Tribal Partnership Program
Jamestown S’Klallam Tribe and USACE
Dungeness River in Washington State

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Overview

- Tribal Partnership Program (Section 203) introduction
- Dungeness River study overview and purpose
- Setting/Study Area
- Issues affecting basin that require action
- Modeling overview
- Modeling results
- Study conclusions
- Summary/Take Aways
**USACE Tribal Partnership Program Overview**

- **Program overview:**
  
  The Tribal Partnership Program (Section 203 of WRDA 2000, as amended) is an authority which allows **federally recognized Indian Tribes** to request the Secretary of the Army to conduct a study on the feasibility of projects that address **economic, environmental, and cultural resource needs**

- **Program goals:**
  
  1. Partner with Tribes on the study, design and execution of water resource related projects (**flood damage reduction, ecosystem restoration, watershed studies**) 
  2. Substantially benefit Indian Tribes for projects in Indian Country

- **Geographic scope of mission → Nationwide**

- **Who initiates study? Federally recognized Tribes**

- **Funding**
  
  - First $100k from USACE used to develop initial “reconnaissance report” (**amended most recently in FY2017**) 
  - If recon report determines Federal interest and Congress allocates $, feasibility study and implementation can follow
• Dungeness River Basin includes **treaty-protected harvest rights** with the Jamestown S’Klallam Tribe’s usual and accustomed harvest area

• River used by 7 species of salmonids

• **4 species listed under ESA:** Chinook, summer chum, steelhead, bull trout

• Tribe and local stakeholder groups actively working to restore habitat and reduce flood damages
Dungeness River and Watershed

- 28 miles long – drains ~ 200 square miles of Olympic Mountains and lowlands near Strait of Juan de Fuca/Salish Sea
- Sister basin to Elwha River
- Basin annual rainfall varies from < 10 inches in Sequim to > 100 inches in headwaters
- Mean annual flow ~ 380 cfs. Bankfull flow ~ 3000 cfs. Annual peak streamflow varies from 740 cfs to 7,610 cfs.
- Transitions from braided to anabranching to single thread morphology in lower 6 miles
Dungeness River and Watershed – Study Area

Study Reach (RM 0 to RM 4)

“Reference Reach” (RM 6.4 to RM 5)
Avulsions and bank erosion supply large quantities of coarse sediment to the river in this **unconfined reach** recovering from historical channel clearing. Boulders and cobble are dominant. **LW, large pools and side channels frequent.** Highly **dynamic.** ELJs present.
Dungeness River – Study Area Reach 3 - River Mile 1.5-2.7

Confined by only one levee. Wood and pools more frequent. **Higher complexity** where not armored. **Aggrading**. Part of CAP Section 1135 restoration project reach.
Historical Habitat Loss and Degradation Summary

1870s to present - RM 0-12

- 30% of river banks armored
- 40% of potential 100-year floodplain disconnected in lower 4 miles by alterations
- Logging, clearing and snagging until 1980s, gravel mining until 1990s
Lower Dungeness River Restoration Strategy

- Restoration concepts provided by JSKT
- River is ecologically functional but distressed
- Focus on most heavily impacted lower 4 miles
- Primary restoration study strategy → set back existing levees to restore ecosystem structures, functions, and processes
- Remove the obstructions to channel migration; let the river, natural processes, and time do the work
Pre-development: River divided into multiple channels, distributing water, sediment, organics, nutrients and energy across floodplain. Channel free to avulse and migrate. Complex conditions create good habitat.
Floodplain development:

- Floodplain cleared for timber and development (agriculture, residential)
- “Snags” removed to increase channel capacity
- Bank erosion/sedimentation/instability increase
Lower Dungeness River → Problem = **Levee Disease***

* as coined by Mr. Joel Freudenthal, Yakima County Public Works restoration lead

**Post-development:**

- Flooding leads to requests to build levees. River forced into narrow channel by levees, water levels & velocities increase
- Floodplain disconnected by levees and developed
- Habitat disconnected and degraded
- Flood risks initially reduced but increased with time due to sedimentation and development (residual risks)
Lower Dungeness River → Solution = Levee Removal/Setback

Proposed Project actions (to be completed under another authority)

• Identify “low hanging fruit” for restoration
• Acquire property and set back levees
• Reconnect habitat and let natural processes do the work
• Resiliency increased, flood damages reduced
Lower Dungeness River – Desired end state (adapted to built environment)

Multi-phase restoration conceptual framework

• Use initial successes to educate and build local support for future restoration phases
Study Methodology – 5 steps

1. GIS data collection and concepts
2. Modify terrain models in GIS
3. H&H modeling
4. Preliminary design
5. Parametric cost estimates and recommendations for further study

<table>
<thead>
<tr>
<th>Phase</th>
<th>Total Project First Cost (October 2015 Price Levels, Rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$225,000</td>
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<tr>
<td>3</td>
<td>$5,725,000</td>
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<tr>
<td>4</td>
<td>$12,970,000</td>
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<td>6</td>
<td>$3,670,000</td>
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<tr>
<td>7</td>
<td>$3,290,000</td>
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<td></td>
<td><strong>Construction Estimate Total</strong> $25,880,000</td>
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<tr>
<td></td>
<td>Lands &amp; Damages</td>
</tr>
<tr>
<td></td>
<td><strong>$0</strong></td>
</tr>
<tr>
<td></td>
<td>Planning, Engineering &amp; Design</td>
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<tr>
<td></td>
<td>$9,075,000</td>
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<tr>
<td></td>
<td>Construction Management</td>
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<tr>
<td></td>
<td>$3,830,000</td>
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<tr>
<td></td>
<td><strong>TOTAL</strong> $38,785,000</td>
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</table>

*Note: Real Estate estimates for land acquisition, relocations, etc. are not included in this cost estimate.
Hydraulic Model Overview

- Combines over 50 recently surveyed river cross sections with 2008 and 2012 LiDAR data
- Models all overbank flood areas using latest version of HEC-RAS 5.0 (1-D channel and 2-D floodplain)
- Allows for simulation of velocity, depth, inundation area at any location and point in time
- Assumes constant steady high tide, 100-year river flow (steady or event hydrograph)
- FAST RUN TIMES
Restoration scenarios analyzed by USACE

*Phase 1 is currently underway under separate project authority
100-year Inundation, Existing Condition
100-year inundation, All Phase Restoration

Legend
- + USGS river miles
- Yellow Setback levee
- Depth All Phase Restoration
- feet
  - High: 15
  - Low: 0

Sources: Esri, DeLorme, USGS, NPS. Sources: Esri. USGS, NOAA
## Hydraulic Modeling Results

<table>
<thead>
<tr>
<th>Restoration Project</th>
<th>Linear Length Removed (feet)</th>
<th>New Floodplain Area (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>2817</td>
<td>98</td>
</tr>
<tr>
<td>Phase 2</td>
<td>440</td>
<td>21</td>
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<tr>
<td>Phase 3</td>
<td>6916</td>
<td>68</td>
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<tr>
<td>Phase 4</td>
<td>5910</td>
<td>72</td>
</tr>
<tr>
<td>Phase 6</td>
<td>1626</td>
<td>7</td>
</tr>
<tr>
<td>Phase 7</td>
<td>7615</td>
<td>31</td>
</tr>
<tr>
<td>Phase 1+3</td>
<td>9733</td>
<td>166</td>
</tr>
<tr>
<td>Phase 1+4</td>
<td>8727</td>
<td>170</td>
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<tr>
<td>Phase 1+3+4</td>
<td>15643</td>
<td>238</td>
</tr>
<tr>
<td>Phase 1+3+4+7</td>
<td>23258</td>
<td>245</td>
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<tr>
<td>Phase 4+7</td>
<td>13525</td>
<td>103</td>
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<tr>
<td><strong>Phase 1+2+3+4+6+7</strong></td>
<td><strong>23,698</strong></td>
<td><strong>266</strong></td>
</tr>
</tbody>
</table>

Note – acreages updated from those provided by JSKT based on GIS area. Phase 7 includes 3,128 lineal feet of road removal, 2,061 lineal feet of agricultural berm removal, and 2,425 lineal feet of rock revetment removal along Ward road.
## Hydraulic Modeling Results

<table>
<thead>
<tr>
<th>Restoration Project</th>
<th>Average Main Channel Velocity in Project Reach (ft/s)</th>
<th>Average Main Channel Velocity for Existing Conditions in Project Reach (ft/s)</th>
<th>Average Decrease in Flood Elevation in Restoration Area (ft)</th>
<th>Average Percent Decrease in Velocity in Restoration Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>6.1</td>
<td>7.5</td>
<td>1.0</td>
<td>23%</td>
</tr>
<tr>
<td>Phase 2</td>
<td>9.2</td>
<td>10.0</td>
<td>0.1</td>
<td>9%</td>
</tr>
<tr>
<td>Phase 1+3</td>
<td>5.6</td>
<td>7.6</td>
<td>2.1</td>
<td>36%</td>
</tr>
<tr>
<td>Phase 4</td>
<td>5.4</td>
<td>7.0</td>
<td>2.0</td>
<td>30%</td>
</tr>
<tr>
<td>Phase 6</td>
<td>8.0</td>
<td>9.2</td>
<td>0.0</td>
<td>15%</td>
</tr>
<tr>
<td>Phase 7</td>
<td>6.6</td>
<td>6.8</td>
<td>0.0</td>
<td>3%</td>
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<tr>
<td>Phase 1+3+4</td>
<td>5.0</td>
<td>7.6</td>
<td>4.0</td>
<td>52%</td>
</tr>
<tr>
<td>Phase 1+3+4+7</td>
<td>5.0</td>
<td>7.2</td>
<td>3.0</td>
<td>44%</td>
</tr>
<tr>
<td>Phase 4+7</td>
<td>5.4</td>
<td>7.3</td>
<td>1.2</td>
<td>35%</td>
</tr>
<tr>
<td><strong>All phase (avg.)</strong></td>
<td><strong>5.3</strong></td>
<td><strong>7.3</strong></td>
<td><strong>2.9</strong></td>
<td><strong>38%</strong></td>
</tr>
</tbody>
</table>
Restoration Study Conclusions

• Lower Dungeness River’s floodplain extent has been significantly reduced by levee construction, which has reduced flood risk for commercial, agricultural and residential developments landward of the levees.

• It is estimated that upwards of 463 acres of active (defined as wetted during the 100-year flood) floodplain area have been converted to other uses.

• Levee removal and set backs could potentially restore from 1 acre (Phase 7) to 164 acres (Phase 1+2+3+4+6+7) of active floodplain, and a similarly large amount of riparian buffer and future floodplain given channel migration.

• Project in federal interest – Corps in discussions to cost share under implementation authority
Restoration Study Conclusions

• If restoration projects are implemented, hydraulic conditions during floods in restored reaches should quickly approach conditions typical of unconfined reaches upstream and downstream of the restoration project areas.

• The proposed changes are likely to sustainably improve habitat quantity and quality in the treated reaches.

• Ecosystem restoration activities may provide ancillary flood risk management benefits in the project area.
Take-Aways

• **Dungeness River Restoration Study (Phase 1)**
  - Development including road and levee construction have isolated or converted 470 acres (40%) of the historical floodplain to other land uses in the lower 4 miles of river.
  - Restoration through land acquisition, levee removal, and setbacks could restore more than half of the habitat lost to development (266 acres).
  - HEC-RAS 5.0 was instrumental in rapidly analyzing and communicating expected floodplain changes to public in a manner that is intuitive and impactful.
Take-Aways

• **Tribal Partnership Program**
  - Sponsor (Jamestown S'Klallam Tribe) was pleased with findings and initiated discussions on how USACE implementation authorities (CAP, GI) could further Tribe’s restoration goals
  - Authority specifically for federally-recognized Tribes; provides **broader flexibility for more rapid analysis of critical issues free from typical constraints of Corps process**
  - Program is well positioned to support a wide range of studies throughout the Seattle District and Northwest Division
  - **Good opportunity to build trust and accelerate development of restoration plans**
More Info and Points of Contact

Seattle District USACE: Frances (Lori) Morris, Tribal Liaison
http://www.nws.usace.army.mil/Missions/Civil-Works/Programs-and-Projects/Authorities/Tribal-Partnership-Program/

Northwest Division USACE

Jamestown S’Klallam Tribe Habitat Restoration Program: Randy Johnson
rjohnson@jamestowntribe.org
http://www.jamestowntribe.org/programs/nrs/nrs_habrest.htm