US Army Corps
of Engineers ®
Portland District

WILLAMETTE FALLS LOCKS
WILLAMETTE RIVER
OREGON
SECTION 216 PRELIMINARY DRAFT DISPOSITION STUDY
WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

EXECUTIVE SUMMARY

The Willamette Falls Locks Disposition Study is being conducted in order to determine whether sufficient federal interest exists to retain the project for its authorized purpose and, if not, to determine whether the project should be de-authorized, and if the associated real property and Government-owned improvements should undergo disposal. As part of the study effort, the analysis seeks to identify the necessary actions to prepare the facility for disposal and to develop a preliminary opinion regarding the marketability of the project, taking into account known stakeholder interests, local opportunities, and the capability of potential end users.

The Willamette Falls Locks (Locks), the oldest multi-lift bypass navigation lock in the nation, is a six chamber lock system with 41 feet elevation change between the first and last chambers. The Locks operate by gravity flow, draining water from one lock chamber into the next through a set of slide gates located in the bottom of each gate. The authorized purpose of the project is to provide navigation between the waterway upstream and downstream of Willamette Falls (Falls), one of the largest waterfalls based on water volume in the United States. It is located approximately 26.2 river miles upstream on the Willamette River from the confluence with the Columbia River. The locks are near the cities of West Linn and Oregon City, Oregon, about 20 miles upstream of Portland, Oregon. Owned and operated by the U.S. Army Corps of Engineers (Corps), the facility is prioritized for funding within the Corps' navigation business line, which is responsible for ensuring safe, reliable, efficient, and environmentally sustainable waterborne transportation for the movement of commercial goods. Nationally, this business line encompasses a network of Corps-maintained navigable channels, ports, waterways, and infrastructure, consisting of approximately 12,000 miles of inland and intra-coastal waterways with 220 Locks at 171 sites. Within the navigation program, prioritization for funding is based on commercial tonnage moved through the Locks supporting national economic benefits.

The Locks were originally constructed by the Willamette Falls Canal and Lock Company with financial help from the State of Oregon between 1868 and 1872, with the Locks opening January 1, 1873. Various entities owned and operated the project before Congress authorized the Corps to purchase the existing canal and Locks for $300,000, contingent on the State of Oregon appropriating the same amount, by the Rivers and Harbors Act of June 25, 1910, 36 Stat. 630, 664, Pub. L. No. 61-264. The Corps purchased the Locks from the Portland Railway Light and Power Company in order to improve navigation along the Willamette River. The Corps signed the deed in 1913 and formally took over operation and maintenance in 1915. The purchase and subsequent operation of the project helped transform the State of Oregon's industrial economy.

From 1921 to 1989, the average annual number of lockages (i.e. the use of the Locks to move water, debris, and vessels downstream) exceeded 5,000 per year; the facility operated 16 hours a day and the average annual commercial tonnage through the Locks was on the order of 1.4 million. Log rafts constituted approximately 90 percent of the commercial lockages throughout this period. Prior to 1956, the Locks were one of the smallest lock systems in the nation but exceeded commercial tonnage in comparison to some of the largest Locks in the nation. The frequency with which the project was used began to decline in 1990 when U.S. Fish and Wildlife Service listed the Northern Spotted Owl as threatened; and the National Marine Fisheries Service listed the Upper Willamette River Chinook salmon as threatened. By 1994, logging was curtailed

by 90 percent in the Pacific Northwest to save these two species, and the commercial tonnage dropped from 1.4 million tons (1989) to less than 200,000 tons due to the disappearance of log rafts.

The remaining commercial tonnage through the Locks consisted of finished paper products from the paper mill adjacent to the Locks. In 1997, the mill elected to truck their commercial goods rather than barge them through the Locks, resulting in a further decline. By 1999, less than a 1,000 tons of commercial goods were transported through the Locks.

The facility was placed in "Caretaker" status in 2006 due to the persistent decline in commerce moving through the Locks. Caretaker status denotes a limited preservation status, with minimal personnel employed to safeguard the facility (against fire, theft, and damage) and conduct minimal maintenance activities. Funding for Caretaker activities continues today and is expected to continue unless the facility is transferred.

In 2008, the Corps dam safety program evaluated the Locks under the Screening Portfolio Risk Assessments (SPRA) process, a first step in national dam safety risk management, establishing DSAC 1 rating for the Locks. Likelihood of failure was determined high due to the low level of seismic stability of the ashlar masonry and concrete structure in the facility in relation to the Maximum Design Earthquake (this was further defined in the 2011 Facility Evaluation Report (FER)). Life Loss was noted as not applicable in the SPRA; however, it was assumed to be of an increased likelihood during operation and that there was risk to occupants within the Locks during failure. Lost project benefits and repair costs were addressed in greater detail within the SPRA with a total economic consequence of $5,898,000 (2017 dollars).

As a result of the 2008 SPRA, the Locks have been closed to all vessel operations since December 2011 due to life safety risks for vessels proceeding through the Locks. A FER completed in 2011 (2011 FER) revealed structural deficiencies resulting from corrosion in the miter gate gudgeon anchors, responsible for holding the gates in place during operation. The anchors are fracture critical members, susceptible to sudden failure which would cause the gate to collapse into the lock chamber endangering anyone within the lock. These gates now have an operational order to engage in maintenance, with no persons, vessels or equipment allowed inside the lock chambers.

The 2011 FER also revealed seismic deficiencies in the gate monoliths and lock walls indicating potential instability in the event of an earthquake. The near term repair and rehabilitation construction cost to address all known deficiencies (gates and lock walls) to the Locks has been estimated to be $9,071,000 (2017 dollars). On December 1, 2011 the Dam Safety Officer for the Corps' Portland District recommended Gates 2, 3, and 4 be red-tagged for use which ensures gates are not able to be operated prior to the replacement of the gudgeon anchors. Subsequently, on December 5, 2011 the Corps, under its emergency operational authority, closed the Locks to vessel traffic due to life safety concerns related to the potentially unsafe physical conditions of the gudgeon anchors on Gates 2, 3, and 4. The Locks have since been in an interim-closure status. Given the low national ranking and the continued decline in commercial tonnage through the Locks, future funding for required repairs to restore the facility to a safe operable condition has been deemed not economically justifiable.

The purpose under the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321–4347, of this Disposition Study is to de-authorize, modify as appropriate, and to dispose of the federal facility. The need for de-authorization and disposal is due to the absence of a federal interest in continued use of the facilities for their authorized purpose of navigation.

Two alternatives will not be investigated in this report: 1) rehabilitation of the facility; and 2) reuse of the facility for a different authorized purpose, such as an ecosystem restoration project. Rehabilitation is not considered an alternative within this study since prior reports have indicated there are insufficient benefits (commercial navigation) to justify the repair and rehabilitation of the facility. No cost share sponsors have been identified to date to support modifying the facility for other cost shared authorized purposes; therefore, alternatives related to re-use of the facility and requiring cost shared sponsors are not carried forward for further consideration (such as for hydropower development or ecosystem restoration).

This Disposition Study evaluates eight alternatives:

- **Status Quo Alternative** (No Action): maintain the current caretaker status. Minimal maintenance activities of the facility shall continue and repairs would be conducted on "as needed" basis and seismic retrofits implemented to the walls and monoliths to avoid potential failure of Gates 6 and 7.
- **Operational Lock**: Convey the facility to a future party after addressing known deficiencies sufficiently that the Locks could be operated by future owners;
- **Non-Operational Lock**: Convey the facility to a future party after minimally addressing known seismic and safety deficiencies This alternative avoids impairing the capability of future owners to return the Locks to service then;
- **As-Is**: Convey the facility to a future party with no facility modifications made.
- **Fully Filled**: Convey the facility to a future party after filling all chambers with sediment to eliminate fall hazards as well as seismic and pool breach hazards. This alternative would fully impede future navigation;
- **Partially Filled**: Convey the facility to a future party after filling the upper chambers with sediment to maintain the upstream pool. This alternative includes the removal of remaining Lock operations equipment and would impede future navigation;
- **Concrete Bulkhead**: Convey the facility to a future party after constructing a concrete bulkhead between Gates 6 and 7 to maintain upstream pool. This alternative includes the removal of remaining Lock operations equipment and would impede future navigation;; and
- **Run-of-River:** Convey the facility to a future party after removing all miter gates to allow the river to flow from upstream of the Locks to pass freely through the Lock chambers. This alternative would impede future navigation.

Under each of these alternatives, it is also assumed Congress will not appropriate funds to repair the gudgeon anchors at Gates 2, 3, and 4, and that the facility shall remain closed to vessel traffic, as it has since December, 2011 due to public safety concerns resulting from the deterioration of the gudgeon anchor assemblies.

The District's Project Delivery Team (PDT) has established the following project constraint: there will be no adverse effect upon the Falls. That is, the project shall:

- Avoid adverse impacts to the aquatic species listed as Threatened or Endangered under the Endangered Species Act (ESA), 16 U.S.C. §§ 1531–1544, within the migration corridor near and around the Falls so that the associated functional fish ladders will continue to operate as intended.

- Avoid adverse impacts to benefits derived from upstream Corps fish passage and ecosystem restoration investments. To date over $194 million has been spent for adult and juvenile fish passage and collection; and an additional $500 million is anticipated to be invested in future Reasonable and Prudent Alternative measures required by the 2008 Biological Opinion (BiOp).

The District's PDT also developed the following considerations for the alternatives evaluation:

- Render the facility sufficiently safe to market for disposal; and

- Minimize impacts to West Linn Paper Company (WLP Co). and Portland General Electric Operations

A number of stakeholders and interest groups (the Region) have expressed concern regarding the closure of the Locks. They have been instrumental in providing local political and financial support for a future reopening of the Locks, especially from 2002 when closure of the Locks was initially threatened until 2011 when the Locks were finally closed. Since early 2014, starting with the consultation under Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. §§ 100101, et seq.; 36 C.F.R. Part 800) for the closure of the Locks, local interests have formed a working group and worked closely with the Corps to express their desire to take on ownership of the facility so that the Locks can be repaired and reopened for recreation, cultural heritage, and other regional economic purposes.

Because the Region is very interested in owning and operating the facility, the Region is currently identifying the future transferee, governance model, and funding mechanism for the Locks through a State Legislative Task Force, under Oregon State Bill 256. The Region is continuing these efforts through the creation of a proposed State Willamette Falls Locks Commission. The Region is also working closely with the Corps, while the Federal Government investigates the current condition of the facility and assesses the suitability of conveying the facility. Congressional interest in the transfer of the facility is high.

After evaluation of the alternatives, Alternative 2: Transfer to Identified Transferee - a Non Operational Lock, was chosen as the Tentatively Selected Plan. Reasons for selection of Alternative 2 include:

- Least-cost alternative to implement and reduces overall Federal risks and future expenditures
- Most implementable
    - Does not preclude the locks from re-opening in the future
    - Matches local regional efforts to preserve cultural value of the locks
    - Consistent with the local regions efforts to redevelop area and re-open the locks

    - Minimizes potential impacts to PGE plant and power production
- Environmentally acceptable
    - Reduces potential impact to ESA species under a lock wall failure causing a change to flow/passage routes
    - Stabilizes pool to ensure future Corps investments are not impacted

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ACRONYMS

AA	**ANNUALIZED**
ACHP	**ADVISORY COUNCIL ON HISTORIC PRESERVATION**
AQI	**AIR QUALITY INDEX**
BOD	**BIOCHEMICAL OXYGEN DEMAND**
CCTV	**CLOSED-CIRCUIT TELEVISION**
CERCLA	**COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT**
CFS	**CUBIC FEET PER SECOND**
DEQ	**OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY**
DO	**DISSOLVED OXYGEN**
DPS	**DISTINCT POPULATION SEGMENT**
DSAC	**DAM SAFETY ACTION CLASSIFICATION**
EA	**ENVIRONMENTAL ASSESSMENT**
EAP	**EMERGENCY ACTION PLAN**
ECSI	**ENVIRONMENTAL CLEANUP SITE INFORMATION**
EM	**ENGINEERING MANUAL**
EPA	**ENVIRONMENTAL PROTECTION AGENCY**
EQ	**ENVIRONMENTAL QUALITY**
ER	**ENGINEERING REGULATION**
ERGO	**ENVIRONMENTAL REVIEW GUIDE FOR OPERATIONS**
ESA	**ENDANGERED SPECIES ACT**
FALLS	**WILLAMETTE FALLS**
FEMA	**FEDERAL EMERGENCY MANAGEMENT ACT**
FER	**FACILITY EVALUATION REPORT**
HSS	**HYDRAULIC STEEL STRUCTURE**
I-205	**INTERSTATE 205**
IRRMP	**INTERIM RISK REDUCTIONS MEASURES PLAN**
MMPA	**MARINE MAMMAL PROTECTION ACT**
MOA	**MEMORENDUM OF AGREEMENT**

NAAQS	**NATIONAL AMBIENT AIR QUALITY STANDARDS**
NED	**NATIONAL ECONOMIC DEVELOPMENT**
NEPA	**NATIONAL ENVIRONMENTAL POLICY ACT**
NHA	**NATIONAL HERITAGE AREA**
NHPA	**NATIONAL HISTORIC PRESERVATION ACT**
NMFS	**NATIONAL MARINE FISHERIES SERVICE**
NRHP	**NATIONAL REGISTER OF HISTORIC PLACES**
ODFW	**OREGON DEPARTMENT OF FISH AND WILDLIFE**
ODOT	**OREGON DEPARTMENT OF TRANSPORTATION**
O&M	**OPERATIONS AND MAINTENANCE (O&M)**
OMBIL	**OPERATIONS AND MAINTENANCE BUSINESS INFORMATION LINK**
OR-SHPO	**OREGON STATE HISTORIC PRESERVATION OFFICE**
OSE	**OTHER SOCIAL EFFECTS**
PGE	**PORTLAND GENERAL ELECTRIC**
PA	**PRELIMINARY ASSESSMENT**
PV	**PRESENT VALUE**
RED	**REGIONAL ECONOMIC DEVELOPMENT**
SPRA	**SCREENING FOR PORTFOLIO RISK ANALYSIS**
TS	**TOTAL SOLIDS**
TSP	**TENTATIVELY SELECTED PLAN**
USACE	**US ARMY CORPS OF ENGINEERS**
USFW	**US FISH AND WILDLIFE SERVICE**
UWR	**UPPER WILLAMETTE RIVER**
WCP	**WILLSONVILLE CONCRETE PRODUCTS**
WFHAC	**WILLAMETTE FALLS HERITAGE AREA COALITION**
WLP CO.	**WEST LINN PAPER COMPANY**
WQI	**WATER QUALITY INDEX**

1. INTRODUCTION

1.1 STUDY AUTHORIZATION*

The Willamette Falls Locks Disposition Study (study) is authorized under Section 216 of the Flood Control Act of December 31, 1970, 84 Stat. 1830, Pub. L. No. 91-611, which authorizes the Corps to permit the use of federal funds to analyze and review the operation of completed civil works projects constructed by the Corps of Engineers when found advisable due to significantly changed physical or economic conditions to report to Congress recommendations on the advisability of modifying its operation, including de-authorization, decommissioning and, disposal of the [facilities].

The Corps purchased the locks approximately 40 years after its initial construction. Various entities owned and operated the project before Congress authorized the Corps to purchase the existing canal and Locks for $300,000, contingent on the State of Oregon appropriating the same amount, by the Rivers and Harbors Act of June 25, 1910, 36 Stat. 630, 664, Pub. L. No. 61-264. The switch from private ownership to federal ownership was authorized and supported by two River and Harbor Acts. The first was in June 1910, as this act authorized the purchase and rehabilitation of the Locks along with the proposed construction of a concrete wall between the canal and the adjoining mills. The second, River and Harbor Act of August 8, 1917, provided for the deepening of the Locks. The estimated cost in 1912 for the project, including the purchase and rehabilitation of the Locks and canal, was $680,000. Congress also required an additional contribution of $300,000 from the State of Oregon to fund the rehabilitation efforts which included quarters for the lockmaster, lock tenders; completion of the concrete wall between the power plants and the lock canal; the replacement of seven pairs of old gates with new wooden ones; and the deepening of the canal to 5 feet at low water in the ship canal and 6 feet in the lock chambers.

Specifically, Chapter 382 of the Rivers and Harbors Act of June 1910 Act, P.L. 61-264 states provides:

> *"An Act Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes."*
> * * *
> *"Improving Willamette River, Oregon: For the purchase of the existing canal and Locks around Willamette Falls at Oregon City, Oregon or for the purchase of the necessary lands and the construction of a new canal and Locks, in the discretion of the Secretary of War in accordance with the report submitted in House Document Numbered Two hundred -and two, Fifty-sixth Congress, first session, three hundred thousand dollars: Provided, That no part of this appropriation shall be expended, except for the acquisition of the necessary lands and rights of way and for such antecedent surveys and preliminary work as may be necessary in this connection, until the State of Oregon shall appropriate for the aforesaid purpose \a like amount; and the purchase of the existing canal and Locks, or the actual construction of a new canal and Locks, shall not be undertaken until the Secretary of War shall be satisfied that the State of Oregon will deposit the said amount in the Treasury of the United States in such sums and at such times as he may require: Provided further, That the*

Treasurer of the United States is hereby authorized to receive from the State of Oregon any and all sums of money that have been or may hereafter be appropriated by said State for the purpose herein set forth; and when so received the said sums are hereby appropriated for said purpose to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers."

In 1941, the Locks shifted from a manual to a hydraulic operated system. The wooden manually operated gates were replaced by hydraulically operated metal gates having mechanical wickets.

A secondary purpose for the Willamette Falls Locks (Locks), as authorized by Section 4 of the Flood Control Act of December 22, 1944, 58 Stat. 887, Pub. L. No., is to provide the public with a public park and recreational facilities at the Locks, opportunities to visit the Locks, the historic information center, and to safely use the recreational features on the premises.

The Flood Control Act of June 28, 1938, 52 Stat. 1222, Pub. L. No. and the Rivers and Harbors Act of March 2, 1945, 59 Stat. 21, Pub. L. No. via reference to House Document 544, 75th Congress, authorized the rebuilding of the project and converting the existing four Locks into a single 400 foot lock with a guard lock. To date no appropriations have been made for this work and the Locks have continued to be operated in their original configuration.

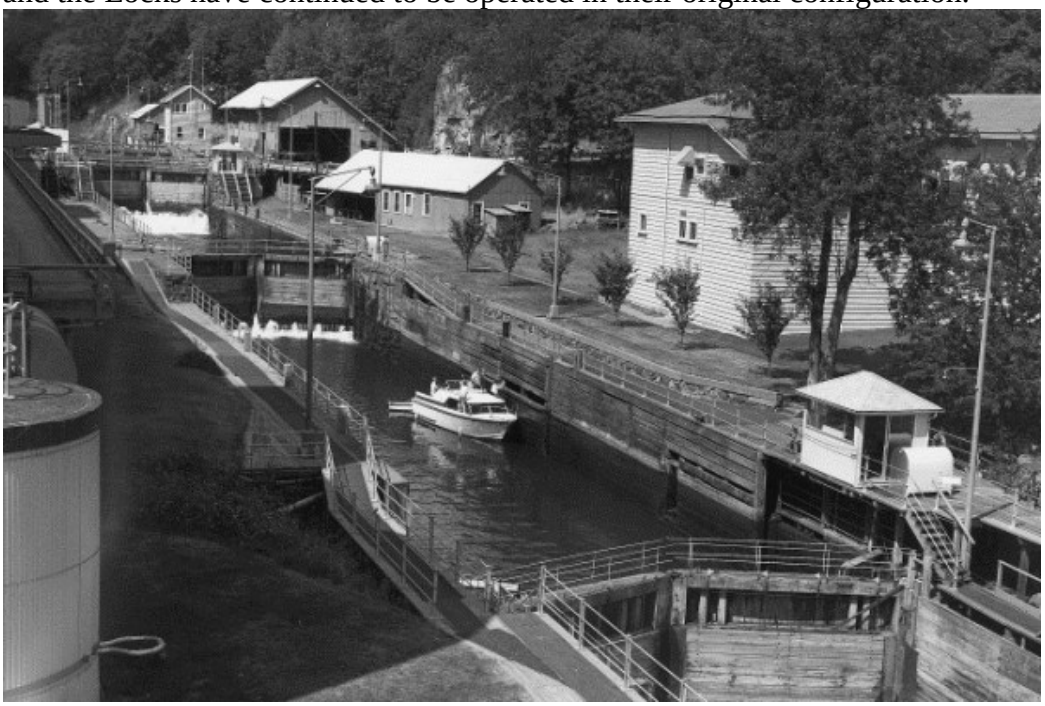

Figure 1: View of Willamette Falls Locks, circa 1967

1.2 REASON FOR THE DISPOSITION STUDY

The reason for the study is to determine whether sufficient federal interest exists to retain the project for its authorized purpose. If sufficient federal interest does not exist, the study will be used to determine whether the federal project should be de-authorized, and if the associated real property interests and Government-owned improvements ought to undergo disposal. As part of the study effort, the [Corps] seeks to identify the necessary actions to prepare the facility for disposal and to develop a preliminary marketability of the project, taking into account known stakeholder interests, local opportunities, and the capability of potential end users.

1.3 STUDY LEAD FEDERAL AGENCY*

The Corps is the lead federal agency on this study.

1.4 STUDY STAKEHOLDERS*

The following parties represent the project stakeholders:

- U.S. Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- Confederated Tribes of the Grand Ronde
- Confederated Tribes of Warm Springs
- Confederated Tribes of the Siletz Indians
- Nez Perce Tribe
- Cowlitz Indian Tribe
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of Umatilla Indian Reservation
- Oregon Department of Fish and Wildlife (ODFW)
- Oregon Department of Environmental Quality (DEQ)
- Oregon State Historic Preservation Office (OR-SHPO)
- Oregon Parks & Recreation Department
- Oregon Department of Transportation (ODOT)
- Oregon State Marine Board
- National Park Service
- Port of Portland
- Association of Oregon Counties
- The counties including Clackamas County, Linn County, Marion County, Multnomah County and Polk County
- The cities of Canby, Eugene, Independence Milwaukie, Oregon city, Portland, Salem, and West Linn.
- Wilsonville Metro Regional Government
- West Linn Paper Company (WLP Co.)
- Portland General Electric (PGE)
- Wilsonville Concrete Products and
- Marine Industrial Construction

- One Willamette River Coalition
- National Trust for Historic Preservation
- Willamette Falls Heritage Area Coalition
- Willamette Falls Heritage Foundation
- Columbia River Yachting Association
- eNRG Kayaking
- Members of the general public

1.5 STUDY AREA DESCRIPTION AND HISTORY*

The Locks are located in an urban/industrial setting in the city of West Linn, Clackamas County, Oregon directly across the river from Oregon City, approximately 20 miles upstream of Portland, Oregon, and approximately 26.2 river miles upstream of the confluence of the Columbia and Willamette rivers. The Locks are located on the west bank of the Willamette River just west of Willamette Falls, a horseshoe shape natural waterfall about 1,500 feet wide and about 40 feet high on the Willamette River, said to be among the largest waterfalls by volume in the United States. Bound by the Cascade Mountain Range to the east and the Coast Range to the west, the Willamette Basin drains 11,487 square miles, 12 percent of the total area of Oregon (Figure *2*). The main stem Willamette flows 187 miles north from the confluence of the Middle and Coast Fork Willamette Rivers, to its confluence with the Columbia River at Portland. The 13th largest river by volume within the U.S., the Willamette accounts for 12 percent of the Columbia River's flow. The Willamette River is also one of the 14 American Heritage Rivers in the U.S., designated by the U.S. Environmental Protection Agency (EPA). Elevations within the watershed range from 10,495 feet (3,199 m) at Mount Jefferson in the Cascade Range to 10 feet (3.0 m) at the mouth on the Columbia River. Upstream of its confluence with the Columbia River, the Willamette is fed by 13 major tributaries and the basin is regulated by 13 Corps dams, as well as other private dams, resulting in a highly regulated flow on the main stem.

Figure 2. Willamette River Basin

The study area encompasses the Locks facility shown in Figure 3 and Figure 4. The area around the Locks is heavily industrialized and has been for well over 100 years. The Locks consist of a long, narrow 11.18 acre parcel that encompasses the entire project with a canal dividing the property. The majority (approximately 7.45 acres) of the fee owned property is underwater (Figure 4). See Appendix B for survey drawing of the facility.

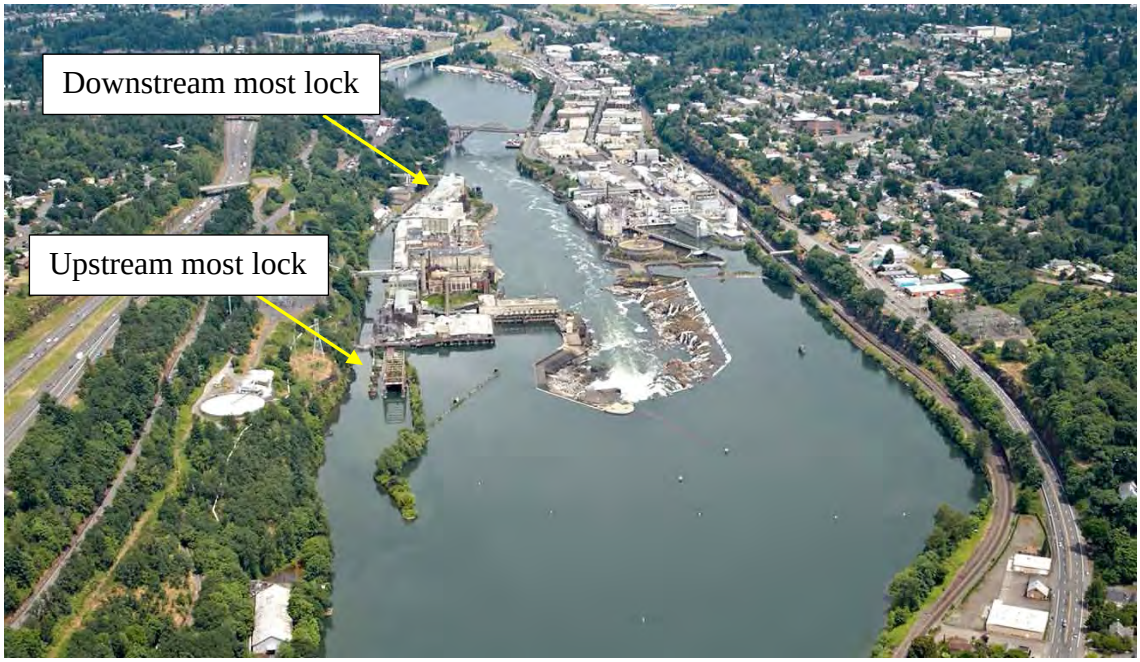

Figure 3: General Aerial Photograph of Willamette Falls Locks and Surrounding Area

Figure 4: General Map of Willamette Falls Locks

1.5.1 PROJECT HISTORY

The Locks and canal around the Falls were built by the Willamette Falls Canal and Locks Company between 1867 and 1872, opening on New Year's Day, 1873. The Locks were among the first multi-lift navigational locks built in the US and were operated by a number of owners before the Corps purchased them from the Portland Railway Light and Power Company in 1913 and began operating them in 1915.

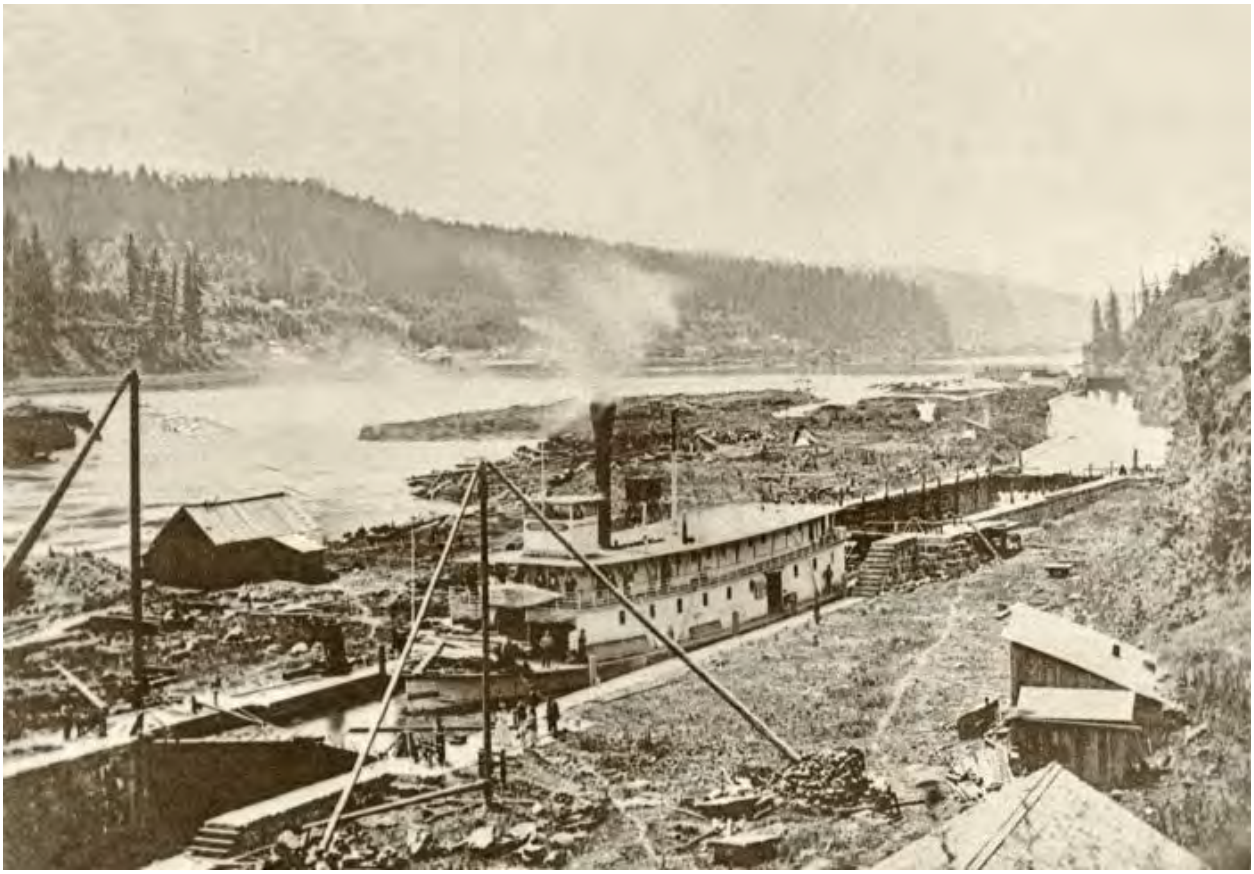

Figure 5: View of Willamette Falls Locks, after initial construction in 1873, circa 1880

The Locks have undergone a number of changes since initial construction and were first renovated in 1915(Figure 6). The Locks were deepened from a depth of 3 feet to 6 feet, with the renovated canal being completed in 1921. In 1941 the original wooden lock gates were replaced with steel miter gates and hydraulic machinery replaced the original hand-cranks to operate the Locks. In the late 1960's and early 1970's, these gates were replaced with new steel gates. After the flood of 1996 some of the electrical equipment was relocated and replaced to reduce the risk of future flood damage. In 1999, the pintles (lower sphere bearing the gate swings on), anchor bolts and seals were replaced on Gate 3; and Gates 5 and 6 were repaired. The last major repairs occurred in 2008 and 2009, as all gates were removed, inspected and repaired through American Recovery and Reinvestment Funds, along with contributed funds received from local and regional interests, addressing deficiencies to the steel gate structures noted during the Hydraulic Steel Structure (HSS) Inspections.

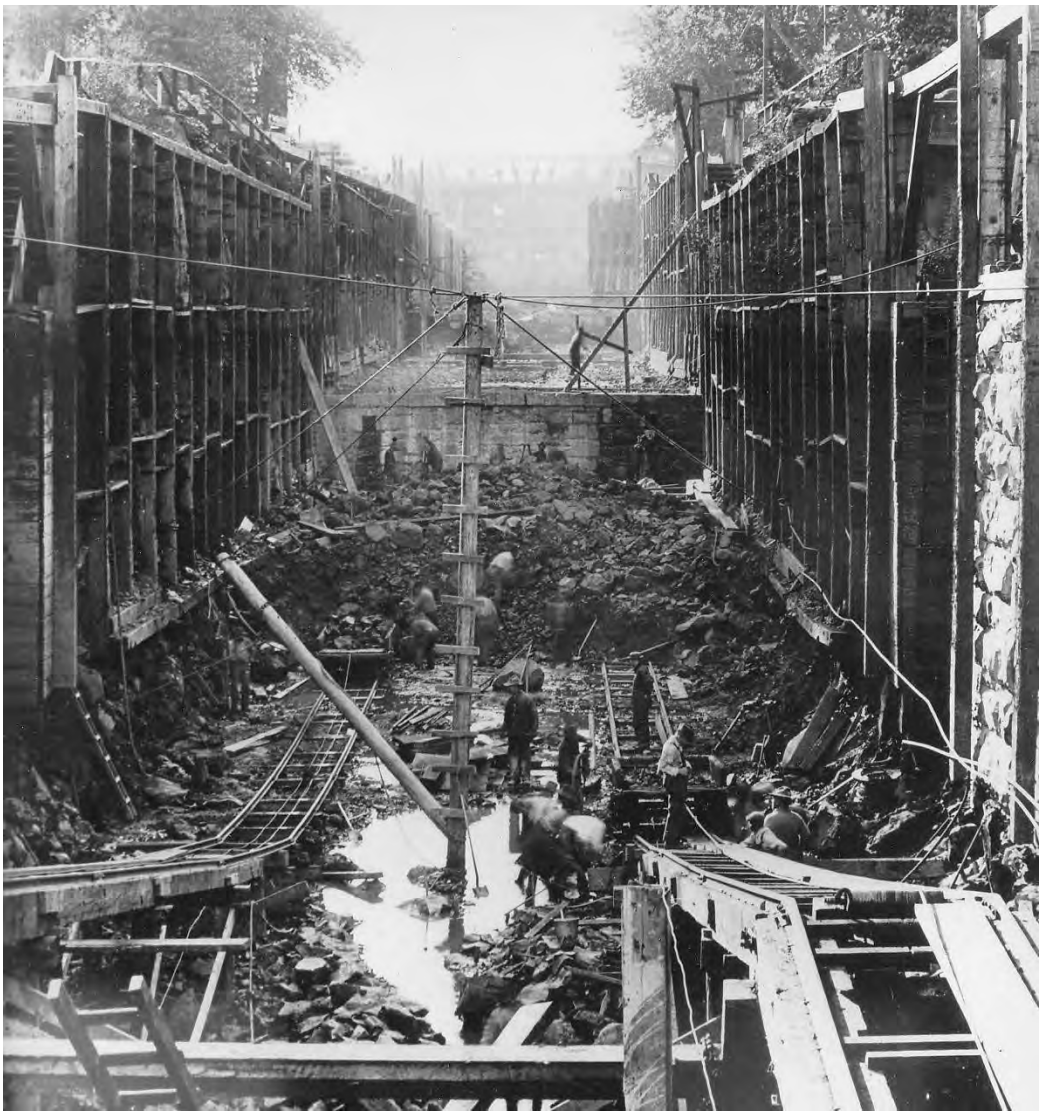

Figure 6: View of Corps' deepening of the lock chambers an additional 3 feet, between 1915 and 1921.

1.5.2 HISTORY OF PERFORMANCE

The Locks and canal have been operated and maintained by the Corps since 1915. From 1939 to 1989, the average annual lockages exceeded 5,000 per year, the facility operated 16 hours a day, and the average annual commercial tons through the Locks was of approximately 1.4 million tons. For decades, the Locks, one of the smallest multi-lift Locks in the nation, out competed some of the nation's largest navigational Locks along the Columbia River with regards to movement of commercial tonnage. Although wheat was the predominant agricultural product moved through the chambers when the Locks first opened, log rafts constituted approximately 90 percent of the commercial lockages from the 1930's to almost 1990. However, commercial tonnage declined after 1990, when the U.S. Fish and Wildlife Service (USFWS) listed the Northern Spotted Owl as threatened, and the National Marine Fisheries Service listed the Chinook salmon as threatened. By 1994, U.S. Forest Service (USFS) curtailed logging by 90 percent in the Pacific Northwest to avoid further impacts to these species and, as a result, the annual commercial tonnage dropped from 1.4 million tons (1989) to less than 200,000 tons, primarily due to decline of log rafts.

From 1994 to 1996, the adjacent paper mill (then Simpson Paper Company), accounted for the majority of the remaining commercial use of the Locks. Beginning in the 1997 in an effort to save costs, the mill (now West Linn Paper Company) elected to truck their commercial goods rather than barge them through the Locks, further reducing the remaining commercial cargo through the Locks. By the end of 1998, there was a more than 99.9 percent decline in the movement of commercial tonnage through the Locks from levels observed in 1989.

As shown in Table 1 below, paper and pulp, as well as logs, were the leading commodities handled in the mid 1990's, but by late in the decade there was no commercial traffic through the locks. Minerals related to the construction industry also moved in substantial volumes on occasion, but Corps records indicate 1995 was the last major year for these movements when total commercial tonnage through the Locks was approximately 200,000 tons.

Because commercial tonnage through the Locks has consistently been less than 10,000 tons per year, since 1997, the Corps discontinued to record commercial tonnage, and started to record the number of vessels and lockages through the Locks starting in the year 2000. Table 2 and Figure 8 display the recorded number of vessels through the Locks per year from 2000 through 2013.

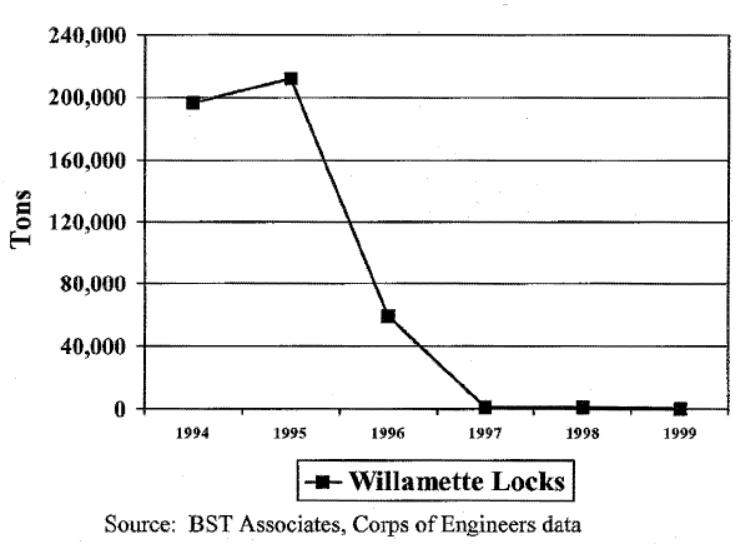

Figure 7: Commercial Tonnage through the Willamette Falls Locks from mid to late 1990's

Table 1: Commodities Transported Through the Willamette Locks (Short Tons)

Commodity	1994	1995	1996	1997	1998	1999
51 - Paper & allied products	83,983	83,961	30,383	20	-	-
42 - Pulp, waste products	75,346	68,477	27,088	-	20	-
52 - Building cement & concrete, lime, glass	-	46,642	-	-	-	-
41 - Forest products, lumber, logs, woodchips	26,000	-	265	132	125	210
43 - Sand, gravel, stone & crushed rock	-	9,223	-	610	85	215
99 - Other commodity not listed elsewhere	8,648	19	4	-	-	-
53 - Primary iron & steel products, …	-	2,431	1,374	174	483	140
32 - Industrial chemicals	2,541	85	-	-	-	-
Other	-	1,428	-	825	465	328
Total	196,518	212,266	59,114	1,761	1,178	893

Source: BST Associates, Corps of Engineers data

Table 2: Number of Vessels Through Willamette Falls Locks (2000-2013)

Year	Total Lockages	Total Number of Vessels Per Year	Total Number of Commercial Vessels Per Year	Total Number of Recreational Vessels Per Year
2000	756	1521	1299	222
2001	473	1110	936	174
2002	401	661	544	117
2003	283	459	378	81
2004	154	481	407	74
2005	153	349	307	42
2006	219	493	402	91
2007	279	603	504	99
2008	3	6	1	5
2009	28	28	0	28
2010	268	546	454	92
2011	50	60	5	55
2012	0	0	0	0
2013	3*	3*	0	3*

**the three vessel locked through in 2013, after the closure were conducted with no personnel on the vessel and the boats pulled into the chambers by ropes from upland locations.*

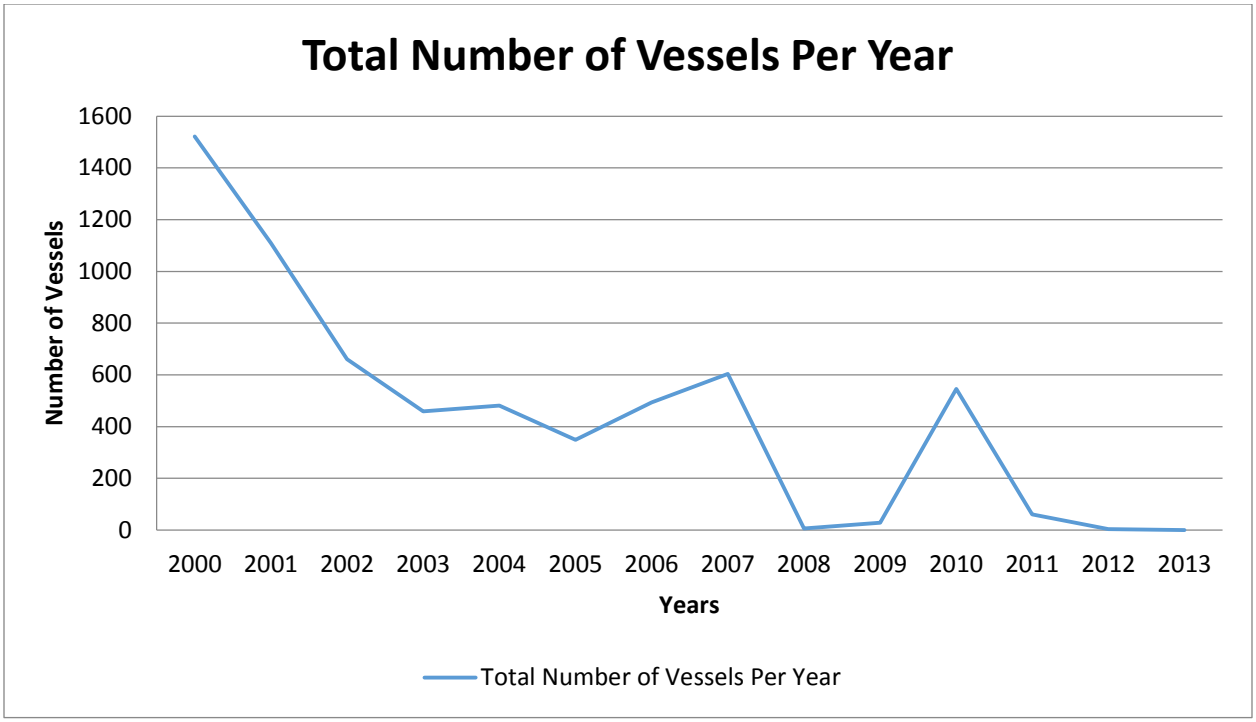

Figure 8 : Graph of Total Vessels through Willamette Falls Locks (2000-2013)

Largely resulting from the continued decline in commercial use of the Locks from 1996 through 2004, the facility only received caretaker funding that was commensurate with the decline in commerce.

In 2005 the Corps placed the Locks into "Caretaker status". In 2006, a coalition of public, private, and civic partners organized in order to seek and coordinate funding for and the repair and operation of the Locks. The coalition included the Corps, U.S. Representative Darlene Hooley, the Governor's Economic Revitalization Team, Metro, Clackamas County, the City of Oregon City, the City of West Linn, the City of Gladstone, the Oregon Department of Parks and Recreation, the Oregon State Marine Board, the Oregon Department of Transportation, the Oregon Tourism Council, Willamette Falls Heritage Foundation, and Portland General Electric.

Additionally, the Corps entered into an agreement with the Oregon Department of Transportation in May 2006 to utilize state Transportation Enhancement Funds to operate the Locks four to five days per week from May through September of 2006. The Corps also entered into a Challenge Partnership Agreement in 2007 to accept additional state and local funds to operate the Locks four to five days per week from May through September of 2007. Thus, even though the Corps placed the Locks into Caretaker status in 2006, the Locks were open for public use from May through September from 2002 through 2007. In January 2008, the Corps closed the Locks indefinitely pending a HSS inspection of the miter gates.

In 2008, the Corps' dam safety program evaluated the Locks under the Screening for Portfolio Risk Analysis (SPRA) process and developed a Dam Safety Action Classification (DSAC) rating for the Locks. The SPRA process screened every one of the approximately 694 dams in the Corps inventory based on available information, to expeditiously identify and classify the highest

risk dams requiring urgent and compelling action. This screening has yielded a clear but basic understanding of where the greatest risks and priorities are located. The SPRA assigned a DSAC 1 rating (Urgent and Compelling), justified by high likelihood of failure. Likelihood was determined high due to the low level of seismic stability of the ashlar masonry and concrete structure in the facility in relation to the Maximum Design Earthquake. This was further evaluated in the 2011 FER.

By February 2009, the HSSI on gate 3 was completed. In April 2009, $1.8 million in America Reinvestment and Recovery Act funds were utilized to inspect and repair the Locks, including the completion of the HSSI. The HSSI involved removing each gate, removing timbers, inspecting and repairing welds, and reinstalling the gate sections. Over 100 feet of weld repair was preformed and many timber sections replaced. All inspections, repairs and re-installations were completed in 2009.

The Locks reopened in May 2010 after the repairs and HSSI inspections were completed. From May through September 20, 2010, the Locks were open on Mondays, Thursdays, and Fridays; and limited hours on Saturdays and Sundays. In 2010 the Corps received funds to conduct a comprehensive facility evaluation report (FER).

The completion of the 2011 FER identified three major issues: seepage, seismic, and safety concerns. The District conducted an additional assessment concerning the safety related issues due to the condition of the Gudgeon Anchor assemblies at Gates 2, 3 and 4. As a result of the corrosion and delamination observed and assumed to be present where not observable, the Locks were closed in December 2011 under an emergency authority to protect life and property due to concerns a gate may collapse into one of the lock chambers, while boats are present as they are being locked through the facility. Total vessels locked through the facility in 2011 was 64, 58 of them being commercial vessels. In December of 2011, the Locks received a “non-operational” status; and the grounds were also closed to the public.

Rehabilitation expenses identified in the 2011 FER to address all known near term seepage, seismic and safety related needs were estimated to be $9,071,000 (2017 dollars). Given the low national ranking and the limited commercial tonnage prior to the Lock closure, future funding for required repairs to return the facility to a safe operable condition continues to be highly unlikely.

The Willamette Falls Locks were placed on the National Register of Historic Places in 1974. Contributing elements include the four numbered locks, the canal basin and guard lock, the Lock Master’s Office/Museum and both sets of basalt stair cases. The Locks retain integrity of its original routing and design and are eligible under National Register Criteria A and C. The Corps is responsible for compliance with the National Historic Preservation Act.

1.6 PROPOSAL FOR FEDERAL ACTION*

The Corps has determined that no federal interest exists to retain the Locks project for its federally authorized navigational purpose. This determination was based on evaluating and comparing the benefits, costs, and impacts (positive and negative) of continued operation, maintenance, repair, replacement, and rehabilitation. A 99 percent decline in commercial navigation has occurred over the past twenty-five years and there has been an associated drop in

economic benefits to the nation. In addition, the operations, maintenance and high repair costs needed to address the life/public safety concerns associated with the deteriorating condition of the facility is a factor. Based on this determination, the Corps is evaluating de-authorization of the Locks and disposal of the associated real property and Government-owned improvements. The interim guidance for dispositions studies requires the utilization of risk informed planning to the decision to dispose of the facility. Risks to public safety, the environment, and to the structural integrity of the facility and adjacent properties are driving this investigation. Although current potential life safety risks associated with the existing condition of the Locks have been minimized due to the closure, continuing to defer major maintenance activities will continue to increase risk to the environment and public safety. This study will identify and evaluate alternative and the necessary actions to mitigate risks before deauthorizing and disposing of the facility.

NEPA requires the lead agency to analyze and disclose impacts of its proposed action and alternatives to it. For analysis of potential environmental impacts of the alternatives, the Corps analyzed a range of measures for addressing life/safety and environmental risks before disposal and transfer to a non-federal entity. The plan formulation process is described in Chapter 4. The study period is 50 years from 2017 to 2067.

1.7 OVERVIEW OF INTEGRATED DISPOSITION STUDY REPORT/ENVIRONMENTAL ASSESSMENT

This document is an integrated Draft Disposition Study Report and Environmental Assessment (EA). The report identifies the alternative plans for disposal of the associated real property and Government-owned improvements. The purpose of the EA portions of the report is to identify and analyze environmental effects of the alternatives, incorporate environmental concerns into the decision-making process, and to determine whether any environmental impacts warrant the preparation of an Environmental Impact Statement.

The six steps of the Corps planning process each align with a NEPA requirement. The planning steps are listed below followed by the document chapter and NEPA element to which they relate:

Planning Step	NEPA Element and Document Chapter
Step 1: Problems and Opportunities	Purpose and Need for Action; Chapter 2
Step 2: Inventory and Forecast of Conditions	Affected Environment; Chapters 3
Step 3: Formulate Alternative Plans	Alternatives including Proposed Action; Chapter 4
Step 4: Evaluate Effects of Alternative Plans	Environmental Consequences; Chapter 5
Step 5: Compare Alternative Plans	Alternatives including Proposed Action; Chapters 4 and 5
Step 6: Select Recommended Plan	Agency Preferred Alternative; Chapter 6

2. NEED FOR AND OBJECTIVES OF ACTION

This chapter presents results of the first step of the planning process, the specification of water and related land resources problems and opportunities in the study area.

2.1 PROBLEMS AND OPPORTUNITIES

The problems that this study seeks to address are as follows:

- Currently, there is insufficient demand for commercial tonnage and it does not appear that there will be a return of commerce sufficient to justify the repair and rehabilitation of the facility to maintain a federal interest in operating and maintaining the Locks for their federally authorized navigation purpose.
- The facilities have fallen into disrepair and facility officially became non-operational to the public on December, 2011, after a facility evaluation report revealed gudgeon anchor distress for gates 2, 3 and 4 and the findings were confirmed with a subsequent Corps' engineering assessment. The near term repair and rehabilitation construction cost to address all known seismic and safety deficiencies (gates and lock walls) to the Locks has been estimated to be $9,071,000 (2017 dollars). The Locks are no longer used for their federal authorized navigation purpose, although the Corps remains responsible for them.
- The federal facility remains unmanned and there are ongoing risks to people, property, and the environment.
    - There are risks to people as employees of adjoining properties cross the federal lands each day to access their respective facilities. Additionally, an uncontrolled breach could lead to an inundation of the adjacent West Linn Paper Co. where approximately 30 to 40 people work in mechanical rooms and shops that may be flooded in the event of an uncontrolled release due to a breach at Gates 6 and 7.
    - There are ongoing risks to structures as a number of structures located at the facility are potentially subject to vandalism, theft, and damage from the elements, including: a) the former lock control tower which serves as a former museum; b) the facility's office building; and c) the lock control structures. Additionally, increased deterioration could cause additional seepage into the paper mill, causing damage to the mill's equipment, materials and supplies.
    - An uncontrolled breach could also lead to an adverse impact to the PGE Sullivan hydropower plant, as a result of a reduction in the amount of water available for hydropower generation. The Sullivan Plant has a power production capacity of 16 MW.
    - There are ongoing risks to the environment as an uncontrolled breach would result in a decrease in flows currently supporting fish attraction to the existing fish ladders. Flow through the locks would produce a false attraction flow near Gate 1 of the facility leading to a high probability the Endangered Species Act (ESA)-listed species would not be attracted to the existing functional fish ladders limiting or eliminating fish passage over Willamette Falls. There are currently two different adult ladder systems, one owned and operated by Oregon Fish and Wildlife and the other owned and operated by the PGE plant as a requirement of the FERC license. The PGE plant also has a downstream juvenile fish bypass route that would also be impacted. This downstream route would not be available and juveniles would be forced to go through the locks with the uncontrolled flow. There is no way to know what the survival would be but given the velocity, grade drops, and places for impingement, it would likely be poor. In addition, by limiting adult fish passage between the lower Willamette River and the upper spawning habitat, the impact would also reduce the effectiveness of Corps fish hatchery and fish passage investments upstream of Willamette Falls. Current

estimates place the required future Corps improvements for ESA species at over $500 million.

The opportunities to address problems for this study include the following:

- Altering structures to lessen the risk of injuries associated with unauthorized entry upon the site.
- Identifying potential interested parties to facilitate disposal if the facility is de-authorized.
- Eliminating Federal maintenance costs by disposing of the facility.
- Modifying the facility to reduce risk of an uncontrolled breach and associated risks to property while protecting upstream federal investments in the order of hundreds of millions of dollars.
- Supporting regional efforts to develop local economic, recreational, and cultural benefits associated with a functioning locks system. A number of stakeholders have been and are continuing to actively engage in taking over ownership and management of the facility. Local interests are aware of the local recreational benefits, cultural and heritage values, and the potential economic benefits to the regional economy that this facility could provide. A Willamette Falls Locks Task Force was established through Oregon Senate Bill 131 in 2015. This Task Force was convened by former Governor Barbara Roberts and developed a set of recommendations, one being the establishment of a Willamette Falls Locks Commission. Currently, the Oregon Legislature is considering Oregon Senate Bill 256 which would establish this Commission. The regional partners supporting the repair and reopening of the Locks (see Section 1.4 for list of stakeholders).

2.2 PURPOSE AND NEED OF ACTION*

The purpose under NEPA of this Disposition Study is to de-authorize, modify as appropriate, and to dispose of the Locks. The need for disposition is due to the absence of federal interest in continued use of the facilities for their authorized purpose (i.e., navigation).

2.3 OBJECTIVES

The planning objectives for the study include the following:

- To Reduce the Federal investment (including O&M funding over the next 50 years.
- To improve safety conditions over the next 50 years.
- To support future vision for development of the local region by stakeholders.

2.4 CONSTRAINTS

The following constraints have been identified for the study:

- No Adverse Affect on the Willamette Falls
  - Minimize Upstream Navigation impacts (Navigation upstream of Willamette Falls);
  - Avoid impacts to aquatic migration corridor (Willamette Valley headwaters to the Pacific Ocean);
  - Avoid adverse impacts to upstream Corps investments (+$500 million anticipated to be invested in BiOp actions).

2.5 PUBLIC SCOPING COMMENTS AND RESOURCES OF CONCERN*

During the disposition study scoping, the Corps used several outreach strategies including notifying local Native American tribes via government to government letters (available in Appendix E) and notifying the natural resource agencies via calls to representatives of the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). Additionally, throughout 2016 the Corps participated in several stakeholder meetings associated with the Willamette Falls Navigation Canal and Locks Task Force. The Task Force was established to compile information related to the historic, economic, cultural, recreational and other current and potential future values of the Falls Navigation Canal and Locks. The Task Force met six times between January and September 2016 to review and develop information to advance a potential future transfer of ownership of the Locks and develop a set of recommendations. The Task Force recommended that the Oregon Legislature establish a Willamette Falls Locks Commission to work with the Corps the disposition study. The Task Force also recommended that the Legislature allocate resources, in partnership with local and regional contributions, to support the technical requirements, due diligence, communications, and economic analysis that are critical to ensuring that tribal, local, regional, and state interests are considered during the disposition study. All relevant information must be available for evaluating a potential future transfer of the Locks. The Task Force recommended that the Willamette Falls Locks Work Group act as the interim body to ensure continuity between the conclusion of the State Task Force and the establishment of a Willamette Falls Locks Commission by legislation in the 2017 Legislative Session.

The Corps met quarterly with representatives from the Willamette Falls Heritage Area Coalition (WFHAC). The WFHAC is a tax exempt non-profit organization under section 501(c)(3) of the Internal Revenue Code with a 23 member board of directors representing key stakeholders and experienced professionals in government, business, industry, tourism, art, heritage, historic preservation, and others. The board includes representatives from all six governments operating within the boundary (Metro, Confederated Tribes of Grand Ronde, Clackamas County, and the cities of Oregon City, Lake Oswego, and West Linn).

As a result of the interim closure of the Locks in 2011, the Corps entered into a Memorandum of Agreement (MOA) with the OR-SHPO and the Advisory Council on Historic Preservation under Section 106 of the National Historic Preservation Act (NHPA). The Corps also regularly engages stakeholders of the Disposition Study through the meetings required by this MOA.

Chapter **Error! Reference source not found.** provides the results of scoping.

3. EXISTING CONDITIONS*

3.1 SUMMARY OF ASSET HOLDING

Moving from downstream to upstream, the Locks are composed of four primary lock chambers, each being about 40 feet wide and 200 feet long lifting vessels a vertical height of 41 feet. Additional Lock features include a canal basin approximately 1,270 feet long, a 200 foot long flood control guard lock chamber at the upstream end of the canal, an upper approach structure about 1050 feet long, and a lower approach structure approximately 150 feet long.

The Locks are one of the oldest continuously operating multi-lift lock and canal systems in America. The Locks have remained generally unchanged since their inception and are constructed mostly of heavy wooden timbers. The lock chamber walls range from 5 to 15 feet high with distinctive portions of Ashlar Masonry which were made from locally quarried, finely dressed and cut stones (Figure 9). The lower two lock chambers are entirely excavated from natural basalt with wood planking on the walls. The upper two Locks and the guard lock have walls of wood and masonry extending up from the excavated rock. Due to the limited use of reinforced concrete in the U.S. at the time, the Locks incorporation of Ashlar Masonry is distinctive and reflects earlier construction methods.

Figure 9: View of Ashlar Masonry at Gate 4, Mill Side

The Locks were uniquely designed to use gravity flow to drain 850,000 gallons of river water in several minutes into or out of a lock chamber by 8 slide gates located at bottom of each miter

gate assembly. Water levels can be raised or lowered to necessary levels for vessels to travel upstream or downstream to the next lock chamber. Average time for passage through the Locks is about 45 minutes going upstream and 30 minutes downstream.

The Corps performed modifications to the Locks between 1915 and 1921, adding an office building, a warehouse, a combined carpenter and machine shop, a paint storage shed and three residence. In 1961, the three residence buildings were removed as the lock tenders preferred to live in the neighboring suburbs. In the late 1980's the combined carpenter shop and machine shop was removed commensurate with the shop machinery and storage needs being relocated to a new lockmaster building constructed. Additionally, the paint storage shed was removed, and the lock master office was converted to a historical information center.

Currently the District administers 7 improvements (buildings):

- lock control stands (shelters enclose the lock operating controls) at Gates 2, Gate 4, and 6;
- a historic information center which once served as the lockmaster office, located near Gate 5;
- a new lockmaster office constructed in 1985, located near Gate 3; and
- two small storage buildings each located south of the historic information center on the Corps side of the Locks, including a white cinderblock metal roofed structure, approximately 9' x 13', a metal roofed and walled storage locker, approximately 8' x 12'.

Each of the 10 feet by 10 feet lock control structures were where lock operators communicated with vessel operators via closed circuit television and radio communication for the opening and closure of the gates via remotely operated hydraulic actuators (Figure 10). The museum (historic information center) is the original two-story Lock Master's Office built near the turn of the century and used to oversee lock operations (Figure 11). The museum contains equipment used prior to the turn of the century for lock maintenance and houses artifacts recovered from a 1984 on-site archeological investigation and an interpretive display.

Figure 10: View of Controls and Communication Mechanisms Within the Lock Control Stand at Gate 4

Figure 11: View of Historic Information Center, the original Lock Master Office

In addition to these improvements, seven picnic tables, each on their own concrete slab, exist within this 0.4 acre lawn to serve recreational needs of the public, before the facility was closed 2011. There are five closed circuit cameras are located throughout the facility with equipment used to control them installed in the Lock Control Stands at Gates 2 and 4, and a 75 KW-Cummins diesel engine generator to provide basic lock operations and building functions during loss of power. Water and sewer services are provided by the City of West Linn. A sprinkler system is installed to maintain the lawn and adjoining vegetation.

3.2 OPERATION AND MAINTENANCE HISTORY

Although most of the lock features are virtually identical to what was originally constructed in 1873, the operation and maintenance of the facility has changed from a fully operational facility to non-operational under Caretaker status. Operations and maintenance of the Locks is carried out by staff and under the supervision of the Bonneville Lock and Dam Project.

Operational Period

When the Locks were fully operational and providing navigation, there were ample resources to maintain the facility, record the maintenance activities, note deficiencies and address required repairs. Personnel remained on-site to maintain and operate the facility. As the movement of commerce through the Locks reduced, the funding for O&M activities also declined.

During its operational history, lockages consisted of barges, log rafts, petroleum, tow boats and pleasure craft. Upstream bound log rafts were destined for the paper mill after storage, while downstream bound log rafts were destined for lumber mills located downstream. Barges accompanied by towboats moved both downstream and upstream. Upstream log rafts and empty barges, unattended by towboats were hoisted (pulled) upstream by means of a cable pulled by an air hoist. Two such hoists were used; one at Gate 3 and one at Gate 4. The Corps provided this service to expedite the movement of traffic through the Locks. When log rafts no longer locked through, the air hoists were removed.

A repair work barge was maintain for use in routine repairs of lock linings, shear walls, and gates. This barge was 14 feet by 22 feet, built on six steel pontoons. It had a hand derrick for lifting heavy timbers and was powered by a 5 horsepower Johnson outboard motor. It was moored in a recessed anchorage, where the on-site museum is now located. This repair work barge was removed with the closure.

The boat basin was dredged along the West Linn Paper Co. landing dock about once every two years to remove accumulation of silt and debris. Sufficient depth was provided for heavily loaded barges. This dredging activity no longer occurs as a result of the paper mill trucking all raw materials and finished goods. Within the Locks, a contract dredge worked its way upstream once yearly. These dredging activities no longer occur and with the decline in use of the Locks, Gate 3 can no longer be opened completely due to aggradation within the chamber between Gates 3 and 4 resulting from erosion of the aggregate from the Corps side wall. There are no plans to dredge the chamber due to the closure.

Interim Closure Period

Currently, the facility is closed to vessel traffic and to the public and the Corps continues minimal maintenance activities associated with the interim closure of the Locks. Personnel no longer maintain a continuous presence onsite. Every two months, the Corps performs a full functions check of the gates by cycling them open and closed. Any mechanical, structural, or electrical issues/changes are addressed as appropriate.

The 0.4 acre grounds adjacent and parallel to the Locks between Gates 3 and 4 is maintained.

Hand railing, ramps and boardwalks are inspected for signs of deterioration. They are repaired only when the wear constitutes a safety hazard. Walkways on the Corps side of the Locks between Gates 1 and 3 continue to be maintained by the Corps. Although some of the loose or deteriorated planks have been replaced, they are no longer painted regularly. Along with these maintenance activities, periodically, riggers are deployed to remove debris that stacks upstream of Gate 7 or debris is locked through the system and moved downstream.

Maintenance is not regularly conducted on the lighting system as it no longer supports lighting for vessel lockage. The existing Inter-Com, telephone, CCTV, or other communication devices within the Lock Control Structures are not maintained or repaired as they no longer serve a function during the interim closure. Also future repairs to the speaker system, if needed, are not anticipated to be conducted in the event of failure.

Guide booms, walls, sills, and sumps are no longer being routinely inspected and repaired. While interim inspections have occurred, the last complete inspection occurred during the assessment for the 2011 FER.

There are no dedicated federal security personnel on-site. Personnel from adjoining property owners access the property daily and communicate concerns should they observe anything unusual. Safety of the general public remains a prime concern, as over 250 non-federal unescorted personnel cross the federal lands on a daily basis to access their respective facilities, either WLP Co., PGE, or ODFW. Maintenance and inspection performed on the Locks is in accordance with the Corps' Safety and Health Requirements Manual, EM-385-1-1.

O&M Costs

Since 2011, the District receives funding of approximately $65,000 per year for minimal maintenance activities (Caretaker).

Real annual holding costs, however, are greater than the Caretaker activities for the Locks, as reoccurring costs include:

- an external Environmental Review Guide for Operations Environmental Assessment, which occurs once every 5 years;
- Hydraulic Steel Structure (HSS) inspections required on a 25 year recurrence interval, which would occur at least twice over the 50 year period of analysis; this entails removal and repair of Gates addressing concerns resulting from the HSS inspections;

- a periodic assessment and potential failure modes analysis is required once every 10 years, this requirement is identified in the 2014 IRRMP;
- a periodic inspection per the dam safety Interim Risk Reduction Measure Plan is required once every five years;
- a yearly exercise of the emergency action plan with the adjoining property owners as recommended by the 2014 IRRMP; and
- ongoing engineering support of real estate activities and needs.

3.3 ENGINEERING CONDITION

In 2008, the Corps' dam safety program evaluated the Locks under the SPRA process and assigned a DSAC 1 rating (Urgent and Compelling), justified by high likelihood of failure.

In 2011, a comprehensive assessment of the condition of Locks was completed and documented in the Facility Evaluation Report (FER). The findings of this study helped identify the driving issues which resulted in red-tagging Gates 2, 3, and 4. The FER has been used as a baseline for evaluating the condition of the Locks for this study. Subsequent to the FER, there have been no substantial improvements to the Locks and there have been no major changes in condition at the Locks.

On December 1, 2011, the Dam Safety Officer for the Portland District removed from service Gates 2, 3, and 4 until the gudgeon anchor could be replaced. Subsequently the Corps, under its emergency operational authority, closed the Willamette Falls Locks to all vessel traffic due to life safety concerns related to potentially unsafe physical conditions of the gudgeon anchors on Gates 2, 3, and 4. Where the gudgeon anchor assemblies could be observed, these terminations were in poor condition, with the bearing plate delaminating, the anchor rod and nuts having lost sections and the threads having been damaged due to corrosion.

In 2014, the Willamette Falls Locks Project Interim Risk Reductions Measures Plan (IRRMP) was issued. The IRRMP recommended the following actions: resume exercising the gates monthly; inspect the gudgeon anchors bi-monthly; reattach all loose timber planks on the deck; place warning tap and barricades around the rotted sections of timber deck; and monitor the sinkholes. The IRRMP, the Locks have received no further evaluation of DSAC classification. This will be further discussed in Section 3.3.6

3.3.1 Geotechnical Condition

Two sinkholes are located behind the Lock chamber 3 wall on the Corps side. These two sinkholes developed in October 2009 and May 2010 are covered with steel plates. The Lock chamber 3 wall (Corps side) consists of two layers of timber lagging mounted to timber columns, anchored to the rock face behind the wall. The outer layer (Chamber side) provides impact protection for navigation traffic and has relatively large gaps between the timbers. The interior layer (Corps side) is present to keep the soil backfill from washing into the chamber. The asphalt walkway between Gates 3 and 4 (Corps side) continues to experience subsidence issues. Currently these sink hole have grown to approximately 3-4 feet landward from the lock wall face, about 3-4 feet deep and stretch along the length of the wall about 20 feet. This area is traveled daily by workers of the adjacent landowners of West Linn Paper and PGE. The Corps has install a temporary guardrail to prevent people from accessing this area. Should this condition continue to grow access through this area may need to be completely closed off. This condition has slowed since the locks have been non-operational, but continue as rain continues to pull fine material from behind the wall.

Timber columns are supported on concrete blocks directly on the sill as shown in Figure 6. The wall has backfill consisting of concrete in the lower half and soil in the upper-half. The backfill material assumed is a combination of river-washed sand, gravel, and waste materials created during rock excavation for the masonry walls. The rock anchors appear to be located approximately 5 feet or more below the sinkholes.

The deterioration of the interior timber lagging layer is visible. It appears the sinkholes have developed as a result of deterioration of the interior lagging. As a result, retained soil caved into the void and continues to wash into the Lock 3 chamber.

During inspections for the FER, water was observed seeping through the downstream end of the Gate 4 monolith on the Corps side and into Lock Chamber 3. The water seepage into Lock Chamber 3 appeared to be clear. As the water level in Lock Chamber 4 was lowered, the volume and rate of seepage through the miter gate monolith and into Lock Chamber 3 began to decrease. As the water level in Lock Chamber 3 increased and the water level in Lock Chamber 4 decreased, water began to seep through the upstream end of the Gate 4 miter gate monolith, on the Corps side, into Lock Chamber 4. The water appeared brown in color, which is an indication of soil fines being washed through the masonry wall.

Seepage from the PGE forebay to and from the ship canal also occurs. This is largely assumed due to poor construction of the concrete gravity wall. The seepage through the wall is most significant when the water surface elevations of the PGE forebay and the Ship Canal differ greatly. This is largely a nuisance issue for PGE when the powerhouse forebay is dewater for inspections and repairs.

During operation of the locks, seepage through the Mill Side ashlar masonry walls and monoliths results in minor flooding of the lower levels of the WLP Co. property. Since the closure of the Locks, there has been insufficient water levels in the lower chambers of the Locks to result in sufficient seepage to impact the lower levels of the WLP Co. property.

3.3.2 Structural Condition

Given the age of the facility and construction practices of those time there are structural concerns as they relate to meeting current design standards and seismic loading potentials. The DSAC 1 rating assessed by the Corps in 2008 was largely due to these concerns. One of the main objective of the 2011 FER was to analyze and substantiate those concerns. Below is a summary of the fining of the FER that was further supported with in-house evaluations and the Interim Engineering Design Report (EDR).

While the ashlar masonry appears in good shape, this construction method does not perform well under seismic load cases, given there is no bond between adjacent masonry blocks. Critical loads occur for the ashlar masonry as the chamber is full of water under a seismic event, this produces the maximum uplift condition and horizontal loads that reduced global stability of the walls. Design peak ground acceleration (PGA) values measured in units of *g*, acceleration due to gravity, for the Operating Base Earthquake (OBE) and the Maximum Design Earthquake (MDE) are 0.0848*g* and 0.2464*g* for the OBE and the MDE, respectively. The OBE (magnitude 5.5) and MDE (magnitude 6.5) have 144-year and 975-year return periods, respectively. The Scotts Mills Earthquake on March 25, 1993 was the largest earthquake within 90-miles of the Willamette Falls Lock in recorded history which precedes the construction of the Lock by over 300 years. It was a magnitude 5.6 event with a PGA of 0.06*g*, measured at Detroit Dam, 27 miles southeast of the epicenter. Willamette Falls is approximately 27-miles from the epicenter as well. Therefore, the Willamette Falls Lock has most likely never experienced an OBE (PGA = 0.0848*g*) sized event and there is no historical data for the Locks performance in a major seismic event.

The result of the stability analysis conducted under the FER are presented below with “Pass” denoting that the wall or monolith has met the requirements of EM 1110-2-2100, Stability Analysis of Concrete Structures.

Table 3: Wall Stability Summary

Chamber - Side	Sliding	Overturning
D/S Approach - Mill	Pass	Pass
Chamber 2 - Mill	Pass	Fail
Chamber 3 - Corps	Fail	Fail
Chamber 3 - Mill	Fail	Fail
Chamber 4 - Corps	Fail	Fail
Chamber 4 - Mill	Pass	Pass
Guard Lock - Mill	Fail	Fail

Table 4: Monolith Stability Summary

Monolith - Side	Sliding	Overturning
Gate 2 - Corps	Pass	Pass
Gate 2 - Mill	Pass	Pass
Gate 3 - Corps	Pass	Pass
Gate 3 - Mill	Pass	Pass
Gate 4 - Corps	Fail	Pass
Gate 4 - Mill	Fail	Pass
Gate 5 - Corps	Fail	Pass
Gate 5 - Mill	Fail	Pass
Gate 6 - Mill	Fail	Pass
Gate 7 - Mill	Pass	Fail

Subsequent to the FER, the Corps performed additional analysis of the PGE Forebay/Ship Canal Wall. This wall constitutes part of the damming surface of the Locks (e.g. a structure which serves to impound water) in conjunction with the Guard Lock. It was found that the wall structure does not meet the Corps stability criteria as outline in EM 1110-2-2100. There is limited documentation on construction of this feature and it should be noted that the analysis was conducted with assumed material properties and construction techniques given the age of construction and standard practices of those times.

Figure 12: Existing Facility Condition diagram indicating seismically unstable walls and monoliths, locations of seepage, and locations of deficient gudgeon anchors.

If the damming surfaces of the Locks were to fail during a seismic event, an uncontrolled breach through either Gate 6, Gate 7, the guard lock wall or through the ship canal wall separating the PGE forebay may result. Since the downstream gate monoliths share similar performance characteristics as the damming surface under a seismic event, it is assumed that a full breach through the remainder of the gates would ensue. An uncontrolled breach presents numerous consequences upstream and downstream of the Locks. The consequences include:

- a potential for reduction in water surface elevation to Willamette Falls upstream pool;
- potential for reduction in PGE forebay elevation and impacts to hydropower production;
- potential flooding of West Linn Paper Mill property with associated risks to human life and safety for workers (approximately 30 people) in the lower levels of the mill;
- mobilization of sediments upstream, within and downstream of the Locks;
- adverse impacts to downstream passage routes by juvenile ESA listed species;
- adverse effects to upstream fish passage at the Falls due to false attraction and delay in finding existing ladder entrances; and
- effects to numerous other stakeholders upstream and downstream of the falls.

The potential expected range flows diverted and impacts to aquatic species of an uncontrolled breach of flow through the Locks is further discussed in Section 3.3.7 .

The existing condition of the miter gate leaves, miter posts, and quoin posts were found sufficient to remain safe for up to 10 years without maintenance. This condition is largely due to the fact that in 2008 the Corps completed the HSSI inspections in which all gates were removed, inspected and repaired.

The gudgeon anchor assemblies are fracture critical members (e.g. members and their associated connections subjected to tensile stresses whose failure would cause the structure to become inoperable) and have significant corrosion in the rod, support plate, and nut assemblies at the end of the anchorage. This was observed at Gate 4 on the Mill Side of the locks. Not all anchors are accessible and are buried further within the Lock walls and subsurface. This observation and evaluation prompted the red-tag of Miter Gates 2, 3, and 4 since life-safety could not be guaranteed. Failure of a gudgeon anchor would likely result in a gate leaf falling into the lock chamber endangering crew and vessels during a lockage.

Figure 13: View of gudgeon anchor rod at Gate 4, Mill Side

There is also degradation of walkways and safety rails that require repair for safe visitor access.

3.3.3 Mechanical Condition

The existing mechanical systems were evaluated against EM 1110-2-2610 *Lock and Dam Gate Operator and Control Systems* (2 April 2004) and EM 1110-2-2703 *Lock Gates and Operating Equipment* (30 June 1994) in the Facility Evaluation Report.

> EM 1110-2-2610 is the engineering manual that establishes the criteria and presents guidance for the mechanical and electrical design of navigation lock and spillway gate operating systems for both new construction and rehabilitation of the existing projects.
>
> EM 1110-2-2703 is the engineering manual that provides guidance in the structural, mechanical and electrical design of the lock gates and operating equipment at navigation projects.

The miter gate leafs are currently operated with a set of hydraulic cylinders. The existing cylinder anchorage systems for Miter Gates 2, 3, and 4 are inadequate, and would need to be replaced if future lock operation is to be executed. EM 1110-2-2610 recommends a minimum of limit switches and automatic sequencing based upon valve location level sensors and limit switches, to prevent over-filling and over-emptying of the lock chamber. The existing design does have automatic control of the valves that is used for the non-lockage operations. The automatic control for the valves has been found malfunctioning at several times in the past. There is no automatic control of either the valves or the miter gates while locking.

The shock load that is experienced by the hydraulic cylinder during the opening and closing operation represents risks to the hydraulic cylinder and potentially the quoin. There is a need for controlled motion of the gates when nearing fully open or close position to prevent excessive shock loads. The open/close limit switches should be installed on all miter gates and also on filling/emptying valves. These limit switches upon actuation shall trigger a command to stop the motor that drives the pump of the hydraulic power unit.

Regular monthly checks for oil sheen on the water and oil leakage from hydraulics have been performed. There is no automatic oil sheen monitoring. To date there has been no major oil leakage issues.

A local hydraulic power unit that is located at each set of miter gates that operates the miter gates and the filling/emptying valves in those gates set is generally in good condition. No leakage of hydraulic fluid or signs of damage were observed. Upon the inspection from 2011it was assumed that the hydraulic power units would be reused if the lock facility is restarted in 3 to 10 years. Further inspection of the hydraulic power units is recommended should they be reused at a later time.

A compressed air system with automatic bubblers is currently not functioning. The bubbler system's purpose is to help clear debris from the upper miter gate recesses as the gates are opened. The system is not necessary because the lock is not operated for traffic.

EM 1110-2-2610 references EM 1110-2-2608 *Navigation Locks – Fire Protection Provisions* that recommends a fire protection system be provided for navigation locks. No equipment for fire protection was found on the facility. This represents fire hazard to the barges carrying flammable liquids or oxidizing chemicals that could potentially damage the lock chamber including the miter gate structure, operating equipment etc. It also presents fire hazard to recreational crafts locking through the facility. EM recommends that other than relying on professional fire-fighting services, alternate means such as a sprinkler system or hose stations be used as quickly as possible in event of fire. Equipment for the fire protection should be installed on this facility in the near future to avoid the potential of risk due to fire.

3.3.4 Electrical Condition

The current electrical distribution and control system was evaluated against EM 1110-2-2610 *Lock and Dam Gate Operating and Control Systems* and EM 1110-2-2703 *Lock Gates and Operating Equipment*.

The existing locks are largely in compliance with Corps Engineering Manuals. The electrical system most in need of updating is the control system.

The condition of the electrical distribution system varies greatly. Some portions of the electrical distribution system such as conduit, wire, and junction boxes are newer and appear to be in good repair. However, other portions appeared to be corroded along with some conduit supports. There are some locations where the conduit system stops and the cables are run in the open.

The existing control system consists of a lock control stand in three locations, each containing a control console that is a generic, hard-wired control system.

There is currently no remote monitoring or remote operation of the lock system. When there is a problem or a lockage, a Lock Master may have to make a 4-hour round trip from Bonneville Dam in order to address the issue.

The Closed-circuit television (CCTV) system enables the Lock Masters to view boats requesting boat passage, the miter gates during opening and closing to ensure boater safety, and to confirm lock miter gates are in the open or closed positions. Per conversation with the Lock Master, current cameras do not provide adequate image quality and coverage/orientation to meet the current needs or to allow remote operation and monitoring of the site. Additionally, the camera monitor displays' resolution are of poor quality.

There is a 75kW standby generator installed inside the Lock Office building to provide basic lock operations and building functions during loss of power. The generator appears to have failed due to lack of maintenance funds.

The lighting system provides path illumination for pedestrians along the Locks. This lighting has not been upgraded since the initial installation in 1969. Existing lighting appears to be the original mercury vapor luminaires mounted on a cast iron pole. Two light fixtures appeared to be out of service including fixtures at Miter Gates 1 and 2 on the mill side. New mercury vapor lamps and ballasts are no longer manufactured effective 2008 and are banned from manufacture and sales per legislation known as Energy Policy Act 2005, Pub. L. No. 109-58. Poles are showing signs of corrosion and should be replaced. Lights on both sides of the lock chambers provide nighttime lighting. Lead based paint is flaking off of these poles; and severe corrosions is observable at their base.

3.3.5 Flood Performance

The Locks are subject to overtopping during high flow events on the Willamette River and have done so on several significant hydrologic events in the past, most recently in January 2012 when the stage upstream of the Falls reached 65.2 feet mean sea level (MSL). Preparations for the overtopping events require mobilization of personnel onsite. Under standard operating procedures the Locks are closed to operation at 64.2 feet MSL. Removal of equipment is conducted when the forecast calls for the river to reach 64.5 feet MSLor higher. A flood at the Falls is considered of major proportions when water tops the guard Locks at 64.8 feet MSL and the miter gates become inoperable due to exceeding the differential head limit across the gate. Exceeding 64.8 feet MSL is approximately a 10-year event (USACE 1987). On a rising river and anticipated overtopping events Gates 1, 2, 3, and 5 are opened and Gates 4, 6, and 7 are closed.

At 64.2 feet MSL sand is ordered for sand bagging efforts. Coordination with WLP Co. and PGE has been initiated for sand drop locations. Some sandbags are already filled and stored in the WLP Co mill on pallets. These sandbags are shared during flood times by WLP, PGE, and Lock employees. Designated areas are cleared for sand bagging and planking, preparations are made at Gate 7 for a flood wall. At a river stage of 64.5 feet MSL, the hydraulic operators are removed or

protected, followed by sand bagging of Gate 7 and installation of stop logs and flash boards adjacent to Gate 7. When flows overtop the stop logs, flash boards, and sand bags, the overtopping flow is entrained into the canal and chambers. When the upper river is forecasted to rise above Gate 7, then the museum is to be sandbagged and left open.

If hydrologic event reaches significant proportions for the river downstream of the Falls and Locks at a forecast of 46 feet MSL or higher, then Locks personnel at the Corps office building are to remove tools, clear out personal lockers; remove all machinery, emergency power generator, hazardous materials, and air compressors. All power switches shall be shut off. The Corps office shall be sandbagged and all doors left open. The last time the Willamette River below the Falls crested above 46 feet MSL was the February 1996 event, which reached 47.2' (USACE 1997).

3.3.6 Dam Safety Action Classification

In 2008, the USACE performed a screening portfolio risk assessment (SPRA) for the Willamette Falls Lock project and assigned a Dam Safety Action Classification (DSAC) for the Locks. The SPRA assigned the project as a DSAC 1 project (Urgent and Compelling) based on the high likelihood of failure associated with the gate components under normal loading conditions and the seismic instability of the ashlar masonry and concrete structures under seismic loading. The consequences associated with failure modes (life loss and economic) were not fully evaluated in the SPRA. Lost project benefits and repair costs were estimated in the SPRA for a total economic consequence estimate of $5,279,423 (2008 dollars). Total economic consequences are derived from cost of damages, cost of repair and 2 years of lost benefits. The previous (2009) Project Interim Risk Reductions Measures Plan (IRRMP) following the SPRA recommended conducting HSS inspections and repairs. HSS inspections were conducted for all miter gates in 2009. Most of the damages and deficiencies noted were repaired in 2009. Completed gate repairs included: repairs to cracks in the gate leaves; replacement of damaged lagging and fasteners; removal of backing bars at the gate leaves; seal replacement, repairs to tension ties; replacement of pintle heel bolts; repair of hydraulics; repair of greaselines; repair of slide gate operators; and other items. As stated previously, miter gates 2, 3 and 4 have been taken out of service until the gudgeon anchors can be repaired. The stability of the masonry and concrete components was further analyzed in the 2011 Facility Evaluation Report. In December 2011, the Corps closed the Locks to all vessel traffic due to life safety concerns attributed to the potential for catastrophic gate failure associated with the gudgeon gate anchors. The life safety risks associated with failure of one or more gates is near zero with the locks in the current non-operational status. In 2014, the current Willamette Falls Locks Project IRRMP was issued. This recommended the following actions: resume exercising the gates monthly; inspect the gudgeon anchors bi-monthly; secure all loose timber planks on the deck; place warning tap and barricades around the unstable sections of timber deck; and monitor the sinkholes. Since the initial DSAC rating in 2008, operational changes have eliminated people from the lock chamber, life-safety hazards have been secured, further evaluation and assessment of the project has been performed, and an IRRMP has been developed and implemented. The USACE dam safety program has evolved since the initial SPRA was conducted to include detailed assessments of consequences, a semi-quantitative risk assessment (SQRA), and consistency reviews to assign a project DSAC rating. A Periodic Assessment, to include a SQRA is scheduled for FY2019, will be the next opportunity to

formally re-evaluate the DSAC. This activity is dependent on the receipt of adequate funding in order to perform as scheduled.

3.3.7 Potential Environmental Impacts of an Uncontrolled Breach of Flow through the Locks

This section is intended to focus largely on describing the physical and hydraulic impacts presented during an uncontrolled breach of flow and relation of fish passage. Section 3.4.25 Biological Resources will further discuss the Biological Resources impacted from the uncontrolled breach.

Most populations of Upper Willamette spring Chinook salmon and Upper Willamette winter steelhead spawn upstream of Willamette Falls (Falls), and therefore adults moving upstream from the ocean must pass Willamette Falls via the existing fish ladder system to complete their migration and reproduce. Juveniles spring Chinook salmon annually migrate downstream toward the ocean and past the Willamette Falls in spring and late fall, and most winter steelhead in spring, however some individuals pass throughout the year. Juvenile pass downstream through the PGE TW Sullivan hydropower plant bypass as well as over the Willamette Falls. The Willamette Falls effectively act as a checkpoint for nearly all anadromous salmonid species of the Willamette Valley Basin during their respective migration periods as seen in Figure *2*

Upper Willamette spring Chinook salmon and Upper Willamette winter steelhead

The adult spring Chinook salmon run begins to enter the Willamette River annually in February, with the majority of the run ascending Willamette Falls in April and May. Mortality of adult spring Chinook salmon has been observed below Willamette Falls, associated with high water temperatures, which could be exacerbated if fish are delayed in the Willamette Falls tailrace. Winter steelhead enter the Willamette in January and February, but generally do not ascend to their spawning areas until late March or April. Sea lion predation of spring Chinook salmon and winter steelhead has been increasing in recent years. Any delay in fish runs in the Willamette Falls tailrace could exacerbate the sea lion predation below the upstream passage routes shown in Figure 14.

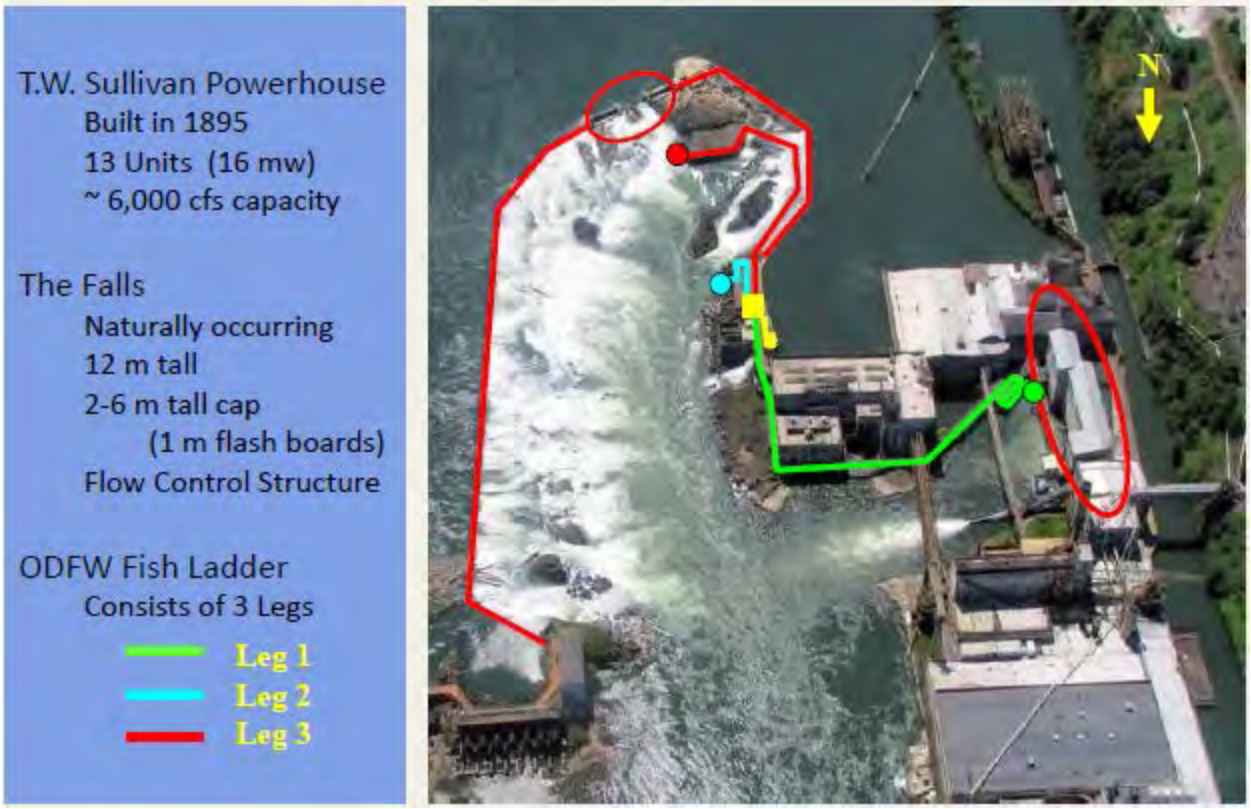

Figure 14: Existing fish passage routes.

Maximum swimming speed for adult Chinook salmon for a few seconds is up to about 20 feet per second (burst speed), and these fish can sustain swimming speeds for several minutes of up to 10 feet per second. Steelhead burst speed is up to 27 feet per second and they can sustain swimming speeds of up to 13 feet per second. Maximum jumping heights for Chinook salmon and steelhead are reported as 8 feet and 11 feet, respectively. Velocities and hydraulic drop heights at or near these levels or higher will create a barrier for upstream fish passage; that is, most upstream migrating adult Chinook salmon or steelhead may not able to pass the velocity or hydraulic barrier.

Juveniles Chinook salmon and steelhead migrating downstream are capable of safely passing through a wide range of velocities and depths in natural rivers. However fish striking man-made structures, or sheer stress and barotrauma due to hydraulic pressure, can cause injury and mortality.

Uncontrolled Release of Upstream Pool

Along with the natural terrain, the TW Sullivan hydropower plant and other associated improvements, the Willamette Falls Locks (Locks) serve to retain the pool upstream of the Falls as shown in **Error! Reference source not found.**. Prior to development in the area around the locks in the early 1800s, salmonids would reach migrate to the Falls in the late winter early spring and wait until high enough flows (typically resulting from a rain on snow event in the upper watershed) enabled the fish to migrate over the around the Falls through various avenues

made accessible by the high flows. With the development of the Falls for hydropower and milling operations, several damming structures were constructed to control the pool above the falls. These various structures effectively closed off avenues utilized by the fish to migrate over the Falls at high flows. Currently, existing fish ladders near the hydropower tailrace and apex and side of the Falls provide upstream passage. Existing fish ladders near the hydropower tailrace and apex and side of the Falls provide upstream passage. The Locks are considered seismically deficient, including the portions of the Locks that retain the upstream Willamette Falls pool. This poses a risk of the pool retaining Lock walls failing during an earthquake ultimately resulting in an uncontrolled release of the upstream pool through the ship canal and lock chambers.

Figure 15: Typical flow path of water at the Willamette Falls.

An uncontrolled release of pool through the Locks will affect the overall hydraulic characteristic of the Willamette Falls resulting in high volumes of water entering the Locks upstream at Gate 7 and existing downstream at Gate 1. This flow rate through the Locks may vary and would be dependent upon overall river stage and discharge. In late summer/fall during low river stages and flows, approximately 8,000 cubic feet per second, nearly half of the overall river flow would be rerouted through the Locks during an uncontrolled release, roughly 4,000 cubic feet per second. This will affect the tailwater and upstream pool stages potentially resulting in the fish ladder system failing to meet passage criteria. In the event of an uncontrolled release at higher river stages and flows, the majority of overall river flow would remain passing over the Willamette Falls; flows through the Locks would increase but would not be commensurate to the flow over the Willamette Falls. This discharge of the uncontrolled release into the main stem of the Willamette as shown in Figure 16 would act as a substantial attraction flow to upstream migrating salmonids in any river flow with a lesser extent during high river flow events.

Figure 16: Flow path developed during an uncontrolled release through the Willamette Falls Locks.

Flow though the Locks would have uniform velocities exceeding 15-20 feet per second at low flows and greater velocities at higher flows. The Lock lifts, elevation change between chamber floors, would result in approximately 10-foot hydraulic drops assuming the sills at each gate remain intact during the event. Although the flow discharging from the Locks will act as an attractive passage route, the hydraulic characteristics internal to the Locks will not support upstream salmonid passage. Lock 1 entrance, where the uncontrolled release would discharge back into the main stem Willamette River, is roughly 2,500 feet downstream of the nearest fish ladder entrance. The lock entrance may support fish passage up to lock chamber 1 as it is less confined and will have reduced velocities. However, fish attracted to the discharge are likely to hold at this location due to the lack of competing flows inside the lock entrance. Exhausted fish may fall back to the main flow of the Willamette River and seek additional passage routes. Holding fish or exhausted fish will be more susceptible to sea lion predations and a number of other direct and indirect mortalities through injury.

This could all could result in a partial or full blockage of upstream migrating adult spring Chinook salmon and winter steelhead, or delay in migration, due to:

- False hydraulic attraction of upstream migrating fish into the lock from an increase in water volume discharged from the lock (with an inability to pass upstream through the lock)
- Inability or poor fish passage efficiency due to changes in fish ladder hydraulic conditions at the existing fish ladder entrances (downstream end of ladder), within the ladder, and/or at the fish ladder exits resulting from
    - changes in forebay and/or tailrace elevations
    - changes in ladder water supply and entrance hydraulics

For adults, if upstream passage is substantially impeded and the impact occurs for multiple years, both hatchery and natural runs could be extirpated since they will not be able to reproduce, unless they can be trapped and transported upstream by other means.

For juveniles, impacts are less likely to be prevalent due to their ability to pass a variety of conditions with the flow. However, if the breach flow path developed were to entrain juveniles and subject them to fish strikes with structures, sheer stress and/or barotrauma due to hydraulic pressure changes, it may result in undue injury or mortality to outmigrating juveniles. Juveniles subject to injury may not succumb to mortality directly from the injury but may become more susceptible to avian and piscivorous predation and/or disease resulting in mortality.

Depending on the nature of the breached lock, adult or juvenile life stages may be impacted. The degree to which Chinook salmon and steelhead populations could be impacted by an uncontrolled release or other hydraulic change at Willamette Falls Lock will depend on the extent that the passage is impeded, impaired, or blocked, the timing and the duration.

Lamprey

Lamprey may also be impacted, depending on the hydraulic changes to the fish ladder and the natural falls, that results from a breach. Upstream migrating Lamprey pass the Falls via the same fish passage routes as the listed salmonids with the exception of several additional “lamprey ramps” positioned around the Falls. Lamprey pass hydraulic barriers by affixing to a smooth, wet surface with their sucker-like mouth, bursting forward and reaffixing to the surface as shown in Figure 17. The Falls and fish ladders have been retrofitted with “lamprey ramps” that provide the smooth, wetted surface necessary for passage. Similarly to salmonids, the result of an uncontrolled breach may render insufficient attraction flow to the existing passage routes and the flow path through the Locks is unlikely to support passage due to velocity extremes and lack of smooth climbing surfaces.

Figure 17: Lamprey ascending "lamprey ramp" at Willamette Falls.

Summary

In addition to possible direct biological impacts, the Portland District has invested over $194M upstream of Willamette Falls for implementing actions required in the 2008 Biological Opinions issued by both NMFS and USFWS since its inception. As part of this federal investment, the Corps has constructed and now operates many upstream fish passage facilities, including adult and juvenile trapping and transporting activities. Each year the Corps spends funds operating and maintaining these fish passage facilities in the Willamette Basin. If conditions at the Locks cause delay or block passage, the benefits of these facilities will not be realized as intended and depending on the time frame for restoring adequate passage at Willamette Falls, the effort to reintroduce these fish and the local adaptation benefits may be severely impacted.

In summary, depending on the severity, timing, and duration of an event that would impact upstream migration of adult ESA-listed spring Chinook and winter steelhead, the direct biological impacts could be severe. Additionally, the benefits achieved through the on-going federal investment in the Upper Willamette Basin may also be diminished. The Corps anticipates additional funding appropriations in excess of $500 million to be invested in downstream passage actions in the McKenzie and Santiam subbasins. These actions, and associated species benefits, are all contingent on adequate passage being provided at Willamette Falls.

3.4 AFFECTED HUMAN ENVIRONMENT*

This section assesses the existing conditions of the project area and resources within the Locks study area. It is organized by resource topic. This is not a comprehensive discussion of every resource within the study area, but rather focuses on those aspects of the environment that were

identified as relevant issues that may be affected by the considered action alternatives. An analysis of the potential environmental effects of the proposed action is presented in Chapter 5.

3.4.1 Climate

Precipitation at the Locks project site averages about 43 inches per year, virtually all of which occurs as rainfall. Most precipitation occurs from November through March, with very little occurring from June through September. Precipitation patterns are generally similar to the greater Willamette Valley. Precipitation amounts in the Coast Range on the west side of the valley are considerably greater than those occurring in the valley. Most of this precipitation occurs as rain during the winter. Precipitation in the Cascade Range of the Willamette River Basin also occurs largely in the winter and is similar in amounts to the Coast Range, but much of the precipitation at higher elevations (i.e., above 4,000 feet) occurs as snow. Snowmelt generally occurs from April through June, although major floods can occur when warm rain-on-snow events accelerate runoff.

3.4.2 Geology

The Locks are founded on Tertiary Columbia River Basalt which extends to great depth below the Locks. This basalt is only 30 million years old and occurs throughout the Pacific Northwest. Individual basalt flows vary from a few feet to hundreds of feet in thickness. Potential hazards associated with the geological formations include fractured and rolling rock. These conditions are a result of the steep basalt cliffs northwest of the project. These conditions do not provide immediate hazard, but would be a problem with any construction activities associated with the Locks or cliffs. These hazards are minimized by a wire mesh screen over stable basalt. The remaining small acreage of flat land parallel to the Locks rests on recent alluvium which has good drainage, is developable, and well suited for recreation. (USACE, 1995)

3.4.3 Seismicity and Seismic Hazards

The Cascadia Subduction Zone is located just off the Oregon coast. This zone, where the Juan de Fuca plate sinks beneath the North American plate, is part of a larger Subduction system that includes the seismically active, and extremely hazardous, San Andreas Fault and Alaskan earthquake zones (Yeates, 2002). Clackamas County is well within the impact area for the Cascadia Subduction Zone and there are several known crustal fault lines throughout the county with further geologic analyses ongoing (Clackamas County, 2013). An earthquake measuring 5.6 on the Richter scale occurred in March 1993 and caused damage throughout the county, especially in the Molalla area only 16 miles from the Falls (Clackamas County, 2013). A number of seismic vulnerability assessments conducted by the Oregon Department of Geology and Mineral Industries have highlighted the need for seismic retrofits to critical facilities (Clackamas County, 2013).

3.4.4 Typography

The Corps manages a small amount of generally flat land adjacent to the northwest of the Locks. There is a steep escarpment that runs parallel to the lock. This steep bank comprises of about 25 percent of the project and quickly rises 30-35 feet in elevation to a flat terrace. (USACE, 1995)

3.4.5 Soils

Soils within the project area include two major types. In channel and along shoreline banks, recent alluvium consists primarily of unconsolidated, poorly sorted silts, sands, and gravel. At higher elevations above river levels and on basalt flows, soils consist of semi consolidated silt, sand, and gravel as well as scattered boulders of igneous and metamorphic rock. Talus deposits are formed from mechanized weathering of the rock slope, and consists of angular size rock boulders grading down to sand size soil material. (USACE, 1995)

The predominate soil in the immediate area of the Locks are soils #82 and # 89 of soil Conservation Services publication, "soil Survey of Clackamas County Area Oregon." Soil #82 is termed "Urban Land." This soil lies in the developed area between the lock chamber and Willamette Falls. Soil #89, located adjacent to the lock chambers on the river shore, is designated "Witzel Very Stony Silt Loam." Both soils are described as "course-textured soils with high infiltration rates." Both soils are well suited to support vegetation, especially with the addition of organic matter and fertilizer and are well drained. (USACE, 1995)

3.4.6 Hydrology

The Willamette River Basin includes 13 major sub-basins (tributaries), of which 12 occur in the drainage area upstream of the Locks project. The Clackamas River is the only major tributary in the basin that discharges into the Willamette River downstream of the Willamette Falls. The major tributaries to the Willamette River, based on stream discharge, are those which drain the Cascade Range and include the McKenzie, South Santiam, and the North Santiam rivers. Most major tributaries to the Willamette River are controlled to various degrees by dams which provide flood control, flow regulation, hydroelectric power generation, and recreation. The Corps owns and operates 13 dams in the upper watershed (Figure *2*). A notable feature of the project area is that the tidal effect of the Pacific Ocean is seen all the way to the base of the Falls at times of low flow (Hajda and Ellis, 2002).

Historically, the Willamette River flooded extensively and frequently. The river channel meandered across the relatively flat valley floor, as evidenced by abandoned meander scars and oxbow lakes (Benner and Sedell 1997). In the 19th and 20th centuries, the fundamental hydrography and hydrology of the Willamette River was altered to improve river transportation and reduce the magnitude and frequency of floods. Annual mean monthly discharge of the Willamette River (Portland, U.S. Geological Survey [USGS] station 14211720) is 33,300 cubic feet per second with a monthly maximum in December (73,200 cubic feet per second) and a monthly minimum in August (8,350 cubic feet per second). Nearly 70 percent of the annual discharge occurs from November through April.

The Willamette River experiences flooding in two classes of magnitude - pre and post construction of the dams and impoundments on the major tributaries. Prior to the 1940s (pre-dam period), flows exceeding the 1964 flood nine times on the Willamette River at Albany in the period from 1862 to 1927. The entire Locks project area is within the Federal Emergency Management Agency's (FEMA) designated 100 year floodplain (Figure 18**Error! Reference source not found.**). Since 1966, when the last of the tributary dams was completed, only two significant floods occurred (January 1974 and February 1996) and these flows were far less than

most of the floods prior to the 1940s (Benner and Sedell 1997). These data indicate that peak regulated flows in the Willamette River have decreased as a consequence of hydrologic alterations in the basin.

Another important consequence of hydrologic modifications in the Willamette River Basin is that minimum flows have increased significantly through release of water from the tributary impoundments. The minimum discharge in the Willamette River prior to construction of the impoundments was 2,480 cubic feet per second at Salem on August 27, 1940. Minimum discharge observed in the river at the same site during the most recent extended drought (1987-1993) was 5,390 cubic feet per second on June 24, 1992. The Willamette River low-flow discharge at Salem has increased approximately two-fold as a consequence of flow regulation made possible by the Corps dams completed between 1941 and 1968. (PGE, 1998)

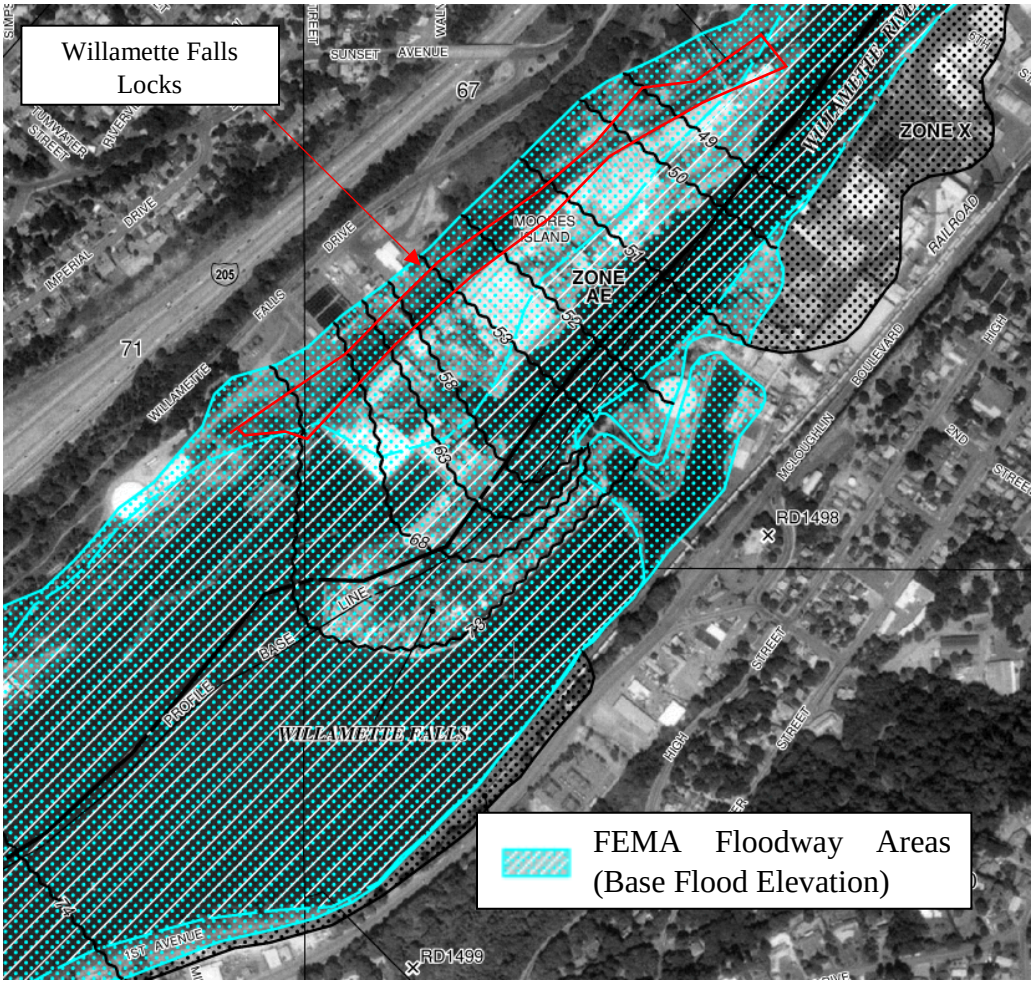

Figure 18. Project Area FEMA Floodplain (Source: https://msc.fema.gov/portal). The Willamette Falls Locks are outlined in red.

3.4.7 Water Quality

Surface Water

The DEQ Laboratory and Environmental Assessment Program, through its own studies and working with sister agencies, collects data for several key environmental indicators for water

quality in the Willamette River. DEQ's statewide network of monitoring sites to assess the water quality status and trend of Oregon's rivers and streams includes 44 sites in the Willamette basin and 9 sites in the Willamette River (Figure 19**Error! Reference source not found.**). Monitoring data collected at some of these sites goes back to the late 1940's. The Locks is located between the Portland/Hawthorne Bridge and Canby monitoring sites (Figure 19Table 5. 2012-2014 WQI, average seasonal minimum scores and 10-year seasonal Kendall trends.). Table 5 presents the water quality condition and ten-year trends for overall water quality as well as the individual parameters that are combined into the overall index (DEQ 2015). Conditions and 10-year trends are presented for the assessment reach average and for each individual site. According to DEQ's 2015 report "More Information about the Willamette River Report Card Water Quality Indicator," the overall water quality of the Willamette River declines from very good conditions in the upper region to fair conditions in the lower region. Table 5 summarizes the average minimum scores and 10-year trends in the lower Willamette River, where the Locks is located, for the following Oregon Water Quality Index (WQI) parameters: pH, Dissolved Oxygen (DO), Biochemical oxygen demand (BOD), total solids (TS), and nutrients (N and P). BOD, TS, and N/P show the greatest declines from upstream to downstream. All three regions and individual sites have an overall improving trend in water quality. Of the individual sites assessed six had improving water quality trends and three had no change trends and none had declining trends. Most individual parameters also had improving trends. BOD and total solids were the two parameters with the most declining condition trends. Overall, BOD is the worst performing WQI parameter in the Willamette River. BOD is mostly poor condition in the lower reach near the Locks site, representing an overall decline in BOD condition from upstream to downstream and BOD trends are in declining condition in the mid and lower reaches.

Table 5. 2012-2014 WQI, average seasonal minimum scores and 10-year seasonal Kendall trends.

Location	Site ID	WQI	pH	DO	BOD	TS	N	P	Bact
Lower Willamette River		↗	-	-	↘	-	↗	↗	-
Portland, St Johns Br	10332	↗	-	-	-	-	↗	↗	-
Portland, Hawthorne Br	10611	-	-	-	-	-	↗	↗	↘
Canby	10339	↗	-	↗	↘	-	↗	↗	-

Condition Grade Scale

Condition	OWQI Scoring	Report Card Scoring System	Condition Description
Very Good	90 - 100	80 - 100%	Expectation for healthy waters are almost always met.
Good	85 - 89	60 - <80%	Expectation for healthy waters are frequently met.
Fair	80 - 84	40 - <60%	Expectation for healthy waters are occasionally met.
Poor	60 - 79	20 - <40%	Expectation for healthy waters are frequently not met.
Very Poor	10 - 59	0 - 20%	Expectation for healthy waters are rarely met.

Condition trending

Trend	Description
↗	Significantly improving trend
-	No change trend
↘	Significantly declining trend

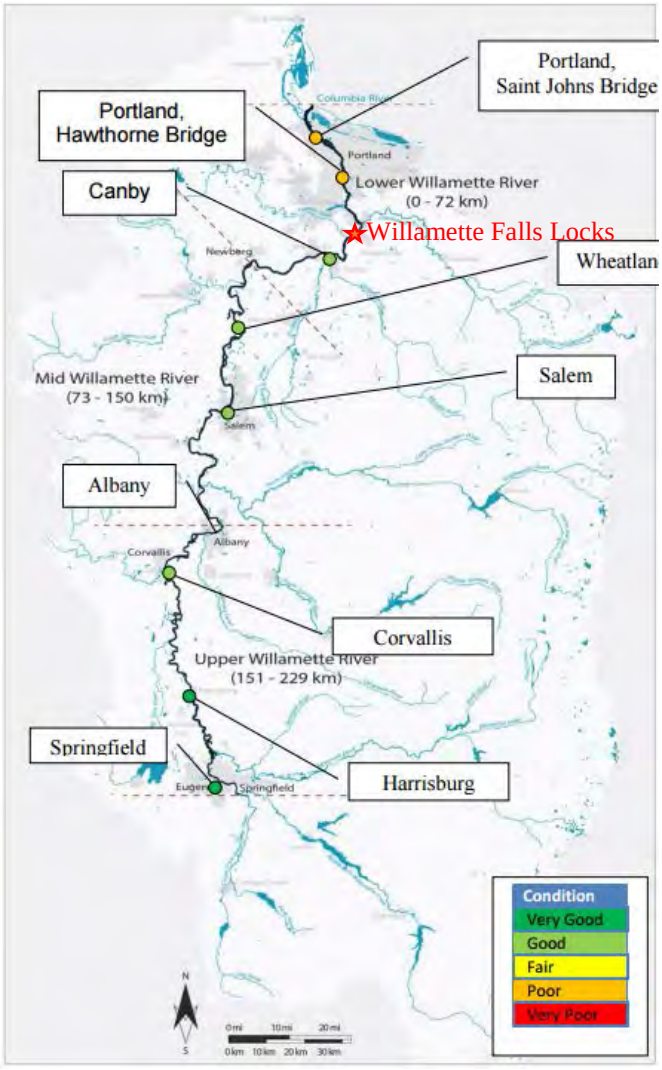

Figure 19. DEQ Water quality monitoring sites in the Willamette River. Source: http://www.deq.state.or.us/lab/docs/WaterQualityRpt.pdf

According to the DEQ 2012 Integrated Report Assessment Database (DEQ, 2016), the lower Willamette at the Willamette Falls is identified as water quality limited and/or in need of Total Daily Maximum Loads (TMDLs) (Category 5: Section 303(d) list) for the following pollutants: Aldrin (303(d)), DDT (303(d)), DDT Metabolite: (303(d)), Dieldrin (303(d)), Dioxin (TMDL approved), Iron (Category 5, TMDL needed), Mercury (303(d)), and PCB (303(d)).

Additionally, a review of historic Google earth imagery has shown a recent history of aquatic growth in the summer months within the ship canal since the interim-closure in 2011. This is likely a result of stagnant conditions within the Locks' canal when they remain closed for an extended period of time. Under the interim-closure status, the Locks are only opened and flow is made available to clear stagnant waters in the canal during periodic maintenance periods to pass debris. Stagnant conditions in other similar facilities has been observed to lead to the accumulation of algae and macrophytes (rooted aquatic plants). Algae and macrophytes can cause aesthetic problems (sight and odor). More extreme conditions can lead to dissolved oxygen and pH problems and some species of algae are known to sometime produce toxins (i.e. Harmful Algae Bloom). However, no evidence of these conditions have been observed at the Locks. In an absolute worst case scenario, a harmful algae bloom forming in the Locks could seed a larger bloom in the Willamette River downstream, however, this is unlikely as maintenance activities prescribe opening the Locks periodically to pass debris. If a bloom is observed that causes water quality concerns, the Corps would likely implement adaptive management maintenance activities such as increasing the occurrence of opening the Locks to move debris through; increase the bypass flow that serves to keep the ship canal full and supply water to WLP Co. secondary water intake; or implement a more active management using some water quality sampling to determine when flushing more water through is needed.

Groundwater

The availability of groundwater in the Willamette River Basin is determined by the hydrogeologic units which include the: (1) basement confining unit, (2) Columbia River Basalt aquifer, (3) Willamette confining unit, (4) Willamette aquifer, and (5) Willamette Silt unit (Gannet and Caldwell, 1998). The basement confining unit consists of marine sedimentary and marine volcanic and intrusive rocks under the Coast Range and volcanic rocks under the Western Cascades. These two confining units have low permeability (Gannet and Woodward 1997) and are not considered viable sources of groundwater.

The quality of groundwater in the Willamette River Basin has been characterized by USGS (Hinkle 1997a, Bonn et al. 1995). Seventy randomly selected domestic wells were sampled in the alluvium, largely in agricultural lands. An additional 10 monitoring wells were installed in areas of residential land use. Nitrate concentrations ranged from < 0.05 to 26 mg N/L from the 70-well set; 9 percent of the wells exceeded the EPA Maximum Contaminant Level of 10 mg N/L. Tritium (^3H) data indicated that 21 percent of the samples from the 70-well set represented water derived from sources prior to 1953 (Hinkle 1997a). Given the trend for increased use of nitrogen fertilizer in the basin based on Data from Alexander and Smith (1990) as presented in Hinkle (1997b) and the age of some of the groundwater, it is conceivable that nitrate concentrations will

increase. Aquifers with high concentrations of dissolved oxygen would be expected to exhibit the larger increases in nitrate because of loss of nitrate through nitrate reduction.

Concentrations of phosphorus ranged from < 0.01 to 2.2 mg/L; 60 percent of the samples were greater than 0.10 mg/L, the EPA guideline for surface waters. Geologic sources are probably the major control on phosphorus concentrations in groundwater. Groundwater discharge to the Willamette River could be a substantially contribution of phosphorus.

Between one and five pesticides were detected at one-third of the sample sites (Hinkle 1997a). A total of 13 different pesticides were detected in the study, with atrazine being the most commonly detected pesticide. Desethlyatrazine, a degradation product of atrazine, was the second-most abundant pesticide detected. Other compounds measured in the USGS studies include arsenic, volatile organic compounds, trace elements, and radon.

3.4.9 Air Quality

Air quality is regulated by the National Ambient Air Quality Standards (NAAQS) established by the federal Clean Air Act, as amended in 1990. The Clean Air Act (CAA) and its associated regulations were developed to protect the public from exposure to dangerous levels of six criteria air pollutants: ozone, particulate matter (PM10 and PM2.5), carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead.

The Oregon DEQ Air Quality Division is the agency responsible for coordination and oversight of state and local air pollution control programs and is primarily responsible for developing and implementing air pollution control plans to achieve and maintain the NAAQS. DEQ monitors and reports air quality through the Air Quality Index (AQI). The AQI is a scale used to report actual levels of ozone and other common pollutants in the air. The higher the AQI, the higher the health concern. DEQ monitors or samplers are located in areas of the state with a history of, or the potential for, specific air pollution problems. Currently, the majority of Oregon, including the area around the Locks (Figure 20is in an attainment or unclassified (i.e. in compliance) area for all state and federal air quality standards.

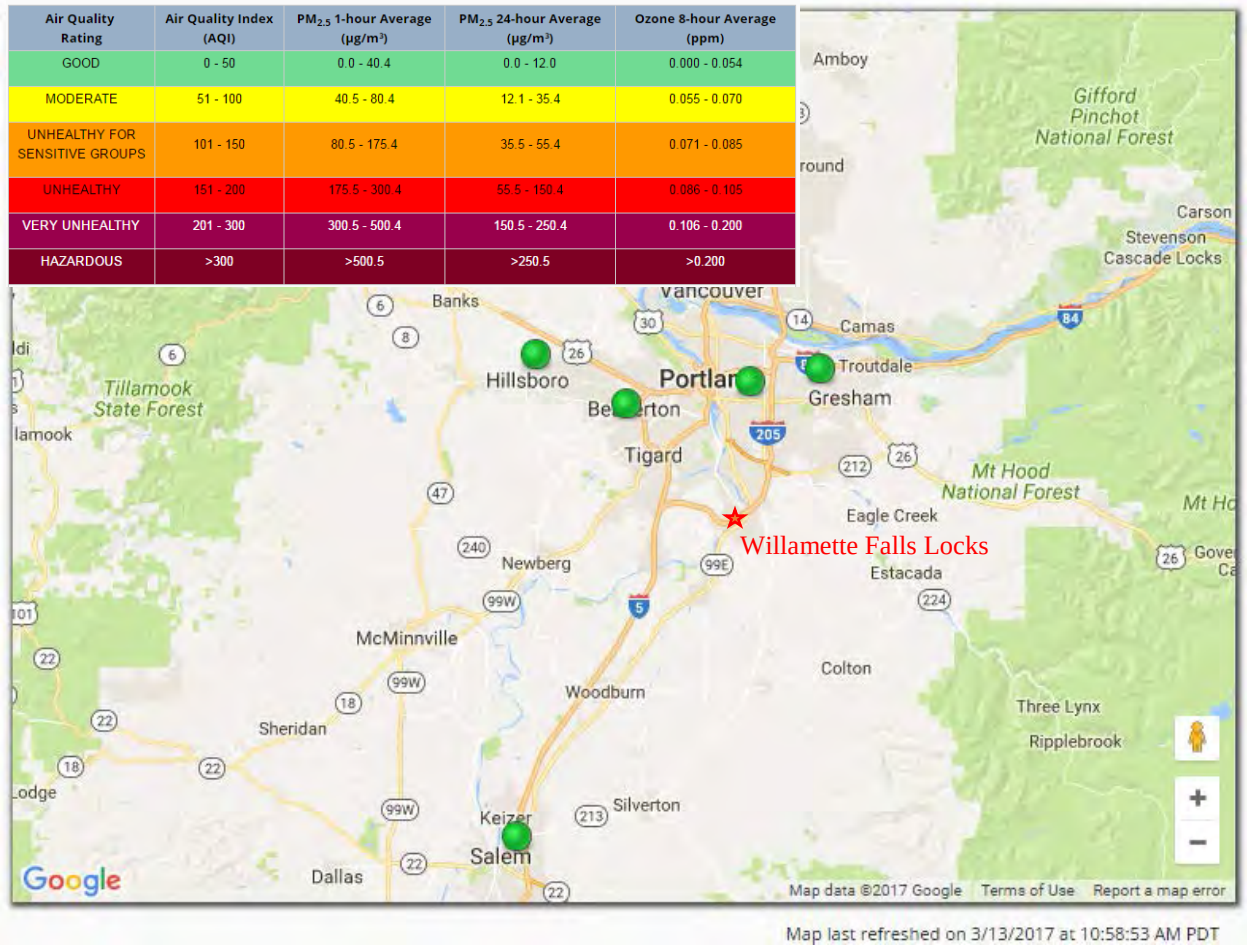

Figure 20. DEQ Air Quality Index Map. The dots on the map change color depending on the current air quality health level at each station. You can quickly assess statewide air quality based on the color of the dots. The meaning of the colors can be found In the legend.

Noise

The Oregon DEQ is responsible for noise control and abatement. The Locks area located in a highly developed, industrial area with high noise producing facilities.

3.4.10 Socioeconomics

According to the 2010 U.S. Census, over 60,000 people live in the cities of West Linn and Oregon City. Over the past 10 years Clackamas County's population grew by 11 percent and is projected to continue to grow in coming years. Oregon-born residents make up 52 percent of the population. Clackamas County residents born in the United States make up 91 percent of the population. Nearly one third of the county's residents are schoolchildren or college students, half are between the ages of 25-65 and 14 percent are over 65. Age distribution is similar to nationwide averages. Median age for the county is 40.6. Veterans comprise 10 percent of the county's residents and 12 percent are disabled, similar to national averages. Of the working population, 25 percent finished high school, 25 percent attended some college, 20 percent hold bachelor's degrees, and 10 percent have graduate or professional degrees.

Table 6. 2010 U.S. Census Data for Communities in the Vicinity of Willamette Falls Locks: Population Data

	2000 Pop	2010 Pop	Growth	Racial Composition	Median Age (Years)	Person/ Mile^2
State of Oregon	3,421,399	3,831,074	12%	78% White	38.4	39.9
Clackamas County	338,391	375,992	11%	88.2% White	40.6	201
Oregon City	25,754	31,859	24%	91.1% White	36.3	3,518.70
West Linn	22,261	25,100	13%	90.7% White	41.5	3,397.50

Source: Census Bureau, U.S. Department of Commerce and Portland State University (https://www.pdx.edu/prc/census-data-for-oregon)

Error! Reference source not found. According to the U.S. Department of Labor Bureau of Labor Statistics, in the last 10 years the unemployment rate in Clackamas County has decreased by 0.4 percent. The unemployment rate in Oregon decreased by 0.5 percent during the same period. About 65 percent of households are double-income households, matching the national average. Median household income is $65,965 or is slightly higher than the national average of $55,775. Three-fourths of workers commute by automobile with an average commute time of 26 minutes, matching the national average.

Table 7. 2010 U.S. Census Data for Communities in the Vicinity of Willamette Falls Locks: Unemployment Rate and Median Income

	2006 Unemployment Rate	2016 Unemployment Rate	Median household income (in 2015 dollars), 2011-2015	Population Below Poverty Line
State of Oregon	5.5%	5.0%	$51,243	16.6%
Clackamas County	4.1%	3.7%	$65,965	9%

Unemployment Rate Source: Bureau of Labor Statistics, U.S. Department of Labor (https://data.bls.gov/map/MapToolServlet)

Income Source: Census Bureau, U.S. Department of Commerce and Portland State University (https://www.pdx.edu/prc/census-data-for-oregon)

The State of Oregon Employment Department's 2015 Employment Census is provided by Table 7. The majority (62 percent) of industry employment is in four sectors: fabricated metals, primary metals, computer and electronics, and food manufacturing. Average wages ranged from a low of $20,459 in beverage and tobacco products to a high of $86,488 in computer and electronic products. The average wage for the industry was $64,086 in 2015. (Wallis, 2016)

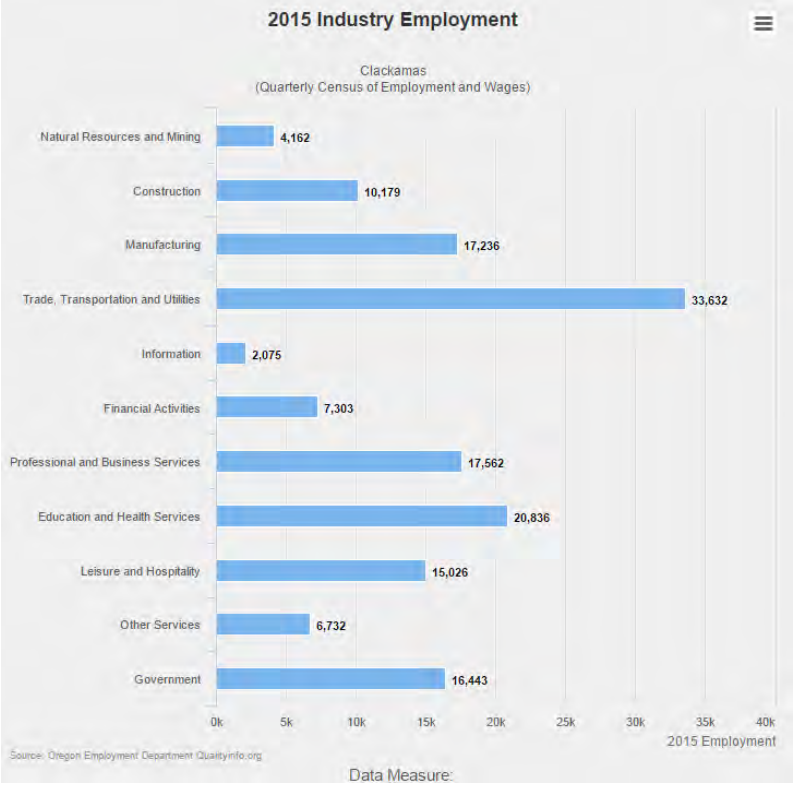

Figure 21. Employment in Clackamas County by Industry (Source: https://www.qualityinfo.org/clackamas)

3.4.11 Local Economic impacts of the interim-closure

The local community, including several local businesses, has experienced negative impact as a result of the interim-closure of the Locks in 2011. Prior to the interim-closure, while the facility was in Caretaker status but not yet red-tagged, the District honored an informal agreement to allow commercial and recreational vessels to proceed through the Locks during the District's periodic maintenance cycles. With the change in status to interim-closure in late 2011, the facility became closed all commercial operations and no manned vessels are now permitted through the Locks. The entire navigation lock channel, from Gate 1 through Gate 7, is closed for public and private vessels passage; Gates 1, 5, 6 and 7 may, however, be operated on a case-by-case basis for public and private vessels if the Bonneville Project Manager authorizes such operations. But Gates 2, 3, and 4 have been, continue to be, and will remain closed until the associated gudgeon anchor assemblies are repaired.

A few known commercial vessels were inadvertently impacted by the sudden closure of the Locks. The Canby Ferry and two dredges, three tugboats and four barges were stranded above the Willamette Falls for more than a year after the 2011 closure. After a year of negotiation, the Portland District allowed two unmanned lockages to help correct this situation; the first lockage was to move the Canby Ferry through the Locks to a downstream dry dock in January of 2013 for inspection and retrofits along with two tugboats; the second lockage in July of the same year allowed the ferry back upstream to its original location. Each of these lockages required the following strict stipulations:

- no one could be in the boat, meaning the vessel had to be pulled with ropes through the chambers;
- the crews needed an emergency action plan in case of a potential incident; and
- that the federal government would be held harmless in case of any damage or injury.

In addition to the impacts to the operations and maintenance of the Canby Ferry, seveal other businesses continue to be impacted by the closure. Willsonville Concrete Products (WCP), Marine Industrial Construction, and four additional companies which support their operations were impacted by the closure of the Locks. The WCP marine fleet consists of 5 large tugs (Rene, Amy B., Vicki B, Duchess B and Sarah B), 2 dredge tender (Princess B and Iris B), 10 barges (flat deck, fuel, ramp barge and bin barges), and other marine equipment. Roughly 100 full time employees with roughly 30 seasonal and temporary construction workers depending on where and what jobs are sourced by these companies. Moorage for WCP marine equipment was based out of Wilsonville and included docks, marine support shops, parking, mooring dolphins and pilings, loading ramps, shore side storage, high speed gravel unload facility with gravel process plant, boat ramp and other facilities for our marine fleet (J. Bernert, 2017). WCP equipment was mobilized on projects doing work for the Port of Portland at Terminal 6 and CalPortland at the time of the Lock's closure in 2011. After the Locks closed, WCP was not able to return to their moorage upstream of the Falls where they have major investments and were paying for moorage. The costs of the companies' port on the upper Willamette river has a current book value of slightly over $2.3 million and the investment in building the facility capitalized over 4 decades of investment (D. Bernert, 2017). These companies have estimated the cost to rebuild these facilities would be approximately $7 million dollars over the property costs of purchasing 100 acres on the river with industrial access rights (D. Bernert, 2017). They were able to find temporary moorage space in the Portland Harbor at higher costs though the site has limited access which has resulted in increased costs for monitoring, inspecting and performing maintenance on equipment (J. Bernert, 2017). Additionally, the rented facilities do not have the loading abilities that upriver access has and WCP is required to rent other facilities at an additional cost when loading some items such as an excavator and/or other equipment (J. Bernert, 2017). Additional moorage total costs are roughly $425,000 a year and growing as they must outsource more of maintenance to local ship yards (D. Bernert, 2017). With WCP equipment in the lower river, they are not able to perform projects done in the upper river including revetment projects, piling and dock repairs. Additionally, the majority of WCP's crew, suppliers, and resources were located in the Wilsonville area, upstream of the Falls. The relocation of their marine equipment to the Portland Harbor has required staff to commute longer distances, and WCP has had to re-source some materials - affecting the businesses that depend on customers local to the Falls as the added distance for deliveries to Portland area is often cost prohibitive.

WCP also has a complete marine terminal that can unload and process over 300,000 tons of aggregate a year. From 1958 on, WCP barged material to this facility. Currently, due to the interim-closure of the Locks, WCP cannot use the site and cannot load upstream material on to barges. WCP mines used for their concrete are all located upstream of Wilsonville at Salem, St Paul and Dayton. Due to the closure, WCP now must truck all of this material to Wilsonville

using dump trucks at a higher cost than barging through the Locks. This has also increased WCP fuel costs as energy (green) credits for using marine based transport are substantial for reduced emission and lower fuel consumption.

Prior to the Lock closure, WCP used their marine based equipment to transport equipment on the upper Willamette River for other local businesses and agencies. Many of these commodities were too large to truck. This included moving oversize power transport for BPA, the Spruce Goose for Evergreen Aviation, large woody material, paper/pump and logs (material to the mills at Newberg, West Linn and Oregon City; Pulp Side, Caffall Brother Mills and others) and aggregate to other concrete and construction companies including Newberg Sand and Gravel, Burch Readi-mix, Baker Rock products, and others. The marine equipment is also used on bridge repair projects and other marine based construction.

Besides WCP operations, other aggregate processing businesses (CalPortland, Baker Rock and others) may benefit from marine transport. Impaired marine transportation over the Falls due to the closure may also limit local marine construction impacting many potential customers including the Oregon City and Newberg Mill redevelopments and other small business located on the upper river. Historically a large volume of logs, paper and aggregate passed through the Willamette Fall Locks. The reduced volume was primarily due to a change from marine based transport to trucking. With increased congestion on the Portland highways, increased fuel costs, economic and environmental advantages to marine transport (lower emissions and cost effectiveness), marine transport may become more prominent in the area in the future. Additionally, the interim-closure has limited the business opportunities for the owner of the tug boat Bull Dog, a servicer of marine installations and docks both upriver and down based at SportCraft Marina in Oregon City (Carter, 2017). The WyEast Expeditions Company had to cease giving lockage tours to 4th Graders around the falls after more than 30 years of annual trips for Local History units. The Portland Spirit company, Willamette Jet Boats, eNRG Kayaking and the Corvallis-to-Portland Regatta will be forced to limit business plans involving the Locks in recreation and tourism possibly causing negative ripple effects out through their circles of suppliers and local hospitality-oriented businesses up and down stream of the Falls (Carter, 2017).

3.4.12 Environmental Justice

Executive Order 12898 (federal Actions to Address Environmental Justice in Minority and Low-Income Populations; February 11, 1994) provides minority and low-income populations an opportunity to comment on the development and design of federal activities and on the consequences of proposed federal actions. This Executive Order requires that federal agencies shall make achieving environmental justice part of their missions by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low-income populations.

The Council on Environmental Quality (CEQ), identifies minority groups as Asian, American Indian or Alaskan Native, Pacific Islander, Black not of Hispanic origin, and Latino (CEQ 1997). It defines a minority population as any group of minorities that exceed 50 percent of the existing population within the market area or where a minority group comprises a meaningfully greater

percentage of the local population than in the general population. Additionally, CEQ identifies low income using 2010 census data for "individuals living below the poverty level." For the purposes of this study, a low income population will be defined similarly as a local or market area population with more than 50 percent of people living below the poverty level. According to the data assembled in Table 6and Table 7, there are no communities surrounding the study area which would qualify as minority or low income populations as defined by CEQ (1997) or for the purposes of this report.

3.4.13 Current Land Use

The Willamette Valley accounts for more than 70 percent of the state's population, the majority of its industry, and almost half of its farmland. Most of the state's major cities (Portland, Salem, Corvallis and Eugene) are in the Willamette Valley along the Interstate 5 corridor. A major agricultural region, more than 50 percent of the valley bottom is in agricultural land use.

The Locks are located within a highly industrialized complex with paper mills and hydroelectric generating developments that have operated in the complex for more than a century. The land adjacent to the federal property at Locks is owned and managed by WLP Co. and PGE. West Linn Paper Company's property includes a paper mill and associated administrative buildings. PGE's 16-MW T.W. Sullivan facility, one of two hydroelectric facilities located at the Falls and situated adjacent to the Locks, includes a dam and powerhouse. Additionally, the Oregon Department of Fish and Wildlife (ODFW) currently operates, maintains, and manages a fish ladder on PGE property near the center of the falls to allow fish passage upriver to their spawning grounds.

3.4.14 Consistency with State, Regional and Local Plans and Programs:

Willamette Falls State Heritage Area

The Willamette Falls State Heritage Area is a designated Oregon State Heritage Area encompassing 26 square miles of natural and historic areas of Oregon City, West Linn, and Lake Oswego along 8 miles of the Willamette River from the mouth of the Tualatin River to the mouth of the Clackamas River (Figure 22**Error! Reference source not found.**). The Willamette Falls Heritage Area is managed by the Willamette Falls Heritage Area Coalition, which was formed in 2007 to support the designation process, the first designation of its kind by the Oregon Heritage Commission.

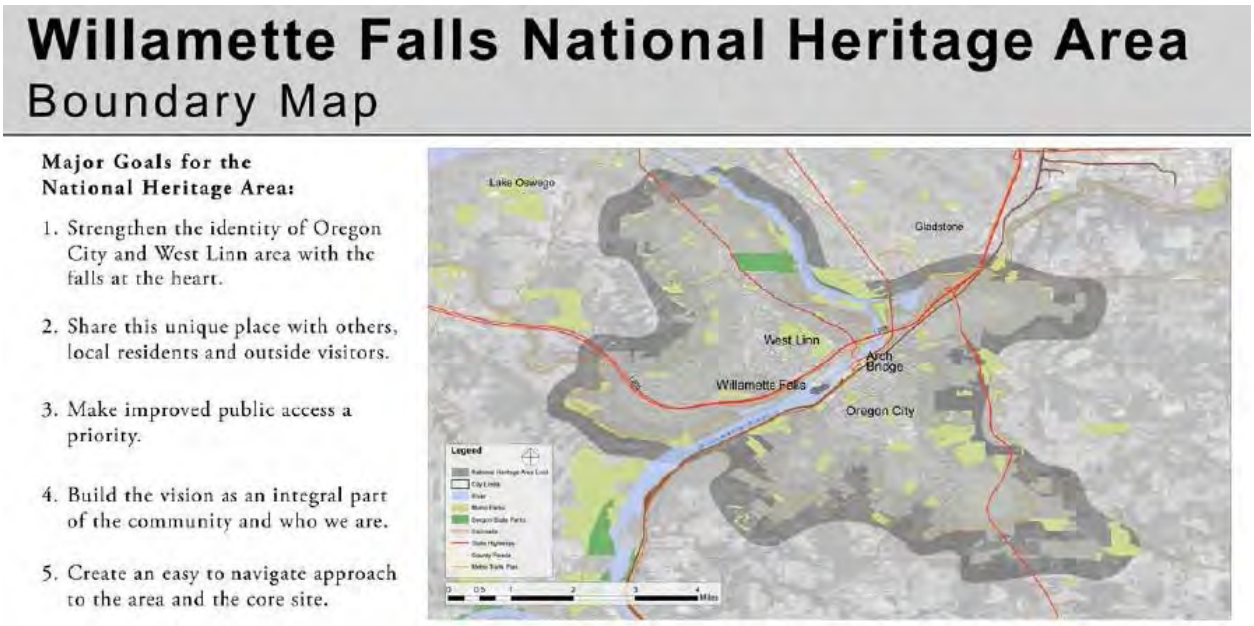

Figure 22. Willamette Falls Heritage Area Boundary Map (Source: Willamette Falls Heritage Area Feasibility Study, 2013)

Currently, there is an effort underway for the State Heritage Area to receive National Heritage Area (NHA) designation. NHAs are places where natural, cultural, and scenic resources combine to form a cohesive, nationally important landscape arising from patterns of human activity shaped by geography. Congress designates NHAs and the National Park Service provides technical, planning and limited financial assistance. In 2009, U.S. Representative Kurt Schrader introduced House Resolution 4081, to direct the Secretary of the Interior to conduct a study of the suitability and feasibility of establishing the Willamette Falls NHA in Oregon, and for other purposes. The Feasibility Study was completed in 2013.

Willamette Falls Legacy Project

The Willamette Falls Legacy Project is a large development planned for construction on the former Blue Heron Paper Mill property across the Willamette River from the Lock project site. In the fall of 2014, the Oregon City Commission unanimously approved the framework plan and zone change for the 23-acre site adjacent to Falls. The framework plan and zone change will allow the site's owner, Falls Legacy LLC, to complete the a multi-phase, mixed-use development aiming to provide public access to the Falls, restore habitat, redevelop the property to honor the site's past, and re-connect to Oregon City's historic downtown. The Willamette Falls Legacy Project is being implemented by a partnership between the new owners and four public agencies: the City of Oregon City, Clackamas County, Metro and Oregon State Parks and the State Historic Preservation Office in concert with the Governor's Regional Solutions Team. Construction of the first phase of the Willamette Falls Legacy Project is expected to begin in 2018 and will include a riverwalk to provide public access to the Falls. Later phases include private mixed-use development to provide commercial space as well as improvements to Oregon City's waterfront esplanade.

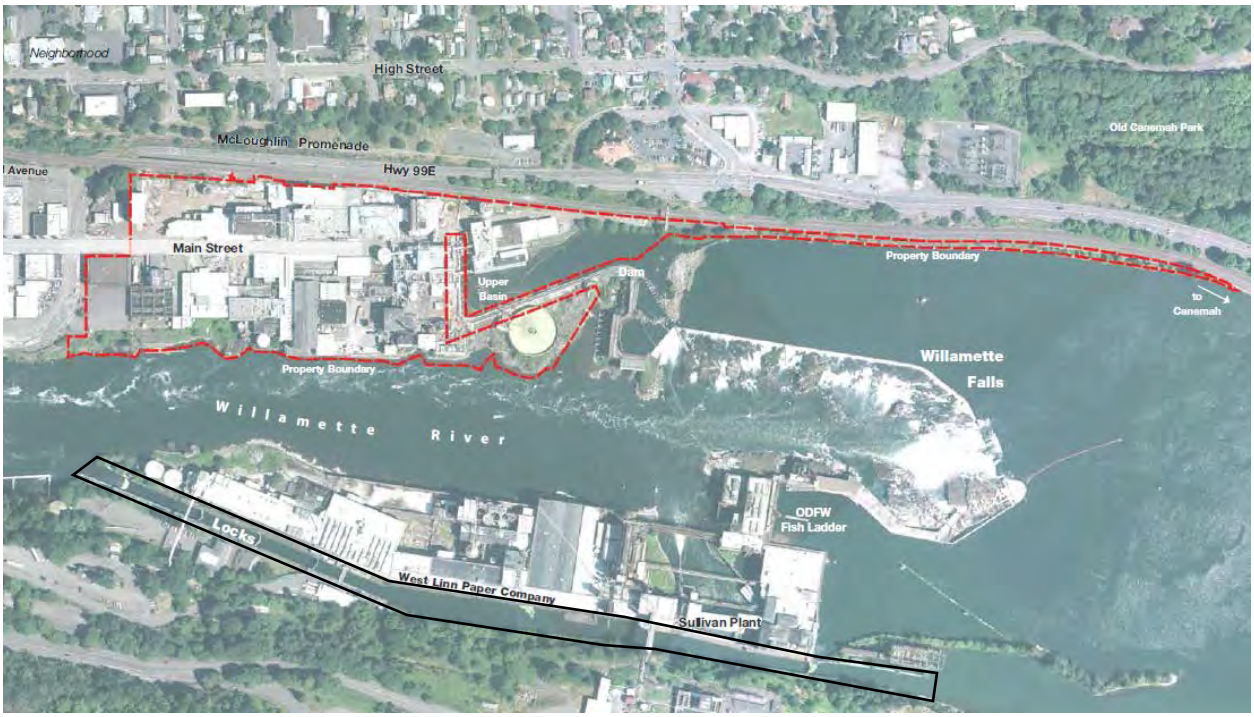

Figure 23. Willamette Falls Legacy Project Area (in red, Willamette Falls Locks (in black)

3.4.16 Recreation

Through both local and regional initiatives, Oregon City and West Linn (the two municipalities surrounding the project site) maintain approximately 10-15 percent of overall city land as public open space within their city limits (WFHAC, 2013). Some of these spaces stretch along the bluffs overlooking the Falls as well as along the riverfronts downstream from the Falls. These particular open spaces offer great opportunities for scenic views of the Falls and mills as well as recreational opportunities for boaters, hikers, and cyclists.

The Willamette River also serves as an important source of recreation, including fishing, boating, and wildlife viewing. The river is highly accessible at a number of public access sites, which adds to the general sense that this is a shared resource with multiple benefits. The Locks are within the Willamette River Greenway which is managed by the Oregon State Parks. The Willamette River Greenway lands dot the banks of the length of the Willamette River. The goal of the Greenway is to protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River (Willamette River Greenway, 2017). Although there are gaps along the Greenway, it currently provides scenic river views, access to historical sites (like the Locks), and river access for boating, fishing and passive recreation. The Willamette River is also a nationally recognized water trail.

Several recreation facilities are nearby the Locks, including the Willamette Park, where the Tualatin River joins the Willamette just upstream of the Falls, a day-use picnic area and museum at the Locks themselves, operated by the Corps, and Clackamette Park, a county park downstream of the Falls where the Clackamas River enters the Willamette. Public access to the Falls is limited due to the industrial complexes on either side, however, (as detailed in Section

3.4.13) several development efforts are ongoing to improve public access to the falls on the shore opposite to the Locks. As the region has grown, along with the interest in the regions natural and historic resources, the Falls has come to the attention of its surrounding communities as an important resource.

3.4.17 Local Economic impacts of the interim-closure

As a result of the interim-closure in 2011, there have been some negative impact to recreation in the project area. Prior to the interim-closure, while the facility was in Caretaker status but not yet red-tagged, the District honored an informal agreement to allow commercial and recreational vessels to proceed through the Locks during the District's periodic maintenance cycles. With the change in status to interim-closure in late 2011, the facility became closed all commercial and recreational operations and no manned vessels are now permitted through the Locks. The entire navigation lock channel, from Gate 1 through Gate 7, is closed for public and private vessels passage; Gates 1, 5, 6 and 7 may, however, be operated on a case-by-case basis for public and private vessels if the Bonneville Project Manager authorizes such operations. But Gates 2, 3, and 4 have been, continue to be, and will remain closed until the associated gudgeon anchor assemblies are repaired. Several companies offering recreational opportunities associated with the Locks have been impacted by the closure. The WyEast Expeditions Company had to cease giving lockage tours to 4th Graders around the falls after more than 30 years of annual trips for Local History units. Additionally, the Portland Spirit company, Willamette Jet Boats, eNRG Kayaking and the Corvallis-to-Portland Regatta have be forced to limit recreation and tours involving the Locks (Carter, 2017).

3.4.18 Infrastructure

Interstate 205 (I-205), a four lane limited access freeway lies a short distance northwest of the project. I-205 originates at Interstate 5 about 10 miles southwest and continues north providing access to Portland and Vancouver. Interior access from I-205 is provided via Highway 99 East, to Highway 213 across the old Oregon City Bridge, then south from the west end of the Bridge. Vehicular access to federal land is available from a WLP Co. owned road which the Corps holds easement rights for official use. There is no public vehicular access to Corps-administered land. Public access is restricted to pedestrian traffic from the WLP Co. parking area. The Corps owns a 0.423 acre easement for permanent road access to the Locks facility.

Additionally, the Corps has a permit to use 0.14 acres as a parking area for official vehicles. Support facilities for the operations and maintenance of the Locks are on the narrow flat bench adjacent to the Locks. Major facilities are in a service building with public restrooms, a picnic area/outdoor storage area, to lock control stations, a public Historic Information Center, and two small mobile storage sheds.

In order to access the paper mill and hydroelectric facilities, non-federal personnel must cross federal property via a WLP Co. owned Bascule Drawbridge that spans the ship canal between Locks 3 and 4. Lands outgranted to non-federal entities total approximately 1.2 acres. The majority of uses authorized by outgrants are for easement, right-of-way improvements including pipelines (West Linn Paper Company), electrical transmission lines (Portland General Electric Company), a fish training wall (ODFW), and various structures including a truss-pipe bridge

(West Linn Paper Company). Most of these improvements are adjacent to and underneath the northern four Locks.

PGE takes water into a forebay adjacent to the navigation Locks through the outer headgates and under a West Linn Paper building. In the forebay, flow is directed into the 13 turbines through individual 10-feet diameter penstocks, each with its own headgate. The forebay has an angled guidance (training) wall on its west side to vary the cross-section in the fore bay, providing more uniform forebay flow characteristics to reduce turbulence and assist fish bypass guidance. There is also an intake for industrial water use by the WLP Co. mill at the end of the forebay. PGE has intakes adjacent to the navigation Locks, approximately 200 feet upstream of the forebay. Three intakes, each with a 5-feet-wide by 12-feet-high headgate, are protected by trash racks. Water entering through the intakes is directed into the development's forebay. PGE and the Corps have shared use of the decking along Gates 5, 6, and 7 between the lock and PGE’s power house and forebay. In the recent past, PGE has worked with the Corps to locate and remove abandoned power lines that cross the Locks, although, due to the age and history of the structure, some may not yet have been located (Quigley, 2017). A fish ladder, owned and operated by ODFW, operates within the powerhouse facility and includes three entrances inside the horseshoe of the Falls and one inside the T.W. Sullivan Development tailrace. The fish ladders rely on operation of the project within a consistent forebay and tailwater elevation range to maintain fish passage within criteria. Breach of the lock and associated uncontrolled flows through the lock would result in less consistent forebay and tailwater operations.

WLP Co. also had a lease issued to them for the placement of a crane, storage of products and a walkway and roadway. Additionally, WLP Co. gets their facilities main water supply through an intake from the PGE forebay located adjacent to the Willamette Falls Locks Canal between Gates 5 and 6 which requires the canal to be full to be used for water supply.

3.4.19 Navigation

As described in Section 0, prior to closure in 2011 due to safety concerns associated with the high risk of failure to the gudgeon anchors securing gates 2, 3, and 4, the Locks provided the only navigational passage past the Falls. Since closure, for all practical purposes, the Locks is closed and no navigation is occurring around through the Locks.

3.4.20 Hydropower

The PGE Willamette Falls Hydropower Project is located at the Falls and is comprised of two separate hydroelectric generating development located on the east (Oregon City) and west (West Linn) sides of the Falls. The site has been home to hydroelectric generation for more than 100 years, beginning with PGE's Station A in 1889 and continuing to this day with PGE's T.W. Sullivan (Station B) Development since 1895 and the Smurfit Development location since 1916 (Greisser 1982). Flour, saw, pulp, and paper mill operations have also been present at the Falls for more than a century.

According to PGE (1998), PGE's 16-MW T.W. Sullivan facility, situated on the west side of the Falls near the City of West Linn, includes a dam and powerhouse adjacent to the navigation

Locks. The 1.5-MW Smurfit Newsprint dam and powerhouse facility is located on the east side of the Falls, adjacent to the Locks near Oregon City.

A low, 6- to 20-feet concrete dam runs along the crest of the Falls to increase the hydraulic head available for electric generation and direct lower river flows to the Hydropower Project forebays on each side of the Falls. The dam helps maintain level in the river upstream of the Falls for approximately 5-6 mi. This is important for upstream river users including houseboat owners, boat mooring operators, and a ferry boat service.

Overall, Willamette River flows are not affected by the Willamette Falls Hydroelectric Project. The Willamette Falls Hydroelectric Project operates as a run-of-river facility, passing up to 60 percent of the flow in the Willamette River during low flow periods (July-August) through the Project. As river flow increases, this percentage declines such that only a minor portion (e.g., < 10 percent) of river flow passes through the development during the winter. The balance of river flows passes through the fish ladder (about 1,000 cubic feet per second), the navigation Locks (unquantified but considered minor), and other minor industrial uses, leaving the remaining flows to pass over the Falls. Water diverted through the powerhouses rejoins the main river immediately below the Falls.

3.4.21 Aesthetics

Locks are within the center of a large, highly developed industrial complex. The project occupies a relatively small part of this industrial area. The Project is hidden from view by the WLP Co. buildings on the south and a steep basalt cliff on the north. Because of these factors, aesthetic views are limited to the ornamental trees, well maintained grass, shrubs, and flowers that surround the project. Visitors, however, come to view the Locks not the landscaped grounds. Boater passing through the Locks, when navigation was allowed prior to closure in 2011, and pedestrian visitors to the grounds can view the historical hand placed rock and large timbers lining the Locks and lock gates. The landscaped features do make the area more appealing and do reduce the overwhelming visual impact of the surrounding industries.

3.4.22 Human Life and Safety

As discussed under Section 0, there is concern with wall stability during seismic events and the risk of an uncontrolled breach through either Gate 6, Gate 7, the guard lock wall or through the ship canal wall separating the PGE forebay. This uncontrolled breach scenario and the subsequent flooding of WLP Co. Paper Mill property has unknown consequences and may pose several life safety risks associated with the flooding of that facility. WLP Co. estimates that 30 to 40 of their employees work within the facility in basement level work zones Monday through Friday during daytime hours. PGE and WLP Co. properties both adjoin the Locks and are structurally dependent on the lock and canal walls and gate monoliths. In the event of wall or monolith failure, employees working near the area are subject to life safety risks and property or structures adjoining the failed area are subject to damage. Currently, the non-operational operations of the interim-closure keeps the ship canal fully watered to maintain stability in the concrete gravity wall separating the PGE forebay and to supply WLP Co. with a secondary water source.

This risk is assumed to be addressed within the planning horizon; however, the time for this to be implemented is uncertain and the risk associated with wall failure and uncontrolled breach is valid until the stability measures are implemented.

Due to the continued maintenance and operational requirements, the mechanical and electrical systems at Gates 5, 6, and 7 are maintained with power to serve the automatic level control valves supplying water to and from the ship canal. There is a risk of vandalism and unauthorized wicket gate operation. This could either lead to surcharging the ship canal from excessive flow through Gate 7 wickets or dewatering the ship canal through excessive flow through Gate 5. This would likely be a very slow process affecting the stability of the ship canal wall at the PGE forebay and the West Linn Paper Mill secondary water supply.

The site is closed to public access but there are no physical barriers to much of the facility. Numerous life safety hazards exist onsite including deteriorating walk ways, exposed electrical wires, and fall hazards. During Corps operations these hazards are addressed; however, unauthorized access by the public is not assumed to be safe. WLP Co. and PGE employees access the project site daily and may be more aware of the hazards; however, there are minimal exclusion measures targeting the general public and these persons may be less attentive to industrial type hazards.

3.4.23 Hazardous/Toxic Materials

A Preliminary Assessment (PA) of the site was completed in April 1992 by the Corps. The PA was triggered by the Locks placement on the federal Facilities Docket by EPA and subsequent letter from EPA requesting that the Corps provide a PA. The PA documents numerous historic spill events of hazardous materials from the paper company but does not identify triggers for a remedial investigation. A Site Information assessment was performed by a Corps contractor, Reidel, and data was incorrectly provided (a magnitude error triggered by ppb/ppm confusion) leading to additional communication between USACE, EPA, and Oregon DEQ. Additionally, several Environmental Review Guide for Operations (ERGO) Assessments have been conducted in the 1990s. The 1997 ERGO report did not identify situations that would materially impact the legacy contamination status of the site. It did identify that the site was erroneously listed on the Oregon Environmental Clean-up Site Information database due to the incorrect data submitted as part of the SI. A non-destructive asbestos and lead inspection was performed on 27 October 2010 and found no asbestos present for the materials inspected. However, many building components were not inspected and are presumed to contain asbestos. The lead tests results identified many of the paint systems present at the Locks as containing lead including the gate control houses, museum, and light posts.

The Corps conducted a legacy contamination review of Locks in November 2016 per the requirements of Engineering Regulation (ER) 200-2-3 (2010). The legacy review included the review of pertinent documents, interviews with people knowledgeable about the site's environmental history, and a site visit performed on 3 November, 2016. The required completion of the questionnaire available on the available on the Environmental Compliance Topics page of the Corps' Natural Resource Managers Gateway is underway. The Oregon DEQ Environmental Cleanup Site Information (ECSI) report was also pulled from DEQ's website in October 2016.

The ECSI report corroborates the discussion that data was incorrectly reported by Corps' contractor Reidel.

The 1997-2014 Operations and Maintenance Business Information Link (OMBIL) Findings Summary report was also pulled in October 2016. The OMBIL is a web-based business information gateway that allows Corps employees easy access to information about the Operations and Maintenance program. The 1997-2014 OMBIL Findings Summary report did not identify situations that would materially impact the legacy contamination status of the site. However, it did identify from the ECSI database that the state did not remove sites from that database even if they were placed on it accidentally.

A site visit was completed on November 3, 2016 identified substantial quantities of chemicals being stored on the east side of the lock in large 300 gallon plastic totes without secondary containment. It is assumed these chemical totes are on WLP Co. property.

3.4.24 Cultural Resources

This section addresses cultural resources known to occur, or that have the potential to occur, in the Project Area. For the purposes of this EA, cultural resources include prehistoric and historic archaeological resources, architectural or built-environment resources, places and locations important to Native Americans and other ethnic groups, and human remains. Historic properties, a type of cultural resources, are any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (National Register). The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

Archeological evidence of Native American activity around Willamette Falls potentially dates to as early as 13,000 years ago, after the last of the Missoula Floods. The Willamette Falls area has a rich past, both from a cultural context as well as historic. The river environment which includes the Clackamas and Tualatin rivers and the natural falls on the Willamette provided a location which supported the lifeways of Native Americans as well as Oregon's first Euro-Americans. The falls are an important center of Native American fishing and trade. The area was ideal for dip-net and spear fishing, for the harvest of salmon and lamprey and other native fisheries.

Historically the falls have contributed to the economic development of Portland and the Pacific Northwest. The falls have been a source of hydroelectric energy for over 100 years. Construction of the Willamette Falls Locks enabled transport of goods around the falls in 1873.

Previous research in the area includes four archaeological inventory projects, two archaeological testing projects, and a Traditional Cultural Property study of Willamette Falls. A total of nine sites have been identified along the river within one mile of Willamette Falls. Four sites are located on Corps property and could be effected by the Proposed Action., they include Willamette Falls Locks, two multi-component sites and a recently documented historic petroglyph. One site is listed on the National Register while the other three sites are unevaluated. The two archaeological testing projects have recovered both precontact and historic artifacts; however both sites had been heavily disturbed by construction and operation of the locks and construction of buildings in the area. Despite the disturbed context, previous archaeological work

suggests these sites have the potential for intact deposits below the disturbed areas and recommended further subsurface testing.

Willamette Falls is a traditional cultural property to the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of the Siletz Indians and the Confederated Tribes of the Warm Springs Reservation of Oregon. The Corps will consult with them to determine if the Proposed Action will affect this resource.

The National Register of Historic Places (NRHP) is the official list of the nation's historic places, nominated through Oregon's State Historic Preservation Office (SHPO). It includes properties that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, and local levels. The NRPH contains one site in the Proposed Action Area, the Willamette Falls Locks, listed in 1974. Contributing elements include the four numbered locks, the canal basin and guard lock, the Lock Master's Office/Museum and both sets of basalt stair cases. In 1991, the Locks were designated a State Historic Civil Engineering Landmark by the American Society of Civil Engineers. In 2012, the Willamette Falls Locks were named a National Trust for Historic Preservation "National Treasure," and the Historic Preservation League of Oregon (now Restore Oregon) named it one of the ten "Most Endangered Places." Prior to closure in 2011, the Willamette Falls Locks facilitated movement on the Willamette River, which has been designated both an American Heritage River and a National Water Trail.

Adjacent to the Locks site are other facilities important to Portland regional history. In 1889 a paper mill – currently owned by the WLP Co. - was built on the island adjacent to the Locks. And the T.W. Sullivan hydroelectric power plant and associated dam were constructed by the forerunner to PGE in 1889, with Station A providing the first long distance transmission of both DC and AC hydropower generated electrical current in the country. A fish ladder over the falls was first built in 1885 and then redesigned and rebuilt by the Oregon Department of Fish and Wildlife in 1971.

In 2016 the Corps entered into an MOA with the OR-SHPO under Section 106 of the National Historic Preservation Act of 1966 (NHPA) after consulting with the OR-SHPO on the 2011 interim closure of the Locks. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on cultural and historic resources, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The Corps must adhere to the set of stipulations in regards to cultural resources set forth in this MOA. Stipulations include:

- Conducting regular meetings with the MOA signatories and stakeholders identified in the MOA.
- Conducting an engineering investigation of the Locks' essential operating materials and components in order to identify the condition of the facility and/or repairs needed to meet standards established by the Corps that would support either the de-authorization, decommissioning, and divestment of the Locks or a complete change in management of the facility in order to provide the future owner and/or operator guidance in mid and long-term capital needs.

- Continue current Caretaker activities for the interim-closure of the Locks commensurate with obligations under Section 110 of the NHPA to preserve and protect significant character defining features of the property, defined herein as the inspection and monitoring of the Locks' status through scheduled operation of gates to identify mechanical changes in performance; surface observation and monitoring of condition and potential deterioration of gudgeon anchors and lock walls; removal of intrusive objects or plant material that may cause harm to operating components; the monitoring of any geophysical activities that may pose harm to the resource; and the prevention of public access that may result in vandalism or other deliberately imposed harm.
- Continue support of public outreach endeavors.

3.4.25 Biological Resources

Terrestrial Biological Community

The project area contains habitat that supports a variety of songbirds, ducks, geese, and at least one osprey pair. The osprey pair only forage in this area, but do not rest at the Locks. Also found are nutria, beaver, opossum, and other smaller mammals. There are no known threatened or endangered wildlife species inhabiting the area.

Aquatic Biological Community

The Willamette River is a major tributary of the Columbia River and provides access for large a run of anadromous fish moving upstream to spawn in the Willamette and its many tributary streams. The major runs of fish are the Upper Willamette River (UWR) spring Chinook salmon and UWR winter steelhead, both ESA listed species. Other species are shad, sturgeon, fall Chinook salmon, coho salmon, and lamprey. Historically (before the laddering of Falls as early as the 1800s), passage by returning adult salmonids over the Falls was possible only during the winter and spring high-flow periods. More recently, ODFW constructed a fish ladder to allow fish passage upriver to their spawning grounds when flows will not allow natural passage. This facility is managed by ODFW and is situated near the center of the river. Figure 24 shows the existing fish passage routes.

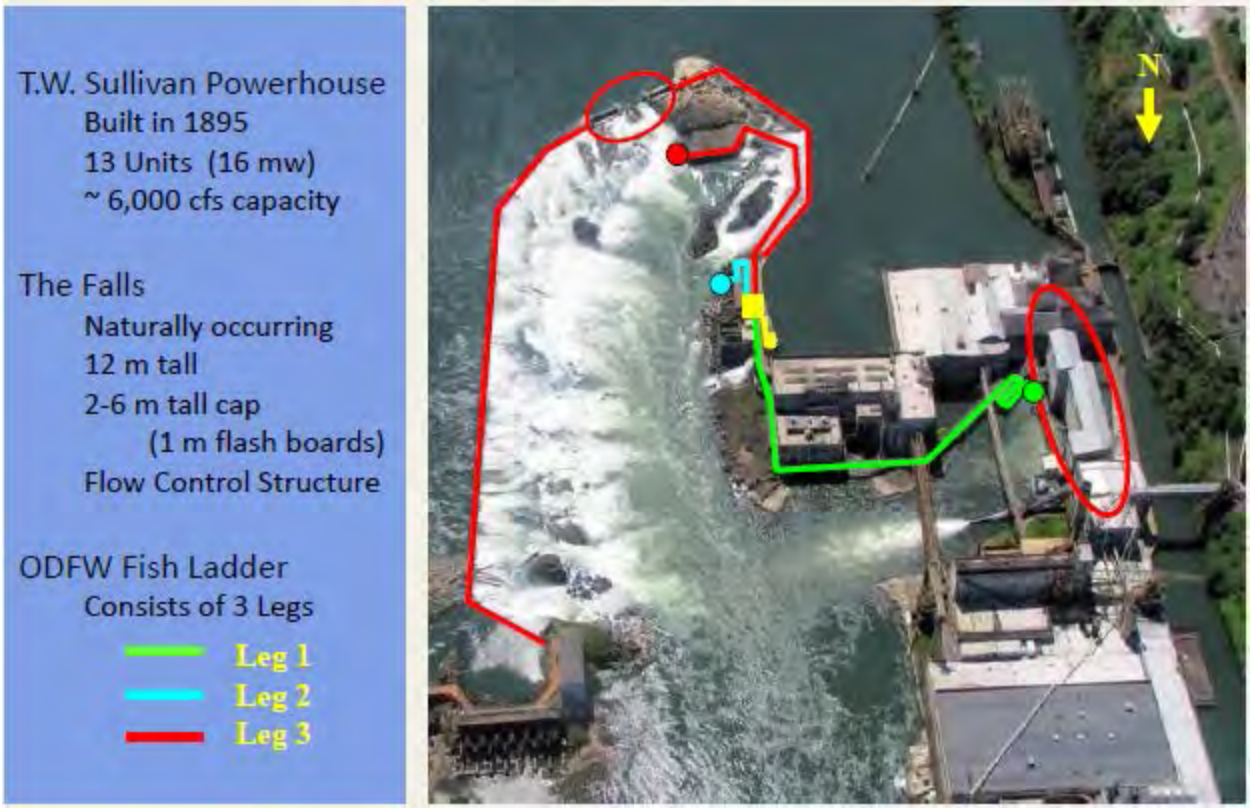

Figure 24. Existing fish passage routes.

Because the Falls block the channel for upstream migrants, the river below the falls becomes a milling place for anadromous fish. Based on fish monitoring data at the falls, fish are in and around the Falls throughout the year, however, peaks occur at key migration timeframes in the spring and fall (Figure 25).

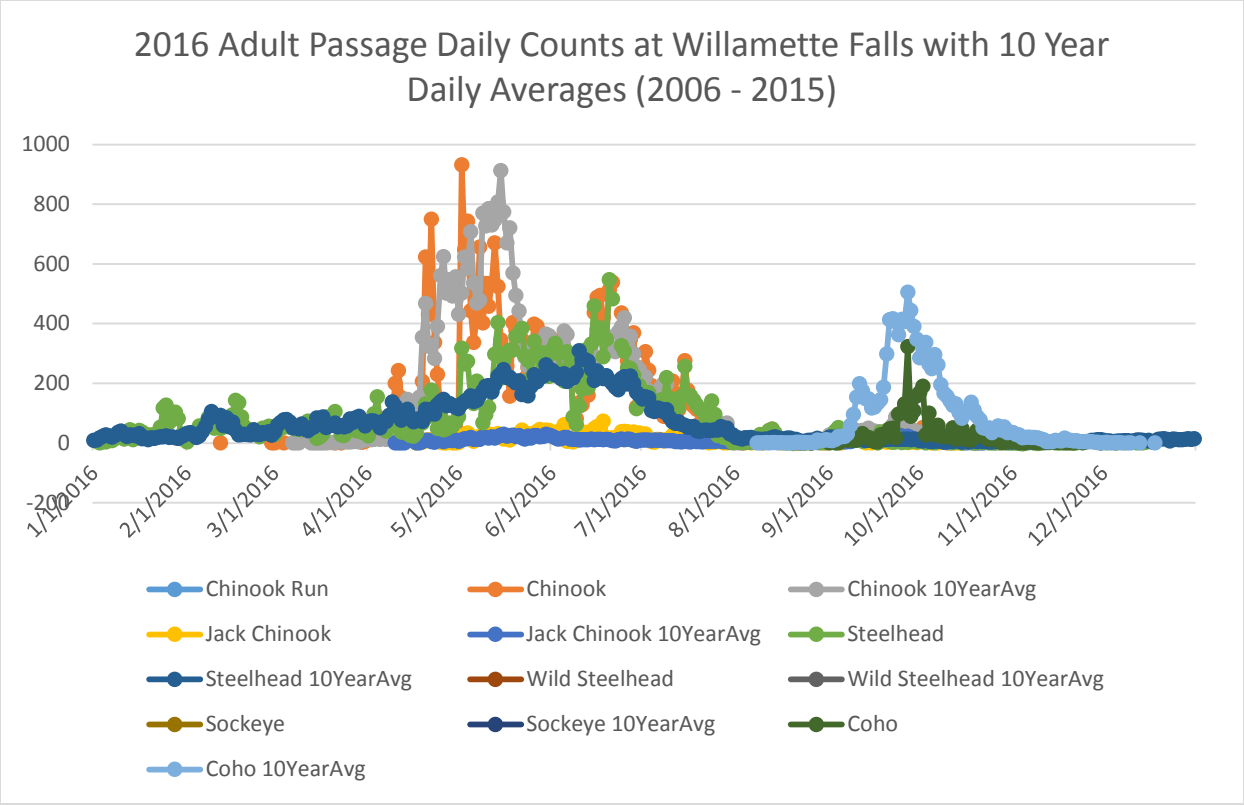

Figure 25. Data Access in Real Time Adult Passage Daily Counts
Generated 20 Mar 2017 07:22:17 PDT. www.cbr.washington.edu/dart/query/adult_daily.
Data Courtesy of Oregon Department of Fish & Wildlife.
Willamette Falls Video Counting: Fish counting through Willamette Falls fishway occurs at the main viewing window. Video cameras and time lapsed video recorders are used to record fish passage 24 hrs/day; 365 days/ year. The ODFW schedule for reviewing the tapes is Monday through Friday. It takes most of the day to accurately review one day of fish passage on tape when the counts are high.

Upstream migrating Lamprey pass the Falls via the same fish passage routes as the listed salmonids with the exception of several additional “lamprey ramps” positioned around the Falls. Lamprey pass hydraulic barriers by affixing to a smooth, wet surface with their sucker-like mouth, bursting forward and reaffixing to the surface as shown in Figure 26. The Falls and fish ladders have been retrofitted with “lamprey ramps” that provide the smooth, wetted surface necessary for passage.

Figure 26. Lamprey ascending "lamprey ramp" at Willamette Falls.

Along with the natural terrain, the T.W. Sullivan hydropower plant and other associated improvements, the Locks serve to retain the pool upstream of the Falls as shown in Figure 27. Existing fish ladders near the hydropower tailrace and apex and side of the Falls provide upstream passage. As previously discussed, the Locks are considered seismically deficient including the portions of the Locks that retain the upstream Willamette Falls pool. This poses a risk of the pool retaining Lock walls failing during an earthquake ultimately resulting in an uncontrolled release of the upstream pool through the ship canal and lock chambers.

Figure 27. Typical flow path of water at the Willamette Falls.

An uncontrolled release of pool through the Locks would affect the overall hydraulic characteristic of the Willamette Falls resulting in high volumes of water entering the Locks upstream at Gate 7 and existing downstream at Gate 1. This flow rate through the Locks may vary and would be dependent upon overall river stage and discharge. In late summer/fall during low river stages and flows, approximately 8,000 cubic feet per second (cubic feet per second), nearly half of the overall river flow would be rerouted through the Locks during an uncontrolled release, roughly 4,000 cubic feet per second. This would affect the tailwater directly downstream of the Falls and associated fish ladders and the upstream pool stages, potentially resulting in the fish ladder system failing to meet passage criteria. This discharge of the uncontrolled release into the main stem of the Willamette through the Locks, as shown in Figure 28, would act as a substantial attraction flow to upstream migrating salmonids in any river flow during high river flow events other than the highest flow events. In the event of an uncontrolled release at higher river stages and flows, the majority of overall river flow would continue passing over the Falls; flows through the Locks would increase but would not be commensurate to the flow over the Falls.

Figure 28. Flow path developed during an uncontrolled release through the Willamette Falls Locks.

The result of an uncontrolled breach may render insufficient attraction flow to the existing passage routes and the flow path through the Locks is unlikely to support lamprey passage due to velocity extremes and lack of smooth climbing surfaces. Impacts to listed salmonids is discussed further below.

California sea lions (*Zalophus californianus*) and the Eastern Distinct Population Segment (DPS) of Steller sea lion (*Eumetopias jubatus*) can be present at the Falls downstream of the Locks. The Eastern DPS Steller sea lions were delistedA as a threatened or endangered species under ESA in 2013. California and Steller sea lion predation on Upper Willamette River salmon and steelhead stocks has been identified as a growing biological concern. The number of listed salmon and steelhead being taken by California sea lions below the Falls is substantial and is one of many

factors having a negative impact on salmon and steelhead populations in the basin. California sea lions are seasonal migrants to the Pacific Northwest, generally arriving around August and departing by the following June. A small fraction of the population congregates at upriver sites such as Bonneville Dam and Willamette Falls each spring, typically peaking in late April and early May (Wright et al. 2010, Wright et al. 2014, Stansell et al. 2013, van der Leeuw 2015). In the mid-1990s observations of California sea lions in the Willamette River began to increase where they often foraged for winter steelhead and spring Chinook salmon below the fishways at Willamette Falls (128 miles upstream from the ocean). Concerned that this would result in another "Ballard Locks"—a site in Washington where California sea lions effectively extirpated a run of steelhead (Oncorhynchus mykiss) (Fraker and Mate 1999)—ODFW began monitoring sea lion occurrence and predation on salmonids at the falls beginning spring 1995. Continuing through 2003, results from these observations showed that sea lions at the falls generally numbered a dozen or fewer animals each year, and predation losses were generally a few hundred fish or less. In addition, the trend in predation activity appeared to be flat or declining whereas winter steelhead runs were increasing. Monitoring at the falls was discontinued after 2003 due to a shift in limited resources to Bonneville Dam on the Columbia River, where, in contrast, newly occurring sea lion predation on salmonids was increasing and beginning to number in the thousands annually (Naughton et al. 2011, Keefer et al. 2012, Stansell et al. 2013) While not subject to monitoring from 2004-2008, anecdotal reports from Willamette Falls continued of sea lions predating on salmonids there each spring. Beginning in 2009, students from Portland State University began conducting observations at the falls as part of a field studies class. It was soon clear from the University’s observations that an increase in predation activity by California sea lions was occurring below the falls.

ODFW conducted non-lethal hazing of sea lions in 2010, 2011 and 2013 in an attempt to deter sea lions from foraging near the fish ladder entrances at the Falls. After hazing proved to be unsuccessful, ODFW began a rigorous monitoring program, tracking sea lion abundance and predation in order to document the extent of the problem. In January of 2017, ODFW began sea lion predation monitoring at the Falls and will continue through May. This marks the fourth year of monitoring sea lion-related predation on Endangered Species Act (ESA)-listed salmonids, sturgeon and lamprey in the Willamette River. According to ODFW, 2016, California sea lion abundance increased each week of the study, peaked in late April and early May, and declined rapidly thereafter. Maximum single-day observation totals were 35 California sea lions (April 22) and one Steller sea lion (many dates from February 4 to April 16). At least three California sea lions were still present on the last day of observations (May 27). Over the three-year study a total of 39 branded sea lions have been observed at the falls. Observers documented a total of 1,211 predation events over the course of the project. Salmonids were the most frequently observed prey item (83 percent) followed by lamprey (15 percent), unknown or other fish (1 percent), and sturgeon (1 percent). California sea lions accounted for nearly all of the observed predation events (99 percent). Steller sea lions accounted for all 8 of the sturgeon killed as well as 9 salmonids. An estimated 4,585 salmonids were consumed by California sea lions in the study area from February 1 to May 29, 2016. While it's difficult to make a direct comparison of predation across the three study years (2014-2016) due to changes in the sampling frame, it appears that sea lion abundance and attendant predation increased each year. The results of the

past three years of pinniped abundance and predation monitoring at Willamette Falls suggests that the problem of California sea lions taking listed salmonids below the falls is significant. Recommendations for future work include an earlier start (i.e., 9 January), installation of a trap to begin marking unbranded sea lions, and continued improvements to the behavioral observations and abundance monitoring.

Monitoring efforts in 2017 will include trapping sea lions in order to brand unmarked individuals and to potentially relocate sea lions back to the ocean. A trap is located at SportCraft Landing Moorages in Oregon City, a place where sea lions currently rest. Depending on sea lion use, the trap could eventually be moved to the downstream entrance of the Locks area. Trapping may occur year-round any time sea lions are on the trap. The trap will be monitored electronically by cameras and the doors on the trap will be locked open when not in use. (ODFW 2017)

Threatened and Endangered Species

When completing a federal action at Willamette Falls Locks (WFL), there are 13 ESA-listed salmon and steelhead species that require consideration. Species that may be affected include: Upper Willamette River (UWR) Chinook salmon (O. tshawytscha), UWR steelhead (O. mykiss), Lower Columbia River (LCR) Chinook salmon, LCR coho salmon (O. kisutch), LCR steelhead, Middle Columbia River (MCR) steelhead, Columbia River (CR) chum salmon (O. keta), Snake River (SR) spring/summer Chinook salmon, SR fall Chinook salmon, SR sockeye salmon (O. nerka), SR steelhead, Upper Columbia River (UCR) spring Chinook salmon, and UCR steelhead. Except for LCR coho salmon, critical habitat has been designated for all of the anadromous fish species.

Outside of the Willamette Basin (below Willamette Falls), effects of a federal action at WFL are limited to very small negligible effects on listed salmonids and their habitat. The ESA listed species most affected by WFL are the UWR spring Chinook salmon and UWR winter steelhead. UWR Chinook salmon are one of the most genetically distinct groups of Chinook salmon in the Columbia River Basin. Historically (before the laddering of Willamette Falls), passage by returning adult salmonids over Willamette Falls (RKm 37) was possible only during the winter and spring high-flow periods. The early run timing of Willamette River spring-run Chinook salmon relative to other lower Columbia River spring-run populations is viewed as an adaptation to flow conditions at the falls. Since the Willamette Valley was not glaciated during the last epoch, the reproductive isolation provided by the falls was probably uninterrupted for a considerable time and provided the potential for significant local adaptation relative to other Columbia River populations (Myers et al. 2006). UWR Chinook salmon contain a unique set of genetic resources compared to other Chinook stocks in the Willamette /Lower Columbia Domain (Myers et al. 1998 and Myers et al. 2006). This is especially important for UWR Chinook salmon, for which the risk of extinction is “high.”

Numbers of UWR winter steelhead in this Distinct Population Segment (DPS) are depressed from historical levels (McElhany et al. 2007). All of the historical populations in this DPS produce moderate numbers of returning adults each year. While long-term trends are less than one, short-term trends are 1.0 or higher (McElhany et al. 2007), indicating that, in the short-term (i.e., 1990-2005), abundance is increasing on average and the populations are growing (NMFS

2008). Recent declines in returning adults have been identified and the 2017 return could be the lowest on record as measured by counts at Willamette Falls.

Significant federal investment is being made by the Corps implementing the 2008 Willamette Biological Opinion (NMFS 2008). These actions represent requirements contained in the 2008 BiOp to avoid jeopardizing the continued existence or adversely modifying their designated critical habitat. The Corps is planning on completing actions to provide access to historical productive spawning and rearing habitat upstream of federal dams in the Upper Willamette Basin upstream of WFL. The success of the proposed significant financial investments in reaches upstream of WFL are contingent on adequate passage at Willamette Falls. Consideration needs to be given to WFL condition, possible future use, and relationship to passage conditions at the Willamette Falls at the fish ladder, which is owned by the State of Oregon. Impacts on adult fish passage at Willamette Falls would reduce the anticipated benefit that is contemplated in the 2008 BiOp through Corps actions in tributary reaches upstream.

The NMFS and ODFW Recovery Plan (2011) delineate a geographic boundary between the upper Willamette River basin and the lower Willamette River basin, which has some tidal influence, at the Falls. Most populations of UWR Chinook salmon and UWR steelhead spawn upstream of the Falls, and, therefore, adults moving upstream from the ocean must pass the Falls via the existing ODFW fish ladder system to complete their migration and reproduce. Juveniles UWR Chinook annually migrate downstream toward the ocean and past the Falls in spring and late fall, and most UWR steelhead migrate over the Falls to the ocean in spring. However, some individuals pass throughout the year. Juveniles pass downstream through the PGE TW Sullivan hydropower plant bypass as well as over the Falls. The Falls effectively act as a checkpoint for nearly all anadromous salmonid species of the Willamette Valley Basin during their respective migration periods. Most populations of UWR Chinook salmon and UWR steelhead spawn upstream of the Falls, and therefore adults moving upstream from the ocean must pass over the Falls via the existing fish ladder system to complete their migration and reproduce. Juveniles spring Chinook salmon annually migrate downstream toward the ocean and past the Falls in spring and late fall, and most winter steelhead in spring, however some individuals pass throughout the year. Juvenile pass downstream through the PGE TW Sullivan hydropower plant bypass as well as over the Falls. When the Locks are open, juveniles can also move into the Locks canal and become trapped if the Locks are closed before they are able to egress downstream

As discussed above, an uncontrolled breach at the Locks will have impacts on fish migrating over the falls, including listed salmonids. Maximum swimming speed for adult Chinook salmon for a few seconds is up to about 20 feet per second (burst speed), and these fish can sustain swimming speeds for several minutes of up to 10 feet per second. Steelhead burst speed is up to 27 feet per second and they can sustain swimming speeds of up to 13 feet per second. Maximum jumping heights for Chinook salmon and steelhead are reported as 8 feet and 11 feet, respectively. Velocities and hydraulic drop heights at or near these levels or higher will create a barrier for upstream fish passage; that is, most upstream migrating adult Chinook salmon or steelhead may not able to pass the velocity or hydraulic barrier.

Following an uncontrolled breach, although the flow discharging from the Locks will act as an attractive passage route, the hydraulic characteristics internal to the Locks will not support upstream salmonid passage. Flow though the Locks would have uniform velocities exceeding 15-20 feet per second at low flows and greater velocities at higher flows. The Lock lifts, elevation change between chamber floors, would result in approximately 10-foot hydraulic drops assuming the sills at each gate remain intact during the event. Lock 1 entrance, where the uncontrolled release would discharge back into the main stem Willamette River, is roughly 2,500 feet downstream of the nearest fish ladder entrance. The lock entrance may support fish passage up to lock chamber 1 as it is less confined and will have reduced velocities. However, fish attracted to the discharge are likely to hold at this location due to the lack of competing flows inside the lock entrance. Exhausted fish may fall back to the main flow of the Willamette River and seek additional passage routes. Holding fish or exhausted fish will be more susceptible to sea lion predations and a number of other direct and indirect mortalities through injury.

Mortality of adult UWR Chinook salmon has been observed below the Falls, associated with high water temperatures, which could be exacerbated if fish are delayed in the Falls tailrace. Sea lion predation of UWR spring Chinook salmon and steelhead has been increasing in recent years. Any delay in fish runs in the Falls tailrace could exacerbate the sea lion predation below the upstream passage routes shown in Figure 24.

An uncontrolled breached at the Locks could result in a partial or full blockage of upstream migrating adult spring Chinook salmon and winter steelhead, or delay in migration, due to:

- False hydraulic attraction of upstream migrating fish into the lock from an increase in water volume discharged from the lock (with an inability to pass upstream through the lock)
- Inability or poor fish passage efficiency due to changes in fish ladder hydraulic conditions at the existing fish ladder entrances (downstream end of ladder), within the ladder, and/or at the fish ladder exits resulting from:
    - changes in forebay and/or tailrace elevations or
    - changes in ladder water supply and related entrance hydraulics.

Depending on the nature of the breached lock, adult or juvenile life stages may be impacted. The degree to which UWR Chinook salmon and steelhead populations could be impacted by an uncontrolled release or other hydraulic change at the Lock will depend on the extent that the passage is impeded, impaired, or blocked, the timing and the duration.

For adults, if upstream passage is impeded and the impact occurs for multiple years, both hatchery and natural runs could be extirpated since they will not be able to reproduce, unless they can be trapped and transported upstream by other means.

For juveniles, impacts are less likely to be prevalent due to their ability to pass a variety of conditions with the flow. However, if the breach flow path developed were to entrain juveniles and subject them to fish strikes with structures, sheer stress, and/or barotrauma due to hydraulic pressure changes, it may result in undue injury or mortality to out-migrating juveniles. Juveniles

subject to injury may not succumb to mortality directly from the injury but may become more susceptible to avian and piscivorous predation and/or disease resulting in mortality.

As previously discussed, the Corps owns, operates, and maintains 13 multipurpose dams and reservoirs that make up the Willamette River Basin Flood Control Project (Willamette Project). In 2008, NMFS issued a Biological Opinion (BiOp; NMFS 2008) on the impact of the Willamette Project on species listed for protection under the Endangered Species Act. In addition to possible direct biological impacts to listed species, the District has invested over $194M upstream of the Falls for implementing actions required in the BiOp. As part of this federal investment, the Corps has constructed and now operates many upstream fish passage facilities, including adult and juvenile trapping and transporting activities. Each year the Corps spends funds operating and maintaining these fish passage facilities in the Willamette Basin. If conditions at the Locks cause delay or block passage, the benefits of these facilities will not be realized as intended and depending on the time frame for restoring adequate passage at Willamette Falls, the effort to reintroduce these fish and the local adaptation benefits may be severely impacted.

In summary, depending on the severity, timing, and duration of an event that would impact upstream migration of adult ESA-listed UWR spring Chinook and winter steelhead, the direct biological impacts could be severe. Additionally, the benefits achieved through the on-going federal investment in the Upper Willamette Basin may also be diminished. The Corps anticipates additional funding appropriations in excess of $500 million to be invested in downstream passage actions in the McKenzie and Santiam subbasins. These actions, and associated species benefits, are all contingent on adequate passage being provided at Willamette Falls.

Bull trout (*Salvelinus confluentus*) is the only federally listed fish species under the jurisdiction of the USFWS found in the study area. One bull trout DPS was listed as threatened in 1999 (64 FR 58910). Based on USFWS's most recent status review (USFWS 2008a), historical habitat loss and fragmentation, interaction with nonnative species, and fish passage issues are widely regarded as the most significant primary threat factors affecting bull trout. Although the bull trout range encompasses the Locks area, no critical habitat for bull trout is located within this project area and there have been no recent sightings of bull trout in the vicinity.

Table 8. Threatened or Endangered Fish Species, and Associated Critical Habitat, potentially occurring within the Study area.

Common Name	Scientific Name	Status	Critical Habitat in or near Study area?
Upper Willamette River Chinook salmon	*Oncorhynchus tschawytschaha*	FT	Yes
Upper Willamette River Chinook salmon	*Oncorhynchus mykiss*	FT	Yes

Bull trout	*Salvelinus confluentus*	FT	No
FT = federally Threatened			

Wetlands

The Willamette Valley has lost approximately 57 percent of its original wetlands area (Morlan, 2000). In 2005, there was an estimated 311,473 acres of wetlands in the Willamette Valley, which represents 9.7 percent of the total land area (Morlan, 2010). Based on data compiled using the National Wetlands Inventory maps (USFWS, 2017), there are no wetlands within the boundaries of the project. The open water of the Willamette River, including the Locks, is omitted to avoid skewing the amount of wetland acreage.

3.5 FUTURE WITHOUT PROJECT CONDITIONS/NO ACTION* ALTERNATIVE

For the purpose of this study the Future Without-Project Condition is considered the No Action alternative. Per the Interim Guidance on the Conduct of Disposition Studies, the No Action alternative is defined as including "the existing and future without-project operations, maintenance, repair, rehabilitation, and replacement of the existing project, including consideration of its current status and any changes in status over the period of analysis." Under the No Action alternative, the Locks would remain in federal ownership an the interim-closure status would become a permanent Caretaker status for the closure of the Locks - a non-operating condition in which the facilities are in a limited preservation status for the 50-year planning horizon. The Portland District's Operations Division would remain responsible for these facilities. Additionally, The DSAC 1 assigned during the screening portfolio risk assessment will be re-evaluated in the next Periodic Assessment as defined in ER 1110-2-1156 Safety of Dams – Policy and Procedures. Measures to reduce the risk associated with the project have been performed since the initial DSAC assignment as described in Section 3.3.6.

<u>Operations and Maintenance:</u>

For this scenario, the entire navigation lock channel, from Gate 1 through Gate 7, will continue to be closed to public and private vessel passage and maintained in non-operational status. Personnel from Bonneville Lock and Dam Project will travel to the Locks for maintenance purposes and to cooperate the Gates to pass trash and woody debris on a periodic basis Operations of Gates 2, 3, and 4 will continue to have the following restrictions:

- no personnel will be permitted on these gates or on gate gudgeons, unless specifically authorized by Bonneville Project Manager, and
- no personnel are permitted in chambers 2, 3, and 4.

HSS inspections will continue on a 25 year cycle. This requires removal and staging of the miter gates for inspection and repair if necessary. Periodic Assessments and Periodic Inspections will be conducted once every 10 years. Emergency Action Plan drills will be conducted annually as indicated in the IRRMP (2014).

For this alternative, Congressional appropriations will continue for repair and maintenance activities for critical components necessary to the Locks non-operational condition. It is assumed minimal maintenance will continue to guard against more costly future repairs and inspections and for environmental, safety, and health compliance purposes. Repair of mechanical and electrical equipment will be required when such items have outlived their functional life and serve current operational and maintenance needs. The chance of experiencing component failure will increase as components continue to deteriorate over time and as the probability of a catastrophic event occurring (either flood or earthquake) increases.

Currently, the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side of Gates 6 and 7 at the upstream end of the Locks is not seismically stable. There is a risk that a large seismic event, such as Cascadia, could destabilize these features and lead to an uncontrolled release of the Willamette Falls pool. To mitigate this risk, future without project condition/No Action Alternative assumes that the lock wall and monolith stability deficiencies will be corrected by implementing the Seismic Partial measure, described in Section 0, when an urgent or compelling need develops during the planning horizon. This measure will likely be implemented at an undetermined year within the planning horizon, however, the implementation of this measure is assumed in 2047 for purposes of cost comparisons with the action alternatives. With the assumption that the Seismic Partial measure will eventually be implemented as a part of the future without project condition, the Willamette Falls upstream pool will be not be affected under the No Action Alternative.

Costs:
Average annual costs of maintaining the interim-closure status and non-operational condition of the Locks is approximately $135,000. This includes minimum Caretaker maintenance, and dam safety actions such as HSS inspections, Periodic Assessments, Periodic Inspections and Emergency Action Plan (EAP) drills. Service and reliability measures for mechanical and electrical components were not included in this estimate as they are considered negligible in comparison of alternatives.

The seismic stability measures are assumed to be implemented in year 0 of the planning horizon and result in a 2017 dollar present value of $1,847,400 or an additional $70,000 in average annual costs for the 50 year planning horizon.

Risks to Cultural Resources
For this alternative, the Corps will continue to be responsible for the long term care and maintenance of the Locks under the National Historic Preservation Act. Overtime the structure will degrade and may require repair and replacement of parts. The Corps will be responsible for maintaining the integrity of the Locks or mitigating future impacts to the Locks.

Table 9: Cost break down for the No Action/Future Without Project (FWoP). Average annual AA cost used as metric for cost comparison. Dam Operations Willamette Falls Locks (WFL) interim-closure Status costs were determined from the average of previous budget requests.

No Action

	AA Cost	Description	Action Cost	Per # Years
Recurring Costs Annualized	$70,667	Dam Operations WFL interim-closure status		
	$600	External ERGO Enviro Assessment	$3,000	5
	$2,000	HSS Inspection - twice over 50 years	$50,000	25
	$22,900	Remove and Replace Gates for HSS	$572,500	25
	$5,000	PA/formal PFMA from IRRMP (2014)	$50,000	10
	$10,000	PI every 5 years (50K) from IRRMP (2014)	$ 50,000	5
	$5,000	EAP Drills Yearly from IRRMP (2014)		
	$4,000	Engineering and Operational support		
	$15,000	Real Estate / Outgrant Administration		
	Total AA Cost			
	$135,000	rounded to nearest 1000		

	2017 PV Costs	Description		
One-Time Costs (Seismic Partial)	$795,500	Guard Lock Wall stability		
	$256,300	Gate 6 and 7 Monolith stability		
	$795,500	Ship Canal/PGE Wall stability		
	One Time Total Costs			
	$1,847,400	rounded to nearest 1000		
	Converted AA Cost	Annualized Seismic Partial measure cost to include group with recurring costs		
	$70,100			

Total AA Cost	Total annualized cost of recurring and one-time costs to maintain existing non-operational status without further impairing the authorized purpose.
$205,100	

The total average annual cost for the No Action Alternative under the future without project condition is $205,100.

4. PLAN FORMULATION AND ALTERNATIVES EVALUATION

Plan Formulation is the process of identifying specific ways to achieve planning objectives while avoiding constraints so as to solve the problems and realize opportunities identified earlier in this report. This step of the planning process produces solutions that achieve all or part of one or more of the planning objectives.

In addition to the problems, opportunities and constraints, Corps Planning Principles and Guidelines (P&G) were considered during the plan formulation process. Per ER1105-2-100, plans should be evaluated for completeness, effectiveness, efficiency and acceptability.

- **Acceptability.** A plan should be acceptable to state and federal resource agencies, local governments and stakeholders in the area. There should be evidence of broad based public consensus and support for the plan.
- **Completeness.** A plan must provide an account for all necessary investments or other actions needed to ensure the realization of the planned action. This may require relating the plan to other types of public or private plans if these plans are crucial to the outcome of the objective. Real estate, operations and maintenance (O&M), monitoring must be considered.
- **Effectiveness.** A plan must represent a cost-effective means of addressing problems or opportunities. It must be determined that the plan's outputs cannot be produced more cost effectively by another agency or institution.
- **Efficiency.** A plan must make a substantial contribution to addressing the specified problems or opportunities.

4.1 MANAGEMENT MEASURES

A management measure is a feature or activity that can be implemented at a specific location to address one or more planning objectives. Specifically, measures were developed to meet different levels of modification to the Locks facility for a successful disposal of the federal real property interests. These management measures are largely based on actions recommended in the 2011 FER for addressing risks associated with facility deficiencies. Summary tables for each measure are provided in Appendix D. The Appendix D measure tables also summarize the costs developed within this study. A list of management measures is included below.

***Seismic Partial**:* This measure is comprised of a seismic retrofit of the damming surface at the upstream end of the lock which is made up of: the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side of Gates 6 and 7. This measure alone would not make the Locks operational for navigation purposes. This measure only addresses the risk of an uncontrolled release of the Willamette Falls pool in the event of a seismic event and meets the constraint of maintaining the existing flow within the aquatic corridor near and around the Falls.

The gate monolith seismic retrofits would be accomplished with vertical rock anchors at a spacing and size to increase the downward force on the masonry layers. The increased downward force would increase the inter-layer friction to resist sliding while not adversely affecting the overturning capabilities of the monolith. Rock anchors would be installed for the concrete wall

retrofit and would be the same as the anchors for the gate monolith retrofit. This measure is in accordance with the recommended action in the 2011 FER Sections 7.2.2.1.4 & 5. The cost identified in the 2011 FER was scaled to the identified wall and monoliths and then escalated from 2011 dollars to 2017 dollar for a present value cost of $1,847,400 (or $70,100 annualized over 50 years.)

***Safety Functional**:* This measure is comprised of near-term deficiency actions, as identified in the 2011 FER, associated with making the Locks operational for navigation purposes. This largely includes mechanical, electrical and structural modifications that would render the facility safe for vessel lockage. This includes addressing surface water, sinkholes, gudgeon anchorage, timber bracing, walkway framing, chamber ladder, gate and valve limit switches and lighting concerns. This does not includes many 5-year and Long Term actions identified in the 2011 FER that are not critical for resuming lock function. Deficiencies associated with seepage and wall stability are not included in this measure and are addressed in other measures. By implementing these actions, this measure reduces the safety hazards associated with operation of the facility in preparation for disposal. The costs of the identified actions in the 2011 FER were aggregated to a sum and then escalated from 2011 dollars to 2017 dollars for a present value cost of $2,750,300 (or $104,400 annualized over 50 years.)

***Safety Minimal**:* This measure is comprised of perimeter fencing and debris and boat barriers for the Locks. Exclusion fencing would serve to remove access to the operational safety hazards present in some alternatives. The costs of the identified actions were sourced from the Willamette Falls Interim Engineering Design Report and then escalated from 2013 dollars to 2017 dollars for a present value cost of $36,000 (or $1,400 annualized over 50 years.)

***Seepage**:* This measure is comprised of near-term deficiency actions associated with the seepage issues at the Locks as identified in the 2011 FER at Gate 4 monolith on the Corps side. This includes the implementation of a grout curtain as described in the 2011 FER (Section 7.2.1.2.3) by way of drilling in the monolith and wall at the area of concern and back filling with pressurized grout. These seepage issues are of concern only when the Locks are in service. The costs of the seepage actions in the 2011 FER were aggregated to a sum and then escalated from 2011 dollars to 2017 dollar for a present value cost of $1,006,800 (or $38,200 annualized over 50 years.)

***Remove Mechanical/Electrical Support**:* This measure removes the mechanical and electrical machinery and power for gate operation from the Locks. This reduces operational and environmental safety hazards at the time of conveyance in alternatives where navigation at the Locks has been impaired. The costs were developed from standard demolition and removal rates and resulted in a 2017 dollar present value cost of $67,600 (or $2,600 annualized over 50 years.)

***Removal of Gates**:* This measure removes the miter gates from the Locks for disposal. This is required when the Locks have unregulated flow through the canal and chambers, specific to the Run-of-River alternative. If the gates were to remain stored in-place, they could become destabilized under flow and be flushed out of the Locks. The costs were developed from previous removal efforts when the gates were removed for Hydraulic Steel Structure inspection and

repairs. This resulted in a 2017 dollar present value cost of $771,200 (or $29,300 annualized over 50 years.)

***Fill All Chambers**:* This measure requires filling the guard lock chamber sufficiently to retain the water surface elevation within the Willamette Falls pool. The downstream ship canal and lock chambers (4, 3 and 2) would be sufficiently filled to remove all fall hazards and provide positive drainage for runoff or overtopping events. This results in a total fill quantity of approximately 456,000 cubic yards of material. Course aggregate or riprap would be necessary for capping the fill sufficiently to prevent erosion during overtopping from rerouting base river flow through the Locks. The cost of the fill was assumed to be $15 per cubic yard and results in a 2017 dollar present value cost of $6,920,800 (or $262,600 annualized over 50 years.)

***Fill Partial**:* This measure requires filling the guard lock chamber with approximately 6,700 cubic yards of material in order to retain the water surface elevation within the Willamette Falls pool. The downstream ship canal and lock chambers would remain open and provide positive drainage for runoff or overtopping events. Fall hazards within the lower lock chambers are not addressed. Course aggregate or riprap would be necessary for capping the fill to sufficiently prevent overtopping erosion from rerouting base river flow through the Locks. The cost of the fill was assumed to be $15 per cubic yard and results in a 2017 dollar present value cost of $102,900 (or $3,900 annualized over 50 years.)

***West Linn Paper Secondary Water Intake**:* The WLP Co. can currently withdraw water from the ship canal. This measure reroutes the secondary water intake upstream of Gate 7 to the Willamette Falls pool such that WLP Co. may still function during periods of time when PGE operations preclude use of the primary water source. The cost to relocate the secondary water supply intake results in a 2017 dollar present value cost of $318,300 (or $12,100 annualized over 50 years.)

***In-Place Gate Storage**:* This measure stabilizes the gates in-place when the mechanical and electrical equipment are removed and there is no need to fully remove the gates from the Locks. The gates would be stored in the open position and fixed to the chamber wall with anchors such that the loads no longer bare on the operating equipment which can then be removed. The cost to store the gates in-place results in a 2017 dollar present value cost of $35,800 (or $1,400 annualized over 50 years.)

***Concrete Bulkhead**:* This measure includes forming a concrete bulkhead within the guardlock chamber to serve as a permanent hydraulic control for the Locks and maintain the upstream Willamette Falls pool when the gates are removed or are inoperable. The bulkhead would be equal height as Gate 7 and have similar performance during an overtopping event. This would be a solid wall such that no water would pass into the ship canal from upstream during normal flow conditions of the Falls or forebay operations by PGE. The cost of placing this concrete bulkhead results in a 2017 dollar present value cost of $125,900 (or $4,800 annualized over 50 years.)

Table 10: Array of Measures represents a consolidated list of the measures considered in alternative development.

Table 10: Array of Measures

Measures	Description	Costs (2017) (PV)	Annual Cost
Seismic Partial	Apply seismic retrofits to: the PGE/Ship Canal Wall, guard lock monoliths and wall. This addresses risk of an uncontrolled release of the Willamette Falls pool in a seismic event.	$1,847,400	$70,100
Safety Functional	Apply all operation and safety action from the 2011 FER to bring the Locks up to a functional status. This does not includes many 5-year and Long Term mitigation actions that not critical for resuming lock function.	$2,750,300	$104,400
Safety Minimal	Put up signage and fencing to exclude public access to safety hazards within the facility.	$36,000	$1,400
Seepage	This addresses seepage issues that persist when the Locks are in a water filled state.	$1,006,800	$38,200
Remove Mechanical/Electica l Support	Remove mechanical and electrical support for lock operation to reduce environmental impacts from failing components and potential hazardous energy.	$67,600	$2,600
Pull All Gates	Remove lock gates for disposal/excess.	$771,200	$29,300
Earthen Fill All	Fill guard lock chamber, downstream ship canal and lock chambers sufficiently to remove fall hazard and provide positive drainage for runoff.	$6,920,800	$262,600
Earthen Fill Partial	Fill guard lock chamber sufficiently to retain Willamette Falls pool.	$102,900	$3,900
New Secondary Water Supply for WLP	Place new secondary water supply for the West Linn Paper in the Willamette Falls upstream pool.	$318,300	$12,100
In-place Gate Storage	Store in-place (dog gates off) in stable manner.	$35,800	$1,400
Concrete Bulkhead	Place concrete bulkhead in guard lock to maintain Willamette Falls upstream pool.	$125,900	$4,800

4.2 PRELIMINARY ARRAY OF ALTERNATIVES*

A preliminary array of alternatives was developed from the list of measures to identify the necessary actions to prepare the facility for disposal in three functionally classified conditions: an operational lock, a non-operational lock and a decommissioned facility. The development of these functional conditions are a result of evaluating future uses after conveyance.

- **Operational Lock**

This alternative includes facility repairs and modifications necessary to return the lock to service for navigation and ensures the upstream Willamette Falls pool is maintained. It is comprised of following measures: Seismic Partial and Safety Functional. Under this alternative the preferred method of conveyance would be to convey the property interests to an identified non-federal transferee.

- **AS-IS (Non-Operation Lock)**

This alternative includes no repairs or modifications to the facility and is deemed "as-is, where is" in its existing state identified in 2016 during the initial phase of this study. No measures from above are included in this alternative and the Locks would remain in the interim-closure status as a non-operational lock for the purposes of navigation. At the time of disposal, the public safety hazard, identified would be unmitigated. Additionally, under this alternative there would be a high risk of an uncontrolled breach at the Locks due to a seismic event. As discussed previously, an uncontrolled breach severely disrupt the function of the aquatic corridor at the Falls. An uncontrolled breach at the Locks would result in false attraction flows for ESA listed salmonids as well as impair the functionality of the ODFW fish ladders leading, severely limiting or totally eliminating fish passage over the Falls and their access to upstream spawning habitat. Additionally, such an event would negatively impact the effectiveness of the Corps' fish passage and restoration investments upstream of the Falls. Finally, an uncontrolled breach would impact PGE operations of their hydro power facility at the Falls. Under this alternative, the preferred method of conveyance would be disposal through the U.S. General Services Administration (GSA).

- **Run-of-River (Decommissioned Facility)**

This alternative would remove all miter gates to allow flow from upstream of the Locks to pass freely through the Lock chambers. This would render the facility decommissioned meaning it would no longer serve any navigational purpose. There is no damming surface at the facility; therefore, there is no risk of sudden pool breach. However, the consequence of continuous flow through the Locks would still severely disrupt the function of the aquatic corridor at the Falls. This alternative is comprised of the following measures: Safety Minimal, Pull All Gates, Removal of Mechanical and Electrical Support and New Secondary Water Supply for WLP. Safety Minimal measure is applied to mitigate for the public safety hazards posed by an open high flow channel. Pulling all the gates from the chambers and channel removes them from the flow path. Removal of the Mechanical and Electrical support for gate operation is necessary for removal of the gate and removes potential for contaminant discharges and high energy hazards at the facility. The ship canal would be turned into a relatively high flow channel and would not be suitable for water withdrawal through the existing WLP Co. secondary water intake. The measure New Secondary Water Intake for WLP Co. would reroute the intake to the upstream

Willamette Falls pool out of the high flow path. The locks and chambers would be subject to relatively high flow velocities and volumes which may result in destabilization and erosion of bed, bank and wall materials. Additional bed and bank armoring may be needed upon further analysis. The preferred method of conveyance would be disposal through GSA.

- **Fill All Chambers (Decommissioned Facility)**

This alternative would fill the lock chambers to eliminate fall, seismic and pool breach hazards. This would render the facility decommissioned, precluding future navigation operations of the facility. It is comprised of the following measures: Pull All Gates, Removal of Mechanical and Electrical Support, Earthen Fill All and New Secondary Water Supply for WLP. Pulling the gates and supporting mechanical and electrical equipment is necessary to ensure no contaminants or components are buried during implementation. The Locks and chambers would be filled such that the fall hazards present at the Locks are reduced and that positive surface water drainage would remain. The upstream end of the Locks would be filled sufficiently to maintain the normal operating Willamette Falls pool. The fill would be capped material sufficient to prevent erosion and head cutting due to overtopping events known to occur at the site. The ship canal would no longer have water and would not be suitable for water withdrawal through the existing WLP secondary water intake. The measure New Secondary Water Supply for WLP would reroute the intake to the upstream Willamette Falls pool. The preferred method of conveyance would be disposal through GSA.

- **Non-Operational Lock**

This alternative minimally addresses deficiencies in the non-operational status and does not impair the capability of future owners to return the Locks to service. It is comprised of following measures: Seismic Partial and Safety Minimal. Under this alternative the preferred method of conveyance would be to convey the property interests to an identified non-federal transferee.

- **Partially Filled-in (Decommissioned Facility)**

This alternative would fill the lock chambers at the upstream end of the facility to eliminate pool breach hazards. This would render the facility decommissioned, precluding future navigation operations of the facility. It is comprised of the following measures: Seismic Partial, Safety Minimal, Removal of Mechanical and Electrical Support, In-Place Gate Storage, Earthen Fill - guard lock and New Secondary Water Supply for WLP. The guard lock would be filled sufficiently to maintain upstream pool and capped with material to prevent excessive erosion during overtopping flood events. The damming surface would be partially stabilized via the earthen fill placement but would still require substantial seismic retrofits where not supported with fill. Pulling the gates supporting mechanical and electrical equipment is necessary to ensure no contaminants discharge or high energy hazards remain after implementation. The miter gates would be stored in-place in the open condition and further stabilize against the wall. The preferred method of conveyance would be disposal through GSA.

- **Concrete Bulkhead (Decommissioned Facility)**

This alternative would place a concrete bulkhead at the upstream end of the facility to eliminate pool breach hazards. This would render the facility decommissioned, precluding future navigation operations of the facility. It is comprised of the following measures: Seismic Partial, Safety Minimal, Removal of Mechanical and Electrical Support, In-Place Gate Storage, Concrete

Bulkhead and New Secondary Water Supply for WLP. A concrete bulkhead would be placed in the guard lock. The damming surface would be partially stabilized via the concrete bulkhead but would still require substantial seismic retrofits where not supported with fill. Pulling the gates supporting mechanical and electrical equipment is necessary to ensure no contaminants discharge or high energy hazards remain after implementation. The miter gates would be stored in-place in the open condition and further stabilize against the wall. The preferred method of conveyance would be disposal through GSA.

- **No Action** In accordance with Planning guidance and the federal obligation under NEPA, the No Action alternative was carried forward for comparison. The No Action Alternative is described in Chapter 3, Section 0.

No cost share sponsors have been identified to date to support modifying the facility for other cost shared authorized purposes; therefore, alternatives requiring cost shared sponsors are not carried forward for further consideration (such as for hydropower development or ecosystem restoration).

4.3 SCREENING CRITERIA

Per ER 1150-2-100, each alternative in the array of alternatives must be independently evaluated using a suite of quantitative and qualitative metrics for each of the Corps' four screening criteria: Completeness, Effectiveness, Efficiency and Acceptability. Below, the metrics are described for each of the four screening criteria:

- **Effectiveness:** The extent to which the measures and alternatives fulfill the planning objectives and avoid planning constraints.
- **Efficiency:** The extent to which the measures and alternatives are cost effective. As the major planning objective is to identify the necessary actions to prepare the facility for disposal, efficient plans would require the least cost to ensure the realization of a successful disposal.
- **Completeness:** The plan must provide and account for all necessary investments needed to ensure the realization of a successful disposal. Environmental risks, needed real estate acquisition preparations, O&M costs and potential transferees should be considered. Additionally, the extent to which the measures and alternatives sufficiently evaluate the potential ease of conveyance of the property, after the required modifications have been completed in preparation for the disposal action is considered qualitatively.
- **Acceptability:** Evaluation of whether the recommended plan is acceptable to the state and federal resource agencies and local governments and the extent to which the measures and alternatives are technically feasible and legally permissible and account for the actions needed to ensure the realization of a successful disposal.

In addition to the four Corps screening criteria outlined in ER1105-2-100, the disposal study includes a risk based analysis screening criteria which assessed the extent to which the measures and alternatives adequately address the risks to the public, property and the environment.

Table 11 summarizes alternatives and the measures that constitute each alternative**.** It is assumed a conveyance to a potential non-federal interest who intends to own and operate the Locks as a navigational facility would only occur under the “Operational”, “Non-Operational,” and the “As-Is” alternatives, as these three alternatives either improve or do not impair the future navigable function of the facility. Where the alternatives preclude navigability, it is assumed the future conveyance would be through the GSA for purposes other than navigation.

Table 11: Preliminary Array of Alternatives

Transfer Method	Alternatives		Measures												
			Seismic	Safety Functional	Safety Minimal	Seepage	Remove Mech/Elec Support	Pull All Gates	Earthen Fill All	Earthen Fill - guard lock	New Secondary Water Intake for WLP	In-place Gate Storage	Concrete Bulkhead	Cost 2017 (Present Value)	Annual Cost
No Action	0	Status Quo	X											NA	$205,100
Transfer to Identified Transferee (Transfer thru GSA viable but not preferred)	1	Operational	X	X		X								$ 5,604,400	$212,700
	2	Non-Operational	X		X									$ 1,883,300	$71,500
	3	AS-IS												$ 0	$0
Transfer Thru GSA	4	Fully Filled In					X	X	X		X			$ 8,077,900	$306,600
	5	Partially Filled In	X		X		X			X	X	X		$ 2,407,900	$91,400
	6	Concrete Bulkhead	X		X		X				X	X	X	$ 2,430,900	$92,300
	7	Run of River			X		X	X			X			$ 1,193,100	$45,400

4.4 ALTERNATIVES SCREENING

Table 12 summarizes the screening decisions for each alternative and a brief discussion is provided below.

4.4.1 No-Action Alternative: Retained

4.4.2 Operational Lock Alternative: Screened Out

Not economically efficient due to high implementation costs. (Table 11). The high federal investment is not justifiable, as there are less expensive alternatives that achieve the project objectives

4.4.3 Non-Operational Lock Alternative: Retained

Least cost alternative that fulfills the planning objectives and avoids violating planning constraints.

4.4.4 "As-Is" Alternative: Screened Out

Violates the project constraints- the risk to people, property and the environment is the highest of all alternatives under the initial array of alternatives.

- In the case of a seismic event causing an uncontrolled release of water due to failure of Gates 6 and 7, there would be an adverse impact to the ESA listed species within the migration corridor near and around the Falls. The breach would cause an attraction flow near Chamber 1, away from the existing fish ladders located within the Falls or at the PGE plant, thousands of feet upstream of Gate 1. The breach would also reduce the pool upstream of the Falls causing the existing fish ladder to become hydraulically disconnected and unusable if fish are able to avoid the false attraction. Should anadromous fish not pass the Falls, and thus expire, hundreds of millions of federal dollars invested in upstream fish passage facilities would also be at risk.
- In the case of a seismic event causing an uncontrolled breach at Gates 6 and 7 would cause flow through the canal rather than to and through the PGE hydropower plant; which has an average annual output of approximately 21,000,000 kilowatt-hours, worth approximately 1.5 million dollars.
- In the case of a seismic event along with a high water event, an uncontrolled release could result in loss of life at the WLP Co. Approximately 30 to 40 mill employees work below grade (the 1st floor elevation) and there is a 20 foot drop in water surface elevation between Gates 7 and 3 (elevation of top of Gate 7 is 64.57', while the elevation of top of Gate 3 is 44.4).

4.4.5 Filling in all Chambers Alternative: Screened Out

Not economically efficient due to high implementation costs (Table 11). The high federal investment is not justifiable, as there are less expensive alternatives that achieve the project objectives.

4.4.6 Partially filling in the chambers Alternative: Screened Out

Not economically efficient due to high cost of long term O&M requirements resulting from erosion and its effects.

4.4.7 Construction of a Concrete Bulkhead in the Guard Lock Alternative: Retained

Competes well financially, meets planning objectives and avoids violating planning constraints.

4.4.8 Run of River Alternative: Screened Out

Violates the project constraint: uncontrolled flow through the chambers would cause an adverse impact to the ESA listed species within the migration corridor near and around the Falls by causing false attraction flow near Chamber 1 and hydraulically disconnecting the existing fish ladders located at either the Falls or the PGE plant, thousands of feet upstream of Gate 1 of the Locks. Should anadromous fish fail to migrate upstream of the Falls, hundreds of millions of federal dollars invested in upstream fish passage at the 13 Corps multipurpose projects in the Willamette River Basin is at risk.

Table 12: Alternatives Screening. Alternatives 0, 2 and 6 are carried forward for further consideration.

	Effective (Meets Project Objective w/o violating Project Constraints) (Yes/No)	**Efficiency** in terms of Cost (when costs are low, the alternative is highly efficient)	**Ease of Conveyance** (Marketability) (High, Medium, Low) (Completeness)	**Risk** to People, Property and the Environment (High, Medium, Low) (Acceptable)	Notes
Alt. #1 - No Action	No	No	N/A	High	Carry Forward
Alt. #2 - Operational Lock	Yes	Low	High	Medium	Screened out due to high federal costs
Alt. #3 - Non Operational Lock *	Yes	High	Medium	Medium	Carry Forward
Alt. #4 - AS-IS *	No	Very High	Low	High	Violates project constraints without some stability measures.
Atl. #5 - Fully Filled In	Yes	Very Low	Medium High	Low	Screen out due to high federal costs
Alt. #6 - Partially Filled In	Yes	High	Medium	Medium	Screen out due long term O&M issues (deal with erosion and its effects)
Alt. #7 - Concrete Bulkhead *	Yes	High	Low	Medium	Carry Forward
Atl. #8 - Run of River	No	Medium	N/A	Medium	Screened out as it violates project constraints

4.5 FINAL ARRAY OF ALTERNATIVES

4.5.1 ALTERNATIVE 1 – NO ACTION

Please see Section 0 above for a detailed description of the No Action Alternative.

4.5.2 ALTERNATIVE 3 - NON-OPERATIONAL LOCK

General Description:
This alternative addresses the primary risks associated with the interim-closure status with measures that do not impede future owner/operators from returning the facility to operability. This alternative consists of minimal repairs required from a federal perspective to address the planning constraints, assuming the future owner/operator continues the base Caretaker maintenance actions for the non-operational condition of the Locks. These measures address immediate safety and environmental hazards and allows adjoining property owners to continue their operation without future adverse impact. This alternative includes Seismic Partial and Safety Minimal measures. The risks associated with operating the Locks as a navigation passage without repairing the critical deficiencies would be passed on to the transferee with all available known information and proposed facility modifications to mitigate these risks.

Facility Modifications and Implementation:

The Seismic Partial measure applied to this alternative is comprised of a seismic retrofit of the following facility elements at the upstream end of the Locks: the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side of Gates 6 and 7. The gate monolith seismic retrofits would be accomplished with vertical rock anchors at a spacing and size to increase the downward force on the masonry layers to increase the inter-layer friction to resist sliding while not adversely affecting the overturning capabilities of the monolith. Rock anchors for the concrete wall retrofit would be the same as the anchors for the gate monolith retrofit. Rock anchors are to be drilled, grouted and post tensioned from the deck of the monoliths and walls. A slurry is used for lubrication and debris removal during drilling of the rock anchor holes. This slurry would result in overspray at the deck. Where there is seepage paths that intersect the drill shaft (such as ashlar masonry block interfaces) this slurry may seep through to either side of the monolith or wall. This slurry is typically environmentally inert and may be mitigated with the use of turbidity curtains and monitoring. The rock anchor is then bonded to the underlying anchor material with a grout. The rock anchor is post-tensioned and the annular space above the bonding grout is filled with a secondary pressurized grout. The pressurized grout may perform similarly to the drill slurry and seep through the cracks within ashlar masonry and concrete into the water; however, this is assumed to occur to a lesser extent. The implementation may be accomplished by tracked or truck mounted drill rig driven onsite via the bascule bridge. No specialized access is assumed necessary. Equipment staging and lay down may occur at the area of implementation or in the parking lots adjacent to the Locks.

The Safety Minimal measure is applied to exclude the general public from the safety hazards present. Implementation of exclusion fencing and debris and boat barriers for the Locks is assumed to be minimally invasive to erect and install. No specialized access is assumed

necessary. Equipment staging and lay down may occur at the area of implementation or in the parking lots adjacent to the Locks.

Table 13: Alternative 3 facility modifications and repair. Cost, including present value (PV) and annualized, were sourced from the 2011 FER and updated to 2017 dollars.

Measures		**Costs (2017) (PV)**	**Annual Cost**
Seismic Partial		$ 1,847,400	**$70,100**
Safety Minimal		$ 36,000	**$1,400**
Real Estate Disposal		$ 80,000	**$3,000**
Total:		$ 1,963,400	**$74,500**

Operations and Maintenance:
The Corps assumes operations and maintenance costs during interim transfer period until transferee has fully assumed ownership. This is assumed to be similar to the No Action alternative; however, it does not include the HSS Inspection, Periodic Assessments and Periodic Inspection costs as these would occur after the transfer period. Cost associated with interim transfer period is not included in this estimate. Transfer period is assumed to be less than 5 years.

Risks:
The Corps assumes risks not mitigated during interim transfer period until transferee has fully assumed ownership. Risks due to hydraulic fluid leakage is mitigated through gate monolith stabilization and continued interim-closure maintenance actions. Risks to public and unauthorized access are minimized through implementation of signage and fencing. Risks to cultural resources due to the seismic stabilization work would be coordinated through consultation with the OR-SHPO, Tribes and the ACHP. Risks due to the transfer of the property out of federal ownership would be addressed in a MOA with SHPO, the ACHP, Tribes and other interested parties.

Costs:
Cost of appropriate modifications are in 2017 (FY17) dollars. The total for these immediate repairs amount to $1,963,400 or approximately $74,500 on an average annual basis (calculated 2.875 percent over 50 years).

Preferred Conveyance Methodology:

Under this alternative the preferred method of conveyance would be to convey the real property interests to an identified non-federal transferee, once developed, as it would allow the Corps to comply with Executive Order 13287. This Executive Order directs that the Corps, where consistent with its mission and governing authorities, shall seek partnerships with State and local governments, Indian tribes and the private sector to promote local economic development and vitality through the use of historic properties in a manner that contributes to the long-term preservation and productive use of those properties. Such a partnership is a goal of the Willamette Falls Working Group.

4.5.3 ALTERNATIVE 7 - CONCRETE BULKHEAD

General Description:
This alternative proposes constructing a concrete bulkhead near the upstream end of the facility between Gates 6 and 7 to prevent an uncontrolled release of water through the Locks and the hazards associated with a pool breach. This would render the facility decommissioned, precluding future navigation operations of the facility. It is comprised of the following measures: Seismic Partial, Safety Minimal, Removal of Mechanical and Electrical Support, In-Place Gate Storage, Concrete Bulkhead and New Secondary Water Intake for WLP Co. The damming surface would be partially stabilized via the concrete bulkhead but would still require substantial seismic retrofits where not supported with fill. Pulling the gates supporting mechanical and electrical equipment is necessary to ensure no contaminants discharge or high energy hazards remain after implementation. The miter gates would be stored in-place in the open condition and further stabilize against the wall. Details on the known risks not mitigated prior to disposal would be provided to the transferee, along with associated proposed remediation measures. It is assumed the method of conveyance would be disposal through GSA since no potential transferee has expressed interest in the facility as a non-navigable facility.

Facility Modifications and Implementation:
The Seismic Partial measure applied to this alternative is comprised of a seismic retrofit of the following facility elements at the upstream end of the Locks: the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side of Gates 6 and 7. The gate monolith seismic retrofits would be accomplished with vertical rock anchors at a spacing and size to increase the downward force on the masonry layers to increase the inter-layer friction to resist sliding while not adversely affecting the overturning capabilities of the monolith. Rock anchors for the concrete wall retrofit would be the same as the anchors for the gate monolith retrofit. Rock anchors are to be drilled, grouted and post tensioned from the deck of the monoliths and walls. A slurry is used for lubrication and debris removal during drilling of the rock anchor holes. This slurry would result in overspray at the deck. Where there is seepage paths that intersect the drill shaft (such as ashlar masonry block interfaces) this slurry may seep through to either side of the monolith or wall. This slurry is typically environmentally inert and may be mitigated with the use of turbidity curtains and monitoring. The rock anchor is then bonded to the underlying anchor material with a grout. The rock anchor is post-tensioned and the annular space above the bonding grout is filled with a secondary pressurized grout. The pressurized grout may perform similarly to the drill slurry and seep through the cracks within ashlar masonry and concrete into the water; however, this is assumed to occur to a lesser extent. The implementation may be accomplished by tracked or truck mounted drill rig driven onsite via the bascule bridge. No specialized access is assumed necessary. Equipment staging and lay down may occur at the area of implementation or in the parking lots adjacent to the Locks.

The Safety Minimal measure is applied to exclude the general public from the safety hazards present. Implementation of exclusion fencing and debris and boat barriers for the Locks is assumed to be minimally invasive to erect and install. No specialized access is assumed necessary. Equipment staging and lay down may occur at the area of implementation or in the parking lots adjacent to the Locks.

The Concrete Bulkhead measure proposed places a cast-in-place concrete bulkhead immediately downstream of Gate 7 and upstream of Gate 6, serving as a dam within the guard lock chamber to provide permanent hydraulic control for the Locks and maintain the upstream Willamette Falls pool. The bulkhead would be of equal height to Gate 7 and have similar performance during an overtopping event. This would be a solid wall such that no water would pass into the ship canal from upstream during normal flow conditions of the Falls or forebay operations by PGE.

The guard lock wall, Gate 6 monolith and concrete gravity wall separating the ship canal and PGE forebay would be modified to meet Corps structural and seismic standards with the Seismic Partial Measure.

A new secondary water supply intake to the West Linn Paper Mill would be placed upstream of the concrete bulkhead and the water would be conveyed via closed conduit pipe to their system.

The remaining miter gates would be left open, dogged in place, with the hydraulic operators removed and stored to avoid potential discharge of hydraulic fluid.

The mechanical and electrical support for all gates would be removed.

This alternative would require little maintenance; however, additional fencing and signage may be required because the empty chambers pose increased fall hazard risk than a water-filled chamber. A debris boom would be placed upstream of Gate 7 to reduce the amount of debris buildup in front of the bulkhead and the new secondary water supply for WLP Co.

The guard lock downstream of the bulkhead, ship canal and subsequent downstream Locks would remain empty. Positive drainage through the Locks would be graded into the lock floor such that any side slope runoff, ground water and other water sources entering the lock would drain to the downstream end of the lock. Under normal conditions, floating debris would not enter the Locks unless a flood occurs, at which point it would either be washed clean of the Locks or removed as necessary via crane from adjacent decking by responsible parties.

The seismic stability of the Ashlar Masonry monoliths and lock walls not addressed with this alternative and the risks not associated with a hydraulic breach of the PGE forebay or the Willamette Falls upstream pool would be accepted by the transferee. Parametric cost estimates are derived from the 2011 FER.

Table 14: Alternative 4 facility modifications and repair. Costs were sourced from the 2011 FER and updated to 2017 dollars. Cost for the Signage, Fencing and Debris Boom was sourced from the Willamette Falls Locks Interim EDR 2013. Costs for New WLP Secondary Water Intake, Concrete Bulkhead and Mechanical/Electrical Systems Removal was developed during the disposition study.

Measures		**Costs (2017) (PV)**	**Annual Cost**
Seismic Partial		$ 1,847,400	**$70,100**
Safety Minimal		$ 36,000	**$1,400**
Remove Mechanical / Electrical Support		$ 67,600	**$2,600**
New Secondary Water Intake for WLP Co		$ 318,300	**$12,100**
In-place Gate Storage		$ 35,800	**$1,400**
Concrete Bulkhead		$ 125,900	**$4,800**
Real Estate Disposal		$ 80,000	**$3,000**
Total:		$ 2,511,000	**$95,300**

Operations and Maintenance:
The Corps would assume operations and maintenance until full conveyance through GSA occurs. Since mechanical and electrical components have been removed operation and maintenance would largely be a monitoring effort.

Risks:
The Corps assumes risks not mitigated by facility modifications during interim transfer period. This includes risk of lock wall or gate monolith failure in Locks 1-4. Risks due to vandalism and unauthorized operations are reduced with signage and fencing as well as removal of operational components, risk of algae bloom is reduced through dewatering the chambers and uncontrolled breach of upstream pool have been reduced in this alternative with seismic stability measures on upstream gate monoliths and walls. Risks to cultural resources due to the construction of he concrete bulkhead and seismic stabilization work would be coordinated through consultation with the SHPO, Tribes and the ACHP. Risks due to the adverse effect of installing a concrete bulkhead would be addressed in an MOA with SHPO, the ACHP, Tribes and other interested parties.

Costs:
The total for these modifications amounted to $2,455,000 or approximately $93,100 on an average annual basis (calculated 2.875 percent over 50 years).

4.6 EVALUATION AND COMPARISON OF ALTERNATIVES

Based on the sharp decline in commercial tonnage at the Locks and based upon existing and anticipated future conditions, the Corps has been determined that there is no federal interest in continuing to retain the project for its currently authorized navigation purposes. A summary of the plans to be carried forward for further consideration in the Final Array of Alternatives is below in Table 15.

Table 15: Final Array of Alternatives

Alternatives	PV Cost	AA Cost	Ease of Conveyance	Risks to People, Property and Environment
Alt 1. No Action	$5,404,800	$205,100	N/A	High
Alt 3. Non-Operational Locks	$1,883,300	$71,500	Medium	Medium
Alt 7. Concrete Bulkhead	$2,430,900	$92,300	Low	Medium

The evaluation and comparison process incorporates four accounts to facilitate evaluation and display of effects of alternative plans in the final array to dispose of the federal property at the Locks. The four accounts are national economic development (NED), environmental quality (EQ), regional economic development (RED) and other social effects (OSE).
Based on this evaluation, Alternative 3, the Non-Operational Locks alternative, was identified as the Tentatively Selected Plan (TSP).

National Economic Development
The NED account identifies the plan that reasonably maximizes net national economic development benefits, consistent with the Federal objective. This plan is to be identified as the NED plan. In the case of a Corps disposal study, the Federal objective is to identify the least cost, environmentally acceptable alternative for disposing of the federal real properties. All alternatives are environmentally acceptable. The NED plan is to implement Alternative 3, the Non-Operational Locks alternative as it is the least cost alternative, assuming there is no market for the existing facility (Table 15). This assumption is based on the fact no interested party has expressed interest in the facility over the past ten year period in which time the Corps has been actively seeking a new owner. Every state agency, local governing body and all known local stakeholders are keenly aware of the Corps' interest in divesting the government's real property interests in the facility as evidenced by the effort to create a governance model and funding mechanism under Oregon Senate Bill 256 for a successful conveyance of the facility.

Regional Economic Development
The RED account measures changes in the distribution of regional economic activity that would result from each alternative plan. The PDT looked at RED qualitatively using the ease of conveyance metric. Alternative 3, the Non-Operational Locks has the greatest potential to provide economic benefits to the region. It is the only alternative in the Final Array that would not preclude returning the Locks to operability and, therefore, would provide for the widest array of potential uses including cultural tourism, recreation and commerce. Alternative 3 is also the most acceptable to local stakeholders because it does not impede a future owner's ability to repair the Locks to operability (demonstrated by a medium rating for ease of conveyance, Table 15). Currently, the primary demand for lock services comes from recreational and tourism use. By facilitating recreational and tourism access up and downstream of the Falls on the Willamette River, the ability to repair the Locks to operability would help support local economic development goals (MacMullan 2014). Additionally, although there is not enough commercial tonnage to support a federal interest in returning the Locks to operability, there are several regional industries or businesses that produce goods that could be and previously have been prior

to the interim-closure, transported via barge through the Locks. These include local aggregate producers, agricultural and logging companies, trash transport and marine construction. As discussed in Section 0, several local businesses and their communities have been negatively impacted by the interim-closure and would continue to be under any alternative that precludes returning the Locks to operability.

The construction expenditures associated with both Alternative 3 and Alternative 7 would result in beneficial short-term economic impacts to the region during the actual period of construction. The economic impacts are expected to be limited due to contract award; the availability of skilled and unskilled labor in the region; and the availability of regional materials and equipment. It is assumed that, at a minimum, a portion of the direct labor and materials budgets would be expended in the area or the region surrounding the area. This assumption is based on the belief that some of the labor would be hired from the local work force and the materials would come from local sources. Expending these resources within the regional economy could result in a temporary increase in employment, personal income and business activity.

Environmental Quality

The environmental quality account considers non-monetary effects on ecological, cultural and aesthetic resources. Under this account, the preferred plan should avoid or minimize environmental impacts in the project area to the extent practicable considering other criteria and planning objectives. Detailed descriptions of the analysis and impacts can be found in Chapter 5. ENVIRONMENTAL IMPACTS*. Each of the alternative have similar environmental impacts, however, Alternative 7, the Concrete Bulkhead alternative, is the only alternative that requires fill in the waters of the United States and would have additional impacts to the human environment not associated with either Alternative 1, the No Action alternative, or Alternative 3, the Non-Operational alternative.

Other Social Effects

The OSE account is a means of displaying and integrating into water resource planning information on alternative plan effects from perspectives that are not reflected in the other three accounts. No construction or operational impacts to the human environment are expected. Populations of minority, juvenile, elderly and low-income families would not experience disproportionately high and adverse effects from any of the proposed alternatives. Schools/childcare facilities and hospitals are dispersed throughout the area and are not disproportionately located near the project area. Thus, no disproportionately high and adverse impacts to children are expected. Overall, based on the absence of adverse impacts to human health, environmental health risks and safety risk, this project would not have disproportionately high and adverse impacts to any communities, including environmental justice communities or children.

5. ENVIRONMENTAL IMPACTS*

This environmental assessment is written in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U,S,C, §§ 4321–4347), as amended, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 C.F.R. §§ 1500–1508) and the Corps Planning Regulations (Engineering Regulation (ER) 200-2-2). The assessment of environmental effects is based on a comparison of conditions with and without implementation of the proposed plan; in this case, potential effects associated with the proposed disposition of the Locks under Alternative 3 (proposed action/preferred alternative/TSP) compared to the No-Action Alternative.

5.1 ALTERNATIVE 1 – NO ACTION ALTERNATIVE

The No-Action Alternative is analyzed as the future without-project conditions for comparison with the action alternatives. In this case, taking no action assumes that the Locks would remain in a non-operational Caretaker status, owned and minimally maintained by the Corps, as described in Section 0, for the 50 year planning horizon. The entire navigation lock channel, from Gate 1 through Gate 7, would continue to be closed to public and private vessel passage and maintained in non-operational status. All physical conditions existing at the time of this analysis are assumed to remain, however, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. Additionally, it is assumed that the lock wall and monolith stability deficiencies at the guard lock wall and the guard lock monoliths on the riverward side of Gates 6 and 7 at the upstream end of the Locks would be corrected by implementing the Seismic Partial measure, described in Section 0, when an urgent or compelling need develops during the planning horizon.

5.2 ALTERNATIVE 3 – PREFERRED ALTERNATIVE – NON-OPERATIONAL LOCKS

Based on the evaluation and comparison of alternatives summarized in Section 4.6 EVALUATION AND COMPARISON OF ALTERNATIVES, the proposed action is Alternative 3, the Non-Operational Locks alternative. Under this alternative, the proposal analyzed is summarized below:

- Transfer the Locks facility to a non-federal transferee. The District would remain responsible for the properties up to the point at which the ownership is transferred.
- Any action necessary to complete the real estate transfer including a Phase 1 Environmental Site Assessment to identify potential or existing environmental contamination and a Memorandum of Agreement (MOA) with the OR-SHPO to implement the agreed upon stipulations in order to mitigate adverse effects to the Locks caused by the disposal would be included.
- Implementation of seismic and safety measures to address immediate health, safety and environmental hazards and permit adjoining property owners to continue their operation without future adverse impacts. Unmitigated risks associated with operating

the Locks as a navigation passage prior to disposal would be passed on to the transferee with all available known information and proposed mitigation measures. Construction activities would generally involve:
    - mobilization;
    - installing vertical rock anchors in the gate monolith at the upstream end of the lock which is made up of: the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7);
    - implementation of exclusion fencing and debris and boat barriers along the length of the west side of the Locks; and
    - site cleanup and demobilization.
- Once the Locks are disposed of, it is reasonably foreseeable that the transferee would eventually fully repair the facility to an operational state and recommence navigation through the Locks structure for recreation and commercial purposes after addressing remaining health and safety risks.

5.3 ALTERNATIVE 7 - CONCRETE BULKHEAD

Under this alternative, the proposal analyzed is summarized below:

- Transfer the Locks facility to a non-federal transferee through GSA. A likely transferee under this alternative has not been identified. The District would remain responsible for the properties up to the point at which the ownership is transferred.
- Any action necessary to complete the real estate transfer including a Phase 1 Environmental Site Assessment to identify potential or existing environmental contamination and a Memorandum of Agreement (MOA) with the OR-SHPO to implement the agreed upon stipulations in order to mitigate adverse effects to the Locks caused by the disposal would be included.
- Construction of a concrete bulkhead near the upstream end of the facility between Gates 6 and 7 as well as implementation of seismic and safety measures to address immediate health, safety and environmental hazards and permit adjoining property owners to continue their operation without future adverse impacts. Construction activities would generally involve:
    - Mobilization;
    - Installing vertical rock anchors in the gate monolith at the upstream end of the lock which is made up of: the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7);
    - Implementation of exclusion fencing and debris and boat barriers along the length of the west side of the Locks;
    - Placement of a cast-in-place concrete bulkhead immediately downstream of Gate 7 and upstream of Gate 6, serving as a dam within the guard lock chamber to provide permanent hydraulic control for the Locks and maintain the upstream Willamette Falls pool.
    - Modification of the guard lock wall, Gate 6 monolith and concrete gravity wall separating the ship canal and PGE forebay;

    - Placement of a new secondary water supply intake to the West Linn Paper Mill upstream of the concrete bulkhead and the water would be conveyed via closed conduit pipe to their system;
    - Removal and storage of the hydraulic gate operators to avoid potential discharge of hydraulic fluid;
    - Removal of the mechanical and electrical support for all gates; and
    - Site cleanup and demobilization.
- These measures would render the facility decommissioned, precluding future navigation operations of the facility without extensive construction to remove the concrete bulkhead. Once the Locks are disposed of, it is reasonably foreseeable that the transferee would not eventually fully repair the facility to an operational state and recommence navigation through the Locks structure due to the expense required to remove the bulkhead and repair the facility to operation.

5.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT (EA)

The objective of this EA is to analyze whether the implementation of the preferred alternative (Alternative 3) would impact the quality of the environment. The scope of the analysis is limited in time and space by the reasonably foreseeable direct, indirect and cumulative impacts of the proposed action. Direct effects are caused by the action and occur at the same time and place as the action (40 C.F.R. § 1508.8a) while indirect effects are caused by the action, but may occur later in time or further removed in distance (40 C.F.R. § 1508.8b). Cumulative effects "result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions" (40 C.F.R. § 1508.7).

This EA compares the effects of the proposed actions in the Preferred Alternative to those of the No Action Alternative. The primary action areas for this analysis include the Locks facility and property currently owned by the federal government; the proposed construction staging area; and the proposed access routes. For certain potential effects, such as those on ambient noise and air quality conditions, the analysis extends to adjacent properties. Indirect effects on conditions within the greater Willamette Falls (e.g. cross river and up or downstream) also fall within the scope of analysis in some cases. Additionally, this analysis includes evaluation of potential cumulative impacts associated with other past, current, or reasonably foreseeable (as of March 2017) future projects expected to occur within the vicinity of the action area.

The existing conditions of the environmental resources evaluated in this EA (the affected environment) are described in Chapter 3 of this integrated document; references to any applicable portions of these sections are provided in the introduction of each resource discussion below. In some instances, neither the No Action alternative (Alternative 1) or the action alternatives (Alternative 3 and Alternative 7) are expected have any effect on a given environmental resource. Such resources are identified at the beginning of the sub-sections below and are not discussed further.

5.5 PHYSICAL ENVIRONMENT

This section discusses the potential effects of the proposed action (Alternative 3) and No Action Alternative on components of the physical environment. The physical environment generally refers to properties of the land, water and air within the vicinity of proposed action areas. Physical environmental resources include those such as topography, soils, geology, hydrology and water quality characteristics and air quality. The alternatives are not anticipated to result in any change to climate, geology, seismicity and seismic hazards, topology, soils, or hydrology. These resources are not further discussed in this section.

5.5.1 WATER QUALITY IMPACTS

5.5.1.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to water quality are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors.

Surface Water

Under the No Action Alternative, summertime aquatic growth within the ship canal that has resulted since the interim-closure in 2011 is expected to persist as a result of stagnant conditions within the Locks' canal when they remain closed for an extended period of time. Under the No Action Alternative, the Corps would continue to open the Locks periodically to pass debris buildup. This flow would clear stagnant water in the canal. If water quality conditions worsen as a result of algal blooms, the Corps would implement adaptive management maintenance activities such as increasing the occurrence of opening the Locks; increasing the bypass flow that serves to keep the ship canal full and supply water to WLP Co. secondary water intake; or implementing a more active management using some water quality sampling to determine when flushing more water through is needed.

Additionally, under the No Action Alternative, when an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, it is assumed that seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. For this seismic retrofit, rock anchors are to be drilled, grouted and post tensioned from the deck of the monoliths and walls. A slurry is used for lubrication and debris removal during drilling of the rock anchor holes. This slurry would result in overspray at the deck. The rock anchor is then bonded to the underlying anchor material with a grout. The rock anchor is post-tensioned and the annular space above the bonding grout is filled with a secondary pressurized grout. The pressurized grout may perform similarly to the drill slurry and seep through the cracks within ashlar masonry and concrete into the water; however, this is assumed to occur to a lesser extent. The slurry and grout are typically environmentally

inert. Water clarity can be affected by releases of solids into a stream course. Turbidity is a measurement of the clarity of the water column and more turbid conditions are generally associated with elevated levels of suspended and settleable particulates in the water column. Some minor temporary increases in turbidity may result from seepage paths that intersect the drill shaft (such as ashlar masonry block interfaces) as this slurry may seep through to either side of the monolith or wall into the Canal or the PGE forebay. However, increases in turbidity can be mitigated with limited use of turbidity curtains and monitoring. The increased turbidity is expected to be of a short-term nature and is not anticipated to degrade water quality in the Willamette River.

Construction activities in the vicinity of surface waters in general have the potential to introduce pollutants into water courses and impact water quality. Avoidance and minimization measures would be exercised throughout the seismic retrofit to ensure no debris, rubbish, petroleum products, or other materials from construction or associated activities impact water quality in the Willamette River. Storage, maintenance and staging of equipment would be limited to the designated staging areas (the WLP Co. parking lot on the west side of the Locks) and conducted in a manner that would not result in a discharge of any substance to the Willamette River. Any fueling of equipment would occur at appropriate off-site facility or in designated locations in staging areas and would be implemented in a manner designed to ensure no pollution occurs (e.g. with secondary containment). Although spills are unanticipated, spill response equipment would be stored onsite for immediate implementation to minimize the impacts of any accidental spills. At the completion of construction, all construction wastes, debris, sediment, rubbish, trash, fencing and materials would be removed from the site and transported to an authorized disposal area to prevent any materials from entering the waters of the Willamette River. Additionally, contracted and Corps-owned construction equipment should use environmentally acceptable lubricants whenever feasible. Given these avoidance measures, the proposed action is not expected to have an adverse effects on water quality from pollutants.

Pursuant to Section 401 of the Clean Water Act (CWA), 33 U.S.C. §§ 1251, et seq. the seismic retrofit construction action would require a Section 401 Water Quality Certification from the DEQ. The Corps would coordinate with the DEQ and is in the process of preparing an application for Section 401 Certification. The proposed action would adhere to any conditions set forth in the water quality certification in order to ensure consistency with the DEQ's Water Quality Control Plan for the jurisdiction.

Ground Water

Stream water levels are not expected to be affected under this alternative, therefore no impacts on groundwater are anticipated.

5.5.1.2 Alternative 3 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to water quality would be the same as described under the Alternative1/No-Action.

5.5.1.3 Alternative 7(Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to water quality would be the same as described under the Alternative1/No-Action. The filling of the lock chamber to implement the concrete bulkhead under this alternative would likely result in additional minor impacts to water quality. Temporary increases in turbidity would likely create short-term degradation of water quality downstream from the work sites. According to the Clean Water Act (CWA), a 404(b)(1) evaluation is required for any project proposing fill be place into Waters of the U.S.

5.5.2 AIR QUALITY IMPACTS

5.5.2.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to air quality are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. Air emissions from the proposed action would be temporary and minimal.

Section 176(c) of the Clean Air Act (CAA), 42 U.S.C. §§ 7506, et seq. of the CAA requires federal agencies to ensure that their actions conform to the applicable State Implementation Plans for attaining and maintaining the NAAQS. Under these regulations, a federal agency is required to conduct an air quality applicability analysis (and potentially a general conformity analysis) for a proposed action unless that action is exempt (as defined in CFR 40 § 93.153(c)) or falls within an air district that is in compliance with all NAAQS. As described in Section 0 of this document, the proposed action would take place in an attainment or unclassified (i.e. in compliance) area for all state and federal air quality standards. Based on the proposed best management practices and minimization measures and the fact that the action areas fall within an air district that is in compliance with all NAAQS, the No Action Alternative would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Thus, the No Action Alternative would not have a adverse effect on air quality or climate change.

Noise

Under the No-Action Alternative, no new long-term noise sources in the study area are expected. The Locks area located in a highly developed, industrial area with high noise producing facilities. Construction activities associated with implementing the eventual seismic retrofit would cause temporary increases in noise levels in the immediate vicinity of the construction zone. According to the U.S. Department of Transportation's (US DOT's) Construction Noise Handbook (US DOT 2006), airborne noise associated with the rock drill likely to be used to

install the vertical rock anchor has an acoustical specification limit of 85 dBA at a reference distance of 50 foot from the loudest side of the equipment. Increased noise would occur in close proximity to the equipment and would not affect residential areas or other sensitive receptors. Assuming that noise from a point source attenuates at a rate of approximately 7.5 dBA per doubling of distance due to absorption of noise waves by soft ground surfaces (e.g., dirt, grass, scattered vegetation) and intervening features and structures, the loudest construction sounds (from vibratory pile driving) would attenuate to 70 dBA at 150 feet from the source activity and 55 dBA at 200 feet from the source activity. Generally, noise levels of 80 decibels (dBA) or above produce the following human responses: 80 to 90 dBA (annoying), 90 to 110 dBA (very loud), 110 to 120 dBA (extremely loud), 130 to 140 dBA (painfully loud) (Science Applications International Corporation, 2007).

As the noise levels from the proposed activities would be temporary, there are no sensitive noise receptors in the immediate vicinity and the localized area is a typically noisy environment due to industrial activities

However, the construction contractor would adhere to the following abatement measures to minimize potential noise impacts associated with construction:

- Maintain and operate equipment to minimize noise.
- Equip engines with properly functioning mufflers
- Limit activity near noise sensitive areas so as not to disrupt normal activities.

Should complaints arise due to construction noise, the following additional abatement measures may be considered:

- Install portable acoustic barrier around stationary construction noise sources.
- Shut off idling equipment.
- Notify nearby residents whenever extremely noisy work would be occurring.
- Schedule noisy construction operations near the middle of the day.
- Locate stationary construction equipment as far from nearby noise sensitive receptors as possible.

5.5.2.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to air quality and noise would be the same as described under the Alternative1/No-Action.

No impacts to air quality and noise are expected after disposition.

5.5.2.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to air quality and noise would be the same as described under the Alternative1/No-Action.

No impacts to air quality and noise are expected after disposition.

5.5.2 CLIMATE CHANGE IMPACTS

5.5.2.1 Alternative 1/No Action

Under the No Action Alternative, construction and any maintenance activities involving fuel-burning equipment would result in greenhouse gas emissions. The combustion of fuel to operate construction equipment releases carbon dioxide (CO2), a greenhouse gas associated with climate change. For example, idling of construction equipment can emit approximately 20.7 pounds of CO2 per hour, depending on engine size (Lyon 2012). Emissions of carbon dioxide would be minimized by enforcing idling limits and ensuring construction equipment meets fleet emissions standards.

5.5.2.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to climate change would be the same as described under the Alternative1/No-Action.

5.5.2.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to climate change would be the same as described under the Alternative1/No-Action.

5.6 SOCIOECONOMIC ENVIRONMENT

This section discusses the potential effects of the Preferred Alternative (Alternative 3) and No Action Alternative on components of the socioeconomic environment. The socioeconomic environment refers to socio-environmental resources related to individuals, communities, cultural or historic features, modes of transportation, specially designated land uses, facilities, or services, as well as to established plans, policies and controls.

Neither the Preferred Alternative (Alternative 3) nor the No Action Alternative would result in any change to certain components of the human environment, including: aesthetics, environmental justice, Prime and Unique Farmland, Parks, National and Historic Monuments, National Seashores, Wild and Scenic Rivers, Wilderness Areas, Research Sites, etc. components of the socioeconomic environment and community or regional growth. These resources are not further discussed in this section.

5.6.1 ECONOMIC IMPACTS

5.6.1.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No economic impacts are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the

guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. The eventual construction expenditures associated with the seismic retrofit would result in beneficial short-term economic impacts to the region during the actual period of construction. It is assumed that, at a minimum, a portion of the direct labor and materials budgets would be expended in the region. This assumption is based on the belief that some of the labor would be hired locally and the materials, much of which is aggregate, would come from local sources. Expending these resources within the regional economy could result in a temporary increase in employment, personal income and business activity. No large scale, long-term changes in the socioeconomic conditions in the study area are expected under this alternative. However, marine commerce between the upstream and downstream areas of the Falls will continue to be restricted and impacts to the local marine commerce as described in Section 0 will continue to be experienced into the future.

5.6.1.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the short term economic impacts would be the same as described under the Alternative1/No-Action.

Impacts to land use after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation. A 2014 Willamette Locks Economic Potential Report, prepared by ECONorthwest, assessed and described the types of demand for river access that Locks would facilitate if fully rehabilitated to operational status (MacMullan 2014). Even though the Locks were originally built to satisfy commercial demand and WCP as well a several other local marine based companies and their suppliers are likely to benefit from an operational lock system at the Falls, only modest demand for lockages from commercial users were expected at the time of the report (MacMullan 2014). The report concludes that the primary demand for lock services comes from recreational and tourism use as the Locks provide a unique draw for visitors interested in the region's historical and cultural attributes (MacMullan 2014). The report further concluded that facilitating recreational and tourism access up and downstream on the Willamette River would help support economic development goals of jurisdictions along the river. The development of the Willamette Legacy Project described in Section 0 at the former Blue Heron Paper Company site across the river is expected to draw more attention to the Falls and Locks and increase the public's awareness of the area's attributes. Therefore, the transfer of the Locks is likely to have a positive impact on the socioeconomics of the region. No negative impacts to socioeconomics are expected after disposition.

5.6.1.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that economic impacts would be the same as described under the Alternative1/No-Action. The eventual construction expenditures

associated with the concrete bulkhead construction and seismic retrofit would result in beneficial short-term economic impacts to the region during the actual period of construction. It is assumed that, at a minimum, a portion of the direct labor and materials budgets would be expended in the region. This assumption is based on the belief that some of the labor would be hired locally and the materials, much of which is aggregate, would come from local sources. Expending these resources within the regional economy could result in a temporary increase in employment, personal income and business activity. No large scale, long-term changes in the socioeconomic conditions in the study area are expected under this alternative. However, marine commerce between the upstream and downstream areas of the Falls would continue to be restricted and impacts to the local marine commerce as described in Section 10 will continue to be experienced into the future.

5.6.2 LAND USE

5.6.2.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to land use are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. Construction activities associated with installation of the vertical rock anchors would cause temporary impacts in the form of increased noise levels in the immediate vicinity of the construction zone. The increase in noise levels would be temporary and should not conflict with adjacent land uses as this is a highly industrialized area where ambient noise levels are already high. Therefore, no short-term or long-term changes in adjacent land use or conflicts with adjacent uses is expected under this alternative.

5.6.2.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the short term landuse impacts would be the same as described under the Alternative1/No-Action. Additionally, the installation of exclusion fencing and debris and boat barriers would deter access to the lock walls, serving to remove access to the operational safety hazards present. No change in adjacent land use or conflicts with adjacent uses is expected due to the addition of the fencing.

Impacts to land use after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation. In 2015, Oregon State Senate Bill 131 established the Willamette Falls Locks Task Force the purpose of which is to compile information related to the historic, economic, cultural, recreational and other current and potential future values of the Willamette Falls Navigation Canal and Locks. The Task Force, which includes tribal and appointed local, regional and state representatives, developed a set of recommendations including a recommendation for the Oregon Legislature to

establish a Willamette Falls Locks Commission. Currently, it is assumed that, through the efforts of the Task Force and of the proposed Willamette Falls Locks Commission, a state, regional, or local authority would purchase the Willamette Fall Locks site in order to rehabilitate and maintain the Locks to an operational status. Returning the Locks to operational status would conform with developments in the surrounding area including the Willamette Legacy Project, described in section 3.4.15, as an operational Locks system would provide public access to the Falls, honor the site's past and provide additional recreational opportunities, all goals of the Legacy Project. There are no negative impacts to land use expected after the disposition of these sites.

5.6.2.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that land use impacts would be the same as described under the Alternative1/No-Action.

Impacts to land use after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. Although the region has expressed considerable interest in acquiring the Locks, these stakeholders have also strongly opposed any alternatives which would inhibit the transferee's ability to return the Locks to operability for navigation. The bulkhead proposed by this alternative would inhibit repairing the Locks to operability. It is assumed that any transferee will be required to maintain the adjacent property owners the ability to access their property via existing right of way across the Locks facility. Therefore, impacts to land use after disposal are anticipated to be the same as described under the Alternative 1/No Action. There are no negative impacts to land use expected after the disposition of these sites.

5.6.3 RECREATION IMPACTS

5.6.3.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to recreation are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. Construction activities associated with installation of the vertical rock anchors would cause temporary impacts in the form of increased noise levels in the immediate vicinity of the construction zone and site access limitations for safety when construction equipment is being transported to the worksite. These impacts would be minimal and temporary in nature. Therefore, no short-term or long-term changes in recreation conditions in the study area are expected under this alternative. Impacts to recreation as described in Section 0 resulting from the interim-closure will persist into the future.

5.6.3.2 Alternative 3

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the short term recreation impacts would be the same as described under the Alternative1/No-Action. No change in existing recreation is expected due to the addition exclusion fencing and debris and boat barriers.

Impacts to recreation after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation. It is assumed that a state, regional, or local authority would purchase the Locks site in order to rehabilitate and maintain the Locks to an operational status. Returning the Locks to operational status would provide additional recreational opportunities not currently available by providing navigational route for recreational boaters across the Falls. There are no negative impacts to recreation expected after the disposition of these sites.

5.6.3.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that short term impacts to recreation would be the same as described under the Alternative1/No-Action.

Impacts to recreation after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. It is unknown if the transferee will maintain public access to the park facilities located on site and, therefore, there may be impacts to recreation if access is limited or prohibited by the non-federal transferee under this alternative.

5.6.4 INFRASTRUCTURE IMPACTS

5.6.4.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to infrastructure are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. The eventual seismic retrofits would aid in maintaining the upstream pool. This would ensure that the WLP Co. water intake would continue to have access to the pool water over the long-term. Construction activities can proceed independent of the water levels, therefore, construction is not expected to impact existing infrastructure. Equipment would be staged on the decking between the Locks and PGE's forebay during construction. This decking area is shared by PGE and the Corps. No impacts to this decking or other infrastructure or utilities on site is expected as a result of construction activities.

5.6.4.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the impacts to infrastructure would be the same as described under the Alternative1/No-Action. No change in existing infrastructure is expected due to the addition exclusion fencing and debris and boat barriers.

Impacts to infrastructure after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, seismic retrofits would aid the transferee in maintaining the upstream pool. This would ensure continued access to the pool water for hydropower operations, water supply to the WLP Co. operations and fish ladder operations. No negative impacts to infrastructure are expected after disposition for any of the alternatives.

5.6.4.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that the impacts to infrastructure would be the same as described under the Alternative1/No-Action. No change in existing infrastructure is expected due to the addition exclusion fencing and debris and boat barriers. However, with the construction of the bulkhead would require the placement of a new secondary water supply intake to the West Linn Paper Mill upstream of the concrete bulkhead and the water would be conveyed via closed conduit pipe to their system. This is not expected to have short or long term impacts to infrastructure

Impacts to infrastructure after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, seismic retrofits would aid the transferee in maintaining the upstream pool. This would ensure continued access to the pool water for hydropower operations, water supply to the WLP Co. operations and fish ladder operations. No negative impacts to infrastructure are expected after disposition for any of the alternatives.

5.6.5 NAVIGATION IMPACTS

5.6.5.1 Alternative 1/No Action

Under the No-Action Alternative, the Locks would remain in non-operational, care-taker status and, therefore, no navigation would occur through the Locks. As the Locks have been closed to navigation since 2011, construction activities associated with the eventual seismic retrofit would have no impact on navigation. Impacts experienced by the local commercial marine businesses after the interim-closure in 2011 would persist. No short-term or long-term changes in navigational conditions in the study area are expected under this alternative.

5.6.5.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the impacts to infrastructure would be the same as described under

the Alternative1/No-Action. No change in existing infrastructure is expected due to the addition exclusion fencing and debris and boat barriers.

Impacts to navigation after disposal of the property to a non-federal transferee is mostly speculative as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation. It is assumed that a state, regional, or local authority would purchase the Willamette Fall Locks site in order to rehabilitate and maintain the Locks to an operational status. Returning the Locks to operational status would provide for navigation across the Falls for commercial, recreational and emergency purposes. There are no negative impacts to navigation expected after the disposition of the site.

5.6.5.3 Alternative 7 (Concrete Bulkhead)

Under disposal with implemented concrete bulkhead, seismic retrofits and exclusion fencing and debris and boat barriers, the Locks would remain non-operational and, therefore, no navigation would occur through the Locks. As the Locks have been closed to navigation since 2011, construction activities associated with the alternative would have no impact on navigation. Impacts experienced by the local commercial marine businesses after the interim-closure in 2011 would persist. No short-term or long-term changes in navigational conditions in the study area are expected under this alternative.

5.6.6 HYDROPOWER IMPACTS

5.6.6.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to hydropower are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. The eventual seismic retrofits would aid in maintaining the upstream pool. This would ensure continued access to the pool water for hydropower operations over the long-term. Construction activities can proceed independent of the water levels, therefore, construction is not expected to impact hydropower conditions. No short-term or long-term changes in hydropower conditions in the study area are expected under this alternative.

5.6.6.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the impacts to hydropower would be the same as described under the Alternative1/No-Action. No change in hydropower operations is expected due to the addition exclusion fencing and debris and boat barriers.

Disposal of the project to a non-federal transferee after seismic retrofits and implementation of enclosure fencing would not adversely impact hydropower at the sites.

5.6.6.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that the impacts to hydropower would be the same as described under the Alternative1/No-Action. No change in hydropower operations is expected due to the addition exclusion fencing and debris and boat barriers.

Disposal of the project to a non-federal transferee after concrete bulkhead construction, seismic retrofits and implementation of enclosure fencing would not adversely impact hydropower at the sites.

5.6.7 AESTHETICS

5.6.7.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to land use are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. However, no short-term or long-term changes in aesthetic conditions in the study area are expected under this alternative.

5.6.7.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that the impacts to aesthetics would be the same as described under the Alternative1/No-Action. As the site is in a highly industrialized area, fencing would be visually consistent with other buildings and structures in the area and, therefore, would not have an impact of on the aesthetic qualities of the site.

Impacts to aesthetics after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation, its original purpose. It is assumed that a state, regional, or local authority would purchase the Locks site in order to rehabilitate and maintain the Locks to an operational status. Therefore, there are no negative impacts to aesthetics expected after the disposition of these sites.

5.6.7.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that the impacts to aesthetics would be the same as described under the Alternative1/No-Action. As the site is in a highly industrialized area, fencing would be visually consistent with other buildings and structures in the area and, therefore, would not have an impact of on the aesthetic qualities of the site. However,

implementation of the concrete bulkhead would impact the sites aesthetics by changing the inherent character of the site, as a bulkhead is incongruent with a Locks facility.

Impacts to aesthetics after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites.

5.6.8 HUMAN LIFE AND SAFETY IMPACTS

5.6.8.1 Alternative 1/No Action

The No Action Alternative does not address the operational safety concerns with regard to miter gate gudgeon anchors, seismic instability of the lock chamber walls and gate monoliths, nor the seepage issues between the Corps ownership and the adjoining property owners (WLP Co. and PGE). Under the No Action Alternative, the concern with wall stability and the risk of an uncontrolled breach through either Gate 6, Gate 7, the guard lock wall or through the ship canal wall separating the PGE forebay will be addressed through the implementation of the Seismic Partial measure. This will mitigate the risk to human life and safety associated with wall failure or an uncontrolled breach scenario and the subsequent flooding of WLP Co. Paper Mill property.

Under the No Action Alternative, the risk of vandalism and unauthorized wicket gate operation will remain. This could either lead to surcharging the ship canal from excessive flow through Gate 7 wickets or dewatering the ship canal through excessive flow through Gate 5. This would likely be a very slow process affecting the stability of the ship canal wall at the PGE forebay and the West Linn Paper Mill secondary water supply.

Under the No Action Alternative, the site would remain closed to public access but there would continue to be no physical barriers to much of the facility. Numerous life safety hazards would continue to exist onsite including deteriorating walk ways, exposed electrical wires and fall hazards. During Corps operations these hazards are addressed; however, unauthorized access by the public is not assumed to be safe. WLP Co. and PGE employees access the project site daily and may be more aware of the hazards; however, there are minimal exclusion measures targeting the general public and these persons may be less attentive to industrial type hazards.

5.6.8.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to human life and safety would be reduced compared to Alternative1/No-Action due to the implementation of exclusion fencing and debris and boat barriers.

Impacts to human life and safety after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation, its original purpose. It is assumed that a state, regional, or local authority would purchase the Locks site in order to rehabilitate and maintain the Locks to an operational status. Therefore, operational safety concerns with regard to miter gate gudgeon anchors, seismic instability of the lock chamber walls and gate monoliths and the seepage issues between the Corps ownership and the adjoining property owners (WLP Co. and PGE) would become the responsibility of the transferee following disposal.

5.6.8.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to human life and safety would be reduced compared to Alternative1/No-Action due to the implementation of exclusion fencing and debris and boat barriers.

Impacts to human life and safety after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. Operational safety concerns with regard to miter gate gudgeon anchors, seismic instability of the lock chamber walls and gate monoliths and the seepage issues between the Corps ownership and the adjoining property owners (WLP Co. and PGE) would become the responsibility of the transferee following disposal.

5.6.9 HAZARDOUS/TOXIC MATERIALS

5.6.9.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No hazardous/toxic materials impacts are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. The eventual seismic retrofits would require rock anchors to be drilled, grouted and post tensioned from the deck of the monoliths and walls. A slurry would be used for lubrication and debris removal during drilling of the rock anchor holes. This slurry would result in overspray at the deck. The rock anchor is then bonded to the underlying anchor material with a grout. The rock anchor is post-tensioned and the annular space above the bonding grout is filled with a secondary pressurized grout. The pressurized grout may perform similarly to the drill slurry and seep through the cracks within ashlar masonry and concrete into the water; however, this is assumed to occur to a lesser extent. The slurry and grout is typically environmentally inert and, therefore, this activities is not expected to result in the release of hazardous or toxic material. Implementation of best management practices for spill prevention and containment during construction of barricades would reduce the potential for hazardous or toxic materials to be released to the environment. Additionally, all contractor and Corps equipment will follow the guidelines set forth by Engineering Manual 1110-2-1424 for the use of approve environmentally acceptable lubricants and hydraulic fluids. Therefore, this alternative is not expected to result in the release of hazardous or toxic materials to the environment.

5.6.9.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that hazardous/toxic materials impacts would be the same as described under the Alternative1/No-Action. The implementation of the exclusion fencing and debris and

boat barriers on the west side of the Locks in order to deter access to the lock walls, serving to remove access to the operational safety hazards present, would likewise not result in hazardous or toxic material.

Prior to the real estate action to dispose of the property, a Phase 1 Environmental Assessment would be implemented to fully characterize and disclose the status of legacy hazardous materials on the site. The proposed action under the Preferred Alternative would adhere to any conditions set forth as a result of the Phase 1. Pre the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 120, codified at 42 U.S.C. § 9620(h), the Corps will provide sufficient notice of any future transfer per Section 120(h)(1) and the deed will contain the items as described in Section 120(h)(3). No negative impacts to infrastructure are expected after disposition for any of the alternatives.

5.6.9.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that hazardous/toxic materials impacts would be the same as described under the Alternative1/No-Action.

Prior to the real estate action to dispose of the property, a Phase 1 Environmental Assessment would be implemented to fully characterize and disclose the status of legacy hazardous materials on the site. The proposed action under the Alternative 7 would adhere to any conditions set forth as a result of the Phase 1. Pre the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 120, codified at 42 U.S.C. § 9620(h), the Corps will provide sufficient notice of any future transfer per Section 120(h)(1) and the deed will contain the items as described in Section 120(h)(3). No negative impacts to infrastructure are expected after disposition for any of the alternatives.

5.6.10 CULTURAL RESOURCES

5.6.10.1 Alternative 1/No Action

Under the No-Action Alternative, the properties would remain in caretaker status with no additional work performed. No project related alterations would be done to the facilities under the No-Action Alternative, therefore, there would be no impacts to cultural resources from the project. In retaining ownership the Corps would continue to be responsible for meeting obligations under the NHPA.

5.6.10.2 Alternative 3 (Preferred Alternative)

Under Alternative 3, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. For this seismic retrofit, rock anchors are to be drilled, grouted and post tensioned from the deck of the monoliths and walls and disposal of the facilities would occur. This would inherently impact the historical masonry, a contributing element to the National Register Eligibility of the Locks. The effects of the seismic stabilization work would be coordinated through consultation with the Oregon State Historic Preservation Officer (SHPO), Tribes

and the Advisory Council on Historic Preservation (ACHP) and appropriate mitigation completed as necessary. Transfer from Federal ownership is considered an adverse effect. Further consultation with the SHPO, Tribes, ACHP and other interested parties would be undertaken and a Memorandum of Agreement (MOA) will be developed and implemented for actions to mitigate the adverse effects to the Locks. The focus of consultation would be to determine appropriate mitigation measures for inclusion in a MOA to address project effects. Development of a MOA would be completed prior to implementation of this alternative. As a part of the disposal, the transferee would be required to agree to any stipulations outlined in the MOA and any preservation clauses as outline in the property transfer documentation.

5.6.10.2 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. The concrete bulkhead would serve as a dam within the guard lock chamber and render the facility decommissioned. The bulkhead would alter the character and integrity of the Locks and would be an adverse effect under the NHPA. Further consultation with the SHPO, Tribes, ACHP and other interested parties would be undertaken and a Memorandum of Agreement (MOA) will be developed and implemented for actions to mitigate the adverse effects to the Locks. The focus of consultation would be to determine appropriate mitigation measures for inclusion in a MOA to address project effects. Development of a MOA would be completed prior to implementation of this alternative. Seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. For this seismic retrofit, rock anchors are to be drilled, grouted and post tensioned from the deck of the monoliths and walls and disposal of the facilities would occur. This would inherently impact the historical masonry, a contributing element to the National Register Eligibility of the Locks. The effects of the seismic stabilization work, installation of a new secondary water supply intake to West Linn Paper Mill and safety measures such as fencing and signage would be coordinated through consultation with the SHPO, Tribes and the ACHP and appropriate mitigation completed as necessary. Disposal of the property to GSA would be a transfer from one federal agency to another and therefore would not be an adverse effect to the Locks under the NHPA. The Locks would remain closed, impeding tribal access by boat around Willamette Falls.

5.7 BIOLOGICAL RESOURCES

This section discusses the potential effects of the Preferred Alternative (Alternative 3) and No Action Alternative on components of the biological environment. The biological environment refers to ecological resources such as species and habitats, including terrestrial, aquatic and special status species and sites. As described in Section 3.4.25, there are no wetlands within the boundaries of the project. Therefore, neither the proposed action (Alternative 3) nor the no action alternative would result in any change to wetlands and this aspect was not further assessed.

5.7.1 TERRESTRIAL BIOLOGICAL COMMUNITY IMPCATS

5.7.1.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to the terrestrial biological community are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. As this activity would occur in a highly developed, industrialized area, impacts to the terrestrial biological community are expected from this activity.

5.7.1.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to the terrestrial biological community would be the same as described under the Alternative1/No-Action.

Impacts to the terrestrial biological community after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation, its original purpose. It is assumed that a state, regional, or local authority would purchase the Locks site in order to rehabilitate and maintain the Locks to an operational status. No negative impacts terrestrial fauna or flora are expected after disposition.

5.7.1.3 Alternative 3 (Preferred Alternative)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to the terrestrial biological community would be the same as described under the Alternative1/No-Action.

Impacts to the terrestrial biological community after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. No negative impacts terrestrial fauna or flora are expected after disposition.

5.7.2 AQUATIC BIOLOGICAL COMMUNITY IMPACTS

5.7.2.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to the aquatic biological community are expected to result from these maintenance activities. When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. Short term aquatic impacts are expected in the form of increased turbidity adjacent to where the

seismic retrofit would occur as described in Section 0. This is not expected to alter the aquatic community or habitat. However, in order to ensure the project avoids impacts to fish species, construction would be limited to times of year when the fewest fish are typically in the area around the falls. Based on 2016 Daily Access in Real Time data from fish monitoring stations at the Falls (Figure 25), construction would be limited to the August 1 through September 1 and November 1 through January 1 timeframes

The Marine Mammal Protection Act (MMPA) (16 U.S.C. §§ 1361–1421h) prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas and the importation of marine mammals and marine mammal products into the United States. Take is defined under the MMPA as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. § 1362) and further defined by regulation (50 C.F.R. § 216.3) as "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal. This includes, without limitation, any of the following:

- the collection of dead animals, or parts thereof
- the restraint or detention of a marine mammal, no matter how temporary
- tagging a marine mammal
- the negligent or intentional operation of an aircraft or vessel
- the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal feeding or attempting to feed a marine mammal in the wild"

As there are sea lions in the area downstream of proposed activities, effects of construction noise on sea lions, particularly noise produced by the rock drilling associated with the seismic retrofit, was considered. In a regulatory context, NMFS uses acoustic thresholds to help assess and quantify “take” and to conduct more comprehensive effects analyses under several statutes. Sea lions have a generalized hearing range of 60 Hz to 39 kHz and the most susceptible frequency range for harm is 60 Hz to 39 kHz (NMFS 2016). Above or below this the generalized hearing range, the risk of auditory impacts from sounds is considered highly unlikely or very low (NMFS 2016). The most susceptible frequency range for harm to sea lions is 0.94 kHz to 25 kHz (NMFS 2016). Sea lions would not be in the immediate vicinity of the drilling at the upstream end of the Locks. Sea lions only have access to area downstream of lock chamber 1, approximately 1500 feet downstream of the nearest drill location. Based on these parameters, noise producing activities would be sufficiently disconnected from the downstream acoustically as the water is not continuous from upstream to downstream and there are several topographic and structural impediments above ground which would dampen and redirect the sound as it travels the 1500 feet from the nearest drill location to lock chamber 1. However, project work would only be conducted during times of year which would avoid or minimize any potential impacts to marine mammals. It is assumed that sea lions would most likely be present when there are large numbers of fish passing the falls. Therefore, construction would be limited to times of year when the fewest fish are typically in the area around the falls. Based on 2016 Daily Access in Real Time data from fish monitoring stations at the Falls (Figure 25), construction would be limited to the August 1 through September 1 and November 1 through January 1 timeframes. Based on this assessment, the Corps has determined that there would be no effect of project activities on marine mammals and, therefore the Corps would not be requesting an incidental take.

5.7.2.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to the aquatic biological community would be the same as described under the Alternative1/No-Action.

Impacts to the aquatic biological community after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation, its original purpose. It is assumed that a state, regional, or local authority would purchase the Locks site in order to rehabilitate and maintain the Locks to an operational status. No negative impacts to the aquatic biological community are expected after disposition.

5.7.2.3 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to the aquatic biological community would be the same as described under the Alternative1/No-Action with the addition of short term aquatic impacts are expected in the form of increased turbidity downstream of the concrete bulkhead construction.

Impacts to the aquatic biological community after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. No negative impacts to the aquatic biological community are expected after disposition.

5.7.3 SPECIES LISTED AS THREATENED OR ENDANGERED UNDER THE ESA

5.7.3.1 Alternative 1/No Action

Under the No-Action Alternative, it is assumed minimal maintenance would continue to guard against more costly future repairs and inspections and for environmental, safety and health compliance purposes. No impacts to the species listed as threatened or endangered under the ESA are expected to result from these maintenance activities. However, when the lock gates are exercised to move debris through the Locks during periodic maintenance periods, there is risk that juvenile salmonids may enter the Locks' canal and become trapped in the Locks facility until the next period when they will have an opportunity to be flushed out of the Locks. To avoid this risk a biologist is on site when gates are operated and each lock is flushed before closing the gates to ensure no fish are still present in the canal.

When an urgent or compelling need develops during the planning horizon to maintain the Willamette Falls pool at its current level, seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. Short term aquatic impacts are expected in the form of increased turbidity adjacent to where the seismic retrofit would occur as described in Section 0. However, these impacts would be localized to the area within the canal directly adjacent to where work would be performed. Currently, listed species are excluded from accessing this area due to the closure of the Locks and, therefore, would not be impacted by short

term turbidity impacts. Additionally, construction would be limited to times of year when the fewest fish are typically in the area around the falls. Based on 2016 Daily Access in Real Time data from fish monitoring stations at the Falls (Figure 25**Error! Reference source not found.**), construction would be limited to the August 1 through September 1 and November 1 through January 1 timeframes. Therefore, this alternative is not expected to result in changes to listed species.

5.7.3.2 Alternative 3 (Preferred Alternative)

Under disposal with implemented seismic retrofits and exclusion fencing and debris and boat barriers, it is anticipated that impacts to the species listed as threatened or endangered under the ESA would be the same as described under the Alternative1/No-Action.

Impacts to the listed species after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. However, the region has expressed considerable interest in acquiring the site and using it for navigation, its original purpose. It is assumed that a state, regional, or local authority would purchase the Locks site in order to rehabilitate and maintain the Locks to an operational status. No negative impacts listed are expected after disposition.

5.7.3.2 Alternative 7 (Concrete Bulkhead)

Under Alternative 7, a concrete bulkhead would be constructed between Gates 6 and 7, partial seismic retrofits would be installed, a new water intake installed for West Linn Paper and safety measures would be added (fencing and signage). The Locks would be transferred through GSA for this alternative. Under this alternative it is anticipated that impacts to the species listed as threatened or endangered under the ESA would be the same as described under the Alternative1/No-Action.

Impacts to the listed species after disposal of the property to a non-federal transferee is mostly speculative, as it is not yet known who would take ownership of the sites. No negative impacts listed are expected after disposition.

CONFLICT WITH OTHER USE PLANS, POLICIES, OR CONTROLS*

The proposed seismic retrofits, construction of fencing enclosures and disposition of federal property (Alternative 3) is not expected to be in conflict with any other plans, policies, or controls in the Willamette Falls region or Clackamas County. Construction and maintenance activities would abide by applicable local policies such as construction or noise ordinances and would be conducted in compliance with applicable federal, state and local laws.

IRREVERSIBLE CHANGES, IRRETRIEVABLE COMMITMENT OF RESOURCES*

The proposed action (Alternative 3) would result in some irretrievable commitment of resources, but the commitment would not be substantial. The types of resources generally considered irretrievable when committed include resources like fossil fuels, minerals, or timber. The use of fossil fuels to operate vehicles and equipment associated with construction and maintenance of the proposed action would constitute an irretrievable commitment of resources, but would be limited and minor. Under the no action alternative there could be a small irretrievable commitment of fossil fuel resources for maintenance activities, but no other irretrievable commitment of resources would be expected.

guard lock monoliths on the riverward side (Gate 6 and 7) would be accomplished through the installation of vertical rock anchors. Additionally, exclusion fencing and debris and boat barriers would be implemented on the west side of the Locks in order to deter access to the lock walls, serving to remove access to the operational safety hazards present. While this would be largely irreversible, the effect would be beneficial for maintaining the structural integrity of the Lock walls and remove safety hazards. Under the No-Action Alternative, the Locks would not be altered and the pool would be maintained at its current level. Irreversible changes/irretrievable commitment of resources would be associated with future maintenance activities.

CUMULATIVE IMPACTS*

Cumulative impacts include those impacts on the environment which result from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions.

PAST ACTIONS

Section 0 describes the history of development in the vicinity of the Falls since the 1800’s.

PRESENT ACTIONS

Chapter 3 describes the more contemporary actions occurring in the vicinity of the locks.

REASONABLY FORESEEABLE FUTURE ACTIONS

Related projects that are currently planned and likely to occur in the region in the foreseeable future include the Willamette Falls Legacy Project, a the 23-acre site adjacent to the Falls on the east side across the river from the Locks slated for a mix-use development and river trail system (described in Section 0).

CONTEXTUAL RELATIONSHIP BETWEEN THE PROPOSED ACTION AND ACTIONS THAT HAVE OR WILL OCCUR ON-SITE

As described in Section 1.5.1, there has been a long history of development actions in and around the Falls including industrialization, navigation and recreation. As described in this EA, the proposed action (Alternative 3) would result in temporary impacts from construction and maintenance activities on water quality, air quality, terrestrial and aquatic habitats and wildlife, noise levels, aesthetics and recreation. For Cultural Resources the proposed action would result in an adverse effect as a result of the transfer of a historic property out of federal ownership. Development of an MOA would be completed prior to implementation of this alternative. It would also result in minor irretrievable commitment of fossil fuel resources and materials associated with rock anchors and fencing. However, it would prepare the site for safe disposal to a non-federal transferee.

Additional development in the Willamette Falls area would be expected to involve similar types of temporary impacts and long term benefits to the proposed action, but scaled to a greater degree due to project size. The development of the Willamette Falls Legacy Project would likely have temporary impacts from construction on aesthetics, transportation, air quality, noise levels, recreation and terrestrial habitats and species, but would have long term benefits for socioeconomics, recreation and terrestrial habitat in the region once complete.

In light of historical actions in the region and the future expected projects currently foreseeable, the proposed action would not result in adverse cumulative impacts in the region. It is unclear when the future expected projects would commence but it is possible that they could be under construction at the same time as the proposed action. Overall effects of the proposed actions combined with the effects of other past, present and reasonably foreseeable future actions are not likely to be substantial.

DETERMINATION AND SUMMARY OF EFFECTS FROM THE PROPOSED ACTION*

The proposed action (Alternative 3) would involve seismic retrofits of the PGE/Ship Canal Wall, the guard lock wall and the guard lock monoliths on the riverward side (Gate 6 and 7). These activities would be accomplished through the installation of rock anchors to be drilled, grouted and post tensioned from the deck of the monoliths and walls. Additionally, exclusion fencing and debris and boat barriers would be erected and installed on the west side of the Locks in order to deter access to the lock walls, serving to remove access to the operational safety hazards present. Finally, the federal property would be disposed of to a non-federal transferee. The proposed action would have some temporary, minor adverse impacts on environmental resources in the action areas only.

The potential temporary adverse effects during construction would include temporarily elevated suspended particulates and turbidity, air pollutant emissions and increased noise levels. However, the described avoidance, minimization and best management practices would be implemented during construction and maintenance to prevent substantial effects. Temporary impacts would cease with the completion of construction. No adverse effects to special status species or habitats would occur. No adverse cumulative impacts are expected.

The Corps will release a Public Notice announcing the availability of the EA for a 30-day Public comment period. The Draft EA will be made available for public review on the Corps website at: nwp.usace.army.mil/Willamette/Locks. A Draft FONSI is included as Appendix F.

7. COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS*

The USACE will ensure that the proposed action complies with applicable federal laws, regulations and executive orders. Major environmental compliance regulations and status of compliance are summarized in Table 16 below. The SCWA is responsible for addressing State requirements including compliance with the California Environmental Quality Act.

Table 16. Other Applicable Laws

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §§ 4321–4347) Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 C.F.R. §§ 1500–1508)	This EA has been prepared in compliance with NEPA, CEQ and the Corps' Planning regulations. All agency and public comments will be considered and evaluated. If appropriate, a FONSI will be signed with a conclusion of no significant impacts from this proposed action. A Draft FONSI is provided in Appendix F.
Clean Air Act, as amended (42 U.S.C. §§ 7401–7671q)	The proposed action would take place in an attainment or unclassified (i.e. in compliance) area for all state and federal air quality standards. Air emissions from the proposed action would be temporary and minimal.
Clean Water Act, as amended (33 U.S.C. 1251–1387)	Pursuant to section 401 of the CWA, the proposed action would require a 401 Certification from the DEQ to ensure the project meets State water quality standards. The Corps will coordinate with DEQ and will prepare a 401 application for the proposed action. Section 404 of the Clean Water Act (33 U.S.C. § 1344) regulates the discharge of dredge or fill material into waters of the United States and within the lateral extent of wetlands adjacent to such waters. Pursuant to section 404, the Corps has determined that the proposed action would not require the discharge of fill dredge or fill material and therefore further 404(b)(1) analysis is not required.
Rivers and Harbors Act of 1899 (33 U.S.C. § 403)	See above. This project would not require the discharge of fill dredge or fill material and therefore be in compliance with Section 10 of the Rivers and Harbors Act.

Executive Order 11990, Protection of Wetlands, (42 FR 26961, 1977)	Under this Executive Order, federal agencies shall take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The proposed action would not result in destruction, loss, or degradation of wetlands and is therefore in compliance with Executive Order 11990.
National Oceanic and Atmospheric Administration federal Consistency Regulation (15 CFR 930) Coastal Zone Management Act of 1972 (16 U.S.C. § 1451)	The proposed action would not occur in or near coastal waters. These statues are not applicable.
Endangered Species Act as amended (16 U.S.C. §§ 1531–1544)	The Corps has determined that the proposed actions would have No Effect on Endangered and Threatened Species and, therefore, is in compliance with ESA. NMFS issued a Jeopardy Biological Opinion in 2000 that requires the Corps to perform various actions to save threatened salmonid species in the Willamette Basin. The proposed action would not hinder these actions.
Magnuson-Stevens Fishery Conservation and Management Act - Fishery Conservation Amendments of 1996, (16 U.S.C. §§ 1801–1883) – Essential Fish Habitat (EFH)	The proposed action area includes Essential Fish Habitat (EFH) for salmonids managed under the Pacific Salmonid Fishery Management Plan, including Upper Willamette spring Chinook and Upper Willamette winter steelhead Salmonids. The proposed action is expected to have no impact on salmon EFH quantity and quality in the Willamette watershed. The Corps will coordinate with NOAA NMFS regarding this determination and identify if any further EFH assessment is necessary for the proposed action. If an EFH assessment is prepared and results in EFH conservation recommendations from NMFS, Corps will incorporate these measures into the proposed action to the maximum extent feasible.
Migratory Bird Treaty Act (16 U.S.C. §§ 703-712)	The Corps has determined that there would be no impacts to migratory birds from the proposed action and, therefore, this proposed actions are in compliance with this act.
Marine Mammal Protection Act (16 U,S,C, §§ 1361–1421h)	The Corps has determined that there would be no impacts to marine mammals from the proposed action and, therefore, this proposed actions are in compliance with this act.

National Marine Sanctuaries Act (16 U.S.C. §§ 1431, *et seq.*) Marine Protection Research and Sanctuaries Act of 1972 (33 U.S.C. §§ 1401, *et seq.*)	The proposed action does not fall within a marine protected area or marine sanctuary. Not applicable.
National Historic Preservation Act (16 USC 470 and 36 CFR 800): Protection of Historic Properties	Willamette Falls Locks is on the National Register. The Corps will initiate consultation with the SHPO in 2017. The area of potential effects (APE) includes the federal property in and around the Willamette Falls Locks. In compliance with the NHPA, consultation will be undertaken with the SHPO regarding historic properties (cultural resources listed, or eligible for listing, on the National Register of Historic Places (NRHP)). Consultation with the SHPO and other interested parties will be undertaken to determine appropriate mitigation measures for inclusion in a MOA to address project effects. Development of a MOA will be completed prior to implementation of the chosen alternative. As a result of any real estate actions to dispose of the Locks, any transferee will be required to agree to the stipulations outlined in the MOA and preservation clauses outlined in the property transfer.
Executive Order 11593: Protection and Enhancement of the Cultural Environment	See above.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601–9675 and the Resource Conservation Recovery Act (RCRA), 42 U.S.C. §§ 6901–6992k.	These two acts pertain to hazardous and toxic materials. The EPA's Envirofacts Facility Database was queried regarding the potential location of any CERCLA (Superfund) or RCRA sites in the vicinity of the proposed project areas. There are neither CERCLA nor EPA-regulated RCRA facilities located within one mile of the proposed project sites. Initial queries and ERGO surveys have identified little or no potential for environmental contamination or disruption from past, present, or proposed activities. A site inspections will be performed prior to any real estate actions to dispose of the site. The site assessment will be detailed in an Environmental Baseline Study.
Farmland Protection Policy Act (7 U.S.C. §§ 4201, *et seq.*)	The proposed action would not result in the conversion of any prime, unique state or locally important farmland to non-agricultural uses.

Abandoned Shipwreck Act of 1987, (43 U.S.C. §§ 2101, *et seq*.)	No abandoned shipwrecks as none are known to occur within the proposed action areas. Not applicable.
Submerged Lands Act, (Public Law 82-3167; 43 U.S.C. §§ 1301, *et seq*.)	No lands covered by the Submerged Lands Act occur within the project area. Not applicable.

8. PUBLIC INVOLVEMENT AND COORDINATION*

Executive Order 12372, Intergovernmental Review of federal Programs, states that federal agencies shall provide opportunities for consultation by elected officials of those State and local governments that would provide the non-federal funds for or that would be directly affected by, proposed federal financial assistance or direct federal development. As required by NEPA (CEQ 1500.1), the proposed project has been coordinated with federal, state and local government agencies having jurisdictional responsibilities, or otherwise having an interest in the project.

The proposed project and environmental assessment is currently being coordinated with the USFWS, NMFS, ODFW and the DEQ as well as OR-SHPO. Their comments and recommendations will be considered in the final project plan and are provided in Appendices F and D, respectively.

This EA will be circulated for public review and comment period. It was sent to federal, state and local agencies, public officials and interested individuals for their comment. Received comments will be considered in the decision to sign a FONSI. All comments and Corps responses can be found in Appendix F.

9. RECOMMENDATION

I recommend that the tentatively selected plan for disposition of the Willamette Falls Locks project as generally described in this report be authorized for implementation as a Federal project, with such modifications thereof as in the discretion of the Commander, USACE may be advisable. The estimated first cost of the recommended plan is $1,839,975. Anticipated holding costs, if transferred within five year time frame is about $75,000/year. Transactions costs are expected to be $50,000. No operations, maintenance, repair, rehabilitation and replacement (OMRR&R) expenses are expected after disposition occurs.

The recommendations contained herein reflect the information available at this time and current departmental policies governing the formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of the national civil works construction program or the perspective of higher levels within the executive branch. Consequently, the recommendations may be modified before they are transmitted to Congress for authorization and/or implementation funding. However, prior to transmittal to Congress, the State of Washington, interested Federal agencies and other parties will be advised of any significant modifications in the recommendations and will be afforded an opportunity to comment further.

JOSE L. AGUILAR
Colonel, Corps of Engineers

District Commander

10. LIST OF PREPARERS*

While individuals have responsibilities for preparing sections of an EA, it is an interdisciplinary team effort. Additionally, Corps Portland District and North Pacific Division specialists and contractors review the analysis and supply information. Contributions by individual preparers are subject to revision by other specialists and by management during the internal review process.

Name	Discipline/Expertise	Experience	Primary Responsibility
Valerie Ringold	Plan Formulation & Planning Policy 28 years	Senior Planner	Plan Formulation & Evaluation
Logan Negherbon	Civil & Hydraulic Engineering 8 years	Hydraulic Engineer	Engineering Lead
Kelly Janes	Masters in Environmental Planning 6 years	Environmental Resource Specialist	EA coordination and preparation
Richard Piaskowski	Masters in Fisheries Ecology and Management 21 years	Fisheries Biologist	Anadromous fish
Tara Gauthier	Archeologist 16 years	Archeology, history	Cultural Resources

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Appendix A – Real Estate

Purpose of Appendix

Investigate and assess the potential and most probable re-uses of the real property associated with the Willamette Falls Locks. Provide a Rough Order of Magnitude valuation for the facility.

1. Project Background / Authorization

The Willamette Falls Locks are found in northwestern Oregon on the Willamette River approximately 26 miles south of where it empties into the Columbia River, which provides access to the Pacific Ocean. The downtown area of Portland, Oregon is located approximately 14 miles downstream from the project site. Major roads which service the immediate area are Interstate 205 and State Route 99E. See Figure 4 of Main Report.

History of the Willamette Falls Locks predates U.S. Government interest and the Corps mission in the facility by several decades. Construction of the Willamette Falls Locks, by the Willamette Falls Canal and Lock Company, was completed in 1872 and the first boat passage occurred on January 1, 1873. During that time period (1873 – 1913) the facility was operated by a number of different owners until it was purchased by the U.S. Government. The purchase of the Willamette Falls Locks was authorized by the Rivers and Harbors Act of June, 25 1910, 36 Stat. 630, 664, Pub. L. No. 61-264. And on July 8, 1913 the U.S. Government procured a Deed for 11.18 acres fee encompassing the Willamette Falls Locks. Years later, in 1940, the U.S Government purchased a perpetual easement for access.

The U.S Government carried out various upgrades and repairs at the Locks which required the acquisition of temporary rights on adjacent property through leases. Army Regulation (AR 25-400-2) does not require lease records to be held permanently and therefore many of the documents are not found on file in the Portland District Real Estate Office. The Government interest obtained from the leases has since expired and is no longer needed and therefore the leases are only mentioned to provide knowledge and help the reviewer understand that the immediate area is either already developed, or undevelopable. These restraints may require the Government, or a potential new owner, to acquire temporary interests for access, staging areas, work areas, etc. to support repair projects at the project site depending on the scope.

In 1993 a condemnation package was submitted to the U.S. Attorney's Office for acquisition for fee land that the U.S. Government was encroaching on with a maintenance shop, road access easements and waterline easements. The US Attorney denied the request for condemnation based on title concerns for the property to be acquired and requested the District clear up the title questions and resubmit the condemnation. The condemnation package was never resubmitted and acquisition of the tracts never occurred. The encroaching maintenance shop was disposed and removed from the adjoining paper company property. While the encroachment issue was resolved, the access issues were not, and to this day the U.S. Government continues to use WLP Co. property under informal agreements to access the project office and parking area.

2. General Description of Existing Conditions

A. Real Estate - Acreage / Estates Acquired

The U.S. Government has purchased, and retains, interest in the following tracts of land which make up the Willamette Falls Lock facility.

Tract 001 – 11.18 acres fee interest acquired by deed dated July 8, 1913 from the Portland Railway Light and Power Company for $375,000.00 and recorded in the records of Clackamas County, Oregon in Deed Book 140, Page 32. Acquisition included all buildings, structures, break-waters, cribs, dams, canals, reservoirs and Locks and machinery and apparatuses for the operation of the Locks then constructed. Subject to a number of rights, privileges and easements as stated in the Deed. Said reservations will be covered later in this section of the report. This was the only tract of land purchased under Public Law 61-264 and encompassed the entire lock system. A copy of the acquisition deed is in the records of the Portland District, Real Estate Division.

Tract 002E – 0.42 acres for perpetual ingress and egress by easement document dated November 2, 1940 from the Crown Zellerbach Corporation for $4,800.00 and recorded in the records of Clackamas County, Oregon in Deed Book 274, Page 308. A copy of the easement is in the records of the Portland District, Real Estate Division.

Real Estate Summary

Tract No	Acreage Acquired			Acreage Disposed	Remaining Acreage for Disposal	Notes
	Fee	Esmt	Other			
001	11.18	-	-	-	11.18	Fee / Deed Contains Reservations
002E	-	0.42	-	-	0.42	Perpetual easement for Ingress / Egress
TOTAL ACREAGE					**11.60**	**Fee / Easement**

B. Site Access

Access to the project site is off State Road 43 (Willamette Dr.) onto Mill Street which is located on the west side of the Willamette River. It is important to note that the Corps does not have complete legal access to the project site. Tract 002E (0.42 acres) was acquired to provide access, however it does not extend all the way to the public right-of-way at Mill Street. To further complicate matters, Tract 002E does not currently provide for vehicular passage and it is unknown if it could be modified to allow for it. Currently, as well as in the past, the WLP Co. has unofficially allowed Corps personnel use of their private road, which will accommodate vehicles, to get to the project parking area. The Government does not have a plan in place to cure this issue given the funding constraints and mothball status of the facility. A map depicting the immediate access area as well as the unofficial access is found below.

C. Structures & Facilities / Condition / Dam Safety Rating

The Willamette Falls Locks consist of six (6) lock chambers, seven (7) sets of gates and seven (7) structures on the property. The structures consist of the project office, a museum, two (2) oil and paint storage sheds and three (3) small lock operator gatehouses. Other real property located at the site consists of utility systems, picnic tables, pavement, information signs, cameras, etc. As elsewhere discussed in this disposition study the facility as a whole is in poor condition, however the condition of some the real property assets alone are classified as fair. The Portland District Real Property Inventory lists (16) line items on the inventory report for the Willamette Falls Locks. A summary showing building square footage, number of items and cost is included with this Appendix as Exhibit “A”.

In 2008 the Dam Safety Action Classification (DSAC) rating for this facility was a 1 (Urgent and Compelling). The rating has not changed from 2008 to present, as stated in the main report. See the main report for further detail on the DSAC rating.

D. Completed Disposal Actions

No disposal actions have been started or completed at this site.

E. Deed Reservations

The deed to Tract 001 (11.18 Acres) was executed subject to multiple leases which were recorded in the Record of Leases for Clackamas County, Oregon. The historical record file found in the Portland District Real Estate Office contains a summary of the leases. The document

completed March 31, 1924 mentions seven (7) different leases which grant a total of 17 rights to the property. The summary page shows that all of the leases have since expired, however, the Portland District Real Estate office does not have copies of the leases on file. It is recommended that further research be performed to obtain copies of the leases to ensure that they did have expiration dates. A current title report has been ordered to help clarify reservations in the deed.

F. Existing Outgrants

The Real Estate Management Information System (REMIS) shows a total of twelve (12) outgrants associated with the project. Five (5) of the outgrants were issued in perpetuity, six (6) are expired and need renewal and one (1) shows as still active. Some of the expired outgrants appear to be associated with the reservations contained in the deed. If this is the case, then it is speculated that the outgrants were issued for tracking purposes. A summary of the outgrants showing the grantee, a brief description and expiration date is below.

Summary of Willamette Falls Locks Outgrants			
Outgrant No.	**Grantee**	**Description**	**Exp. Date**
DACW57-1-01-0021	West Linn Paper Co.	Storage/Walkway/Roadway	31 Jul 2005
DACW57-2-74-0045	West Linn Paper Co.	Steam Pipe	16 Dec 2000
DACW57-2-90-0036	PGE	Install, Operate, Remove Fish Training Wall	10 Jul 2040
DACW57-3-00-0016	Clackamas Co. Sheriff	Boathouse	14 Apr 2005
DACW57-3-20-7002	Crown Willamette Corp.	Concrete Wall	Perpetuity
DACW57-3-53-7001	Crown Zellerbach Corp.	Sewer Line	1 Jan 2003
DACW57-3-53-7002	PGE	Portland General Easement	11 Mar 2003
DACW57-3-53-7003	PGE	Repair / Maintain Wall	Perpetuity
DACW57-3-54-7001	Crown Zellerbach Corp.	Rock Filled Timber Crib	5 Jul 2003
DACW57-3-58-7002	PGE		Perpetuity
DACW57-3-60-7000	Crown Zellerbach Corp.	Modify Structure	Perpetuity
DACW57-3-63-7000	Crown Zellerbach Corp.	Modify Structure	Perpetuity

G. Property Zoning

The Willamette Falls Locks property falls under the City of West Linn General Industrial Zoning Classification. The purpose of this zoning is to provide for manufacturing, processing and assembling uses which are of a size and scale which makes them generally incompatible with other adjoining non-industrial uses. The uses included in this zone are generally characterized by large buildings and large storage areas and have off-site effects from smoke, odor, noise, dust, lights or other externalities. There are no defined building setbacks (varies by intended use), but it does have a maximum lot coverage of 50 percent. A copy of the zoning ordinance, which states permitted uses, conditional uses and dimensional requirements is included with this Appendix as Exhibit “B”.

H. Annual Holding Cost

The Portland District estimates the annual cost to maintain the facility in the current caretaker status to be at $135,000. /See the main report for additional detail to the annual holding costs.

I. Current Status of Project

The project is currently in a non-operational status and no longer meets its authorized purpose for navigation. Starting in 1990 all types of commerce plummeted a total of 99 percent which led to decreased funding and eventually the locks were closed in 2011 due to life safety concerns resulting from gudgeon anchor corrosion for several gates. The District does not forecast a resurgence of commercial traffic on the Willamette River to justify the cost of repairs needed to reopen the facility.

3. Rough Order of Magnitude (ROM) Cost Estimate
This Section For Official Use Only (FOUO) – not for public release.

4. Potential Re-Uses
This section of the report will lay out the potential re-uses considered through a market analysis taking into consideration the constraints of the property associated with its physical characteristics, zoning and historical significance and other relevant factors. The constraints will be discussed first followed by a summary of the market analysis

A. Constraints

Physical Characteristics
The 11.18 acre parcel encompassing the entire project is a long narrow band of land with a canal dividing the property. The majority (approximately 7.45 acres) of the fee owned property is underwater. On each side of the canal U.S. Government ownership is comprised of approximately 30 foot strips of land which run the length of the canal. Some of these areas on the Western side of the property have topography and elevation changes (rocks walls, steep embankments) that limit any type of use. As previously noted in Section 2. B. of this Appendix, access is an issue. Last, adjacent property owners are Portland General Electric and the West Linn Paper Company. Both companies have operations on an island which U.S Government property lies between. The deed contains reservations necessary for the operation of their facilities.

Zoning
The zoning classification of the property is General Industrial, which sets out dimensional requirements that would severely limit the use of the U.S. Government property. There is only one small area of land above the waterline that would meet the width / depth requirement for development. That area is where the project office is currently located. The rest of the property is either under water or does not meet the requirements.

Historical Significance
In 1974 the project was placed on the National Register of Historic Places and then in 1991 the facility was designated as a State Historic Civil Engineering Landmark by the History and Heritage Committee of the American Society of Civil Engineers. The project was designated as a Landmark because it was the first water resource development project in Oregon.
On December 1, 2011, the Portland District, Corps of Engineers entered into an MOA with the OR-SHPO and the Advisory Council on Historic Preservation, with 16 Concurring parties regarding the interim closure of Willamette Falls Locks. The MOA placed requirements on the District to consider regional interests in order to comply with 54 USC § 306114 and Executive Order 13287. This legally binding MOA commits the district to work with signatories and

regional interests to conduct studies and to identify a potential non-federal transferee for the property.

Other Relevant Factors Considered
The protection of upstream Corps assets, as discussed in the main report of this disposition study, which could be negatively affected by failure of the locks.

B. Market Analysis Summary and Conclusion
This Section for Official Use Only (FOUO) – not for public release.

5. Disposal Methods
The ability for USACE to carry out the disposal is dependent on legislation being passed or the value being within the delegated authority. Outside of legislation being passed, reporting the property as excess to the General Services Administration is always an option. The FMR outlines procedures that must be followed prior to an agency declaring property as excess.

DoD Screening / 10 USC 2662 Compliance
Prior to a DoD component reporting property as excess it must first be screened against the needs of other DoD components. Title 10 USC 2662 also requires that any property valued in excess of $750,000 be reported to congress. After such screening and compliance with 10 USC 2662 the Secretary of the Army may report the property as excess to the DoD and request the USACE report it to the General Services Administration (GSA) for further processing.

Federal Screening
Following a Determination of Excess by the Secretary of the Army the property will be reported to GSA where it will undergo a screening for other federal interest. In cases where Legislation is passed the property will still undergo a federal screening in accordance with 10 USC 2696.

Homeless Screening (McKinney-Vento, Title V)
Title V of the McKinney-Vento Homeless Assistance Act requires that suitable federal properties, which are categorized as unutilized, underutilized, excess, or surplus, are made available to states, local governments and nonprofit organizations for use to assist the homeless. The program is administered by the GSA and the U.S. Department of Housing and Urban Development (HUD). Title V may be waived for properties determined to be unsuitable. The federal Management Regulation, Subchapter C Subpart 1 102-75.1185 defines six (6) characteristics that classify a property as unsuitable. One such characteristic is a property located in the floodway of a 100-year floodplain, which is true of this project. Therefore this property would be considered unsuitable and not require homeless screening.

8. Interested Parties
The U.S. Government has not officially solicited the intent to dispose of the Willamette Falls Locks to any Congressional Districts, State Governments, or County Officials. However, they are all aware of the current study and potential for disposition. There is a local group, the Willamette Falls Locks Task Force containing 17 representatives from a variety of State and local Government bodies that has successfully obtained limited funding to study a potential acquisition of the Willamette Falls Locks. Their mission is to determine a Governance and

funding model to accept ownership, complete repairs and once again open the Locks for passage on the river. The Portland District has had communication with the group over the past several years concerning their interest in obtaining the Locks. Tribal interest in the future use of the site has also been expressed by the Confederated Tribes of the Grande Ronde Grande Tribe as the only Tribe with a ratified Treaty in vicinity of the Willamette Falls.

10. Recommendation of Preferred Divestiture Path Ahead

The Real Estate factors considered within this Appendix support Alternative 2 (Transfer to Transferee – Non-Operational Lock). Alternative 2 entails continuing to work with the Willamette Falls Task Force to identify a Governance to own and operate the facility as a historical lock.

This paragraph For Official Use Only (FOUO) – not for public release.

If the Willamette Falls Task Force is successful in establishing a formal Governance body and funding model, as identified in Alternative 2, USACE would need to proceed with steps for divestiture. This would require direct legislation authorizing the transfer of Willamette Falls Locks to a specifically named entity.

List of Exhibits

Exhibit “A” - Willamette Falls Locks Inventory Report (FOUO – Not for public release).
Exhibit “B” - Zoning

Exhibit “A” – Willamette Falls Locks Inventory Report

For Official Use Only (FOUO) – not for public release.

Exhibit "B" – Zoning

CLACKAMAS COUNTY ZONING AND DEVELOPMENT ORDINANCE

602-1 Last Amended 1/4/16

602 BUSINESS PARK (BP), LIGHT INDUSTRIAL (LI) AND GENERAL INDUSTRIAL (GI) DISTRICTS

602.01 PURPOSE

Section 602 is adopted to implement the policies of the Comprehensive Plan for Business Park, Light Industrial and General Industrial areas.

602.02 APPLICABILITY

Section 602 applies to land in the Business Park (BP), Light Industrial (LI) and General Industrial (GI) Districts.

602.03 USES PERMITTED

Uses permitted in each zoning district are listed in Table 602-1, *Permitted Uses in the BP, LI and GI Districts*. In addition, uses similar to one or more of the listed uses for the applicable zoning district may be authorized pursuant to Section 106, *Authorization of Similar Uses*.

A. As used in Table 602-1:

1. "P" means the use is a primary use.
2. "A" means the use is an accessory use.
3. "C" means the use is a conditional use, approval of which is subject to Section 1203, *Conditional Uses*.
4. "X" means the use is prohibited.
5. Numbers in superscript correspond to the notes that follow Table 602-1.

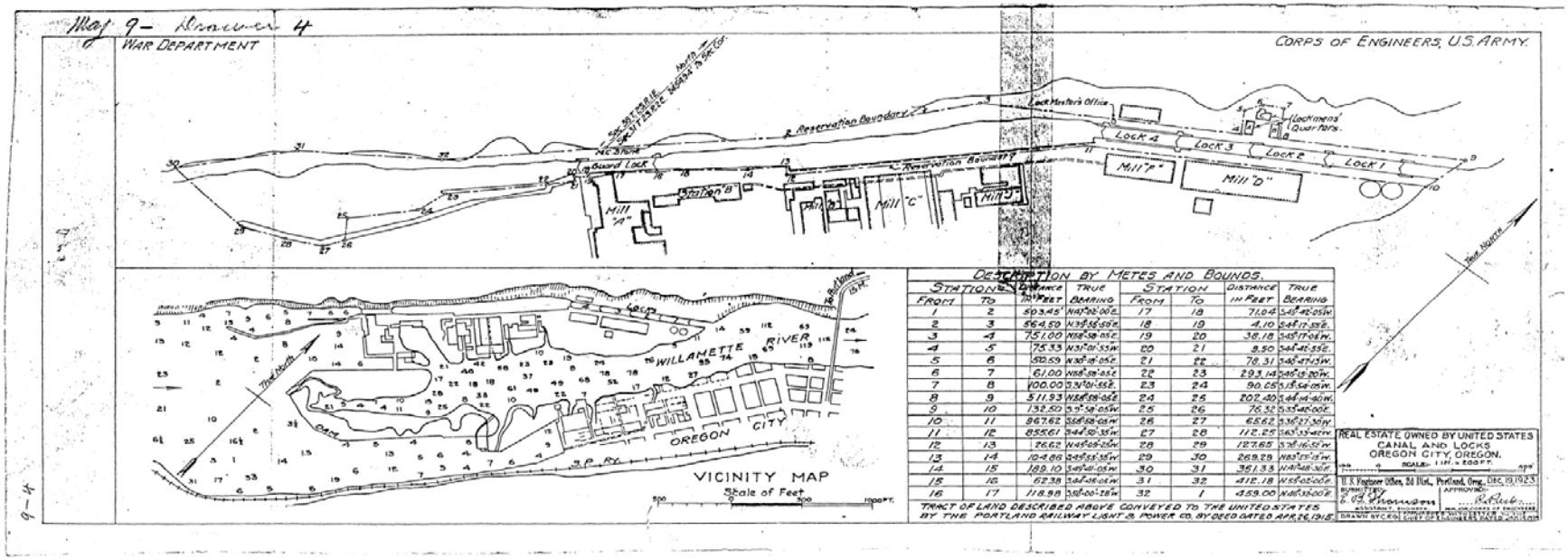
B. Permitted uses are subject to the applicable provisions of Subsection 602.04, *Dimensional Standards*, Subsection 602.05, *Development Standards*, Section 1000, *Development Standards* and Section 1100, *Development Review Process*.

Table 602-1: Permitted Uses in the BP, LI and GI Districts	**BP**	**LI**	**GI**
Use			
Accessory Uses permitted in the R-5 through R-30 Districts, except accessory dwelling units, listed in Table 315-1, *Permitted Uses in the Urban Residential Zoning Districts*, provided that such uses are accessory to a single-	A	A	A

family dwelling that is a nonconforming use			
Arenas, Exhibition Halls and Stadiums	C1	C1	C1
Bus Shelters, subject to Section 823	A	A	A
Cogeneration Facilities	A	A	A
Composting Facilities, subject to Section 834	X	C	C
Construction and Maintenance Contractors This category includes contractors engaged in construction and maintenance of buildings and their component parts (e.g., roofing, siding, windows), fencing, decking, building systems (e.g., plumbing, electrical, mechanical), landscaping and infrastructure (e.g., roads, utilities). Also included are excavation contractors, building movers, pest control services and janitorial services.	P	P	P
Electric Vehicle Charging Stations	A	A	A
Electrical Power Production Facilities	X	X	C
Employee Amenities, such as clinics, daycare facilities, lounges, cafeterias and recreational facilities	A	A	A

Farmers' Markets, subject to Section 840	P	P	P
Government and Special District Uses	C2,3	C2,3	C2,3
Heavy Truck and Heavy Equipment Uses This category includes sales, rental, storage, repair and servicing of heavy trucks such as dump trucks, moving trucks and truck tractors; large construction equipment such as backhoes and bulldozers; large farm equipment such as tractors and combines; and large cargo trailers such as semitrailers. Sales, rental, storage, repair and servicing of passenger vehicles, recreational vehicles and boats are excluded from this category.	X	P	P
Heliports	C	C	C

Appendix B – 1923 Survey of Willamette falls Locks



Appendix C – Memorandum of agreement resulting from Section 106 consultation for closure of the Willamette Falls Locks

MEMORANDUM OF AGREEMENT
BETWEEN
THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
AND
THE OREGON STATE HISTORIC PRESERVATION OFFICER,
AND THE
ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE INTERIM CLOSURE OF THE WILLAMETTE FALLS LOCKS, WEST LINN, OREGON

WHEREAS on December 1, 2011 the Dam Safety Officer for the Portland District, U.S. Army Corps of Engineers recommended Gates 2, 3, and 4 be red-tagged for use until the gudgeon anchors are replaced; and subsequently on December 5, 2011 the U.S. Army Corps of Engineers, Portland District (Corps), under its emergency operational authority, closed the Willamette Falls Locks (Locks) to vessel traffic (the "undertaking") due to life safety concerns related to the potentially unsafe physical conditions of the gudgeon anchors on Gates 2, 3, and 4; and,

WHEREAS the repairs to address the immediate dam safety and operational safety concerns have been estimated to cost between three to five million dollars; and

WHEREAS the decline of commercial tonnage through the Locks from 1990 to 1997 caused more than a 99% decline in navigational benefits causing a commensurate decline in funding for Operations, Maintenance, Repair, Replacement, and Rehabilitation activities to support the navigation authority of the Locks which led to Caretaker funding for minimal maintenance activities of the facility starting in 2006; and as the decline in commerce has persisted for more than 15 years, the repairs to the underground gudgeon anchors at Gates 2, 3 and 4 are deemed not economically justified; and

WHEREAS the Locks are a historic property that was listed in the National Register of Historic Places in 1974, and therefore, pursuant to 36 C.F.R. part 800, the regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f), the Corps notified the Oregon State Historic Preservation Officer (SHPO) on May 15, 2014 that the undertaking posed an adverse effect to the features and qualities that made the Locks eligible for listing, (Appendix A) to which the SHPO agreed; and

WHEREAS the Corps has defined the undertaking's area of potential effects (APE) as the Locks, associated structures, and environs, to include the Lock Operator and Administration buildings, dock, and park easement along the west side of the Locks chambers (map of APE is attached as Appendix B); and

WHEREAS the undertaking resulted in adverse effects to historical associations, specifically, associations with transportation and navigation history, and with tribal access to the Willamette Falls via the Locks to conduct traditional cultural practices; and

WHEREAS, although no immediate or additional adverse effect to the physical engineering qualities of the Locks was realized by the undertaking, further examination of materials and operating components of lock walls and gudgeon anchors on Gates 2, 3, and 4 would be necessary to determine if, and to what degree, further decline may have occurred since closure; and

WHEREAS the Corps acknowledges that, since 2011, there has been continued impact on certain cultural, economic, and recreational goals of the proposed Willamette Falls National Heritage Area, the 2015-designated State Heritage Area, the 2012-designated National Water Trail, and the 1999-designated American Heritage River; to all of which the Locks is a significant and contributing resource; and

WHEREAS the Corps acknowledges that the undertaking has eliminated the potential for commercial navigation through the Locks, resulting in a loss of economic opportunity for some sectors of the community; and

WHEREAS the Corps considers the undertaking to be an essential and immediate response to an emergency condition threatening both life and property; the Corps has, through this consultation, notified SHPO, the Advisory Council on Historic Preservation (Council), and the tribes within the time and resources available (36 C.F.R. § 800.12 (b)(2)) so that comments and suggestions on how to appropriately mitigate for the subject undertaking could be provided. Stipulations provided in this agreement address adverse effects that resulted from the undertaking in 2011, although the last vessel permitted through the Locks occurred in July 2013. No data or information has been identified or presented to demonstrate that the mitigation needs have changed since the date of closure; and

WHEREAS the Locks chambers and environs are no longer publicly accessible on a regular basis due to safety concerns and budgetary constraints, the Corps has provided supervised, infrequently scheduled opportunities for on-site viewing to requesting parties and has supported various events such as the Willamette Falls Heritage Foundation's Lock Fest; and

WHEREAS the Corps invited participation of the Confederated Tribes of Grand Ronde (CTGR), the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Confederated Tribes of Siletz Indians who attach religious and cultural significance to lands within the Willamette Falls Locks and around the Willamette Falls; and

WHEREAS the Corps has invited the West Linn Certified Local Government, National Trust for Historic Preservation (NTHP), Willamette Falls Heritage Foundation (WFHF), Clackamas County (CC), Clackamas County Historical Society, Willamette Falls Heritage Area Coalition (WFHAC), Metro, Oregon Marine Board, Oregon City, Portland General Electric Company, Wilsonville Concrete LLC, Marine Industrial Construction LLC, WCP INC, Pacific Northwest Waterways Association (PNWA), Restore Oregon, City of Wilsonville and other stakeholders to participate as concurring parties; and

WHEREAS many of the consulting parties endorse the repair and reopening of the Locks in order to achieve potential cultural, economic, commercial and recreational goals of state and local stakeholders; and acknowledge since closure of the Locks, the Corps' annual requests for Congressionally appropriated funding for repairs have not been successful because the costs of rehabilitation outweigh the commercial navigation benefits to the nation and therefore, agree, although not part of the current undertaking or this Section 106 consultation, the most viable long term disposition of the Locks may be through a transfer of ownership to another agency or non-federal entity or via alternative management of the facility through cost-sharing of repairs, leasing the facility, or other arrangement; and

WHEREAS the Corps serves as an ex-post participant in the Senate Bill 131 Task Force whose purpose is to: 1) compile information related to the Willamette Falls Locks and Canal; 2) consider means of facilitating the repair and reopening of the facility; 3) develop a plan for its sustainable operation; and 4) deliberate the future disposition of the facility via either the future lease or transfer from the Corps to a specified non-federal entity. It is anticipated much of the future Federal investigation described in Stipulation III below will be helpful to the Task Force when developing the future governance model and funding mechanism for the long term repair and operation of the facility; and

WHEREAS the Corps has received initial funding to conduct an investigation for the final disposition / divestiture report; and

WHEREAS in accordance with 36 C.F.R. § 800.6(a)(1), the Corps has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effects determination with specified documentation, and the ACHP has chosen to participate in the consultation pursuant to 36 C.F.R. § 800.6(a)(1)(iii); and,

WHEREAS the parties acknowledge additional Section 106 consultations will be required prior to a future decision regarding the permanent long term disposition of the facility;

NOW, THEREFORE, the Corps, SHPO, and the ACHP agree that the Corps will implement the following stipulations in order to mitigate adverse effects to the Locks caused by the undertaking:

STIPULATIONS

The Corps shall ensure that the following measures are carried out:

I. Conduct regular informational meetings no less than twice a year with signatories and concurring parties to report on progress made toward accomplishing Stipulations III-V.

II. Conduct a meeting with signatories, concurring parties, and other Federal and non-Federal stakeholders a minimum of every two months, or as required, to discuss possible options for the long term disposition of the Locks. Such a meeting will be with local interests that have organized under the leadership of the Clackamas County (identified as the Willamette Falls Locks Working Group) to study issues relating to repair, reopening and operation of the Locks. The goal of the process is to develop a report as described in either Stipulations IIIA or IIIB. These meetings can be accomplished during one of the meetings described in Stipulation I.

III. Future investigations shall include but not be limited to:

A. Beginning in Fiscal Year 2017, will conduct 100% federally funded engineering investigation to be completed no later than Fiscal Year 2019 of the Locks' essential operating materials and components in order to identify the condition of the facility and/or repairs needed to meet standards established by the Corps that would support either the deauthorization, decommissioning, and divestment of the Locks or a complete change in management of the facility, whereby reopened operations result from contributed funds and provide the future owner and/or operator guidance in mid and long-term capital needs. This investigation may include the following:

1. A forensic investigation of the operating components (gudgeon anchors, masonry, and wood materials of the lock walls) using minimally invasive techniques and technologies to probe non-visible conditions and substrates;

2. An updated technical condition of the facility;

3. An updated economic analysis to identify the least cost alternative to decommission the facility; an environmental condition of the property to assess the presence, abundance and cleanup requirements resulting from hazardous and toxic materials exposed within the locks and ship canal.

4. Pertinent structural repairs to the locks so that the locks are returned to a safe and operable condition

5. Pertinent assessments identified in Stipulation IIIB.

B. Will pursue with an appropriate non-federal entity a 50/50 cost share study to identify the necessary analysis and administrative steps necessary for alternate ownership or management of the Locks. Should a cost shared study be of mutual interest, the Corps shall execute a separate agreement, such as a feasibility cost share agreement, with the appropriate non-federal entity. The study, if pursued, may include the following:

1. An updated technical condition of the facility to assess the rate of deterioration, the risks and potential liabilities associated with the facility, and the need, if any, for dredging and proper disposal of dredge materials;

2. Consideration, including an economic assessment, of transfer of ownership and/or operations of the facility to an identified transferee;

3. An economic evaluation of potential reauthorization of the facility to a different mission;

4. An economic analysis of the status quo closure condition;

5. Evaluation, including economic assessment, of de-authorization, decommissioning and divestment of the facility;

6. A current cost estimate to repair and return the Locks to safe operability;

7. An economic opportunity analysis of reopening and continued operation;

8. A full investigation of all environmental and regulatory requirements, including addressing NEPA and Section 106 requirements of both repair and final disposition options;

9. An assessment of the real estate title and boundary issues, resulting in a detailed scope, schedule, and budget to resolve any potential real estate issues;

10. An environmental condition of the property to assess the presence, abundance and cleanup requirements resulting from hazardous and toxic materials exposed within the locks and ship canal; and,

11. Assessment of any continued Corps regulatory oversight requirements that may transfer to a new third-party operator.

IV. Continue current caretaker activities commensurate with obligations under Section 110 of the National Historic Preservation Act to preserve and protect significant character defining features of the property, defined herein as the inspection and monitoring of the Locks' status through scheduled operation of gates to identify mechanical changes in performance; surface observation and monitoring of condition and potential deterioration of gudgeon anchors and lock walls; removal of intrusive objects or plant material that may cause harm to operating components; the monitoring of any geophysical activities that may pose harm to the resource; and the prevention of public access that may result in vandalism or other deliberately imposed harm.

V. Continue support of public outreach endeavors, including, but not limited to:

A. In cooperation with any volunteers, permit public tours of the Locks concurrent with Corps personnel on-site inspections and minimal maintenance activities, and continue to support local endeavors to heighten public awareness and appreciation of the Locks, as exemplified by the Willamette Falls Heritage Foundation's Lock Fest.

B. Upon requests and invitations, the Corps shall provide public presentations of the Locks' Past, Present and Future to interested organizations.

C. Corps shall conduct on-going conditions assessment of interpretive displays and shall inventory historical items, photographs, archives, and artifacts on display at the Lock Operator's Building and Museum, and seek professional services within the USACE or other curation facilities to inventory and conserve artifacts, archives and photos, and upgrade interpretive exhibits, so long as the Locks is in caretaker status. SHPO shall be afforded 30 days to review and comment on revisions and/or layout and content when interpretive elements are modified or replaced. The Corps shall review requests and facilitate the temporary loan of historic artifacts and resources to qualified local museums for public education purposes.

D. In consultation with signatories to this agreement, the Corps shall contract for the development of a book, website, or video documentary to commemorate the history of the Willamette Falls Locks.

E. The Willamette Falls Locks and Navigation Canal will be documented for submittal to the Historic American Engineering Record (HAER) by a qualified professional meeting National Park Service Standards (36 C.F.R. part 61) in coordination with appropriate NPS staff. HAER documentation will incorporate, expand upon, and complete HAER documentation previously prepared for the Willamette Falls Locks Chamber No. 1 (completed in 1980). Draft documentation will be submitted to Oregon SHPO and the NPS for review and approval. The Corps will assure that any required modifications or revisions necessary for NPS approval of the HAER submittal are accomplished in a timely manner. Once NPS has reviewed and accepted the final documentation, it will be duplicated in either digital or hardcopy form as preferred and supplied to NPS, SHPO, University of Oregon and the Oregon Historical Society. Proof of submittal of the NPS-approved HAER documentation to each of the above repositories will be provided to SHPO, completing this stipulation within four years of the final signature of this Memorandum of Agreement (MOA).

F. Within one year of execution of this MOA, the Corps will further consult with the tribes to develop a mutually agreeable plan to enable means for conducting traditional cultural practices at Willamette Falls Locks.

G. Within one year of execution of this MOA, the Corps will have investigated and discussed the results of their investigation with the appropriate non-federal entity regarding the need for the Locks to be repaired and operational prior to transfer.

VI. ANTI-DEFICIENCY ACT

A. The Corps shall make reasonable and good faith efforts to secure the necessary Federal funds to implement this MOA. The parties agree that any requirement for obligation of funds arising from the terms of this agreement shall be subject to inclusion in the President's Budget and the availability of congressionally appropriated funds for that purpose. This agreement shall not be interpreted to require the obligation or expenditure of funds in violation of the Anti-Deficiency Act.

B. If compliance with the Anti-Deficiency Act alters or impairs the Corps' ability to implement the stipulations of this MOA within the term of this agreement, the Corps shall conduct supplementary consultation with the signatories and concurring parties in accordance with Stipulations VII and VIII below.

VII. DURATION

This MOA will expire upon completion of requirements in the above Stipulations, or if its terms are not carried out, within ten years from the date of its execution. Prior to such time, the Corps may consult with the other signatories and concurring parties to reconsider the terms of the MOA and amend or renew it in accordance with Stipulation IX below.

VIII. MONITORING AND REPORTING

Each year following the execution of this MOA until it expires or is terminated, the Corps shall provide all parties to this MOA a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in the Corps' efforts to carry out the terms of this MOA. In addition to an annual report, per Stipulation I above, the Corps will conduct meetings as required with signatories, concurring parties and other stakeholders to report on progress made toward accomplishing the terms of this agreement.

IX. DISPUTE RESOLUTION

Should any signatory or concurring party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the Corps shall consult with such party to resolve the objection. If the Corps determines that such objection cannot be resolved, the Corps will:

A. Forward all documentation relevant to the dispute, including the Corps' proposed resolution, to the ACHP. The ACHP shall provide the Corps with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the Corps shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories, and concurring parties, and provide them with a copy of this written response. The Corps will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, the Corps may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the Corps shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.

C. The Corps shall carry out all other actions subject to the terms of this MOA that are not the subject of the dispute.

X. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

XI. TERMINATION

A. If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment per Stipulation X above. If, within thirty (30) days (or another time period agreed to by all signatories), an amendment cannot be reached, any signatory may terminate their interest in the MOA upon written notification to the other signatories.

B. If the MOA is terminated, and, prior to work continuing on the undertaking, the Corps must either (a) execute an MOA pursuant to 36 C.F.R. § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 C.F.R. § 800.7. The Corps shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by the Corps, SHPO, and ACHP, and implementation of its terms evidences that the Corps has taken into account the effects of this undertaking on historic properties.

SIGNATORIES:

U.S. ARMY CORPS OF ENGINEERS,
PORTLAND DISTRICT

Jose L. Aguilar
Colonel, Corps of Engineers
District Commander

Date: 20161013

OREGON STATE HISTORIC
PRESERVATION OFFICER

Ms. Christine Curran
Deputy

Date: 10.6.16

ADVISORY COUNCIL ON
HISTORIC PRESERVATION

Mr. John M. Fowler
Executive Director

Date: 10/19/16

CONCURRING PARTIES:

Signing as a concurring party is primarily a way to express agreement with the contents of the MOA and acceptance of the outcome of the process (36 CFR § 800.6(c)(3)). Concurring parties do not have the rights or responsibilities of the required signatories; however, their contribution is and has been important to the development of the above MOA. Their participation and signature expresses a desire to remain informed of the Corps fulfillment of the stipulations listed in the MOA. The signatories express gratitude to the following organizations, agencies and interested parties for serving as a concurring party:

NATIONAL TRUST FOR HISTORIC PRESERVATION

CLACKAMAS COUNTY

METRO

OREGON CITY CERTIFIED LOCAL GOVERNMENT

WEST LINN CERTIFIED LOCAL GOVERNMENT

ONE WILLAMETTE RIVER COALITION

WILLAMETTE FALLS HERITAGE FOUNDATION

WILLAMETTE FALLS HERITAGE AREA COALITION

RESTORE OREGON

PORTLAND GENERAL ELECTRIC

CITY OF WILSONVILLE

CLACKAMAS COUNTY HISTORICAL SOCIETY

WILSONVILLE CONCRETE / MARINE INDUSTRIAL CONSTRUCTION LLC

WEST LINN PAPER

WILLAMETTE RIVER KEEPERS

eNRG KAYAKING

Signatures for all concurring parties are located at the end of this document.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
PO BOX 2946
PORTLAND OR 97208-2946

MAY 15 2014

Planning, Programs and Project
Management Division

Mr. Roger Roper
Deputy State Historic Preservation Officer
Oregon Parks and Recreation Department
State Historic Preservation Office
725 Summer Street NE, Suite C
Salem, OR 97301-1266

RE: Continued Section 106 Consultation Regarding the Caretaker Status of the Willamette Falls Locks, Oregon City, Clackamas County, Oregon

Dear Mr. Roper

The U.S. Army Corps of Engineers, Portland District (Corps) is writing to notify you of its finding, pursuant to Section 106 (16 U.S.C. § 470f, 36 C.F.R. part 800) of the National Historic Preservation Act (Act), regarding the closure in November 2011 of the Willamette Falls Lock (locks), a property listed in the National Register of Historic Places (National Register). Please recall we previously notified you on August 21, 2013 about the potential for this action to cause effects on the resource in order to initiate compliance with the Corps' responsibilities under the Act. We have since determined that the closure of the locks to vessel traffic has had and may continue to have – adverse effects on the character defining features and qualities that made the locks eligible for listing in the National Register.

Following our initial letter regarding this action, the Corps convened a Section 106 information meeting for consulting and invited parties wherein the Corps outlined the status of compliance, and sought input about the effects of the closure. The meeting took place February 25, 2014 at the Corps' Portland District office. A number of parties identified over the past year were invited to participate, including representatives from the Oregon State Historic Preservation Office, Certified Local Governments, historical organizations, elected officials, tribes, and leaders from the industrial, commercial, and recreation sectors. The Corps asked for comment specifically about the effects of the closure on the aspects of integrity that originally made the locks eligible for listing in the National Register, and also requested suggestions for developing the Area of Potential Effects (APE). Comments were recorded on paper and compiled for the record. At the conclusion of the meeting, the Corps explained that further comments would be received until March 28, 2014, at which time the Corps would communicate its findings of effects to the SHPO.

The following is a summary of considerations made by the Corps in developing an APE, and a rationale for a finding of adverse effects for the locks closure as regards National Register criteria and integrity guidelines.

Area of Potential Effects

Based upon review of comment letters and its own investigations, the Corps recommends that the APE for the closure action is defined by the entirety of the Corps owned resource, including the adjacent park land that includes buildings and structures incidental to the historic period. A map of the proposed APE is attached for your reference. While there are clearly a number of contemporary recreational and commercial uses that have relied upon the locks throughout the years, as well as potential cultural activities that may realize future benefits from a functioning locks, none of these interests – even if potentially historic – has lost measurable integrity due to closure.

The Corps considered whether a potential historic property outside of the locks boundaries, upstream or downstream, would lose its criterion A associations because the locks has ceased to pass vessels. It was determined that such a property would lose critical historical associations only if its eligibility has been visually or functionally dependent upon the operation of the locks. An example would be a river front structure fifty years of age that derived its primary significance from the servicing or outfitting of vessels before they entered the locks. The Corps has not identified properties with such associations that have been compromised by the closure. However, should specific examples of this association be presented, further investigation of property eligibility and effects can be made.

The Corps also did not find evidence that architectural or engineering values of properties located outside of the locks have been affected with respect to design, style, workmanship, or materials, though it can be asserted that the locks itself has experienced a loss of physical integrity, as discussed below.

In developing the APE, the presence of other National Register listed and eligible properties adjacent to or nearby the locks was also considered, including the Sullivan Power Plant and West Linn Paper Company, as well as the potential of a larger historic district that encompasses properties on Moore Island, as well as the locks. However, it was determined that, while certain economic relationships may have changed somewhat with the closure of the locks to vessel traffic, even if listed or eligible, these properties did not lose any critical historical associations or material integrity.

Finally, given the interest in establishing a heritage area in and around the falls, the Corps also considered the potential effects of the closure on a designation of this section of the river. While an operating locks might benefit commercial and recreational interests within a heritage corridor, the aggregate of historic properties – including a contributing, but non-active locks - could easily meet eligibility standards for such a designation. The Corps recommends that the

closure of the locks does not compromise the potential nomination and listing of a Willamette Falls heritage area. However, it can be anticipated that a broader thematic designation focused around a functioning locks could generate important benefits to the area through heritage tourism and related economic activities.

Navigation/Transportation - Criterion A

The Corps acknowledges the pivotal role the locks have played in the navigational and transportation history of the Willamette River and environs at this locale since its operation began in 1873. Certain vessels no longer congregate before the locks and cannot use the waterway as a viable avenue of transport. The ability to understand and experience the historic function the locks had in moving commerce and people around the falls was best understood by the actual operation of the gates and the passage of vessels through them. The closure has created a degree of isolation of the facility from both vehicle and foot access and thereby reduced the associative and experiential qualities of a vibrant water passage with river traffic moving through the lock chambers. Although the gates are periodically exercised, without the direct association of watercraft an understanding of the locks' mechanical operation and historical role is no longer fully understood or conveyed. It is therefore concluded that a degree of visual association with navigation and transportation history has been lost within the immediate boundaries of the resource where those activities took place and were in display.

Architecture/Engineering - Criterion C

The Corps acknowledges its obligation to meet the standard of preservation of the locks, defined as measures that stabilize, repair, and retain a property's existing form as evolved over time. Toward this goal, the Corps performs basic maintenance and exercises the gates on a regular basis, and conducted an engineering inspection and evaluation of components to identify conditions and associated costs to address critical needs. Reporting has shown the gudgeon anchors may be in decline and should be replaced, although the level of suspected deterioration is not fully known, due to limited funding to fully probe the status of these components. To date, this lack of funding has prevented the Corps from reaching definite conclusions about the condition of the anchors and their ability to support the gates, beyond the finding that safety risks are too high to continue allowing the public and vessels into the locks' chambers.

However, the Corps believes that deferring replacement of the anchors could result in some type of failure of these components at an indeterminate point in time, and that higher costs may be incurred if this work is postponed long term. Other aspects of the locks that may require future repair include the masonry walls and timber components, all of which receive basic monitoring as part of the overall custodial care of the facility. Therefore, although a complete picture of the locks' mechanical and physical status can only be speculated, the Corps recommends that without replacement of the gudgeon anchors some degree of adverse effects to the engineering values of the resource may occur.

Traditional Culture

Comments from tribal representatives have shown that the locks were adapted during the historic period for various religious and cultural activities when full access to the falls was cut off by development. Though not cited in the National Register nomination, it has been demonstrated that access above the falls via the locks was essential for the continuance of traditional cultural and educational practices such as the canoe journey. Because the closure prevents native people from conducting these traditions and teachings to new generations, the Corps acknowledges the action has had an adverse effect on the tribes' ability to maintain certain aspects of their traditional culture. Non- native life ways based upon shipping and river transportation may also be viewed as aspects of traditional culture that have been curtailed to some degree by the closure action.

The Corps has determined that the closure of the Willamette Falls Locks to vessels has an adverse effect on the aspects of setting, association, and feeling that originally made the locks eligible for listing in the National Register, and that there is some potential for adverse effects to the character defining design, materials, features, and workmanship of the resource as long as the status of the gudgeon anchors and other materials and components remains partly unknown.

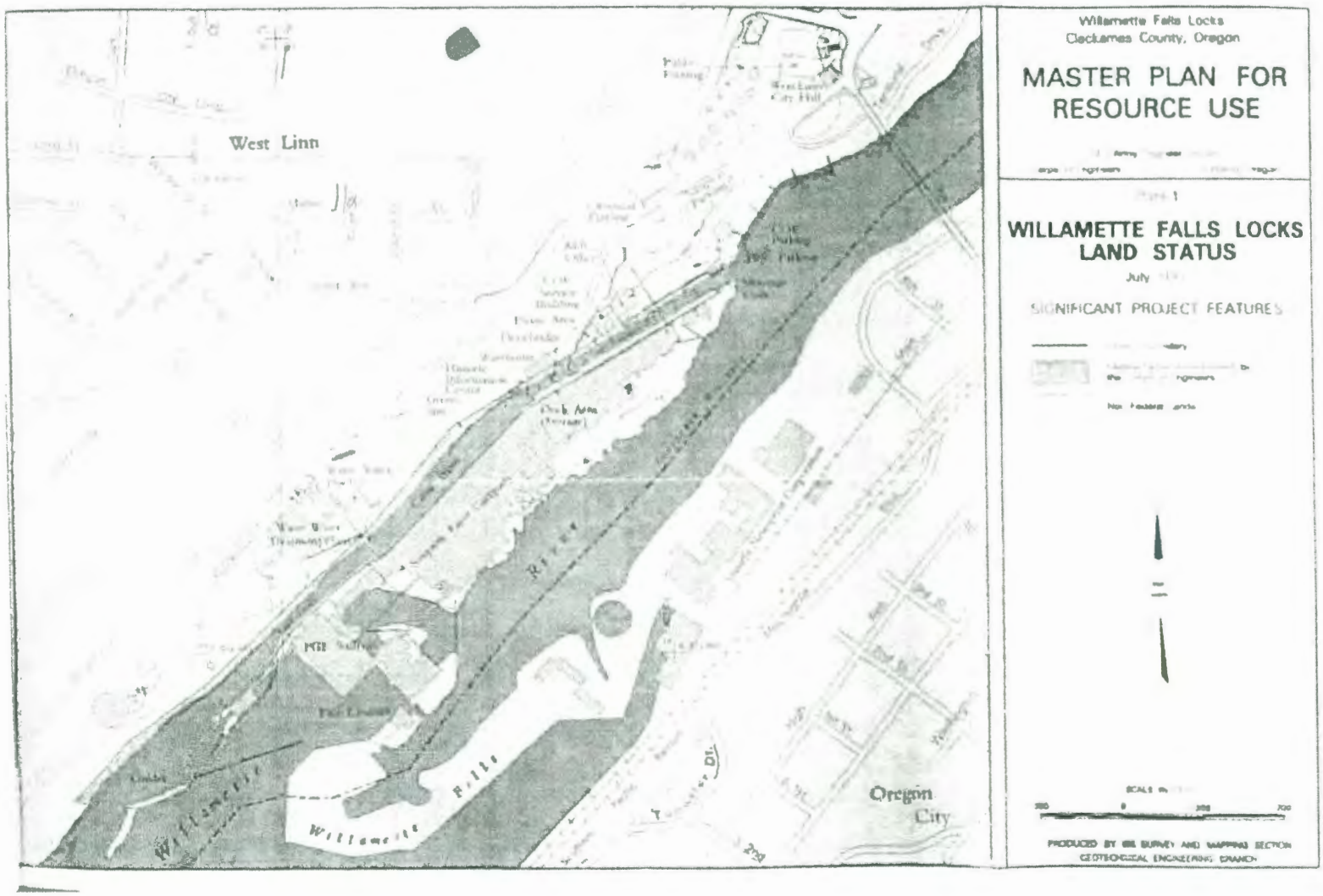
The Corps believes that continued engagement of all consulting and invited parties will be essential in crafting a meaningful resolution of adverse effects. The Corps also anticipates that all parties with cultural, historical, recreational, and commercial interests in the locks will provide valuable input into a separate Section 106 consultation if there is a future transfer of the property out of federal ownership. We look forward to further discussion of the Willamette Falls Locks closure with regard to this finding, and your advisement in developing the most appropriate means of avoiding, minimizing or mitigating the adverse effects of the closure action.

Questions regarding this evaluation may be directed to Ms. Lauren McCroskey, Program Manager, Technical Center of Expertise for the Preservation of Historic Buildings and Structures at (206) 764-3538, or by email at lauren.f.mccroskey@usace.army.mil.

Sincerely,

Joyce E. Casey
Chief, Environmental Resources Branch

Appendix A – Copy of Letter of Adverse Effects to State Historic Preservation Office



Appendix B – Boundary for the Area of Potential Effect is the "Project Boundary" outlined in red, constituting the Federal ownership, including the easement right-of-way for the Picnic Area.

NATIONAL TRUST FOR HISTORIC PRESERVATION

David J. Brown Date: 7/1/16

[insert name and title]

DAVID J. BROWN, EX. VP and Chief Preservation Officer

CLACKAMAS COUNTY

_____ Date: _____

[insert name and title]

METRO

_____ Date: _____

[insert name and title]

OREGON CITY CERTIFIED LOCAL GOVERNMENT

_____ Date: _____

[insert name and title]

WEST LINN CERTIFIED LOCAL GOVERNMENT

_____ Date: _____

[insert name and title]

ONE WILLAMETTE RIVER COALITION

_____ Date: _____

[insert name and title]

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: _____

[insert name and title]

WILLAMETTE FALLS HERITAGE AREA COALITION

NATIONAL TRUST FOR HISTORIC PRESERVATION (see attached)

_____ Date: _____
David J. Brown, Executive Vice-President and
Chief Preservation Officer

CLACKAMAS COUNTY

Tootie Smith Date: 9-7-16
Tootie Smith, Vice Chair

METRO

_____ Date: _____
Martha Bennett, Chief Operating Officer

OREGON CITY CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
[insert name and title]

WEST LINN CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
[insert name and title]

ONE WILLAMETTE RIVER COALITION

_____ Date: _____
[insert name and title]

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: _____
Troy Bowers, President

CONCURRING PARTIES:

Signing as a concurring party is primarily a way to express agreement with the contents of the MOA and acceptance of the outcome of the process (36 CFR 800.6(c)(3). Concurring parties do not have the rights of signatories; their approval is not needed to execute, amend, or terminate the MOA.

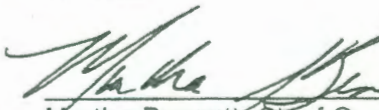
NATIONAL TRUST FOR HISTORIC PRESERVATION (see attached)

_____ Date: _____
David J. Brown, Executive Vice-President and
Chief Preservation Officer

CLACKAMAS COUNTY (see attached)

_____ Date: _____
Tootie Smith, Vice Chair

METRO


Date: 9/12/14
Martha Bennett, Chief Operating Officer

OREGON CITY CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
Dan Holladay, Mayor

WEST LINN CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
Russell Axelrod, Mayor

NATIONAL TRUST FOR HISTORIC PRESERVATION

_____ Date: _____
[insert name and title]

CLACKAMAS COUNTY

_____ Date: _____
[insert name and title]

METRO

_____ Date: _____
[insert name and title]

OREGON CITY CERTIFIED LOCAL GOVERNMENT

_____ Date: 5/4/16
Dan Holladay, Mayor

WEST LINN CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
[insert name and title]

ONE WILLAMETTE RIVER COALITION

_____ Date: _____
[insert name and title]

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: _____
[insert name and title]

WILLAMETTE FALLS HERITAGE AREA COALITION

NATIONAL TRUST FOR HISTORIC PRESERVATION

_____ Date: _____
[insert name and title]

CLACKAMAS COUNTY

_____ Date: _____
[insert name and title]

METRO

_____ Date: _____
[insert name and title]

OREGON CITY CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
[insert name and title]

WEST LINN CERTIFIED LOCAL GOVERNMENT

Eileen Stein, City Manager Date: 8-16-16
[insert name and title]

ONE WILLAMETTE RIVER COALITION

_____ Date: _____
[insert name and title]

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: _____
[insert name and title]

WILLAMETTE FALLS HERITAGE AREA COALITION

ONE WILLAMETTE RIVER COALITION

Sandy Carter, Coord.
[insert name and title]

Date: 9/15/16

NATIONAL TRUST FOR HISTORIC PRESERVATION

_____ Date: _____
[David Brown, VP of Preservation]

CLACKAMAS COUNTY

_____ Date: _____
[insert name and title]

METRO

_____ Date: _____
[insert name and title]

OREGON CITY CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
[Daniel Holladay, Mayor]

WEST LINN CERTIFIED LOCAL GOVERNMENT

_____ Date: _____
[Russell Axelrod, Mayor]

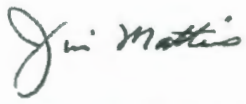
ONE WILLAMETTE RIVER COALITION

_____ Date: _____
[Sandy Carter, Coordinator]

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: 10/6/2016
[Troy Bowers, President]

WILLAMETTE FALLS HERITAGE AREA COALITION



_____ Date: 9/22/16

[Jim Mattis, President]

RESTORE OREGON

_____ Date: _____

[Peggy Moretti, Executive Director]

PORTLAND GENERAL ELECTRIC

_____ Date: _____

[insert name and title]

CITY OF WILSONVILLE

_____ Date: _____

[insert name and title]

CLACKAMAS COUNTY HISTORICAL SOCIETY

_____ Date: _____

[insert name and title]

WILSONVILLE CONCRETE / MARINE INDUSTRIAL CONSTRUCTION LLC

_____ Date: _____

[David Bernert, CEO]

_____ Date: _____
[insert name and title]

RESTORE OREGON


Executive Director Date: _July 21, 2016___
[insert name and title]

PORTLAND GENERAL ELECTRIC

_____ Date: _____
[insert name and title]

CITY OF WILSONVILLE

_____ Date: _____
[insert name and title]

PACIFIC NORTHWEST WATERWAYS ASSOCIATION

_____ Date: _____
[insert name and title]

CLACKAMAS COUNTY HISTORICAL SOCIETY

_____ Date: _____
[insert name and title]

WILSONVILLE CONCRETE / MARINE INDUSTRIAL CONSTRUCTION LLC

_____ Date: _____
[insert name and title]

WEST LINN PAPER

ONE WILLAMETTE RIVER COALITION

_____ Date: _____
Sandy Carter, Director

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: _____
Troy Bowers, President

WILLAMETTE FALLS HERITAGE AREA COALITION

_____ Date: _____
Jim Mattis, President

RESTORE OREGON (See Attached)

_____ Date: _____
Peggy Moretti, Executive Director

PORTLAND GENERAL ELECTRIC

_____ Date: 9/30/2014
Maria Pope, Senior Vice President
Power Supply & Operations and Resource Strategies

CITY OF WILSONVILLE

_____ Date: _____
Tim Knapp, Mayor

ONE WILLAMETTE RIVER COALITION

_____ Date: _____
Sandy Carter, Director

WILLAMETTE FALLS HERITAGE FOUNDATION

_____ Date: _____
Troy Bowers, President

WILLAMETTE FALLS HERITAGE AREA COALITION

_____ Date: _____
Jim Mattis, President

RESTORE OREGON (See Attached)

_____ Date: _____
Peggy Moretti, Executive Director

PORTLAND GENERAL ELECTRIC

_____ Date: _____
Maria Pope, Senior Vice President
Power Supply & Operations and Resource Strategies

CITY OF WILSONVILLE

Tim Knapp Date: 9-19-16
Tim Knapp, Mayor

CLACKAMAS COUNTY HISTORICAL SOCIETY

Marilyn Morrissey Date: 9.28.16
Marilyn Morrissey, President

Ed Lindquist Date: 9-28-16
Ed Lindquist, Designee, Willamette Falls Locks Committee

WILSONVILLE CONCRETE / MARINE INDUSTRIAL CONSTRUCTION LLC

_____ Date: _____
David Bernert, President

WEST LINN PAPER (see attached)

_____ Date: _____
Brian Konan, Chief Operating Officer

WILLAMETTE RIVER KEEPERS

_____ Date: _____
Travis Williams, Executive Director

eNRG KAYAKING (see attached)

_____ Date: _____
Sam Drevo, Director Northwest River Guides LLC
dba eNRG Kayaking

CLACKAMAS COUNTY HISTORICAL SOCIETY

_____ Date: _____
Marilyn Morrissey, President

_____ Date: _____
Ed Lindquist, Designee, Willamette Falls Locks Committee

WILSONVILLE CONCRETE / MARINE INDUSTRIAL CONSTRUCTION LLC

David Bernert Date: 9/21/2016
David Bernert, President

WEST LINN PAPER (see attached)

_____ Date: _____
Brian Konan, Chief Operating Officer

WILLAMETTE RIVER KEEPERS

_____ Date: _____
Travis Williams, Executive Director

eNRG KAYAKING (see attached)

_____ Date: _____
Sam Drevo, Director Northwest River Guides LLC
dba eNRG Kayaking

WILLAMETTE FALLS HERITAGE AREA COALITION

_____ Date: _____
[insert name and title]

RESTORE OREGON

_____ Date: _____
Peggy Moretti, Executive Director

PORTLAND GENERAL ELECTRIC

_____ Date: _____
Maria Pope, Senior Vice President

CITY OF WILSONVILLE

_____ Date: _____
[insert name and title]

CLACKAMAS COUNTY HISTORICAL SOCIETY

_____ Date: _____
Marilyn Morrissey, President

_____ Date: _____
Ed Lindquist, Designee, Willamette Falls Locks Committee

WILSONVILLE CONCRETE / MARINE INDUSTRIAL CONSTRUCTION LLC

_____ Date: _____
David Bernert, President

WEST LINN PAPER

_____ Date: 9/12/16
[insert name and title]
BRIAN KONEN 6M

WILLAMETTE RIVERKEEPER

Date: 10/6/16

[Travis Williams, Executive Director]

WEST LINN PAPER

_____ Date: _____
Brian Konan, Chief Operating Officer

WILLAMETTE RIVER KEEPERS

_____ Date: _____
Travis Williams, Executive Director

eNRG KAYAKING

_____ Date: 9/1/16
Sam Drevo, Director Northwest River Guides LLC
dba eNRG Kayaking

Appendix D – COST BREAKDOWN FOR MEASURES AND ALTERNATIVES

For Official Use Only (FOUO) – not for public release.

Appendix E – PUBLIC INVOLVEMENT

(**NOT** INCLUDED FOR REVIEW)
To be completed following Public Comment Period.

Appendix F – FINDING OF NO SIGNIFICANT IMPACT

US Army Corps of Engineers ®
Portland District

FINDING OF NO SIGNIFICANT IMPACT

for the Integrated Disposition Study Report and Environmental Assessment

Willamette Falls Locks Disposition Study, Portland, Oregon

I find the proposed action will not significantly affect the quality of the human environment and that an environmental impact statement is not required. This Finding of No Significant Impact (FONSI) is supported by the U.S. Army Corps of Engineers (Corps) *Integrated Disposition Study Report and Environmental Assessment (EA) Willamette Falls Locks Disposition Study, Portland, Oregon* and is hereby incorporated by reference.

The Integrated Disposition Study/EA and FONSI have been prepared pursuant to the National Environmental Policy Act (NEPA) in accordance with the Council on Environmental Quality regulations as contained in 40 Code of Federal Regulations (CFR) Parts 1500 to 1508 and the Corps procedures for implementing NEPA found at 33 CFR Part 230.

PROJECT PURPOSE AND NEED

Section 216 of the Flood Control Act of December 31, 1970, 84 Stat. 1830, Pub. L. No. 91-611, authorizes the Corps to analyze and review the operation of completed civil works projects constructed by the Corps when found advisable due to significantly changed physical or economic conditions and to report to Congress recommendations on the advisability of modifying its operation, including de-authorization, decommissioning and disposal of the federal interest. The purpose of the proposed action is to de-authorize, modify as appropriate, and dispose of the Locks. The need for disposition is due to the absence of federal interest in continued use of the facilities for their authorized purpose (i.e., navigation).

PROPOSED ACTION/PREFERRED ALTERNATIVE

The U.S. Army Corps of Engineers has proposed a project for the de-authorization of the Willamette Falls Locks (Locks). These locks and dams were originally authorized for the purpose of navigation but, currently, there is insufficient demand for commercial lockages and it doesn't appear that there will be a return of commerce sufficient to justify the repair and rehabilitation of the facility to maintain a federal interest in operating and maintaining the Locks. The Integrated Disposition Study/EA recommends minor modification for seismic retrofits, installing perimeter fencing and debris and boat barriers, Congressional de-authorization and disposal of the facilities to a non-federal entity.

FINAL DETERMINATION

In accordance with ER 200-2-2, Policy and Procedures for Implementing the National Environmental Policy Act (NEPA), an EA was prepared and circulated contemporaneously with the unsigned, draft FONSI and the Integrated Disposition Study/EA for a 30-day public and agency review. Coordination with federally recognized tribes, the National Marine Fishers Service and the U.S. Fish and Wildlife Service was conducted. Coordination with Oregon State Historic Preservation Officer (SHPO) is underway. Congressional de-authorization of the navigation purpose of the obsolete locks and dams is a prerequisite to all of the action-based alternatives. An effort was made to address all environmentally related public and agency comments, as appropriate, in the Integrated Disposition Study/EA. The Corps' further responses to comments are found in Appendix F of the Integrated Disposition Study/EA.

The Corps recognizes that in fulfilling the authorization, the agency needs to assess whether the impacts of a project rise to the level of "significantly affecting the human environment." The following is an assessment of the impacts of the proposed action when compared to the "significance" of the impact. "Significance" requires considerations of both context and intensity (40 CFR § 1508.27). "Context" means that the significance of an action must be analyzed in several contexts (such as society as a whole, the affected region, the affected interests and the locality). "Intensity" refers to the severity of impact. Listed below are 10 tests of intensity and Corps determinations that should be considered in the context of Corps proposed action when determining significance.

1) *Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.*

The EA revealed minimal or no adverse impacts on water quality, aquatic resources, terrestrial resources, air quality, land use, infrastructure or noise from the actions constituting the preferred alternative as identified herein. No significant issues were noted regarding hazardous, toxic, or radioactive materials. The preferred alternative is in compliance with the Clean Air Act and Executive Order 12898 for Environmental Justice. The preferred alternative would not disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations. Although there may be adverse impacts to local economic interests as a result of the continued closure of the Locks, per 40 CFR 1508.14, economic and social impacts are not by themselves sufficient to constitute a "significant effect on the human environment." The basis for these findings may be found in Chapter 4 of the attached EA.

2) *The degree to which the action affects public health or safety.*

Seismic retrofits and installation of perimeter fencing and debris and boat barriers is expected to yield public safety benefits.

3) *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*

There would be no significant impacts from the proposed actions on park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. The basis for these findings may be found in Chapter 4 and Chapter 5 of the attached EA. The Willamette Falls Locks are listed on the National Register of Historic Places (NRHP). Contributing elements include the four numbered locks, the canal basin and guard lock, the Lock Master's Office/Museum and both sets of basalt stair cases.

4) *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

The effects of the proposed action are well known and not controversial. The Corps solicited public comments on the Draft EA. The Draft Integrated Disposition Study/EA was circulated for a 30-day public and agency review on May 23, 2017. The comment period ended June 23, 2017. During the comment period, _____ comment letters were received; commenters requested . . . . Comments and responses and a summary of public outreach efforts may be found in Appendix F of the EA.

5) *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*

There are no uncertain or unique risks associated with the implementation of the proposed action. None of the features are expected to provide unique or uncertain risks beyond those addressed during the disposition study. An analysis of the potential adverse and beneficial effects of the proposed action may be found in Chapter 4 of the EA.

6) *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*

The proposed action does not set a precedent for future actions in scope, scale, or design of the de-authorization and disposition of a federal facility; nor does it set a future precedent in action or operation of the project area.

7) *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.*

The Integrated Disposition Study/EA considered the effects of implementing the proposed action in association with past, present, and reasonably foreseeable actions in and near Willamette Falls. The Integrated Disposition Study/EA revealed no effects on the human environment from the actions constituting the preferred alternative that would, when added to other past, present and reasonably foreseeable future effects, be significant. The reader is directed to Section 4.9 of the EA for the detailed Cumulative Impact Analysis, which supports this finding.

8) *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations at 36 CFR 800 require consideration of cultural resources prior to a federal undertaking and require consultation with the OR-SHPO, federally recognized tribes with a connection to the project location, and other consulting parties defined at Section 800.3. The NHPA only affords protection to sites, buildings, structures, objects, or landscapes listed in or determined eligible for listing in the National Register of Historic Places (NRHP). In compliance with the NHPA, consultation will be undertaken with the Oregon State Historic Preservation Office (SHPO) regarding historic properties (cultural resources listed, or eligible for listing, on the NRHP). Consultation with the SHPO and other interested parties will be undertaken to determine appropriate mitigation measures for inclusion in a Memorandum of Agreement (MOA) to address project effects. Development of a MOA will be completed prior to implementation of the chosen alternative. As a result of any real estate actions to dispose of the Locks, any transferee will be required to agree to the stipulations outlined in the MOA and preservation clauses outlined in the property transfer.

The Confederated Tribes of Siletz Indians, Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Cowlitz Indian Tribe, the Nez Perce Tribe, Confederated Tribes of Umatilla Indian Reservation, and the

Confederated Tribes and Bands of the Yakama Nation were consulted on this undertaking; no comments have been received in regards to the proposed action.

9) *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*

The Corps determined that the proposed action would have "no effect" on National Marine Fisheries Service or U.S. Fish and Wildlife Service listed species and their listed critical habitat.

10) *Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.*

The Corps is required to fulfill all statutory authorized project purposes following the balance of purposes and other directions provided by the Congress in the authorization documents. The Corps is also required to take into account other legal mandates such as the Clean Water Act and the Coastal Zone Management Act. The proposed action does not threaten a violation of any law or requirements imposed for the protection of the environment.

_____ _____

Date

Aaron L. Dorf

Colonel, Corps of Engineers

District Commander