If you build it, they will come: marine habitat provided by a wastewater outfall

Kimberle Stark  
King County, United States, kimberle.stark@kingcounty.gov

Jeffrey Lundt  
King County, United States, jeff.lundt@kingcounty.gov

Wendy Eash-Loucks  
King County, United States, wendy.eash-loucks@kingcounty.gov

Follow this and additional works at: https://cedar.wwu.edu/ssec

Part of the Fresh Water Studies Commons, Marine Biology Commons, Natural Resources and Conservation Commons, and the Terrestrial and Aquatic Ecology Commons

Stark, Kimberle; Lundt, Jeffrey; and Eash-Loucks, Wendy, "If you build it, they will come: marine habitat provided by a wastewater outfall" (2018). Salish Sea Ecosystem Conference. 105.  
https://cedar.wwu.edu/ssec/2018ssec/allsessions/105

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.
If You Build it, They Will Come: Marine Habitat Provided by a Wastewater Outfall

Kimberle Stark, Jeff Lundt, Wendy Eash-Loucks
King County Dept. of Natural Resources & Parks
Brightwater Treatment System Outfall

- Completed in 2008
- Twin 63-in (1.6m) diameter, mile long HDPE pipes
- Weighted with concrete collars
- Terminates at -600 ft MLLW (183m)
ROV Surveys: 2009--2017

80-150 ft (30-46m) depth

300 ft (91m) depth

600 ft (183m) depth

Photo: Bob Pacunski WDFW
Fish Species Observed

**Bocaccio rockfish**
- Brown rockfish
- Canary rockfish
- Copper rockfish
- Quillback rockfish
**Yelloweye rockfish**
- Yellowtail rockfish

**Lingcod**
- Pacific herring
- Kelp greenling
- Cabezon
- Ratfish
- Skate (sp?)
- Pile perch
- Surf perch

Photos: Jen Vanderhoof
One project led to another.....

★ What is the effectiveness and amount of habitat artificial structures, such as outfall pipes, provide?
★ Document presence and abundance of marine organisms on the pipes at various depths
★ Do marine organisms attached to the pipe affect the structural integrity?
Study Design

★ 2 ft x 1 ft pipe sections deployed in 2012
★ -100 (30m), -300 (91m), -600 (183m) ft MLLW
★ 10 “settlement plates”/depth
★ 3 replicates/depth
★ To retrieve at 2, 5, & 10 yrs
Plate Assessment

- Assessed for total % cover in field
- Flexible mesh grid (21 cells) to aid estimation
- Macroscopic biota identified & counted in field
- Photographs taken of each plate & grid cell
- % cover & counts determined in office (Image J)
- Structural integrity tests
<table>
<thead>
<tr>
<th>% Cover Categories (non-motile)</th>
<th>Phylum</th>
<th>Count Categories (motile)</th>
<th>Phylum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubeworm: calcareous</td>
<td>Annelida</td>
<td>Polychaete: errant</td>
<td>Annelida</td>
</tr>
<tr>
<td>Polychaete: tube</td>
<td>Annelida</td>
<td>Amphipod/shrimp</td>
<td>Arthropoda</td>
</tr>
<tr>
<td>Amphipod: tube</td>
<td>Arthropoda</td>
<td>Cancridae crab</td>
<td>Arthropoda</td>
</tr>
<tr>
<td>Barnacle: live</td>
<td>Arthropoda</td>
<td>Majoidae crab</td>
<td>Arthropoda</td>
</tr>
<tr>
<td>Bryozoan: branched</td>
<td>Bryozoa</td>
<td>Sea urchin</td>
<td>Echinodermata</td>
</tr>
<tr>
<td>Bryozoan: coral</td>
<td>Bryozoa</td>
<td>Gastropod</td>
<td>Mollusca</td>
</tr>
<tr>
<td>Bryozoan: encrusting</td>
<td>Bryozoa</td>
<td>Trichotrops gastrospod</td>
<td>Mollusca</td>
</tr>
<tr>
<td>Ulva spp.</td>
<td>Chlorophyta</td>
<td>Flatworm</td>
<td>Platyhelminthes</td>
</tr>
<tr>
<td>Tunicate</td>
<td>Chordata</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemone</td>
<td>Cnidaria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydroid</td>
<td>Cnidaria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bivalve: clam</td>
<td>Mollusca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jingle shell</td>
<td>Mollusca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limpet</td>
<td>Mollusca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scallop</td>
<td>Mollusca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slipper snail</td>
<td>Mollusca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mussel</td>
<td>Mollusca</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sponge: calcareous</td>
<td>Porifera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demosponge</td>
<td>Porifera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Non-motile species ( % cover)

Motile species (presence/absence)
Settling Plate Summary

coral bryozoans

calcareous tubeworm

checkered hairsnail
tunicates

scallops
encrusting bryozoans

clams

amphipods
Photos After 5 Years: 2017
Take Home Messages

★ Brightwater outfall structure is providing multiple habitat functions

★ Something for everyone

★ Make as structurally complex as possible to provide the most benefit
Acknowledgements

**ROV surveys:**
- Jim Devereaux: King County Environmental Lab ROV team leader
- Global Diving & Salvage
- Bob Pacunski: WA Dept. of Fish & Wildlife

**Critter identification assistance:**
- Megan Dethier-University of Washington
- Greg Jensen-University of Washington
- Gretchen Lambert
- Maggie Dutch-WA Dept. of Ecology
- Dany Burgess-WA Dept. of Ecology