Marine Invertebrate Field Guide
Contents

ANEMONES ............................................................................................................................................................................................. 2
AGGREGATING ANEMONE (ANTHOPLEURA ELEGANTISSIMA) .............................................................................................................. 2
BROODING ANEMONE (EPIACTIS PROLIFERA) ......................................................................................................................................... 2
CHRISTMAS ANEMONE (URTICINA CRASSICORNIS) .............................................................................................................................. 3
PLUMOSE ANEMONE (METRIDIUM SENILE) ......................................................................................................................................... 3

BARNACLES ....................................................................................................................................................................................... 4
ACORN BARNACLE (BALANUS GLANDULA) ................................................................................................................................................. 4
HAYSTACK BARNACLE (SEMIBALANUS CARIOSUS) ............................................................................................................................... 4

CITTONS.................................................................................................................................................................................................. 5
BLACK KATY CHITON (KATHARINA TUNICATA) ........................................................................................................................................... 5
GUMBOOT CHITON (CRYPTUCHITON STELLERI) ....................................................................................................................................... 5
LINED CHITON (TONICELLA LINEATA) .................................................................................................................................................... 5
MOSSY CHITON (MOPALIA MUSCOSA) ..................................................................................................................................................... 6

CRABS................................................................................................................................................................................................ 7
GRACEFUL DECORATOR CRAB (OREGONIA GRACILIS) ............................................................................................................................. 7
HERMIT CRAB (PAGURUS GRANOSIMANUS).................................................................................................................................................. 7
KELP CRAB (PUGETTIA PRODOTA) ........................................................................................................................................................ 8
PURPLE SHORE CRAB (HEMIGRAPSUS NUDUS) ........................................................................................................................................ 8
RED ROCK CRAB (CANCER PRODUCTUS) ................................................................................................................................................. 8

ISOPODS ................................................................................................................................................................................................ 9
KELP ISOPODS (IDOTEA WOSNESENSII) .................................................................................................................................................. 9

LIMPETS ................................................................................................................................................................................................ 10
FINGER LIMPET (LOTTIA DIGITALIS) ....................................................................................................................................................... 10
KEYHOLE LIMPET (DIOODRA ASPERAPIA) ............................................................................................................................................... 10
PLATE LIMPET (TECTURA SCUTUM) ...................................................................................................................................................... 10

NUDBRANCHS .................................................................................................................................................................................. 11
LEOPARD NUDIBRANCH (DIALULA SANDIEGENSIS) ........................................................................................................................... 11
SEA CLOWN NUDIBRANCH (TROPHIA CATALINAEE) .................................................................................................................................... 11
SEA LEMON NUDIBRANCH (ANISODORIS NOBILIS) ...................................................................................................................................... 11
SHAGGY MOUSE NUDIBRANCH (AEOLIDIA PAPILLOSA) ................................................................................................................................... 12

SEA CUCUMBERS ............................................................................................................................................................................. 13
RED SEA CUCUMBER (CUCUMARIA MINIATA) ......................................................................................................................................... 13

SEA STARS ......................................................................................................................................................................................... 14
BLOOD STAR (HENRICA SP.) .................................................................................................................................................................... 14
MOTTLED STAR (EVASTERIAS TROSCHELI) .............................................................................................................................................. 14
SIX-RAYED STAR (LEPTASTERIAS HEXACTIS) ........................................................................................................................................... 14

SNAILS................................................................................................................................................................................................ 15
BLACK TURBAN SNAIL (CHLOROSTOMA FUNEBRALIS) ........................................................................................................................ 15
CHECKERED PERIWINKLE (LITTORINA SCUTULATA) ...................................................................................................................................... 15
DOG WINKLE (NUCELLA LAMELLOSA) ..................................................................................................................................................... 15

MARINE VERTEBRATE ....................................................................................................................................................................... 16
TIDE POOL SCULPIN (OLIGOCOTTUS MACULATUS) ........................................................................................................................................ 16
ANEMONES

Species Adaptations:

- All anemones have nematocysts, or stinging cells, which fire harpoon like microscopic threads and discharge a toxin into predator or prey. When eating, prey become paralyzed by the nematocysts and are swallowed whole. Nematocysts can only be used once and then they have to regrow.
- Anemones will pull tentacles in and close up to avoid desiccation and predators.
- Anemones have an adhesive foot, called a basal, which helps them cling to rocks.

Aggregating Anemone (Anthopleura elegantissima)

Tidal Zone: High to Sub

Identification:

- Averages 5cm in diameter.
- A green disc with pink-tipped tentacles.

Predators: Nudibranch, Snails, Crabs, Fishes, and Sea Stars

Food Source: Algae, Plankton, Small Crabs, Fish, Shrimp, and Isopods

Adaptations:

- Aggregating Anemone covers themselves with sand and shell pieces to conserve moisture and prevent from sun damage during exposure.
- Aggregating Anemones can pull themselves apart to make exact replicas of themselves and colonies of anemones will continue to grow until they run out of food or space.

Brooding Anemone (Epiactis prolifera)

Tide Zone: Lower Mid to Sub

Identification:

- Grow to 5cm in diameter and 10cm tall.
- Coloration varies with brown or greenish brown on eelgrass, red or pink on rocks, or gray.
- Tentacles are the same color as the body.

Predators: Nudibranchs, Sea Stars, Sculpins

Food Source: Small crustaceans

Adaptations:

- Brooding Anemone found on sheltered sides of rocks, under rocks, on algae and eelgrass.
- Brooding Anemone starts their lives as a female. At a certain age and size, they develop testes and spend the rest of its life as a hermaphrodite.
- Brooding Anemone is known for “brooding” its young on the outer surface of its body column.
Christmas Anemone (*Urticina crassicornis*)

**Tidal Zone:** Low to Sub

**Identification:**
- Grow to 30cm tall with a column diameter of 20cm.
- Coloration varies with red, green, yellow, brown, tan or olive Blotched with red and green looking like paint strokes.
- Smooth body column and the top of the column has rings of short, stubby tentacles with bands of white and ending with blunt white tips.

**Predators:** Sea Stars, Snails, Nudibranchs

**Food Source:** Crabs, Urchins, Mussels, Gastropods, Chitons, Barnacles, Fish

**Adaptations:**
- Christmas Anemones attach to rocks, docks, and solid substrates.
- Unaffected by the anemone’s sting, the Candy-striped Shrimp has a commensal relationship for protection and food scrapes.

Plumose Anemone (*Metridium senile*)

**Tidal Zone:** Mid to Sub

**Identification:**
- Grow to 10cm tall, but usually grows no more than 5cm.
- Coloration varies with white, brown, tan, or pinkish-orange.
- Smooth column with 100 thin, relatively short, translucent tentacles.

**Predators:** Sea Stars

**Food Source:** Anything that floats by like small fish, but most of their prey is not much larger than microscopic

**Adaptations:**
- Plumose Anemone tentacles never number more than 100. Tentacles can be extended three to four times their resting length while searching the water around them for prey.
- Plumose Anemone display two types of tentacles, common ones are used for feeding and the less common ones are used for defense.
  - As a defense, when encountered by another species of anemone or different genetic clone of the same species, the tip breaks off and adheres to the other individual by killing cells at that spot and possibly the entire animal.
- Plumose Anemone are found on docks, pilings, rocks, other hard surfaces and growing on carapace and claws of crabs.
Barnacles

**Species Adaptations:**
- Barnacles have special glands that produce a type of cement, one of the strongest known natural adhesives, which they use to attach themselves to hard surfaces such as rocks, ships, whales, and docks.
- As barnacles grow, they create their own little "houses that “look like tiny volcanoes. These “houses” are made of calcium carbonate which the barnacles make by combining carbon dioxide with calcium extracted from the water.
- Food is captured by waving an arrangement of limbs called, cirri, in the water to catch drifting plankton.
- Inner hinged, overlapping shell plates seal the barnacle off to avoid desiccation and predation during low tides.

**Acorn Barnacle** (*Balanus glandula*)

- **Tidal Zone:** High to Mid
- **Identification:**
  - Grow to 2 cm in diameter and are as tall as they are wide.
  - Coloration is light gray or white.
  - Shell is made of 6 plates that form a W or M shape when closed.
- **Predators:** Worms, Limpets, Whelks, Sea Stars, Fish, Shorebirds
- **Food Source:** Phytoplankton, Zooplankton (filter feeder)
- **Adaptions:**
  - Acorn Barnacles have 6 pairs of feathery cirri.
  - Acorn Barnacles often grow in crowded conditions and are columnar shape.

**Haystack Barnacle** (*Semibalanus cariosus*)

- **Tidal Zone:** Mid to Low
- **Identification:**
  - Grow to 5 cm wide at their base.
  - Coloration is white as juveniles and becomes grayer with age.
- **Predators:** Worms, Limpets, Whelks, Sea Stars, Fish, Shorebirds
- **Food Source:** Phytoplankton, Zooplankton (filter feeder)
- **Adaptions:**
  - Haystack Barnacles are named “haystack” because it looks like a pile of straw.
  - The top plates of the Haystack Barnacle look almost like a beak and form a wavy line where they join.
CHITONS

Species Adaptations:
- Chitons have a fleshy muscular foot which they use to cling tightly to rocks.
- Chitons have eight exposed, tightly overlapping shell plates on their backs.
- Chitons crawl along rocks and forage mostly for algae using their radulae, or teeth, to scrape it off of the substrate. Teeth have magnetite making them hard enough to etch glass.

Black Katy Chiton (*Katharina tunicata*)

**Tidal Zone:** Mid to Sub

**Identification:**
- Average 7 to 12cm long.
- Black, leathery, thick, sleek, smooth, girdles cover white plates.
- Mantle and foot are pinkish-red or orange-red.

**Predators:** Crabs, Fish, Anemones, Sea Stars, Birds, and Sea Otters

**Food Source:** Diatoms, Brown and Red Algae

**Adaptions:**
- Latin name honors Lady Katherine Douglas, the naturalist who sent the first specimen of this species for studies to England in 1815.
- Black Katy Chitons can be out in the sun longer than other chitons.

Gumboot Chiton (*Cryptochiton stelleri*)

**Tidal Zone:** Low to Sub

**Identification:**
- Grow to 35 cm long.
- Leathery and brown or reddish brown.
- Plates are covered by a tough, grainy girdle.

**Predators:** River Otters, Octopus, Sea Star

**Food Source:** Encrusting Red Algae, Sea Lettuce

**Adaptions:**
- Gumboot Chiton are over 500 million years and are the world’s largest chiton.
- Gumboot Chiton receive their color as they digested red algae.
- Dead Gumboot Chiton washed up on shore often resembles half a cantaloupe or butterfly wings based.

Lined Chiton (*Tonicella lineata*)

**Tidal Zone:** Mid to Sub

**Identification:**
- Grow to 2 to 5cm long.
- Coloration varies from pink to lavender with red, white, blue and black wavy lines and a spotted girdle.

**Predators:** Sea Stars, Fish, Shorebirds, Sea Otters

**Food Source:** Microorganisms on Algae, small Crustaceans

**Adaptions:**
- Lined Chiton are usually found on Encrusting Coralline Algae.
- A Lined Chiton’s coloration is coordinated by its preferred meal, which is the Encrusting Coralline Algae.
**Mossy Chiton (Mopalia muscosa)**

**Tidal Zone:** Mid to Low

**Identification:**
- Grow to 3 to 7 cm long.
- Coloration varies with brown, dark olive, or greenish gray, and rarely tinted with red, orange, or green.
- The eight plates often have a whitish stripe down their centers and most of each plate is exposed.

**Predators:** Sea Stars, Crabs, Shore Birds

**Food Source:** Primarily Green and Red Algae, Sponges, Mussels, and Barnacles unlike other chitons

**Adaptations:**
- Mossy Chiton are found under rocks or in crevices.
- Small barnacles, limpets, and algae often grow on the girdle of the Mossy Chiton and can cover the plates completely.
Crabs

Species Adaptations:
- Crabs have five pairs of appendages with the front pair are called chelipeds, which are the claws, and the remaining four pairs are walking legs.
- In order to grow, crabs must molt their shells which usually comes off by a slit in the back of the shell. New skin hardens with calcium carbonate which is extracted from sea water or eating the old shell. Crabs can shed legs or claws by contracting special muscles at predetermined breakage points. Lost appendages can regenerate through molting, except for hermit and porcelain crabs.
- Crabs will burrow into the sand for camouflage from predation and while hunting prey.

Graceful Decorator Crab *(Oregonia gracilis)*

Tidal Zone: Low

Identification:
- Grow to 4 cm across
- Coloration is usually gray or tan.
- The *carapace* is heart shaped.
- Long, spindly legs which display *setae* as well.

Predators: Fish, Birds, and Seals

Food Source: Algae, Sponges, and small Crustaceans

Adaptions:
- Graceful Decorator Crabs are sluggish and the least active of all crabs.
- If the Graceful Decorator Crabs is relocated, it replaces old growth on its back and legs with species from its new environment.
- Graceful Decorator Crabs are usually found open among seaweed, or on pilings, but can also be found in crevices.

Hermit Crab *(Pagurus granosimanus)*

Tidal Zone: Low

Identification:
- Grow to 2cm across.
- Coloration is gray-green.
- Relatively hairless crabs.

Predators: Fish

Food Source: eats almost anything

Adaptions:
- Hermit Crabs are usually found in periwinkle shells.
- Hermit Crab’s found in Puget Sound are the smallest in Pacific Northwest.
- A Scale Worm can often be found inside the shell of a Hermit Crab waiting to share food.
**Kelp Crab** (*Pugettia producta*)

**Tidal Zone:** Low to Sub

**Identification:**
- Grow to 12 cm across.
- Have a smooth dark chestnut shell with a reddish underbelly.
- Have long, thin legs with sharp tips for grasping marine algae.

**Predators:** Sea Otters

**Food Source:** Brown and Red Algae, but in winter they eat animal a diet of Mussels, Barnacles, Bryozoans and Hydroids.

**Adaptions:**
- Kelp Crabs are usually camouflaged, hard to spot, and slow moving.
- Young kelp crabs graze in tide pools whereas large kelp crabs usually live in kelp forests.
- Often, kelp crabs are parasitized by a barnacle, which can render males and females sterile or convert some males into hermaphrodites.

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**Purple Shore Crab** (*Hemigrapsus nudus*)

**Tidal Zone:** Mid to Low

**Identification:**
- Grow to 5 cm across.
- Coloration on the carapace is dark wine-purple with purple-red spots on the claws.
- Carapace is shaped like a rounded rectangle with three jagged “teeth” on the front margin.

**Predators:** Shorebirds, some Fish

**Food Source:** algae and scavenge dead animals

**Adaptions:**
- Purple Shore Crabs can spend long periods of time without direct contact with seawater which is why they are often found in higher tidal zones.
- A Purple Shore Crab’s first pair of legs are pinchers with each of the other eight legs ending in a pointy hook which helps them grip slippery rocks.

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**Red Rock Crab** (*Cancer productus*)

**Tidal Zone:** Low to Sub

**Identification:**
- Grow to 20 cm across.
- Coloration of shell is brick-red with a yellowish, white underbelly and black-tipped claws.
- Carapace shaped like a fan or letter ‘D.’

**Predators:** Fish, Shorebirds,

**Food Source:** Oysters, Clams, Barnacles, Snails, smaller Crabs

**Adaptions:**
- Red Rock Crabs are found among rocks in the tide pools and are one of the larger crabs seen in the Salish Sea area.
- Barnacles, Sponges, Tunicates, Algae, and Worms all have a commensal relationship Red Rock Crabs are often found living near or on the crabs.
Isopods

Species Adaptations:
- Many isopods are exclusively parasitic on crabs, shrimps, lobsters, fish, barnacles, amphipods, and on other isopods.
- Unlike the terrestrial pill bug, isopods cannot roll themselves into balls.
- Females isopods develop brood pouches on their bellies where the eggs hatch from.

Kelp Isopods (*Idotea wosnesenskii*)

Tidal Zone: Mid to Sub

Identification:
- Grow to 4 cm long.
- Have a flattened, elongated, and segmented body.
- Coloration varies with tan, brown, red, green, black, or even pink to match seaweed habitat.

Predators: Fish, Shorebirds

Food Source: Diatoms, Algae, Dogwinkle eggs capsules

Adaptions:
- Kelp Isopods are found in mussel beds, kelp, and under rocks.
- Kelp Isopods are sluggish in nature, but swim very well and breath underwater.
LIMPETS

Species Adaptations:
• Limpets scrape tiny algae from rocks with their radula, breaking up food particles.
• Limpets rely on their suction power to protect them from pounding surf and predators.
• As an escape defense, many species of limpets can sense and respond to the approach of a sea star, so it pulls up its shell and moves to another location.
• When tides rise, limpets graze within a range of up to 2 meters, but when tide falls, they feel their way back to crevices protected from waves where their shells have worn snug depressions in rocks.

Finger Limpet (Lottia digitalis)

Tidal Zone: High
Identification:
• Shell growth to 2cm long.
• Shell often have broad ribs with mixed large and fine white dots, and the tops of the shell may look eroded.
Predators: Birds, Crabs, and Fish
Food Source: grazes on microalgae
Adaptions:
• Finger Limpets prefer vertical rock faces and will cluster in groups to retain moisture.
• These limpets do not make home scars, instead they settle in a different area after each low tide.

Keyhole Limpet (Diodora aspera)

Tidal Zone: High to Low
Identification:
• Shell grows to 6cm in length.
• Coloration can be gray-brown and white with light and dark radiating ribs.
• Small opening at the top of the shell
Predators: Sea Star
Food Source: Algae
Adaptions:
• Keyhole Limpets have a symbiotic relationship with scale worms living between their foot and shell. The worms receive protection and access to food while biting the tube feet of predatory sea stars and helping to protect the limpet.

Plate Limpet (Tectura scutum)

Tidal Zone: Mid to Sub
Identification:
• Shell grows to 6cm in length.
• Shell has a flat profile with smooth edges.
• Usually brownish to olive-green and spotted with white.
Predators: Crabs, Sea Stars, Birds, and Fish
Food Source: microscopic and encrusting Red Algae
Adaptions:
• The Plate Limpet is the only limpet on the west coast of the United States with brown tentacles.
• Green algae and barnacles grow from the surface of the shell of the Plate Limpet.
Nudibranchs

Species Adaptions:
- Commonly called Sea Slugs, Nudibranchs come in a variety of shapes and bright colors to warn predators of poisonous stings and foul taste.
- Sensory tentacles called *rhinophores* arise from the front and back of the animal which can be conical, feathery, or spires.
- Most species of Nudibranchs are hermaphroditic and can be both genders simultaneously.

**Leopard Nudibranch** (*Dialula sandiegensis*)

Tidal Zone: Low

Identification:
- Grows to 8cm in length.
- Body is firm and oval.
- Colored yellow to near white with dark brown scattered rings of various sizes.

Predators: Crabs, Fish

Food Source: Sponges

Adaptions:
- The Leopard Nudibranch is named after the brown rings that dot the body to create a definite leopard-print look.
- Leopard Nudibranch eggs are a ribbon that is narrow, white, and often attached in an oval spiral under rock ledges.

**Sea Clown Nudibranch** (*Triopha catalinae*)

Tidal Zone: Low to Sub

Identification:
- Grow to 15cm in length.
- Colored translucent white to pale yellow with deep orange spots.
- Body is a flattened shape with a gill flume found in middle of the dorsal side and nonretractable orange tipped projections.

Predators: Crabs, Fish

Food Source: Bryozoans

Adaptions:
- Tidepool fish ignore this species, possibly due to some sort of chemical repellant.
- Sea Clown Nudibranch are one of the largest nudibranchs and are able to crawl upside down through the water.

**Sea Lemon Nudibranch** (*Anisodoris nobilis*)

Tidal Zone: Low to Sub

Identification:
- Grow to 8cm in length, but some can grow to 20cm in length.
- Coloration is orange-yellow with dark brown to black blotches.
- *Cerata* are replaced by flowery, white plume of gills on the upper rear end.

Predators: Crabs, Fish

Food Source: Sponges only

Adaptions:
- The false Sea Lemon Nudibranch (*Archidoris montereyensis*) is similar, but blotches are on and around bumps on back.
- The Sea Lemon Nudibranch may produce a lot of sweet, fruity-smelling mucus when disturbed.
- Eggs look like layers of yellow ribbon.
**Shaggy Mouse Nudibranch** (*Aeolidia papillosa*)

**Tidal Zone:** Low

**Identification:**
- Grow to 10cm in length.
- Coloration is white to brownish or dull gray to pink.
- *Cerata* are elongated, cylindrical, leaflike, somewhat flattened and arranged in diagonal rows with white tips.
- *Rhinophores* are white tipped, smooth, free standing, and cannot be retracted.

**Predators:** Crabs, Fish

**Food Source:** Sea Anemones

**Adaptions:**
- The Shaggy Mouse Nudibranch have a protective mucus in their esophagus which allows them to consume the nematocyst from Sea Anemones without causing pain. They then use the nematocyst on the outside of their skin as a defense mechanism. The *cerata* then reflect the color of eaten anemone.
- Shaggy Mouse Nudibranch can consume half to full body weight each day in food.
Sea Cucumbers

Species Adaptations:

- The mouth of a Sea Cucumber is surrounded by branched tentacles, plume-like structures looking like mop heads, that are special tube feet and act as part of their water vascular system.
- When feeding, the Sea Cucumber may position itself in a spot on the ocean floor where a current will bring a steady supply of food. Tentacles then open to collect food and the cucumber sticks each tentacle in its mouth, one at a time licking them off.
- In response to danger, Sea Cucumbers can self-eviscerate by exerting pressure and squeezing water inside itself to expel the organs out through the anus to satisfy predators while they make a getaway or to scare them off. Sea cucumbers will then grow another set of organs.
- Many Sea Cucumbers are quite poisonous and can affect humans if their poisons come in contact with eyes.

Red Sea Cucumber *(Cucumaria miniata)*

Tidal Zone: Low to Sub

Identification:

- Grows to 10 to 25cm in length.
- Body is cylindrical and tapered toward the rear.
- Coloration varies with reddish-brown, pinkish-brown, brick red, or bright orange.

Predators: Sea Star

Food Source: Plankton and Detritus

Adaptions:

- Red Sea Cucumbers are found living between rocks and in crevices.
- A Red Sea Cucumber’s tentacle can retract quickly if disturbed.
Sea Stars

Species Adaptations:
- More well known as the starfish, Sea Stars are not actually fish, but echinoderms, and more closely related to sea urchins and sand dollars.
- Sea Stars are capable of regenerating limbs in the event that one or more is severed or damaged.
- A sea star can travel three inches per minute by reaching out with its tube feet’s suckers, and pulling its body along.

Blood Star (*Henricia sp.*)

Tidal Zone: Low to Sub
Identification:
- Grow to 13cm across.
- Coloration is bright orange-red Some have gray patches at the base of the arms or on the disk
- Have five, slender rays. Spine is smooth and skin is pincer-free.

Predators: Shorebirds, Crabs
Food Source: Sponges, Plankton, Bacteria
Adaptions:
- The Blood Stars only has sensory organs at the tip of each arm. These organs look like a red eye spot and allow it to “see” though their vision only depicts differences of light and dark.
- Blood Stars are found on the west coast of North America, and in the eastern Pacific Ocean.

Mottled Star (*Evasterias troschelii*)

Tidal Zone: Low to Sub
Identification:
- Grows up to 56cm across.
- Have five, long rays.
- Coloration varies from brown and dark blue-gray to rust, pink, and orange.

Predators: Gulls, Crabs
Food Source: Bivalves, Limpets, Snails, Brachiopods, and Barnacles
Adaptions:
- Mottled Star is also known as the false ochre star because of their resemblance.
- It is common to find scale worms living commensally on the underside of the star.

Six-rayed Star (*Leptasterias hexactis*)

Tidal Zone: Mid to Low
Identification:
- Body to 10cm across, but usually smaller.
- Coloration varies with grey, olive-green, blackish, or orange with pink tones.
- Generally, have six rays, but can have five to seven. Has a distinct central line of white spines along each arm.

Predators: Shorebirds, Sea Otters
Food Source: Sea Cucumbers, Snails, Limpets, Chitons, Mussels, Barnacles
Adaptations:
- The Six-rayed Star is found under rocks or algae, or among small beds of mussels.
- Six-rayed Star clings tightly to rocks with its tube feet.
Snails

Species Adaptations:
- Snails can withdraw completely into their shells and close a trap-door plate which provides protection from sun exposure, predators, wave action, and desiccation.
- The snail’s shell grows larger when the snail extracts calcium carbonate from sea water and deposits it through a membranous mantel and onto the edge of the shells opening. The deposit is made unevenly so that the shell grows into a compact spiral rather than a long tube.
- Marine snails have a distinct head, display plume-like gills and have eyes on tentacles which can be withdrawn in case of a threat. Most marine snails have additional tentacles for smell, taste, and touch.

Black Turban Snail (*Chlorostoma funebralis*)

Tidal Zone: High to Mid
Identification:
- Shell grows up to 3cm in length.
- Shell coloration is black or purple. Shell is broad and thick with the top often eroded.
Predators: Sea Stars, Crabs
Food Source: algae
Adaptions:
- Black Turban Snail shells are a favorite of Hermit Crabs for new homes.
- Black Turban Snails have a symbiotic relationship with small crabs who live on the snail’s foot and tentacles.

Checkered Periwinkle (*Littorina scutulata*)

Tidal Zone: High to Mid
Identification:
- Shell grows to 1.5cm in length.
- Shell is smooth and dark.
- Shell coloration varies from brownish to purple or even black with a banded or checkered white pattern.
Predators: Fish, Sea Stars, Gulls, Scooters
Food Source: Algal film on rocks, Diatoms
Adaptions:
- Unlike most marine organisms, Checkered Periwinkles spend most of their time in the highest parts of the intertidal.
- Checkered Periwinkles are also known for feeding on lichens found above the high tide line.

Dog Winkle (*Nucella lamellosa*)

Tidal Zone: High to Low
Identification:
- Shell grows to 5 cm in length.
- Shell can be rough, frilly, smooth, or thick.
- Shell coloration varies from a uniform pale brown, gray or creamy white.
Predators: ducks, sea stars
Food Source: barnacles, mussels
Adaptions:
- Dog Winkle will force its long, thin tube-like mouth in between shells releasing enzymes to liquefy the prey’s body and then they suck it up.
**Marine Vertebrate**

**Tide Pool Sculpin** (*Oligocottus maculatus*)

**Tidal Zone:**

**Identification:**
- Grow to 9cm in length.
- Large head and front fins with a disproportionately tapering body.
- Front fins are large and shaped like a fan.
- Coloration varies but is usually a mottled gray.

**Predators:** Larger Fish, Birds

**Food Source:** Shrimp, smaller Fish, Fish eggs, Crabs

**Adaptations:**
- Within twenty minutes, a tide pool Sculpin can change its color to blend in with a new environment making them great at camouflaging. Sculpins can become various shades of red, brown, green, or gray.
- Sculpins are extremely tolerant of the changes in water temperature, salinity, and oxygen within its pool.