Willamette Falls Lock
Command Briefing

Jeremy Weber August 2008
US Army Corps of Engineers
Portland District

- West bank of the Willamette River at West Linn, Oregon (Clackamas County)
- 26.1 miles from the mouth of the Willamette

The Willamette Basin
Willamette Falls

Natural waterfall over resistant basalt bedrock
Introduction

- Navigation: provides the only passage for boats around the Willamette Falls
- National Register of Historic Places
- Designated as a State Historic Civil Engineering Landmark by the American Society of Civil Engineers
Location and Plan Map
Recent History

2002-2004 – Appropriated funding substantially decreases, recreational season limited to summer.
2005 – Appropriated funding goes to 0. Congressional Add funding
FY06 and FY07 – Budget puts locks in “Caretaker Status”
Oregon Solutions Process convened to examine short, mid, and long term plans for the lock – Congresswoman Darlene Hooley (OR-5) is a major proponent
Operations costs for FY06 and FY07 paid by Coalition and through Short term Challenge Partnership Agreement with Oregon Department of Transportation (ODOT)
Coalition members include Oregon Solutions (Governor Kulongoski), Representative Hooley, Senator Smith’s staff, the Mayor of West Linn, the Mayor of Oregon City, Clackamas County, the West Linn Heritage Society, Oregon Trail Museum, The Maritime Museum, Willamette Riverkeepers, and Tualatin Riverkeepers.
## Funding for Willamette Falls Lock, FY 2004-2008

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<tr>
<th>FY</th>
<th>President’s Budget</th>
<th>Received</th>
<th>Coalition / ODOT Funds</th>
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<td>2008</td>
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<td>$155,000*</td>
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<td><strong>TOTAL</strong></td>
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# Willamette Falls Locks 1-4, Total Lockages 2000-2006

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<td>265</td>
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Willamette Falls Guard Lock.  
Total Lockages 2000-2006

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<td>1521</td>
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<td>661</td>
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<td>Total Lockage</td>
<td>756</td>
<td>473</td>
<td>401</td>
<td>283</td>
<td>154</td>
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Leading up to the FY08 Budget...

- Corps provided Congress with capability amount including operation, but not Hydraulic Steel Structure (HSS) Inspection
- Corps revised capability for FY08 to include HSS
- HSS is necessary based on best engineering judgement
- NWP determined locks should not be operated for safety reasons until HSS is performed and any necessary repairs completed
Hydraulic Steel Structure (HSS) Investigation

- An extensive inspection, required by regulation, designed to ensure structural integrity of the locks. The HSS inspection includes:
  - Dewater lock chambers
  - Dismantle gate leaves
  - Remove all timber lagging
  - Wash and clean gate
  - Inspect gate (visual, non-destructive testing, divers to inspect pintle bearing)
  - Repair as needed
  - Return lock to working order

- Original Government estimate was $511,000
- Updated estimate is $1,494,000
- Magnitude of necessary repairs is unknown
NWP received $155,000

Congress directed Corps to
- Initiate the HSS with funds provided
- Seek additional funding to cover difference
  - Identify non-essential NWD O&M activities
  - Identify local stakeholder sources
  - Report back on additional sources within 45 days
- Report back to Congress on necessary repairs and cost following completion of the HSS

No additional funds for repairs or operation were provided
Local stakeholders have approximately $130,000 for repairs/operations but not HSS

NWP identified funding source (Columbia and Lower Willamette River Dredging) and drafted reprogramming request to Committees

2/01/08 - NWD transmitted request to HQUSACE
4/29/08 - ASA(CW) refused to sign request
5/23/08 - WFL received preliminary Dam Safety Action Category (DSAC) 1 “urgent and compelling” classification
6/10/08 - Oregon Congressional delegation sends letter to HQUSACE
6/12/08 - ASA(CW) signs reprogramming request
Committees approved reprogramming request
Bids/Funding will determine if HSS can be completed in 2008

Locks will not be operated during summer season 2008

Signage/Website Update

Oregon Solutions Group and others working to address alternate sources of funding and long term future of the facility
Current Milestones

- Solicitation Issued: 06 Aug 08
- Bid Opening: 09 Sep 08
- Award/NTP: 30 Sep 08
- Inspections:
  - Gate 3: 06 Nov 08
  - Gate 7*: 13 Nov 08
  - Gate 1*: 20 Nov 08
  - Gate 6*: 27 Nov 08
  - Gate 5*: 04 Dec 08
  - Gate 4*: 11 Dec 08
  - Gate 2*: 18 Dec 08
NWP continues to work with the Coalition and other stakeholders exploring:

- Alternatives for funding the HSS, Repairs, Operation in FY08 and in the future
- Long term options for ownership/operation of the facility

Facility is aging, and significant capital improvements will be needed over the next 20 years
2009 Tentative Budget

- President’s Budget: $210K
- Tentative House: $200K
- Tentative Senate: $210K
- Capability Numbers Provided:
  - Caretaker Status: $75K
  - Critical Minimum Maintenance: $135K
  - DDR for Comp. Rehab: $600K
  - Minimal Operations: $148K
Questions?
Background

1899 photograph of the Willamette River looking upstream, with Willamette Falls Locks to the right, Oregon City to the left, and the horseshoe shaped falls in the background.

Circa 1888 photograph showing the stern wheeler “N. R. Lang” moving through the locks. (OHS #61782)
Located in West Linn, Oregon (Clackamas County)

12 miles upstream from Portland along the left bank of the Willamette River at Willamette Falls

Built by Willamette Falls Canal and Lock Company (1870-1872) with ownership changing several times

U.S. Army Corps Purchased April 26, 1915

Until the 1940s, the gates were opened and closed manually. As part of the renovation by the Corps, this antiquated, manually operated mechanism was replaced by the hydraulic system which is still in use today.

The manual operation of lock gears to open and close the lock gates required a strong back.
Historic Problems and Improvements

- Complete Rehabilitation (1916)
  - Locks deepened to controlling depth of 6’ at low water
  - Renewed all seven pairs of wooden gates
  - Renewed timberwork and fenders along lock walls

Following the purchase of the locks by the Corps of Engineers, a major renovation was undertaken. The lock chambers were deepened from 3 feet to 6 feet as a response to the increased need for passage by deeper draft vessels.
Historic Problems and Improvements

- 1941: original wooden lock gates replaced with steel miter gates and hydraulic operating machinery installed, replacing previous manual operation

- 1960: Lock 3 left wall (Corps side) replaced by modified timber structure with partial concrete backfill
Historic Problems and Improvements

- 1962: Lock 4 walls were replaced with new timber wall lining of similar structure to original except that the lumber is now treated.

- 1971: Lock 3 (Mill side) wall replaced with same type of structure as the left wall – modified timber structure with partial concrete backfill.

- 1973: Lock 2 wall linings were replaced with similar structure to original using treated timber supports. Chain link fabric added above elev. 26.5 right wall and above elev. 31.5 left wall.

- 1980: Cracked Welds and Repairs – Various Gates

- Late 1990’s replaced several quoin posts.
# Pertinent Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tr>
<td>Total Length</td>
<td>3,565</td>
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<tr>
<td>Usable Width</td>
<td>37’</td>
</tr>
<tr>
<td>Total Lift</td>
<td>50.4’</td>
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<tr>
<td>Depth Over Sills</td>
<td>6.5’</td>
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<tr>
<td>Max Vessel Length</td>
<td>175’</td>
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<tr>
<td>Gate Type</td>
<td>2 leaves, structural steel with wooden miter &amp; quoin posts</td>
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<tr>
<td>Gate Size</td>
<td>30’5.5” high x 20’ wide (Gate 1)</td>
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<tr>
<td></td>
<td>20’ high x 20’ wide (Gate 2-7)</td>
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## Pertinent Data, cont.

<table>
<thead>
<tr>
<th>GATE #</th>
<th>STATION</th>
<th>ELEVATION (Tog)</th>
<th>ELEVATION</th>
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<tr>
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<td>7</td>
<td>32+23</td>
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</table>
Pertinent Data, cont.

- Gates, Sliding: structural steel, 4’ each gate live, each 27’ x 41’
- Sills: all gate sills are concrete on rock masonry, except #1
- Canal Basin:
  - Length: 1250’
  - Width: 40-100’ variable
  - Water Level: Maintained constant
  - Paper Mill warf: 850’ along right side of canal basin
- Stage Fluctuation:
  - Above Locks: 10’ (12’ in extreme conditions)
  - Below Locks: 20’ (30’ in extreme conditions)
- Wall Elevation/Lift: Guard lock at upstream end is used only seasonally to maintain constant level of canal basin
Pertinent Data, cont.

<table>
<thead>
<tr>
<th>LOCK #</th>
<th>LOCK WALL LEVELATION</th>
<th>LIFT OF LOCK</th>
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<td>1</td>
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