



SIERRA
CLUB BC

OLD-GROWTH FORESTS

EXPLORATION GUIDE



Illustrations by Amira Maddison

HOW TO USE THIS GUIDE

BUILD YOUR OWN ADVENTURE

This booklet will help you discover the story of old-growth forests in British Columbia. The content is designed primarily for students in Grades 6-8. Use this booklet as a guide to explore forests in your area and prompt questions about their history and current use.

Colour in the pictures as you go along.



Printing: If you don't have access to a printer, simply follow along on a device and complete the activities on blank paper or in your own nature journal.

Take the time to **acknowledge** that the land you live on has been stewarded by Indigenous peoples for millennia before the arrival of Europeans and other immigrants. Indigenous peoples around the world continue to steward the land and waters, benefiting all lifeforms. If you don't know the names of the Indigenous nations who have traditionally called the area you live home, take the time to read about them online. Learn about territories, language and treaties in your area at native-land.ca/

Fill in the blank to write the names of the Indigenous peoples who have traditionally called the area you live home:



TAKE ONLY MEMORIES LEAVE ONLY FOOTPRINTS



Leave no trace. What does the three-word slogan really mean? Simply put, it is the best practice to follow to enjoy and respect our natural spaces. It means a lot more than just packing out your garbage.

Leave What You Find: Make sure everything from nature stays in nature. Even the smallest flower plays an important role in the ecosystem. Try using a camera to document your favourite treasures during your time outside. Create a nature journal or slideshow with your pictures to preserve your memories. Let “take only memories (and nowadays pictures or photographs) and leave only footprints” be your mantra.

Respect all beings: Animal encounters can be exciting and a great learning opportunity. Know before you go which animals you’re likely to encounter and any safety concerns. Observe from a distance and never approach or feed beings. It is best to only observe small beings such as insects and worms, but if you do pick them up, treat them with extreme care and place them gently back where you found them.

Stay on designated paths and trails: Your feet can have a big impact on the surrounding habitat. In some parks, you may come across restoration areas (designated by signs) where it is especially important to only walk on designated paths. Check out these areas and read about the species that traditionally live in that particular ecosystem.



Be Considerate of Others: We share these outdoor spaces with each other. Be courteous to other users and let the sounds of nature prevail. Follow all physical distancing guidelines such as 2 metre separation between yourself and other people.

INTRODUCTION TO OLD-GROWTH

The forests that we might recognize today in British Columbia first appeared around 13,000 years ago after many freeze and thaw events that shaped the landscape we now know. Some of the first trees to appear after this last Ice Age were likely Lodgepole Pine and Mountain Hemlock. These are trees we can still find in our forests today.

Indigenous peoples have been residing in these lands for thousands of years and use forests and trees for shelter, food, medicine, transportation, fuel, clothing and tools. In 2017, archaeologists found carved wooden tools on Triquet Island (on Heiltsuk First Nation territory, along the Central Coast of B.C.) that are 6500 years old!



DOUGLAS FIR

OLD-GROWTH FORESTS IN BRITISH COLUMBIA

Old-growth forests are forest ecosystems that have grown for at least 200 years without any disturbance such as logging. Old-growth ecosystems are unique because they have a very dense canopy that allows for a rich understory. This understory is an important habitat for many beings—from mammals to insects to fungi. Some species, like the Marbled murrelet and the Spotted owl, can only survive in old-growth forests! Unfortunately, the logging industry in B.C. continues to threaten these unique ecosystems.



SPOTTED OWL

Did you know? On Vancouver Island, a century of industrialized logging has resulted in about 80% of the original old-growth forests being logged, including over 90% of the valley bottoms where the biggest trees are found.

FUN FACT!

Marbled murrelets are kind of like penguins! They have webbed feet and can only land on their nesting branches in old growth trees whose branches are at least 30cm wide! They use mature or old-growth forest stands near the coastline for nesting. When the young murrelets leave the nest, they jump off the branch and need to learn to fly in their first free fall!



FEET UP A TREE

This activity can give you a new perspective and invite questions about the trees living nearby!

- Find a tree at least 2 metres tall.
- Gently lay down next to the tree so that you can put your feet up the trunk of the tree (if the ground is wet, use a blanket or jacket to stay dry).
- Observe the branches of the trees and the directions they go in. Are there off-shoots growing from the main branches? How thick are the branches? What life can you observe living on the branches? Is there moss? Do you see any insects? Maybe there is even a nest!
- Draw what you see (or take a picture and then draw it at home). Start drawing from the trunk of the tree and go outwards from there.



A SHADY PAST

THE HISTORY OF LOGGING IN B.C.

There is a long history and tradition of logging and logging culture in B.C. When Europeans first arrived on the coast of what is now British Columbia, they were amazed to find the vast and huge old-growth forests that hug the coastline and continue inland. In the 18th century, these colonizers saw potential for commercial logging in B.C. to build their ships. By the 19th century, the forests were being logged and shipped world-wide. Trees were not replanted as there seemed to be an endless supply of trees.

Logging continued to be an important part of the economy in the 20th century. Replanting of trees was introduced. Even in many cases today, only one species of tree is planted and all at the same time. In a naturally occurring forest, there would be many species of trees of varying ages. Old-growth forests are non-renewable. Not only is the rate at which they are being cut down far faster than the hundreds of years they take to grow, but climate change means that the conditions these forests need to grow (including appropriate temperature and rainfall) are available less and less. This means planting trees does not make up for logging old-growth forests. *What do you think some effects of only planting one type of tree might be?*

The current rate of old-growth logging on Vancouver Island alone is more than three square meters per second, equivalent to the area of nearly two soccer fields per hour. The destruction of B.C.'s globally rare, endangered old-growth rainforests threatens biodiversity, water quality and Indigenous cultural values and practices.

B.C.'s temperate rainforests represent the largest remaining tracts of a globally rare ecosystem, covering just half a per cent of the planet's landmass. When left intact, they are also considered relatively resilient and less vulnerable to climate impacts such as fire and insect outbreaks compared to other forests.

DID YOU KNOW?

90% of British Columbians want the province to take action to protect endangered old-growth forests. It's our global responsibility to protect them!



MARTEN

FOREST MAPS

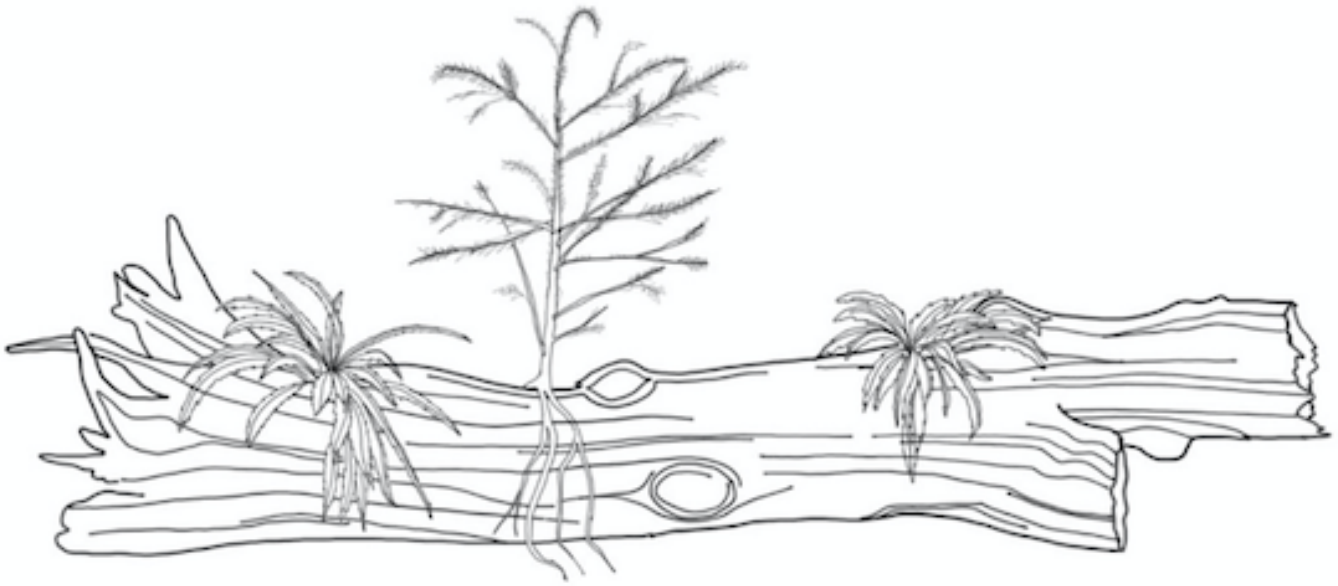
These maps show the impact of old-growth logging on our rainforests!



NURSE LOG HUNT

SEARCHING FOR HISTORY

Although most of the old-growth forests in B.C. have been logged, there is still evidence of older trees all around us. One piece of old-growth evidence is nurse logs. Nurse logs are trees that have fallen or been cut and, instead of being used by humans, are left to decay in the forest. These logs are extremely nutrient-rich and can provide a great habitat for new species to grow. In your local greenspace, **see if you can find a nurse log or stump.**



Count the number of species growing on the nurse log you find:

Using a device with internet or a plant identification book, try to identify as many plants as you can! List them here:

-
-
-
-

WHY PROTECT OLD-GROWTH?

FAST FACTS!

DID YOU KNOW?
Western red cedar
trees can live for
1,500 years and grow
over 200 feet tall!



WESTERN RED CEDAR

- Today, ancient forests should be considered a non-renewable resource. Almost all of B.C.'s young forests are logged again before they grow old and because of the changing climate, forests logged today cannot grow back as we know them. Planting trees where an ancient ecosystem once developed over hundreds of years does not "replace" the original forest; it creates an entirely different type of forest.
- We are still discovering new species in ancient forests that were unknown to scientists.
- Many trees and other forest species in B.C. were actively looked after to varying degrees by Indigenous peoples since time immemorial.
- A healthy forest ecosystem supports healthy soils, healthy water and aquatic species, and unique flora and fauna. Trees and their root systems hold water, so when they are clear-cut the soil has less capacity to hold water and nutrients. This means that erosion is 3 times more likely on sites that are clear-cut.
- There are over 600,000 km of resource roads in B.C., with an average of 10,000 km more added each year. Many of these are used for logging. Combined, these roads cover a huge area where trees will not grow.



HOW OLD AM I?

ESTIMATE THE AGE OF A TREE

Suggested materials: Pencil, fabric measuring tape or a piece of string that you can use to wrap around the tree and then measure with a ruler or measuring tape.

The easiest way to tell the age of a tree is by counting its rings, but this method means the tree must be cut down. There are a few other ways to estimate the age of a tree without cutting it. Using the method below, calculate the approximate age of a tree in a typical forest environment nearby (trees growing under less than optimal conditions might be a lot smaller than average).

Step 1 – Identify the type of tree

Step 2 – Wrap a measuring tape around the tree about 1.3 metres or 4.3 feet up from the base of the tree. Record the circumference of the tree in inches here:

Step 3 – Use the circumference of the tree to determine the diameter (width) of the tree by **dividing your measurement by 3.14 (π or pi)**.

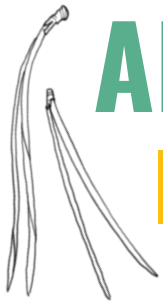
$\text{Circumference} / 3.14 = \text{Diameter}$

Step 4 – Determine the approximate age of the tree by **multiplying the diameter by the growth rate** of the tree you are measuring. Different trees have different growth factors. Here are the growth factors for some common trees:

- Douglas Fir: 5
- Cottonwood, Aspen: 2
- Dogwood: 7
- Birch: 3.5
- Oak: 4

Write the approximate age of the tree here:

How many more years would this tree have to grow to be considered old-growth?



ANIMALS AND OLD-GROWTH INTERCONNECTED ECOSYSTEMS

r p o g s j f q y s b l d e k m c f s o
x e u g j r h o p n m i d p p y q i c t
t v d q l u g r q s o w n a y a j b m n
p g s n p m u f j j w c t m a l k k t w
p x a e a c l c q k s l s v j a k t s y
a v l z e m r w c l c v r d c a w n g u
v y m k i m a o o r n h y h r z v g j j
k r o c q k l l k a x v l z d f k v h v
n x n x l m n w a f y p p t t r a m u q
d c k x e e r a c s p l t e h i i q i n
i d q h i t g k y i p e b l w f q m l d
u g n x p q h i n u k k f e g q y c i m
o d t z b t q b y h u q h r a d e c g b
n v i b d g g d v u c n b r b v y d c b
f d c v b v z k a d y g n u s d b k t m
a i q r e k c e p d o o w m a r t e n r
w q s u o m h j k o o p z c h o s d l j
x e s h p e r t h d b i t j t c x s t j
t o b a e h s s c h e v e v o d h o h l
a p o q u r p c u j w k p w a j x r p s



Here is a list of some animals and trees that make up old-growth forests. Can you find them all?

Cedar
Fisher

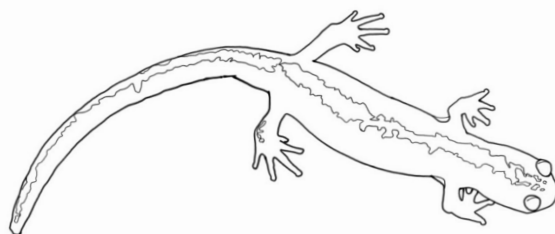
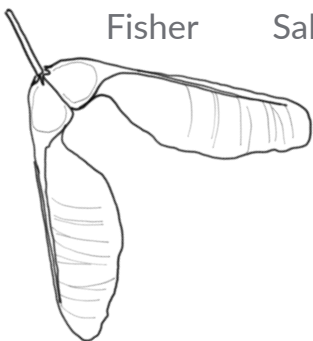
Murrelet
Salamander

Spruce
Woodpecker

Fir
Hemlock

Marten
Owl

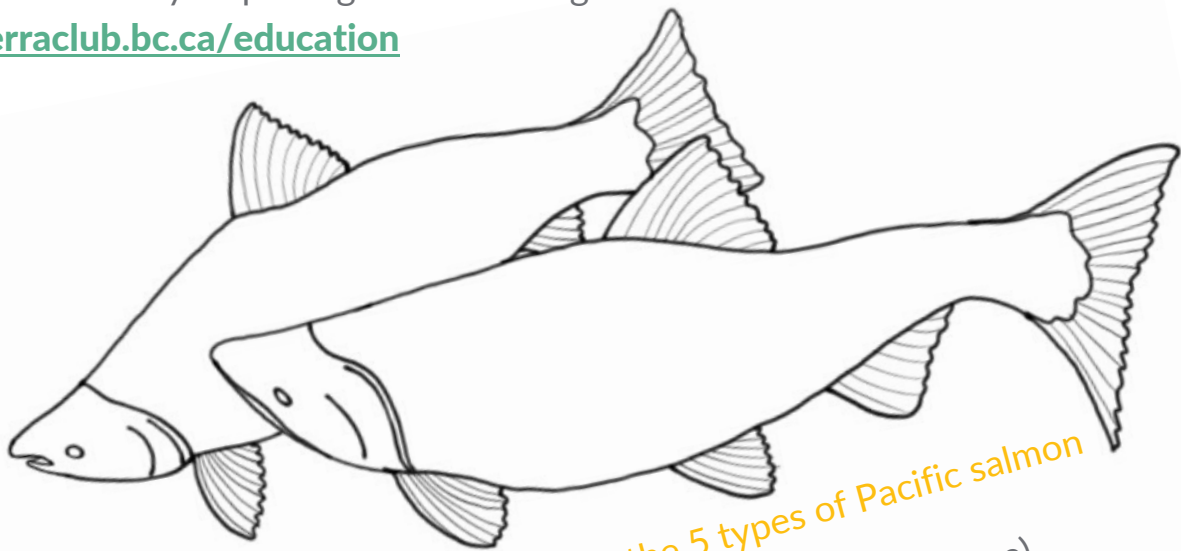
Salmon



SALMON AND OLD-GROWTH INTERCONNECTED ECOSYSTEMS

Salmon depend on forest habitats to provide shelter for spawning. Old-growth forests provide unique protection for Pacific salmon species because of their rich cover and understory. Old-growth forests provide shelter and keep stream temperatures cool for safe spawning habitats. Over the last 200 years, we have cut much of the old-growth that the salmon rely on.

To learn more about the spawning habits of Pacific salmon, check out the Salmon Lifecycle package on the Google Classroom or at sierraclub.bc.ca/education



DID YOU KNOW?

Here is a quick and easy way to remember the 5 types of Pacific salmon



- **Thumb:** Chum (Thumb and chum rhyme)
- **Pointer finger:** Sockeye (you might scratch your EYE with this finger)
- **Middle finger:** King/Chinook (this is your longest finger or your 'king' finger)
- **Ring finger:** Silver/Coho (silver like the ring you can wear on your ring finger)
- **Pinky:** Pink (Pink like your pinky finger)

OLD-GROWTH INVESTIGATION

Suggested materials: Pencil, magnifying glass, measuring tape

This activity will introduce you to observation strategies, creating testable questions and designing your own experiment. Although ecosystems are extremely complex, we can do our best to try to understand parts of them.

Choose an area of interest in your yard or local green-space.

Investigating begins with observations and questions! Take 15 minutes to write down all the questions and observations you have about your area of interest. Use “I notice”, “I wonder” and “it reminds me of” to make guided observations.

List your observations here:

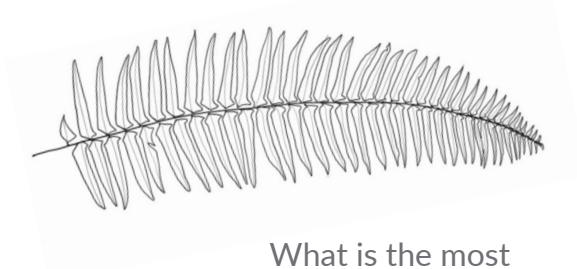
A large empty rectangular box with a thick yellow border, intended for listing observations.

OLD-GROWTH INVESTIGATION

Now that you have some questions and observations, it's time to come up with something to test! Testable questions have a few key qualities...

- Measurements can be repeated by others with the same result
- Questions can be answered using the available equipment and resources
- Question is a “comparison” or “observation” question, not a “why” question.

For example:



| | | | |
|--|---|---|--|
| Testable: | What is the average stalk length of a fern? | What is the most common species growing on a nurse log? | Do we find more spider webs below or above 3 feet from the ground? |
| Not Testable during this activity. Research these! | Do ferns like wet or dry soil? | Do plants like to grow on small or big nurse logs? | Why do some spider webs have holes in them? |

Write your testable question here:

Use this space to draw and take notes of your observations for your testable question:

OLD-GROWTH INVESTIGATION

FOLLOW UP QUESTIONS

What did you learn during this investigation?

What were some challenges you encountered?

What improvements could you make to your project design?

What questions do you wish you could find answers to? Look them up at your library or online!



While standing in Avatar Grove (on Pacheedaht territory near Port Renfrew), you can feel the temperature in the forest is considerably lower and the air humidity feels moist and fresh. These conditions help allow for more biodiversity than in nearby forests that have been logged and replanted with only one species of tree.

STAND UP FOR TREES

DESIGN YOUR OWN POSTER

Use the facts about Old Growth you learned in this package to create a poster. See more resources at the end of this package. You do not need to use a piece of poster board to make an effective poster (a 8.5 x 11 inch piece of paper works).

1. **Decide on a Call to Action** - what you want people to do as a result of looking at your poster?

What is a Call to Action?

Something such as a speech, piece of writing, or act that encourages people to take action about a problem.

Example: "STAND UP FOR OLD-GROWTH FORESTS! Write to your local government telling them to STOP OLD GROWTH LOGGING".

2. Make sure that every word on your poster **supports your message and Call to Action**.

3. Make sure that you **write clearly so your poster is legible**. Use a large title to draw attention to the poster. Write other text big enough so that people can easily read your poster.

4. **Add attractive visuals** that show why old-growth forests are important, beautiful and unique.

5. **Try using contrasting colours** (black/white, red/green, blue/orange, yellow/purple).

6. **Display your poster** in a public place so that people will see it!

SHARE YOUR POSTER WITH US!

Send a photo or scan of your poster to: education@sierraclub.bc.ca or share a picture on **Instagram** at tag @SierraClubBC and #SierraClubBCed
Please also post a photo on the Google Classroom!

LINKS AND RESOURCES

Visit our EcoMap - This tool will help you learn about the fascinating beings that live in BC's various 'Ecoprovinces', including traditional Indigenous uses of and connections to these lifeforms. There is even a glossary with vocabulary specific to nature. <https://sierraclub.bc.ca/ecomap/>

Seeing Through Watchers' Eyes (STWE) - Between the Worlds is an online interactive learning tool built using the Prezi platform by tSouke member kQwa'st'not (Charlene George). It tells the story of the land where the mural lives, on the territory of the Lekwungen speaking peoples (Songhees and Esquimalt Nations). This learning tool is based on the thirty-two foot collaborative mural Through Watchers' Eyes, housed at Spencer Middle School (School District 62), as designed by kQwa'st'not (Charlene George).

Built using the Prezi platform with support from Sierra Club BC, this tool is a publicly shareable, culturally rich Indigenous learning tool to support community learners of all ages and backgrounds to see through another's eyes. The mural and online tool help to open our eyes to new perspectives and answer many questions including where to begin in addressing the climate crisis. This tool invites learners into a new way of seeing and relating to the natural world while offering opportunities for learning using various modalities. sierraclub.bc.ca/watcherseyes/

Visit the Sierra Club BC website to learn more about the myths about forests & 10 reasons why to protect old-growth:

- sierraclub.bc.ca/7-myths-about-forests-carbon-and-climate-change/
- sierraclub.bc.ca/10-reasons-to-save-old-growth/
- prezi.com/vic9lroluxw_/10-things-to-know-about-forests-and-climate/

Old Growth Forest Network - oldgrowthforest.net/why-oldgrowth-forests

Learn more about early human settlement in Heiltsuk Nation territory -

cbc.ca/news/canada/british-columbia/archeological-find-affirms-heiltsuk-nation-s-oral-history-1.4046088

Other recommended reading:

- thetyee.ca/Opinion/2017/09/12/Preserve-Forests-Carbon-Belongs/
- "Nature's Temples: Complex Old Growth Forests" by Joan Maloof
- "Nowhere Else on Earth: Standing Tall for the Great Bear Rainforest" by Caitlyn Vernon (online version available through the Victoria Public Library)

Fun story time idea! "The Tree in the Ancient Forest" by Carol Reed-Jones

