

SHELLFISH SAFETY



MAYNARD JOHNNY JR. 2006



**A Guide to Activities for
The Joint Penelakut Tribe,
Cowichan Tribes and
Hul'qumi'num Treaty Group
Shellfish Safety Project**

Prepared as companion activities for:

The Shellfish Safety Resource Manual, Karen Fediuk, Mia Parker
and Kristiann Allen, Ladysmith BC: 2007

Prepared by:

Linda Hiemstra, Mel Mor Science, Nanaimo, BC
Tel: 250-751-4862

March 19, 2007



Materials List for Activities

1. Who is a Happy Clam?

- Activity Guide
- 2 – marine charts for Cowichan and Kuper Island areas (rolled up)
- Large laminated map (rolled up)
- Reusable stickers on sticker storage pages (front pouch of binder)

2. This is My Beach!

- Activity Guide
- 2 Laminated Enhanced Resource and Human Activity Maps (back pouch of binder)
- Data Collection Sheets (extras in Activity Guide)

3. What is My Name?

- Activity Page for Participants to Complete (extras in Activity Guide)
- Activity Key (Activity Guide)

4. Is It Safe To Eat?

- Posters (rolled up)
- Poster Examples (Activity Guide)

5. General

- CD with files (Activity Guide)





Activity Guide for

This is My Beach

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This is My Beach! – Activity Guide

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This is My Beach! – Activity Guide

Activity Goals

The following are the goals of this activity.

- To make participants aware of the beaches in the reserve lands
- To provide information on the intertidal (beach) environment and the animals that inhabit this area
- To provide information on sanitary and biotoxin harvesting closures
- To make participants aware of human activities that cause harvesting closures
- To provide a safe and interesting learning environment for participants

Activity Description

- This activity takes place on a beach at low tide.
- Onsite, participants are provided information on tides, beach zones and animals that inhabit the zones.
- Participants are divided into groups to locate and identify animals found in specific zones and enter the data on data reporting sheets.
- Participants then identify potential pollution sources as far as they can see and enter on the data reporting sheets.
- Participants discuss the shellfish harvesting status of the beach in relation to the season, the identified potential pollution issues and the other human activities.
- All animals and beach material is returned to the state in which it was prior to the beach activity.



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Instructions

Organizing the Activity

1. Choose the beach for the activity that has been or will be harvested for shellfish and is relatively easy to access for a group.
2. Determine how long it will take to travel to the beach and how long you plan to spend on the beach (1-2 hours).
3. Check the tides and schedule the beach activity so a .8m or a 2ft tide level or lower occurs during the first hour on the beach.
4. Calculate the travel time and determine the departure and return schedule.
5. Using the land use maps and local knowledge determine the upland use around the beach.
6. Using charts and local knowledge determine the marine activities in the beach area.
7. Call the Fisheries Officer and determine if the beach is open or closed to harvesting; the harvest schedule for the past several months and for the next season and known contamination sources.

Leading the Activity

1. Enter the beach. At the high point of the beach, look towards the water and provide a general description of tides move on the beach, intertidal zones and how specific animals inhabit each zone. Draw attention to obvious inhabitants of specific zones such as seaweed, barnacles, starfish, clam depressions etc. (10 minutes)
2. Find the high water line for the previous 24 hours. Locate and identify animals inhabiting this area and the area above which gets the least amount of seawater coverage. (15 minutes)
3. As you walk towards the water, identify general zone areas and surface animals in each area. Discuss how each animal needs the water for survival and food. (10 minutes)
4. As you move towards the water, dispatch groups of students to locate animals by turning over rocks and debris, digging etc to areas roughly equivalent to zones. Each group is to identify the animals and location and enter the information on the Data Record. Ask the question “Which beach area has the greatest diversity of species and the largest number of animals?” (25 minutes)
5. Congregate at the water’s edge and look towards the upland. Identify potential sources of shellfish contamination for the beach and surrounding area. Enter this information on the Data Record. Discuss what materials could be in the water from these sources and the problem these materials could cause to humans. (15 minutes)



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6. Facing the water, identify potential sources of shellfish contamination as far as you can see. Enter this information on the Data Record. Discuss what materials could be in the water from these sources and the problem these materials could cause to humans. HINT: Be sure to include the ocean as a source of biotoxins. (15 minutes)
7. Discuss if the beach is open or closed to harvesting and the impact of human activity on the beach. (10 minutes)
8. Instructor collects Data Records. (2 minutes)
9. Return all animals and beach materials to the state at which they were found initially. (10 minutes)
10. Leave the beach.

Activity Materials

1. Activity Guide
2. Data Report Sheets – one for each group
3. Pencils
4. Resource Map Kuper Island and Cowichan area

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Resource Maps

The two resource maps are provided. These maps were modified from iMaps BC Land Resources Data Warehouse, URL: <http://maps.gov.bc.ca/imf50/imf.jsp?site=imapbc>. The maps are laminated versions for field use.

Resource Information

Tides

- Tides are the alternating rise and fall of the ocean water on the land; produced by the gravitational pull of the moon and the sun on the earth.
- The moon takes about 24 hours and 50 minutes to return to the same position in the sky from one day to the next; therefore tides of one day repeat about 50 minutes later on following day.
- The tidal pattern in the Strait of Georgia is called semi-diurnal - two high tides and two low tides every 24 hours.
- The tides are not equal and one high tide is higher than the other and one low tide is lower than the other.
- Many factors affect the tides: the shape of the coastline, depth of the water, contour of the ocean floor, and other influences.
- Being able to read tides is useful to plan harvesting times and will also indicate when a boat can access an area.
- It is critical to consult a tide table that represents the specific area you are interested in. For Cowichan area and Kuper Island look up the tide table for Fulford Harbour at: <http://www.niveauxdeau.gc.ca/english/Canada.shtml>.

Beach or Intertidal Environment

The beach or intertidal environment is between the land and the ocean. It is also called the littoral zone. The intertidal area is divided into sections or zones according to the influence of the tides or how often or how much water covers the area. See Figure 1 below.



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The intertidal area is in constant change and is therefore a very difficult place for animals and plants to survive. Despite the harshness, it remains one of the most productive aquatic regions - the water is rich in nutrients, has an abundant supply of oxygen and plankton, the tiny marine food for many shellfish, is brought in with each tide.

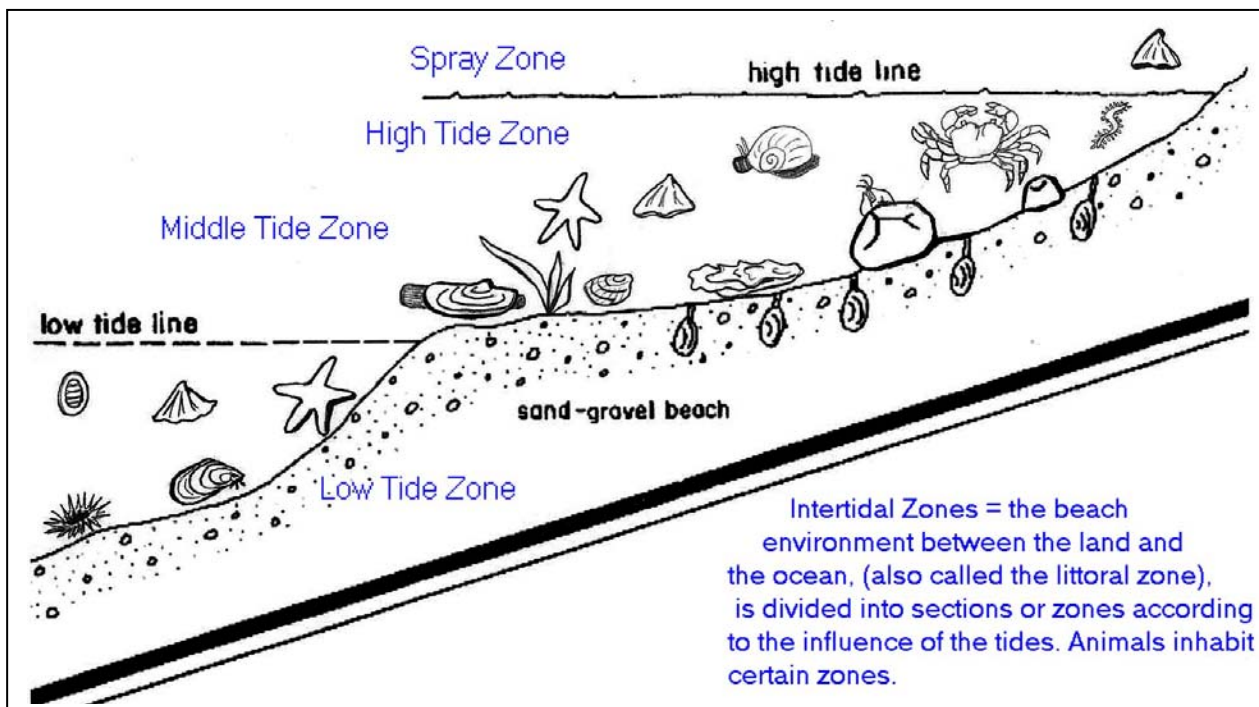


Figure 1 Intertidal Zones and the Animals that Inhabit Each Zone

Intertidal Zones

1. Spray Zone (Upper Littoral, Splash Zone or Barnacle Belt) is dry much of the time, but is sprayed with saltwater during high tides. It is flooded during storms and extremely high water.

- barnacles
- lichens
- lice
- limpets
- periwinkles
- whelks



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2. High Tide Zone (Upper Mid-littoral Zone) is flooded only during high tide and has limited vegetation.

- anemones
- barnacles
- brittle stars
- chitons
- crabs
- green algae
- limpets
- mussels
- sea stars
- snails
- whelks

3. Middle Tide Zone (Lower Mid-littoral Zone) is a turbulent area covered and uncovered twice a day with saltwater.

- anemones
- barnacles
- chitons
- crabs
- green algae
- limpets
- mussels
- sea lettuce
- sea palms
- sea stars
- snails
- sponges
- whelks
- clams
- oysters

4. Low Tide Zone (Lower Littoral Zone) area is usually under water and is only exposed during very low tides. Organisms in this zone are not well adapted to long periods of dryness or to the extreme temperatures of the upper zones.

- abalone
- anemones
- brown seaweed
- chitons
- crabs
- green algae
- hydroids
- limpets
- mussels
- nudibranchs
- sculpin
- sea cucumber
- sea lettuce
- sea palms
- sea stars
- sea urchins
- shrimp
- snails
- sponges
- surf grass
- tube worms
- whelks

NOTES



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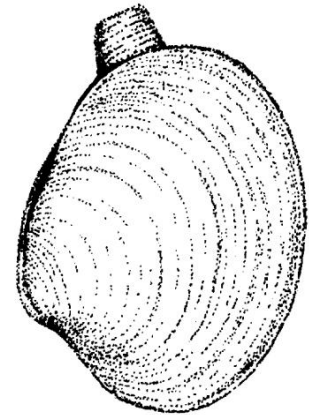
Identification of Intertidal Species

Butter Clam, *Saxidomus gigantea*

Size: to 130mm (5 inches)

Description: Butter clams have chalky-white shells with fine concentric rings and they lack the radiating ridges found on the Littleneck clam shells. The siphon can retract completely into the shell. They grow to approximately five inches in length and are common in the middle to lower intertidal areas.

Habitat: Found in a variety of substrates but typically occur in areas with porous sand, broken shell or gravely mud. They are common in protected beaches in bays and estuaries along BC coast. They burrow to a maximum depth of 25 cm and adults remain in same burrow for life. Crabs and fishes prey on juveniles; moon snails, birds and sea stars prey on adults.



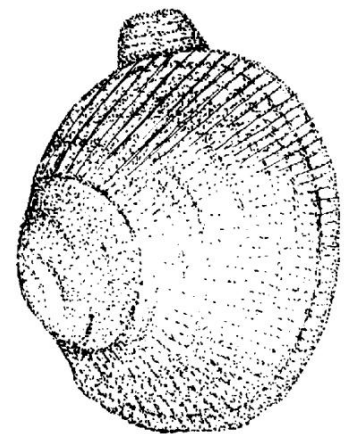
Littleneck Clam, *Protothaca staminea*

Size: to 80mm (3 inches)

Description: Littleneck clams have oval shells with radiating ribs and concentric ridges with highly variable colouration. In the ocean and along the coast, the colour is often whitish with patterns of brown lines along the sides. In bays and estuaries, the colour is commonly grey or yellowish grey.

Range: Common in protected beaches in bays and estuaries and near rocky outcrops on outer coastal areas. They are found from Baja California to the Aleutian Islands in Alaska.

Habitat: Commonly found in firm, gravel beaches and are often found with Butter clams. They can burrow up to 15 cm, but are usually found 3-8 cm below surface. Adults remain in same burrow for life. They occur slightly above mid-intertidal to the subtidal up to 12 m. Crabs and fishes prey on juveniles and moon snails, birds, and sea stars prey on adult clams.





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Manila Clam, *Tapes philippinarum*

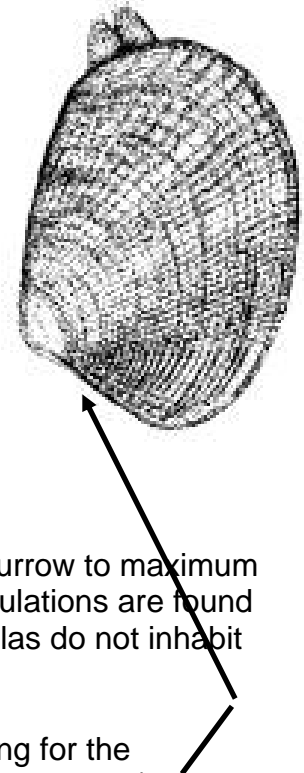
Size: to 75mm (3 inches)

Description: Manila clams have oval elongated shells with visible radial ribs; ribs stronger at posterior end. Shell colour is variable, gray to brown, often with streaked patterns and occasionally angular pattern similar to native littleneck. The siphon tip is split. Interior often has purple or yellow coloration; inside edge of the shell is smooth to the touch.

Range: Manila clams are not native to BC. They have adapted well to BC intertidal areas and are now common in protected beaches, bays and estuaries in the Georgia Strait and west coast of Vancouver Island. There are also small isolated populations in Queen Charlotte Strait and around Bella Bella.

Habitat: Preferred habitat is sand or gravel beaches, where they burrow to maximum depth of 10 cm. Adults remain in same location for life. Manila populations are found from the 1 m intertidal zone to well above mid-intertidal level. Manilas do not inhabit subtidal areas.

- ❖ Find a Manila and a Littleneck clam and tell them apart by looking for the depression next to the points where the shells started growing (see arrow). Feel that the depression area is flat on a Manila clam and on the littleneck there is a ridge formed by the edges of the two shells.



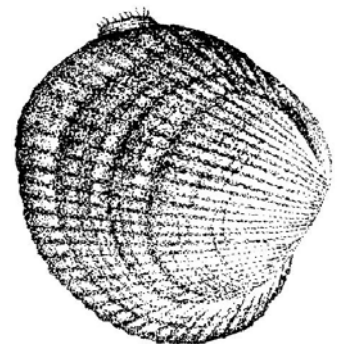
Pacific Cockle, *Clinocardium nuttallii*

Size: to 114mm (about 5 1/2 inches)

Description: The Cockle shell is as high, or slightly higher, than it is long. It has 34-38 strong ribs with wavy lines at the margins. While buried, the short siphons shows at surface. Yellow-brown colour with a mottled russet and brown pattern is common.

Range: Distribution is scattered on tidal flats along the coast, but is not abundant in any one location.

Habitat: Preferred habitat is soft, sand-mud or eelgrass beds. Cockles are often associated with Butter and Littleneck clams.





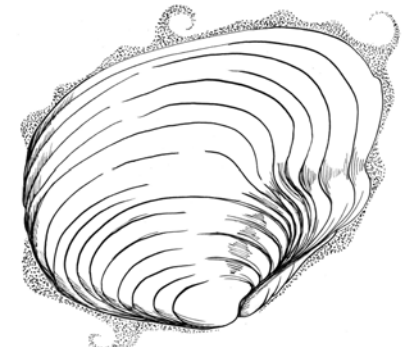
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They either create a shallow burrow or may be found on surface. They are able to move across beach and do not remain in same burrow. Cockles are most common in intertidal or shallow subtidal to 30 m depth. Cockles are easy prey because they occur on the surfaces of tidal flats and predators include sea stars, crabs, flatfish and birds.

Horse Clam (or Pacific Gaper), *Tresus nuttallii*

Size: to 1750mm (about 7 inches)

Description: A large, elongated shell with a length of approximately 1.5 times the height. The shells gape and are not able to contain the body and the large siphon. The siphon has leather-like plates at the tip. It has a smaller body and siphon compared to the Geoduck clam.



Range: Widespread in sheltered coastal areas of BC, but less abundant in the north.

Habitat: Horse clams prefer sandy substrates and eelgrass beds. They burrow to 1 m and adults remain in same burrow for life. They prefer the lower one third of intertidal zone to 20 m subtidal depth. Predators include birds, moon snails, sea stars, crabs, and various fishes.

Razor Clam, *Siliqua patula*

Size: to 180mm (about 7 inches)

Description: A long, thin, brittle shell is covered with a layer of shiny brown periostracum. Two white siphons extend from one end of the shell and a foot extends from the other. The shell is about 15 cm (6 inches) long and about 6.5 cm (2.5 inches) wide. Razor clams are rapid digger requiring specialized tools for harvesting.



Range: Razors occur only on surf-swept beaches in Long Beach region on the west coast of Vancouver Island and on beaches east of Massett on the northeast coast of Graham Island in the Queen Charlotte Islands.



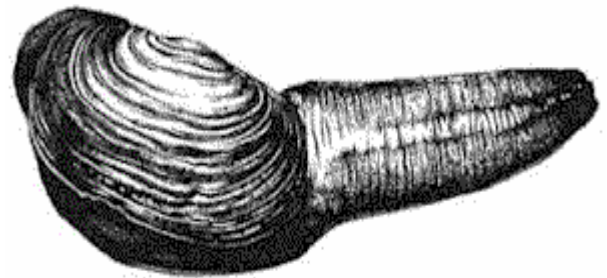
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Habitat: Found in sandy, exposed beaches they usually burrow up to a depth of 25 cm. When disturbed, they can burrow to depths greater than 60 cm in less than a minute. They occur from mid-tide level to 20 m depth subtidally. Predators include gulls, ducks, crabs and fish.

Geoduck Clam, *Panope abrupta*

Size: to 1950mm (7.5 inches or more)

Description: Geoduck is the world's largest burrowing clam and can live for 140 to 160 years. Shells are chalky-white, may reach nine inches in length and do not completely close. The long siphon lacks the leather-like flaps of the horse clam.



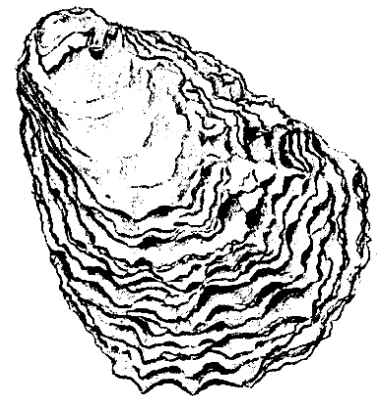
Range: Geoduck is widespread throughout BC, in sheltered to moderately exposed brackish water or outer coastal areas.

Habitat: They prefer fine mud, sand or gravel and are sometimes abundant in eelgrass. Mostly occur subtidally, from 8 to 120 m in depth, but they may also be found in lower intertidal areas. Predators include sea stars, crabs, fishes, birds, and sea otters.

Pacific Oyster, *Crassostrea gigas*

Size: to 12 inches in length

Description: Oysters are variable in shape, from long and thin to round and deep. The shell is fluted; exterior grey-white with new growth often purple-black; smooth white interior. Lower (left) shell or valve is usually cupped; upper valve is flattened and smaller than other valve.



Range: Oysters are found from Prince William Sound, Alaska south to Newport Bay, California.

Habitat: Oysters attach permanently to surfaces and are most often found on structures or firm or rocky beaches. They inhabit intertidal areas to 20 feet (6m) depth.



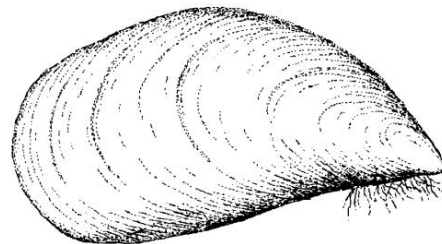
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Blue Mussel, *Mytilus edulis*

California Mussel, *Mytilus californianus*

Size: Blue mussel to 4½ inches & California mussel to 10 inches

Description: Smooth or lightly ridged dark blue shells, which are equal and are elongated. California mussels shells are thick and pointed at anterior and are blue black. Mussels attach themselves to rocks, docks etc. by strong, thin threads called byssal threads, which are produced by a gland in the foot.



Range: Mussels are very common and widely distributed along BC coast.

Habitat: Mussels inhabit rocky shorelines on rocks, gravel, or compact mud. They are also common on floating or suspended surfaces. They occur intertidally and to 45 m depth subtidally. Dense colonies of mussels can be found between 1.5 to 3.7 m tide levels. Predators include diving ducks, sea stars, crabs, snails, and sea urchins.

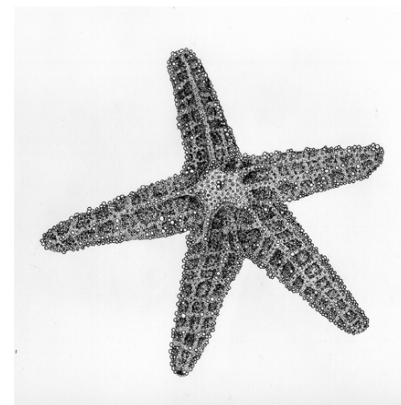
Ochre Star, *Pisaster ochraceus*

Size: Arm radius to 7 inches

Description: The Ochre Star has 5 arms (rays) with a very thick and very stiff body. It has shorter, thicker rays than Mottled Star. It ranges in colour from purple, orange, yellow to brown with a network of white spines.

Range: Sitka, Alaska to Cedros Island, Baja California.

Habitat: Often found in clusters, intertidally in mussel beds or on structures or rocks, to 87 m depth.



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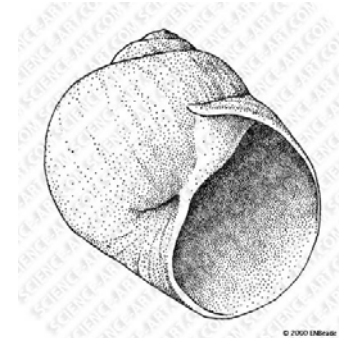
Lewis' Moonsnail, *Polinices lewisii*

Size: to 5 1/2 inches high

Description: The Moonsnail has a large globular shell with a whitish exterior, a thin brown periostracum, wide and flaring aperture and a tan to brown horn operculum. The soft body is translucent brown with spots or blotches.

Range: Southeastern Alaska to southern California.

Habitat: Commonly found in sandy intertidal areas to 50m depth.



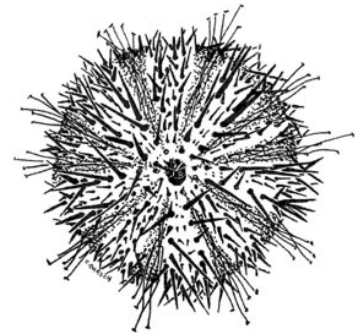
Green Sea Urchin, *Strongylocentrotus droebachiensis*

Size: test (shell) diameter to about 3½ and to about 1½ inches high

Description: Green sea urchins reach a maximum shell or "test" diameter of slightly greater than 100 mm on the Pacific coast. This urchin is a spiny oval shaped creature, greenish brown in color.

Range: In the Pacific Ocean, the green urchin is found from the Aleutian Islands down the west coast of North America to Oregon. This urchin is also found on the east coast of Canada.

Habitat: Green sea urchins are found at depths of 0 to 300 m, but are most common in the upper 50 m where kelp and other macroalgae are plentiful. The optimum environment is around 16°C and between 28 and 33 ppt salinity. Green sea urchins are found in abundance in BC waters and may be found in tide pools in the low intertidal zone, but are primarily found in the subtidal zone in areas with large gravel to rocky substrate.





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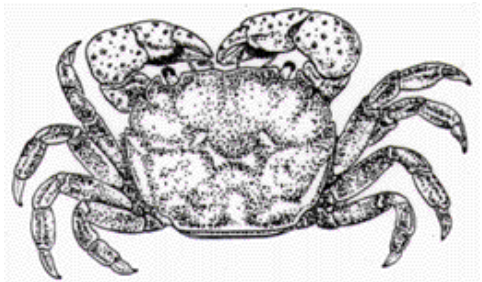
Purple Shore Crab, *Hemigrapsus nudus*

Size: carapace to 2¼ inches (5.5cm) wide

Description: Purple Shore crabs have a square carapace with dark spots on claws. They may be olive or red-brown. The walking legs are not hairy.

Range: Yakobi Island, Alaska to Mexico.

Habitat: Purple shore crabs are found in the mid to lower intertidal areas, where they most commonly eat barnacles.

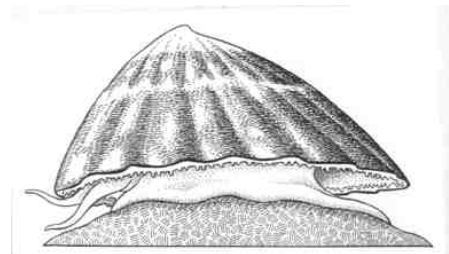


Keyhole Limpet, Whitecap Limpet, Shield Limpet, Ribbed Limpet, Plate Limpet

Size: Range 1 to 2 inches.

Description: Limpets have a round, cone shaped shell with a single apex.

Habitat: Limpets inhabit a variety of high intertidal to subtidal environments including rock crevices and areas in association with seaweeds and barnacles.

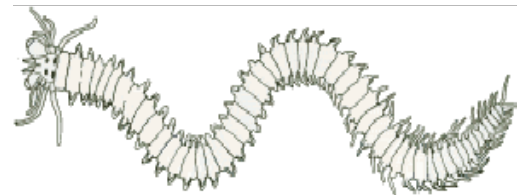


Clam Worm, *Nereis vexillosa*

Blood Worm, *Glycera americana*

Size: Clam Worm 6 to 12 inches and Blood Worm to 13 inches

Description: Worms are iridescent green-blue to grey or brown hues with many paddle-like feet. Blood worm's rear and head is more tapered than the Clam worm.



Habitat: Worms inhabit both the intertidal and subtidal areas, often in mussel beds, mudflats, and in the roots of eel grass.



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Potential Sources of Shellfish Contamination

- The coast of British Columbia yields an abundance of clams, mussels, scallops and oysters for human consumption.
- Large areas of the coast are closed for the harvest of shellfish.
- Shellfish Closures are notices from government agencies that commercial harvesters and members of the public (recreational harvesters, tourists, First Nations) should not harvest shellfish in a specific area.
- Closures are due to sewage contamination or dangerous levels of toxins and pathogens, both human-produced and natural.



Human Sources

Sanitary closures are assessed by counting fecal coliform bacteria: tiny animals that normally live in the guts of animals. Fecal coliform bacteria show if human or animal fecal wastes are likely present - and this indicates that other bacteria and viruses that do cause human and animal illness may also present.

Shellfish filter large volumes of water to extract suspended food particles and in this process can concentrate harmful substances. Harmful bacteria, viruses and toxic substances present in the water can be concentrated in shellfish.

Pollution sources, such as runoff from urban and agricultural areas, sewage discharges, faulty septic fields or drainage from wildlife areas, can negatively affect water quality causing sanitary closure for shellfish harvesting.

Multiple pollution sources account for the largest number of closures followed generally by agricultural/urban runoff, hinterland drainage, outfall sewage discharges and marine vessel discharges.

Natural Sources

Marine toxins produced by naturally occurring plankton are called biotoxins. Shellfish concentrate biotoxins while feeding and the shellfish become harmful to eat. Shellfish can become toxic shellfish in BC at any time of the year.



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Paralytic Shellfish Poisoning (PSP) is produced by plankton naturally occurring in our marine water and is concentrated by shellfish. Cooking does not destroy the toxin.

Amnesiac Shellfish Poisoning (ASP) is caused by domoic acid, a toxin also produced by natural plankton. Shellfish and crabs are tested for domoic acid.

Potential Pollution Sources for the Area

- Marinas and Anchored Boats
- Wildlife
- Seaplanes
- Ferry Traffic
- Agriculture
- Biotoxins
- Urban Development
- Garbage
- Sewage Outfalls
- Industry

NOTES



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Topics for Discussion or Further Investigation

Patterns

Seasonality

- Plankton grows faster and is more abundant in the summer time.
- Summer brings more boats and people into the area.

Environmental Factors

- Many conditions change the amount of contaminants reaching shellfish intertidal areas: Rainfall – Temperature - Ocean Currents and Tides

Issues That Can Be Helped or Prevented

Point Source Pollution means identifying the source of pollution and controlling contaminants so they do not flow into the ocean.

- This includes checking household septic tanks are in good shape and are not leaking.
- Through Regional District referral systems, Environment Canada assists municipal and regional planning departments by providing information on local shoreline sanitary conditions, shellfish resources and concerns about sewage disposal, storm water control and farm waste management practices.
- Ensuring that coastal facilities have proper waste disposal systems.
- Through referral systems for the federal Department of Transport, Navigable Waters Protection Act and the provincial Waste Management and Crown Lands Acts, Environment Canada provides input on siting and waste handling concerns with respect to shoreline installations and floating operations such as aquaculture facilities, logging and fishing camps.

Enforcing pollution regulations for boats on designated water bodies.

- Through the Pacific Shellfish Classification Committee recommendations are made to the provincial Ministry of Environment, Lands and Parks for the designation of water bodies under the new Pleasure and Non-pleasure Craft Sewage Pollution Prevention Regulations in the Canada Shipping Act.



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For More Information

Fisheries and Oceans Canada – Tides Currents and Water Levels:
<http://www.niveauxdeau.gc.ca/english/Canada.shtml>

Fisheries and Oceans Canada – GIS Maps with Data Programs:
http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm

Environment Canada Fact Sheet on shellfish and water quality:
http://www.atl.ec.gc.ca/epb/factsheets/sfish_wq.htmlsurveys

Environment Canada shellfish Water Quality Protection Program:
<http://www.pyr.ec.gc.ca/EN/shellfish/index.shtml>

<http://www.keepersweb.org>
http://www.atl.ec.gc.ca/epb/factsheets/sfish_wq.html
<http://www.pyr.ec.gc.ca/EN/Shellfish/index.shtml>

Fediuk, Karen, Parker, Mia and Allen, Kristiann. 2005. Shellfish Safety Resource Manual. A Joint Penelakut and Chemainus Fisheries Project. Ladysmith, BC.

Harbo, Rick M. 1997. Shells & Shellfish of the Pacific Northwest. A Field Guide. Harbour Publishing, Madeira Park BC, Canada.

Harbo, Rick M. 1999. Whelks to Whales. Coastal Marine Life of Oregon, Washington, British Columbia and Alaska. Harbour Publishing. Madeira Park BC, Canada.

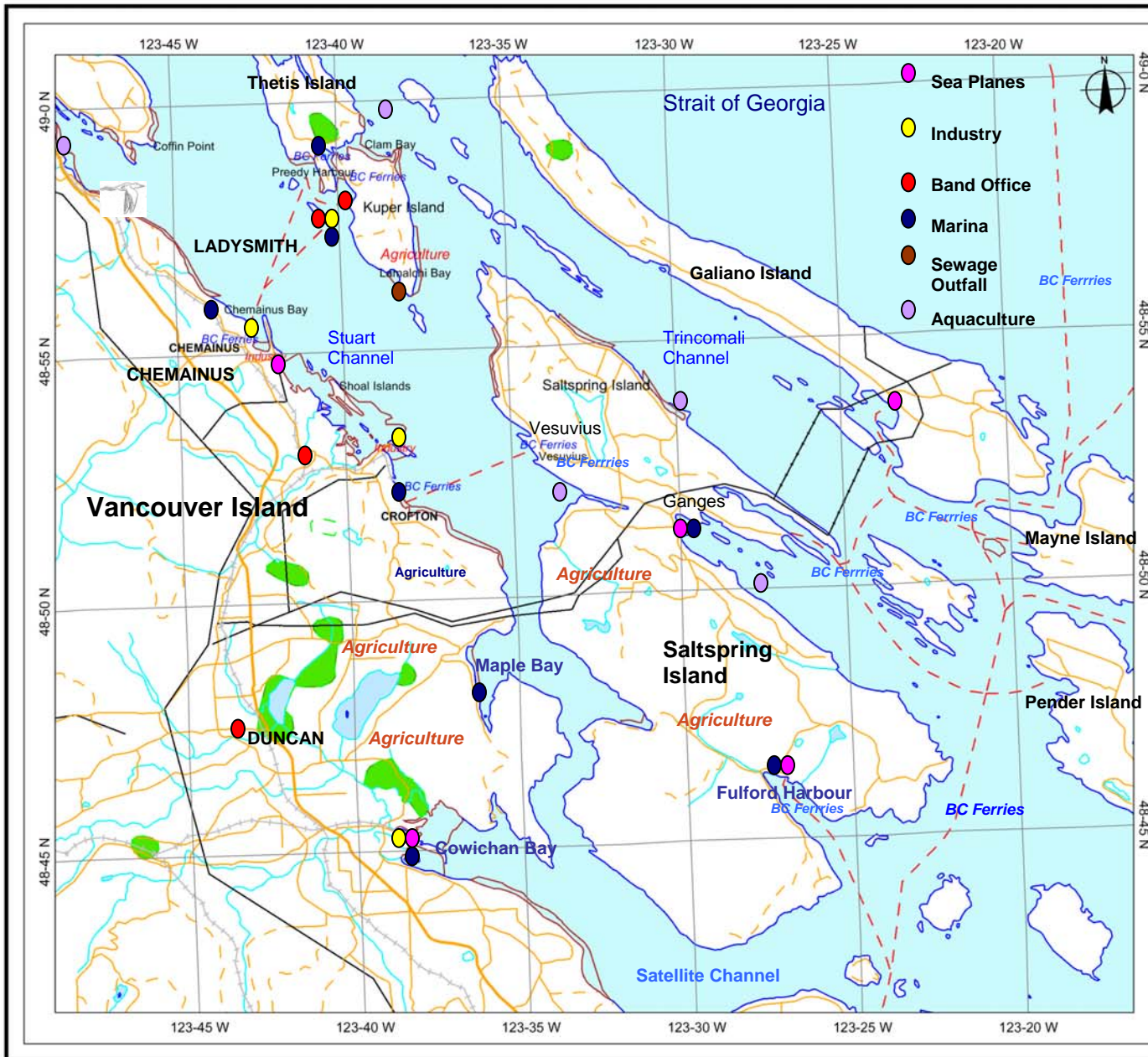
NOTES



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Data Record Sheet

| | | |
|----------------|--|------------------------|
| Beach | | |
| Name(s) | | |
| Date | | |
| | | |
| | Animals | Intertidal Zone |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | Uses of the Land that are Potential Sources of Shellfish Contamination | Location |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| | Uses of the Water that are Potential Sources of Shellfish Contamination | Location |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |



- Sea Planes
- Industry
- Band Office
- Marina
- Sewage Outfall
- Aquaculture

BRITISH COLUMBIA

Area 18 Resource Map

Legend

(1:250,000) Map Text - Geographical - Mountains, Lakes, etc.

(1:250,000) Transportation - Roads, Railroads, etc.

- Road (Parallel Lanes 2 or More Unidirectional Flow)
- Road (Parallel Lanes 2 or More Unidirectional Flow, As an Arterial)
- Road (Parallel Lanes 1 Lane)
- Road (Parallel Lanes 2 Lanes)
- Road (Parallel Lanes 3 or More Unidirectional Flow)
- Road (Lower across Dry Weather)
- Road (Winter Road)
- Road (Parallel Lanes 2 Unidirectional L.C.)
- Road (Parallel Lanes 2 Unidirectional L.C. across 10m Barrier)

0 3 6 km.

Scale: 1:204,659

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CAUTION: Maps obtained using this site are not designed to assist in navigation. These maps may be generalized and may not reflect current conditions. Uncharted hazards may exist. DO NOT USE THESE MAPS FOR NAVIGATIONAL PURPOSES.

Datum/Projection: NAD83, Albers Equal Area Conic

Key Map of British Columbia

Fort St. John
Terrace
Quesnel
Revelstoke
Trail
Victoria



Posters for

Is It Safe to Eat?

Prepared as a companion activity for:

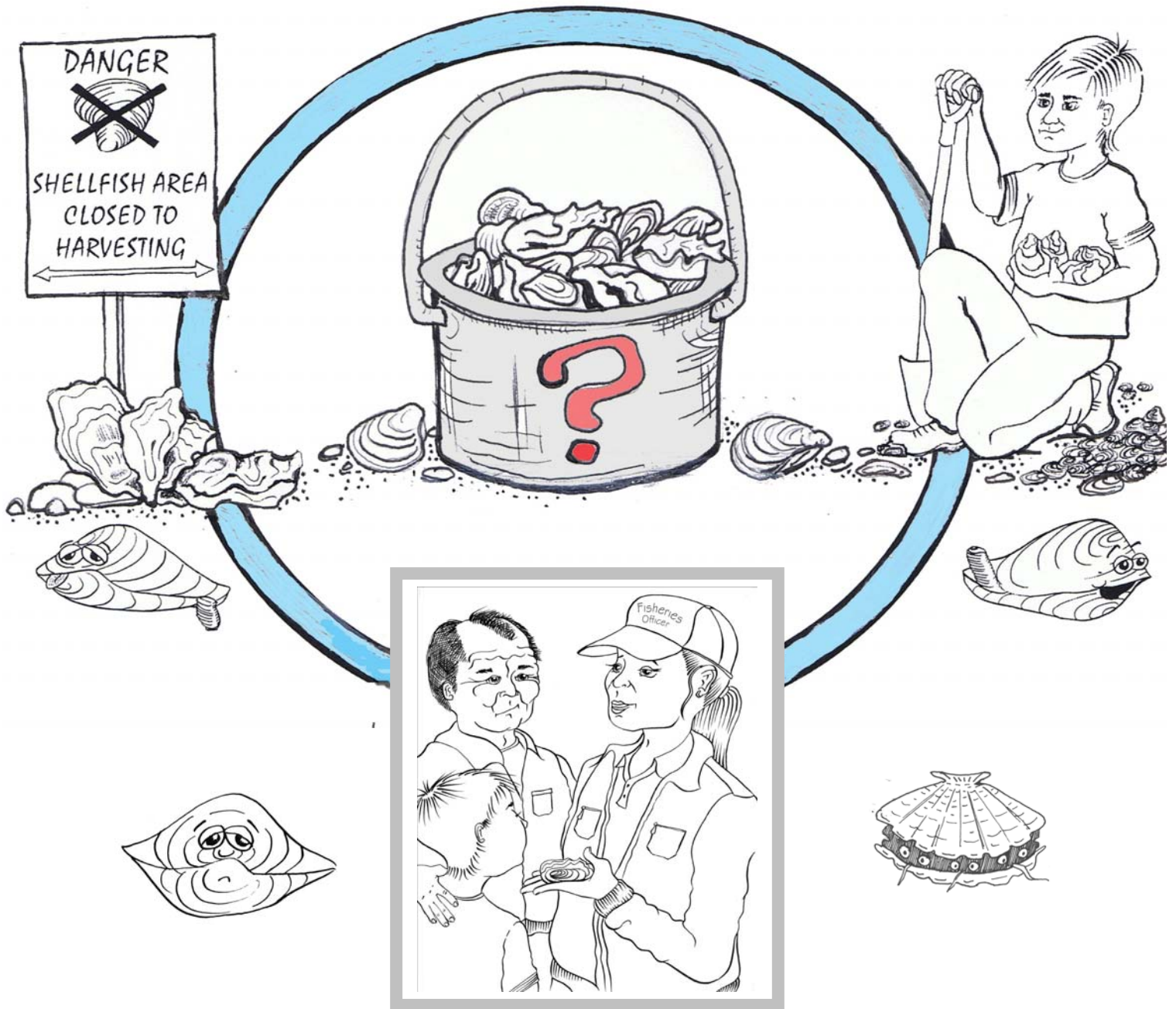
The Shellfish Safety Resource Manual, Karen Fediuk, Mia Parker
and Kristiann Allen, Ladysmith BC: 2007

Prepared by:

Linda Hiemstra, Mel Mor Science, Nanaimo, BC
Tel: 250-751-4862

March 19, 2007

Are Those Shellfish Safe to Eat?



Questions to Ask

1. What beach did the shellfish come from?
2. Is the beach open to shellfish harvesting?
3. Are these shellfish harvested from areas safe from contamination?



Where it is Safe to Harvest?

1. Call your Resource Manager or Fisheries Officer.

Kuper Island: Loren James

Tel: 246-2321 Extension 225

Cowichan Tribes: Wayne Paige

Tel: 748-3196

Halalt Band: Bert Thomas

Tel: 246-4736

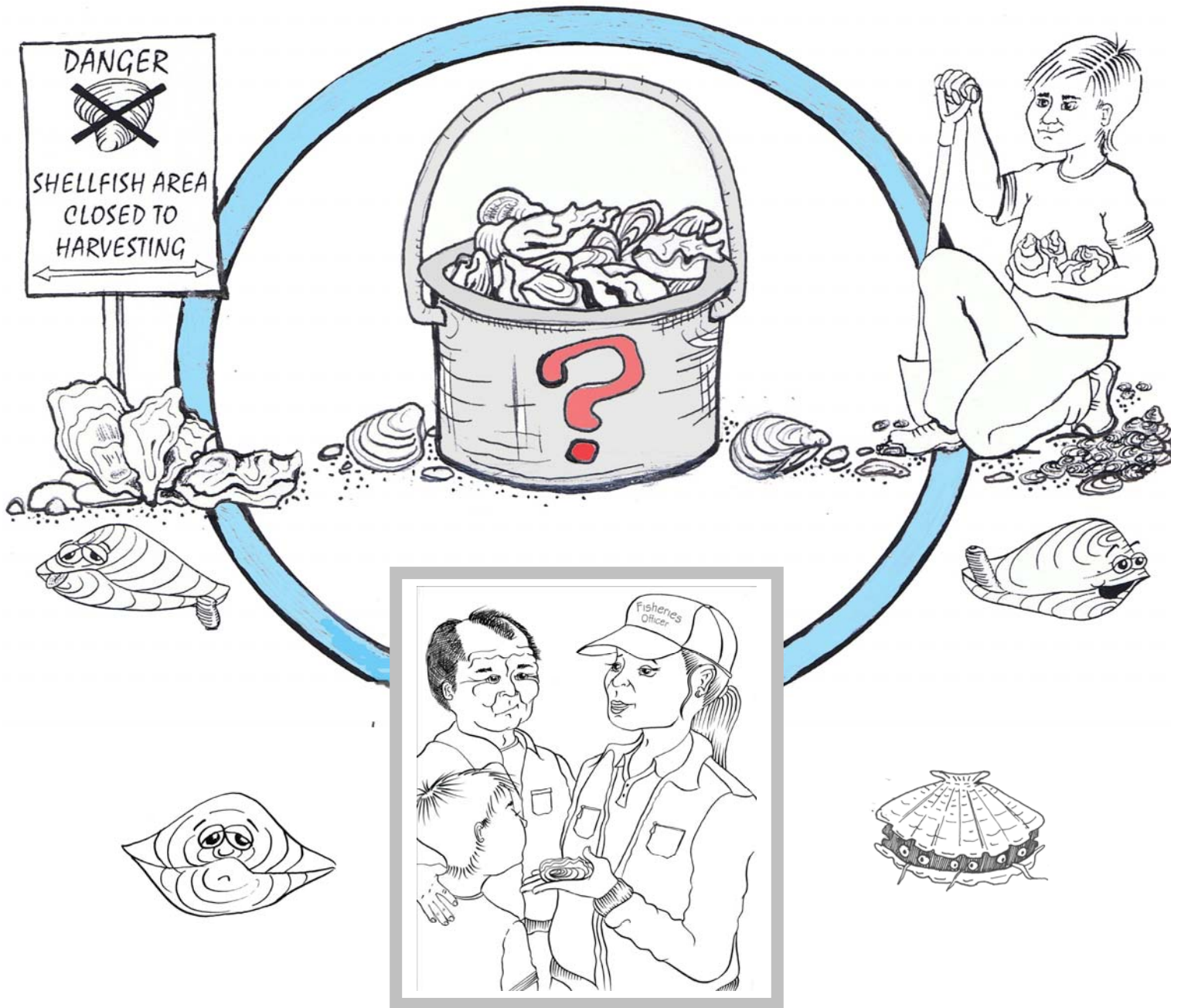
Lyackson Band

Tel: 246-5019

Chemainus Band: Kevin Frenchie

Tel: 245-7155 Extension 247

Are Those Shellfish Safe to Eat?



Questions to Ask

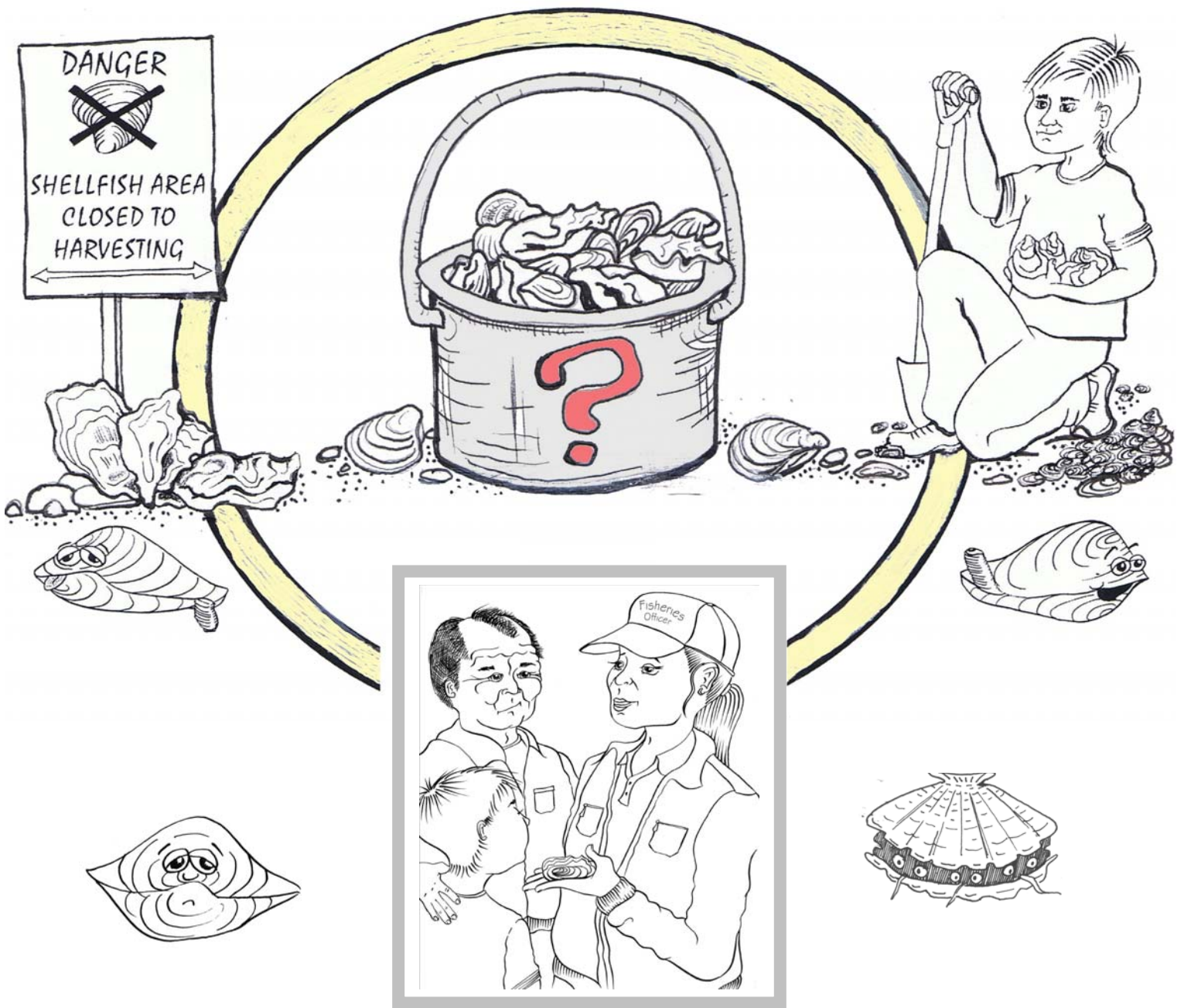
1. What beach did the shellfish come from?
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Where it is Safe to Harvest?

1. Call your Resource Manager or Fisheries Officer.
2. Read the closure postings at the Band office.
3. Check the website below.

Are Those Shellfish Safe to Eat?



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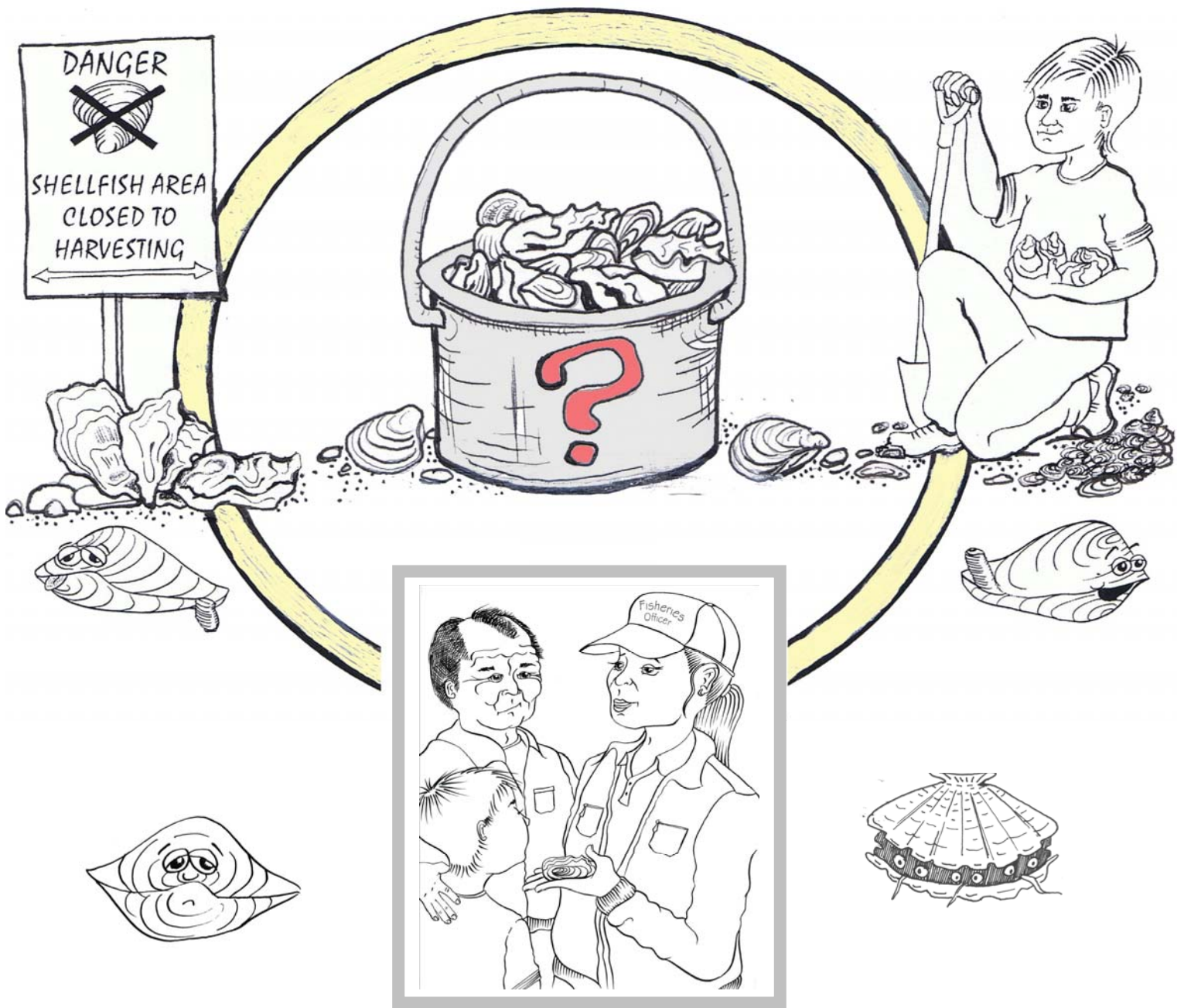
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Are Those Shellfish Safe to Eat?



Questions to Ask

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3. Are these shellfish harvested from areas safe from contamination?



Where it is Safe to Harvest?

1. Call your Resource Manager or Fisheries Officer

2. Read the closure postings at the Band office.

3. Check the website below.



Activity Guide for

What is My Name?

Prepared as a companion activity for:

The Shellfish Safety Resource Manual, Karen Fediuk, Mia Parker
and Kristiann Allen, Ladysmith BC: 2007

Prepared by:

Linda Hiemstra, Mel Mor Science, Nanaimo, BC
Tel: 250-751-4862

March 19, 2007



What is My Name? – Activity

Indicate the letter of the Hul'qumi'num name under the English name.



Figure 1. Dungeness Crab

Hul'qumi'num ____



Figure 2. Butter Clam

Hul'qumi'num ____



Figure 3. Horse Clam

Hul'qumi'num ____



Figure 4. Cockle

Hul'qumi'num ____



Figure 5. Oyster

Hul'qumi'num ____



Figure 6. Mussel

Hul'qumi'num ____



Figure 7. Manila Clam

Hul'qumi'num ____

HUL'QUMI'NUM

- a. sweem
- b. lhew'qum'
- c. 'ey'x
- d. skw'lhey'
- e. tl'uxwtl'uxw
- f. st'ula'um / st'ula'am
- g. s'axwa'

Let's make a sentence! Say the Hul'q'umi'num' words for:

- Dig clams
- Gather oysters
- Let's go dig clams.
- Let's go gather oysters.



What is My Name? – Activity

Activity Key

Indicate the letter of the Hul'qumi'num name under the English name.



Figure 1. Dungeness Crab

Hul'qumi'num - c



Figure 2. Butter Clam

Hul'qumi'num - g



Figure 3. Horse Clam

Hul'qumi'num - a



Figure 4. Cockle

Hul'qumi'num - f



Figure 5. Oyster

Hul'qumi'num - e



Figure 6. Mussel

Hul'qumi'num - b



Figure 7. Manila Clam

Hul'qumi'num - d

HUL'QUMI'NUM

- a. sweem
- b. lhew'qum'
- c. 'ey'x
- d. skw'lhey'
- e. tl'uxwtl'uxw
- f. stl'ula'um / st'ula'am
- g. s'axwa'

Let's make a sentence! Say the island Hul'qumi'num' words for:

- Dig clams – t'hwaalh
- Gather oysters - tstl'uxwtl'uxw
- Let's go dig clams. - 'ilhe nem' t'hwaalh
- Let's go gather oysters. - 'ilhe nem' tstl'uxwtl'uxw



Activity Guide for

Who is a Happy Clam?

Prepared as a companion activity for:

The Shellfish Safety Resource Manual, Karen Fediuk, Mia Parker
and Kristiann Allen, Ladysmith BC: 2007

Prepared by:

Linda Hiemstra, Mel Mor Science, Nanaimo, BC
Tel: 250-751-4862

March 19, 2007



Who is a Happy Clam? – Activity Guide

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Who is a Happy Clam? – Activity Guide

Activity Goals

The goals of this activity are as follows.

- To provide information that will assist participants to read local marine charts and land maps and to identify land masses, landmarks and marine uses
- To have participants use a map of the area to determine the location of communities and shellfish harvesting areas
- To provide information and location of potential and existing pollution sources
- To have participants determine if an area is open or closed to shellfish harvesting
- To provide a positive, interactive learning experience for all participants

Activity Description

- This activity centres on a large poster size map of the local area.
- Using reusable stickers provided participants are asked to identify and label the following:
 - gross features – islands, harbours, water masses;
 - marine and upland activities; and
 - shellfish harvesting areas.
- Using the step by step instructions, participants are asked to determine if the shellfish harvesting areas are open or closed using the local fisheries officers, posted information, or the website
- Closure information is added to the poster map in the appropriate location.
- Happy Clams are put on areas that are open to shellfish harvesting.
- Map is left in a conspicuous location with stickers in place.
- When activity is to be repeated, all stickers are removed prior to starting.

NOTES



Who is a Happy Clam? – Activity Guide

Instructions

Organizing the Activity

1. Call the Fisheries Officer and determine the following for the Cowichan and Kuper Island areas
 - areas open or closed to harvesting
 - known contamination sources
 - harvesting schedules
2. Remove the reusable stickers placed on the map in previous activities and place on the laminated Sticker Storage Pages.
3. Hang the large poster map in a conspicuous place at eye level for the participants.
4. Gather the materials required.

Leading the Activity

1. Using the provided marine chart of the Cowichan and Kuper Island area, have the students identify the Kuper Island and Cowichan areas and the area covered by the poster map.
2. Using the large poster map have the students identify the location of the following.
 - Kuper Island, Thetis Island, Vancouver Island, Saltspring Island
 - Penelakut and Cowichan Reserve areas
 - Towns of Ladysmith, Chemainus and Duncan
 - Ladysmith and Chemainus Harbour areas
 - BC ferry routes and docks
 - Farms, dry land sort areas, pulp mill and other land uses
 - Marinas, aquaculture sites, other marine activities
 - Other marine and upland uses that the students can also identify
3. Bending the laminated Sticker Storage Pages, peel off the appropriate sticker for the above and place on the map correctly.
4. Students locate where they are now. (30 minutes)
5. Students identify traditional harvesting beaches and write the names down. (5 minutes)
6. Allocate a person or group to call the Fisheries Officer to determine areas closed and reasons for closures. (20 minutes). Post this information on the black board for everyone to use.
7. Give specific beaches to pairs or groups. Have them log onto the website to determine if a beach has a sanitary closure or a biotoxin closure. Have a representative of the group put the appropriate sad (closed area) or happy (open area) clam sticker on the beach area of the poster map. (30 minutes)



Who is a Happy Clam? – Activity Guide

8. Have each group provide the shellfish harvesting information they determined to the class.
9. Discuss the importance to human health of knowing if an area is open or closed (15 minutes)
10. Leave poster map in conspicuous place until next activity. (5 minutes)

Activity Materials

1. Activity Guide
2. Poster Map
3. Map Labels
4. Area Marine Chart

Resource Materials

Harvesting Closure Information

Checking for Shellfish Harvesting Closures on the Website

1. Log into Fisheries and Oceans Canada website:
http://www.pac.dfo-mpo.gc.ca/ops/fm/shellfish/biotoxins/closures/default_e.htm
2. Click on [PSP and Sanitary Contamination Closures](#).
3. Using maps on page 6-7 of this manual, determine the area of interest – either Area 17 or 18. Go to the correct area using scroll down box and press go.
4. Click on specific beaches for a larger map to determine if areas are closed. Harvesting is restricted in the red marked areas.
5. After checking a specific beach, click on [Return to Area 17 Closures \(or Area 18 Closures if you are using this area\)](#), to access the area map and check other beaches.
6. Once you are finished checking for sanitary closures, click on [Shellfish Biotoxin Closures](#) above the map.
7. Scroll down to find the area you are interested in and the appropriate closure information.

**Be sure to check for both [PSP](#) and [Sanitary Contamination Closures](#) if you plan on consuming any shellfish.*



Who is a Happy Clam? – Activity Guide

Checking for Shellfish Harvesting Closure Information Locally

1. Penelakut Tribe
 - Loren James, Fisheries Officer
 - Tel: 246-2321 Ext 225, Email: loren@penelakut.ca
 - Closure information is posted weekly outside the Band Office

2. Cowichan Tribes
 - Wayne Paige, Natural Resources Officer
 - Tel: 748-3196, Email: wpaige@cowichantribes.com

3. Halalt Band
 - Bert Thomas, Fisheries Officer
 - Tel: 246-4736

4. Lyackson Band
 - Tel: 246-5019

5. Chemainus Band
 - Kevin Frenchie
 - Tel: 245-7155 Est 247

Maps

1. Area marine chart – provided
2. Large laminated poster of Kuper Island, Coffin Point, and Duncan areas - provided
3. Fisheries and Oceans Canada maps with local Biotoxin and Sanitary closures and Reserve Land, page 6.

The red, hatched areas below are closed to shellfish harvesting due to high levels of bacteria found in sewage.

4. Fisheries and Oceans Canada, Fisheries Management Area 17 and Area 18 maps, pages 7 and 8.



Who is a Happy Clam? – Activity Guide

For current closure information go to:

http://www.pac.dfo-mpo.gc.ca/ops/fm/shellfish/Biotoxins/closures/sanitary_e.htm

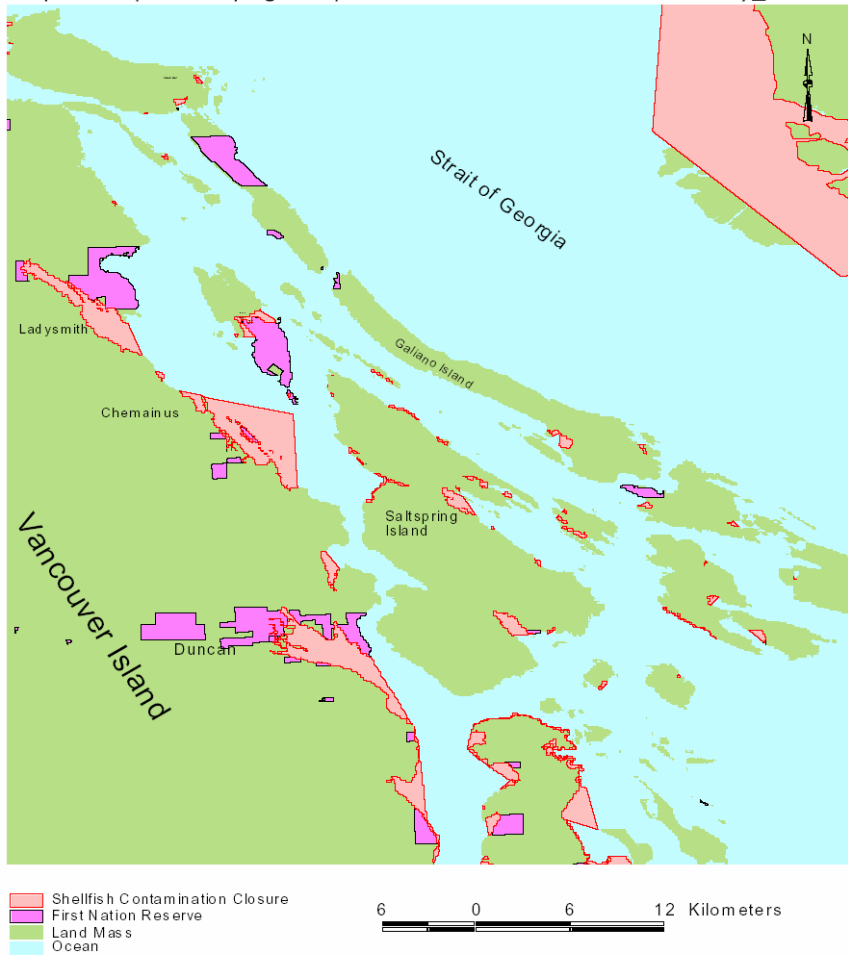


Figure 1 Biotoxin and Sanitary Closures



Who is a Happy Clam? – Activity Guide



Figure 2 Fisheries Management Area 17



Who is a Happy Clam? – Activity Guide

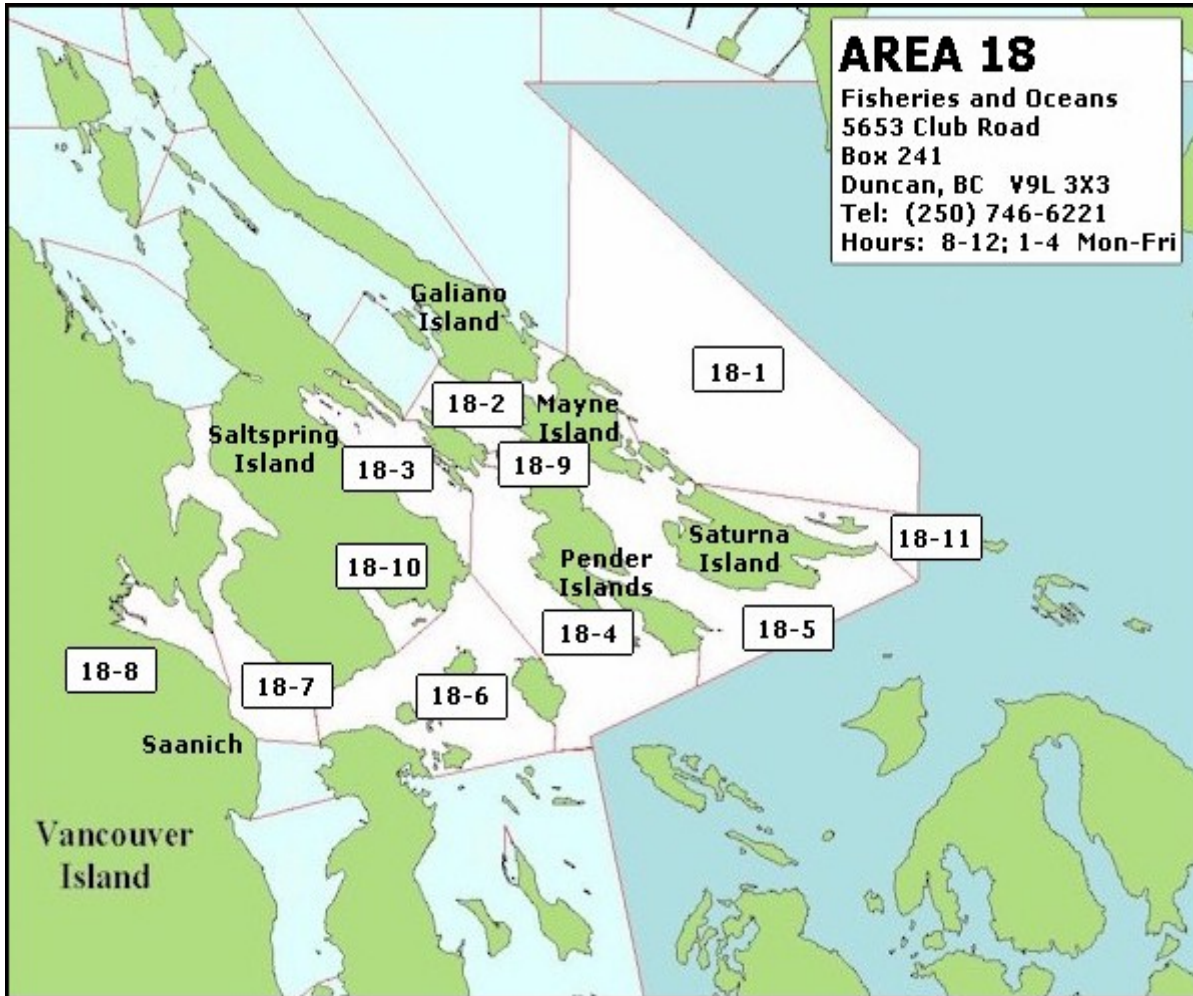


Figure 3 Fisheries Management Area 18



Who is a Happy Clam? – Activity Guide

Reusable Map Labels

- Printed Names
 - a. Kuper Island, Thetis Island, Vancouver Island, Saltspring Island
 - b. Towns of Chemainus, Ladysmith and Duncan
 - c. Ladysmith Harbour and Chemainus Harbour

- Land and Marine Use Icons
 - a. BC ferry routes and docks
 - b. Farms
 - c. Industry
 - d. Marinas and boat activities
 - e. Aquaculture

- Harvesting Information Icons
 - f. Icons for areas open to harvesting – happy clam
 - g. Icons for areas closed to harvesting – sad clam







- Potential Sources of Shellfish Contamination Icons
 - h. as per Table page 10-11

Notes







Who is a Happy Clam? – Activity Guide

Potential Sources of Shellfish Contamination

| | Potential Pollutant/Issue | Map Sticker | Description |
|----|----------------------------|---|--|
| 1. | Marinas And Anchored Boats |  | Concentrated risk of oil, fuel and waste spilling. Only some waters are protected from dumping septic waste from recreational boats. |
| 2. | Wildlife |  | Bacterial contamination from wildlife fecal waste and from dead carcasses. |
| 3. | Seaplanes |  | This ocean travel method poses risk of possible fuel and waste spillage. |
| 4. | Ferry Traffic |  | Increased risk of fuel and waste leakage on a larger scale. |
| 5. | Agriculture |  | Agriculture and lawn care put more nitrogen in the ocean, encouraging Red Tide (Toxic Algae Blooms). The fertilizers containing the nitrogen go into the ocean by runoff of water after rains. |
| 6. | Urban Development |  | Construction and other human activities may also increase the amount of runoff into the ocean. It also raises the risk of faulty septic containment and more wastes. |



Who is a Happy Clam? – Activity Guide

| | Potential Pollutant/Issue | Map Sticker | Description |
|-----|---------------------------|---|--|
| 7. | Sewage Outfalls |  | Bacteria and viruses associated with the human body waste are evaluated by counting fecal coliform bacteria. |
| 8. | Industry |  | Pesticides and industrial processes include dioxins, furans, and PCBs. These are called <u>Persistent Organic Pollutants</u> (POPs) and can build up in animals eating contaminated shellfish. The health effects on humans from these POPs are managed by consumption limits of shellfish for areas of concern. |
| 9. | Biotoxins |  | Some tiny ocean plants produce toxins that may cause Paralytic Shellfish Poisoning (PSP) and Amnesiac Shellfish Poisoning (ASP). When these plants are plentiful it is called a harmful algae bloom. |
| 10. | Garbage |  | Waste from human activities settles to the bottom of the ocean where the animals come into contact with it. An example is chemical pollution from improper disposal of containers. Remember shellfish need clean water! |



Who is a Happy Clam? – Activity Guide

For More Information

Shellfish Water Quality Protection Program on the West Coast of Canada
www.pyr.ec.gc.ca/EN/Shellfish/index.shtml

Environment Canada Fact Sheet of shellfish and water quality
http://www.ns.ec.gc.ca/epb/factsheets/sfish_wq.html

Environment Canada Shellfish Water Quality Protection Program information
<http://www.pyr.ec.gc.ca/EN/Shellfish/index.shtml>

Canadian Shellfish Sanitation Program:
<http://www.ns.ec.gc.ca/epb/sfish/cssp.html>

Shellfish Contamination Closures
http://www.pac.dfo-mpo.gc.ca/ops/fm/shllfish/biotoxins/closures/default_e.htm

Shellfish Biotoxins
http://www.pac.dfo-mpo.gc.ca/ops/fm/shellfish/Biotoxins/biotoxins_e.htm

Shellfish Factsheet
http://www.atl.ec.gc.ca/epb/factsheets/sfish_wq.html

Fediuk, Karen, Mia Parker and Kristiann Allen. 2005. Shellfish Safety Resource Manual. A Joint Penelakut and Cowichan Tribes Fisheries Project. Ladysmith, BC.

Notes



Who is a Happy Clam? – Activity Guide

Template for Reusable Stickers



CLOSED



CLOSED



OPEN



OPEN



CLOSED



CLOSED



OPEN



OPEN



CLOSED



CLOSED



OPEN



OPEN



Who is a Happy Clam? – Activity Guide





Who is a Happy Clam? – Activity Guide



**Kuper
Island**

**Thetis
Island**

**Saltspring
Island**

**Vancouver
Island**

**Chemainus
Bay**

Preedy Harbour

**Telegraph
Harbour**

**Trincomali
Channel**

**Lamalchi
Bay**

Stuart Channel

Clam Bay

Houston Passage

Kulleet Bay

Cowichan Bay

Chemainus

Ladysmith

Crofton

**Shingle
Point**

Shoal Island

Aquaculture

Aquaculture

Aquaculture

Aquaculture

Aquaculture

Aquaculture

Aquaculture

**Band
Office**

**Band
Office**

**Band
Office**



Who is a Happy Clam? – Activity Guide

NOTES

Who Is a Happy Clam Activity – Sticker Storage Pages

Marinas and Anchored
Boats

Wildlife

Seaplanes

Ferry Traffic

Agriculture

Who Is a Happy Clam Activity – Sticker Storage Pages

Urban Development

Sewage Outfalls

Industry

Biotoxins

Garbage

Who Is a Happy Clam Activity – Sticker Storage Pages

Towns and Harbours

Bays and Channels

Band Offices

Open to Harvesting

Closed to Harvesting
