales or industry output which represents the value of an industry's total production; income, which includes employee compensation (wages and salaries of workers and benefits such as health and life insurance and retirement payments), plus proprietary income (self-employed workers payments); and employment, which includes full- and part-time workers.

The greatest impacts to the impact region are seen under Alternative F, because that alternative creates the most construction expenditures out of the action alternatives, which leads to the most spending in the region. Likewise, alternatives that cost the least produce the least amount of regional spending and impacts.

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<sup>8</sup> U.S. Bureau of Economic Analysis.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Qtr&FirstYear=2007&LastYear=2011&3Place=N&Update=Update&JavaBox=no>

**Table 5: Modeled Design/Construction Indirect Impacts within the Impact Region**

<b>Adjusted to April 2011 Values</b>	<b>Alt. B</b>			
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Output/Sales</b>	\$14,538,000	\$1,690,000	\$1,879,000	\$18,108,000
<b>Labor</b>	\$2,696,000	\$584,000	\$601,000	\$3,881,000
<b>Employment</b>	52.6	14.9	19.7	87.2
	<b>Alt. B1</b>			
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Output/Sales</b>	\$15,759,000	\$1,860,000	\$2,087,000	\$19,706,000
<b>Labor</b>	\$3,000,000	\$643,000	\$668,000	\$4,311,000
<b>Employment</b>	59.3	16.5	21.9	97.7
	<b>Alt. C</b>			
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Output/Sales</b>	\$14,000,000	\$1,712,000	\$1,821,000	\$17,533,000
<b>Labor</b>	\$2,585,000	\$592,000	\$583,000	\$3,760,000
<b>Employment</b>	53.2	15.3	19.1	87.6
	<b>Alt. D</b>			
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Output/Sales</b>	\$15,854,000	\$1,934,000	\$2,203,000	\$19,991,000
<b>Labor</b>	\$3,176,000	\$669,000	\$705,000	\$4,550,000
<b>Employment</b>	61.5	17.1	23.1	101.7
	<b>Alt. E</b>			
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Output/Sales</b>	\$12,717,000	\$1,556,000	\$1,633,000	\$15,907,000
<b>Labor</b>	\$2,312,000	\$539,000	\$523,000	\$3,373,000
<b>Employment</b>	47.3	13.9	17.1	78.3
	<b>Alt. F</b>			
	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Output/Sales</b>	\$24,236,000	\$2,130,000	\$2,395,000	\$28,761,000
<b>Labor</b>	\$3,441,000	\$738,000	\$766,000	\$4,945,000
<b>Employment</b>	70.3	18.9	25.1	114.3



Table 5 presents the regional economic impacts (rounded to the nearest \$1,000) during the construction period when impacts would be at their greatest. After construction is completed, jobs and income will be reduced, because the alternatives represent a short term construction project.

### **ABILITY TO PAY THRESHOLD**

There is no universally accepted method of measuring payment capability or affordability for domestic water supplies. Government agencies, academic institutions, and water resource consultants have used a wide range of methods to evaluate how much water users can pay for domestic water supply improvements. The most common method of evaluating affordability is the cost of water as a percentage of median household income. The EPA affordability threshold is not a true measure of affordability, but is instead based on acceptability of fee increases by lending institutions and the cost of other utilities.

It is beyond the scope of an appraisal level economic analysis to estimate a final non-Federal cost share. Using this measure of affordability, total annual costs that would be passed along to water users are divided by the number of accounts that would absorb these costs. This information is compared to the county-level median household income which has been multiplied by the predetermined threshold value of water utility affordability.<sup>9</sup> For this appraisal level analysis, the EPA's threshold for affordability for water supply of 2.5 percent of median household income is used. In 2009, median household income for Nez Perce County was \$42,919 and is presented in Table 6 along with the cost for water that would be passed along to 6,295 active untreated water accounts under each of the alternatives. Table 6 calculations assume all project costs (see Table 3 *Annual Equivalent* costs) are assigned to the 6,295 accounts currently assessed by LOID.

The current payment for treated water for each household in the LOP is based upon average annual household usage as metered by LOID and applying 2010 costs of \$43.50 per 100 cubic feet, for a total of \$344 annually. Metered values may be slightly higher than actual usage within the LOP, due to differences between the boundaries of the LOP and LOID. This payment is added to the amount for the alternatives to estimate the total amount users would be paying for all of their water under each alternative. Using the EPA's affordability threshold methodology for this appraisal level analysis, all of the action alternatives are affordable.

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<sup>9</sup> Piper, Steve. *Evaluating Economic and Financial Feasibility of Municipal and Industrial Water Projects*. Bureau of Reclamation, Technical Memorandum EC-2009-02. December 2009.

**Table 6: Ability to Pay Threshold**

Nez Perce County Median Household Income	Ability to Pay Threshold	# of Accounts	Alt. B	Alt. B1	Alt. C	Alt. D	Alt. E	Alt. F
\$42,919	<b>\$1,073</b>	6,295	\$356	\$373	\$358	\$456	\$407	\$518
		Current average treated water payment	\$344	\$344	\$344	\$344	\$344	\$344
		Total	<b>\$700</b>	<b>\$717</b>	<b>\$702</b>	<b>\$800</b>	<b>\$751</b>	<b>\$862</b>

The Rules and Regulations for Reclamation’s RWSP state that the Federal portion of feasibility study costs would be 50 percent of the total cost. Regarding the Federal portion of other costs, the Rules and Regulations state, “Reclamation will determine the appropriate non-Federal share of construction costs in the process of developing the feasibility report. The non-Federal cost-share will be at least 25 percent of the total construction costs and an additional amount based on capability to pay, as appropriate, to be determined by Reclamation.”<sup>10</sup> There are provisions for modifications, the consideration of which is beyond the scope of this appraisal level economic analysis. Further, it is stated that 100 percent of operational-related costs of a water supply project planned under the RWSP will be borne by the recipient.

Table 6, above, is based on 100 percent of calculated capital costs and operational costs over the 50-year period of analysis in the calculated average annual cost of water. The capital costs include feasibility study and construction costs, and recreation costs. These values are provided to demonstrate calculated values relative to the ability to pay threshold.

<sup>10</sup> Federal Register Vol. 73, No. 222, November 17, 2008. *Rules and Regulations*.