

WASHINGTON STATE MUSSEL WATCH PILOT EXPANSION



Deployment & Retrieval Protocol October 20, 2012



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A letter to our volunteers

Dear Volunteer,

Thank you for committing a portion of your valuable time to the Mussel Watch Pilot Expansion Project this fall and winter! As a volunteer, you are a highly valued and important member of our sampling team and essential to the success of the Mussel Watch sampling efforts all across the greater Puget Sound.

Included in this protocol packet is all the information you will need to successfully deploy and retrieve a mussel watch cage at your adopted and/or sponsored monitoring site(s). We ask that you follow the steps outlined in this document to the best of your ability and call or email Jennifer Lanksbury with any questions you may have regarding these protocols.

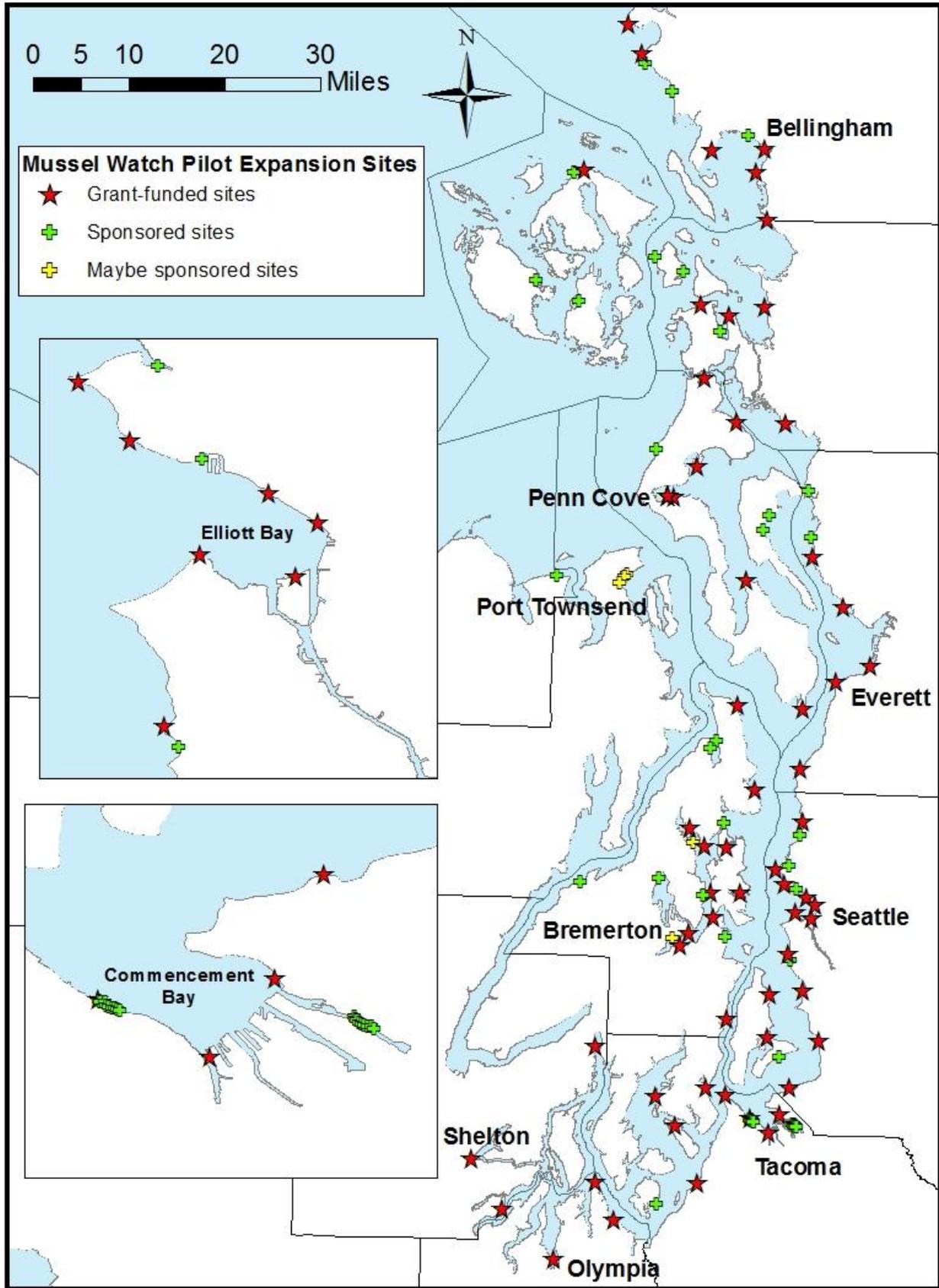
We hope you enjoy your experience working on the Mussel Watch Pilot Expansion Project and thank you for all your hard work!

Sincerely,

Jennifer Lanksbury and Jim West

Washington Department of Fish and Wildlife Mussel Watch

Washington State - Mussel Watch Pilot Expansion Sites 2012/13



Mussel Deployment/Retrieval Supplies

Mussel Kit (for 1 site) - provided by WDFW:

- Wire mesh cage (16x16x16" cube)
- 4 bags of mussels (*Mytilus trossulus*)
- 1 helical anchor + 2 rebar stakes (anchors of choice for most sites)
 - Cinder blocks (only at very rocky sites)
 - Long (3' - 5') cable ties (only at sites with pilings/fixed objects)
- 24 cable ties (8-inch)
- Deployment and Retrieval Data Sheets (waterproof)
- Deployment and Retrieval Chain of Custody forms (waterproof)
- Large Ziplock bags (site name marked on outside, bag label on inside)
- Garbage bags
- Cooler with ice
- Nitrile laboratory gloves (size Medium and Large)
- 50 mL centrifuge tube with blue cap (for sediment collection)
- Paper towels
- Directions to WDFW laboratory in Olympia
- This protocol (for backup)
- Contact cell phone for in-field questions

Equipment and supplies provided by volunteers:

- Flashlights/headlamps with fresh batteries or bring extra batteries
- Propane lantern with propane and matches (useful, but optional)
- Digital camera, charged + extra batteries
- GPS device + extra batteries (set to Datum NAD83 and decimal degrees)
- Small or hand sledge hammer (for driving in rebar stakes)
- Wire cutters (for cutting cable ties)
- Clipboard
- Pencils and a Sharpie pen
- Ice (only for retrieval in January)
- Waterproof boots and/or waders
- Warm, waterproof clothing
- Personal Floatation Device (PFD) – (if needed)
- Glove liners or knit gloves (optional, worn under lab gloves for warmth)
- Cellular Phone

Safety Information

Field work, particularly in coastal environments, has an inherent risk of danger and can often be unpredictable. It is essential that you exercise due caution whenever you are conducting field sampling. Here are some safety guidelines to follow:

- Do not go to your site alone. Go with a minimum of one other person.
- Make sure someone else knows where you will be going and when to expect you back.
- Take a cell phone, or other means of contacting help, with you into the field.
- Wear appropriate clothing for thermal and water protection.
- Be alert to breaking waves; wear a life jacket if appropriate.
- Avoid falls; be aware that wet rocks and logs are slippery.
- Wear gloves to protect hands from cuts and samples from contamination.

Field teams should use good judgment and not risk their personal safety when conditions pose an undue risk.

Be sure you have registered as a WDFW volunteer prior to field work. You must register with WDFW unless you are a paid employee by an organization that is sanctioning you to partake in the Mussel Watch Pilot Expansion Study. If you want to be reimbursed for mileage and purchases (i.e. ice) you should register regardless of employment status.

Field contact information

If you have questions during field activities, call in this order:

- 1st – Jennifer Lanksbury: (253) 312-1119 (cell)
- 2nd – Jim West: (206) 718-4787 (cell)
- 3rd – Laurie Niewolney: (360) 556-9919 (cell)

1.0 Deployment Protocol

Summary

- Set a deployment date/time, notify land owners and WDFW
- Deployment date – pick up cage/supplies/mussels several hours before low tide
 - ✓ Pack/bring volunteer supplies too (see page 5)
- Deploy mussels on the beach that night
 - ✓ Attach mussel bags inside cage, position and anchor cage
 - ✓ Record a landmark to help remember cage location at retrieval in 2 months
- Record GPS location and other information on datasheet, take pictures
 - ✓ Set GPS device to datum NAD83 and to read in decimal degrees

Plan and Notify

- Pick a deployment date(s) from November 12 - 18, 2012 and notify Jennifer Lanksbury. (See tide table on page 19)

Check tide predictor for timing of low tide at your site:

http://tidesandcurrents.noaa.gov/tide_predictions.shtml?gid=259

- Calculate time for mussel pick-up at Penn Cove or with a “Mussel Runner”

Mussel Runners with spacious vehicles needed to deliver cage/supplies and mussels in coolers to groups in outlying areas – please email Jennifer if you can volunteer for this job

- Notify land owner a few days before deploying - let them know the night and time you will be on site. State Park Rangers will need a 10 day notice.

Pick-up Cage/Supplies & Mussels

- Remember to bring your part of the supplies including GPS, camera, flashlights, small sledge hammer, and wire cutters among other things (page 5).
- Penn Cove Shellfish - 106 Sherman Road, Coupeville: Pick up cage/supplies and mussels no more than 3 to 4 hours before deployment at your site(s). Follow signs at Penn Cove Shellfish for parking.

Mussel Runners will be at prearranged locations on certain evenings to deliver cage/supplies and mussels to groups in outlying areas. Details for this option will be sent out in late October.

- You will fill out a Chain of Custody (COC) form when you pick up the mussels.



Mussel cage, 30" helical anchor and several 4' rebar stakes will be included in your kit.

Travel to Deployment Site

Deployment will begin when tide is at zero (0) feet or lower and should take no more than about 1 hour (not including travel time).

- Note time/height of low tide for your site(s). You will record this information on the datasheet and it will help you place the cage at the correct tidal elevation.

Deploy Cage

Once on site use the following protocol (order of steps 1-3 can be changed):

1. Install 4 mussel bags into the cage – *can be done at your car or on the beach*

- Wear laboratory gloves provided when handling mussel bags
- Handle bags gently – *M. trossulus* shells are somewhat thin and fragile
- Use cable ties to affix bags to top 1/3 of cage, spacing evenly apart.

Thread/weave cable tie through the *mussel side* of the bag end, providing a more secure attachment (red arrow on photo below)

- Do not cinch cable ties very tightly to cage wire or removal at end of study will be difficult



Mussel bags installed at top 1/3 of cage. Cage attachment through mussel side of bag end (arrow).

- After mussel bags are installed, secure wire mesh lid in place with two 8" cable ties per side (i.e. use 8 cable ties in total to secure lid). Trim cable ties to about 1 inch long - do not trim too short!

Note – if attaching cage to piling or other fixed object, it is easier to run the long cable tie through side of cage *before* installing lid.



Cage lid being installed; cable ties still need trimming here.

2. Position cage

- Place cage between 0 and -1.5 feet mean lower low water (MLLW)
 - i. WARNING – *do not go any deeper than about -1.5 feet*, your cage may be under water when you try to retrieve in January!
- Use a landmark (e.g. building, large boulder, downed tree) to help you remember the location of the cage when you retrieve it in January

3. Anchor cage – use one or more of these options

- 30" helical anchor – also called an earth or screw anchor
 - ✓ Stand the anchor up, place the short rebar rod through the eye and start turning in a clockwise direction while pressing down. Drive the anchor deep enough to resist pulling out by hand
 - Note - depending on the amount of rocks in the substrate, you may have to try several locations before you succeed in properly installing the anchor.
 - ✓ After the anchor is deep enough cable tie the cage to the anchor eye using at least two 8" cable ties.
- 4' rebar stakes – can be installed after the cage lid is attached.
 - ✓ Place 2 stakes on the opposite side of the cage from the helix anchor and drive them through the cage using a small sledge hammer
 - ✓ Rebar can go straight through top of cage or into side of cage at an angle
 - ✓ Cable tie rebar to cage



Screwing in helical anchor.

- Long cable ties (3' to 5') – Thread long cable tie through the wire mesh and secure it *tightly* around a piling (non-creosote) or other fixed object, *making sure the cage will not bang against the object during tidal exchanges.*

- Cinder blocks – Attach cage to one or several cinder blocks using large cable ties. Wedge cinder blocks and cage into a secure location between boulders, large cobbles, or other protected location, if possible.
- **Important - trim cable ties to about 1" (not too short!) and mangle the ends so they cannot slip back through the cable head.**



To mangle - slit the end of the cable tie lengthwise up a little way.

4. **Record information on deployment data sheet** (example on page 18)
 - Fill out all areas of the datasheet to the best of your ability
 - Record GPS coordinates in decimal degrees (i.e. 47.6316, -122.3855)
 - ✓ Be sure the datum of your unit is set to NAD83
 - Note time and depth of water at cage OR distance to waterline
 - ✓ Together this data helps us approximate cage elevation
 - Remember to record site conditions, description and potential sources of contamination nearby.
 - Record any additional observations, notes or comments in the space provided and/or on back of datasheet (including map of site if desired).
5. **Take pictures** - of the deployed cage (for verification purposes) and any other interesting details you find, such as marine vegetation or animals present.

Save remaining WDFW supplies

- Keep everything for retrieval in January

2.0 Mussel Checking Protocol

Plan and Notify

- Pick a date(s) between November 25 - December 2 or December 9 - 17 to check on your cage and notify Jennifer Lanksbury of your plans.

Check tide predictor for timing of low tides:

http://tidesandcurrents.noaa.gov/tide_predictions.shtml?gid=259

- Notify land owner a few days before checking on cage - let them know the night and time you will be on site. State Park Rangers will need a 10 day notice.

Check on Cage

- Is it still there? Has it been badly damaged?
- If the mussel cage is no longer there (i.e. lost or stolen), contact Jennifer Lanksbury the following morning to report the loss.
 - We *may* deploy another cage at that site on an evening to follow, if feasible
 - Redeployment will be handled by WDFW staff and/or volunteers (you) as available
- If another cage is deployed, retrieval of that cage will be delayed by one tidal cycle to allow for a 2 month soak time (as other cages).

3.0 Retrieval Protocol

Summary

- Set a retrieval date/time, notify land owners and WDFW
- Get ice in WDFW cooler, pack/bring volunteer supplies (see page 5)
- Retrieve mussels
 - ✓ Use landmark to help find cage location
 - ✓ Handle bags with lab gloves on, be gentle
 - ✓ Place mussel bags in labeled Ziplock bag on ice
- Keep mussels at home overnight - do not let them freeze
- Bring mussels to WDFW in Olympia the next morning

Plan and Notify

- Pick a retrieval date(s) from January 8 - 14, 2013 and notify Jennifer Lanksbury. (tide table on page 19 for planning)

Check tide predictor for timing of low tide at your site:

http://tidesandcurrents.noaa.gov/tide_predictions.shtml?gid=259

- Notify land owner a few days before retrieval - let them know the night and time you will be on site. State Park Rangers will need a 10 day notice.

Retrieve Cage

Retrieval will begin when tide is at zero (0) feet or lower and should take no more than about a half hour (not including travel time).

- **Get ICE** - place ice in a garbage bag in sufficient quantity to cover the bottom of the cooler provided to you by WDFW
 - ✓ Garbage bag is intended to hold melt water away from mussels
- Bring WDFW and your supplies along for retrieval (see page 5)

Once on site use the following protocol:

1. **Take digital photos of the cage** - to document its condition, including structural integrity and overall condition before removal (see example below).



2. Record information on retrieval data sheet – conditions may have changed, so please be thorough!

- Fill out all areas of the datasheet to the best of your ability
- Record GPS coordinates in decimal degrees (i.e. 47.6316, -122.3855)
 - ✓ Be sure the datum of your unit is set to NAD83
- Note time and depth of water at cage OR distance to waterline
 - ✓ We will use this to verify cage elevation a second time
- Remember to record site conditions and description and potential sources of contamination nearby.
- Record any additional observations, notes or comments in the space provided.

3. Open the cage and retrieve mussels

- Use wire cutters to cut cable ties holding down lid
- Put on laboratory gloves and remove the bags of mussels from the cage
 - ✓ If bags are stuck together with byssal threads do not pull them apart
 - ✓ Handle bags gently – *M. trossulus* shells are somewhat thin and fragile
 - ✓ Do not open bags!
- Place mussel bags immediately into a large (1-Gallon), pre-labeled Ziplock bag provided by WDFW
 - ✓ Do not put any extra seawater into this bag, mussels will have enough moisture on their own
 - ✓ Seal mussels into Ziplock bag
- Place sealed Ziplock bag into cooler on bagged ice (see example below).

- ✓ Double bag barrier ensures mussels do not come into contact with melt water during holding (chlorine can kill mussels)

Place bagged ice into bottom of cooler and tie shut.



Place bagged mussels in sealed Ziplock bag on top of bagged ice.



4. **Collect sediment sample** - use 50 mL centrifuge tube with a blue cap to collect a sample of the surface sediment.
 - Remove cap from tube and scrape tube across the top 2 cm (3/4 inch) of sediment, filling the tube 1/2 to 3/4 full.
 - ✓ If cage is on rocky substrate, collect sediment sample as near as possible to cage and make note of distance from cage on tube with a Sharpie marker.
 - Wipe excess sediment off threads of tube with paper towel and replace cap
 - Place capped tube in small Ziplock bag provided and put on ice next to mussels (NOT in the bag with the mussels though).
5. **Remove cage and all anchoring devices from beach** - be sure to leave nothing behind including any cut cable ties, pencils or tools.

Take mussels home and keep overnight

- DO NOT FREEZE the mussels
 - ✓ If temperature outside falls near or below freezing, please keep mussels inside your house, in the cooler, on ice. *We need them alive.*
- Fill out the top portion of the Chain of Custody form (provided by WDFW). Save the form.

Deliver mussels to Olympia

The morning after retrieval deliver the live mussels, datasheet, chain of custody form and all remaining supplies to:

**WDFW - Marine Resources Laboratory
Natural Resources Building, 6th floor
1111 Washington Street SE
Olympia WA 98501**

Directions:

From I-5 take Exit 105 (105A from southbound direction), follow ramp as it becomes 14th Ave SE. At traffic circle take first right onto Jefferson St. SE. At second traffic light turn left onto 11th Ave SE. At next traffic light turn left onto Washington St SE. Take first left into P-1 parking lot of Natural Resources Building. Parking on outer edge of this lot is *free* for the first 30 minutes (look for signs).

Take parking elevator up to lobby level, walk through central lobby to main building elevators. Go up to 6th floor and ask receptionist just outside elevators for Jennifer Lanksbury or Laurie Niewolny.

Map on page 17.

4.0 Appendix

Map to WDFW in Olympia

Southbound:

Take I-5 Exit 105A. Follow the "State Capitol" lane, which parallels the freeway, for 1/4 mile.

Northbound:

Take I-5 Exit 105. Keep to the LEFT following the "State Capitol" lane.

Go through the roundabout and the tunnel. At first traffic light (Capitol Way), turn RIGHT. Turn RIGHT again at the next traffic light (11th Ave.). At next traffic light (Washington St. SE), turn RIGHT once more. Turn LEFT into the visitor parking lot.

Parking costs \$1.50 per hour, weekdays 8 a.m. to 5 p.m., but is free on evenings and weekends. Parking fees can be paid by debit and credit cards, \$1 bills or coins.



Example of filled out data sheet

EXAMPLE

DEPLOYMENT DATA SHEET		MUSSEL WATCH PILOT EXPANSION STUDY		
Site Name: <u>Point Defiance</u>	Bag #'s: <u>115 116 117 118</u>	Date: <u>11/13/2012</u>		
Cage & Mussel Deployer(s) - please print: <u>John & Jane Doe, Bill Smith</u>				
Data Recorder - please print: <u>Bill Smith</u>				
GPS Make/Model (set to Datum NAD83): <u>Garmin GPSMap 76C</u>				
Latitude: <u>47.3166</u>	Longitude: <u>-122.5326</u>	Accuracy: <u>16</u>	(± feet)	
Deployment Details				
Time cage was anchored: <u>10:15 pm</u>				
Cage Elevation (approximate): depth of water on cage _____ (inches) OR distance to water line <u>3</u> (feet).				
Anchoring method(s): No. of Rebar Used <u>2</u> Screw Anchor: (circle one) <u>Yes</u> No				
Comments regarding deployment: <u>Used large boulder in middle of intertidal about 1/2 mile from sign for "Owen Beach" as landmark - cage on south side of boulder.</u>				
Conditions at Deployment Site				
Time of low tide: <u>11:05 pm</u>		Height of Low Tide in Feet (MLLW): <u>-2.2ft</u>		
Eelgrass present (circle one) <u>Yes</u> No	Substrate: <u>Mix of sand, gravel and cobble</u>			
What else is present around the area of the cage? (Bulkheads, stream, docks, etc...): <u>Old crumbling bulkhead, old pilings (creosote), stream mouth, some boats moored off shore, derelict steel mesh on concrete block</u>				
Obvious sources of pollution? (oil slicks, pilings, seeps, derelict boats or pipes, etc...): <u>Boats moored nearby, creosote pilings, outfall on beach (pipe)</u>				
Other observations: <u>Saw kelp and sea lettuce washed up on beach. Lots of sand dollars in intertidal zone. Raining lightly upon arrival.</u>				



Please take photos of deployed cage.

Took pictures

Guidelines for deployment/retrieval dates and times

Use these tables as a guideline to plan your deployment/retrieval, but check LOCAL tide tables for exact timing of tides at your site: http://tidesandcurrents.noaa.gov/tide_predictions.shtml?gid=259

DEPLOYMENT WINDOWS

		Bellingham		Penn Cove		Everett		Seattle		Bremerton		Tacoma		Olympia	
Nov.		Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)
Monday	12	8:02 PM	0	8:06 PM	0	7:55 PM	0	7:57 PM	0	8:14 PM	0	8:00 PM	0	8:53 PM	0
		9:43 PM	-1.5	9:39 PM	-1.9	9:29 PM	-1.9	9:30 PM	-2.0	9:48 PM	-2.0	9:33 PM	-2.0	10:27 PM	-2.1
Tuesday	13	8:22 PM	0	8:33 PM	0	8:20 PM	0	8:20 PM	0	8:39 PM	0	8:24 PM	0	9:24 PM	0
		10:25 PM	-2.3	10:22 PM	-2.9	10:12 PM	-2.9	10:13 PM	-2.9	10:31 PM	-2.9	10:15 PM	-2.9	11:10 PM	-3.2
Wednesday	14	8:57 PM	0	9:08 PM	0	8:55 PM	0	8:57 PM	0	9:14 PM	0	8:58 PM	0	10:00 PM	0
		11:09 PM	-2.8	11:06 PM	-3.4	10:56 PM	-3.4	10:57 PM	-3.4	11:15 PM	-3.4	10:59 PM	-3.4	11:54 PM	-3.7
Thurs/Friday	15/16	9:43 PM	0	9:55 PM	0	9:41 PM	0	9:43 PM	0	10:00 PM	0	9:45 PM	0	10:45 PM	0
		11:56 PM	-2.8	11:53 PM	-3.4	11:43 PM	-3.4	11:44 PM	-3.4	12:02 AM	-3.4	11:45 PM	-3.4	12:45 AM	-3.7
Fri/Saturday	16/17	10:37 PM	0	10:49 PM	0	10:37 PM	0	10:37 PM	0	10:55 PM	0	10:39 PM	0	11:41 PM	0
		12:44 AM	-2.4	12:42 AM	-2.9	12:32 AM	-2.9	12:33 AM	-3.0	12:51 AM	-3.0	12:33 AM	-2.9	1:30 AM	-3.2
Sat/Sunday	17-18	11:43 PM	0	11:55 PM	0	11:43 PM	0	11:45 PM	0	11:59 PM	0	11:49 PM	0	12:45 AM	0
		1:35 AM	-1.7	1:32 AM	-2.0	1:22 AM	-2.0	1:23 AM	-2.1	1:41 AM	-2.1	1:23 AM	-1.9	2:20 AM	-2.2

RETRIEVAL WINDOWS

		Bellingham		Penn Cove		Everett		Seattle		Bremerton		Tacoma		Olympia	
Jan.		Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)	Time	Depth (ft)
Tuesday	8	6:35 PM	0	6:45 PM	0	6:33 PM	0	6:33 PM	0	6:53 PM	0	6:37 PM	0	7:37 PM	0
		8:19 PM	-1.4	8:11 PM	-1.5	8:01 PM	-1.5	8:02 PM	-1.5	8:20 PM	-1.5	8:05 PM	-1.5	8:59 PM	-1.7
Wednesday	9	7:06 PM	0	7:20 PM	0	7:08 PM	0	7:08 PM	0	7:26 PM	0	7:12 PM	0	8:10 PM	0
		9:07 PM	-2.0	9:02 PM	-2.3	8:52 PM	-2.3	5:53 PM	-2.4	9:11 PM	-2.4	8:55 PM	-2.3	9:50 PM	-2.5
Thursday	10	7:47 PM	0	8:02 PM	0	7:49 PM	0	7:51 PM	0	8:08 PM	0	7:53 PM	0	8:53 PM	0
		9:54 PM	-2.3	9:50 PM	-2.8	9:40 PM	-2.8	9:41 PM	-2.8	9:59 PM	-2.8	9:44 PM	-2.7	10:38 PM	-3.0
Friday	11	8:37 PM	0	8:49 PM	0	8:37 PM	0	8:37 PM	0	8:55 PM	0	8:41 PM	0	9:41 PM	0
		10:40 PM	-2.3	10:37 PM	-2.8	10:27 PM	-2.8	10:28 PM	-2.8	10:46 PM	-2.8	10:31 PM	-2.8	11:25 PM	-3.1
Sat/Sunday	12/13	9:33 PM	0	9:43 PM	0	9:31 PM	0	9:33 PM	0	9:49 PM	0	9:35 PM	0	10:33 PM	0
		11:25 PM	-1.9	11:23 PM	-2.4	11:13 PM	-2.4	11:14 PM	-2.4	11:32 PM	-2.4	11:16 PM	-2.4	12:11 AM	-2.6
Sun/Monday	13/14	10:35 PM	0	10:45 PM	0	10:35 PM	0	10:35 PM	0	10:53 PM	0	10:39 PM	0	11:37 PM	0
		12:10 AM	-1.2	12:08 AM	-1.6	11:58 PM	-1.6	11:59 PM	-1.6	12:17 AM	-1.6	12:00 AM	-1.6	12:56 AM	-1.7