The WRIA 9 Marine Shoreline Monitoring and Compliance Pilot Project

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• WRIA 9 Salmon Plan calls for:
  – No new shoreline armoring
  – Monitoring shoreline condition
  – “Improve enforcement of existing land use and other regulations”

• WRIA 9—2010 Status and Trends monitoring report called for boat based surveys vs. aerial photo analysis
Project Area

- 92 miles
  - 52 miles rural (48% armored)
  - 40 miles urban (83% armored)
## Characterized changes

<table>
<thead>
<tr>
<th>Type of change</th>
<th>Status</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoreline armoring</td>
<td>New</td>
<td>Wood</td>
</tr>
<tr>
<td>Docks/overwater structures</td>
<td>Major Repair</td>
<td>Rock</td>
</tr>
<tr>
<td>Groins</td>
<td>Minor Repair</td>
<td>Concrete</td>
</tr>
<tr>
<td>Clearing/grading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structures (houses/sheds/stairs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquaculture operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other changes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the office

QA/QC & verification of changes by comparing to other photos

<table>
<thead>
<tr>
<th>Vertical Aerial photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>2009 (2 sets)</td>
</tr>
<tr>
<td>2010</td>
</tr>
<tr>
<td>2012</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oblique photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 DOE</td>
</tr>
<tr>
<td>2006 King County</td>
</tr>
<tr>
<td>2011 King County</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>2011 (Vashon only)</td>
</tr>
</tbody>
</table>
What type of changes were seen?

Armoring = 51% of all changes

Number of different shoreline changes
Where were they seen?

Number of & where changes occurred

- 2012-85 changes
- 2013-60 changes
- Total-145 changes

- Burien
- Normandy Park
- Des Moines
- Federal Way
- Seattle
- King County

# of changes

- 2012
- 2013
The 2012 survey looked at changes between 2004 and September of 2012 (~8 years)
The 2013 survey looked at changes between Sept 2012 and June of 2013 (less than a year)

2012-85 changes
2013-60 changes

Why so many changes in both surveys?

2013 survey

– ~10% were older, missed in the 2012 survey
– Highest tide on record between surveys
– Very wet fall/winter
– Changes easier to pick out due to newness
Evaluated impacts to ecological & physical processes

- Sediment delivery to beach
- Sediment transport along the beach
- Light energy (day & night)
- Organic material accumulation (input & storage)
- Wave energy
- Water Quality
- Forage fish spawning habitat displacement
- Hazards to public safety
How many and what type had no apparent effect?

# of changes with no apparent effect

- Armoring: Major repair
- Armoring: Minor repair
- Armoring: New
- Docks
- Clearing
- Stairs
- Other

Legend:
- Total #
- # no effect
Evaluated if changes in condition had a City or County permit for the change.
Evaluated if changes in condition had a local permit, continued

Compliance by jurisdiction

Overall compliance rate

- Burien
- Normandy Park
- Des Moines
- Federal Way
- Seattle
- County

# of changes

2012
2013
Total # of changes
Enforcement

• Original intent was to track enforcement outcomes of unpermitted changes
• Time constraints did not allow a thorough evaluation of enforcement activities
• Of the 96 total unpermitted changes in shoreline condition, eight of them were already in enforcement process when they were encountered during the surveys
• Between 2005 and June 2013
  ~1500 feet of shoreline armoring was removed via restoration projects
  ~1570 feet of new shoreline armoring was constructed
PSP has a goal of a net decrease in shoreline armoring from 2011-2020 across Puget Sound

• In 2005-2010 *permitted* projects resulted in:
  – Net gain of 6 miles of new armoring
  – 14.5 miles of repair/replacement

• Assuming compliance rates similar to WRIA 9:
  – 60% for new armor—net gain actually = 8.5 miles
  – 40%* for repairs—repairs would be around 23 miles

* 40% is the approximate average compliance between minor and major repairs
Between 2005 and June of 2013
• Even with CAOs that protect marine riparian areas, more trees and shrubs are being cleared than are being replanted/restored or naturally re-establishing
Take Aways

• Most of the changes involved repairs to existing infrastructure

• Did not attempt to answer why people are or aren’t getting permits
Lower compliance rate compared to other areas of Puget Sound

- Bainbridge (80%)  
- San Juan (50%)
• To get entire report—google “WRIA 9 monitoring compliance”
• Thanks to the Puget Sound Marine and Nearshore Protection and Restoration Grant Program for selecting this project for funding
• Thanks to EPA and WRIA 9 for project funding and support

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