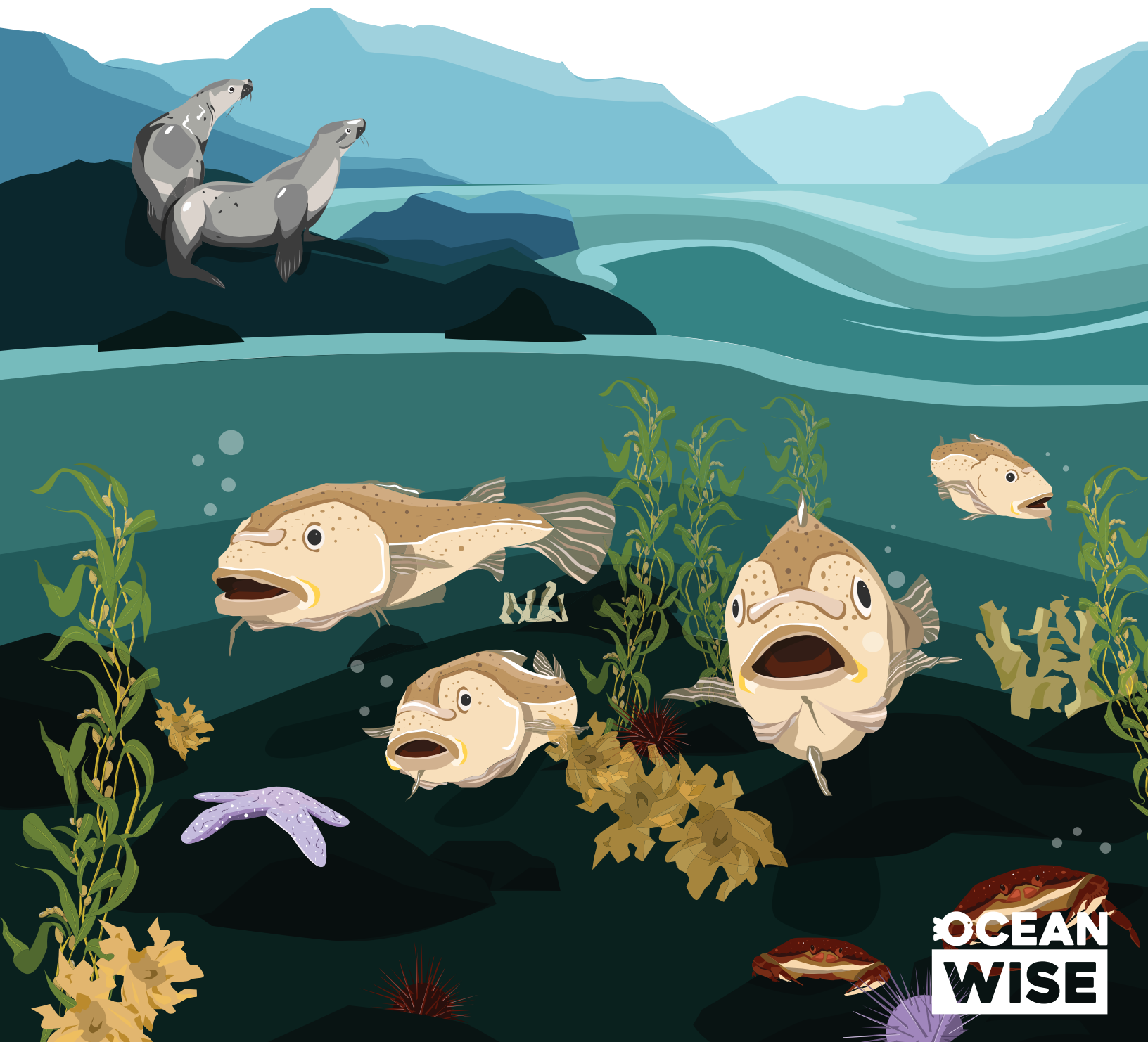


# Átl'ka7tsem-Txwnéwu7ts Howe Sound Edition



We acknowledge and are grateful that many Ocean Wise employees work and play on the traditional, ancestral and unceded territories of the x<sup>w</sup>məθk<sup>w</sup>ə́yəm (Musqueam), Sk̓wx̓wú7mesh (Squamish), and sə́lilwətaʔɬ (Tsleil-Waututh) peoples.

Átl'ka7tsem/Txwnéwu7ts/Howe Sound is within the traditional, ancestral, and unceded territories of the Sk̓wx̓wú7mesh (Squamish), sə́lilwətaʔɬ (Tsleil-Waututh), and x<sup>w</sup>məθk<sup>w</sup>ə́yəm (Musqueam) peoples.



# LESSON 1: SENSE OF PLACE

- Using [Google Earth](#) projects, or the accompanying map, label the following landmarks in English and Skwxwú7mesh Snichim.
- Use the [OWHS 2020 report](#) p.15, the [Squamish Atlas](#)
- You may use the [Google Earth Tutorial: Intro to Creation Tools](#) to help you

## Label the following:

- Mt. Garibaldi
- Halkett Bay
- Deeks Creek Port
- Squamish
- Black Tusk
- Gambier Island
- Mellon Gibsons Landing
- Eagle Harbour
- Bowen Island
- Cheakamus River
- Popham Island
- Horseshoe Bay
- Britannia Beach

# ATL'KÍTSEM / TEXWNÉWETS' HOWE SOUND MARINE CONSERVATION ASSESSMENT

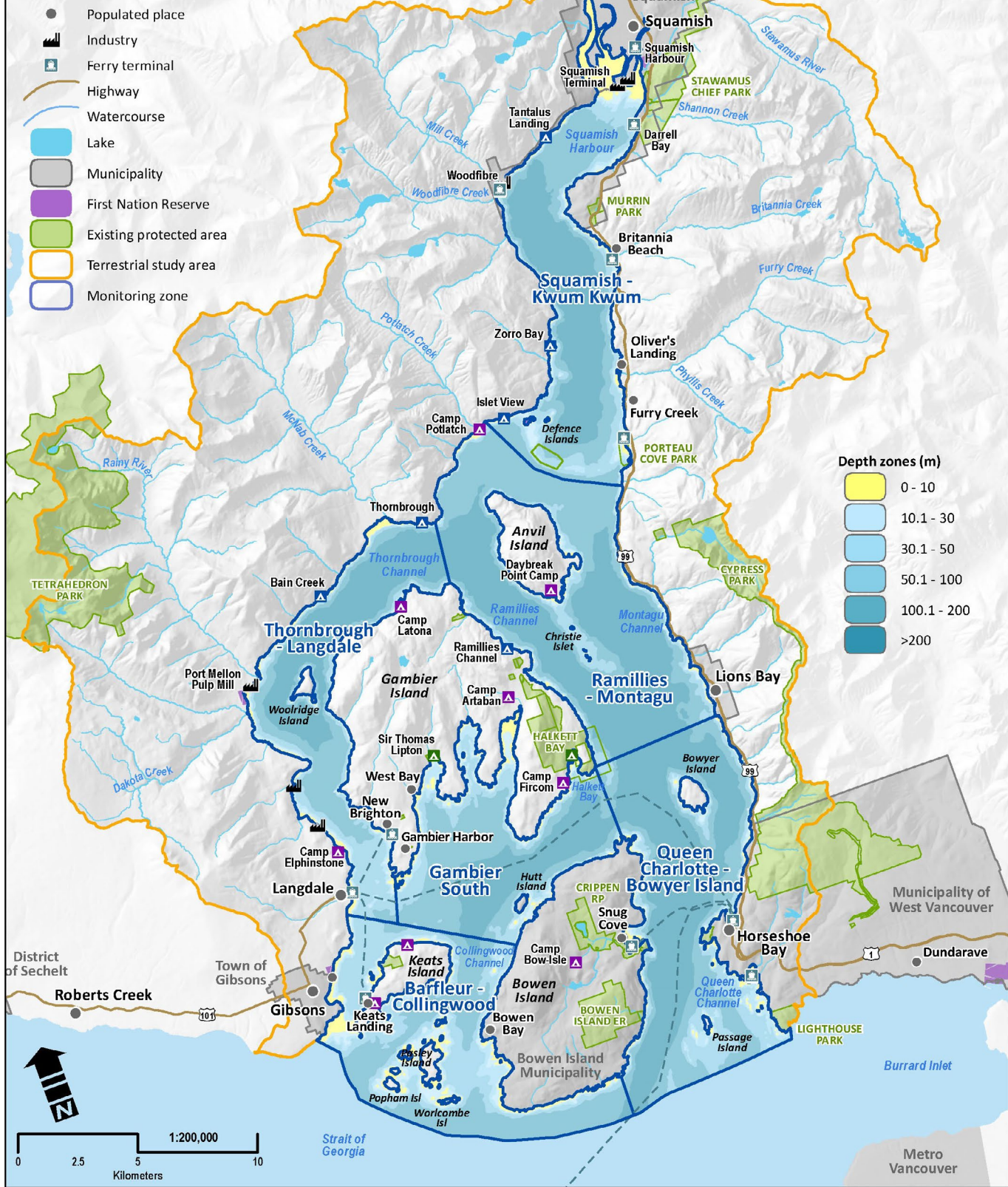


figure 1. Átl'ka7sem/Txwnéwu7ts /Howe Sound, depicted by the gray lines. The watershed that feeds into Átl'ka7sem/Txwnéwu7ts/Howe Sound extends north – east and is therefore not shown in its entirety. From: Beaty F, van Riet W, Wareham B, Schultz J. Howe Sound/Átl'ka7sem/Txwnéwu7ts Map. Ocean Wise and David Suzuki Foundation; 2019. Available from: <http://howesoundconservation.ca>

# THOUGHT BOOK

In this section you will focus on Regeneration. You will journal after each lesson in this Thought Book on the idea of regeneration and the connection to what you are learning.

## REFLECT

What does regeneration mean to you?

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How can I help to regenerate relations between settlers and Indigenous peoples through my own understanding and actions?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.



## TAKE ACTION

- I will learn to pronounce the Skwxwú7mesh Snichim for a landmark near my community or in a language of an Indigenous community where I live.
- I will learn the land acknowledgment specific to where I live at [Native-Land.ca](https://www.native-land.ca/)

## THE WHY

It is important to learn the place name of where you live in the language of the Indigenous communities who were the first peoples of that area. This is one of the first step towards reconciliation and understanding your role in the history of colonization.



# LESSON 2: SPECIES AND HABITAT

You will report on a marine species assigned by your teacher. Feel free to present it however you like. Your report/presentation must include the following information:

*P.S - Answers to many of these questions can be found in the [OWHS 2020 pages, 116 – 203](#) (Theme: Species and Habitat). Remember to include photographs!*

Species English name

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Latin name

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Squamish Snichim name

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Circle One: Invertebrate Vertebrate

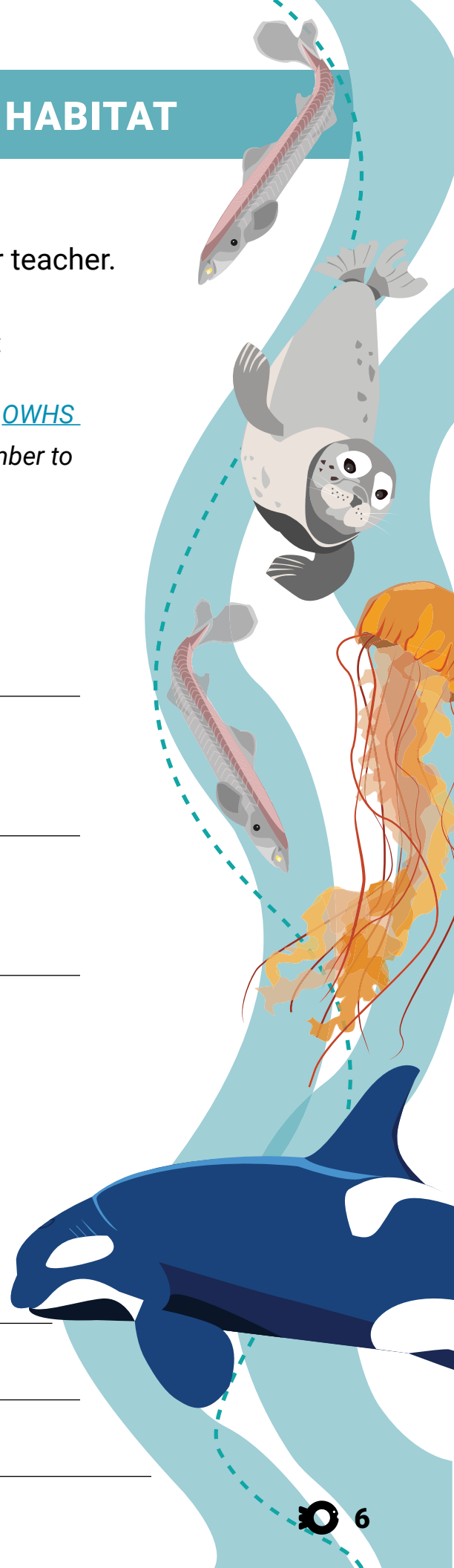
Economic use and value?

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An interesting/strange fact you learned:

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What is happening with this species in Átl'ká7tsem/Txwnéwu7ts/Howe Sound?

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What is the current status of this species in Átl'ká7tsem/Txwnéwu7ts/Howe Sound?

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Potential impacts of climate change on this species in Átl'ká7tsem/Txwnéwu7ts/  
Howe Sound?

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What has been done to help this species survive/recover in Átl'ka7tsem/Txwnéwu7ts/  
Howe Sound?

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What can you do to help this species survive?

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Find a citizen science organization that gathers data about the species you chose, or a similar species/group. Explain what information people gather for this organization and what that information is used for.

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Can you find another citizen science organization with a similar mission in another country?  
Note down any differences or similarities you found.

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# THOUGHT BOOK

## REFLECT

What were you most surprised to learn from the presentations of your peers? List your three biggest takeaways, including one traditional or cultural takeaway.

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How and why does species diversity differ in different kingdoms, orders, and families?

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How are the species found in Átl'ka7tsem/Txwnéwu7ts/Howe Sound interdependent?

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What can we do to help the regeneration of species at risk?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.



## TAKE ACTION

I will assist a local citizen science group and share my sightings.

### Resources:

- [BC Cetaceans Sighting Network](#)
- [WhaleReport Alert System](#)
- [Citizen Science in OWHS 2020](#) page 349-353
- [iNaturalist](#)
- [eBird](#)
- [20 Citizen Science Projects for Students](#)

## THE WHY

Citizen Science helps scientists learn about the health of species and ecosystems to better inform the public on how to help.

**For example:** Reporting sightings on Ocean Wise's [WhaleReport Alert System](#) informs ships of where whales are in real time, to allow them to shift course to avoid the whales. This lowers the impact of noise pollution on whales, improving their ability to feed, communicate, and get their bearing.

## LESSON 3: SURVIVAL NEEDS

Use the chart below to list factors you observed outside and in the photographs of the ocean. You can also illustrate factors if you have time!

OUTSIDE	
BIOTIC FACTORS	ABIOTIC FACTORS

## OCEAN PICS

**BIOTIC FACTORS**

**ABIOTIC FACTORS**

# THOUGHT BOOK

## REFLECT

What do humans need to survive in the Átl'ka7tsem/Txwnéwu7ts/Howe Sound ecosystem?

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What can we do to preserve and/or regenerate what we need for survival for later generations? Consider biotic and abiotic ecosystem components

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Reflecting on Indigenous beliefs of living and non-living spirits, how does this point of view change your understanding of the land, water, and everything within it?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.



## TAKE ACTION

I will take part in a [shoreline cleanup](#).

## THE WHY

We need to stop the leak of plastics into our oceans! More than 800 marine species are known to be affected by plastic pollution, including all sea turtles, more than 40% of cetaceans, and 44% of marine birds. Shoreline cleanups are a great way to work collaboratively to fight plastic pollution and keep litter out of our ecosystems.



## LESSON 4: STEWARDSHIP AND GOVERNANCE

Using 'I wonder, I notice, it reminds me of' activity:

- Share one new thing or fun fact you learned about the Herring Roe harvest.

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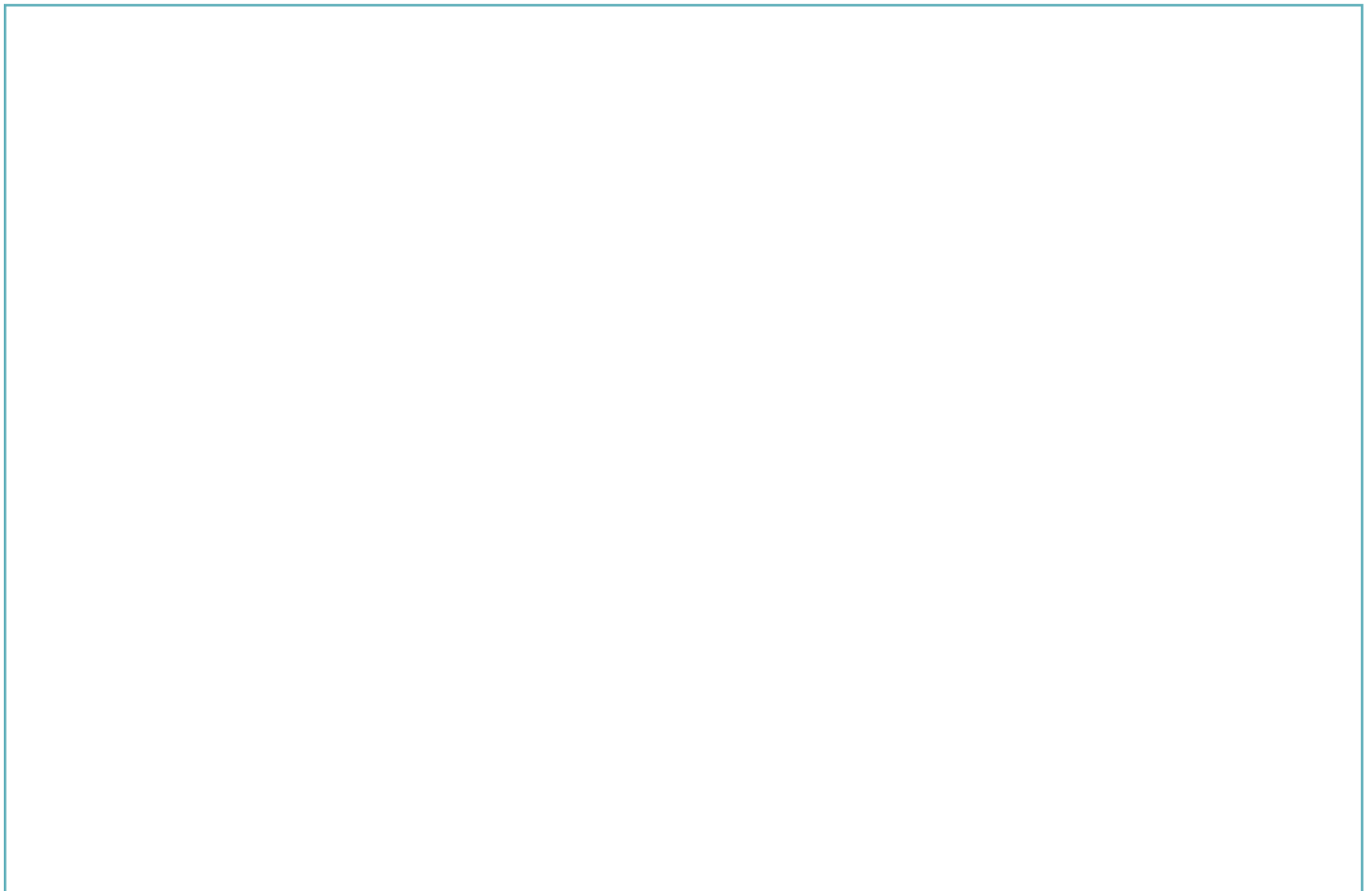
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- Draw your favourite part from the herring roe harvest video below.







# THOUGHT BOOK

## REFLECT

In what ways do people interact with Átl'ká7tsem / Txwnéwu7ts / Howe Sound?

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What are the most inspiring initiatives underway to protect Átl'ká7tsem / Txwnéwu7ts / Howe Sound?

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What cultural or traditional areas are being considered for further protection? Why should these areas be considered?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.



## TAKE ACTION

I will plant a tree, or a native species plant, in my community.

## THE WHY

Did you know that trees are a natural solution to climate change? A tree that lives to 100 years old can take up to 450kg of carbon dioxide out of the atmosphere over its lifetime! Trees also provide us with the air we breathe and are safe habitats for many species.



# LESSON 5: THE IMPORTANCE OF WATER

Use the information from the following resources to construct a timeline of the colonized impacts from Britannia Mine and the Howe Sound Pulp and Paper Mill on Átl'ka7tsem / Txwnéwu7ts / Howe Sound.

## WATCH

- [“This B.C. ecosystem came back from ecological disaster – now climate change could undo it”](#)

## READ

- [OWHS 2020](#) pages 255 – 263 (Britannia Mine) and 263 – 271 (Pulp Mill)
- [OWHS 2017](#) (Theme: Water)



Draw a timeline below to include the important historical dates and facts: **1900** → **Present Day**





# THOUGHT BOOK

## REFLECT

How have these pulp & paper and Britannia Mine corporations impacted the First Nations relationship to the area of Átl'ka7tsem/ Txwnéwu7ts/Howe Sound? In what ways has it changed?

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What are the most significant ways that water quality affects all life in Átl'ka7tsem/ Txwnéwu7ts/Howe Sound?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.



## TAKE ACTION

- Take the [Ocean Wise plastic challenge](#)
- I will join my class in [marking storm drains](#) in our community

## THE WHY

Plastics find their way into our oceans in big pieces (i.e., litter such as plastic water bottles) and small pieces (i.e., tiny fibres released when washing a synthetic sweater). Lowering our plastic consumption, as well as being mindful of what we put down our drains, helps keep plastic out of waterways and makes our oceans healthier.



# LESSON 6: CLIMATE CHANGE AND OCEANOGRAPHY

## OCEAN ACIDIFICATION EXPERIMENT

<b>TIME ELAPSED</b>	<b>FRESHWATER CONTAINER</b>	<b>SALTWATER CONTAINER</b>	<b>VINEGAR CONTAINER</b>
<b>0 hours Initial observation</b>			
<b>1 hour</b>			
<b>12 hours</b>			
<b>24 hours</b>			

**Observations:**

Are there any bubbles in the water?

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Has there been any change to the colour of the shell?

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Has there been any change to the shape of the shell?

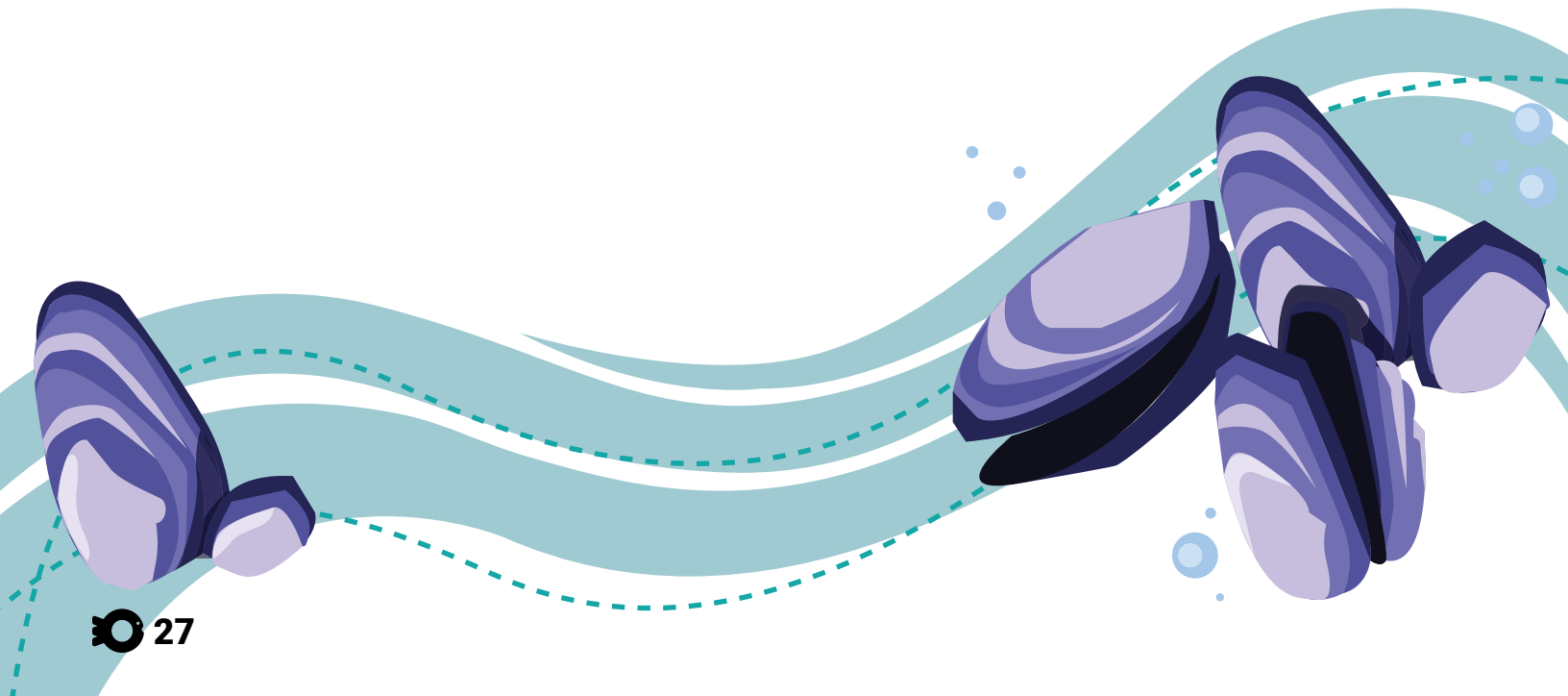
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Has there been any change to the durability of the shell?

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# SOIL EROSION EXPERIMENT

BOTTLE #	OBSERVATIONS (WATER COLOUR, ETC.)				
	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
_____					
WEEK 1					
WEEK 2					

<b>OBSERVATIONS (WATER COLOUR, ETC.)</b>					
<b>BOTTLE #</b> _____	<b>DAY 1</b>	<b>DAY 2</b>	<b>DAY 3</b>	<b>DAY 4</b>	<b>DAY 5</b>
<b>WEEK 1</b>					
<b>WEEK 2</b>					

<b>OBSERVATIONS (WATER COLOUR, ETC.)</b>					
<b>BOTTLE #</b> _____	<b>DAY 1</b>	<b>DAY 2</b>	<b>DAY 3</b>	<b>DAY 4</b>	<b>DAY 5</b>
<b>WEEK 1</b>					
<b>WEEK 2</b>					

# THOUGHT BOOK

## REFLECT

What are the most effective ways Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound can be protected from the ongoing impacts of climate change?

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What do you think are the most impactful ways to reduce greenhouse emissions at the individual, local, provincial, national, and global level?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.





## TAKE ACTION

- I will calculate my [carbon footprint](#)
- I will minimize my carbon footprint by buying goods produced locally whenever possible, and encourage my family to do the same
- Check out the [Do One Thing: Climate Change](#) videos and choose an action to take from the challenge.
- Unplug your computers, TVs, and other electronics when not in use.

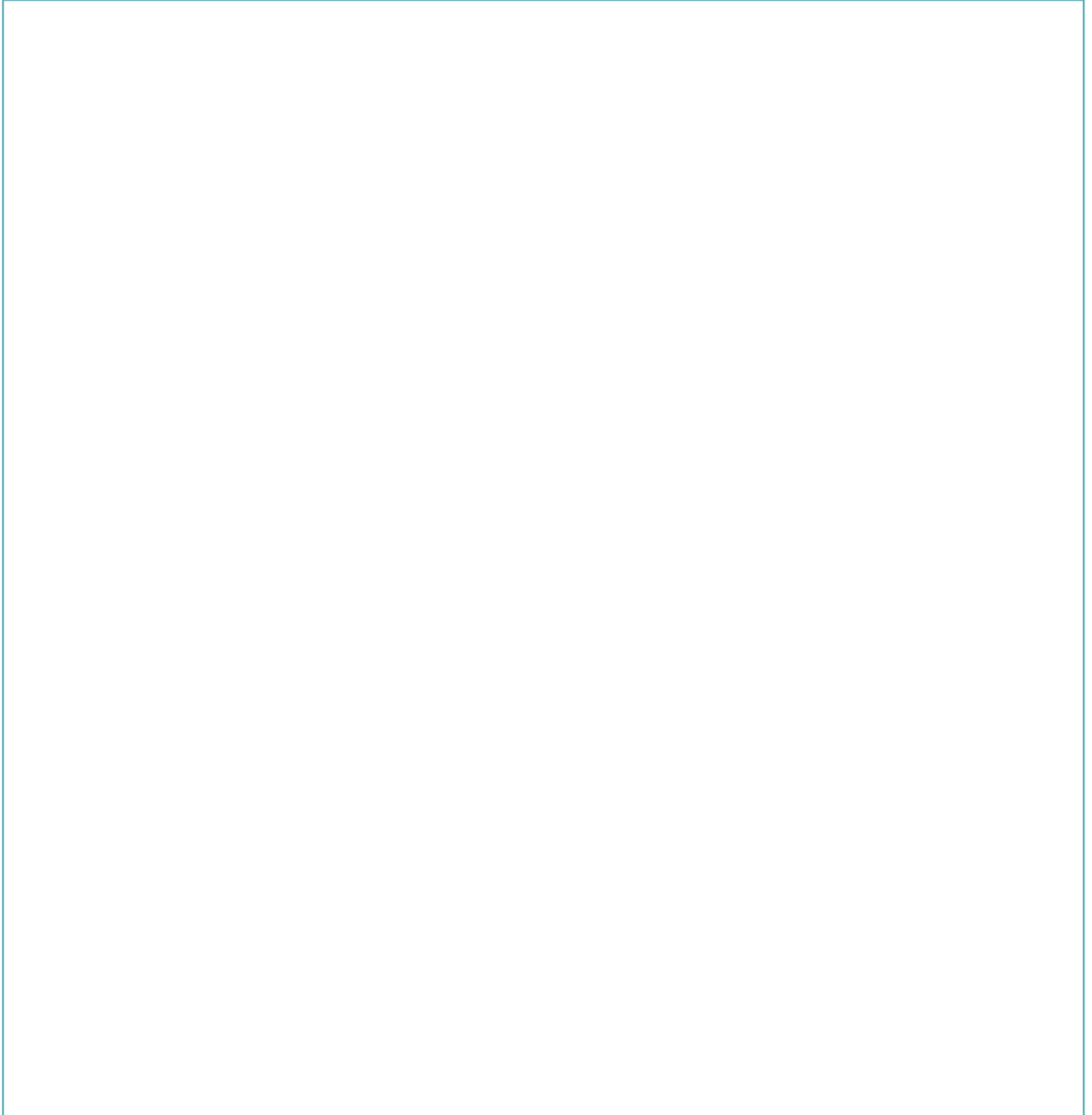
## THE WHY

Although systemic change has greater impact, individual action should not be underestimated. Every carbon molecule kept out of the atmosphere is a move in the right direction. Small changes, such as buying local goods or riding your bicycle instead of driving, can reduce carbon emissions and help fight climate change.



## LESSON 7: MARINE PROTECTED AREAS

1. On the map from lesson 1, outline the MPAs in Átl'ka7tsem/Txwnéwu7ts /Howe Sound and label the glass sponge reefs using the OWHS 2020 page 368. Colour code accordingly and add to the legend.
2. Illustrate at least one of your discoveries.



3. On your map from Lesson 1, add glass sponge reefs [CPAWS Glass](#) and marine protected areas from [OWHS 2020](#) p. 368. Remember to differentiate them by colour, including this in the legend.
4. Explore the [Howe Sound/ Átl'ka7tsem Marine Reference Guide Interactive Map](#) and choose one marine unit to focus on. Add features to your map from lesson 1 (remember to colour code and add to the legend) and find information from the interactive map specific to your marine unit. See the [tutorial video](#) for instructions on how to navigate the map.

Marine Unit Number:

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Add the following features to your map:

- Salmon bearing streams
- Protected shoreline
- Commercial fisheries
- Urchin observations
- Sea colander kelp observations

Referring to the map, fill in the following:

Predominant tree species along the coast:

• \_\_\_\_\_

• \_\_\_\_\_

• \_\_\_\_\_

Range of tree age (i.e., 20 - 240 years old):

\_\_\_\_\_ to \_\_\_\_\_



Three cetacean species sighted:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

List three bird species observed:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

What are the types of pollution impacting your marine unit?

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What kinds of restoration and monitoring is happening in your marine unit?

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

○ What kinds of MPAs are established in your marine unit?

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

○ What additional features exist in your marine unit?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

○ List the shortcomings of MPAs and compose a list of solutions to each identified limitation.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# THOUGHT BOOK

## REFLECT

In what ways do MPAs support regeneration in ecosystems?

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List the shortcomings of MPAs and compose a list of solutions to each identified limitation.

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.



## TAKE ACTION

I will write an email to a local politician about conservation or traditional protection for my community.

## THE WHY

Politicians, as our representatives, weigh in on decisions that have major impacts on our lives, the environment, and the ecosystems around us. By voicing your concerns directly to your representative, you are participating in democracy and having your voice heard. Major ecological decisions have been swayed by people voicing their concerns to their government officials. Consider having letter writing parties with friends, family members, and/or community members to help protect our ecosystems.




# LESSON 8: THE FUTURE OF ÁTL'KA7TSEM/ TXWNÉWU7TS/ HOWE SOUND

## EXPLAIN

Write a report, preparing a thoughtful and evidence-based case for why Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound, or a region near you, should be designated a UNESCO Biosphere Reserve. (Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound succeeded in receiving this designation in 2021, so imagine that you were charged with making the case in 2020)

To bolster your case, review the material covered across the previous lessons and research what factors are considered when determining whether a region can qualify for the UNESCO Biosphere designation. Visit [this link](#) to learn more about the application process. Consider relationships with Indigenous communities and decolonization. How will your case conserve and protect traditional use and/or cultural heritage of the area chosen for your biosphere region?



 Meighan Makarchuck | Haida Gwaii









# THOUGHT BOOK

## REFLECT

How does biosphere status promote the regeneration of an ecosystem?

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How can I thoughtfully use my voice to advocate for Biosphere protection for an area near me?

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Considering all Biosphere Regions have three main responsibilities: conservation and protection of biodiversity, sustainable development, and education, research and monitoring. How can you ensure that Indigenous voices are heard in each of these areas?

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## TAKE A DEEPER DIVE

Are you an Ocean Champion? Click through to our 2-min quiz and see where you score against other students.

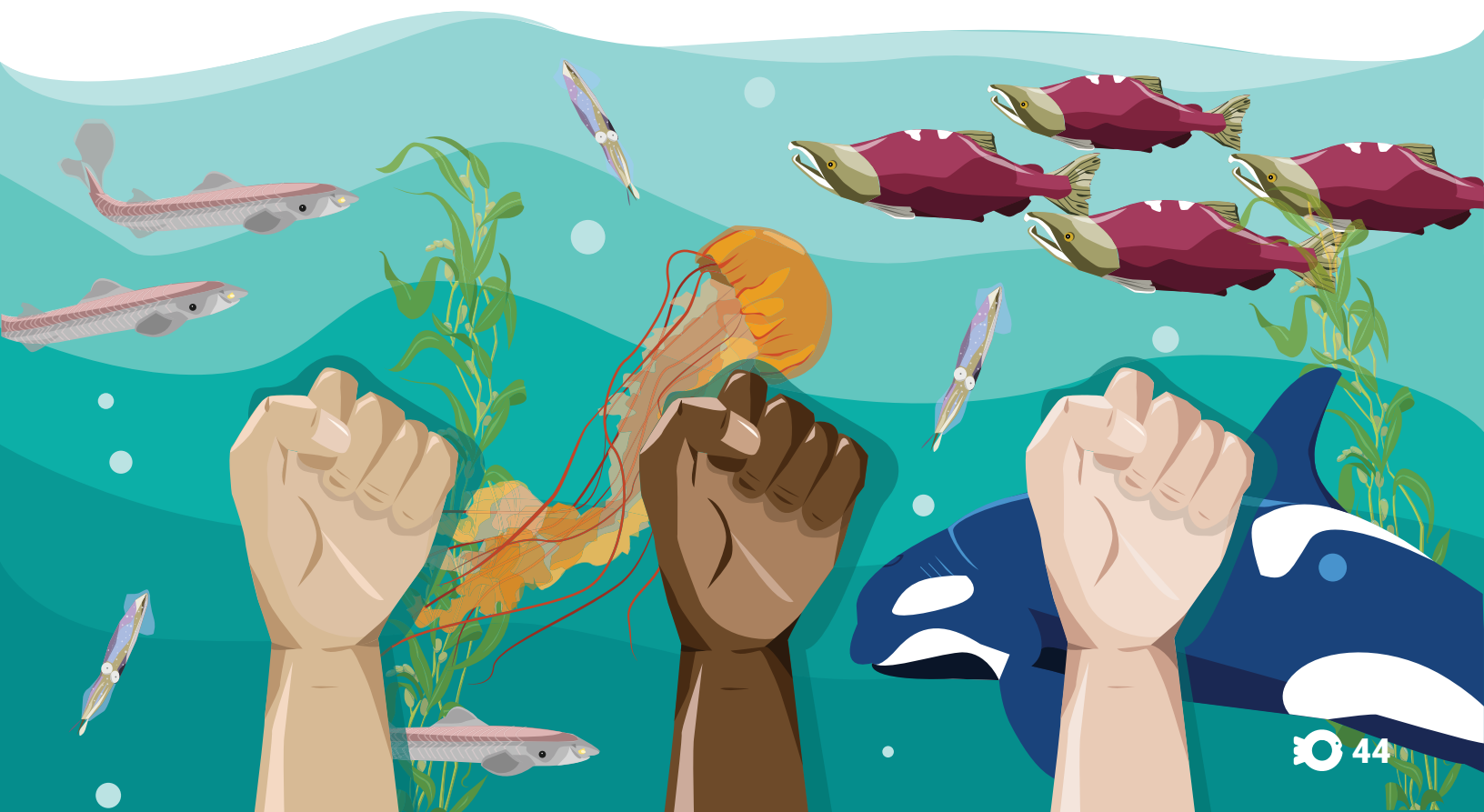


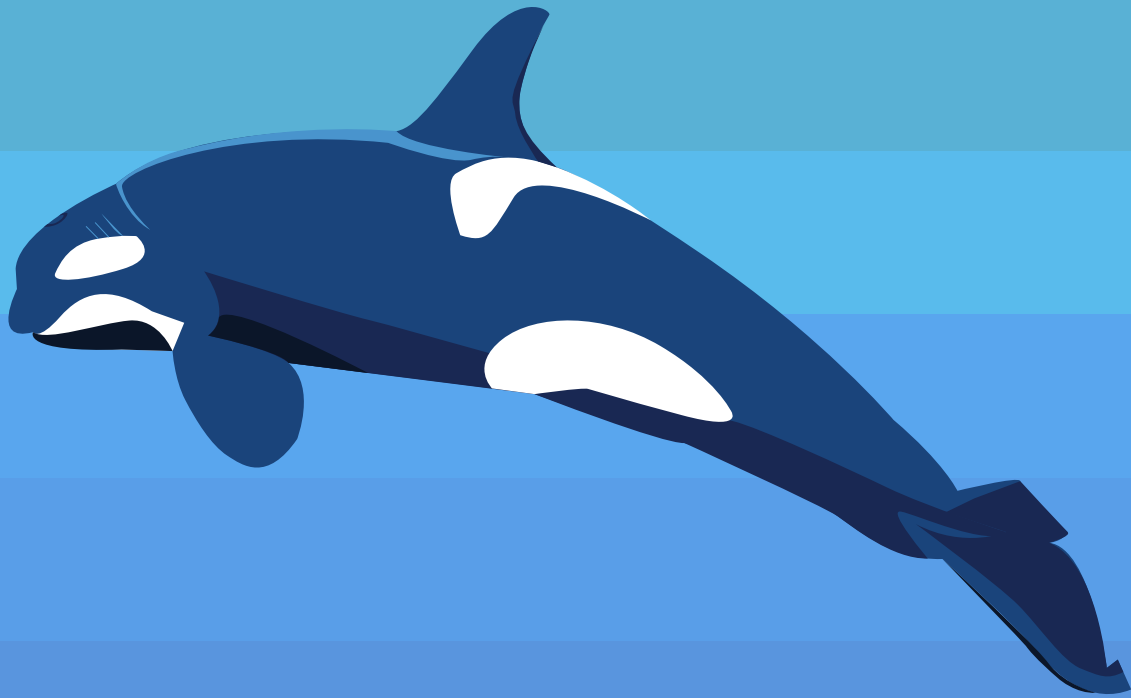
## TAKE ACTION

Start a conversation with your peers about the environmental impact of your actions and how to protect green spaces in your area.

## THE WHY

In Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound, it was the collaborative work of a diverse group of people that made systemic changes to regenerate both the ecosystem and the relationships between people and the Sound. Movements often start with conversations. Your voice is a powerful tool in creating change, especially when joined with the voices of others.





## Waves of Change

This project was undertaken with the financial support of the Government of Canada.

Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.

Canada 

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