3.1.e.2 Based on current funding levels, control the percent of ferry vessel systems that are past due for replacement from increasing over 10% by 2020 - Supplemental report

February 22, 2017

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Washington State Ferry Vessel and Terminals

**Matt von Ruden**  
Director, Vessel Engineering and Maintenance

Control the percent of ferry vessel systems that are past due for replacement from increasing over 10% by 2020

**Nicole McIntosh, PE**  
Director, Terminal Engineering

Control the percent of ferry terminal systems that are past due for replacement from increasing over 6% by 2020
Background:

**Sustained System Reliability:** Getting people where they need to go, safely and reliably, every day and over the long term

![Graph showing reliability and on-time performance by quarter](image)

**Performance Goals:** Established by a multi-agency team with legislative oversight to provide a benchmark for Ferries Division Performance.

**On-Time Performance:** The percent of vessels leaving the terminal within 10 minutes of the scheduled departure time.

**Service Reliability:** The percentage of sailings compared to the number of scheduled sailings.

**Service Statistics:**
- 162,000 trips per year
- 910,600 miles traveled in 2016
- 22 ½ hours of service each day on some routes

3.1.e.2: Control the percent of ferry vessel systems that are past due for replacement from increasing over 10% by 2020

**Current State:** Trending Away From Goal

**Steady Degradation of Fleet Condition**
- Over last 10 years, preservation investment averaged 50% of the documented need
- Since 2010, five new vessels have been built; two more will be built by 2018
- Impact of deferred preservation is reduced vessel reliability and increased maintenance and related operations costs
- Attainment of 60 year service life is unlikely

![Graph showing percentage of ferry vessel systems past due for replacement](image)

**Vessel Age and Preservation Backlog 2016**

<table>
<thead>
<tr>
<th>Class</th>
<th>Vehicle Capacity</th>
<th>Count</th>
<th>Average Age (yrs)</th>
<th>Preservation Backlog ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olympic</td>
<td>144</td>
<td>2</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Kwa-di Tabil</td>
<td>64</td>
<td>3</td>
<td>6.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Jumbo Mark II</td>
<td>202</td>
<td>3</td>
<td>19.3</td>
<td>36.9</td>
</tr>
<tr>
<td>Issaquah</td>
<td>124</td>
<td>6</td>
<td>36.5</td>
<td>66.5</td>
</tr>
<tr>
<td>Jumbo</td>
<td>188</td>
<td>2</td>
<td>45</td>
<td>27.8</td>
</tr>
<tr>
<td>Super</td>
<td>144</td>
<td>4</td>
<td>50</td>
<td>109.6</td>
</tr>
<tr>
<td>Evergreen State</td>
<td>87</td>
<td>2</td>
<td>58.5</td>
<td>25.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22</td>
<td>32.2</td>
<td>269.3</td>
</tr>
</tbody>
</table>
Problem/Opportunity: Preservation Program Challenges

- Funding levels are constrained
- Requirements are not even across biennia
- Requirements continue to increase (9% annually over past 3 years)
- Vessel availability is limited by service requirements and fleet size
- Demand for shipyards exceeds capacity
- Emergent work such as emergency repairs and regulatory requirements preclude essential preservation and maintenance
- Current ten year need is $639.1M

Projected Preservation Backlog Without Vessel Replacements ($M)

<table>
<thead>
<tr>
<th>Vessels</th>
<th>Pre-2017</th>
<th>17-19</th>
<th>19-21</th>
<th>21-23</th>
<th>23-25</th>
<th>25-27</th>
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<tbody>
<tr>
<td>New Preservation Needs</td>
<td>109.8</td>
<td>67.3</td>
<td>79</td>
<td>58.8</td>
<td>54.9</td>
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<tr>
<td>Preservation Plan*</td>
<td>65.1</td>
<td>66.1</td>
<td>88.1</td>
<td>137.7</td>
<td>93.8</td>
<td></td>
</tr>
<tr>
<td>Backlog change, increase in red</td>
<td>44.7</td>
<td>1.2</td>
<td>(9.1)</td>
<td>(78.9)</td>
<td>(38.9)</td>
<td></td>
</tr>
<tr>
<td>Cumulative Backlog</td>
<td>269.3</td>
<td>314</td>
<td>315.2</td>
<td>306.1</td>
<td>227.2</td>
<td>188.3</td>
</tr>
</tbody>
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* Plan is unconstrained beginning in the 23-25 Biennium

Problem/Opportunity: New Construction Program

- Kwa-di Tabli Class — Three 64-car ferries (2010-2012)
- Olympic Class — Four 144-car ferries (2012-2018)
  - MV Tukwila and MV Samish completed on schedule and within budget
  - MV Chimacum is 96% complete, ahead of schedule and within budget
  - MV Suquamish is 40% complete, ahead of schedule and within budget
  - Shipbuilder demobilization is beginning – 166 jobs affected
- Next Program – Replace Tillikum and three Super Class ferries
  - Gap in program construction for new RFP development in 17-19 Biennium
  - Validate requirements and update Long Range Plan
  - Consider alternative designs
  - New RCW requirements apply

Projected Preservation Backlog With Vessel Replacements ($M)

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<td>Vessel Replacements</td>
<td>(52.4)</td>
<td>(10.5)</td>
<td>(20.6)</td>
<td>(20.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative Backlog</td>
<td>269.3</td>
<td>261.6</td>
<td>262.8</td>
<td>243.2</td>
<td>143.7</td>
<td>84.3</td>
</tr>
<tr>
<td>Vessels Replaced</td>
<td>Hyak, Klahowya, Tillikum, Kalestan, Yakima</td>
<td></td>
<td></td>
<td></td>
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**Strategies**: Identify and implement low cost high impact activities to improve reliability

- Prioritize preservation investments to address greatest risks
- Improve Preservation program execution
- Maximize the benefit of our limited excess vessel capacity to support preservation and protect service
- Continue Hull Inspection program
- Cooperate with industry partners to share limited shipyard capacity
- Promote expansion of shipyard capacity
- Strengthen vessel maintenance & reliability program
- Further develop engine and deck training programs
- Fully leverage Eagle Harbor Maintenance Facility

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**Current State**: Trending Away From Goal

- Terminal assets past due for replacement, or backlog, is projected to increase from 5.4% in 2016 to 6.2% in 2017
- This is slightly over the goal of 6%

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Percent of terminal systems past due for replacement
Fiscal years 2013 through 2017

Data source: WSDOT Ferries Division
Current State: Goal on Track!

The top bar chart shows percent of systems that are past due by Terminal
- Orcas Ferry Terminal has almost 19% its assets that are past due for replacement
- Mukilteo and Seattle have 14% and 12% respectively

The pie chart shows the percent by value of terminal systems that are past due for replacement
- Seattle has the greatest value of backlog, comprising of over 50%. Seattle is our largest ferry terminal, therefore it contains the most assets.
- Does not include the seismic risk assessment results
  - This is likely to increase the backlog

Problem/Opportunity:

- 2017 Governor’s Budget supports backlog reduction
- Connecting Washington provides funding to replace the following Terminals:
  - Seattle Terminal $86 million
  - Mukilteo Terminal $70 million
- Terminal Engineering is applying risk based economic model that identifies the optimal service life for aging assets based on balancing the trade-off between risk and preservation spending.
  - The model quantifies risk from the perspective of riders and other stakeholders.
  - The model allows the program to prioritize preservation spending.
  - Without preservation the backlog will increase
Strategies: Identify and implement low cost high impact activities to improve reliability

- Annual tracking of asset failures.
- Investigate repeated critical asset failures.
- Develop targeted strategies to avoid future failures.

Examples:
- Operating staff use moveable bridge systems checklists regularly.
- Monthly generator inspections
- Increase network connectivity of bridges

Strategies: Implement maintenance activities focused on life extensions

- Inspect critical assets and track condition
  - 68% (514 assets) of all Terminal assets were completed in 2016
  - WSDOT Ferries inspections terminal assets on a two year cycle
- Adapt maintenance plan based on inspection findings
- Extend the useful life of systems by painting
  - 7 assets painted in 2016
Strategies: Identify lower cost solutions that address the problem (Vashon Trestle)

- Saves $28 million in near-term capital spending over replacement.
- Life-cycle cost savings, including risk and maintenance:
  - $16 million compared to no action.
  - $18 million compared to immediate replacement.
Assistance Needed:

- Thank you for your support:
  - Connecting Washington Transportation Funding package
    - Funding the construction of the MV SUQUAMISH
    - Colman Dock and Mukilteo terminals
- Continued support for:
  - Practical Solutions: Asset Management
    - Vessel preservation, new construction and maintenance programs
    - Risk-based asset management program for Ferry Terminals
  - Workforce Development
    - Fully leverage Eagle Harbor Maintenance Facility for Ferry Vessels and Terminals
    - 2016 Recruitment and Retention Study
  - Inclusion
    - Local Partnerships & Community Engagement
    - Shipbuilding and ship repair industry
    - Ferry Advisory Groups