

**2013-2018 Cherry Point and Fidalgo Bay
Aquatic Reserves Intertidal Monitoring Report
Appendices**

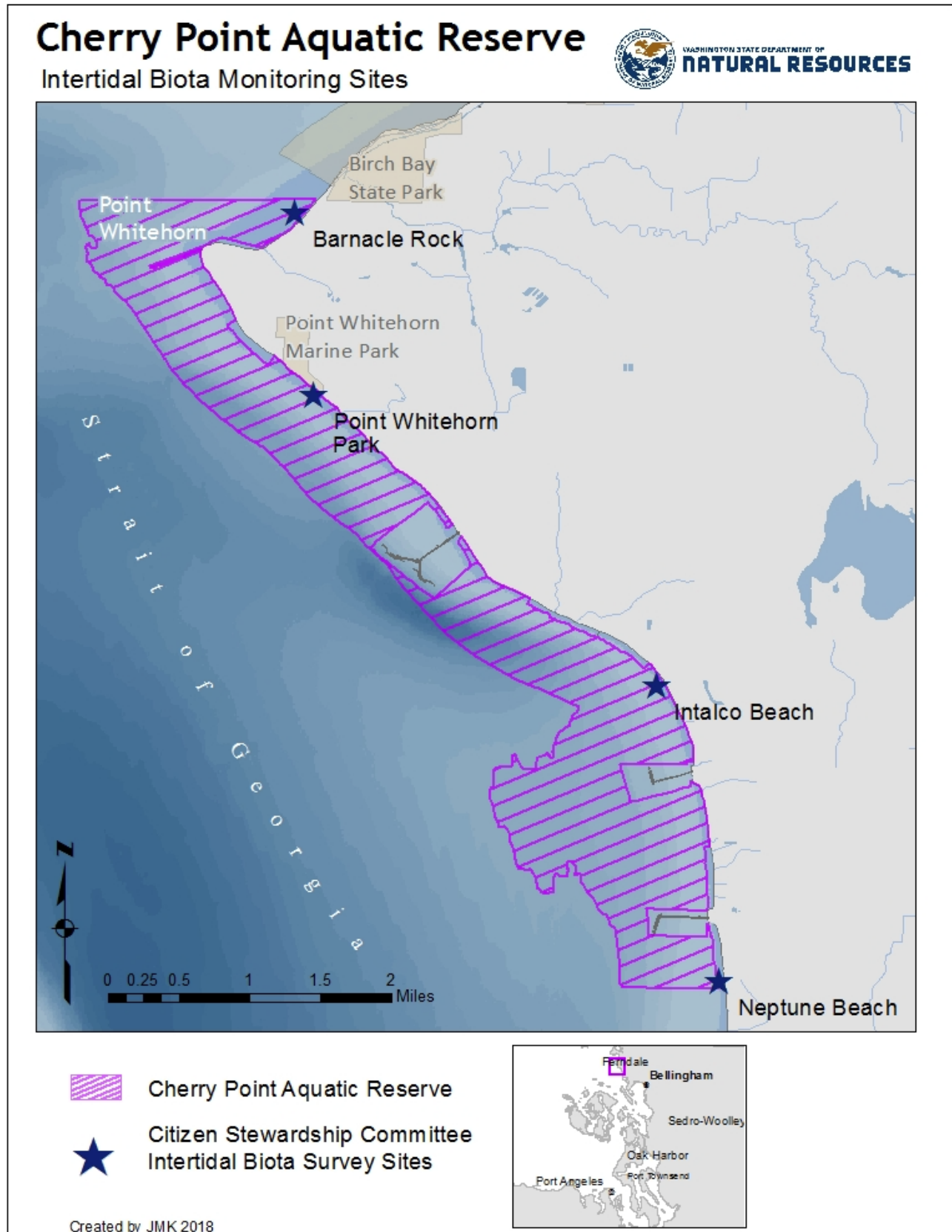


Figure 1. Map of the Cherry Point Aquatic Reserve with the locations of sites surveyed during 2016-2018, including Barnacle Rock, Point Whitehorn Marine Park, Intalco, and Neptune. Map courtesy of Jamie Kilgo of the Washington Department of Natural Resources Aquatic Reserves Program (WA DNR 2018).

Fidalgo Bay Aquatic Reserve

Intertidal Biota Monitoring Sites



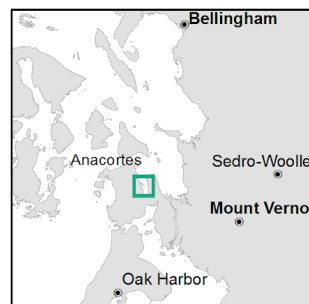
WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES



★ Fidalgo Bay Aquatic Reserve
Citizen Stewardship Committee
Intertidal Biota Monitoring Sites

■ Fidalgo Bay Aquatic Reserve

— Watercourse

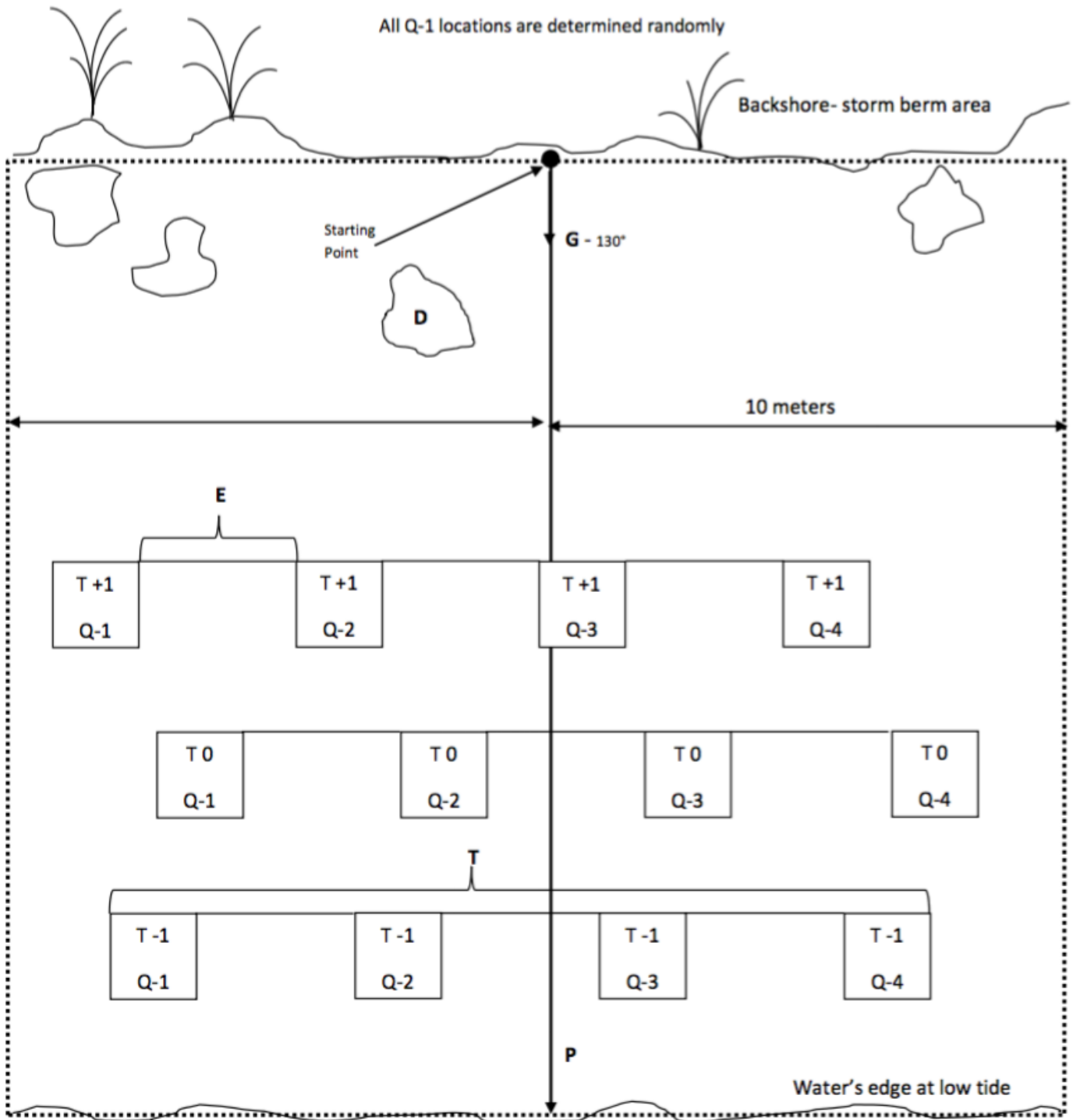


Created: JMK 9/2016

Figure 2. Map of the Fidalgo Bay Aquatic Reserve with the locations of sites surveyed during 2016-2018, including Trestle, Fir, Otter, and Custom Plywood. Map courtesy of Jamie Kilgo of the Washington Department of Natural Resources Aquatic Reserves Program (WA DNR 2018).

Beach Monitoring Site Layout

All Q-1 locations are determined randomly



- D** Erratic near profile line which could be used as a vertical height reference point.
- E** Distance between quadrats. The four quadrats should be equally spaced along the transect line (16.5 feet apart).
- G** Compass heading of profile line towards horizon.
- P** Profile line, defined as line perpendicular to beach face from ordinary high water mark to one foot below mean lower low water or lower.
- T** Transect lines, defined as lines parallel to beach face at the tidal elevations of +1', 0', and -1'.

Figure 3. Layout of survey sites adapted from Island County/Washington State University Beach Watchers (2003). For the studies in this report, a fourth quadrat was added to each surveyed tidal height.

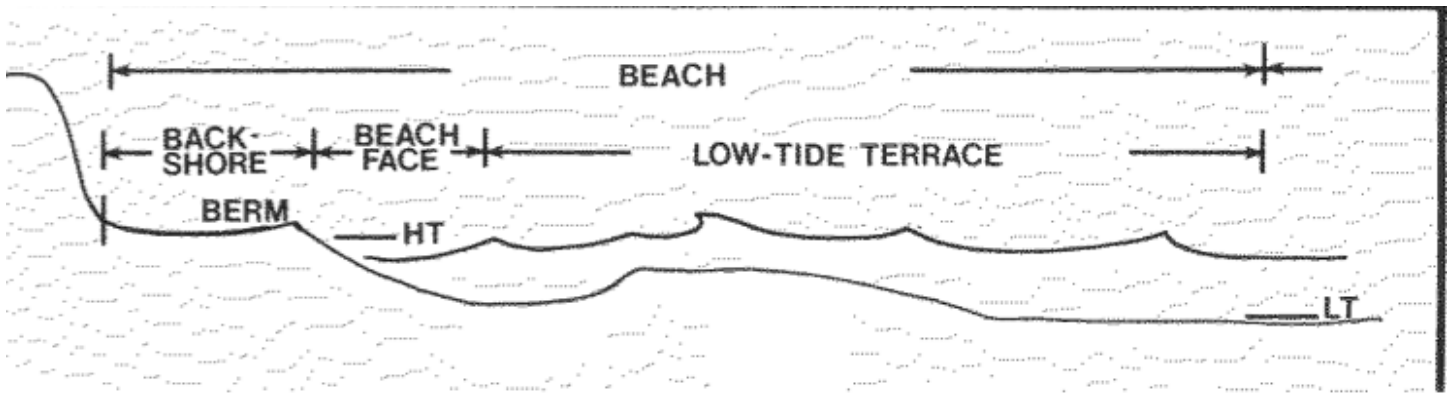


Figure 4. Typical beach morphology.

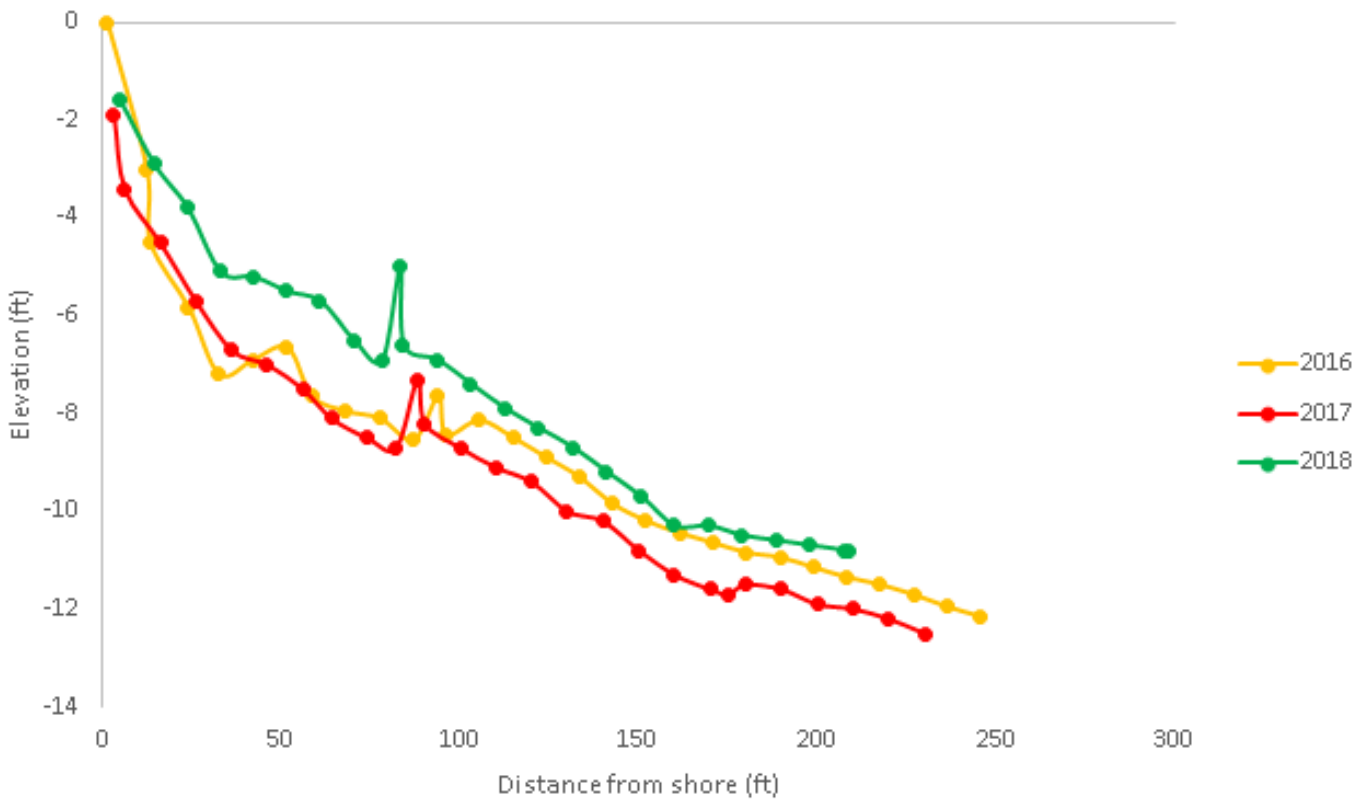


Figure 5. Beach elevation profile for Barnacle Rock, Cherry Point Aquatic Reserve from 2016-2018 surveys.

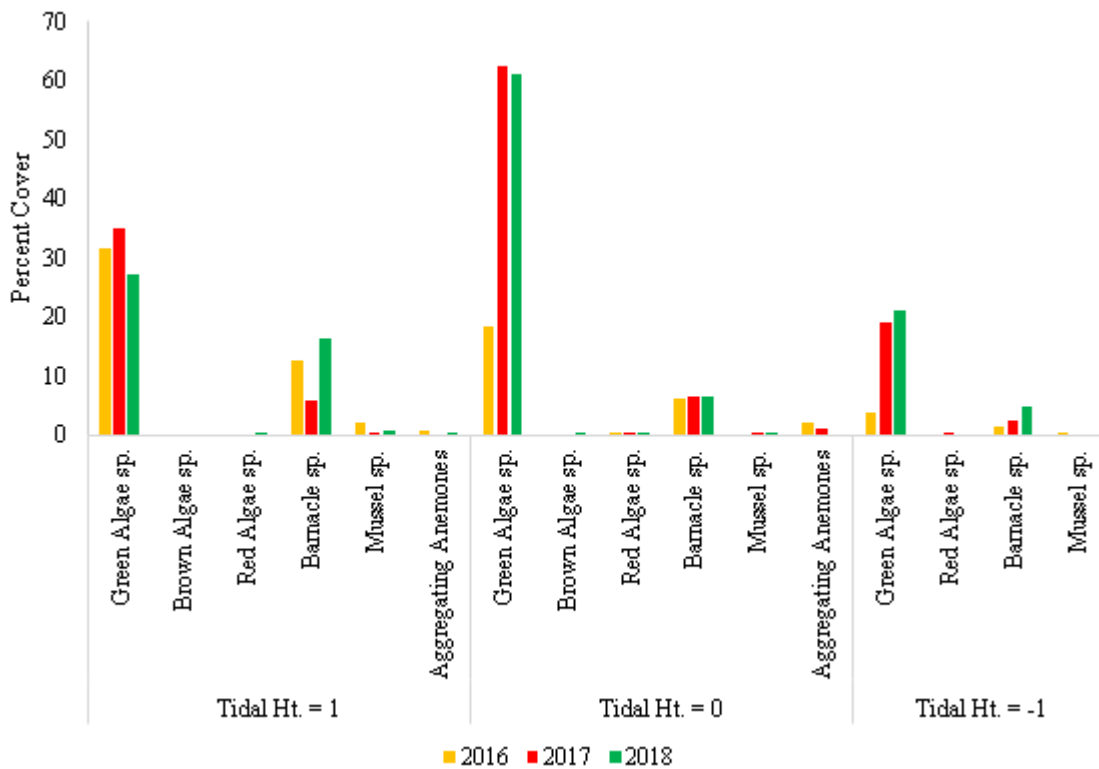


Figure 6. Average percent cover of plants and non-individual count animals in quadrats at Barnacle Rock, Cherry Point Aquatic Reserve by tidal height for 2016-2018 surveys.

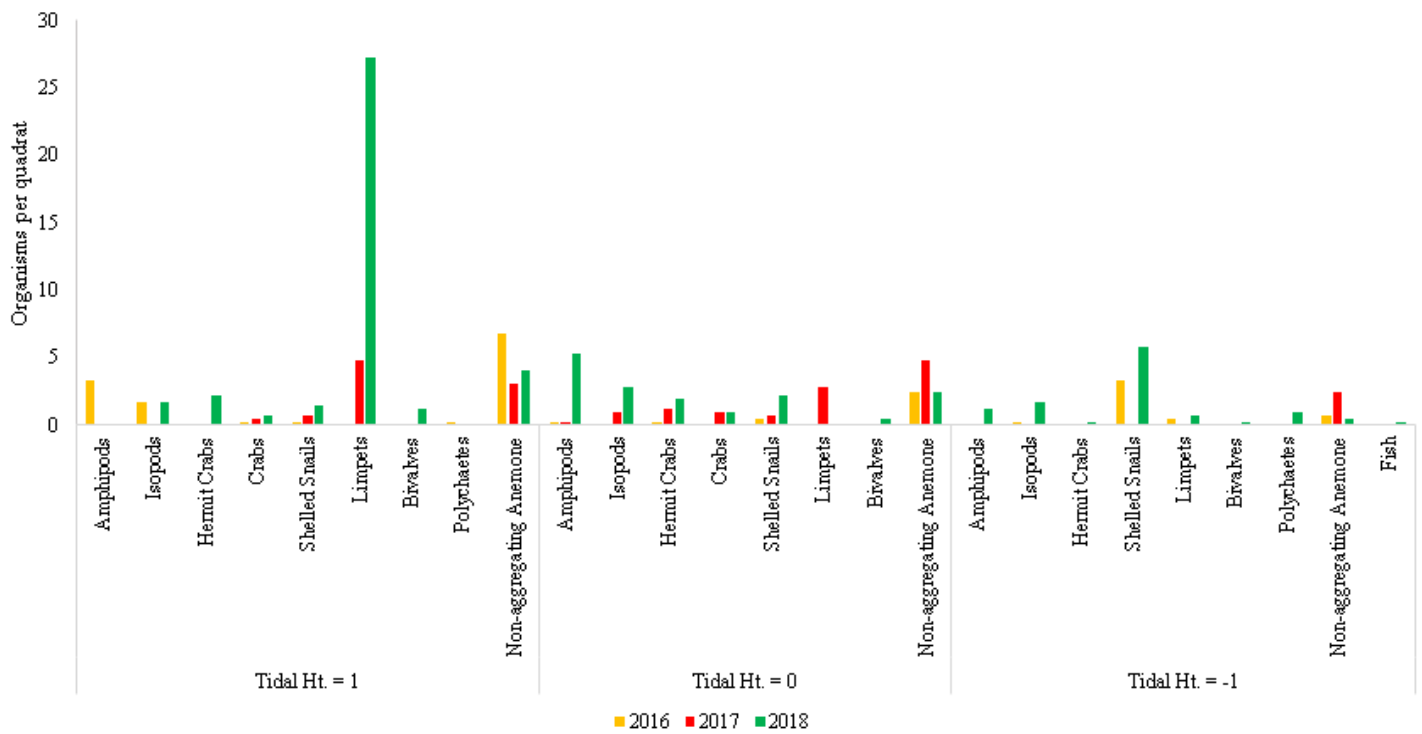


Figure 7. Average number of individual organisms in quadrats at Barnacle Rock, Cherry Point Aquatic Reserve by tidal height for 2016-2018 surveys.

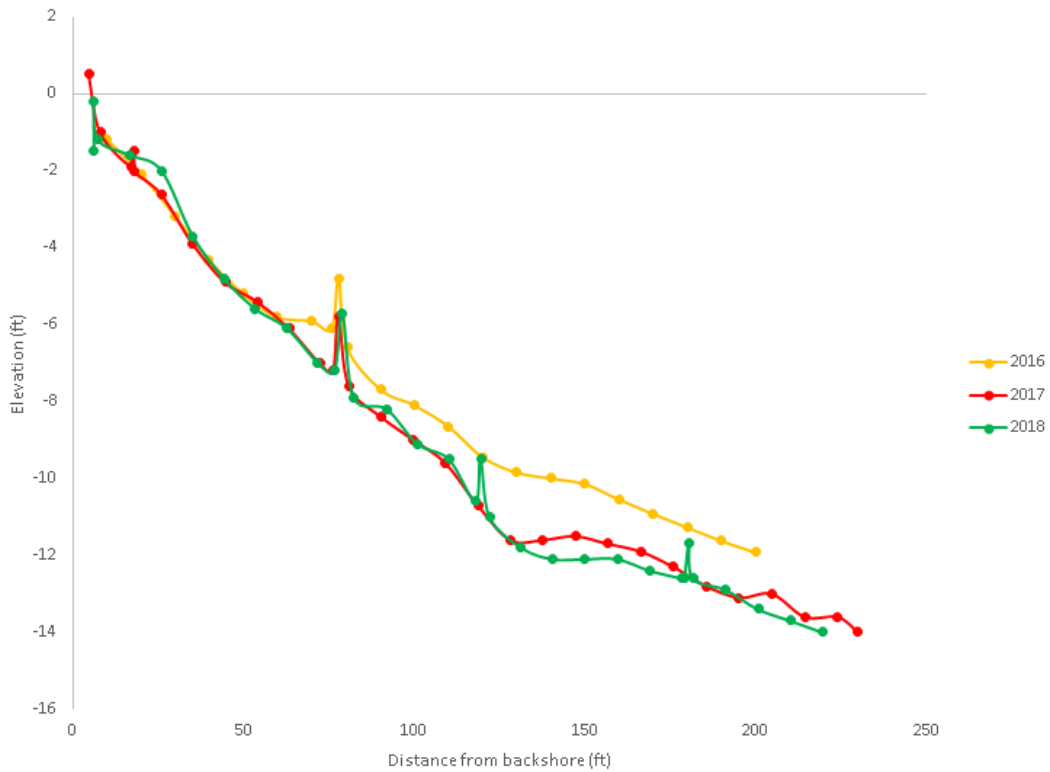


Figure 8. Beach elevation profile for Point Whitehorn Marine Park, Cherry Point Aquatic Reserve from 2016-2018 surveys.

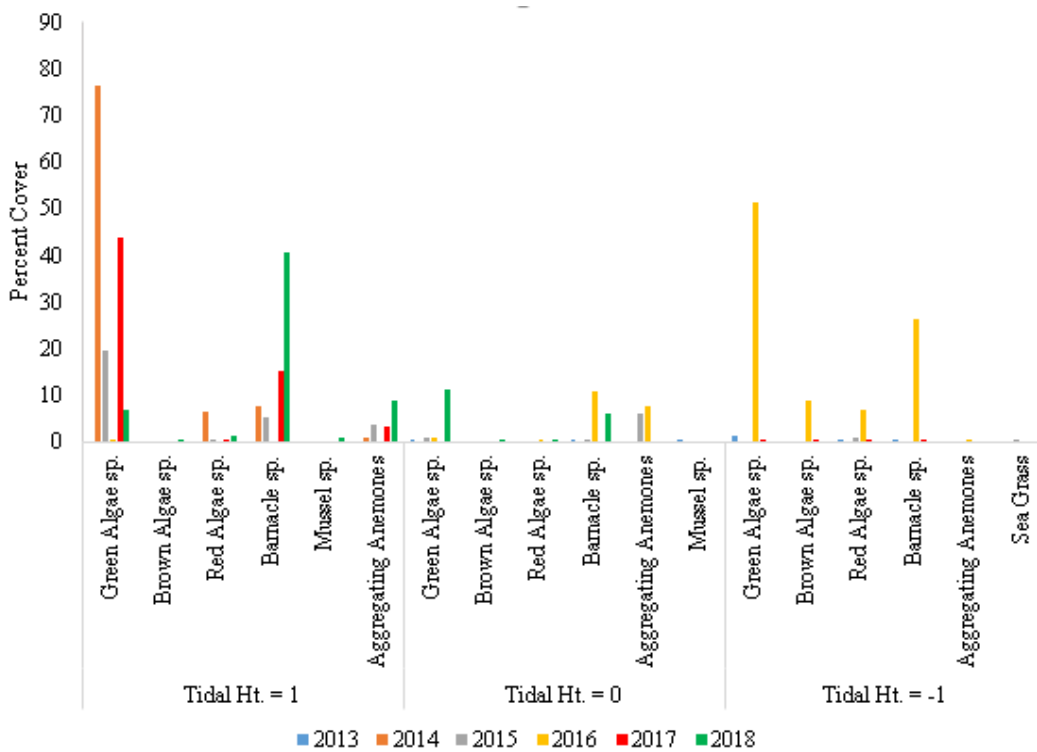


Figure 9. Average percent cover of plants and non-individual count organisms in quadrats at Point Whitehorn Marine Park, Cherry Point Aquatic Reserve by tidal height for 2013-2018 surveys.

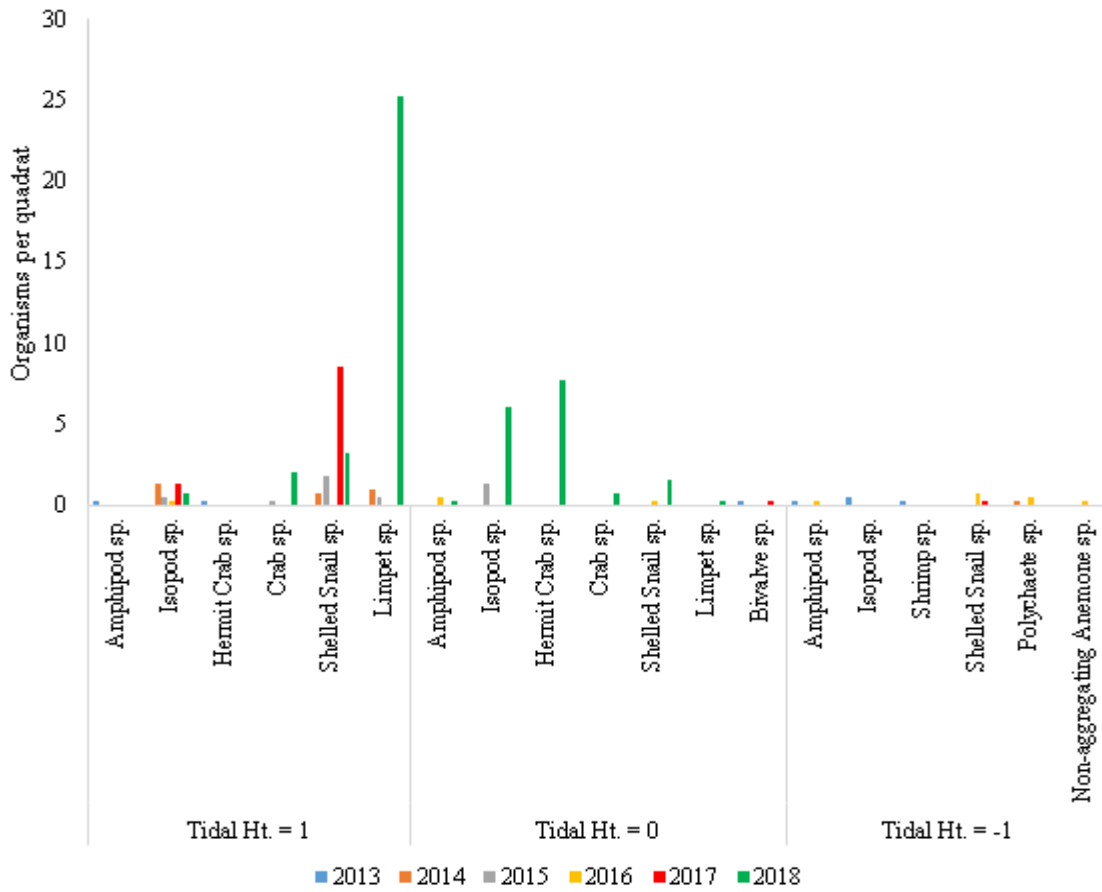


Figure 10. Average number of individual organisms in quadrats at Point Whitehorn Marine Park, Cherry Point Aquatic Reserve by tidal height for 2013-2018 surveys.

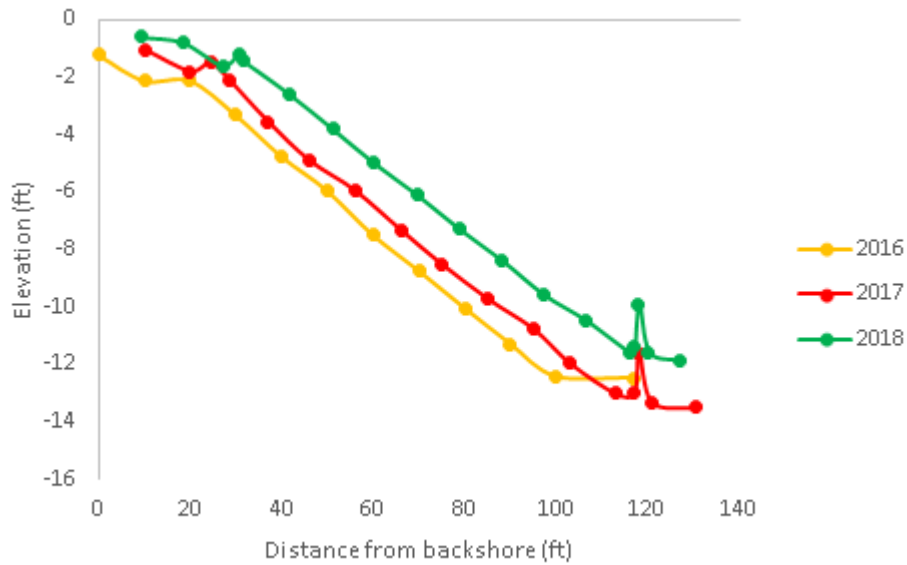


Figure 11. Beach elevation profile for Intalco, Cherry Point Aquatic Reserve from 2016-2018 surveys.

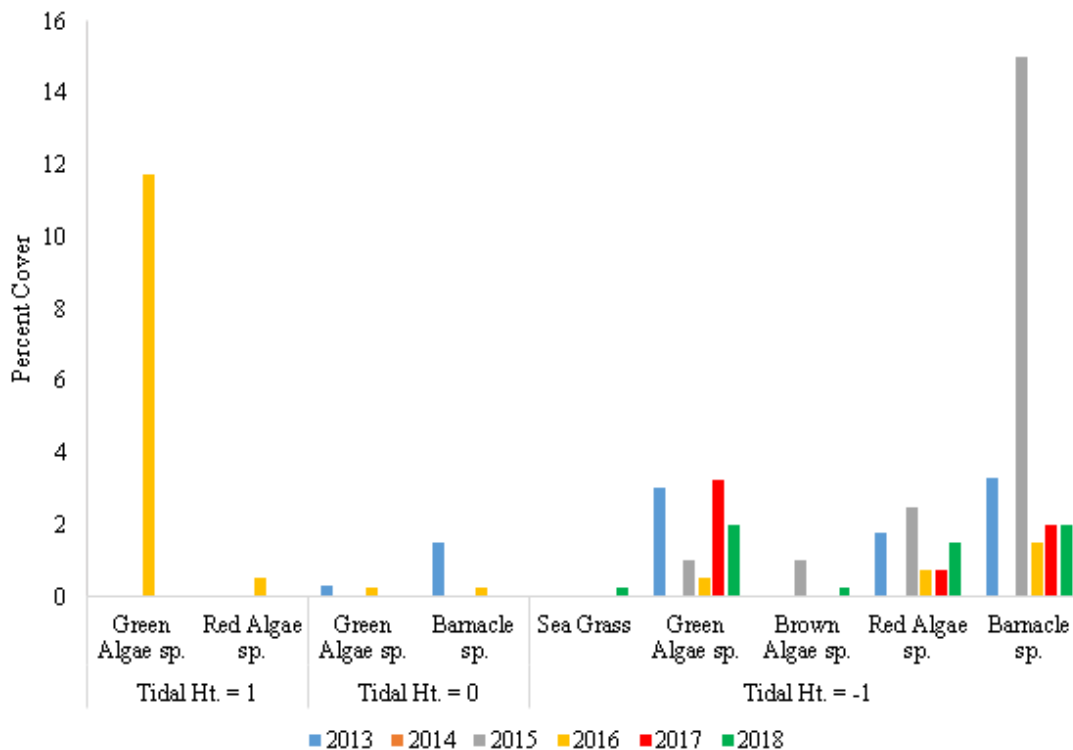


Figure 12. Average percent cover of plants and non-individual count organisms in quadrats at Intalco, Cherry Point Aquatic Reserve by tidal height for 2013-2018 surveys.

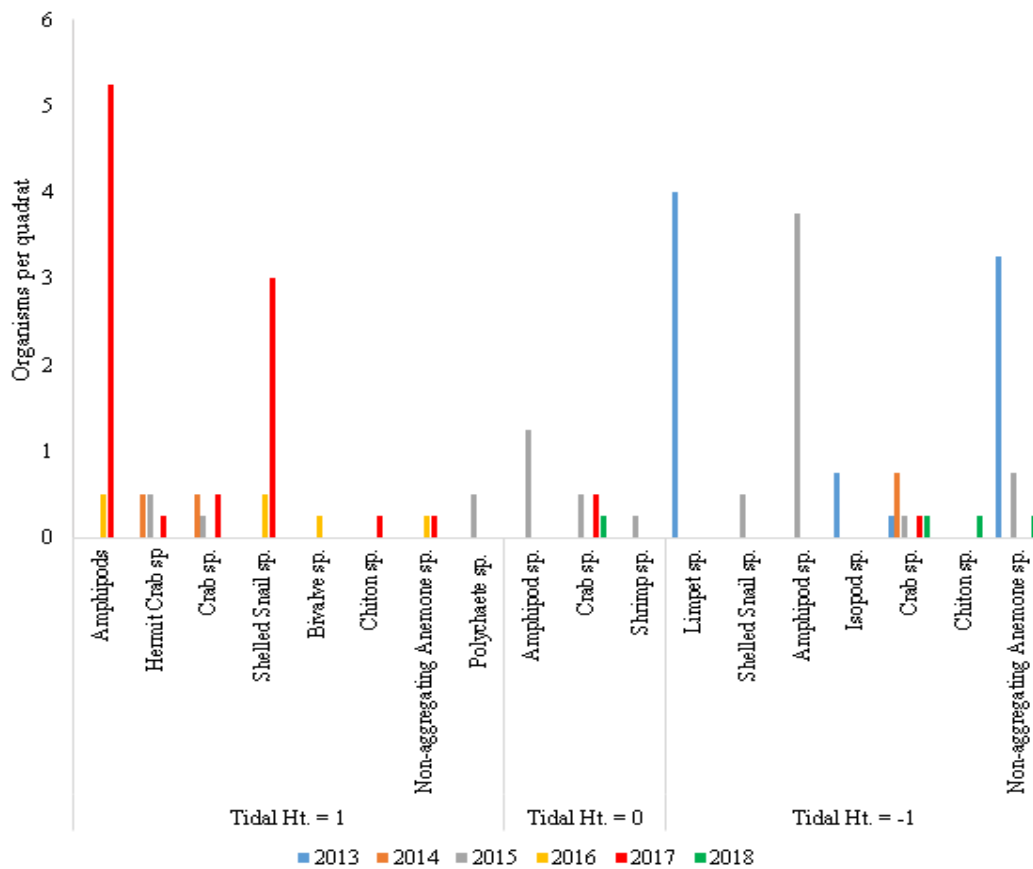


Figure 13. Average number of individual organisms in quadrats at Intalco, Cherry Point Aquatic Reserve by tidal height for 2013-2018 surveys.

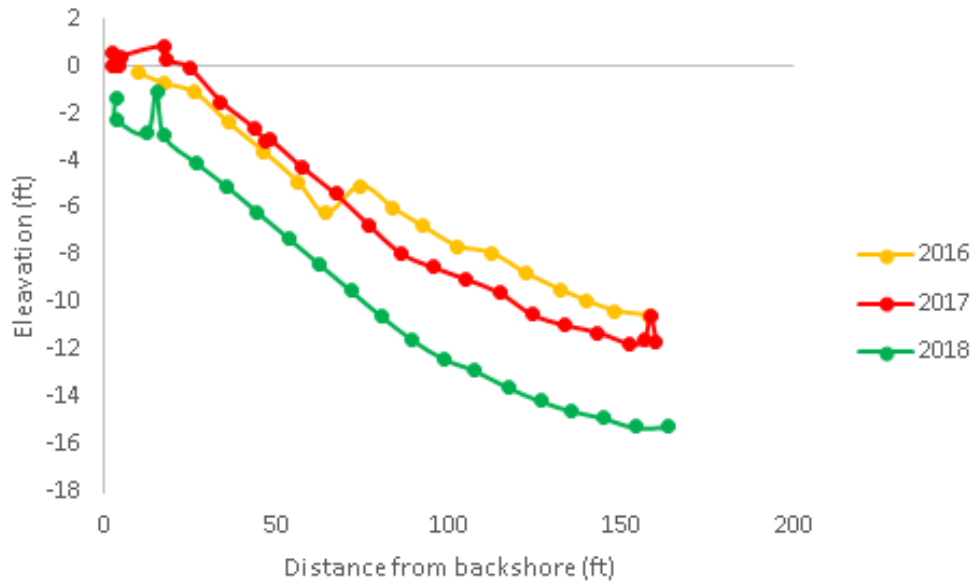


Figure 14. Beach elevation profile for Neptune Beach, Cherry Point Aquatic Reserve from 2016-2018 surveys.

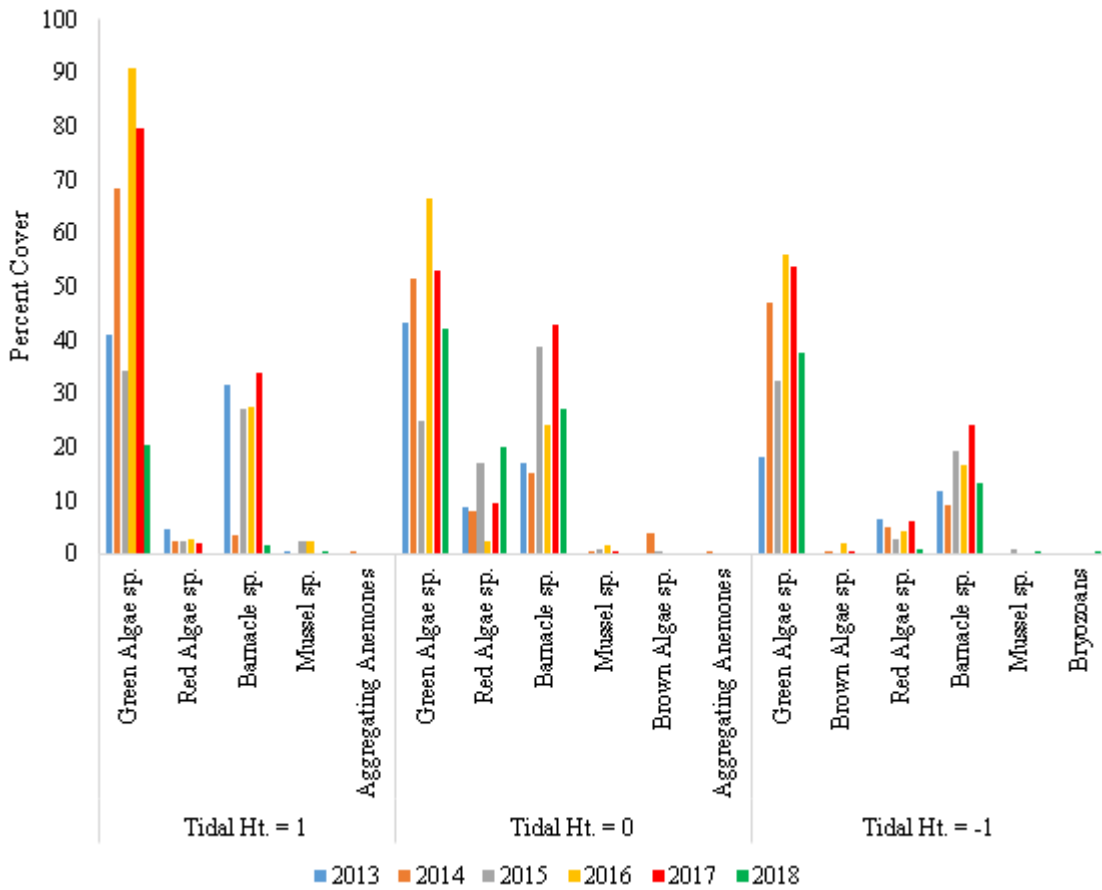


Figure 15. Average percent cover of plants and non-individual count organisms in quadrats at Neptune Beach, Cherry Point Aquatic Reserve by tidal height for 2013-2018 surveys.

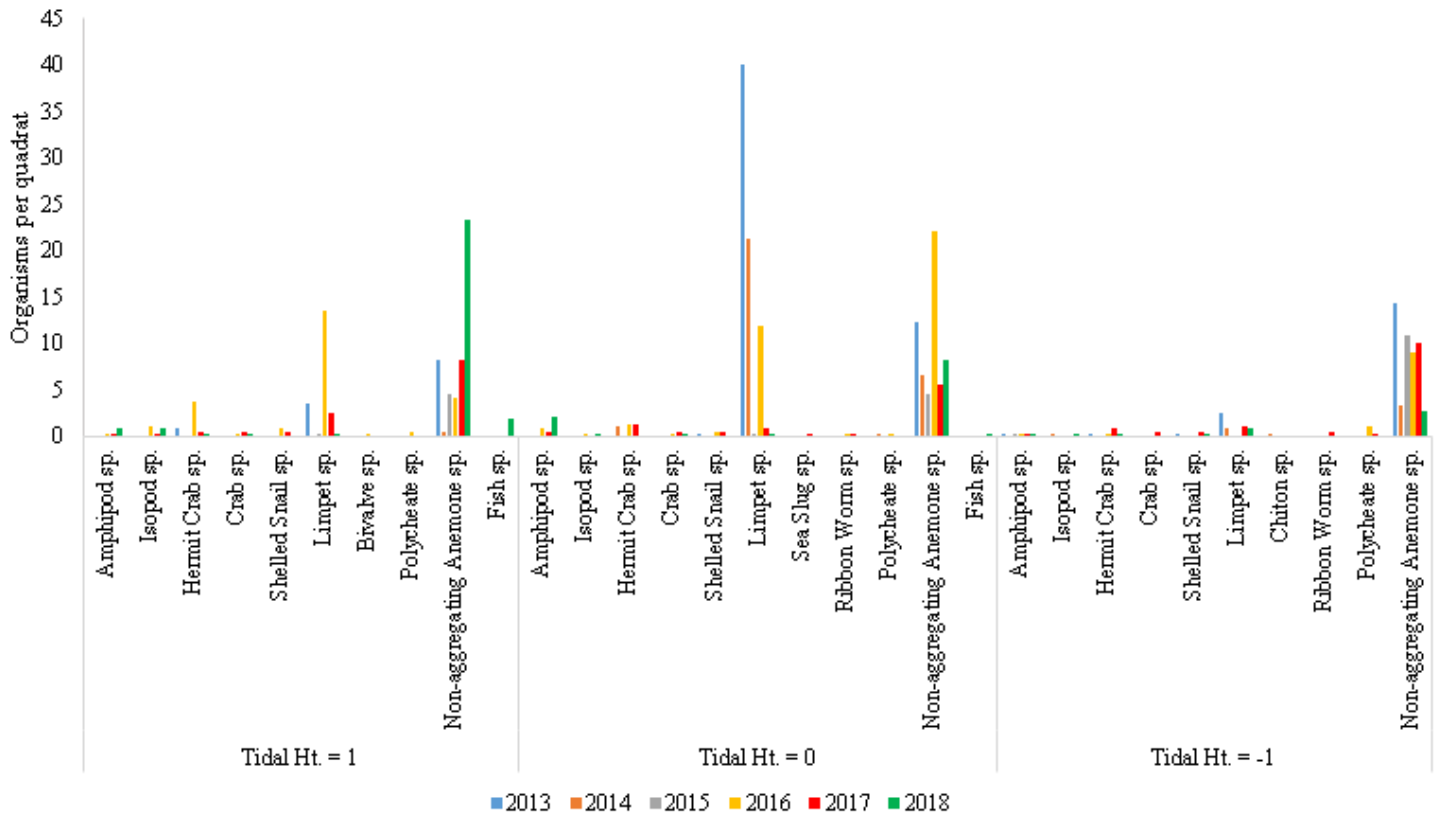


Figure 16. Average number of individual organisms in quadrats at Neptune Beach, CPAR by tidal height for 2013-2018 surveys.



Figure 17. Beach elevation profile for Custom Plywood, FBAR from 2016-2018 surveys.

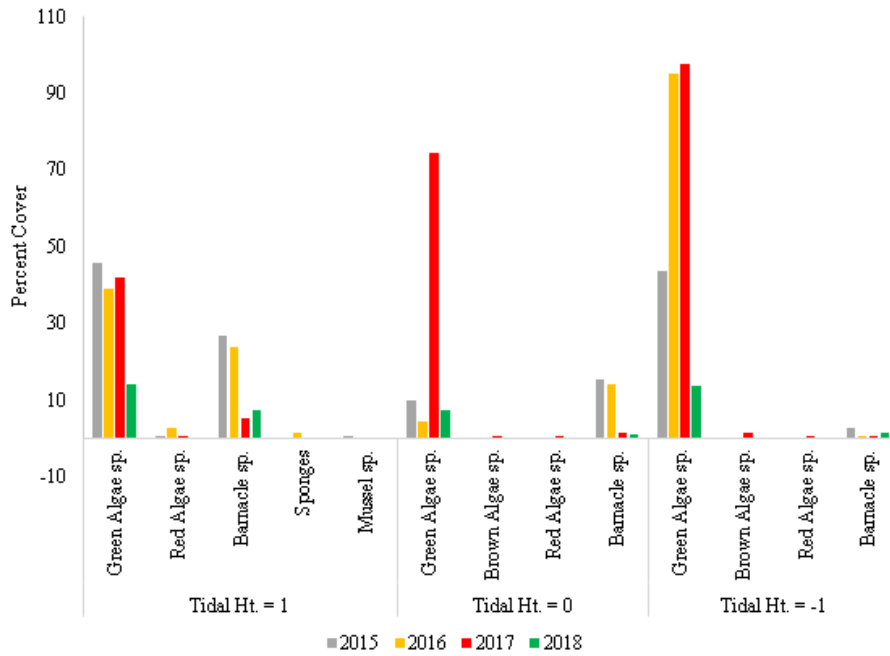


Figure 18. Average percent cover of plants and non-individual count organisms in quadrats at Custom Plywood, FBAR by tidal height for 2015-2018 surveys.

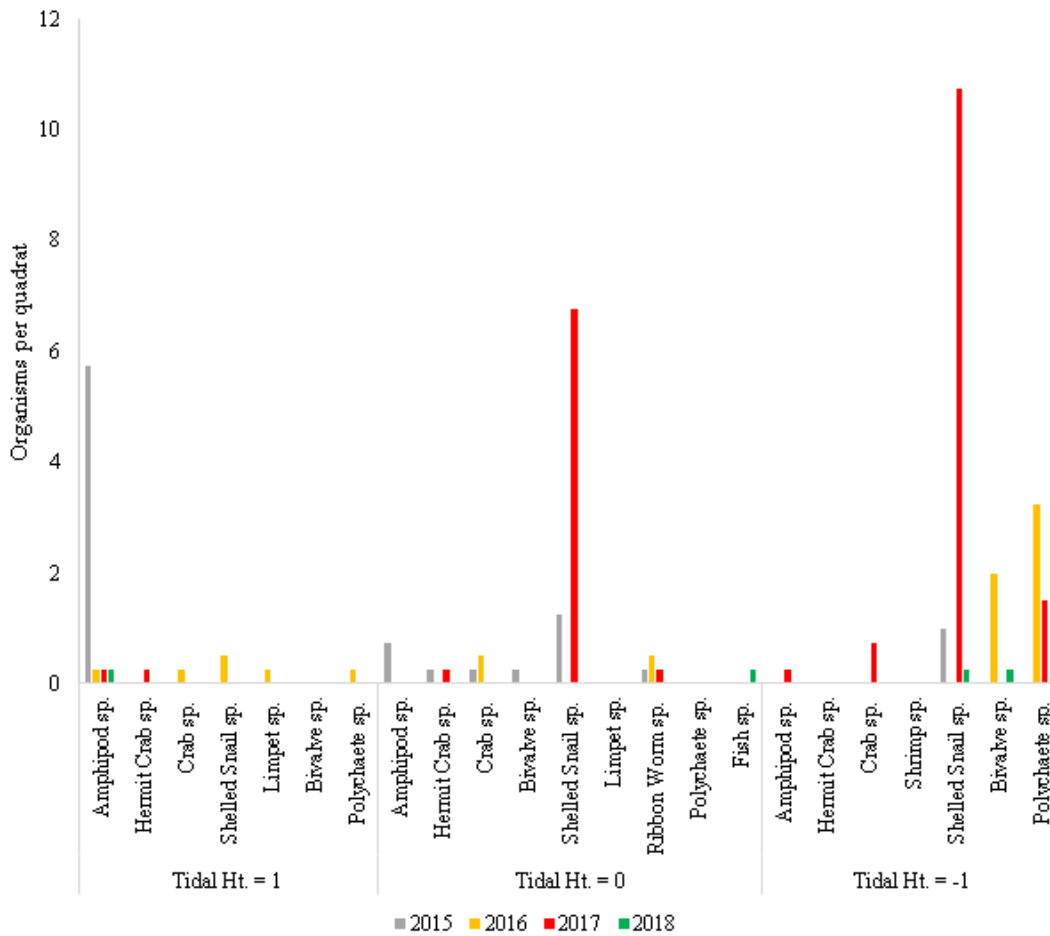


Figure 19. Average number of individual organisms in quadrats at Custom Plywood, FBAR by tidal height for 2015-2018 surveys.

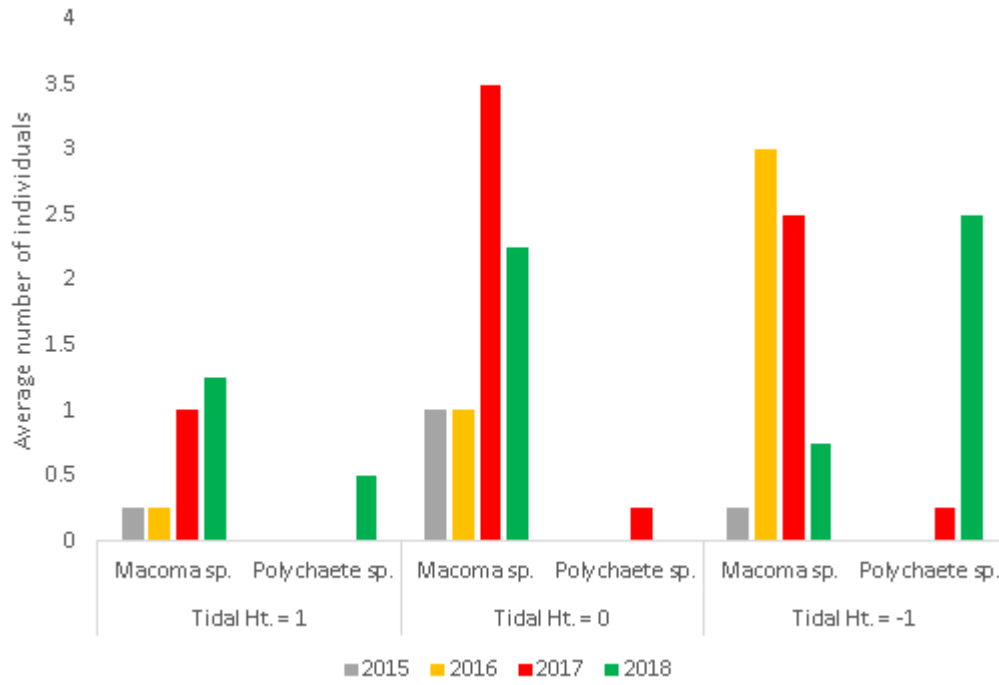


Figure 20. Average number of infaunal animals in sediment cores at Custom Plywood, FBAR by tidal height for 2015-2018 surveys for most prevalent species.

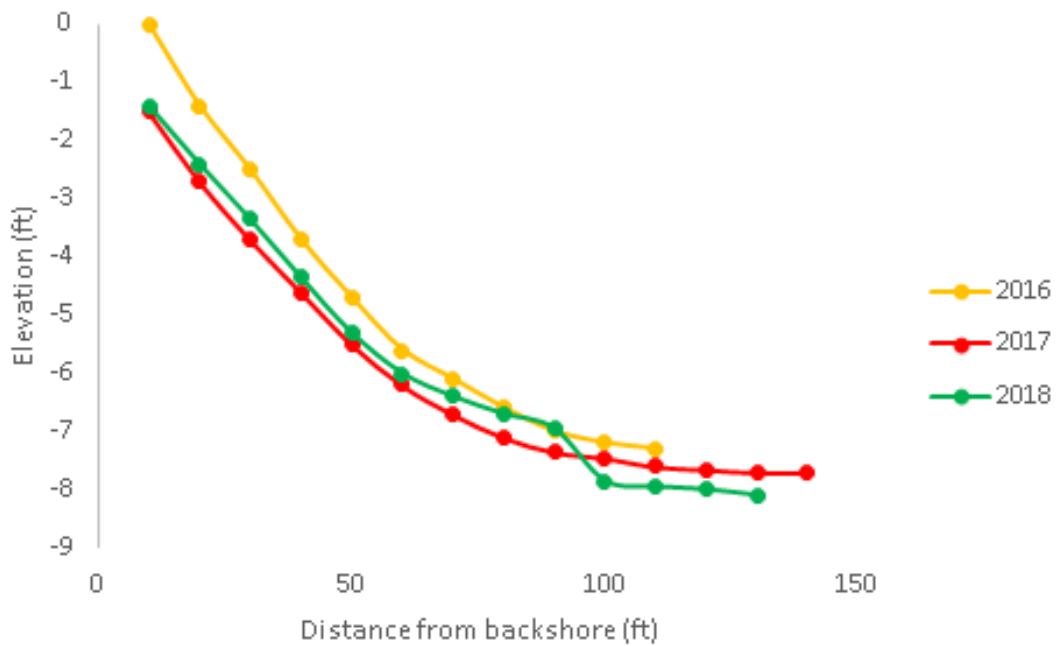


Figure 21. Beach elevation profile for Otter, FBAR from 2016-2018 surveys.

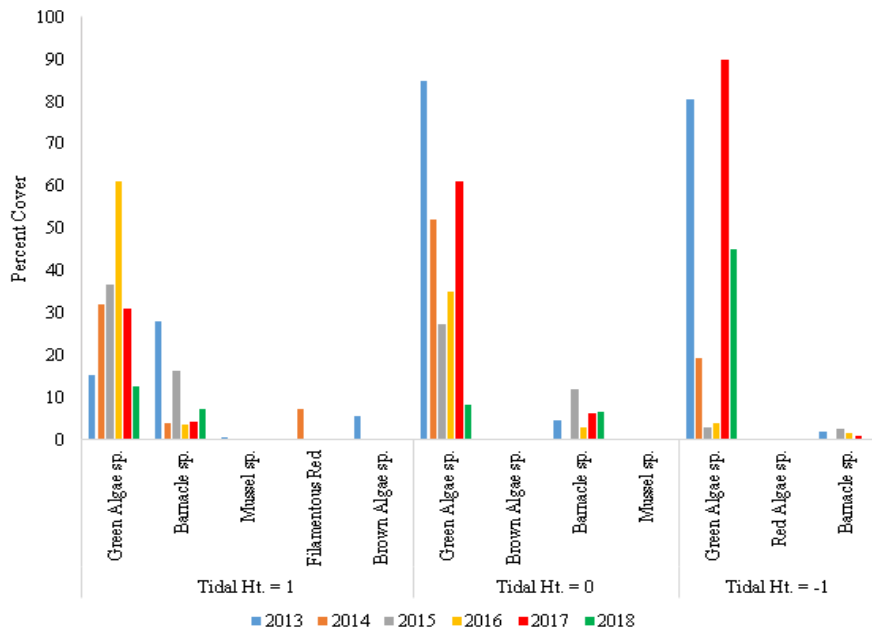


Figure 22. Average percent cover of plants and non-individual count animals in quadrats at Otter, FBAR by tidal height for 2013-2018 surveys.

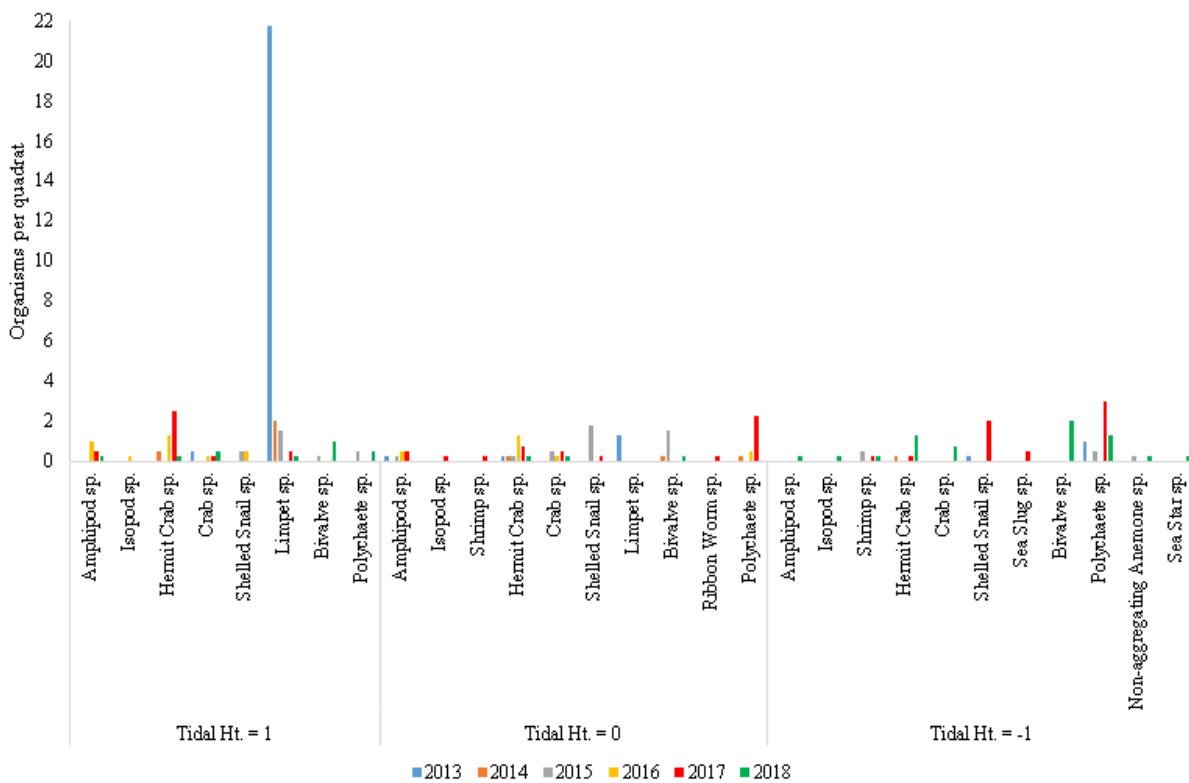


Figure 23. Average number of individual animals in quadrats at Otter, FBAR by tidal height for 2013-2018 surveys.

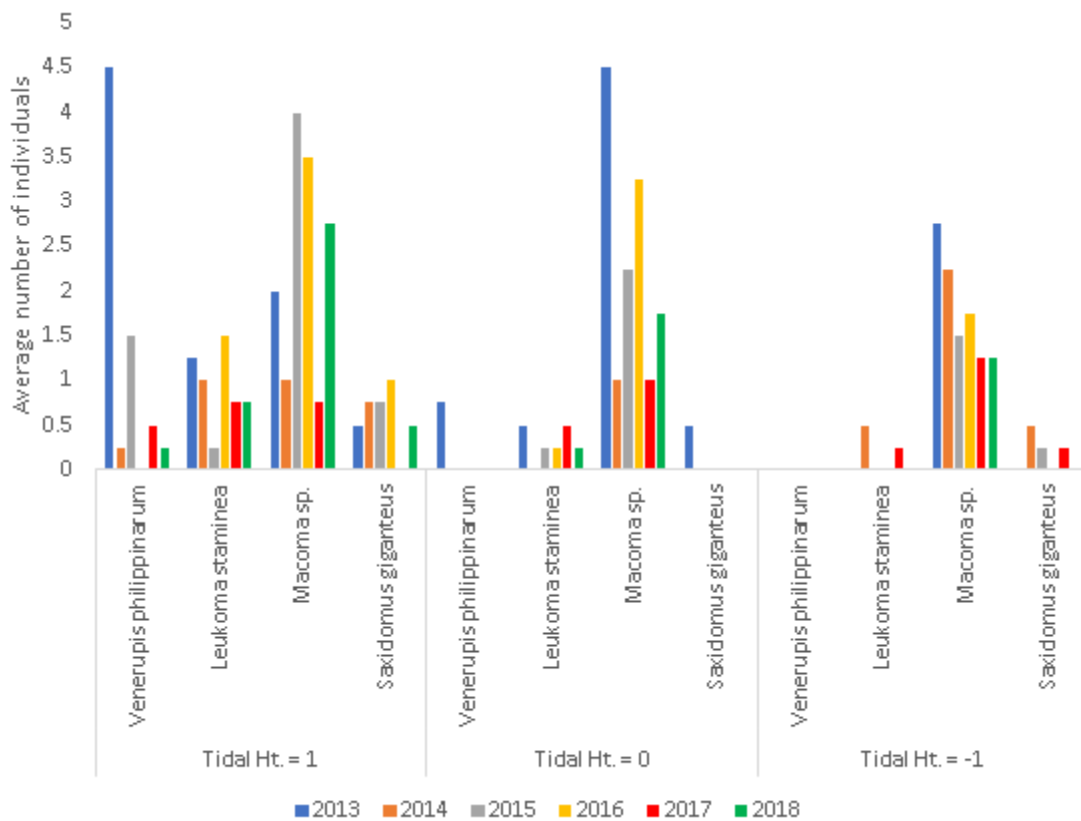


Figure 24. Average number of infaunal animals in sediment cores at Otter, FBAR by tidal height for 2013-2018 surveys for most prevalent species.

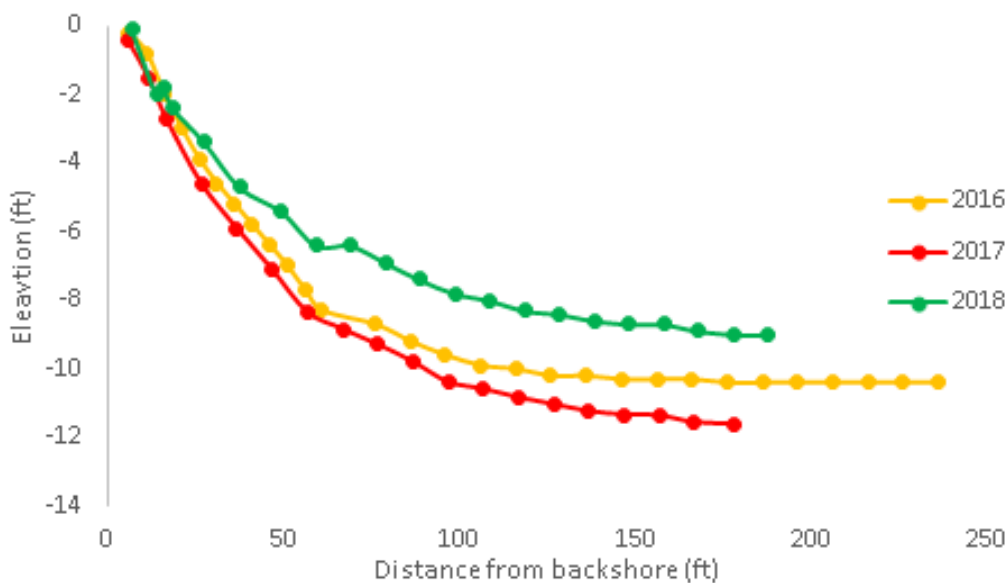


Figure 25. Beach elevation profile for Fir, FBAR from 2016-2018 surveys.

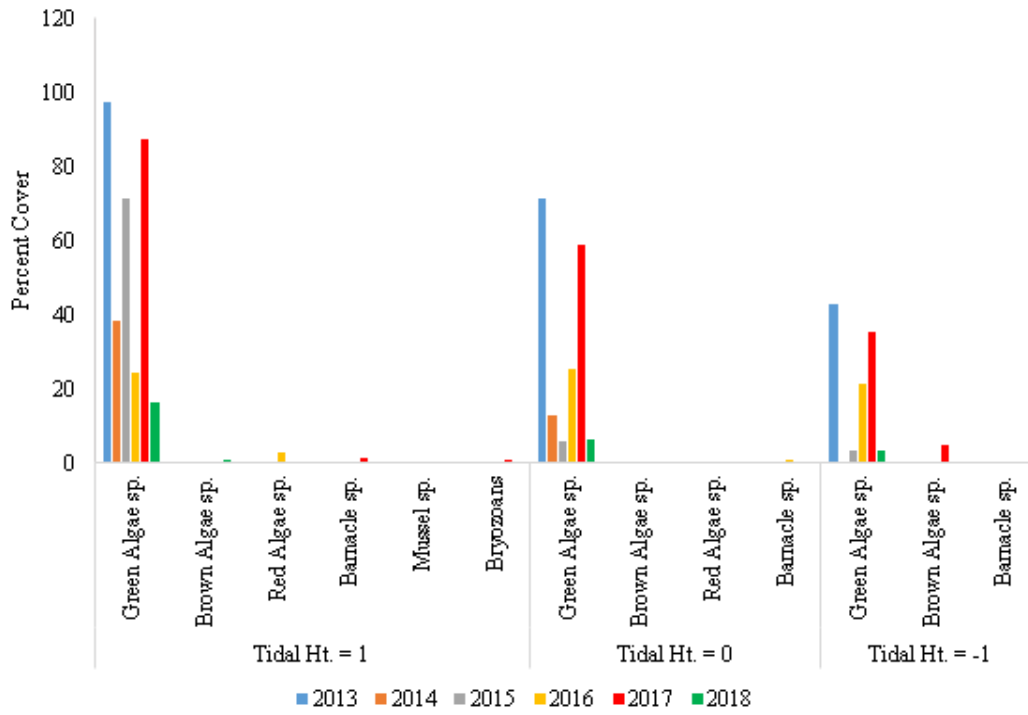


Figure 26. Average percent cover of plants and non-individual count animals in quadrats at Fir, FBAR by tidal height for 2013-2018 surveys.

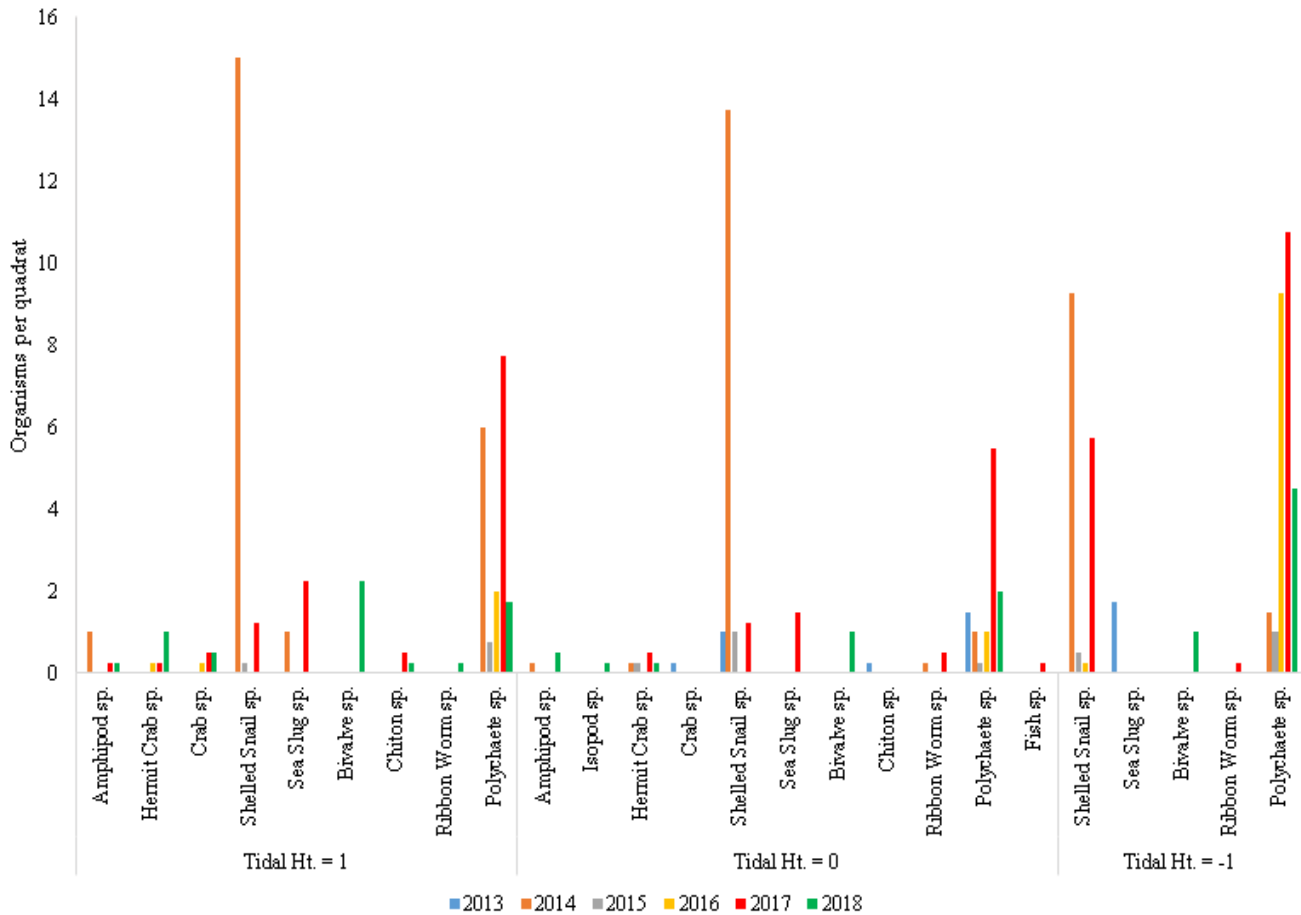


Figure 27. Average number of individual animals in quadrats at Fir, FBAR by tidal height for 2013-2018 surveys.

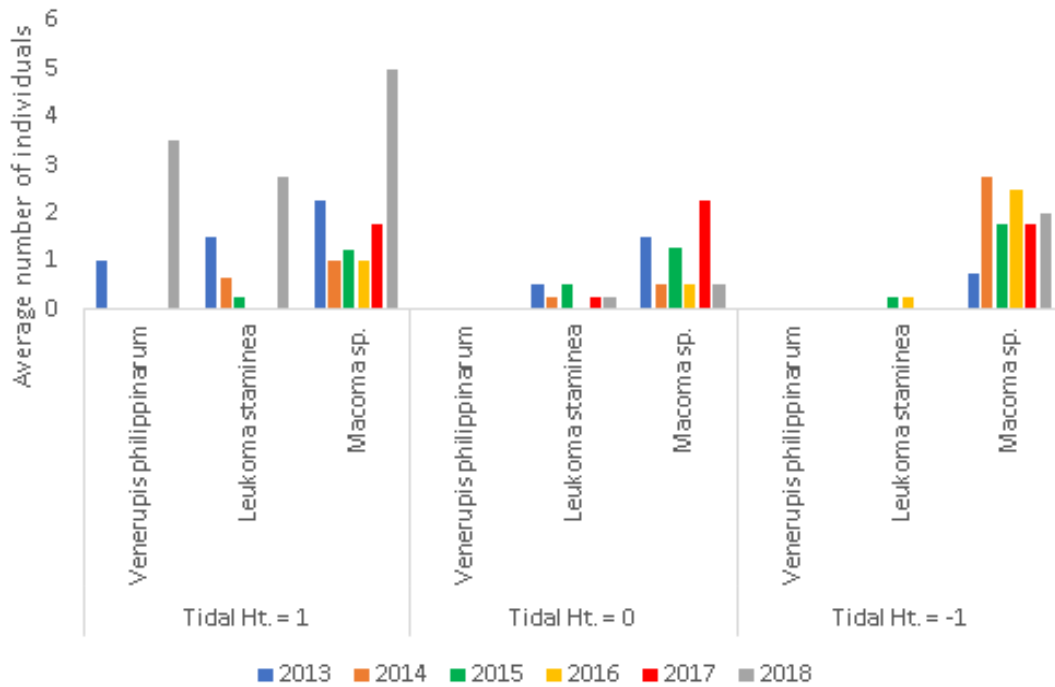


Figure 28. Average number of infaunal animals in sediment cores at Fir, FBAR by tidal height for 2013-2018 surveys for most prevalent species.

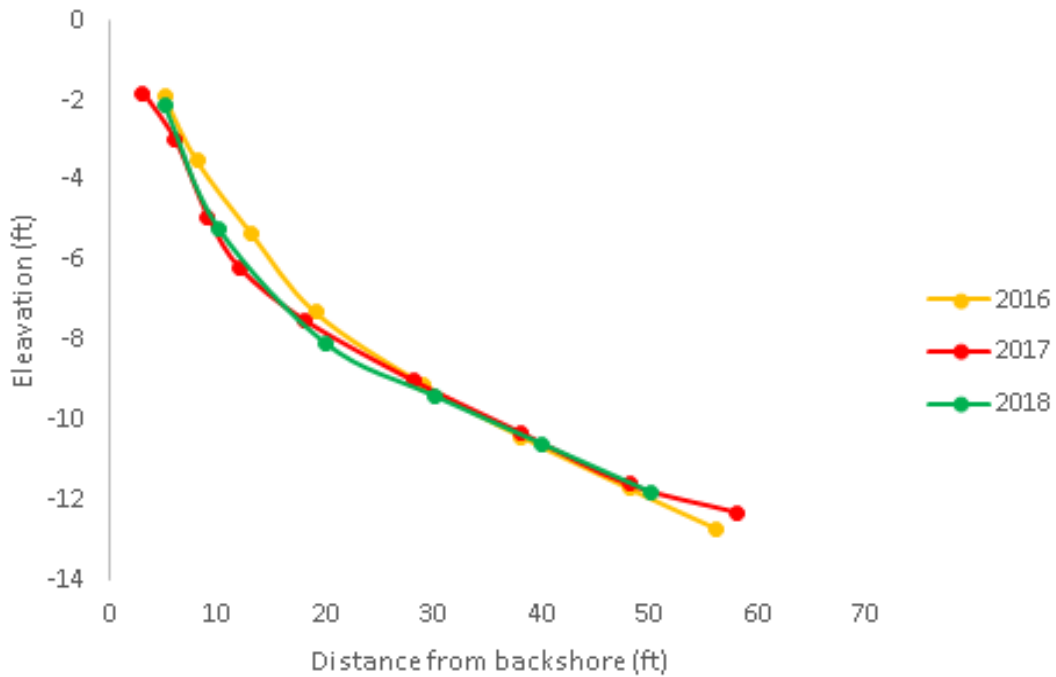


Figure 29. Beach elevation profile for Trestle, FBAR from 2016-2018 surveys.

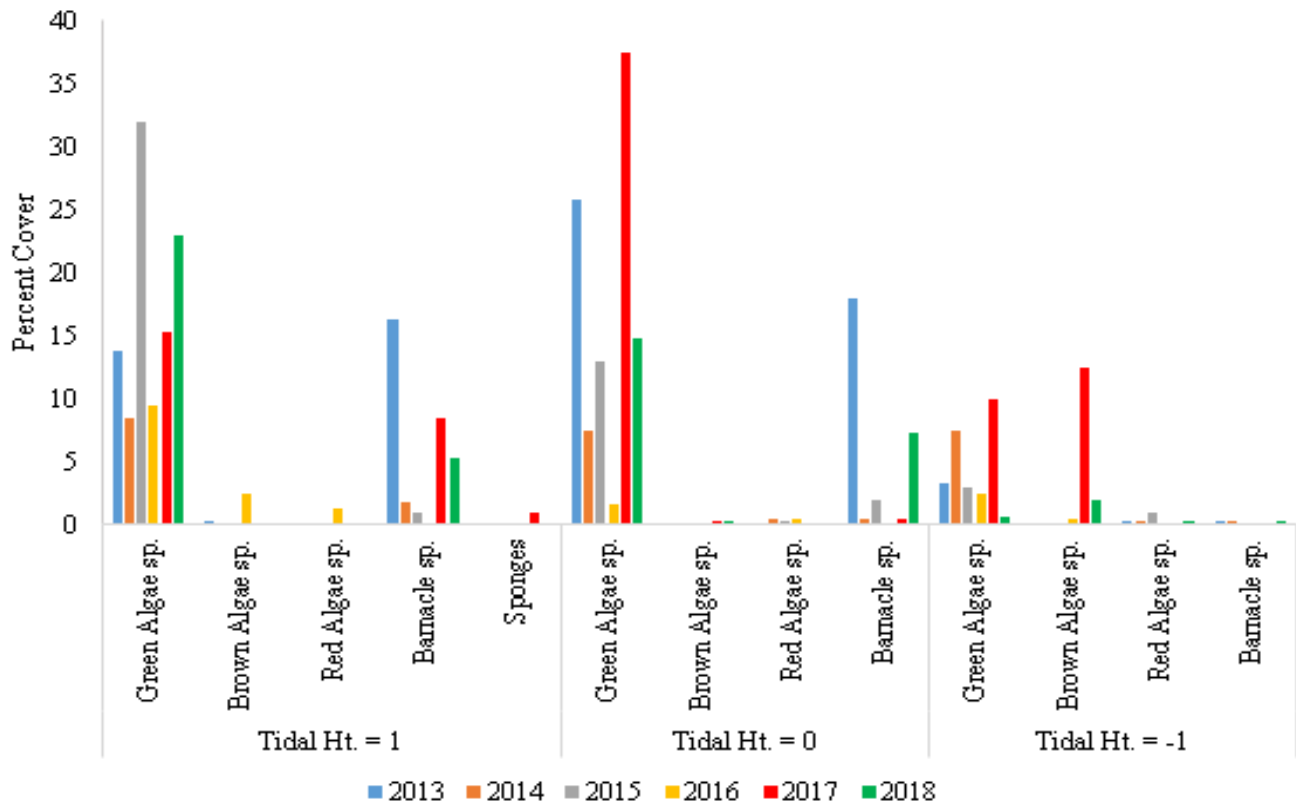


Figure 30. Average percent cover of plants and non-individual count animals in quadrats at Trestle, FBAR by tidal height for 2013-2018 surveys.

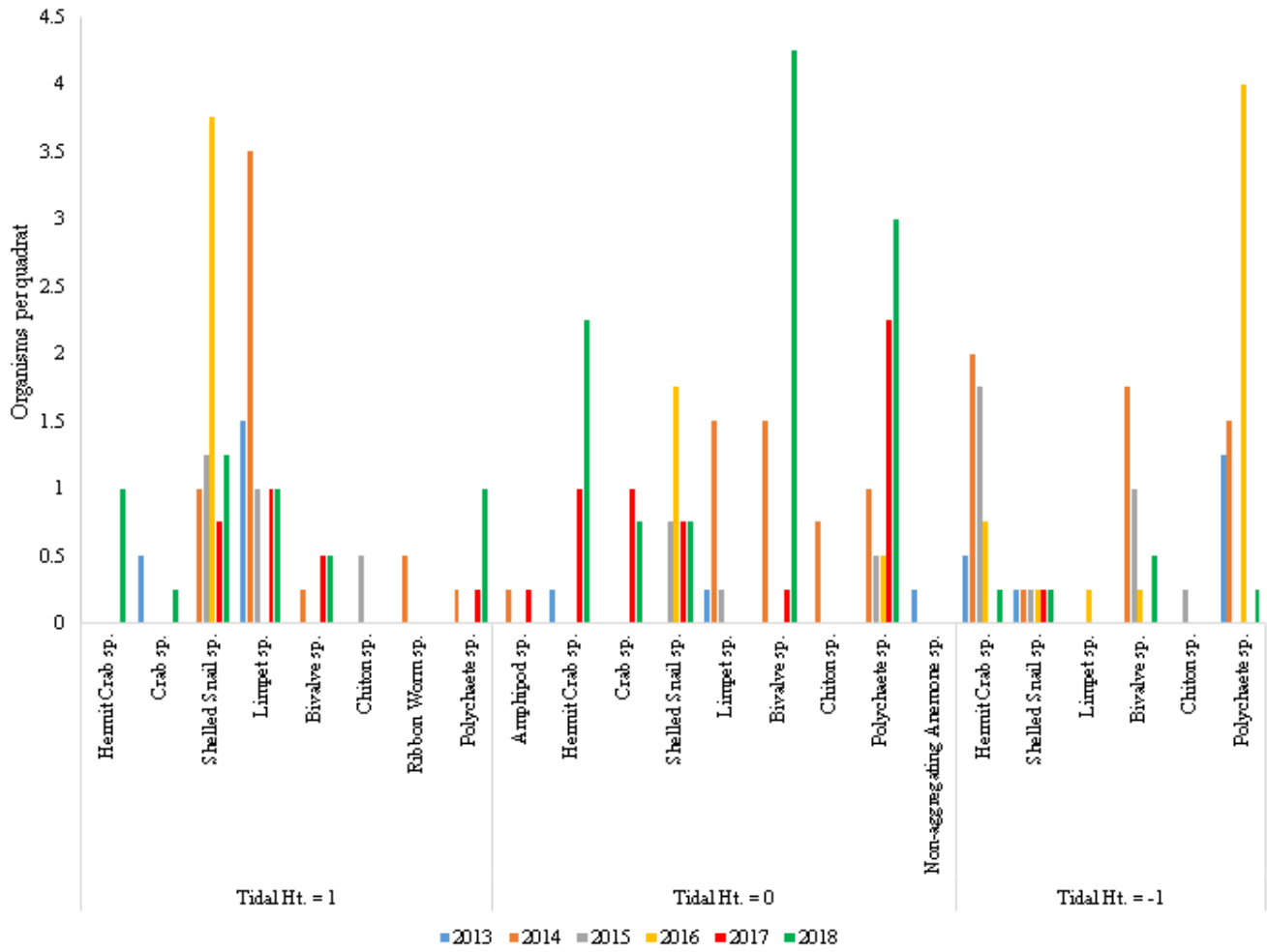


Figure 31. Average number of individual animals in quadrats at Trestle, FBAR by tidal height for 2013-2018 surveys.

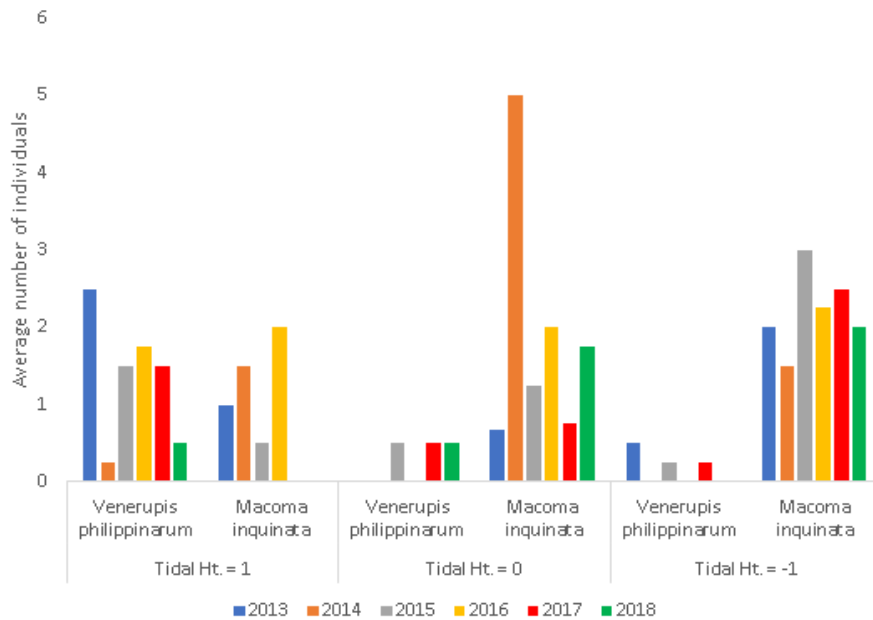


Figure 32. Average number of infaunal animals in sediment cores at Trestle, FBAR by tidal height for 2013-2018 surveys for most prevalent species.

Appendix B: Report Tables

Table 1. Survey site locations and compass bearings for orienting start locations for each profile at the high tide line.

Aquatic Reserve	Site	Latitude (N)	Longitude (W)	Years Monitored
CPAR	Birch Bay	48.89830	122.77841	2013-2014
CPAR	Barnacle Rock	48.89487	122.79199	2016-2018
CPAR	Point Whitehorn Point	48.894070	122.793570	2015
CPAR	Point Whitehorn Marine Park	48.87778	122.77838	2013-2018
CPAR	Intalco Beach	48.85062	122.72043	2013-2018
CPAR	Neptune Beach	48.82030	122.70952	2013-2018
FBAR	Custom Plywood	48.4962	122.60094	2015-2018
FBAR	Otter	48.49208	122.59958	2013-2018
FBAR	Fir	48.48428	122.59298	2013-2018
FBAR	Trestle	48.28.766	122. 34.827	2013-2018

Appendix C: Report Photos



Photo 1. Birch Bay, CPAR. Quadrat 3 at 0' tide height from the 2014 survey. Not much biota was counted in 2013 and 2014, so this site was dropped.



Photo 2. Barnacle Rock, CPAR. June 13, 2018, volunteers start on quadrat work as soon as the tide gets to +1 ft.



Photo 3. Point Whitehorn Point, CPAR. Trained citizen science volunteers help with intertidal monitoring and sea star wasting syndrome surveys in May 2015. This site had too much biota to count, so was only surveyed in 2015.



Photo 4. Point Whitehorn Marine Park, CPAR. May 10, 2016 volunteers get to work on quadrats. This survey is conducted alongside with the sea star wasting syndrome survey at this site.



Photo 5. Intalco, CPAR. July 21, 2017 volunteers identifying and counting in quadrats alongside Intalco and Petrogas employees who are also interested in the data. This site is adjacent to their pier and property.



Photo 6. Neptune Beach, CPAR. July 23, 2017 volunteer lead naturalist conducts species swath with assistant scribe with Phillips 66 pier in the background. Phillips 66 is also interested in this data collected. This survey is conducted alongside with the sea star wasting syndrome surveys at this site.



Photo 7. Custom Plywood, FBAR. July 24, 2017 citizen scientist collect data at the previous Custom Plywood Mill site, which had several interim actions, the latest completed in 2013, which included shoreline enhancement. These cleanups occurred under the Puget Sound Initiative as a toxic cleanup site. Both the Washington Department of Ecology and the current landowner are interested in these monitoring results.



Photo 8. Otter, FBAR. July 22, 2017 volunteers conduct surveys off the Tommy Thompson Trail by the otter statue, after which the site was named. There are often signs of otter activity seen here.



Photo 9. Fir, FBAR. May 16, 2018 Anacortes High School students work alongside citizen science volunteers to finish core samples after finishing quadrats and elevation profiles.



Photo 10. Trestle, FBAR. May 28, 2017 volunteers work carefully around lower intertidal mud. If the Tommy Thompson Trail Trestle is removed in the future, this site may need to be changed and could serve as a reference of interest.

Appendix D: Species Lists

The following are lists of species observed per site in species swaths from 2016-2018.

Cherry Point Species List (NB = Neptune Beach, I = Intalco, PW = Pt. Whitehorn Marine Park , BR = Barnacle Rock)

CPAR Site		NB	I	PW	BR
FUNGI: Ascomycota	LICHENS				
<i>Caloplaca</i> sp.	Yellow lichen	x			x
<i>Physicia</i> sp. (lt. gray to pale brown)	Lichen	x			x
<i>Verrucaria</i> sp.	Lichen	x		x	x
<i>Xanthora candelaria</i>	Orange Wall Lichen	x		x	x
PLANTAE: Tracheophyta					
<i>Ambrosia chamissonis</i>	Silver bur ragweed		x	x	
<i>Artemisia</i> ("artemesia sp.") sp.	Absinth wormwood			x	
<i>Atriplex patula</i>	Saltbush	x	x	x	
<i>Cakile</i> (<i>cackile</i> sp.) <i>edentula</i>	American sea-rocket	x	x	x	

<i>Cakile maritima</i>	European sea-rocket		x		
<i>Equisetum</i> sp. (not salt tolerant sp)	Horsetail	x			
<i>Leymus mollis</i>	American dunegrass		x	x	
<i>Zostera japonica</i>	Japanese eelgrass (introd. species)	x			x
<i>Zostera marina</i>	Eelgrass	x		x	x
PLANTAE: Chlorophyta	GREEN ALGAE				
<i>Acrosiphonia</i> sp.	Green rope	x		x	x
<i>Codium fragile</i>	Dead man's fingers			x	
<i>Derbesia</i> sp.? (unlikely habitat)	Sea bottle				x
<i>Ulva intestinalis</i>	Sea lettuce (filamentous)		x	x	x
<i>Ulva lactuca</i>	Sea lettuce (foliose)	x	x	x	x
<i>Ulva linza</i>	Sea lettuce (Flat-tube)	x	x	x	x
<i>Ulva</i> sp.	Sea lettuce	x	x	x	
CHROMISTA: Ochrophyta	BROWN ALGAE				

<i>Alaria marginata</i>	Ribbon kelp				x
<i>Colpomenia</i> sp.	Bulb seaweed		x	x	x
<i>Desmarestia aculeata</i>	Acid kelp		x		
<i>Fucus distichus</i>	Rockweed, "Two-headed Wrack"	x		x	x
<i>Fucus</i> sp.	Rockweed				x
<i>Nereocystis luetkeana</i>	Bull kelp	x	x	x	x
<i>Saccharina latissima</i>	Sugar kelp	x	x	x	x
<i>Saccharina sessilis</i>	Sea cabbage			x	
<i>Sargassum muticum</i>	Japanese wireweed (introd. species)	x	x	x	x
<i>Scytosiphon</i> sp.	Soda straws			x	x
<i>Soranthera ulvoidea</i>	Studded sea balloons	x		x	
PLANTAE: Rhodophyta	RED ALGAE				
<i>Bossiella</i> sp.	Calcareous red algae			x	
<i>Callophyllis</i> sp.	Red sea fan			x	
<i>Constantinia subulifera</i>	Cracked saucer			x	

<i>Constantinia</i> sp.	Northern cup and saucer seaweed				
<i>Cryptopleura ruprechtiana</i>	Hidden rib			x	
<i>Cryptosiphonia woodii</i>	Bleached brunette			x	x
<i>Endocladia muricata</i>	Sea moss		x	x	
<i>Farlowia mollis</i>	Farlow's seaweed		x	x	
<i>Gracilariopsis sjoestedtii</i>	Red spaghetti	x		x	
<i>Hildenbrandia</i> sp.	Rusty rock	x	x	x	x
<i>Hymenena</i> sp.	Sea fern fringe			x	
<i>Mastocarpus</i> sp.	Turkish towel or washcloth	x	x	x	x
<i>Mazzaella splendens</i>	Splendid iridescent seaweed	x	x	x	x
<i>Microcladia</i> sp.	Coarse sea lace	x		x	x
<i>Neorhodomela larix</i>	Black pine	x	x	x	
<i>Odonthalia floccosa</i>	Sea brush	x			x
<i>Palmaria</i> sp.	Red ribbon				x
<i>Polysiphonia</i> complex	Filamentous red algae			x	
<i>Porphyra</i> sp.	Nori	x	x	x	x
<i>Prionitis</i> sp.	Bleach weed	x	x	x	x

<i>Ralfsia fungiformis</i>	Sea Fungus		x	x	
Rhodophyta - Filamentous	Filamentous red algae	x		x	x
<i>Sarcodiotheca gaudichaudii</i>	Succulent seaweed			x	x
ARTHROPODA: Insecta: Coleoptera	BEETLES				
Coleoptera adult sp.	Beetle		x		
Coleoptera larvae sp.	Beetle larvae	x			
<i>Ocypus olens</i>	Devil's coach-horse beetle	x			
ARTHROPODA: Insecta: Diptera	FLIES				
Diptera	Flies	x	x	x	x
ARTHROPODA: Insecta: Dermaptera	EARWIGS				
<i>Anisolabis maritima</i>	Marine earwig	x	x	x	
ARTHROPODA: Arachnida	MITES				

<i>Neomolgus littoralis</i>	Red velvet mite	x			x
ARTHROPODA: Crustacea	CRUSTACEANS				
Balanomorpha	unidentified acorn barnacle				
<i>Balanus crenatus</i>	Crenate Barnacle	x	x	x	x
<i>Balanus glandula</i>	Acorn Barnacle	x	x	x	x
<i>Chthalamus dalli</i>	Little brown barnacle	x	x	x	x
<i>Semibalanus cariosus</i>	Haystack Barnacle	x	x	x	x
<i>Gammaridean amphipods</i>	Gammarid amphipod	x	x	x	x
Caprellidae (skeleton shrimp)	Caprella amphipod		x	x	x
<i>Gnorimosphaeroma oregonensis</i>	Pill bug isopod	x		x	x
<i>Pentidotea stenops?</i> (wrong habitat)	Seaweed isopod			x	
<i>Pentidotea wosnesenskii</i>	Rockweed isopod	x	x	x	
<i>Heptacarpus</i> sp.	shrimp	x		x	x
<i>Cancer magister</i>	Dungeness crab	x			x
<i>Cancer productus</i>	Red rock crab	x	x	x	x

Decapoda: unknown family	juvenile crab	x			
<i>Hemigrapsus nudus</i>	Purple shore crab	x	x	x	x
<i>Hemigrapsus oregonensis</i>	Yellow shore crab	x	x	x	x
<i>Lophopanopeus bellus</i>	Black-clawed crestleg crab		x	x	
<i>Oregonia gracilis</i>	Graceful Decorator crab	x		x	x
<i>Pagurus beringanus</i>	Bering hermit			x	x
<i>Pagurus granosimanus</i>	Grainyhand hermit	x	x	x	x
<i>Pagurus hirsutiussculus</i>	Hairy hermit	x		x	x
<i>Pagurus sp.</i>	unidentified hermit crab	x	x	x	x
<i>Petrolisthes eriomerus</i>	Porcelain crab			x	x
Pinnotheridae sp.	Pea Crab	x			
<i>Pugettia gracilis</i>	Graceful kelp crab		x		
<i>Pugettia producta</i>	Northern kelp crab	x		x	x
<i>Telmessus cheiragonus</i>	Helmut crab			x	x
MOLLUSCA: Bivalvia	BIVALVES				
<i>Clinorcardium nuttallii</i>	Heart cockle			x	

<i>Crassostrea gigas</i>	Pacific oyster		x	x	
<i>Hiatella arctica</i>	Arctic Hiatella				x
<i>Leukoma staminea</i>	Pacific littleneck			x	x
<i>Macoma balthica</i>	Baltic clam			x	
<i>Macoma inquinata</i>	Pointed macoma		x	x	x
<i>Macoma nasuta</i>	Bent-nose macoma			x	
<i>Mytilus trossulus</i>	Pacific blue mussel	x	x	x	x
<i>Pododesmus macrochisma</i>	Alaska jingle	x	x	x	x
<i>Saxidomus gigantea</i>	Washington butter clam	x			x
<i>Tresus capax</i>	Fat gaper			x	x
<i>Venerupis philippinarum</i>	Japanese littleneck			x	
MOLLUSCA: Gastropoda	GASTROPODS				
<i>Alia carinata</i>	Carinate dovesnail	x		x	x
<i>Calliostoma ligatum</i>	Blue topsnail			x	
<i>Lacuna vincta</i>	Northern lacuna	x	x	x	x
<i>Lacuna sp.</i>	Lacuna		x	x	

<i>Lacuna</i> sp. eggs	Lacuna eggs		x	x	x
<i>Lirabuccinum dirum</i>	Dire whelk			x	x
<i>Littorina scutulata</i>	Checkered Periwinkle	x	x	x	x
<i>Littorina sitkana</i>	Sitka periwinkle	x		x	x
<i>Lottia digitalis</i>	Ribbed limpet	x	x	x	x
<i>Lottia pelta</i>	Shield limpet	x	x	x	x
<i>Lottia pelta</i> (formerly <i>alveus</i>)	Eelgrass limpet		x	x	x
<i>Lottia persona</i>	Mask limpet	x	x	x	x
<i>Lottia scutum</i>	Plate limpet	x	x	x	x
<i>Margarites pupillus</i>	Puppet Margarite	x	x	x	x
<i>Nucella lamellosa</i>	Frilled dogwinkle	x	x	x	x
<i>Nucella lamellosa</i> eggs	Frilled dogwinkle eggs				
<i>Nucella ostrina</i>	Northern "Emarginate dogwinkle"			x	x
Pyramellidae (e.g. <i>Odostomia</i>)	Pyramidellid				x
<i>Aeolidia papillosa</i> or <i>loui</i>	Shag-rug aeolis nudibranch	x			
<i>Hermisenda</i> <i>crassicornis</i>	Opalescent nudibranch				x
<i>Meliba leonina</i>	Lion's Meliba			x	x

<i>Doris montereyensis</i> (includes an ID as <i>Peltodoris nobilis</i> which likely wrong)	Noble sea lemon				x
<i>Onchidoris bilamellata</i>	Barnacle-eating onchidoris	x	x	x	x
<i>Onchidoris bilamellata</i> eggs	<i>Onchidoris bilamellata</i> eggs				
Nudibranch eggs	eggs	x	x	x	x
MOLLUSCA:					
Polyplacophora	CHITONS				
<i>Cryptochiton stelleri</i>	Gumboot Chiton	x		x	
<i>Cyanoplax dentiens</i>	Gould's Baby Chiton	x			
<i>Mopalia kennerleyi</i>	Northern hairy chiton	x		x	
<i>Mopalia hindsii</i>	Hind's Mopalia			x	
<i>Mopalia lignosa</i>	Woody chiton	x	x	x	x
<i>Mopalia muscosa</i>	Mossy chiton	x	x	x	x
<i>Mopalia vespertina</i>	Smooth chiton	x		x	x
<i>Tonicella lineata</i>	Lined chiton	x		x	x
<i>Tonicella undocaerulea</i>	Blue-line chiton				x

PLATYHELMINTHES	FLATWORMS				
<i>Kaburakia excelsa</i>	Giant flatworm	x			x
Platyhelminthes	unidentified flatworm		x	x	x
NEMERTEA	RIBBON WORMS				
<i>Carinoma mutabilis</i>	Nemertea - white	x	x	x	x
<i>Emplectonema gracile</i>	Green ribbon worm	x			x
<i>Paranemertes peregrina</i>	Purple ribbon worm	x		x	x
<i>Tubulanus polymorphus</i>	Nemertea - orange			x	x
ANNELIDA: Oligochaeta	OLIGOCHAETE SEGMENTED WORMS				
Oligochaeta	Oligochaete	x		x	x
ANNELIDA: Polychaeta	POLYCHAETE SEGMENTED WORMS				
Glyceridae	Bloodworm	x		x	
Hesionidae	Princess-of-Troy worms	x	x	x	x
Lumbrinereidae	polychaete				

Nereidae	Pile worm	x		x	x
Polychaeta	Polychaete	x		x	x
Polynoidae	Scale worms	x			x
Sabellidae	Sabellid tube worm	x			x
Terebellidae	Terebellid tube worm	x			x
BRYOZOA	BRYOZOA				
Bugula sp.	erect bryozoan	x		x	x
Membranipora sp.	encrusting bryozoan	x			x
PORIFERA	SPONGES				
<i>Clathria pennata</i>	Red sponge	x			x
<i>Haliclona</i> sp.	Brown encrusted sponge	x			
<i>Halichondria bowerbanki</i>	Dead Man's Finger sponge	x		x	x
CNIDARIA:					
Anthozoa	ANEMONES				
<i>Anthopleura artemisia</i>	Moonglow anemone	x	x	x	x

<i>Anthopleura elegantissima</i>	Aggregating anemone	x	x	x	x
<i>Metridium senile</i>	Short plumose anemone	x	x	x	x
<i>Urticina coriacea</i>	Stubby rose anemone	x		x	x
<i>Urticina crassicornis</i> or <i>grebelnyi</i>	Red and Green anemone	x	x	x	x
ECHINODERMATA: Holothuroidea	SEA CUCUMBERS				
<i>Cucumaria miniata</i>	Orange sea cucumber	x	x	x	x
<i>Eupentacta quinquesemita</i>	White sea cucumber	x		x	x
ECHINODERMATA: Echinoidea	SEA URCHINS				
<i>Strongylocentrotus drobachiensis</i>	Green sea urchin			x	x
ECHINODERMATA: Asteroidea	SEASTARS				
<i>Evasterias troschelii</i>	Mottled seastar	x		x	x
<i>Henricia</i> sp. (includes <i>H. pumila</i>)	Dwarf mottled henricia				
<i>Henricia leviuscula</i>	Blood star		x	x	x

<i>Leptasterias hexactis</i>	Six-arm seastar	x			x
<i>Pisaster ochraceus</i>	Ochre seastar	x	x	x	x
<i>Pycnopodia helianthoides</i>	Sunflower star			x	x
ECHINODERMATA: Ophiuroidea	BRITTLE STARS				
<i>Amphiodia occidentalis</i>	Long-armed brittle star	x		x	
<i>Amphipholis squamata</i>	Brooding or small brittle star			x	
CHORDATA: Pisces	FISH				
Cottidae	unidentified sculpin			x	x
<i>Gobiesox maeandricus</i>	Northern clingfish	x		x	
Liparidae	Snailfish				
<i>Oligocottus maculosus</i>	Tidepool sculpin	x			
<i>Pholis ornata</i>	Saddleback gunnel			x	x
Pholidae	gunnels/blennies			x	
Pleuronectidae	flatfish - sole			x	x

Fidalgo Bay Species List (T = Trestle, F = Fir, O = Otter, CP = Custom Plywood)

FBAR Site		T	F	O	CP
FUNGI: Ascomycota	LICHENS				
<i>Caloplaca</i> sp.	Yellow lichen	x		x	x
<i>Verrucaria</i> sp.	Lichen	x	x	x	
<i>Xanthoria</i> sp.	Lichen	x		x	
PLANTAE: Tracheophyta					
<i>Ambrosia chamissonis</i>	Silver bur ragweed		x		x
<i>Atriplex patula</i>	Saltbush		x		x
<i>Cakile</i> sp.	Sea-rocket		x		x
<i>Distichlis spicata</i>	Salt Grass				
<i>Rumex acetosella</i>	Sheep sorrel		x		x
<i>Leymus mollis</i>	American dunegrass				x
<i>Zostera marina</i>	Eelgrass	x	x	x	
PLANTAE: Chlorophyta	GREEN ALGAE				

<i>Acrosiphonia</i> sp.	Green rope	x	x		
<i>Ulva intestinalis</i>	Sea lettuce (filamentous)	x	x	x	x
<i>Ulva lactuca</i>	Sea lettuce (foliose)	x	x	x	x
<i>Ulva prolifera</i>	Branched string lettuce			x	x
<i>Ulva</i> sp.	Sea lettuce			x	
CHROMISTA: Ochrophyta	BROWN ALGAE				
<i>Diatoms</i>	Filamentous diatoms		x		x
<i>Fucus distichus</i>	Rockweed, "Two-headed Wrack"		x	x	
<i>Saccharina latissima</i>	Sugar kelp, Ribbon kelp	x	x		x
<i>Saccharina</i> sp.	Kelp		x	x	
<i>Sargassum muticum</i>	Japanese wireweed (introd. species)		x		
<i>Scytosiphon lomentaria</i>	Soda straws		x		
PLANTAE: Rhodophyta	RED ALGAE				
<i>Gracilariopsis</i> sp.	Red spaghetti			x	

<i>Hildenbrandia</i> sp.	Rusty rock	x			
<i>Mastocarpus papillatus</i>	Turkish washcloth, tarspot	x	x	x	
<i>Polysiphonia</i> complex	Filamentous red algae			x	
<i>Porphyra</i> sp.	Nori	x	x	x	x
<i>Rhodophyta</i> - Filamentous	Filamentous red algae	x	x	x	x
ARTHROPODA: Insecta: Diptera	FLIES				
Diptera	Flies				x
ARTHROPODA: Insecta: Dermaptera	EARWIGS				
<i>Anisolabis maritima</i>	marine earwig	x			x
ARTHROPODA: Arachnida	MITES				
<i>Neomolgus littoralis</i>	Red velvet mite	x	x	x	
ARTHROPODA: Crustacea	CRUSTACEANS				

<i>Balanus crenatus</i>	Crenate Barnacle	x	x	x	x
<i>Balanus glandula</i>	Acorn Barnacle	x	x	x	x
<i>Chthalamus dalli</i>	Little brown barnacle	x	x	x	
<i>Semibalanus cariosus</i>	Haystack Barnacle	x			x
<i>Caprellidae</i> (skeleton shrimp)	Caprella amphipod		x		
<i>Gammaridean amphipods</i>	Gammarid amphipod	x	x	x	x
<i>Traskorchestia traskiana</i>	Amphipod		x		x
<i>Gnorimosphaeroma oregonensis</i>	Pill bug isopod	x	x	x	x
<i>Heptacarpus</i> sp.	shrimp			x	
<i>Cancer gracilis</i>	Graceful crab				x
<i>Cancer magister</i>	Dungeness crab		x	x	x
<i>Cancer oregonensis</i>	Pygmy rock crab	x			
<i>Cancer productus</i>	Red rock crab	x			x
<i>Hapalogaster mertensii?</i>	Hairy crab				x
<i>Hemigrapsus nudus</i>	Purple shore crab	x	x	x	x
<i>Hemigrapsus oregonensis</i>	Yellow shore crab	x	x	x	x
<i>Oregonia gracilis</i>	Graceful Decorator crab	x	x	x	

<i>Pagurus granosimanus</i>	Grainyhand hermit	x	x	x	
<i>Pagurus hirsutiusculus</i>	Hairy hermit	x	x	x	x
<i>Pagurus</i> sp.	unidentified hermit crab		x	x	
<i>Telmessus cheiragonus</i>	Helmet crab		x	x	
MOLLUSCA: Bivalvia	BIVALVES				
<i>Clinocardium nuttallii</i>	Nuttall cockle (heart cockle)	x	x	x	x
<i>Crassostrea gigas</i>	Pacific oyster (introduced species)	x	x	x	x
<i>Hiatella arctica</i>	Arctic Hiatella	x			
<i>Leukoma staminea</i>	Pacific littleneck	x	x	x	x
<i>Macoma balthica</i>	Baltic macoma (introduced species)			x	
<i>Macoma inquinata</i>	Pointed macoma			x	x
<i>Macoma nasuta</i>	Bent-nose macoma		x		
<i>Mya arenaria</i>	Softshell clam (introduced species)		x		x
<i>Mytilus trossulus</i>	Pacific blue mussel	x	x	x	x
<i>Pododesmus macrochisma</i>	Alaska jingle	x	x		

<i>Saxidomus gigantea</i>	Washington butter clam			x	x	x
<i>Tresus capax</i>	Fat gaper			x	x	x
<i>Tresus</i> sp.	Gaper clam					x
<i>Venerupis philippinarum</i>	Japanese littleneck (introduced sp.)	x	x	x		x
MOLLUSCA: Gastropoda	GASTROPODS					
<i>Alia carinata</i>	Carinate Dovesnail			x		
<i>Amphissa columbiana</i>	Wrinkled amphissa			x		
<i>Batillaria attramentaria</i>	Japanese false cerith (introd. species)			x		
<i>Lacuna variegata</i>	Variegated "lacuna"				x	
<i>Lacuna vincta</i>	Northern lacuna				x	x
<i>Littorina scutulata</i>	Checkered Periwinkle	x	x	x		x
<i>Littorina sitkana</i>	Sitka periwinkle	x	x	x		x
<i>Lottia digitalis</i>	Ribbed limpet	x	x	x		
<i>Lottia pelta</i>	Shield limpet	x	x	x		x
<i>Lottia persona</i>	Mask limpet	x	x	x		x
<i>Lottia scutum</i>	Plate limpet	x	x	x		

<i>Nassarius fraterculus</i>	Japanese nassa (introduced species)		x	x	
<i>Nucella canaliculata</i>	Channeled dogwinkle	x			
<i>Nucella lamellosa</i>	Frilled dogwinkle	x	x	x	
<i>Nucella ostrina</i>	Northern "Emarginate dogwinkle"	x			
<i>Odostomia tenuisculpta</i>	no common name	x		x	
<i>Haminoea vesicula</i> (incl. egg masses)	Blister glassy-bubble (white bubble)	x	x	x	x
<i>Peltodoris nobilis</i> (prob. wrong ID, likely Doris montereyensis)	Noble sea lemon	x			
MOLLUSCA: Polyplacophora	CHITONS				
<i>Mopalia lignosa</i>	Woody chiton	x	x		
<i>Mopalia muscosa</i>	Mossy chiton	x	x	x	
PLATYHELMINTHES	FLATWORMS				
<i>Kaburakia excelsa</i>	Giant flatworm	x	x		
<i>Platyhelminthes</i>	unidentified			x	

	flatworm				
NEMERTEA	RIBBON WORMS				
<i>Carinoma mutabilis</i>	Nemertea - white			x	
<i>Emplectonema</i> sp.	Ribbon worm				x
<i>Paranemertes peregrina</i>	Purple ribbon worm		x		
<i>Tubulanus polymorphus</i>	Nemertea - orange		x		
ANNELIDA: Oligochaeta	OLIGOCHAETE SEGMENTED WORMS				
<i>Oligochaeta</i>	Oligochaete		x		x
ANNELIDA: Polychaeta	POLYCHAETE SEGMENTED WORMS				
<i>Glyceridae</i>	Bloodworm				x
<i>Hesionidae</i>	Princess-of-Troy worms	x	x	x	x
<i>Hesionidae - Oxydromus pugettensis</i>	Bat Star worm			x	
<i>Lumbrinereidae</i>	polychaete			x	

<i>Nephtyidae</i>	Goddess worm			x	x
<i>Nereididae</i>	Pile worm/Sand worm	x			x
<i>Polychaeta</i>	Polychaete	x	x	x	
<i>Polychaeta - Tubiculous polychaete</i>	unidentified tube worm	x	x	x	
<i>Polynoidae</i>	Scale worms	x	x	x	x
<i>Syllidae</i>	Errant polychaete		x		
<i>Terebellidae</i>	Terebellid tube worm				x
BRYOZOA	BRYOZOA				
<i>Bryozoa</i>	unidentified bryozoan	x	x		
<i>Dendrobeania lichenoides</i>	Encrusting bryozoan	x			
<i>Membranipora membranacea</i>	Lacy crust bryozoan			x	
PORIFERA	SPONGES				
<i>Halichondria sp.</i>	Bread crumb sponge	x	x		
<i>Haliclona sp.</i>	Brown encrusted sponge	x	x		

CNIDARIA: Anthozoa	ANEMONES				
<i>Anthopleura artemisia</i>	Moonglow anemone			x	
<i>Diadumene lineata</i>	Orange-striped green anemone (Introd. Sp.)		x	x	
<i>Metridium senile</i>	Short plumose anemone	x	x	x	
ECHINODERMATA : Asteroidea	SEASTARS				
<i>Leptasterias hexactis</i>	Six-arm seastar		x		
ECHINODERMATA : Ophiuroidea	BRITTLE STARS				
<i>Amphipholis squamata</i>	Brooding or small brittle star			x	
<i>Ophiuroidea</i>	unknown brittle star	x		x	
BRACHIOPODA	LAMPSHELLS				
<i>Terebratalia transversa</i>	Common Lampshell	x			
CHORDATA:	FISH				

Pisces					
<i>Cottidae</i>	unidentified sculpin		x	x	x
<i>Hypomesus pretiosus</i> eggs	Surf smelt eggs		x		
<i>Pholis ornata</i>	Saddleback gunnel	x		x	x

Appendix E: Field Sheets

Quadrat Sheet, CPAR:

Aquatic Reserve Intertidal Biota Monitoring

Quadrat Data Sheet

Site: _____ Date: _____ Time: _____

Team Members: _____

Tide Level: _____ Quadrat #: _____

Distances: Quadrat distance on transect line: _____ ft Transect on profile line: _____ ft

Photo after debris removal (initial): _____ QC check (initial): _____

Photo after *Ulva* sp. removal (initial): _____ QC check (initial): _____

Substrate in Quadrat (% cover):

Clay/Silt: _____ Sand (.002"- .08"): _____ Gravel (.08"-2"): _____

Cobble (2"-10"): _____ Boulders (>10"): _____ Shell debris: _____

Other (specify): _____

PERCENT COVERAGE METHOD: algae, plants and aggregating organisms:

If using the QUADRAT ESTIMATION worksheet, transfer that information here. If you encounter any aggregating species you believe are not on this list, please consult with a lead naturalist.

Organism Name	Guide Page #	Before <i>Ulva</i> removal	After <i>Ulva</i> removal
Eelgrass (Genus: <i>Zostera</i>)	Seaweeds, 1		
Green Seaweed (Phylum: Chlorophyta)	Seaweeds, 2		
Brown Seaweed (Phylum: <i>Chlorophyta</i>)	Seaweeds, 3-4		
Red Seaweed: (Phylum: Rhodophyta)	Seaweeds, 5-6		
Barnacles (Subphylum: Crustacea)	Invertebrates, 1		
Mussels (Genus: <i>Mytilus</i>)	Invertebrates, 1		
Aggregating anemone (<i>Anthopleura elegantissima</i>)	Invertebrates, 4		
Sponges (Phylum: Porifera)	Invertebrates, 7		
Bryozoans (Phylum: <i>Bryozoa</i>)	Invertebrates, 7		
Colonial Ascidiaceans (Class: <i>Ascidiacea</i>)	Invertebrates, 7		

What is the % Total **WITH** *Ulva* sp: _____ Visually does this seem accurate? _____

What is the % Total **WITHOUT** *Ulva* sp: _____ Visually does this seem accurate? _____

(Countable animals on the other side)

Quadrat Sheet, FBAR:

Site: _____ Date: _____ Time: _____

Team Members: _____

Tide Level: _____ Quadrat #: _____

Distances: Quadrat distance on transect line: _____ ft Transect on profile line: _____ ft

Photo after debris removal (initial): _____ QC check (initial): _____

Photo after *Ulva* sp. removal (initial): _____ QC check (initial): _____

Substrate in Quadrat (% cover):

Clay/Silt: _____ Sand (.002"- .08"): _____ Gravel (.08"-2"): _____

Cobble (2"-10"): _____ Boulders (>10"): _____ Shell debris: _____

Other (specify): _____

PERCENT COVERAGE METHOD: algae, plants and aggregating organisms:

If using the QUADRAT ESTIMATION worksheet, transfer that information here. If you encounter any aggregating species you believe are not on this list, please consult with a lead naturalist.

Organism Name	Guide Page #	Before <i>Ulva</i> removal	After <i>Ulva</i> removal
Eelgrass (Genus: <i>Zostera</i>)	Seaweeds, 1		
Green Seaweed (Phylum: Chlorophyta)	Seaweeds, 2		
Brown Seaweed (Phylum: Ochrophyta)	Seaweeds, 3-4		
Red Seaweed: (Phylum: Rhodophyta)	Seaweeds, 5-6		
Barnacles (Subphylum: Crustacea)	Invertebrates, 1		
Mussels (Genus: <i>Mytilus</i>)	Invertebrates, 1		
Aggregating anemone (<i>Anthopleura elegantissima</i>)	Invertebrates, 4		
Sponges (Phylum: Porifera)	Invertebrates, 7		
Bryozoans (Phylum: Bryozoa)	Invertebrates, 7		
Colonial Ascidiaceans (Class: Ascidiacea)	Invertebrates, 7		

What is the % Total **WITH** *Ulva* sp: _____ Visually does this seem accurate? _____

What is the % Total **WITHOUT** *Ulva* sp: _____ Visually does this seem accurate? _____

(Countable animals on the other side)

Countable Animals: Animals that can be counted and are >3mm in size. If you encounter any countable species you believe are not on this list, please consult with a lead naturalist.

Organism Name	Side #	Total before <i>Ulva</i>	Total after <i>Ulva</i>
Amphipods	2		
Isopods (Order: Isopoda)	2		
Shrimp (Infraorder: Caridea)	2		
Hermit Crabs (Superfamily: Paguroidea)	2		
Crabs (Infraorder: Brachyura)	2		
Shelled Snails (Class: Gastropoda)	2		
Limpets (Class: Gastropoda)			
Sea Slugs (Class: Gastropoda)			
Bivalves (Class: Bivalvia)			
Chitons (Polyplacophora)			
Ribbon Worms (Phylum: Nemertea)	2		
Flatworms (Phylum: Platyhelminthes)	2		
Polychaeta Segmented Worms (Class: Polychaeta)	2		
Non-Aggregating Anemones (Class: Anthozoa)			
Sea Stars (Class: Asteroidea)	8		
Brittle Stars (Class: Ophiuroidea)	8		
Sea Urchins (Class: Echinoidea)	8		
Sea Cucumbers (Class: Holothuroidea)	8		
Solitary Tunicates (Subphylum: Tunicata)			
Fish (Phylum: Chordata)			

Animals Buried in the Sediment (Fidalgo Bay)

Core Depth (cm): _____

	Organism Name	Number
1		
2		
3		
4		
5		

Notes:

Species Swath Sheet Example, Otter, FBAR:

Site:	Date & Time:	Expert & Scribe:									
					Section along profile line, in feet						
		0-10'	10-30'	30-40'	40-60'	60-90'	90-120'	120-170'	170' +		
FUNGI: Ascomycota	LICHENS										
<i>Caloplaca</i> sp.	Yellow lichen										
<i>Verrucaria</i> sp.	Lichen										
<i>Xanthoria</i> sp.	Lichen										
PLANTAE: Tracheophyta											
<i>Ambrosia chamissonis</i>	Silver bur ragweed										
<i>Argentina egedii</i>	Pacific silverweed										
<i>Atriplex patula</i>	Saltbush										
<i>Cakile</i> sp.	Sea-rocket										
<i>Distichlis spicata</i>	Salt Grass										
<i>Rumex acetosella</i>	Sheep sorrel										
<i>Lymus mollis</i>	"American dunegrass"										
<i>Zostera marina</i>	Eelgrass										
PLANTAE: Chlorophyta	GREEN ALGAE										
<i>Acrosiphonia</i> sp.	Green rope										
<i>Ulva intestinalis</i>	Sea lettuce (filamentous)										
<i>Ulva lactuca</i>	Sea lettuce (foliose)										
<i>Ulva prolifera</i>	Branched string lettuce										
<i>Ulva</i> sp.	Sea lettuce										
PLANTAE: Ochrophyta	BROWN ALGAE										
<i>Bryopsis</i> sp.	Green algae										
<i>Desmarestia ligulata</i>	"Flattened acid kelp"										
Diatoms	Filamentous diatoms										
<i>Fucus distichus</i>	Rockweed, "Two-headed Wrack"										
Phaeophyta	unidentified filamentous brown algae										
<i>Saccharina latissima</i>	Sugar kelp, Ribbon kelp										
<i>Saccharina</i> sp.	Kelp										
<i>Sargassum muticum</i>	Japanese wireweed (introd. species)										
<i>Scytosiphon lomentaria</i>	"Soda straws"										
PLANTAE: Rhodophyta	RED ALGAE										
<i>Gracilaria</i> sp.	Red spaghetti										
<i>Hildenbrandia</i> sp.	"Rusty rock"										
<i>Mastocarpus papillatus</i>	Turkish washcloth, tarspot										
<i>Polysiphonia</i> complex	Filamentous red algae										
<i>Porphyra</i> sp.	"Nori"										
Rhodophyta - Filamentous	Filamentous red algae										
Fidalgo Species List											

		0-10'	10-30'	30-40'	40-60'	60-90'	90-120'	120-170'	170' +		
ARTHROPODA: Insecta: Diptera	FLIES										
Diptera	Flies										
ARTHROPODA: Insecta: Dermaptera	EARWIGS										
<i>Anisolabis maritima</i>	marine earwig										
ARTHROPODA: Insecta: Coleoptera	BETLES										
<i>Liparocephalus cardicollis</i>	beetle larvae										
ARTHROPODA: Arachnida	MITES										
<i>Neomolgus littoralis</i>	Red velvet mite										
ARTHROPODA: Crustacea	CRUSTACEANS										
Balanomorpha	unidentified acorn barnacle										
<i>Balanus crenatus</i>	Crenate Barnacle										
<i>Balanus glandula</i>	Acorn Barnacle										
<i>Chthamalus dalli</i>	Little brown barnacle										
<i>Semibalanus cariosus</i>	Haystack Barnacle										
Caprellidae (skeleton shrimp)	Caprella amphipod										
Gammaridean amphipods	Gammarid amphipod										
<i>Traskorchestia traskiana</i>	Amphipod										
<i>Gnorimosphaeroma oregonensis</i>	Pill bug isopod										
<i>Ligia pallasii</i>	"Rock louse"										
<i>Pentidotea wosnesenskii</i>	Rockweed isopod										
<i>Heptacarpus</i> sp.	"shrimp"										
<i>Upogebia pugettensis</i>	"Blue mud shrimp" (burrow entrance only)										
<i>Cancer gracilis</i>	Graceful crab										
<i>Cancer magister</i>	Dungeness crab										
<i>Cancer oregonensis</i>	Pygmy rock crab										
<i>Hapalogaster mertensii?</i> (wrong habitat)	"Hairy crab"										
<i>Hemigrapsus nudus</i>	"Purple shore crab"										
<i>Hemigrapsus oregonensis</i>	"Yellow shore crab"										
<i>Oregonia gracilis</i>	Graceful Decorator crab										
<i>Pagurus granosimanus</i>	"Grainyhand hermit"										
<i>Pagurus hirsutiusculus</i>	"Hairy hermit"										
<i>Pagurus</i> sp.	unidentified hermit crab										
<i>Telmessus cheiragonus</i>	"Helmet crab"										
MOLLUSCA: Bivalvia	BIVALVES										
<i>Clinocardium nuttallii</i>	"Nuttall cockle" (heart cockle)										
<i>Crassostrea gigas</i>	"Pacific oyster" (introduced species)										
<i>Hiatella arctica</i>	Arctic Hiatella										
<i>Leukoma staminea</i>	"Pacific littleneck"										
<i>Macoma balthica</i>	"Baltic macoma" (introduced species)										
<i>Macoma inquinata</i>	Pointed macoma										
<i>Macoma nasuta</i>	"Bent-nose macoma"										
<i>Mya arenaria</i>	"Softshell clam" (introduced species)										
<i>Mytilus trossulus</i>	Pacific blue mussel										
<i>Nutricula tantilla ?</i>	Purple dwarf-venus										
<i>Nuttallia obscurata</i>	"Purple mahogany-clam" (introd.										
<i>Ostrea lurida</i>	Olympia oyster										
<i>Pododesmus macrochisma</i>	"Alaska jingle"										
<i>Saxidomus gigantea</i>	"Washington butterclam"										
<i>Tresus capax</i>	"Fat gaper"										
<i>Tresus</i> sp.	Gaper clam										
<i>Venerupis philippinarum</i>	"Japanese littleneck" (introduced										

		0-10'	10-30'	30-40'	40-60'	60-90'	90-120'	120-170'	170' +		
MOLLUSCA: Gastropoda	GASTROPODS										
<i>Amphissa columbiana</i>	"Wrinkled amphissa"										
<i>Batillaria attramentaria</i>	"Japanese false cerith" (introd. species)										
<i>Bitium</i> sp.	genus and species uncertain										
<i>Lacuna variegata</i>	Variegated "lacuna"										
<i>Lacuna vincta</i>	Northern lacuna										
<i>Lacuna</i> sp.	Lacuna										
<i>Lacuna</i> sp. eggs	Lacuna eggs										
<i>Lirabuccinum dirum</i>	Dire whelk										
<i>Littorina scutulata</i>	Checkered Periwinkle										
<i>Littorina sitkana</i>	"Sitka periwinkle"										
<i>Lottia digitalis</i>	"Ribbed limpet"										
<i>Lottia pelta</i>	"Shield limpet"										
<i>Lottia persona</i>	"Mask limpet"										
<i>Lottia scutum</i>	"Plate limpet"										
<i>Nassarius fraterculus</i>	Japanese nassa (introduced species)										
<i>Nassarius mendicus</i> (?- verify ID)	Western lean nassa										
<i>Nucella canaliculata</i>	Channeled dogwinkle										
<i>Nucella lamellosa</i>	"Frimled dogwinkle"										
<i>Nucella ostrina</i>	Northern "Emarginate dogwinkle"										
<i>Odosstomia tenuisculpta</i>	no common name										
<i>Onchidella borealis</i>	"Leather limpet"										
<i>Acanthodoris brunnea</i> (prob. wrong ID, likely <i>A. nanaimoensis</i>)	"Brown spiny doris"										
<i>Aglaja ocelligera</i>	Spotted Aglaja										
<i>Haminoea vesicula</i> (incl. egg masses)	"Blister glassy-bubble" (white bubble)										
<i>Peltochordis nobilis</i> (prob. wrong ID, likely <i>Doris montereyensis</i>)	Noble sea lemon										
Nudibranch eggs	eggs										
Nudibranch	unidentified nudibranch										
MOLLUSCA: Polyplacophora	CHITONS										
Lepidochitonidae	unidentified Lepidochiton										
<i>Mopalia kennerleyi</i>	"Northern hairy chiton"										
<i>Mopalia lignosa</i>	Woody chiton										
<i>Mopalia muscosa</i>	Mossy chiton										
PLATYHELMINTHES	FLATWORMS										
<i>Kaburakia excelsa</i>	"Giant flatworm"										
Platyhelminthes	unidentified flatworm										
NEMERTEA	RIBBON WORMS										
<i>Amphiporus bimaculatus</i>	Two-spotted ribbon worm										
<i>Carinoma mutabilis</i>	Nemertea - white										
<i>Emplectonema</i> sp.	Ribbon worm										
<i>Paranemertes peregrina</i>	Purple ribbon worm										
<i>Tubulanus polymorphus</i>	Nemertea - orange										
ANNELIDA: Oligochaeta	OLIGOCHAETE SEGMENTED WORMS										
<i>Oligochaeta</i> species list	Oligochaete										

		0-10'	10-30'	30-40'	40-60'	60-90'	90-120'	120-170'	170' +		
ANNELIDA: Polychaeta	POLYCHAETE SEGMENTED WORMS										
Capitellidae - <i>Capitella capitata</i>	Gallery worm										
Chaetopteridae	Bamboo worm										
Glyceridae	Bloodworm										
Hesionidae	Princess-of-Troy worms										
Hesionidae - <i>Oxydromus pugettensis</i>	Bat Star worm										
Lumbrinereidae	polychaete										
Nephtyidae	Goddess worm										
Nereididae	Pile worm										
Nereididae - <i>Alitta brandti</i>	Giant pile worm										
Nereididae - <i>Nereis sp.</i>	Sand worm										
Polychaeta	Polychaete										
Polychaeta - Tubiculous polychaete	unidentified tube worm										
Polynoidae	Scale worms										
Sabellidae	Sabellid tube worm										
Syllidae	Errant polychaete										
Terebellidae	Terebellid tube worm										
BRYOZOA	BRYOZOA										
Bryozoa	unidentified bryozoan										
<i>Dendrobeatia lichenoides</i>	Encrusting bryozoan										
<i>Membranipora membranacea</i>	Lacy crust bryozoan										
PORIFERA	SPONGES										
<i>Halichondria sp.</i>	Bread crumb sponge										
<i>Haliclona sp.</i>	"Brown encrusted sponge"										
CNIDARIA: ANTHOZOA	ANEMONES										
<i>Anthopleura artemisia</i>	Moonglow anemone										
<i>Diadumene lineata</i>	Orange-striped green anemone										
<i>Metridium senile</i>	Short plumose anemone										
ECHINODERMATA: Asteroidea	SEASTARS										
<i>Leptasterias hexactis</i>	Six-arm seastar										
<i>Pisaster ochraceus</i>	Ochre seastar										
ECHINODERMATA: Ophiuroidea	BRITTLE STARS										
<i>Amphipholis squamata</i>	Brooding or small brittle star										
Ophiuroidea	unknown brittle star										
BRACHIOPODA	LAMPSHELLS										
<i>Terebratalia transversa</i>	Common Lampshell										
CHORDATA: Tunicata	TUNICATES										
<i>Pyura haustor</i>	Wrinkled sea squirt										
CHORDATA: Pisces	FISH										
Cottidae	unidentified sculpin										
<i>Hypomesus pretiosus</i> eggs	Surf smelt eggs										
<i>Pholis ornata</i>	"Saddleback gunnel"										
Pisces	unidentified juvenile fish										
Fidalgo Species List											

Elevation Profile Sheet:

Site: _____ Date: _____ Time: _____

Team names: _____

Recorder: _____

Notes for starting point conditions (e.g. presence of landslide, large woody debris, or other shoreline modifications covering the starting point):

Directions: In column A record the number of feet traveled for each reading. Column B is the running total of column A. Column C is the actual profile reading (be sure to include + or -). Check the substrates found within each profile section.

Entry Number	A	B	C		Substrate (check all that apply)							Notes:
	Length of Survey Section (ft)	Cumulative Distance (ft)	+ or -	Survey Reading	Shell Debris	Clay/Silt	Sand (.002" - .08"; sugar grain to rice)	Gravel (.08" - 2"; pea to chicken egg)	Cobbles (2" - 10"; chicken egg to basketball)	Boulders (> 10"; larger than a basketball)	Large Woody Debris	
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