Willamette Locks Economic Potential Report

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INTRODUCTION

On January 1, 1873, the Willamette Falls Locks (WFL) opened and allowed passage around Willamette Falls, the second largest waterfall by volume in the US behind Niagara Falls. The WFL were one of the first multi-lift tandem navigation locks[1] built in the US.[2] The initial design for the way the WFL gates are beveled upstream came directly from drawings by Leonardo da Vinci. The locks were considered an engineering marvel at the time and dramatically reduced transit times and transportation costs.[3]

Fast-forward 138 years. In response to dwindling commercial tonnage passing through the WFL, and a mounting bill for deferred maintenance and repairs, the US Army Corps of Engineers (ACoE) changed the operational status of the WFL from "caretaker status" to "non-operational status" in December 2011.[4] That decision effectively cut the Willamette River in two. Commercial and recreational users upstream from Oregon City and Willamette Falls (Falls) can no longer access markets, customers, or recreation sites downstream via the river. Likewise, downstream business and recreational river users can no longer access sites upstream from the Falls.

Willamette Locks, 1894.

[1]Each of the WFL's four tandem or adjacent lift-chambers provide 10-12 feet of elevation change.
[2]Lewis, Alan. No Date. Conquering the Falls, The Willamette Falls Locks. Willamette Falls Heritage Foundation. www.willamettefalls.org/hisLocks; Willamette River Initiative. Willamette Falls. http://willa-metteinitiative.org/topics/willamette-falls.
[3]Clackamas County Historical Society. 2013. Willamette Falls Locks: Past, Present, and Future — Army Corps of Engineers at MOOT. OregonLive blog. http://blog.oregonlive.com/my-oregon-city//print.html?entry=/2013/09/willamette_falls_locks_past_pr.html. September 27; Dungca, Nicole. 2009. Second Chance for Willamette Falls Locks, An Oregon Treasure. OregonLive blog. http://blog.oregonlive.com/clackamascounty_impact/print.html?entry=/2009/10/second_chance_for_an_oregon_tr.html. October 28.
[4]Oregon Solutions. Willamette Falls Locks. http://orsolutions.org/osproject.willamette-falls-locks, accessed July 2014; Clackamas County Historical Society, 2013; In a December 1, 2011 press release, the ACoE indicated that "caretaker status" involved operating the locks at least once a month for maintenance. "Non-operational status" means they will not operate the locks at all. US Army Corps of Engineers, Portland District. News Release. Corps Changes Status of Willamette Falls Locks. Release Number 11-076, December 1, 2011; As we understand, the ACoE changed the locks status from "operational" to "caretaker" sometime prior to 2011. This change reduced funding, operations and number of lockages., and effectively began the process of shutting down the locks, which occurred with the change from "caretaker" to "non-operational" status.

"The recreational boating use (both motorized and non-motorized) and commercial tourist boating on the Willamette River will grow and could become a significant tourism asset for Oregon and the Willamette Valley region." -Travel Oregon

The ACoE's decision to close the WFL does not reflect their historical and navigational significance, especially to Oregonians. In 1974, the WFL were listed on the National Register of Historic Places.[5] In 1991, they were designated a State Historic Civil Engineering Landmark by the American Society of Civil Engineers.[6] In 2012, the WFL 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." The WFL facilitates movement on the Willamette River, which has been designated both an American Heritage River and a National Water Trail.[7]

Local interest in the WFL is also reflected in the efforts taken by Oregonians to keep them open and to describe their navigation and economic significance. These efforts include:[8]

- In 2005, then U.S. Representative Darlene Hooley convened a Willamette River United conference, which explored ideas for keeping the WFL open.
- Governor Ted Kulongoski designated keeping the WFL open an Oregon Solutions project. This lead to a Declaration of Cooperation in May 2006, signed by more than 20 public and private organizations, to collectively commit to keep WFL open.
- The ACoE signed an agreement with Oregon Department of Transportation (ODOT) and Clackamas County to accept funds raised locally and provided by state agencies, that helped keep the locks open during 2006 and 2007.
- The City of West Linn submitted annual Congressional Budget requests, which provided O&M funding. The funding amount in the fiscal year 2008 appropriations was $157,000.
- The Willamette Falls Heritage Foundation provides public education and outreach regarding the WFL and their historical significance. Their work includes sponsoring the annual Lock Fest celebration, which included rides through the locks prior to the ACoE shutting them down.
- Clackamas County coordinated with the Willamette Falls Heritage Foundation and took on the responsibility and cost of nominating the WFL as a National Historic Landmark.
- Inca Engineering undertook a $50,000 engineering study that provided the first assessment of the locks' structural and operational conditions. The Clackamas Heritage Partners managed and administered the funds donated for the study commissioned by the One Willamette River Coalition, which came from: The Kinsman Foundation, Metro, Oregon Department of Parks and Recreation, Oregon State Marine Board, Columbia River Yachting Association, Clackamas County, and the City of Keizer.
- Travel Oregon provide $26,000 to fund public outreach and education about WFL. This project also produced a new name for partners collaborating to keep the locks open: The One Willamette River Coalition.
- ODOT contributed $118,000 to fund the ACoE's inspection of the locks.
- The Oregon Solutions partnership secured $1.8 million in stimulus funding to complete needed structural inspections.

In 2009, the Oregon Solutions project organized another Declaration of Cooperation, signed by public and private parties in support of keeping the WFL open. Signers included: Clackamas County, Wilsonville Concrete, the Governor's Economic Revitalization Team, ODOT, Clackamas Heritage Partners, Oregon Marine Board, the City of Oregon City, Oregon Department of Parks and Recreation, Portland General Electric, Travel Oregon, Willamette Falls Heritage Foundation, Northwest Oregon Resource Conservation & Development Council, ACoE, the Port of Portland, and the City of West Linn. A number of signers noted the significance of keeping WFL open including:

[5]Clackamas County Historical Society, 2013.
[6]Lewis, A. 2004. "The Willamette Falls Canal," American Canals, Bulletin of the American Canal Society. Vol. 33, No. 2, Spring, pp 1 – 4.
[7]Clackamas County Historical Society, 2013.
[8]Oregon Solutions. Declaration of Cooperation, The Willamette Falls Locks' Oregon Solution, May 2009.

- Travel Oregon: "We continue to believe that recreational boating use (both motorized and non-motorized) and commercial tourist boating on the Willamette River will grow and could become a significant tourism asset for Oregon and the Willamette Valley region."[9]
- Port of Portland: "The Port of Portland is pleased to support the repair and refurbishment of the locks at Willamette Falls. Our hope is that this investment will allow a historical piece of infrastructure to contribute to the economic growth of the region for another 100 years to come. Moreover, we believe the revitalized locks at Willamette Falls can play a key role in the reintroduction of thriving commercial river traffic along the entire navigable length of the Willamette River."[10]

The efforts described above reflect local, regional and state interests in the locks and how much stakeholders value the locks' scenic, historic, transportation, and engineering attributes.

Between 2001 and 2006, the number of lockages steadily declined. Lockages increased between 2006 and 2007, which coincided with a temporary increase in funding for WFL operations brought about by an innovative community partnership agreement that allowed an ODOT Transportation Enhancement grant to be used for operations for two years. Funding, operations and lockages declined again in 2008, and the locks were closed in 2009 for inspection. Operations and lockages increased dramatically in 2010 as a result of the funding provided through the Oregon Solutions project.[11] One could interpret these two episodes of lockages and use responding to increased funding and operations as indicative of pent-up demand for the types of river access that the WFL provide.

In 2005, BST Associates completed a report for the Clackamas County Tourism Development Council and Oregon Tourism Commission that described an analysis of the costs of keeping the WFL open, and the economic spending by the primarily recreational users. The authors concluded that the economic benefits of keeping the WFL open far outweighed the costs.[12] In a 2008 report for the One Willamette River Coalition, CEDER, Synergy

[9]Oregon Solutions, 2009, p. 13.
[10]Oregon Solution, 2009, p. 17.
[11]U.S. Army Corps of Engineers, Lock Performance Monitoring System, http://www.ndc.iwr.usace.army.mil/lpms/lpms.htm; U.S. Army Corps of Engineers, Corps of Engineers Financial Management System year-end 3011a reports.
[12]BST Associates. 2005. Willamette Falls Locks Economic Impact Analysis Final Report. Prepared for Clackamas County Tourism Development Council and Oregon Tourism commission. March.

and Chenoweth Consulting described the results of a case study of transferring ownership and operations of the WFL from the ACoE to another entity. The authors reviewed the transfer of three other locks from ACoE and the associated transfer issues, challenges and lessons learned.[13] In July of 2011, Michael Bernert outlined the economic and environmental advantages of shipping municipal waste, pulp and paper, steel, bulk agricultural commodities and bulk building materials such as sand and gravel via barge vs. rail or truck.[14]

Our report describes the economic potential of the WFL if they were functioning and operating on a regular schedule. By economic potential we mean describing the types of demand for river access that the WFL would facilitate. Our analysis builds on past studies of the WFL and includes three major parts. First, we summarized and updated the description by CEDER et al. (2008) of the three transfers to date of ACoE locks to other entities. The ACoE's decision to change the status of the WFL to non-operational makes more challenging an assessment of the future economic potential of the WFL. Hence, we review experiences of other lock transfers for insights into the WFL's future economic potential. Second, we describe the results of our assessment of the demand for WFL services based on key-informant interviews we conducted with representatives from various stakeholder groups. Third, we outline three potential operating scenarios for the WFL with varying number of lockages, operating costs, and revenues.

The remaining sections of this report are as follows. In *River Locks Transfers*, we describe the issues behind the ACoE transferring ownership or operations of three sets of locks to state or regional groups. The circumstances that led to the transfers are similar to conditions at the WFL today. All of the locks were built at a time when rivers provided the main transportation mode for commerce. Eventually rail and then road systems competed with river transport. As a result, the amount of commerce transported by river and through the locks gradually declined. As commercial lockages declined, however, recreational lockages increased. In spite of the increased recreational use, the ACoE, guided by the WFL's strictly "navigation authorization," eventually decided that the small amounts of commerce passing through the locks did not justify the expense of operating them. Prior to closure in 2011, recreational boaters were the dominant users of the locks' services, with limited commercial use.

In *The Locks and River Users*, we describe the results of our assessment of the demand for the types of river access that the WFL provide. Our assessment relies on our interviews with key-informants from stakeholder groups including: recreational users; commercial or industrial users; economic development officials from area jurisdictions; and county and state emergency managers.

In E*conomic Potential*, we describe our conclusions based on information in the proceeding sections.

In the Appendix we describe three different operating scenarios. The assumptions in our scenarios reverse the ramp down in WFL operations that the ACoE implemented over the previous years. That is, we start with limited service during summer months, increase service to six months, then increase to twelve months of operations. The first two scenarios rely primarily on recreational users. We assume that for the most part, commercial shippers will not begin using the WFL until they have some assurances that the locks will operate on a regular basis, so our third scenario assumes both recreational and commercial users. We include in our operating scenarios estimated lockages, operations and maintenance costs, revenues generated by user fees, and revenues that could be generated by a transportation district established to support the WFL. The spreadsheet accompanying this report has the details of our assumptions, analyses and results.

[13]CEDER, Synergy Northwest, LLC, and Chenoweth Consulting. 2008. The Willamette Falls Locks: A Case Study Analysis of Potential Transfer Issues. Prepared for the One Willamette River Coalition. October 23.
[14]Bernert, Michael. 2011. Reclaim Our River, Environmental, Economic and Community Advantages of a United Willamette River. July 17.

RIVER LOCKS TRANSFERS

The ACoE's decision to change the status of the WFL from "caretaker status" to "non-operational status," makes more challenging the task of estimating future demand for, and use of, the WFL. For insights into the future economic potential of the WFL, we collected and reviewed information on three locks systems that the ACoE transferred to other entities. We began by reviewing the CEDER et al. (2008) report that describes transfer issues in general, and issues specific to the three locks systems. We then reviewed other sources, e.g., web sites, and contacted representatives of the locks with follow up questions and requests for information. At the end of our summary for each lock system, we describe similarities, differences and other insights relative to the WFL.

Locks Case Studies

We summarize the available information on current operations and usage details for three systems of locks that the ACoE turned over to regional or state entities:

- Muskingum River Parkway Locks in Ohio
- Kentucky River Locks in Kentucky
- Lower Fox River Locks in Wisconsin

We also summarize use and operations information for the Hiram Chittenden Locks in Seattle. The ACoE operates these locks, but we include them in our summary because of their geographic proximity to the WFL, and because their mix of recreation and commercial users is comparable to what could be expected at the WFL. We also mention other lock systems that the ACoE currently owns and maintains in "non-operational" status that local stakeholders are interested in transferring ownership from the ACoE to other entities.

Muskingum River Parkway Locks, Ohio

The ACoE transferred ownership of the Muskingum River Parkway Locks to the State of Ohio in 1958. The flat-water lock system consists of ten, hand-operated locks distributed along a 112-mile stretch of the Muskingum River in southeast Ohio. Operating the locks employs 14 seasonal workers.[15] Most of the locks are 184 feet long, 36 feet wide, and accommodate boats up to 160 feet long.[16] The Ohio State Parks (OSP) department manages locks operations and maintenance.

The locks currently operate seasonally, with daytime operating hours on Saturdays and Sundays from May 10, 2013 through October 12, 2014, and additional Friday and Monday hours between Memorial Day weekend and early September. Special arrangements for lockages outside of normal operational hours can be made with 48 hours notice and an additional fee. Public launch ramps are provided at five of the ten locks.[17]

The Ohio State Parks charge daily user fees of $5, annual fees of between $15 and $50, and special fees for lockages outside of normal operations times of $15 or $25.[18] Gross user fees collected in 2013 totaled $8,501. Revenues from user fees goes into the State's general fund and does not directly offset the costs of operating and maintaining the locks. Annual maintenance costs totaled $67,000 in recent years.[19]

As is the case with many of the country's older locks systems, the Muskingum River Locks have a backlog of needed repairs. Locks #7 and #10 needed emergency repair work in recent years. The Ohio Department of Natural Resources, which oversees the OSP, place a priority on bringing the locks to full operations before peak summer seasons.[20, 21] This can be challenging at times. For example, Lock #11 is currently under repair and not operational for the 2014 summer recreational season.

Today, most of the lockages are for recreational boaters and anglers who fish from boats.[22] The river has a reputation among fishers for the unique "pools" between locks that contain a variety of bass and catfish species.[23] The number of recreational boaters has been estimated at roughly 7,000 per year.[24] Staff at the Ohio Department of Parks and Recreation report recent declines in the number of lockages, primarily due to weather causing poor boating conditions.

[15]Ohio State Parks representative, July 3rd, 2014, Interview.
[16]American Society of Civil Engineers. Muskingum River Navigation System. http://www.asce.org/People-and-Projects/Projects/Landmarks/Muskingum-River-Navigation-System/. Accessed July 2014.
[17]Ohio State Parks, Ohio Department of Natural Resources Division. Muskingum River State Park. http://parks.ohiodnr.gov/muskingumriver. Accessed July 2014.
[18]LAWriter Ohio Laws and Rules. 1501:41-2-30 Muskingum river parkway lock fee. http://codes.ohio.gov/oac/1501:41-2-30
[19]Ohio State Parks representative, July 3rd, 2014, Interview.
[20]Hannahs, Nichole. 2013. Canal Leak Serious Issue. http://www.whiznews.com/content/news/local/2013/01/15/canal-leak-serious-issue. January 15.
[21]Ohio State General Assembly. Balderson Announces Funding For Emergency Repairs To The Muskingum River Parkways Lock. 2012. http://www.ohiosenate.gov/senate/balderson/press/balderson-announces-funding-for-emergency-repairs-to-the-muskingum-river-parkway-lock. April 24.
[22]Most of the locks are 184-feet long and 36 feet wide, with the ability to handle boats up to 160 feet long.
[23]OhioBassAngler.com. Muskingum River Update. 2013. http://www.ohiobassangler.com/blog/2013/1/Muskingum-River-Update. January 13.
[24]Ohio Water Trails. Muskingum River Water Trail. http://watercraft.ohiodnr.gov/Portals/watercraft/pdfs/maps/wtmuskingum.pdf. Accessed July 2014.

Comparison with WFL:

- Ten sets of flat-water locks spread over 110 miles vs. a bypass canal with four 210-foot tandem lift locks, a boat basin and a 210-foot guard lock, all in less than one-half mile for WFL.[25]
- Operating the locks takes 14 seasonal workers. When last operational, the WFL employed two fulltime workers.
- Lockages driven primarily by fishing demand, and factors that affect fishing, e.g., weather, will also affect demand for lockages. Lockages at WF served a broader group of users and the lock chambers contain no fish.
- Locks were transferred from the ACoE 56 years ago, which shows it's possible for an entity other than the ACoE to operate and maintain a system of locks over a long time.
- Users pay fees to access the locks. The ACoE did not charge user fees for the WFL. Our operating scenarios include user fees.

Kentucky River Locks, Kentucky

The Kentucky River Locks consist of 14 flat-water lock and dam sites along 245 miles of the Kentucky River. The Commonwealth of Kentucky took over ownership of locks #5 through #14 in 1986, under the administration of the Kentucky River Authority(KRA), which was established to manage the system. The KRA also manages the ACoE-owned locks #1 through #4. The ACoE is currently in the process of transferring ownership of these four locks to the KRA.[26]

Currently, only two of the 14 locks are operational. These are locks #3 and #4, two of the locks managed, but not currently owned, by the KRA. These two locks operate seasonally, Friday and Saturday, between May 23rd and October 26th.[27] The KRA plan to bring an additional three locks back into service.[28]

The locks upstream from Frankfort are not operational.[29] Locks above this point are primarily used for pooling water that creates a water source for the local population. The ACoE conducted a study published in February 2014 that recommended the "disposal" of these locks (permanent blockage by concrete barriers) or removal of many of the locks upstream. The KRA is assessing the stability of the locks and dams for their impacts on ecosystem restoration projects and water supply.

The KRA's most recent budget is approximately $4 million. Fees assessed on water users supplied by the pool behind the locks upstream from Frankfort generate approximately $250,000. Revenues allocated from the State general fund make up the shortfall between water fees and operating costs.[30]

The KRA does not operate the locks for commercial traffic.[31] The areas between dams are frequented by anglers attracted by the area's healthy fish stocks,[32] but the dams pose a risk to small vessels like kayaks and canoes that try to pass over them.[33]

Comparison with WFL:

- A larger number of flat-water locks spread out over a much longer stretch of river relative to the WFL.
- Some locks provide pooling, which supplies water users. Fees from water users help fund locks O&M. The WFL has no user fees under the ACoE.
- State ownership with support from the State general fund makes up the large majority of operating funds. ACoE funds the current "non-operational status" of the WFL.

[25]Lewis, 2004.
[26]http://finance.ky.gov/offices/Pages/LocksandDams.aspx
[27]http://finance.ky.gov/offices/Documents/2014/2014%20Lock%20Schedule.doc
[28]Jerry, Kentucky River Authority, July 3rd, 2014, Interview.
[29]http://www.kentucky.com/2009/10/19/982597/kentucky-river-a-river-to-nowhere.html
[30]Jerry Graves, Kentucky River Authority, July 3rd, 2014, Interview.
[31]Jerry Graves, Kentucky River Authority, July 3rd, 2014, Interview.
[32]http://www.worldfishingnetwork.com/news/post/good-fish-populations-in-kentucky-river
[33]http://www.lrl.usace.army.mil/Portals/64/docs/CWProjects/Green%20and%20Barren%20dispo/Main%20Report.pdf

Lower Fox River Locks, Wisconsin

The Lower Fox River Locks system, located along the Lower Fox River in Wisconsin, consists of eight locks sites along 39 river miles, with three sites of five, four, and three locks each, and five sites with only one lock. The sites with five and three locks, as well as one of the single locks, are currently undergoing restoration. The vertical drop across the Lower Fox River locks is approximately 180 feet.[34]

The State of Wisconsin took ownership of the lock system in September 2004. The State created the Fox River Navigational System Authority (Authority) to manage the lock system. The Authority is a public body overseen by a board of nine directors, consisting of two representatives from each of the counties from where the locks are located and the additional three designated by the Department of Natural Resources, Department of Transportation, and Director of the State Historical Society.[35]

Among the eight operational locks, service is provided on a seasonal basis, with start dates for 2014 ranging from April 18th to May 23rd, with regular service ending on either September 1st or October 5th. Days of operation vary, with some operating on weekdays and all operating Friday through Sunday.

Funding for the transfer, rehabilitation, and operation and maintenance of the locks is outlined in a joint funding agreement between the state and the ACoE. The agreement outlines the creation of a trust consisting of combined funds of roughly $22.8 million dollars. The agreement stated that the ACoE would contribute $11.8 million, the State of Wisconsin would contribute $5.5 million and the federal government would contribute $5.5 million in matched funds. The State responsibility of $5.5 million is broken into $2.75 million from the state general fund and $2.75 million in local and private funds to be raised by the contractor operating the locks, which is the Fox River Navigation System Authority.[36] Based on the most recent May 2014 reporting by the Authority, funds are currently stable at roughly $20.1 million available and is considered within budget.[37]

The Authority currently charges user fees through daily or seasonal permits. Daily permits cost either $6 or $12, based on boat length and seasonal permits are either $120 or $140, depending on the intended use. Special lockages are available, with 12 hours notice, on an hourly basis for between $15 and $50 per hour with a two hour minimum charge.[38]

Currently, recreational use dominates lock usage, but there is potential for more commercial use.[39] Figure 1 shows total lockages for all lock sites. These include lockages of commercial and recreational craft. The number of operational locks changes over time; only three locks operated between 2007 and 2010.[40]

Comparisons with WFL:

- The lock system is much larger and includes many more locks than the WFL.
- Lower Fox River locks operations and maintenance is supported by funds including those supplied by the ACoE, the State of Wisconsin, and the Federal government.

Figure 1. Annual Lockages, Craft, and Passengers Passing Through Lower Fox River Locks

Year	Lockages	Craft	Passengers
2007	3,781	6,158	23,925
2008	3,300	5,073	20,226
2009	4,001	6,051	23,263
2010	3,297	5,223	20,303
2011	3,377	5,095	19,233
2012	3,876	5,921	23,298
2013	3,467	4,954	20,723
Average	3,586	5,496	21,567

Source: Fox River Navigational System Authority, reported by lock tenders as boats travel through the locks

[34]http://www.friendsofthefox.org/friendsofthefox/river+navigation/lock+and+bridge+schedules+-+procedures.asp; http://foxriverlocks.org/index.php?option=com_content&view=article&id=11&Itemid=4.
[35]http://foxriverlocks.org/index.php?option=com_content&view=article&id=3&Itemid=6.
[36]https://docs.legis.wisconsin.gov/statutes/statutes/237/08/2
[37]http://foxriverlocks.org/frnsa_committeeminutes/2014/052714.pdf
[38]http://www.friendsofthefox.org/friendsofthefox/river+navigation/lock+and+bridge+schedules+-+procedures.asp
[39]Harlan Kiesow, Fox River Locks CEO. July 22nd, 2014. Interview
[40]http://foxriverlocks.org/index.php?option=com_content&view=article&id=6&Itemid=5

- A mix of recreational and commercial vessels use the lock system, similar to the expected use of the WFL.
- Users pay fees to access the locks. When operated by the ACoE, the WFL had no user fees. We include user fees in our operating scenarios.

Hiram M. Chittenden (Ballard Locks), Washington

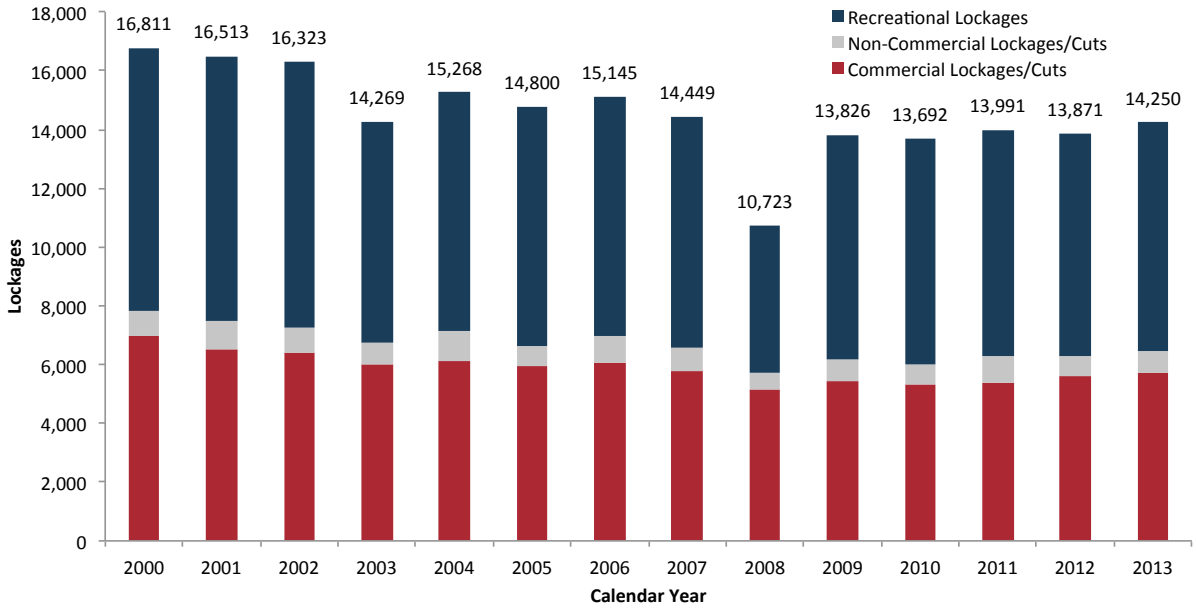
The Hiram M. Chittenden Locks, known as the Ballard Locks, in Seattle, Washington is a single site lock, like the WFL, consisting of one larger lock, with a length of 825 feet and width of 80 feet, and an auxiliary lock that is 150 feet long and 28 feet wide. The Ballard Locks are currently owned and operated by the ACoE.[41] The Ballard Locks are authorized for both navigation (commercial cargo) and recreational use.[42]

The locks operate all days of the year and at all hours. The locks employ roughly 60 staff, including visitor center personnel and administration. The budget for the locks fluctuates greatly due to capital investments, but it is usually in excess of $5 million, annually.[43] The ACoE does not charge user fees to access the locks.

The ACoE Navigation Data Center reported that the lockages for recreational purposes have generally been slightly more than half of all lockages on an annual basis, as shown in Figure 2.[44]

Use of the locks is highly seasonal. Commercial users include sand and gravel barges, tugboats, north Pacific fishing fleet, fuel barges, and drydock and repair traffic.[45]

Figure 2. Ballard Locks Lockages by User Type



Source: OHSU, ECONorthwest, IMPLAN 2012 data

Comparison with WFL:

- The locks have an authorization for both navigation (commercial cargo movement) and recreation. The WFL have a navigation authorization only, though there is interest and efforts in expanding the ACoE authorization for the WFL to include recreational use.[46]
- The locks are proximate to a larger population than the WFL.
- Both locks serve recreational and commercial users.
- ACoE maintains the locks and does not charge user fees. ACoE no longer operates the WFL.
- The staff and operating budget are significantly larger than that for the WFL when they were operating.

[41]http://www.nws.usace.army.mil/Missions/CivilWorks/LocksandDams/ChittendenLocks.aspx
[42]Personal Communication. 2014. Peggy Sigler, National Trust for Historic Preservation.
[43]Jay Wells, ACOE Visitor Center Representative. July 2, 2014. Interview.
[44]http://www.navigationdatacenter.us/lpms/lock2013web.htm
[45]Jay Wells, ACOE Visitor Center Representative, July 2, 2014, Interview.
[46]Personal communication, Sandy Carter, Willamette Falls Heritage Foundation, 2014.47http://www.kittanningpaper.com/2014/01/20/fundraising-to-reopen-river-locks-starting-soon/42955

Allegheny River Locks

The WFL is not the only ACoE-owned locks looking for alternative ownership or operations arrangements. The Allegheny River Locks, located in Pennsylvania, has struggled to maintain regular operations of its roughly 90-year old locks with the sole source of funding provided through the ACoE. A local non-profit, the Allegheny River Development Corporation (ARDC) and the local county commissioners, both interested in seeing the reopening of many of the system's 23 locks and dams, have organized to apply for the ability to contribute funds to the repair and operations of the locks.[47] The County would serve as a pass-through entity to provide funds to the ACoE.

The recently enacted 2013 Water Resources Reform Development Act, signed by President Obama on June 10, 2014, means that this process will become simpler. The Act allows non-profits to negotiate directly with the local ACoE.[48] Although raising funds is still an issue, this Act will allow interested parties more options for supporting locks operations. Local stakeholders are considering this option as a means of funding operations for the WFL as well.[49]

[47]http://www.kittanningpaper.com/2014/01/20/fundraising-to-reopen-river-locks-starting-soon/42955
[48]http://www.boatlocal.com/articles/2014/ardc-gets-approval
[49]Personal communication, Sandy Carter, Willamette Falls Heritage Foundation, 2014.

THE LOCKS AND RIVER USERS

The trend in use of WFL mirrors that of the three locks described in the previous section. The WFL were built at a time when rivers were the primary transportation mode for personal or commercial travel. Railroads and then highways eventually provided alternative means of moving people and cargo. Commercial use of the WFL declined, while recreational use increased. In response to declining commercial tonnage passing through the WFL, which caused a lack of funds for inspection and maintenance, the ACoE closed the locks in December of 2011 for safety reasons.

As part of our evaluation of the economic potential of the WFL, we conducted an assessment of the likely future demand for the WFL if they were reopened and operating on a regular schedule. Our assessment included interviews with key-informants from stakeholder groups (e.g., recreational users; commercial or industrial users; economic development officials from area jurisdictions; and county and state emergency managers), as well as reviewing literature and reports that pertain to stakeholder groups.

Our assessment of demand also help inform the details of the three operating scenarios, which we describe in the appendix.

Recreation

The recreational demand for WFL services would come primarily from three user groups: non-motorized vessel users, motorized vessel users, and commercial recreational users.

To inform our assessment of the demand for recreational use of the Willamette River and the WFL, we conducted interviews with the following key informants:

- Dennis Corwin, Explorer Tours (Portland Spirit)
- Kate Ross, Willamette Riverkeeper, Outreach and Education Coordinator
- Alexandra Phillips, Oregon Parks and Recreation, Water Recreation Coordinator
- Eric Dye, Sportcraft Landing Moorages
- Sam Drevo, eNRG Kayaks

Non-motorized vessel users

Non-motorized users include paddling vessels such as kayaks, canoes, and rafts, and can include both long and short distance trips. The Willamette River is a nationally recognized water body for paddling. In 2012, the Secretary of the Interior designated the Willamette River a National Water Trail. The Willamette River Water Trail (Trail) stretches from Creswell to St. Helens, Oregon and includes 187 miles of the Willamette River as well as 29 miles of connecting rivers. The Trail passes

through the heart of the Willamette Valley, flowing past urban and rural landscapes where seventy percent of Oregonians live.[50] The Willamette Riverkeeper, a non-profit organization dedicated to the preservation of the Willamette River, manage the Trail.[51, 52] *Canoeroots* magazine profiled the Trail and described it as one of the 13 "awesome canoe trips of a lifetime." The group of 13 includes the Yukon River.[53] The Oregon Parks and Recreation Department manages Willamette Greenway sites from upstream of Eugene to Portland that facilitate access and recreation along the Trail.[54]

Although there are no formal records kept on the number of paddlers that use the river each year, Willamette Riverkeeper and the Oregon Parks and Recreation Department reported that they receive many inquiries from Oregonians and interested paddlers from other states and countries about paddling the river. Inquiries have increased since the Willamette's addition to the National Water Trail System.

According to the staff at Willamette Riverkeeper, many paddlers travel the entire length of the Trail. Most through-paddles of the Willamette River occur during the summer months, and include several organized trips that occur annually. These trips include Paddle Oregon and the Corvallis-Portland Row. The 2014 Paddle Oregon begins in Corvallis and ends at Canby, upriver from Willamette Falls and the WFL. But for the fact that WFL are not operating, the trip could extend all the way downstream to Portland and the confluence with the Columbia River.[55]

There is also demand from a growing community of paddlers seeking new and less congested options for paddling day trips in the Portland area. Demand for flat-water paddling and tubing activities in Oregon Department of Parks and Recreation Region 2, which includes the Portland and Salem metropolitan regions and the Willamette River north of Albany, is significant and includes participation by almost 10 percent of the Region's population. Demand from Region 3, which includes Benton, Linn and non-coastal Lane Counties, amounts to almost 13 percent of the Region's population. Additional details of local recreational demand based on the 2011 survey completed in preparation for the 2013-2017 Oregon Statewide Comprehensive Outdoor Recreation Plan can be found in Figure 3.[56]

Figure 3. SCORP Water-based Recreation Participation, Region 2 and 3, 2011

	Using Personal Water Craft, Such As Jet Ski		Power Boating (Cruising/Water Skiing)		Flat-Water Canoeing, Sea Kayaking, Rowing, Stand-Up Paddling, Tubing/Floating		Beach Activities (Lakes, Reservoirs, Rivers, Etc.)	
	# of trips	% of region population	# of trips	% of region population	# of trips	% of region population	# of trips	% of region population
Region 2	558,185	3.6%	2,600,014	12.8%	1,717,149	9.9%	3,728,314	30.0%
Region 3	221,999	4.6%	1,600,679	17.4%	456,208	12.8%	2,810,191	36.5%

Source: OSU College of Forestry, Oregon Resident Outdoor Recreation Demand Analysis

Most paddlers end their trip upstream of the Willamette Falls because of the challenging logistics of portaging around them. Moving past the Falls requires a several-mile vehicle trip, with takeout and put-in on opposite sides of the river. According to Willamette Riverkeeper staff, many paddlers inquire about going through the WFL and are disappointed when they learn that this is not an option. The last organized paddles or cruises by Willamette Riverkeeper through the locks occurred in 2005.

Motorized vessel users

Motorized vessels include anything from yachts to smaller recreational motorboats and personal watercraft. In the past, yacht clubs based on the Willamette and Columbia Rivers took two- or three-day trips up the river and through the WFL. The SCORP results in Figure 3 show that a significant percentage of Oregonians living in the Willamette River drainage are involved in powerboating.

[50]National Water Trails System, http://www.nps.gov/WaterTrails/Trail.
[51]http://www.nps.gov/WaterTrails/Trail/Info/36
[52]http://willamette-riverkeeper.org/WRK/about.html
[53]Willamette River Water Trail, http://willamettewatertrail.org/.
[54]http://www.oregonstateparks.org/index.cfm?do=parkPage.dsp_parkHistory&parkId=194
[55]Paddle Oregon, http://www.paddleoregon.org/.
[56]http://www.oregon.gov/oprd/PLANS/docs/scorp/2013-2018_SCORP/Demand_Analysis.pdf

Closing the WFL increased the costs of maintaining recreational docks and moorages upstream. Prior to closure, tugboats and crane barges were easily transported upstream. After the closure, equipment needed upstream is either transported around the WFL, at greater cost, or contractors use more costly construction and maintenance methods. Two dredges, three tugboats and four barges were able to negotiate passing downstream through the WFL during the specially scheduled opening for Canby Ferry in 2013, which needed to be repaired in Portland.[57]

Commercial recreational users

Commercial recreational users include commercial tour boats, charter boats, and other local river-based recreation businesses. River cruises would likely take advantage of the re-opened WFL to expand their offerings on the Willamette River. Prior to the closure, Explorer Tours, which runs the Portland Spirit, was looking into the feasibility of starting a through-locks tour. Representatives of the company believe that the tours would sell well. If implemented, the tours would occur weekly from June through September, and could accommodate 35 people per tour.

Some river-based recreation businesses, such as eNRG Kayaks, locate near the falls and WFL to take advantage of the tourism and recreation interest in these attractions. Their customers and other paddlers visit the falls every year. According to representatives of these businesses, there would be strong demand from river paddlers for the types of river access that the WFL would facilitate.

Past Recreational Use and Demand

Figure 4 shows the number of recreational vessels that passed through the WFL in previous years. The decline in use reflects the trend of reduced operating budgets and months and days of operations. The two spikes in use, in 2007 and 2010, are in response to two episodes of temporary funding increases and operations. One could interpret these increases in use as indicative of pent up recreational demand for access through the WFL.

Tourism and Economic Development

Prior to closure the WFL were a tourism destination for local and regional visitors. Prior to the ACoE's closure, visitors came to see the locks operate and to learn about their historical significance.

For information on the tourism and economic development potential of the WFL, we contacted economic development officials in municipal jurisdictions along the Willamette River. We asked if their economic development plans included river access or river activities that could be affected by the reopening of the WFL. We conducted interviews with staff at the following jurisdictions:

Figure 4. Recent Recreational WFL Activity

Year	Recreational Vessels	Recreational Lockages
2000	2,548	1,221
2001	1,831	731
2002	1,068	605
2003	756	408
2004	787	160
2005	612	227
2006	795	304
2007	1,053	406
2008	2	0
2009	0	0
2010	899	380
2011	11	5

Source: US Army Corps of Engineers Navigation Data Center

- City of Wilsonville
- City of Oregon City
- Marion County
- Clackamas County Tourism and Cultural Affairs Office

[57]http://www.oregonlive.com/west-linn/index.ssf/2013/01/willamette_falls_locks_open_br.html

Historical and Cultural Tourism

The WFL provide a multi-faceted recreational experience unmatched in the region. According to Willamette Riverkeeper, many paddlers express interest in learning about the history of the river. The WFL are a key feature of that history, and provided an additional draw for many paddlers, from both the local area and outside the region. The SCORP data on historical visits by Oregonians in Figure 5, shows a significant percent of the population has an interest in learning about the state's historic sites.

Figure 5. SCORP Historic Site Recreation, Region 2 and 3, 2011

	Visiting Historic Sites/History-Themed Parks (History-Oriented Museums, Outdoor Displays, Visitor Centers, Etc.)	
	# of trips	% of region population
Region 2	4,238,756	43.3%
Region 3	905,598	42.4%

Source: OSU College of Forestry, Oregon Resident Outdoor Recreation Demand Analysis

A coalition of those interested in protecting and making more accessible the historical and cultural resources of the Willamette Falls and the WFL recently completed a feasibility study of creating a Willamette Falls Heritage Area.[58] The report describes the historical and cultural importance of the Falls and WFL area. The coalition includes stakeholders from political, business, Tribal, utilities, and non-profit groups, and illustrates the widespread support for the area's cultural resources.

Economic Development

Many of the local jurisdictions included access to the river or the river itself as an asset for tourism-driven economic development. The City of Wilsonville's Tourism Development Strategy notes "increasing access and recreation on the river, including the Willamette River Trail" as a key opportunity and consideration in their strategy going forward. The strategy document also notes that additional infrastructure development is needed to move river recreation up to a priority status in terms of strong markets for their target audiences.[59] Reopening the WFL would help support the City's river-related economic development goals.

The City of Oregon City commented that the river and river access support area tourism and recreation businesses, and that reopening the WFL would provide new tourism opportunities.

Marion County noted that tourism is an economic development priority and that any development that draws tourists will increase economic activity. The river is not specifically mentioned in the County's economic development plan, but, increasing activities such as kayaking, boating, and fishing are. Reopening the WFL may strengthen these activities. Lack of river access is a limiting factor.

The Clackamas County Tourism and Cultural Affairs Office stated that supporting river-based recreation is a County priority.[60] Reopening the WFL would allow tourism access that connects downstream and upstream portions of the river. The County could then promote river recreation all the way downriver to Portland, which the County believes would be popular among local recreationists and tourists. Boating, fishing, and kayaking have become very popular near the WFL, but lack of connectivity to the river and through the locks or around the falls limits the tourism and recreation potential. The historical aspect of the WFL draws tourists to the area. If the locks were not maintained, it would be a lost historical and cultural opportunity. The County currently owns and operates a boat landing on the south side of the WFL. If the locks were operational, the County expects this landing would get more use.

Commercial and Industrial

Commercial and industrial users of the WFL include industries or businesses that produce goods that could be, or had previously been, transported via barge down the Willamette River. These include aggregate producers, agricultural and logging companies, trash transport, and marine construction.

To inform our assessment of the demand for commercial or industrial use of the Willamette River and the WFL, we conducted interviews with the following key informants:

- Dave Bernert, Wilsonville Concrete Products and Marine Industrial Construction
- Baker Rock Resources
- Oregon Concrete and Aggregate Producers Association
- Ross Island Sand and Gravel
- Oregon Seed Association
- Marion Agricultural Services

[58]Willamette Falls Heritage Area Coalition. 2013. Willamette Falls Heritage Area A National Heritage Area Feasibility Study. August.
[59]http://ci.wilsonville.or.us/DocumentCenter/View/6023
[60]https://www.mthoodterritory.com/Scripts/tinymce/jscripts/tiny_mce/plugins/filemanager/files/master_plan.pdf

- Oregon Feed and Grain Association
- Dr. Starr McMullen, Oregon State University, Professor of Economics, transportation researcher
- Oregon Forest Industries Council
- Dr. Darius Adams, Oregon State University, College of Forestry
- Oregon Marine Construction
- Sportcraft Landing Moorages/Ken's Flotation Services Inc.
- Portland Metro
- Pacific Northwest Waterway Association
- Portland General Electric

Aggregate

Aggregate, typically in the form of sand or gravel, can be found in relative abundance along the Willamette River. Moving aggregate and other heavy materials can cost less by barge than by truck, but, moving materials by truck may require less handling. Producers who source gravel close up or downstream from the WFL could benefit from reopening the locks. Producers further from the WFL may not move significant amounts of aggregate through the locks given the abundance of aggregate and the possibility of additional handling steps and associated costs.

Loading and unloading aggregate requires minimal infrastructure. Barges or riverside sites with portable conveyors and hoppers are sufficient. Investments in large or permanent infrastructure are not required. Moving aggregate further upstream from the WFL may require dredging the navigation channel. Also, not all aggregate producers have barges that would fit through the locks.

Data compiled by the ACoE lists "sand and gravel" as the only commodity shipped on the Willamette River between Portland and Harrisburg in recent years.[61] The ACoE, however, do not track all materials moved along the river and thus relying on the ACoE data would give an incomplete picture of river transport upstream and downstream from the locks.

Agriculture and Lumber

Rail companies prefer consolidating rail shipments at central rail yards. This requires grain or seed producers to transport their products by truck to rail lines. Rail companies do not stop for small volumes of materials, preferring instead to assemble large rail shipments at central yards and not stopping along their route to add small shipments of one or a few cars. According to the local agricultural producers we spoke with, the Willamette Valley does not produce grain in sufficient volumes to support multiple shipping points.

The seed and grain key informants expressed the following concerns regarding moving grain by barge:

- The uncertainty of adding barge to their current transportation modes
- The lack of loading and unloading infrastructure specific to barge transport
- The additional handling step and cost of moving grain from truck to barge to truck, or truck to barge to rail

Logging and forestry key informants expressed the same reservations to barging as agricultural producers:

- The lack of loading and unloading facilities; and

- The additional handling step and cost of moving logs from truck to barge to truck or truck to barge.

These informants stated that barging would likely cost less per mile, but the additional handling and costs required to add barge transport could negate the cost-per-mile savings. The actual cost benefits or increases of barging relative to other transportation modes are unknown at this time. We note that containerized wood products produced upriver of the locks currently travel to Portland, Rainer, Tacoma, or Seattle for export.

[61] 2006 through 2011, the most recent data available.

Construction and Maintenance

Marine-based construction key-informants expressed varied interest in the reopening the WFL. One marine construction key informant stated that they have made investments in infrastructure and rolling stock that suit their needs and business model. These investments do not include barges and moving material through the WFL. Another key informant from a construction operation that focuses on recreational docks and facilities expressed strong interest in having the WFL available again. He used the WFL to transport tugs and crane barges upstream to repair and construct docks. Without the WFL, his costs have increased because he must either take equipment out of the water and transport it around the falls, or use more time consuming and expensive construction techniques. He indicated a willingness to pay a fee for using the locks.

Trash haulers noted higher costs and dredging concerns as factors that could inhibit moving trash by barge through the WFL. In the past, barging through the WFL was considered a competing mode for transporting trash, which placed pressure on truck and rail modes to keep prices down. Closing the locks foreclosed this competition pressure to keep prices down.[62]

Portland General Electric commented that the WFL might have a slight beneficial effect on their operations in that they could possibly use them to help facilitate maintenance on their equipment and facilities at the Falls.

Past Commercial and Industrial Use and Demand

Figure 6 shows the general decline in commercial lockages over time. It also shows how commercial users responded to the two episodes of increased funding and operations in 2006 and 2010 by increasing lockages.

In the past, the WFL facilitated river transport as an alternative to truck and rail, which helped promote competition and reduced transportation costs. Closing the WFL foreclosed the competition option. The importance of the WFL to industrial and commercial users will likely increase in the future with continued economic growth in the I-5 corridor, increased congestion on road and rail lines, and uncertainty over reducing congestion at the I-5 Columbia River crossing.

Transportation and Emergency Planning

Jurisdictions in the area recognize the benefits that the WFL could provide for transportation more generally. For example, the City of Wilsonville includes the WFL and river access as part of their transportation plan. The City's 2013 Transportation System Plan (TSP) establishes the continued maintenance of access to the Willamette River as a policy and supports the availability of river access for potential future transportation purposes. The TSP's goals include improving access for public docking, and designating sites for potential future ports. The TSP also suggests that the City would benefit from increased marine and barge traffic on the river. The TSP describes the City's past and ongoing support of the ACoE's of Engineer's efforts to maintain the WFL and periodically dredge the channel to maintain the river as a viable transportation facility.[63]

Figure 6. Recent Commercial WFL Activity

Year	Commercial Vessels	Commercial Lockages
2000	443	272
2001	338	190
2002	229	180
2003	145	140
2004	149	149
2005	84	76
2006	231	181
2007	215	174
2008	10	6
2009	61	61
2010	183	160
2011	113	98
2012	2	2

Source: US Army Corps of Engineers Navigation Data Center

We also spoke to emergency managers to ask about the benefits of using the Willamette River and the WFL for transportation in the aftermath of a natural disaster, such as an earthquake that destroys bridges, roads, and rail transportation systems. Clackamas County's hazards plan does not specifically mention using the river for transportation. However, they noted that it has possibilities. Yamhill County does not include the river in its hazard mitigation planning.

According to staff from the State of Oregon's Office of Emergency Management, the river will be an important transportation asset in the event of a natural disaster.

[62]Personal Communication, Metro staff. 2014.
[63]http://or-wilsonville.civicplus.com/DocumentCenter/Home/View/661

River transport may be one of the few transportation routes serving areas along the river. The WFL would facilitate moving longer distances down and up river. ODOT Director Matt Garrett also commented that the WFL could have a potentially important role as a redundant transportation mode in the aftermath of the Cascadia earthquake.[64] Some relevant questions when assessing the role of the WFL in the event of a natural disaster include the extent to which they would function in the aftermath of an earthquake, and how debris flows would affect their operations.

Overall, Emergency Managers at the State level see the WFL as a potential asset for facilitation transport in the aftermath of a natural disaster, while local emergency managers had more questions or concerns.

Sociocultural Values

We can describe the types of demand for WFL using market and nonmarket values. The assessments of likely future demand described above are examples of market measures. For example, data can be collected on the numbers of paddlers and expenditures per paddler that pass through a reopened WFL. Likewise, tons of gravel and value per ton moved through the WFL are market measures. Examples of nonmarket values are the sociocultural values that people and society place on WFL. Such values are typically more difficult to quantify and so analysts describe them qualitatively.

A number of researchers describe these values in general and for structures or places.[65] For example, a report by the Getty Conservation Institute in Los Angeles, describes the types of sociocultural values that benefit society from facilities such as the WFL:

> "Sociocultural values are the traditional core of conservation—values attached to an object, building, or place because it holds meaning for people or social groups due to its age, beauty, artistry, or association with a significant person or event or (otherwise) contributes to processes of cultural affiliation."[66]

The range of sociocultural values for structures such as the WFL can include:

- Historical
- Cultural
- Social
- Aesthetic[67]

[64]Personal communication, Peggy Sigler, Oregon Field Officer, National Trust for Historic Preservation.
[65]These include: Archimedes. No date. Cultural Heritage as a Socio-Economic Development Factor. http://www.med-pact.com/Download/Archimedes/11%20Introduction%20Paper%20Cultural%20Heritage%20and%20Ec%20Dvlpmt.pdf; Dumcke, C. and M. Gnedovsky. 2013. The Social and Economic Value of Cultural Heritage: Literature Review. European Expert Network on Culture (EENC). EENC Paper, July; Manatu Taonga – Ministry for Culture and Heritage. 2013. Value and Culture an Economic Framework. Wellington, New Zealand; The J. Paul Getty Trust. 2002. Assessing the Values of Cultural Heritage. Research report edited by Marta de la Torre. The Getty Conservation Institute, Los Angeles.
[66]The J. Paul Getty Trust, 2002, page 11.
[67]The J. Paul Getty Trust, 2002.

ECONOMIC POTENTIAL

The economic potential of WFL is multidimensional. The WFL are a unique historical, commercial and recreational piece of Oregon's transportation infrastructure. Demands for the locks' services changed over time. Commercial use dominated the large majority of years the locks were in service. More recently, demand from paddlers and boaters eclipsed that from commercial users. The locks proximity to Willamette Falls generates demand from those interested in the region's historic and cultural aspects.

In this section we provide a summary of the main points regarding the WFL's economic potential.

Recreational and Tourism Demand

The primary demand for lock services comes from recreational and tourism use.

- The shift from predominantly commercial to predominantly recreational demand for locks services is similar to the changes in demand at other locks that the ACoE turned over.
- Our analysis of demand for WFL services found strong demand from local recreational and tourism groups and participants.
- Facilitating recreational and tourism access up and downstream on the Willamette River would help support economic development goals of jurisdictions along the river.
- The locks provide a unique draw for visitors interested in the region's historical and cultural attributes.
- Developing the former Blue Heron Paper Company site across the river will draw more attention to Willamette Falls and WFL, and increase the public's awareness of the area's attributes.[68]

User Fees and Other Funding

- Any entity that takes over ownership and operation of the WFL will need a dedicated funding source. (See Appendix.)
- User fees will cover but a small portion of the costs to operate and maintain the locks. This situation is common to the other locks that the ACoE turned over. (See Appendix.)
- Oregon Statutes include a range of funding mechanisms that jurisdictions throughout the state use to support the services they provide. These funding mechanisms could potentially be used to support locks operations. (See Appendix.)
- Our illustrative operating scenarios based on funding from a transportation district found that supporting the locks would require very small increases in tax assessments per $1,000 of assessed value. For example, our six-month operating scenario resulted in a tax per $1,000 of assessed value of between 0.3 and 0.4 cents. (See Appendix.)
- Our operating scenarios also found that the net tax increase to tax payers would also be very small. For our six-month operating scenario and a property with $300,000 in assessed value, the tax increase would be approximately $1.20 per year. (See Appendix.)

[68]Willamette Falls Legacy Project. http://www.rediscoverthefalls.com/.

Commercial Demand

Even though the locks were originally built to satisfy commercial demand, we would expect only modest demand for lockages from commercial users at this time.

- A few commercial operators that currently transport commodities, mostly aggregate, up and down the Willamette River would take advantage of the locks reopening.
- We would also expect one-off demands from other users with special transportation needs. For example, moving ferries or other vessels to and from Portland for repairs. Clackamas County Director of Transportation and Development Cam Gilmour, stated that moving the Canby Ferry through the WFL in 2013 for repairs and biannual Coast Guard inspection saved Clackamas County $500,000.[69]
- We would not expect significant commercial demand until the locks are operating on a regular schedule for a period of time. Another necessary condition is that commercial operators have confidence that the locks will be operating in the future. Without this assurance, it is unlikely that potential commercial users would make the necessary investments in barges and related infrastructure.
- The amount of commodities that currently move through Oregon includes commodities that could potentially move by barge through the WFL. See Figures A-4 and A-5 in the Appendix for information on these commodities.

Other factors that could contribute to increasing demand from commercial users for locks services include:

- The region's projected population increase and resulting demands on transportation infrastructure.
- Congestion on the region's roads. A recent study ranked Portland as the ninth worst for traffic congestion in the US.[70]
- Congestion on the region's rail system. This could become especially problematic if coal exports increase in the future.[71]
- A report prepared for the Oregon Business Council and Portland Business Alliance described the consequences of congested road and rail systems to the region's economy:

"The state's economy is transportation-dependent. Despite Oregon's excellent rail, marine, highway and air connections to national and international destinations, projected growth in freight and general traffic cannot be accommodated on the current system. Increasing congestion and travel time delay—even with currently planned improvement—will significantly impact the state's ability to maintain and grow business, as well as our quality of life."[72]

- When the Cascadia earthquake hits, the Willamette River could revert to a major transportation route in the likely event of downed bridges and other disruptions to road and rail systems. To the extent that the locks function after the event, they would be critical to moving goods and people up and down the river.

Transfer and Related Issues

Transferring ownership of the locks from the ACoE to another entity will require both parties and interested stakeholders addressing a number of issues. The report by CEDER, et al., describes these issues for the WFL, which include clearing property titles, addressing existing easements, and other real estate matters.[73] The WFL status on the National Register of Historic Places means that the ACoE must fulfill certain requirements that protect and preserve historic resources as part of changing ownership. For example, in this instance, Section 110 of the National Historic Preservation Act(Act) requires that the ACoE preserve and maintain the WFL, or pay other entities to preserve and maintain them.[74] On this topic, CEDER, et al., compared the preservation needs of the WFL with three locks transferred from ACoE to other entities and found that the needs specific to the WFL, "… are both resolvable and of smaller scope."[75] As we noted in ***River Locks Transfer***, the ACoE, the State of Wisconsin, and the Federal government entered into a joint funding agreement that established a trust of $22.8 million for the transfer, rehabilitation, and operation and maintenance of the Lower Fox River locks.

As we understand it, the ACoE must also fulfill requirements under Section 106 of the Act. This section requires that the ACoE mitigate for any adverse effects on the WFL caused by their decision to move the locks to non-operational status. ACoE did not complete a Section 106 assessment prior to shutting down the locks due to their determination

[69]Wilsonville Area Chamber of Commerce, 2012, Canby Ferry Closed for Retrofitting. December 12. http://business.wilsonvillechamber.com/news/details/canby-ferry-closed-for-retrofitting.
[70]Loos, Mary. 2014. "Study Ranks Portland 9th Worst for Traffic Congestion." KATU.com. June 5. http://www.katu.com/news/local/New-study-ranks-Portland-for-traffic-congestion-261860261.html.
[71]Stewart, Bonnie. 2013. Northwest Railroads Will Need Improvements to Handle Coal Trains. OBP.org. April 1. http://earthfix.opb.org/communities/article/northwest-railroads-already-congested/.
[72]Economic Development Research Group. 2007. The Cost of Highway Limitation and Traffic Delay to Oregon's Economy. Executive Summary. March. Prepared for Oregon Business Council and Portland Business Alliance. Page 1.
[73]See the CEDER et al., 2008, report for the complete list of transfer issues.
[74]National Historic Preservation Act of 1966, Public Law 102-575, http://www.nps.gov/history/local-law/nhpa1966.htm.
[75]CEDER et al., 2008, page 27.

of safety concerns of continued operations.[76] In a May 15, 2014 letter to the Oregon State Historic Preservation Office, the ACoE stated that, "We have…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."[77] Future meetings between ACoE staff and stakeholders will address the next steps regarding mitigating the adverse effects on the WFL caused by the ACoE closure.[78]

Even though our report focuses on WFL operations after transfer from the ACoE to another entity, a number of transfer and related issues could affect the economic potential of the locks and so we mention them here.

- The recent determination under Section 106 of the National Historic Preservation Act (Act) that the ACoE's shutting down the locks caused adverse effects on the locks' historical attributes is significant. This means the ACoE must take actions to mitigate the adverse effects. In this case, those actions could include addressing some of the locks' deferred maintenance issues.
- As evidenced by the Oregon Solutions projects, and current efforts by the Willamette Falls Heritage Foundation and other local groups, there is significant support among the region's population, government entities, non-profit interest groups, and area business to reopen the locks.

- The ACoE has contributed funding to the repair and maintenance of locks it transferred to other entities. As we note in ***River Locks Transfer***, the ACoE, the State of Wisconsin, and the Federal government entered into a joint funding agreement that established a trust of $22.8 million for the transfer, rehabilitation, and operation and maintenance of the Lower Fox River locks. A comparable funding agreement may be feasible for the WFL.
- In addition to transferring ownership and operations of the locks, stakeholders are interested in exploring the option of expanding the ACoE's authorization for the WFL to include recreational use. This could increase the likelihood of additional ACoE funding for the locks.
- Local stakeholders are also considering how the recently passed Water Resources Reform Development Act, which allows non-profits to provide funding to ACoE in support of locks operations, could be used to help fund WFL operations.

[76]Willamette Falls Heritage Foundation, 2013, Winter Newsletter. December. www.willamettefalls.org; Willamette Falls Heritage Foundation, 2014, Spring Newsletter. March. www.willamettefalls.org.
[77]Casey, J. 2014. Letter to Mr. Roger Roper, Deputy State Historic Preservation Officer, Oregon Parks and Recreation Department, State Historic Preservation Office, RE: Continued Section 106 Consultation Regarding the Caretaker Status of the Willamette Falls Locks, Oregon, City, Clackamas County, Oregon. May 15, p. 1.
[78]Casey, 2014.

Appendix: Operating Scenarios and Supplementary Tables

OPERATING SCENARIOS

Our economic analysis of operating scenarios for the WFL begins after ownership of the locks has transferred to another entity. That is, our analysis focuses on use of the locks and associated costs and revenues after necessary preservation repairs and maintenance issues have been dealt with and transfer of ownership has occurred. We developed the details of the three operating scenarios based on past studies of the locks, historical ACoE records of lock usage and operations and maintenance costs, and our recent interviews.[79] The ACoE records show that through the mid to late 1990s the locks operated year round. Between 1999 and 2004, the ACoE operated the locks six months per year. After 2005, operations dropped to summer months only.

Our scenarios reverse the ACoE's ramping down lock operations over the years.[80] Our first scenario assumes three months of operations during the summer. Our second scenario assumes six months of operations. Our third scenario assumes year-round operations. We anticipate that demand for the locks will come primarily from recreational and tourism users. As we describe in the ***Locks and River Users*** section, it is unlikely that commercial haulers, e.g., barge operators, would use the locks to any significant degree until they are operating consistently on a regular basis. This is a likely necessary condition before commercial users would make investments and expand the transportation modes they use to include barging in addition to road and rail modes.

In each of our scenarios, we describe a high and low estimated number of lockages, operating costs, user fees, and tax revenues that support locks operations. We estimated the number of lockages based on available ACoE records of lockages over the years.[81] We estimated operations and maintenance costs based on the costs reported by BST Associates in their 2005 analysis, which was the average cost from 2002 to 2004.[82] During those years, the WFL operated for 6-months annually. We recalculated this average to account for inflation.[83] This amount was halved for the 3-month operating scenario, and doubled for the 12-month operating scenario. We also included a contingency factor of from 0 to 30 percent to account for the uncertainty of projecting future operating costs.

Our model also includes two other costs specific to operating and maintaining the WFL. Given the fact that the WFL were constructed over 140 years ago, and the findings of the CEDER et al. report regarding the recommendations for maintaining structures of that age, our model includes options of adding costs for deferred maintenance and a set-aside for future capital upgrades. Our annual deferred maintenance amounts in the model range from $0 to $225,000, and the annual capital set-aside ranges from $0 to $150,000. Our use of the term, operating costs, includes costs for operations and maintenance, deferred maintenance and set-aside capital amounts.

In addition to incurring costs from operating the locks, the new entity that takes over the WFL could generate revenues through user fees. Our model includes a range of user fees per lockage from $0 to $15. We know, however, based on our review of data from the other locks that the ACoE turned over, and from our analysis of the WFL, that user fees will cover only a small portion of operating costs, and possibly not enough to offset the cost of administrating the fee. We therefore considered other possible funding sources to make up the shortfall.

Aside from single-owner options such as the State of Oregon leasing from the ACoE, Oregon statute includes provisions for a number of possible funding models that could support the WFL operations. We considered four possibilities and included the one we felt was most likely in our model. The first is creating a public corporation.[84] A public corporation can provide services, generate operating funds via taxes (though not through property taxes), is self-governed, but must be approved by the State legislature. Examples include the Port of Portland, TriMet and Oregon Health Sciences University.

The next possibility we considered was creating a new transportation agency via intergovernmental agreement, as described under Oregon Statute 190.[85] Government parties to the agreement must decide on the operating and financing details of the agreement and the services provided. Funding cannot come from property taxes. Establishing a new agency would include additional administrative fees, staff, and offices.

[79]US Army Corps of Engineers, Corps of Engineers Financial Management System (CEFMS), http://www.usace.army.mil/FinanceCenter.aspx.
[80]Contact the Willamette Falls Heritage Foundation, 503-650-9570, for a copy of the spreadsheet model that accompanies this report.
[81]Army Corps of Engineers, Locks Performance Monitoring System (LPMS), http://www.ndc.iwr.usace.army.mil/lpms/lpms.htm.
[82]BST Associates, 2005.
[83]Using the US Producer Price Index.
[84]www.oregonlaws.org.
[85]2011 ORS § 190.010 Authority of local governments to make intergovernmental agreement, http://www.oregonlaws.org/ors/190.010.

The third option is creating a service district, as described in Oregon Statute 451.[86] Creating such a district would require negotiations among entities that would form the boundary of the district. Examples of services districts formed in Oregon include districts for water and sewer services, parks and recreation, solid waste disposal, and emergency medical services, e.g., ambulance. Typically, the district services directly benefit the users who pay district fees.

The forth option, and the one we include in our model, is forming a transportation district as described in Oregon Statute 391.550.[87] Currently, eleven transportation districts operate in Oregon including, TriMet, South Clackamas Transportation District, Salem Area Mass Transit District, and Land Transit District.[88] A district can be formed across jurisdictional boundaries of interested constituents. We included the transportation district option in our analysis because they are prevalent across the state, the process for establishing a district is relatively well know, and transportation districts can be funded by property taxes.

To help illustrate the amounts of revenues that a WFL-specific transportation district could generate, we developed transportation districts using jurisdictional boundaries of four entities. We stress that these transportation districts are illustrative only. We use these jurisdictional boundaries for convenience because assessed values for property taxes are available for these boundaries, and because they illustrate districts covering a range of geographies, from large to small. We use jurisdictional boundaries for the Port of Portland, Metro, TriMet, and Clackamas County in our model.

Figure A-1: Illustrative Model Run #1

Operating Scenario: 3 Months (300 to 600 lockages)
Transportation District: Clackamas County Boundary
Deferred Maintenance: $25,000
Set-Asides For Future Capital Improvements: $50,000
User Fees: $5 per lockage

Costs	Low Estimate	High Estimate
Operations & Maintenance	$156,900	$156,900
O&M Contingency (10%)	0	15,690
Deferred Maintenance	25,000	25,000
Set-Asides For Capital Improvements	50,000	50,000
Total	$231,900	$247,590
Revenues	**Low Estimate**	**High Estimate**
From User Fees	$1,500	$3,000
From Clackamas County Boundary	231,900	246,090
Total	$233,400	$249,090
Tax Impacts		
Tax per $1,000 Assessed Value	0.81¢	0.89¢
Net Tax Increase	0.04%	0.04%

Our model calculates tax revenues generated from each jurisdictional boundary that would be needed to make up the revenue shortfall between user fees and operating costs. Our model calculates total revenues generated from a transportation district, the tax amount per $1,000 of assessed value, and the percent net tax increase attributed to the district-specific tax amounts.

As described above, our model includes a number of assumptions and choices that affect the number of lockages, operating costs, and revenues. We reproduce results from three illustrative model runs using different assumptions and choices.

Model Run #1 assumes three months of operations, a 10% contingency factor for operating costs, $25,000 a year in deferred maintenance, $50,000 per year set-aside for future capital improvements, a $5 per lockage user fee, and a transportation district equivalent to the Clackamas County boundary.

[86]2011 ORS § 451.010 Facilities and services provided by service districts, http://www.oregonlaws.org/ors/451.010.
[87]2011 ORS § 391.550 Powers of Mass Transportation Financing Authority, http://www.oregonlaws.org/ors/391.550.
[88]Oregon Blue Book, Transit Districts, http://bluebook.state.or.us/local/other/other05.htm#r. [81]Metro. Adopted Budget FY 2013-14. www.oregonmetro.gov.

Figure A-2: Illustrative Model Run #2

Operating Scenario: 6 Months (1,000 to 1,500 lockages)
Transportation District: Metro Region Boundary
Deferred Maintenance: $50,000
Set-Asides For Future Capital Improvements: $100,000
User Fees: $8 per lockage

Costs	Low Estimate	High Estimate
Operations & Maintenance	$313,800	$313,800
O&M Contingency (10%)	0	31,380
Deferred Maintenance	50,000	50,000
Set-Asides For Capital Improvements	100,000	100,000
Total	$463,800	$495,180
Revenues	**Low Estimate**	**High Estimate**
From User Fees	$8,000	$12,000
From Metro Region Boundary	463,800	487,180
Total	$471,800	$499,180
Tax Impacts		
Tax per $1,000 Assessed Value	0.34¢	0.37¢
Net Tax Increase	0.02%	0.02%

Model Run #2 assumes six months of operations, a 10% contingency factor for operating costs, $50,000 a year in deferred maintenance, $100,000 per year set-aside for future capital improvements, a $8 per lockage user fee, and a transportation district equivalent to the Metro boundary.

Figure A-3: Illustrative Model Run #3

Operating Scenario: 12 Months (1,700 to 2,500 lockages)
Transportation District: Port of Portland District Boundary
Deferred Maintenance: $100,000
Set-Asides For Future Capital Improvements: $150,000
User Fees: $0 per lockage

Costs	Low Estimate	High Estimate
Operations & Maintenance	$627,600	$627,600
O&M Contingency (10%)	0	62,760
Deferred Maintenance	100,000	100,000
Set-Asides For Capital Improvements	150,000	150,000
Total	$877,600	$940,360
Revenues	**Low Estimate**	**High Estimate**
From User Fees	$0	$0
From Port of Portland District Boundary	877,600	940,360
Total	$877,600	$940,360
Tax Impacts		
Tax per $1,000 Assessed Value	0.58¢	0.64¢
Net Tax Increase	0.03%	0.03%

Model Run #3 assumes twelve months of operations, a 10% contingency factor for operating costs, $100,000 a year in deferred maintenance, $150,000 per year set-aside for future capital improvements, a $0 per lockage user fee, and a transportation district equivalent to the Port of Portland jurisdictional boundary.

Our three illustrative model runs show results across a range of operating possibilities for the WFL. Despite this range, we can draw a number of conclusions about the outcomes of likely future operations of the WFL.

- User fees will cover but a small portion of operating costs. If actual lockages were greater than the numbers in our operating scenarios, it is unlikely that the impacts on user fees would significantly reduce the demand for supplemental funding from other sources, e.g., a transportation district.
- The revenues provided by a transportation district based on the boundaries in our analysis would result in less than a tenth of a percent increase in taxes paid by property owners within the district boundaries.
- The highest operating costs from our illustrative model run #3, in which we assume 12 months of operations, would represent a very small portion of current budgets for area jurisdictions. For example, Metro's fiscal year (FY) 2013-14 total budget is $490 million. The $940 thousand WFL operating costs for 12 months works out to less than 0.2% of Metro's budget.[89] TriMet's adopted budget for FY 2014-15 is comparable to Metro's, at $494 million,[90] as is the Port of Portland's adopted budget for FY 2014-15, of $489 million.[91] Clackamas County's FY 2014-15 adopted budget is $606 million.[92] Costs of operating WFL for 12 months represents 0.16% of the County's budget.

Readers interested in running alternative operating scenarios to those reported above can select from a menu of values for model inputs and the model will generate new results.[93]

[89] Metro. Adopted Budget FY 2013-14. www.oregonmetro.gov.
[90] Tri-County Metropolitan Transportation District of Oregon. Adopted Budget 2014-2015. Trimet.org/budget/.
[91] Port of Portland, 2014-15 Adopted Budget, www.portofportland.com/strategicplanbudget.aspx.
[92] Clackamas County, Amended FY 2013-14 vs. Adopted FY 2014-15 Budgets. www.clackamas.us/budget/documents/budportala.pdf.
[93] Contact the Willamette Falls Heritage Foundation, 503-650-9570, for a copy of the spreadsheet model that accompanies this report.

SUPPLEMENTAL TABLES

Figure A-4: Shipments Originating in Oregon, by Transportation Mode

Mode type	Value (millions)	Tons (thousands)	Ton-miles (millions)
Single modes			
Truck	$101,093	149,917	27,962
Rail	3,353	7,204	9,889
Water	1,859	8,454	379
Air*	5,262	13	21
Pipeline	23	89	1
Subtotal, single modes	$111,590	165,677	38,252
Multiple modes	28,450	8,312	11,083
Other and unknown modes	6,846	10,749	514
Total	$146,886	184,738	49,849

*Includes truck & air multi-mode

Source: 2007 Commodity Flow Survey, U.S. Bureau of Transportation Statistics.

Figure A-5: Shipments Originating in Oregon, by Commodity

Commodity type	Value (millions)	Tons (thousands)	Ton-miles (millions)
Cereal grains (includes seed)	$3,262	14,541	34
Agricultural products (excludes animal feed, cereal grains, and forage products)	5,340	3,190	3,795
Animal feed, eggs, honey, and other products of animal origin	ND	ND	279
Meat, poultry, fish, seafood, and their preparations	1,864	561	151
Milled grain products and preparations and bakery products	2,009	1,533	571
Other prepared foodstuffs and fats and oils	8,112	6,344	5,262
Alcoholic beverages	1,474	1,130	149
Tobacco products	137	3	ND
Monumental or building stone	ND	ND	60
Natural sands	ND	2,147	63
Gravel and crushed sone (excludes dolomite and slate)	404	47,978	1,148
Other nonmetallic minerals, nec	111	1,442	309
Metallic ores and concentrates	ND	8	ND
Gasoline and aviation turbine fuel	4,614	7,076	228
Fuel oils	2,580	4,292	215
Other coal and petroleum products, nec	1,938	5,468	368
Basic chemicals	765	617	146
Pharmaceutical products	ND	ND	2
Fertilizers	358	892	209
Chemical products and preparations, nec	3,141	1,002	508
Plastics and rubber	3,828	1,234	657
Logs and other wood in the rough	ND	357	ND
Wood products	11,076	23,169	19,530
Pulp, newsprint, paper, and paperboard	2,754	4,251	3,503
Paper or paperboard articles	1,985	1,668	442
Printed products	1,511	493	348
Textiles, leather, and articles of textiles or leather	5,666	135	127
Nonmetallic mineral products	5,023	ND	ND
Base metal in primary or semifinished forms and in finished basic shapes	4,439	2,791	950
Articles of base metal	4,434	980	478
Machinery	6,270	485	441
Electronic and other electrical equipment and components and office equipment	21,208	262	104
Motorized and other vehicles (including parts)	6,958	835	618
Transportation equipment, nec	993	19	23
Precision instruments and apparatus	8,441	51	103
Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs	1,227	152	98
Miscellaneous manufactured products	5,760	806	584
Waste and scrap	1,258	4,363	320
Mixed freight	14,834	4,926	1,030
Total	$146,886	184,738	49,849

ND = Not disclosed.

Source: 2007 Commodity Flow Survey, U.S. Bureau of Transportation Statistics.

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