

RSMP Mussel Monitoring Update

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Puget Sound Ecosystem and Monitoring Program (PSEMP)

Washington Department of Fish and Wildlife



Project Timeline To Date – On Schedule

- QAPP developed – May 2015
 - <http://wdfw.wa.gov/publications/01760/>
- Volunteer Recruitment/Organization – June 2015
- Site Confirmations/Permissions – August 2015
- Permits & MOUs – September 2015
- Equipment – September 2015
- Preparation of Mussels – October 2015
- Mussel Cage Deployment – October 2015
- Mussel Cage Retrieval – February 2016
- Mussel Processing (WDFW) – April 2016
- Chemical Analysis (contract labs) – September 2016
- Data QA/QC check – *in process* (October 2016)

37 Partners and Volunteer Groups helped with RSMP Mussel Monitoring (2015/16)

Americorps

Bainbridge Water Resource Council - Beach Naturalists

Cherry Point Citizen Stewardship Committee

City of Bellingham - Natural Resources Department

EPA (grant for one site)

Evergreen College

Feiro Marine Life Center

Harbor WildWatch

King County Public Works

Kitsap Co. Public Works - Stormwater Division

Lighthouse Environmental Programs – Beach Watchers

Nisqually Reach Nature Center

Pacific Lutheran University

Pacific Shellfish Institute

**Padilla Bay National Estuarine Research Reserve - Coastal
Volunteer Partnership**

Penn Cove Shellfish, Inc.

Port Gamble S'Klallam Tribe

Port Townsend Marine Science Center

Puget Sound Corps

Puget Sound Partnership

Puget Soundkeeper Alliance

San Juan County MRC

Seattle Aquarium

Snohomish County MRC

South Puget Sound Salmon Enhancement Group

Stillaguamish Tribe

Suquamish Tribe

University of Puget Sound

University of Washington - Seattle

University of Washington - Tacoma

Vashon Nature Center

Washington Conservation Corps

WDNR Aquatic Reserves Program

WDFW's Puget Sound Ecosystem Monitoring Program

WDFW-affiliated Volunteers

Western Washington University

Whatcom County MRC

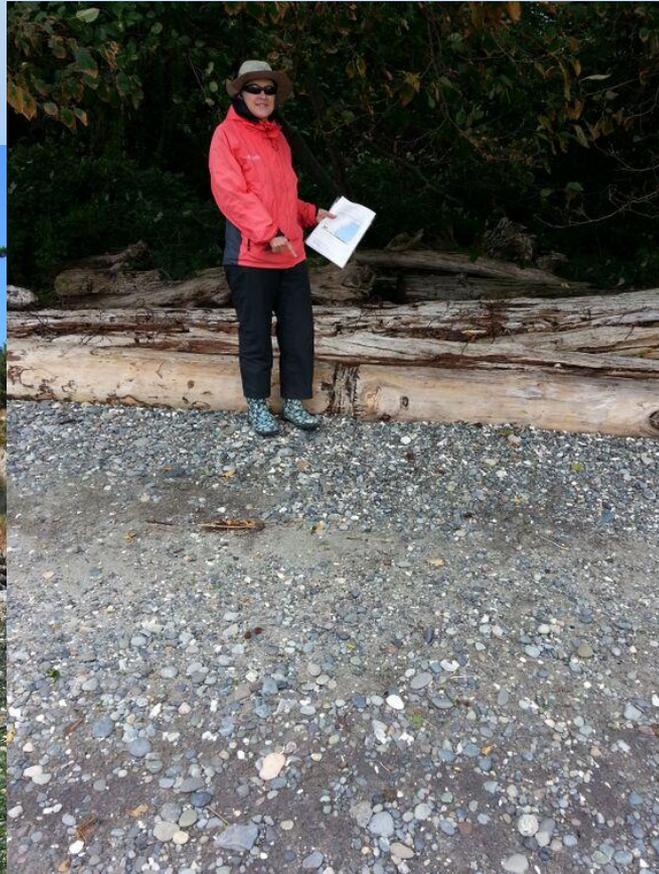
WSU Island County Beach Watchers

RSMP Mussel Monitoring Volunteer Stats

- Site Evaluations
 - 3 months
 - 50+ volunteers (+ staff)
 - 150+ hours
- Mussel Preparation
 - 4 days
 - 34 volunteers (+ staff)
 - 280 hours
- Deployment/Retrieval
 - 10 days
 - 90+ volunteers
 - 420+ hours
- Lab Processing Mussels
 - 14 days
 - 18 volunteers (+ staff)
 - 140+ hours
- TOTAL
 - 150+ volunteers
 - 980+ hours

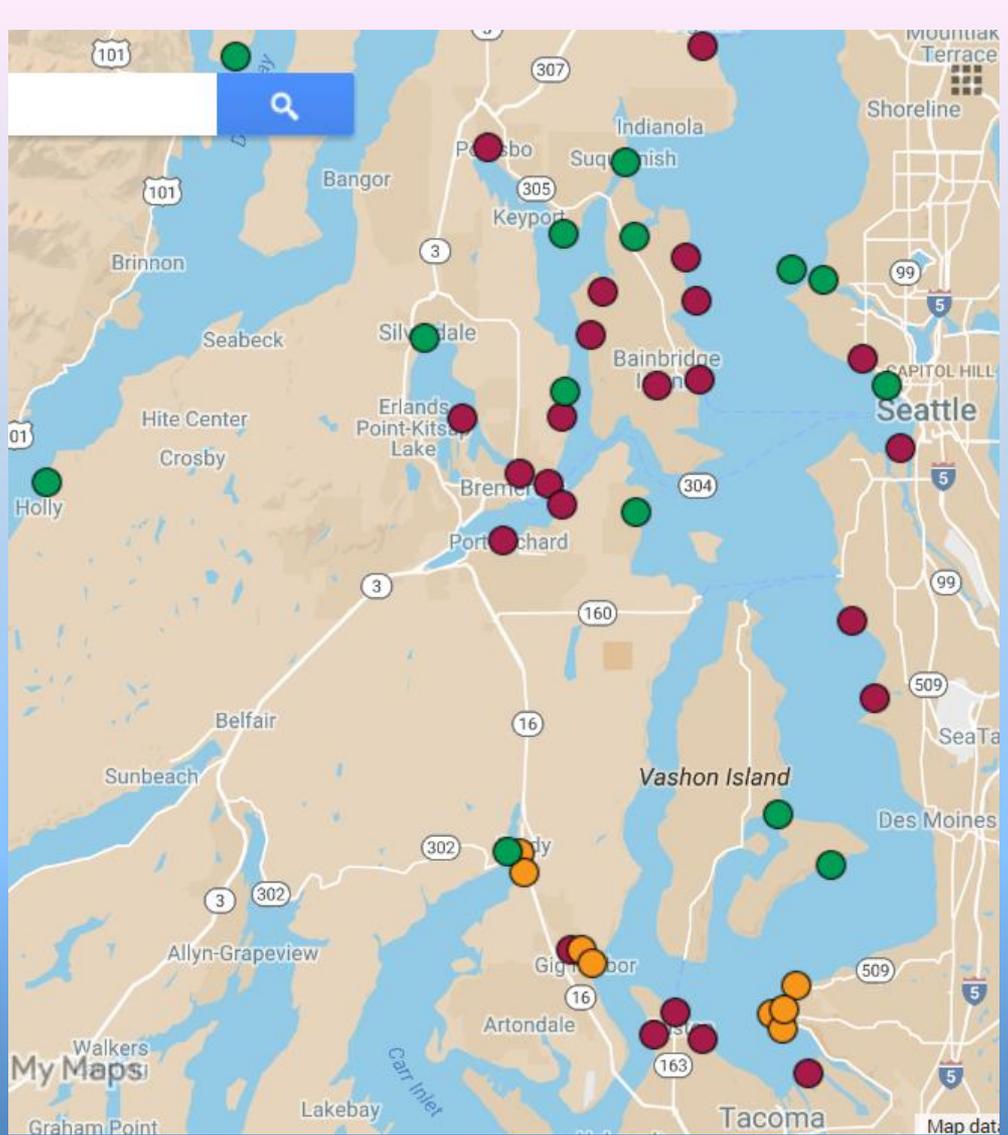
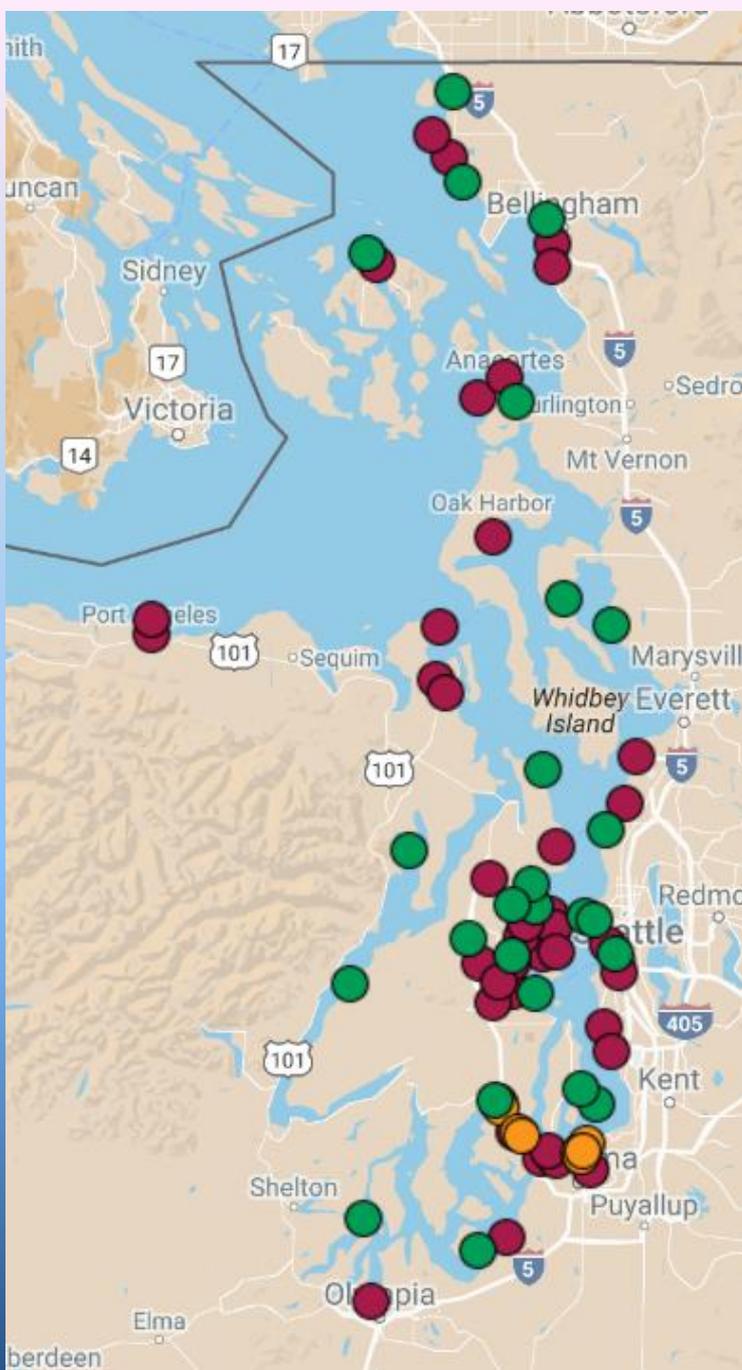
Volunteers helped with site evaluations

- Performed reconnaissance at study sites (checking conditions)
- Obtained permission from property owners



Site Evaluation & Selection

- 40 random sites accepted for RSMP opt-in
 - 9 sites were rejected
 - 4 - dangerous conditions, including sucking mud or unexploded ordinance
 - 2 - access too difficult, e.g. cliffs or arduous path to beach
 - 2 - permission not granted
 - 1 - too many sites randomly fell in the Blair Waterway
- 8 random sites in Pierce County for opt-out
- 25 sites sponsored by other partner groups
 - 10 partners = \$72,225 added to mussel monitoring



Red = RSMP opt-in randomly selected sites
Orange = RSMP opt-out randomly selected sites
Green = Sponsored sites

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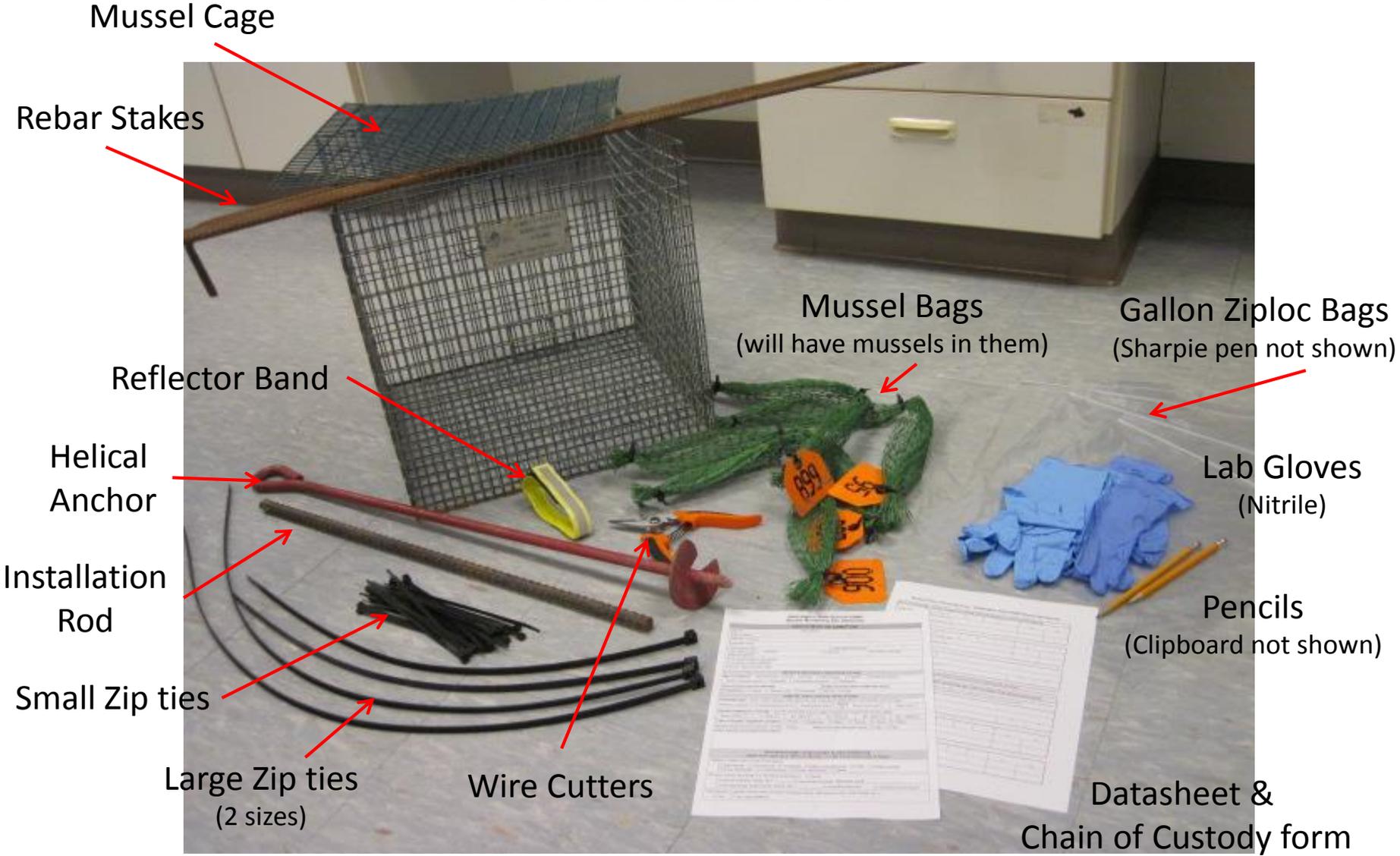
Big thanks to Penn Cove Shellfish, Inc. for donating the mussels!



Deployment/Retrieval Stats

- **RSMP Opt-In Sites:**
 - Deployed = 40
 - Lost = 4
- **RSMP Opt-Out Sites:**
 - Deployed = 8
 - Lost = 1
- **Sponsored Sites:**
 - Deployed = 25
 - Lost = 2
- **All Mussel Sites:**
 - Total Retrieved = 66
 - Success Rate = 90.4%
- **High Survival Rate**
 - 78% for RSMP
 - 80% in 2012/13 pilot

Mussel Kit



Cinder blocks available on request for sites where helical anchor/rebar not suitable.

Mussel Cage Deployment - October 26-29, 2015



Little Squalicum Creek



Maury Island Aq Rsrv



2015

Skiff Point



Kayak Point



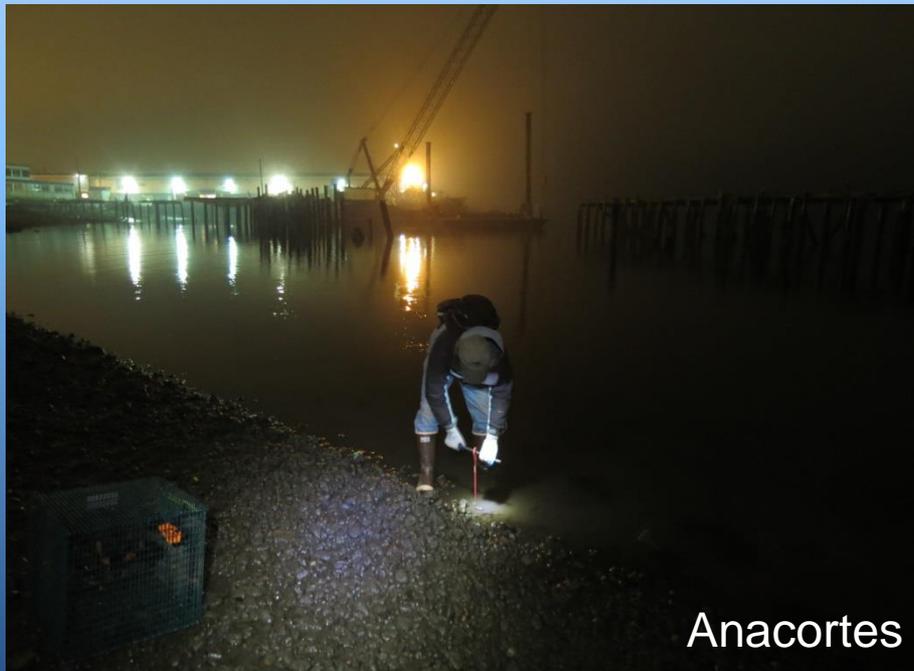
2015



Chuckanut



Cherry Point



Anacortes



Fidalgo Bay Aq. Rsvr



Mussel Cage Retrieval

February 5-10, 2016



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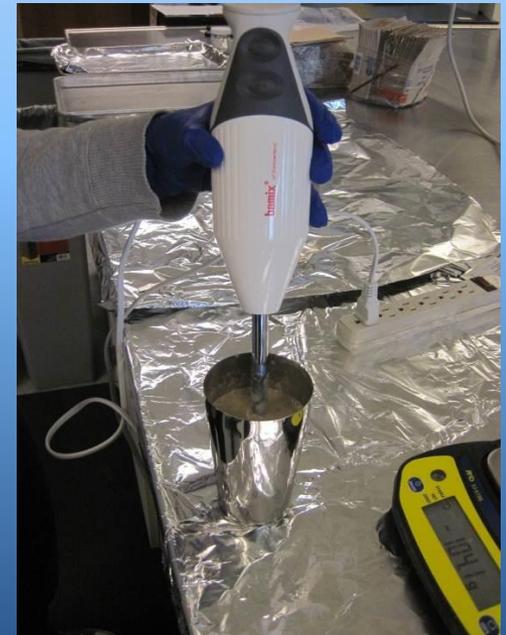
**Volunteers
helped with
lab
processing
too....**





Chemical Analyses

- **Organic chemicals** (NWFSC-Montlake):
 - Polycyclic Aromatic Hydrocarbons (PAHs)
 - Polychlorinated Biphenyls (PCBs)
 - PolyBrominated DiphenylEthers (PBDEs)
 - Organochlorine pesticides - DDTs, chlordanes, HCB, aldrin, dieldrin, HCHs, endosulfan 1, Mirex
- **Metals** (KCEL):
 - arsenic, cadmium, copper, lead, mercury, zinc



Moving Forward...

- RSMP – Mussel Monitoring
 - First round - winter 2015/16
 - **Second round - winter of 2017/18**
- Concurrent study – evaluating chemicals of emerging concern (CECs) from 13 mussel sites in 2012/13 pilot
 - AXYS lab
 - PPCPs, pesticides, perfluorinated compounds, nonylphenols
 - Results could help determine chemicals to target in future mussel monitoring?
 - Stay tuned for data update at SWG meeting in May...

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Thank you



FEEDBACK: a poem by volunteer Mark Kennedy

**Just imagine yourself
hiking off to retrieve a mussel cage
on a black night under the stars.**

**On the walk down to the beach
through the howling wind,
only the path is lit by your light.
All else is black.**

**You see the surf breaking white on the black water,
the black cage nearby with its small reflector.
What you don't see are the rapidly gathering clouds.**

**As you approach the cage over the slippery black rocks,
it begins to rain, mostly sideways.
It's a struggle in the blackness to pull on your vinyl gloves
over wet hands.**

**Bending over the cage, you recall using
a lot of cable ties (black ones) to secure the lid
and keep the starfish out.
The rain picks up, not quite as sideways as before.**

**So you begin to cut the cable ties with your dikes,
which have a high visibility red handle, and black tips.
It's now RAINING straight down, despite the wind.**

**As you rotate around the cage cutting cable ties,
you block the light from the lantern held by your partner,
plunging all the black components:
the cage, the cable ties, the dikes...into blackness.**

**And just as your back pocket is filling with water
and your boots are feeling the wind driven tide
that isn't supposed to be there right now,
you have a blinding revelation...**

Why don't we make these damn cable ties white next year?