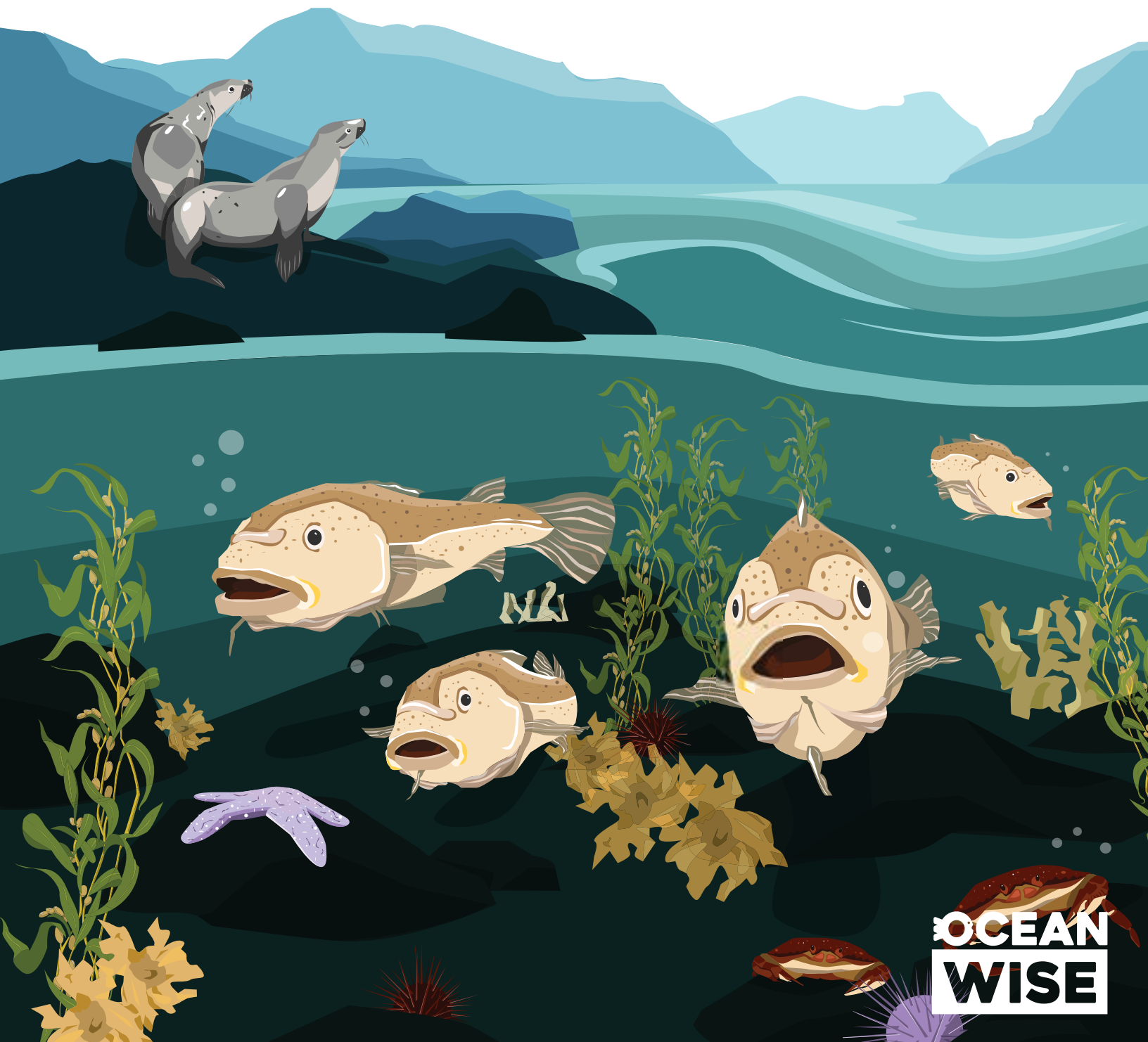


Átl'ka7tsem-Txwnéwu7ts Howe Sound Edition



We acknowledge and are grateful that many Ocean Wise employees work and play on the traditional, ancestral and unceded territories of the x^wməθk^wəyəm (Musqueam), Skwxwú7mesh (Squamish), and səlilwətaʔɬ (Tsleil-Waututh) peoples.

Átl'ka7tsem/Txwnéwu7ts/Howe Sound is within the traditional, ancestral, and unceded territories of the Skwxwú7mesh (Squamish), səlilwətaʔɬ (Tsleil-Waututh), and x^wməθk^wəyəm (Musqueam) peoples.



LESSON 1: SENSE OF PLACE

As **Chief Ian Campbell** stated

“ This is what keeps us together as a people. We’re not going to be packing up and moving. This land is where we come from. This is where our songs come from. This is where our power is. It’s on the land. When you go on the land, that’s when your dreams get strong, your feelings get strong. ”

These deep values apply as strongly to the waters of Howe Sound as to the watersheds. Every little creek in the Sound has a Skwxwú7mesh snichim name.

- 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](#), and the A/T/H [Interactive map](#)
- You may use the [Google Earth Tutorial: Intro to Creation Tools](#) to help you

Label the following:

- | | | |
|-----------------|--------------------|--------------------|
| • Shannon Falls | • Horseshoe Bay | • Halkett Bay |
| • Darrell Bay | • Woodfibre Creek | • Potlatch Creek |
| • McNab Estuary | • Squamish Estuary | • Stawamus Estuary |

Skwxwú7mesh snichem : _____

Landmark (English) : _____

Skwxwú7mesh snichem : _____

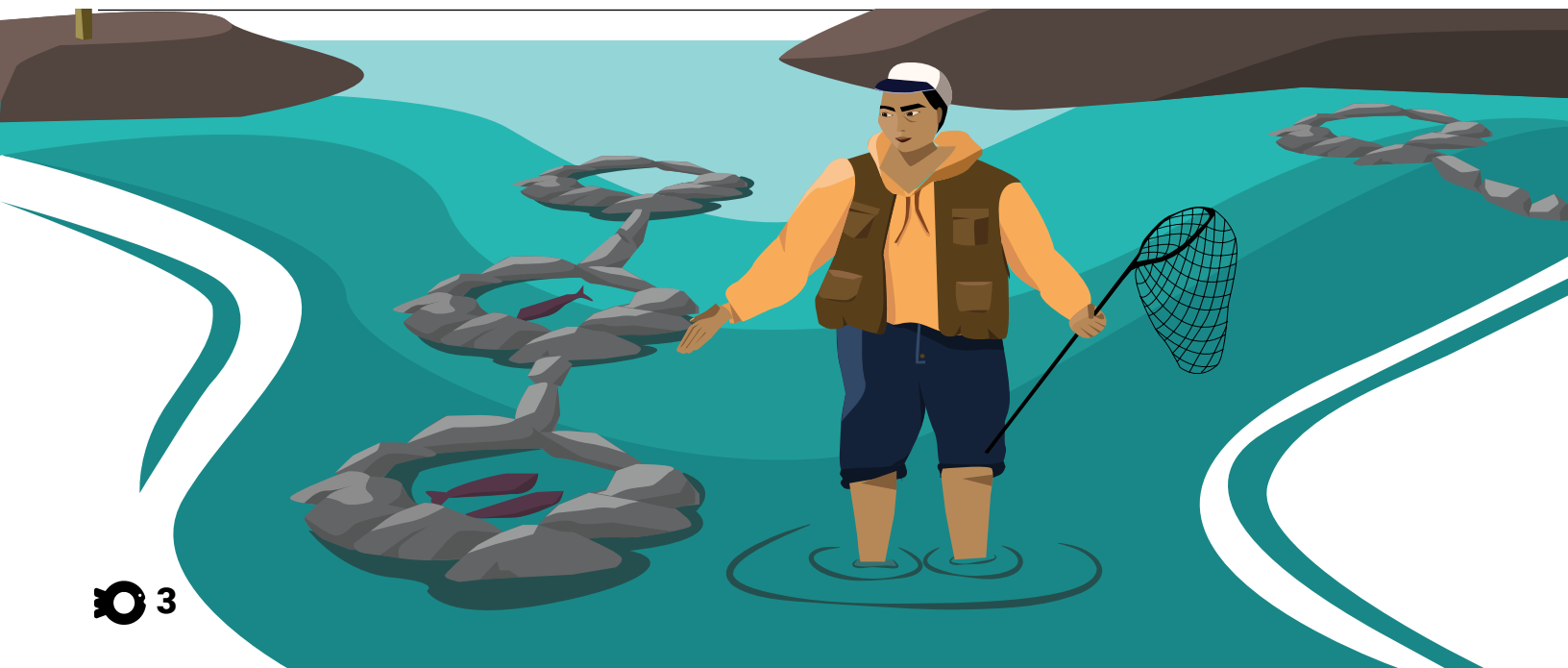
Source of the name (English) : _____

Meaning behind the place chosen:

Why I chose this area:

- Within the feature(s), what information provided stood out the most to you about this area? (ex. Importance to the Squamish Nation, protected area/species, etc.).

- How do Squamish perspectives on this place enhance your understanding?



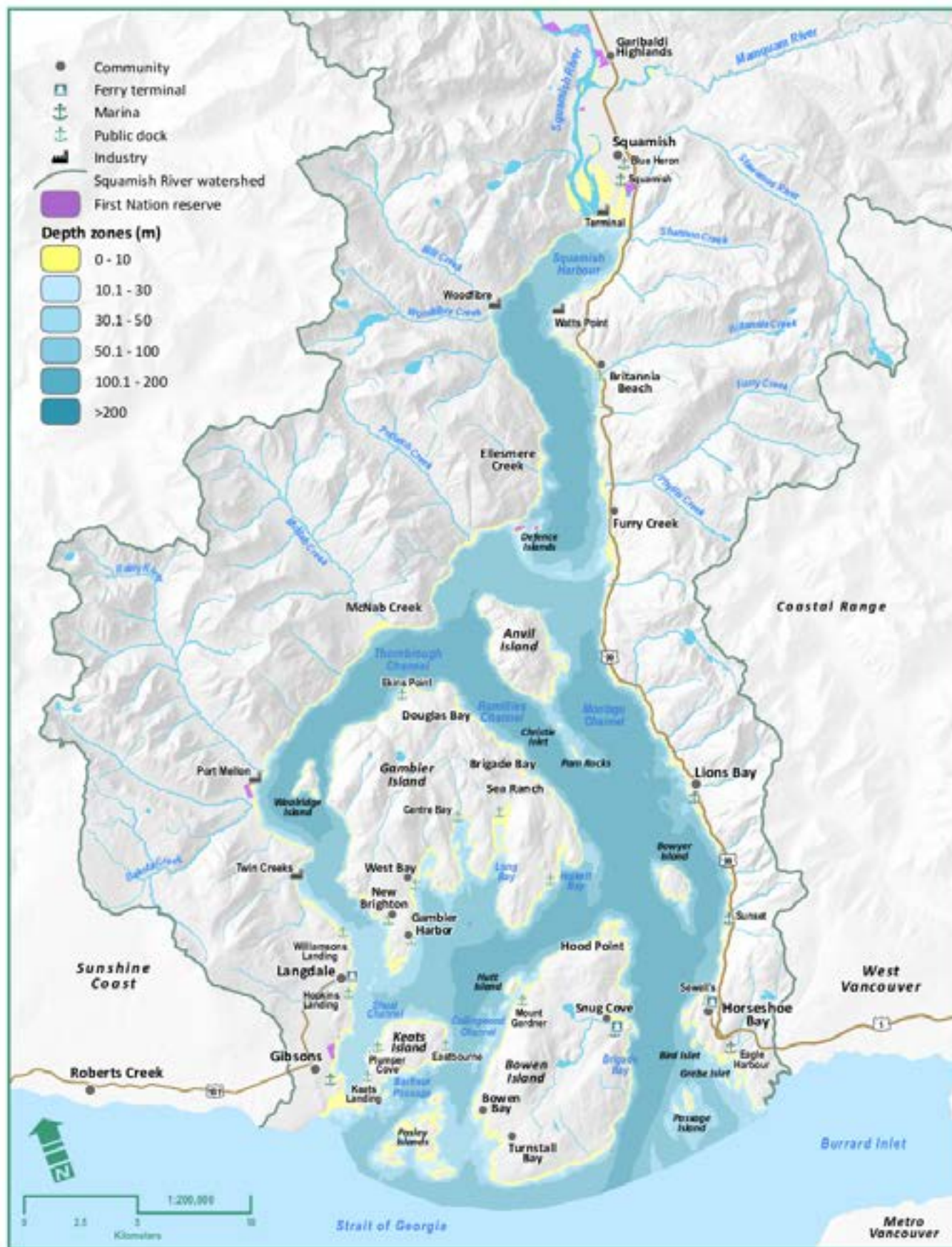


figure 1. Átl'ka7tsem/Txwnéwu7ts /Howe Sound, depicted by the gray lines. The watershed that feeds into Átl'ka7tsem/Txwnéwu7ts/ Howe Sound extends north – east and is therefore not shown in its entirety. From: Beaty F, van Riet W, Wareham B, Schultz J. Howe Sound/Átl'ka7tsem/Txwnéwu7ts Map. Ocean Wise 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 its connection to what you are learning.

REFLECT

What does regeneration mean to you?

How would you describe this place to someone who came from far away?

- What would be the most important information to include?
- What are the most important facts to know about Átl'ka7tsem /Txwnéwu7ts / Howe Sound?

What learning, and action, needs to take place to regenerate relations between settlers and Indigenous Peoples?

How can you help regenerate relations between settlers and Indigenous Peoples through your own understanding and actions?

Whose land do you live on?

- Do you feel connected to those who have lived here before you?
- How can you enhance this connection?

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 the language of an Indigenous group where I live.
- I will learn the land acknowledgment specific to where I live at [NativeLand.com](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 will put you on the first step towards reconciliation and understanding your role in the history of colonization.

LESSON 2: SPECIES AND HABITAT

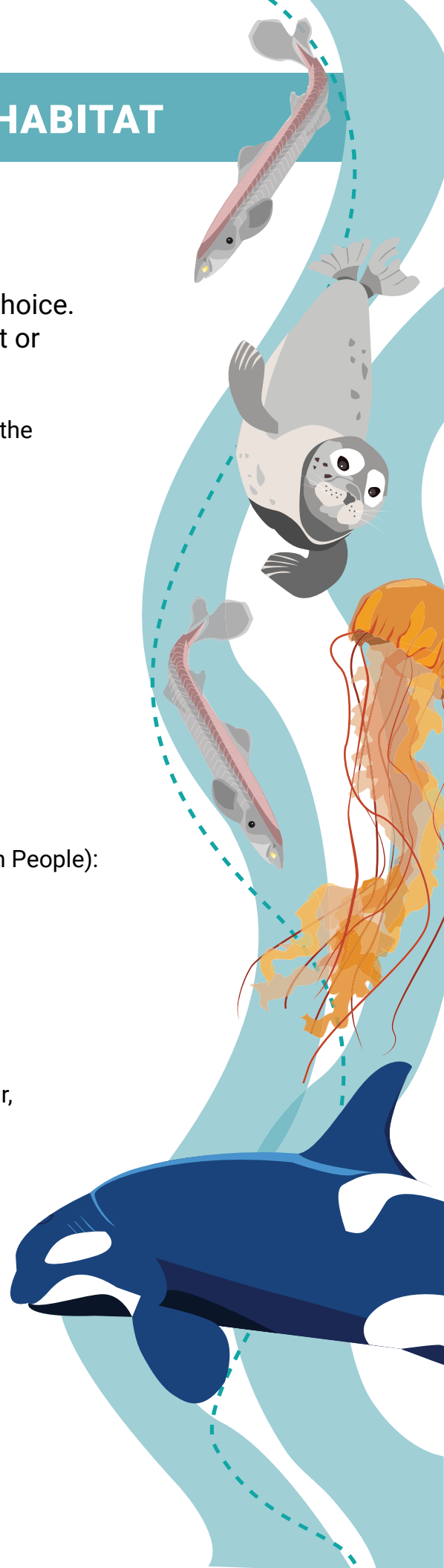
MARINE SPECIES

You will report and present on a marine species of your choice. Feel free to present it however you would like. Your report or presentation must include the following information:

Please note: Answers to many of these questions can be found in the OWHS 2020 pages, 116 – 203 (Theme: Species and Habitat). Remember to include photographs!

Information to be researched and included in your presentation:

1. Species English name
2. Latin name
3. Squamish Snichim name
4. Cultural Connections (how is/was it used by the Skwxwú7mesh People):
5. Economic use and value
6. What is the current status of this species?
7. List the major risks the species is presently facing
8. Explain how said factors impact the species (ex. their behaviour, anatomically, etc.):
9. Propose specific actions that the community can take to help minimize these impacts:
10. What can you, as an individual, do to help this species survive?
11. Additional information you'd like to include here (fun fact, habitat, drawing etc.)



CITIZEN SCIENCE

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

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

While researching, how common was it to come across an Indigenous led citizen science project? Why do you think such projects are or aren't common?

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

How can you become involved in a local stewardship project?



THOUGHT BOOK

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

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

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

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

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:

- [Wild Whales](#)
- [Whale Report App](#)
- [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 Whale Report app 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 bearings. Seeing trends in the number and location of any species offers up a lot of information that helps humans help species and their ecosystems.



LESSON 3: SURVIVAL NEEDS

Abiotic and biotic factors impacting the health of kelp forests:

| | KELP FOREST | |
|----------------------|-------------|--|
| ABIOTIC FACTORS | HOWE SOUND | |
| Temperature of water | | |
| Velocity of current | | |
| Salinity | | |
| Substrate | | |
| Pollutants | | |

| | KELP FOREST | |
|-----------------|-------------|--|
| ABIOTIC FACTORS | HOWE SOUND | |
| Light | | |
| Depth(?) | | |
| BIOTIC FACTORS | HOWE SOUND | |
| Kelp Predators | | |
| Commensalism | | |

What species of kelp live in each place?

What environmental impacts put kelp at risk?

Make a list of species that depend on kelp for survival in each ecosystem. Remember to consider those who rely on kelp as a habitat, food source, etc.

Which of the two ecosystems you studied is richer in biodiversity? Explain how abiotic factors impact the ecosystem's ability to sustain a diversity of



THOUGHT BOOK

What can we do to preserve and/or regenerate ecosystems for the coming generations? Consider biotic and abiotic components.

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

How has an ecosystem in your local area changed over time?

What actions can an individual take to improve the abiotic factors of an environment? How would these actions affect the living plants, animals, and fungi in the ecosystem?

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 the [Debate at a Glance](#) resource, organize a debate.

Choose one of the following debate topics:

- Risks vs. Benefits of Coastal Development in Átl'ka7tsem/ Txwnéwu7ts / Howe Sound
- Use: [OWHS 2017: Risks of Coastal Development](#).
- For vs. Against Closing the Howe Sound Pulp and Paper Mill
- Use: [OWHS 2020 : Pulp Mill: Marine Effluent](#) and [OWHS 2017 : Pulp Mill Effluent](#)

In preparation for the debate, use the report (see hyperlinks above). Consider whether to incorporate further resources or do your own research to support your findings.

Notes

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

THOUGHT BOOK

REFLECT

In what ways do people interact with Átl'ka7tsem / Txwnéwu7ts / Howe Sound?

What are the most inspiring initiatives underway to protect Átl'ka7tsem / Txwnéwu7ts / Howe Sound?

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

How do First Peoples' perspectives and knowledge inform sustainable practices?

How do society and governance contribute to efforts promoting regeneration?

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: WATER

Use the information from the following resources to create observations and generate questions focusing on water.

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)

In your small group, with the assigned ‘top reason’, create an argument supporting why your assigned reason is the most important.

EX. Top reasons

- Soluble
- Weather/Climate
- Erosion
- Basis of all life/survival needs

Notes

How does your top reason impact Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound throughout time?



THOUGHT BOOK

REFLECT

How have human actions changed over time and why has the water quality in Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound changed over time?

How do you think the Squamish Nation's relationship to water in Átl'ka7tsem/ Txwnéwu7ts/ Howe Sound has changed over time? Has this impacted their relationship with organisms found in Átl'ka7tsem/ Txwnéwu7ts/Howe Sound?

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

How can industrial waste in the water of Howe Sound be dealt with responsibly?

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., through 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

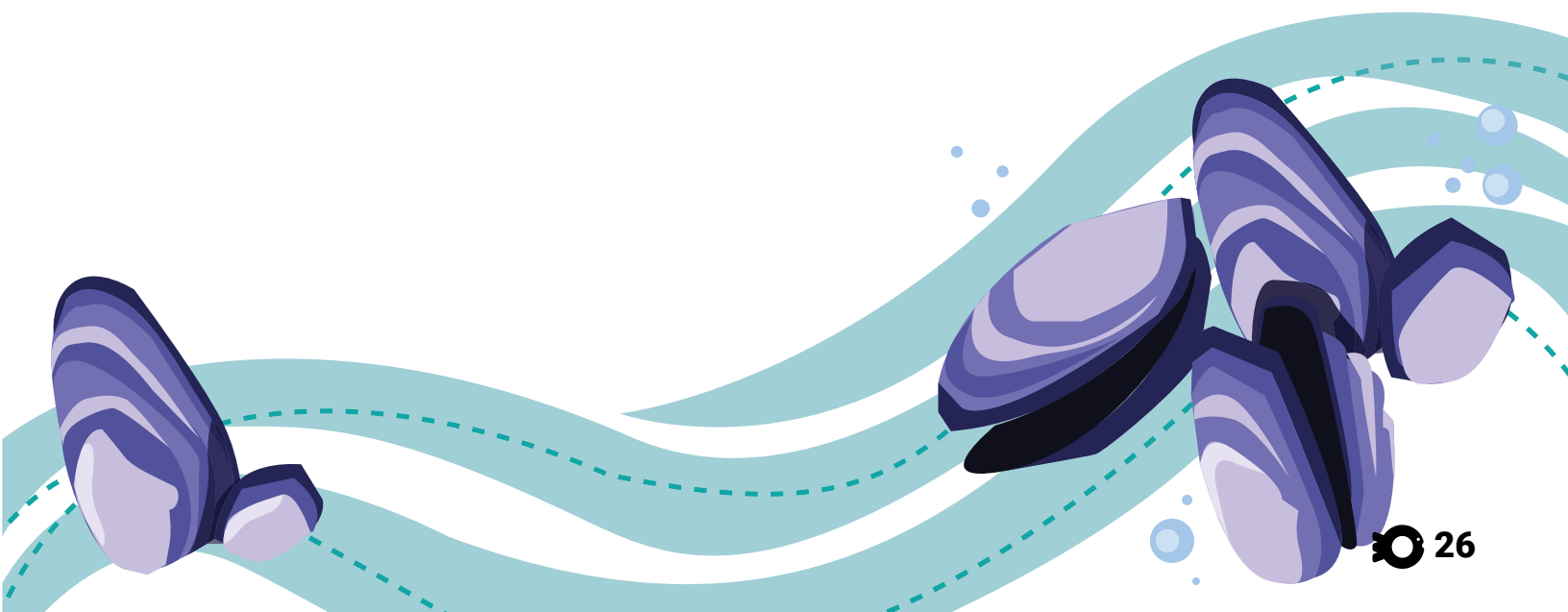
Observations:

Are there any bubbles in the water?

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

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

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



| TIME ELAPSED | FRESHWATER CONTAINER | SALTWATER CONTAINER | VINEGAR CONTAINER |
|-----------------------------------|-------------------------|------------------------|----------------------|
| 0 hours initial Observation | | | |
| 1 hour | | | |
| 12 hours | | | |
| 24 hours | | | |

THOUGHT BOOK

REFLECT

What are the most powerful ways A/T/H can be protected from the ongoing impacts of climate change?

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

What are some examples of how scientific understanding enables humans to respond and adapt to climate change?

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

READ

the introduction and abstract of the scientific paper: [Blue Carbon in Marine Protected Areas: Part 1 - A Guide to Understanding and Increasing Protection of Blue Carbon](#)

- Referring to the above article, outline the connections between establishing MPA's in British Columbia and climate change.

- What would you prioritize when selecting an area to establish a MPA for maximum environmental impact?

READ

The abstract and introduction of the scientific paper: [Strong historical and ongoing indigenous marine governance in the northeast Pacific Ocean: a case study of the Kitasoo/Xai'xais First Nation](#)

- How would you recommend Indigenous marine governance be incorporated in the selection of MPA sites?

- What measures can be put into place to ensure that Indigenous communities can continue to exercise their traditional rights within MPA regions? Expand on why it is important for Indigenous communities to exercise their traditional rights.



THOUGHT BOOK

REFLECT

In what ways do MPAs support regeneration in ecosystems?

How might Marine Protected Areas infringe on the rights of Indigenous people? How could Marine Protected Areas instead recognize and honour the rights of Indigenous peoples?

List the possible shortcomings of MPAs and identify solutions to each limitation.

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.



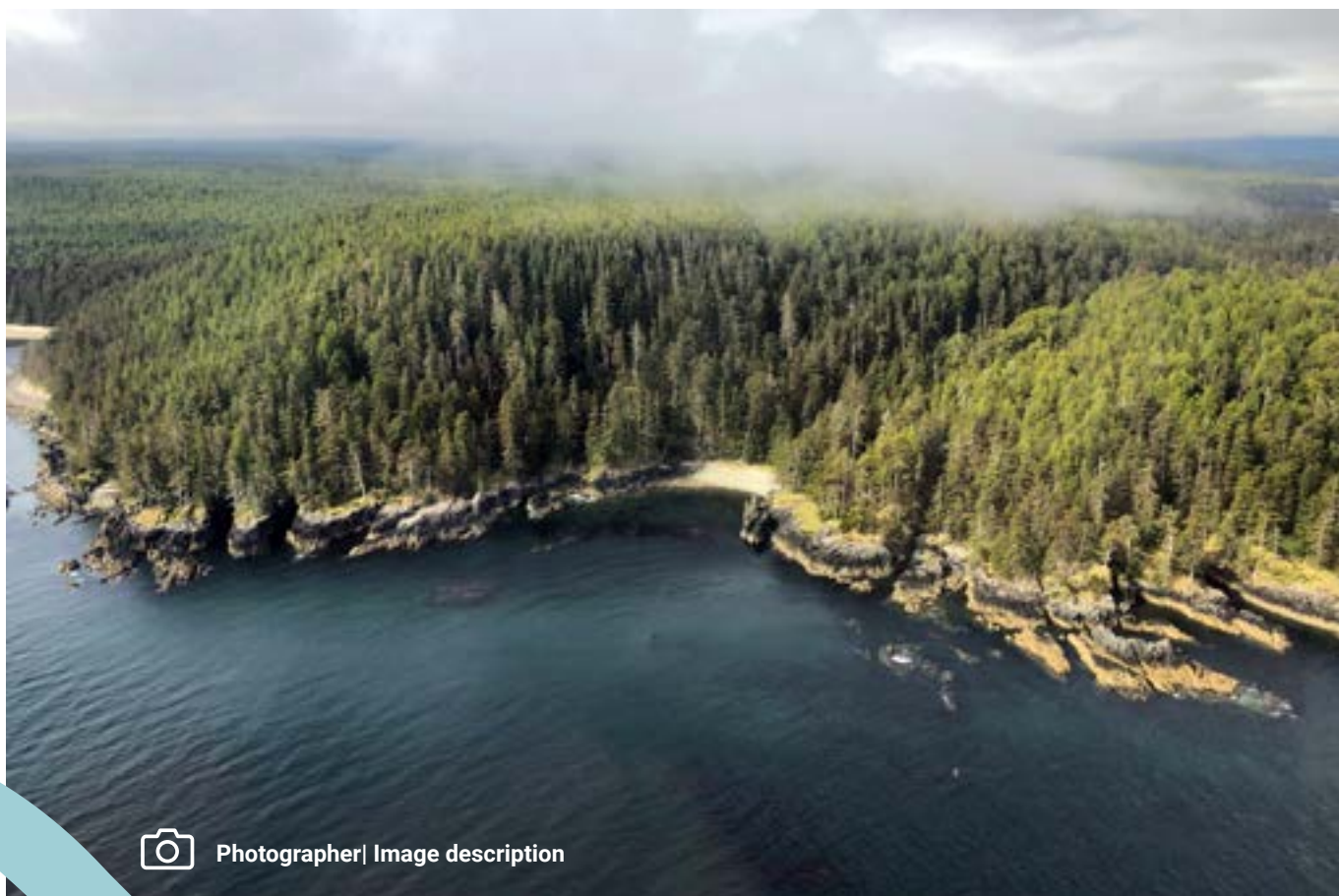
LESSON 8: THE FUTURE OF ÁTL'KA7TSEM/ TXWNÉWU7TS/ HOWE SOUND

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.

Please note: 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? Furthermore, be sure to discuss the role biospheres play as global observatories for climate change adaptation and mitigation.



[illegible]

THOUGHT BOOK

REFLECT

How does biosphere status promote the regeneration of an ecosystem?

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

Consider that all Biosphere Regions have three main functions: conservation and protection of biodiversity, sustainable development, and education, research and monitoring. How can you ensure that Indigenous voices are heard throughout these three actions?

TAKE A DEEPER DIVE

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

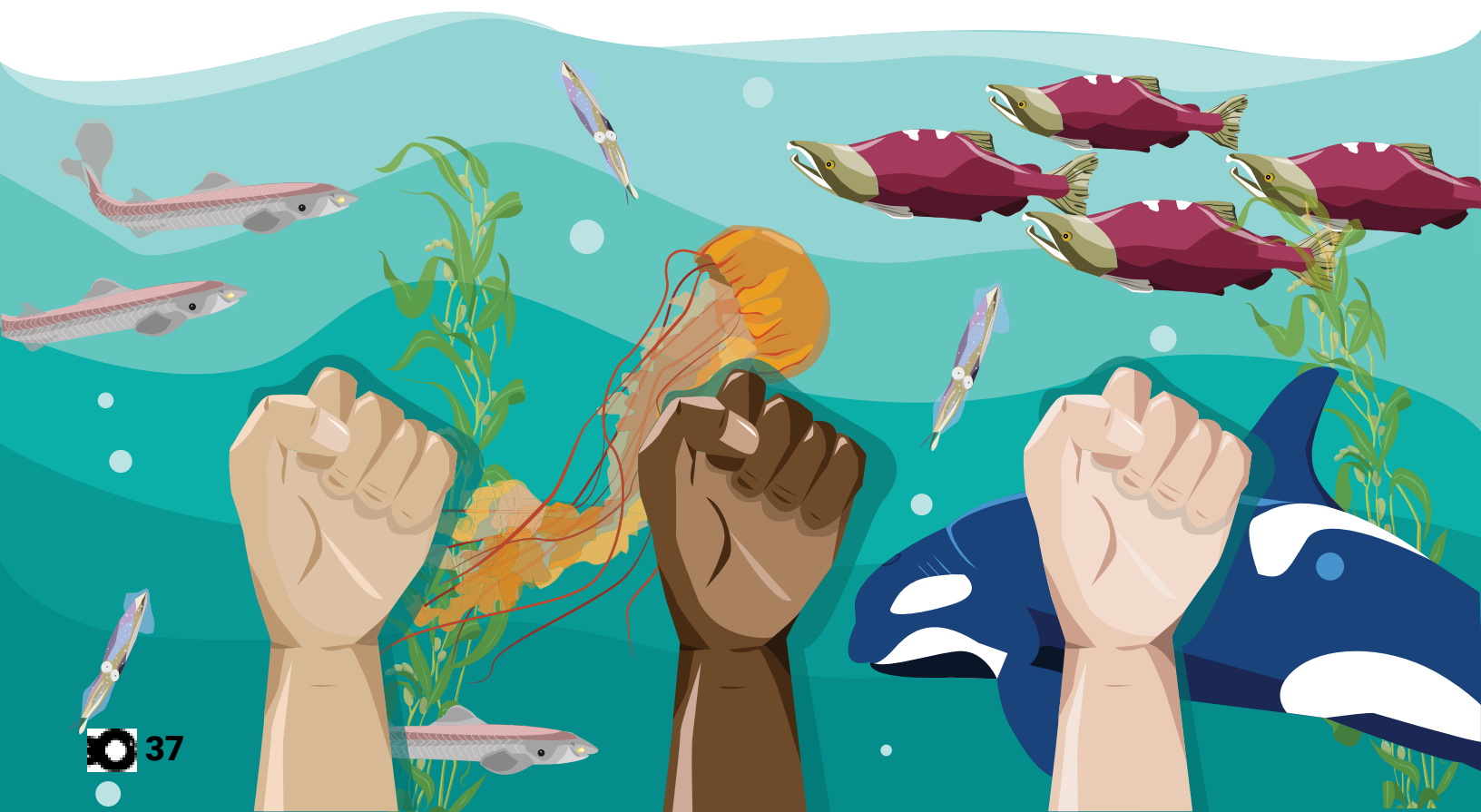


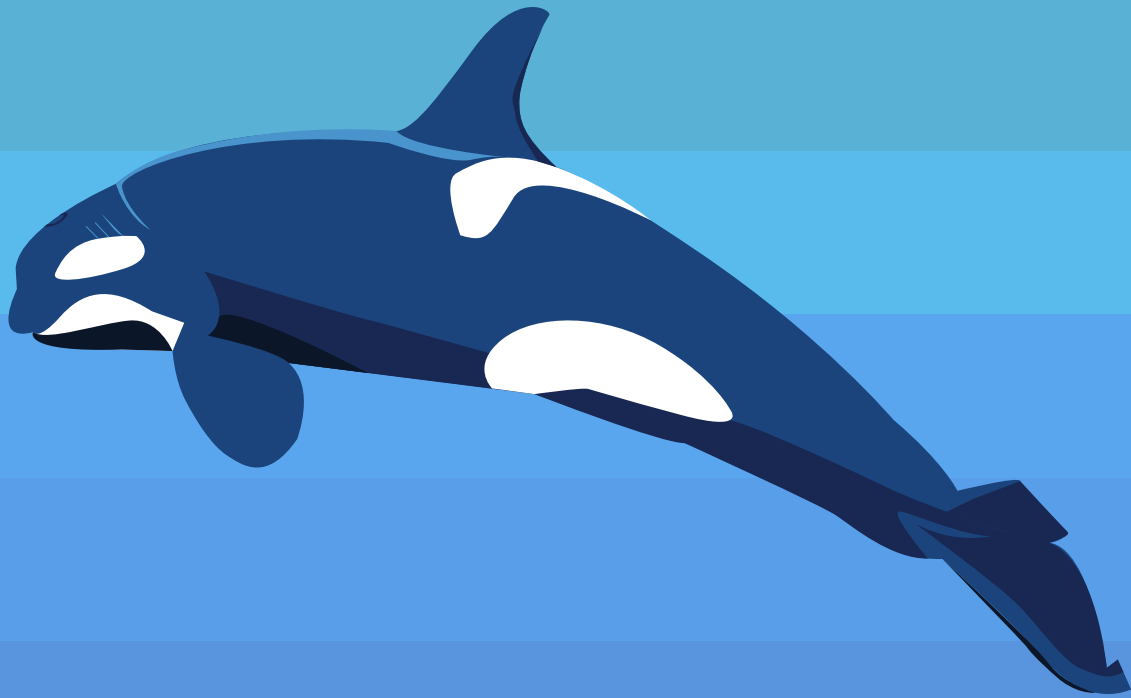
TAKE ACTION

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

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

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Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

