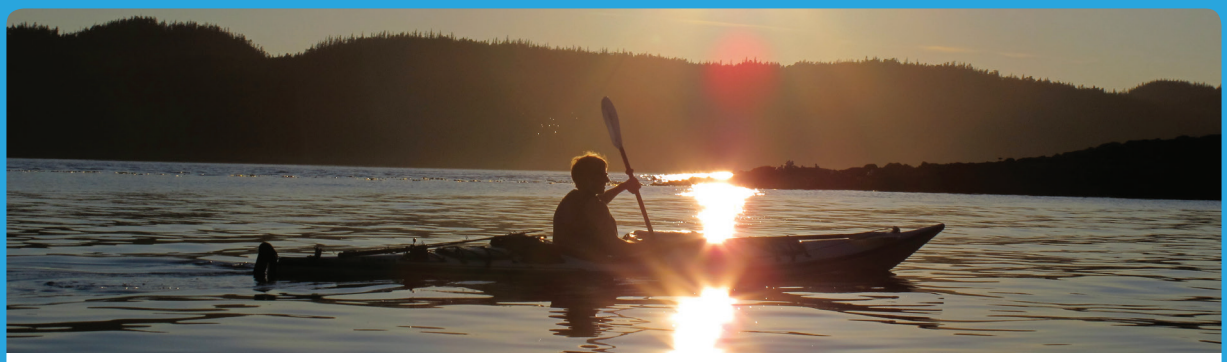


Exploring the Great Bear Sea

Elementary Grades 4 - 7 Resource

Acknowledgements

Film – Green Fire Productions

Karen Anspacher-Meyer	Executive Director
Ralf Meyer	Creative Director

Curriculum Authors

Jennifer Buffett	B.A., B.Ed, Masters of Science Communications
Sarah Lockman	B.Kin, B.Ed, Masters in Cultural Studies and Critical Theory

Resource Reviewers

Karen Anspacher-Meyer	Executive Director, Green Fire Productions
Molly Clarkson	Marine Communications and Technical Support Officer, Council of the Haida Nation
James Zlatanov	Helping Teacher Aboriginal Education, Middle/High School Support, School District #52, Prince Rupert

Graphic Design

Monika Sosnowska	MSE Marketing (www.msemarketing.net)

Green Fire Productions
www.greenfireproductions.org
www.greatbearsea.net

Table of Contents

Introduction

The **Exploring the Great Bear Sea Elementary and Secondary Curriculum Resources** are based on the film *The Great Bear Sea: Reflecting on the Past, Planning for the Future*, by Green Fire Productions, and can be used to engage students on an inquiry-based, educational journey through the Great Bear Sea. The Great Bear Sea is a new name given to the North Coast of British Columbia (BC), an area that extends from Campbell River on Vancouver Island to the border of BC and Alaska. This region of British Columbia's coast is one of the richest marine ecosystems in the world, has enormous cultural significance to the people who live here, and contains important resources for BC's economy. It covers a large area – 103,000 square kilometers in total – and extends from the high tide line to the edge of the continental shelf. In an effort to manage existing uses and plan for the future, coastal communities, local government, and more than 10 marine sectors participated in a planning process with 18 First Nations and the Province of British Columbia, a government-to-government partnership to create marine plans and ensure this region is sustained for future generations.

These resources include an elementary cross-curricular unit for Grades 4-7 and secondary units for Social Studies Grades 11 & 12 and Environmental Science Grades 11 & 12. Using film segments, research data, local knowledge and place-based stories, the Great Bear Sea curriculum explores themes such as traditional and local knowledge, collaborative science, marine planning, biodiversity, sustainable resource management and marine stewardship. All resources are connected to the revised BC curriculum and include lesson plans, supplementary resources and film clips to support classroom learning.

The Great Bear Sea Film

The film, *The Great Bear Sea: Reflecting on the Past, Planning for the Future*, by Green Fire Productions, is a journey through the Great Bear Sea region, home to First Nations for thousands of years. The film explores this unique area – a wild expanse of ocean where whales, wolves, bears, fish, seabirds, other marine life and humans thrive in rich coastal ecosystems. The Great Bear Sea is also a place where worlds collide – a place full of historic conflicts and looming battles over ocean resources. Now 18 First Nations and the Province of British Columbia have crafted marine plans for the Great Bear Sea to both protect their home and to build sustainable coastal economies through the Marine Planning Partnership (MaPP). Through the film, we meet people and communities along the coast of BC who are working to implement BC's marine plans.

Green Fire Productions, a non-governmental organization, specializes in producing documentaries on sustainability and conservation of natural resources. *The Great Bear Sea* is part of the Ocean Frontiers film series on ocean stewardship in North America. www.ocean-frontiers.org Founded in 1989 by Karen Anspacher-Meyer and Ralf Meyer, Green Fire films are used in classrooms worldwide and screened in community events, for decision-makers and on public television.
www.greenfireproductions.org

Marine Planning Partnership (MaPP)

The Marine Planning Partnership for the North Pacific Coast (MaPP) www.mappocean.org represents an innovative response and approach to the challenge of ensuring sustainable use of the MaPP study area, or the Great Bear Sea, for generations to come. The MaPP is a co-led process between 18 First Nations and the Province of British Columbia to establish four area-specific marine plans and a regional planning framework. Over the course of four years, the planning teams created new marine plans in consultation with marine stakeholders from the fishing, tourism, recreation, academia, local government, renewable energy, and other sectors.

The plans include special management zones for tourism, aquaculture, and First Nations culture and protection management zones for marine life and habitat. The plans address a variety of marine uses, activities and values and contain hundreds of strategies that will lead to solutions and revitalise the North Coast. The year 2015 marked an important milestone for shaping the future of Canada's North Pacific Coast and the Great Bear Sea. On April 27, 2015, after four years of planning, marine plans for four sub-regions (North Coast, Central Coast, Haida Gwaii, North Vancouver Island) were released and made public on the MaPP website. According to the BC and First Nations' governments, these plans: "when implemented, will help to create opportunities for sustainable economic development, support the well-being of coastal communities and protect the marine environment."

This collaborative government-to-government planning process is innovative and globally significant; there is no other country where a marine plan has been developed by Indigenous and provincial governments. Worldwide, there is great interest in MaPP and learning more about how the planning was done, and what was achieved. The MaPP website is a very useful resource to learn more about the process, watch a video on "10 Things You Need to Know About MaPP", read stories from the First Nations and the MaPP stakeholder members, as well as a research tool for students.

The Great Bear Sea: Reflecting on the Past, Planning for the Future explores the marine planning process from the perspective of the four sub-regions. The 18 First Nations* working on the MaPP plans include:

Central Coast

Nuxalk Nation, Heiltsuk Nation, Kitasoo/Xai'xais First Nation, Wuikinuxv Nation

Haida Gwaii

Council of the Haida Nation, Old Massett Village Council, Skidegate Band Council

North Coast

Gitga'at First Nation, Gitxaała First Nation, Haisla First Nation, Kitselas First Nation, Kitsumkalum First Nation, Metlakatla First Nation

North Vancouver Island

Mamalilikulla Qwe'Qwa'Sot'Em First Nation, Tlowitsis Nation, Da'naxda'xw Awaetlatla First Nation, Gwa'sala-'Nakwaxda'xw First Nations, We Wai Kum First Nation, Kwiakah First Nation, K'ómoks First Nation

** This list contains over 18 First Nations. Some Nations and territories had been amalgamated post-contact and have very recently been re-defining traditional territories and spaces.*

First Peoples' Perspectives & Indigenous Knowledge

The Great Bear region is the traditional, ancestral and unceded territory for many First Nations that have called this area home and have co-existed with the resources of the land and sea for thousands of years. First Peoples in this region have developed a vast body of knowledge over time – and they continue to develop this knowledge – around the land, sea, resources and how humans both impact and are connected to nature.

The film presents the perspectives of some of the diverse First Peoples of this region, and particularly their connection with place – with the land and sea – and their unique knowledge connected to their environment and territories. All perspectives shared were granted with permission, and in collaboration with individuals interviewed in the film. There are also a number of supplementary materials included in the Exploring the Great Bear Sea Curriculum Resources that were provided with permission from various First Nations. Throughout the resource, you will see these cited appropriately.

This Indigenous Knowledge forms the basis of the film and the Exploring the Great Bear Sea Curriculum Resources. Before beginning this unit, it is important to review the following:

- **Appendix A: Interview with Doug Neasloss** (Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority) sharing some of the history of the First Nations in the Central Coast region of BC.
- **Appendix B: Indigenous Knowledge** (Source: Science First Peoples Teacher Resource Guide © 2016, First Nations Education Steering Committee and First Nations Schools Association. Used with permission from the First Nations Education Steering Committee Society).
- The full-length version of ***The Great Bear Sea: Reflecting on the Past, Planning for the Future*** film (75 minutes), so you have an understanding of the context and geography of the perspectives shared in individual film clips. The full-length film is available at www.greatbearsea.net or on the Great Bear Sea USB Drive.

Individual lessons will also provide contextual and background information to support the teaching of this material.

Curriculum Development & Contributors

Curriculum developers, Jennifer Buffett (B.A., B.Ed, Masters of Science Communications) and Sarah Lockman (B.Kin, B.Ed., Masters in Cultural Studies and Critical Theory), have worked in formal and informal educational settings, including elementary, secondary and post-secondary classrooms, non-profit organizations, municipal and provincial educational organizations in BC and Ontario. Together, they bring over 30 years of curriculum development and teaching experience to projects, and work together to create innovative approaches to meeting outcomes and deliverables. They specialize in innovative approaches to hands-on, inquiry and place-based learning, and work with students, teachers and organizations to develop relevant, engaging learning resources and environments. Contact them at: learninginplace@gmail.com.

There are a number of resources included in this curriculum that were provided by individuals or organizations for use in this resource. Please note these resources are not available for use or publication outside of the classroom. Thank you to the following contributors for sharing these resources:

Bear Data and Bear Identification Information
Spirit Bear Research Foundation

***Bear Witness* (film clip)**
Bears Forever - a project of Coastal First Nations and the Central Coast First Nations Bear Working Group

Biographies

- Karen Anspacher-Meyer - *Executive Director, Green Fire Productions*
- Vernon Brown - Data & Referrals Coordinator Kitasoo/Xai'xais Integrated Resource Stewardship Authority
- Jenn Burt - Doctorate in Resource Management – Marine Ecology Simon Fraser University
- Rosie Child - Operations Manager and a Research Technician for the Spirit Bear Research Foundation
- Molly Clarkson - Marine Communication and Technical Support Officer
- Alejandro Frid - Science Coordinator/Ecologist Central Coast Indigenous Resource Alliance
- Kira Krumhansl - Postdoctoral Researcher at Simon Fraser University and Hakai Institue
- Doug Neasloss - Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority
- Dan Okamoto - Postdoctoral Researcher, Simon Fraser University
- Chantal Pronteau - Guardian Watchman & Researcher

- Trevor Russ - Vice President, Council of the Haida Nation
- Markus Thompson - Masters of Resource in Environment Management Simon Fraser University

Coastal Guardian Watchmen - *Eyes and Ears on the Land and Sea* (film clip)
Coastal Guardian Watchmen Network

Collaborative Research
Alejandro Frid, PhD, Science Coordinator, Central Coast Indigenous Resource Alliance

Cover photo (bear) by Doug Neasloss

***Eelgrass* (film clip)**
Florian Graner, Sealife Productions

***Gwaii Haanas Legacy Pole* (film clip)**
Parks Canada and filmmaker, Nate Jolley

Haida Marine Seasonal Round and Ocean & Way of Life brochure
Council of the Haida Nation – Marine Planning Program

Ha-ma-yas Marine Plan (excerpt)
Member Nations of the Nanwakolas Council

Indigenous Knowledge (Appendix B)
Source: Science First Peoples Teacher Resource Guide © 2016, First Nations Education Steering Committee and First Nations Schools Association. Used with permission from the First Nations Education Steering Committee Society

Interview with Doug Neasloss (Appendix A)
Doug Neasloss, Chief Councillor- Kitasoo/Xai'xais Band Council and Resource Stewardship Director- Kitasoo/Xai'xais Integrated Resource Stewardship Authority

Kelp Data and Background
Hakai Institute

***Otter Kelp Research* (film clip)**
Jenn Burt

***Ratfish* (film clip)**
Florian Graner, Sealife Productions

Seasonal Use Cycles of the Kwakwaka'wakw
Emily Aitken, Tlowitsis Nation

Supporting Emerging Aboriginal Stewards – *SEAS* (film clip)
Philip Charles

Resource Overview

Elementary Resource

The Elementary resource has been designed for Grades 4-7, using a hands-on, inquiry-based approach exploring themes of Indigenous Knowledge, collaborative research, marine planning, collaborative decision-making, careers and stewardship. It focuses specifically on Science and Social Studies but can be used cross-curricular as certain activities are Mathematics, English Language Arts, Career Education and Arts Education based. The key subjects have been identified at the beginning of each lesson plan. Educators are encouraged to consider using science journals or duotangs for the students to keep track of their individual learning.

Secondary Resources

The Secondary resources have been designed to align with the updated Social Studies Grades 11 & 12 and the Environmental Science Grades 11 & 12 BC curriculum. Both units provide an inquiry-based approach to exploring themes of collaborative planning and research, Indigenous Knowledge, marine planning, and stewardship.

From an Environmental Science perspective, the Great Bear Sea serves as a useful BC case study to consider how development and management of resources in the area can be planned and implemented as a means of moving toward sustainability for generations to come. The unit provides an indepth exploration of sustainable resource management and planning through the lens of the Great Bear Sea.

From a Social Studies perspective, the innovative approach to marine planning, as presented through the Marine Planning Partnership (MaPP), provides a new lens for considering issues of governance and collaboration. By exploring this key region of BC through the multiple lens of ecological, economic, geographic and social/cultural perspectives, students have the opportunity to consider both the benefits and challenges associated with collaborative decision making, and how this could be considered at local, national and international levels.

Both units provide an opportunity for educators to specifically look at First Peoples' perspectives and worldviews, and embed these perspectives into all aspects of student learning.

Tips for Educators

The lesson plans, film clips and resources provide a framework for educators to facilitate a unit of study. The lessons have learning outcomes and concepts that build upon each other; however activities have been designed to allow for customization or differentiation as you move through the unit to suit the needs of your environment or learners. All units are inquiry-based and can be tailored to suit students' interests and curiosity. At points in the units, it may be helpful to pre-teach concepts or learning strategies. These have been noted in lessons where appropriate.

These resources incorporate opportunities to engage in place-based learning by moving outside of your classroom and into your own place, as well as thinking critically about the importance of place and culture. We encourage teachers to incorporate the suggested ideas when possible to make connections to your own place as well as to the Great Bear Sea.

The resources also make suggestions for incorporating technology into the activities. Particularly at the upper elementary and secondary levels, one could take a technology-focused approach to the units by linking to the film clips via your own website or mediated online learning environments (such as Edmodo, Google classroom, Moodle, etc.) and encourage student engagement with the resources in this space. Questions for further exploration or inquiry could be mediated in an online environment, capturing evidence of student learning. Many online learning tools can also be incorporated into lessons, such as movie-making, pre/post surveys, blogs, personal websites, research tools, digital storytelling, etc.

How to Use and Access Materials

The resources have been divided into sections to guide the classroom teacher. For each lesson teachers will find required materials, lesson context and learning outcomes, step-by-step instructions for suggested activities, extensions and assessment ideas as well as black line masters. A Teacher Background section is also included for each lesson, highlighting additional background content for educators.

Throughout this resource, several images and colour resources are noted with a ***** in the materials list. These resources are available on the Great Bear Sea USB Drive, or at www.greatbearsea.net.

The full Exploring the Great Bear Sea Elementary and Secondary Curriculum Resources are available for download and viewing through the website: www.greatbearsea.net, including complete lesson plans as well as all supplementary materials for each lesson (film clips, images, etc.). Film clip transcripts have also been provided as a tool for educators.

We recognize that schools in rural or remote areas may have limited or inconsistent access to the internet and may not be able to download or view the resources. Please contact us through the website (**www.greatbearsea.net**) for alternate arrangements, or email at **greatbearsea@gmail.com**.

Curriculum Connections

All units were designed with the framework of the Core Competencies in mind, as outlined in the revised BC curriculum. Educators will see strong links to these competencies through the learning activities. These include:

- communication
- creative and critical thinking
- positive personal and cultural identity
- personal awareness and responsibility
- social responsibility

The resources also provide a framework for embedding First Peoples' worldviews, and engaging with Traditional Knowledge, throughout the units. It is suggested that educators refer to the First Peoples' Principles of Learning and other resources for more suggestions on embedding a First Peoples' worldview into your teaching practice: www.fnesc.ca/learningfirstpeoples.

Elementary

The Elementary Unit for Grades 4 – 7 addresses a variety of Science and Social Studies Big Ideas, content and curricular competencies. This cross-curricular unit also offers activities that target Mathematics, English Language Arts, Career Education and Arts Education.

Secondary

The Environmental Science Unit for Grades 11 & 12 addresses a variety of Big Ideas, content and curricular competencies associated with this area of learning. This unit also offers activities that target Science for Citizens 11.

The Social Studies Unit for Grades 11 & 12 specifically addresses a variety of Big Ideas, content and curricular competencies associated with BC First Peoples 11, Human Geography 11 and Contemporary Indigenous Studies 12. This unit also offers activities that target Social Studies 10, Comparative Cultures 11, Physcial Geography 11, Political Science 11, and Social Justice 12.

Curriculum Charts

See the following pages for BC curriculum connected charts.

Curriculum Connections Grade 4

Area of Learning: Science **Big Ideas:** All living things sense and respond to their environment.

Content	Curricular Competencies
• Sensing and responding: humans, other animals and plants • Biomes as large regions with similar environmental features	Questioning and predicting • Demonstrate curiosity about the natural world • Observe objects and events in familiar contexts • Identify questions about familiar objects and events that can be investigated scientifically • Make predictions based on prior knowledge Planning and conducting • Suggest ways to plan and conduct an inquiry to find answers to their questions • Safely use appropriate tools to make observations and measurements, using formal measurements and digital technology as appropriate • Make observations about living and non-living things in the local environment • Collect simple data Processing and analyzing data and information • Experience and interpret the local environment • Identify First Peoples perspectives and knowledge as sources of information • Sort and classify data and information using drawings or provided tables • Use tables, simple bar graphs, or other formats to represent data and show simple patterns and trends • Compare results with predictions, suggesting possible reasons for findings Evaluating • Make simple inferences based on their results and prior knowledge • Identify some simple environmental implications of their and others' actions Applying and innovating • Contribute to care for self, others, school, and neighbourhood through individual or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations Communicating • Represent and communicate ideas and findings in a variety of ways, such as diagrams and simple reports, using digital technologies as appropriate • Express and reflect on personal or shared experiences of place

Curriculum Connections Grade 4

Area of Learning: Social Studies

Big Ideas: The pursuit of valuable natural resources has played a key role in changing the land, people and communities of Canada.

Content	Curricular Competencies
• The history of the local community and of local First Peoples communities	• Use Social Studies inquiry processes and skills to: ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions • Construct arguments defending the significance of individuals/groups, places, events, and developments (significance) • Ask questions, corroborate inferences, and draw conclusions about the content and origins of different sources (evidence) • Differentiate between intended and unintended consequences of events, decisions, and developments, and speculate about alternative outcomes (cause and consequence) • Construct narratives that capture the attitudes, values, and worldviews commonly held by people at different times and places (perspective) • Make ethical judgments about events, decisions, and actions that consider the conditions of a particular time and place (ethical judgment)

Curriculum Connections Grade 5

Area of Learning: Science

Big Ideas: Earth materials change as they move through the rock cycle and can be used as natural resources.

Content	Curricular Competencies
• Local types of earth materials • First Peoples concepts of interconnectedness in the environment • The nature of sustainable practices around BC's resources • First Peoples knowledge of sustainable practices	Questioning and predicting • Demonstrate a sustained curiosity about a scientific topic or problem of personal interest • Make observations in familiar or unfamiliar contexts • Identify questions to answer or problems to solve through scientific inquiry • Make predictions about the findings of their inquiry Planning and conducting • With support, plan appropriate investigations to answer their questions or solve problems they have identified • Choose appropriate data to collect to answer their questions • Observe, measure, and record data, using appropriate tools, including digital technologies Processing and analyzing data and information • Experience and interpret the local environment • Identify First Peoples perspectives and knowledge as sources of information • Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data • Identify patterns and connections in data • Compare data with predictions and develop explanations for results • Demonstrate an openness to new ideas and consideration of alternatives Evaluating • Suggest improvements to their investigation methods • Identify some of the assumptions in secondary sources • Identify some of the social, ethical, and environmental implications of the findings from their own and others' investigations Applying and innovating • Contribute to care for self, others, and community through personal or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving Communicating • Communicate ideas, explanations, and processes in a variety of ways • Express and reflect on personal, shared, or others' experiences of place

Curriculum Connections Grade 5

Area of Learning: Social Studies

Big Ideas: Natural resources continue to shape the economy and identity of different regions of Canada.

Content	Curricular Competencies
• Resources and economic development in different regions of Canada	• Use Social Studies inquiry processes and skills to: ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions • Construct arguments defending the significance of individuals/groups, places, events, and developments (significance) • Ask questions, corroborate inferences, and draw conclusions about the content and origins of a variety of sources, including mass media (evidence) • Differentiate between intended and unintended consequences of events, decisions, and developments, and speculate about alternative outcomes (cause and consequence) • Take stakeholders' perspectives on issues, developments, and events by making inferences about their beliefs, values, and motivations (perspective)

Curriculum Connections Grade 6

Area of Learning: Science **Big Ideas:** N/A

Content	Curricular Competencies
• N/A	Questioning and predicting • Demonstrate a sustained curiosity about a scientific topic or problem of personal interest • Make observations in familiar or unfamiliar contexts • Identify questions to answer or problems to solve through scientific inquiry • Make predictions about the findings of their inquiry Planning and conducting • With support, plan appropriate investigations to answer their questions or solve problems they have identified • Choose appropriate data to collect to answer their questions • Observe, measure, and record data, using appropriate tools, including digital technologies Processing and analyzing data and information • Experience and interpret the local environment • Identify First Peoples perspectives and knowledge as sources of information • Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data • Identify patterns and connections in data • Compare data with predictions and develop explanations for results • Demonstrate an openness to new ideas and consideration of alternatives Evaluating • Suggest improvements to their investigation methods • Identify some of the assumptions in secondary sources • Identify some of the social, ethical, and environmental implications of the findings from their own and others' investigations Applying and innovating • Contribute to care for self, others, and community through personal or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving Communicating • Communicate ideas, explanations, and processes in a variety of ways • Express and reflect on personal, shared, or others' experiences of place

Curriculum Connections Grade 6

Area of Learning: Social Studies

Big Ideas: Economic self-interest can be a significant cause of conflict among peoples and governments.

Complex global problems require international cooperation to make difficult choices for the future.

Content	Curricular Competencies
• Roles of individuals, governmental organizations, and NGOs, including groups representing indigenous peoples • Global poverty and inequality issues, including class structure and gender • Economic policies and resource management, including effects on indigenous peoples	• Use Social Studies inquiry processes and skills to: ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions • Construct arguments defending the significance of individuals/groups, places, events, and developments (significance) • Ask questions, corroborate inferences, and draw conclusions about the content and origins of a variety of sources, including mass media (evidence) • Differentiate between short- and long-term causes, and intended and unintended consequences, of events, decisions, and developments (cause and consequence) • Take stakeholders' perspectives on issues, developments, and events by making inferences about their beliefs, values, and motivations (perspective)

Curriculum Connections Grade 7

Area of Learning: Science

Big Ideas: Evolution by natural selection provides an explanation for the diversity and survival of living things

Earth and its climate have changed over geological time.

Content	Curricular Competencies
• Survival needs • First Peoples knowledge of changes in biodiversity over time	Questioning and predicting • Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest • Make observations aimed at identifying their own questions about the natural world • Identify a question to answer or a problem to solve through scientific inquiry • Make predictions about the findings of their inquiry Planning and conducting • Collaboratively plan a range of investigation types, including field work and experiments, to answer their questions or solve problems they have identified • Observe, measure, and record data (qualitative and quantitative), using equipment, including digital technologies, with accuracy and precision Processing and analyzing data and information • Experience and interpret the local environment • Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information • Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate • Seek patterns and connections in data from their own investigations and secondary sources • Use scientific understandings to identify relationships and draw conclusions Evaluating • Demonstrate an understanding and appreciation of evidence (qualitative and quantitative) • Consider social, ethical, and environmental implications of the findings from their own and others' investigations Applying and innovating • Contribute to care for self, others, community, and world through personal or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving Communicating • Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate • Express and reflect on a variety of experiences and perspectives of place

Curriculum Connections Grade 7

Area of Learning: Social Studies **Big Ideas:** N/A

Content	Curricular Competencies
• Human responses to particular geographic challenges and opportunities, including climates, landforms, and natural resources	• Use Social Studies inquiry processes and skills to: ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions • Determine what is significant in an account, narrative, map, and text (significance) • Explain different perspectives on past or present people, places, issues, and events, and compare the values, worldviews, and beliefs of human cultures and societies in different times and places (perspective)

Lesson 1: The Great Bear Sea

Overview: Students will learn about the location and importance of the Great Bear Sea and why this ecosystem is important to conserve for future generations.

Subjects: Science, Social Studies, Art, Language Arts

Suggested Time: 4 classes (45-60 minutes)

*** Teacher Note:** Throughout this resource, additional materials, several images and colour resources are noted with a ***** in the materials list. These resources are available on the Great Bear Sea USB, or at www.greatbearsea.net.

Materials and Resources:

- Computer, projector, and screen
- Lesson 1 Film Clips:
  - Introduction (6 mins)
  - Respect (10 mins)
  - Ratfish (4 mins)
- Teacher Background – Lesson 1
- Digital cameras or phones
- 1.1: Importance of the Great Bear Sea
- 1.2: Connections to the Great Bear Sea
- 1.3: Biodiversity in the Great Bear Sea
- Maps (6) of the Great Bear Sea Regions (Great Bear Sea MaPP Study Area Map, Great Bear Sea MaPP Study Area With Sub-Regions Map, Central Coast Map, Haida Gwaii Map, North Coast Map, North Vancouver Island Map)*

Learning Objectives:

Students will:

1. Understand the Great Bear Sea is an ecosystem with ecological, economic, cultural and social significance, particularly for First Nations communities.
2. Explore the ideas of stewardship and leadership in planning for the future of marine resources and cosystems in the Great Bear Sea.

Lesson Context

This lesson will introduce the students to the Great Bear Sea region, including the ecological, economic, cultural and social importance of this region. Students will learn about the four sub-regions of the Great Bear Sea and will explore key terms such as ecosystem, biotic parts, abiotic parts and biodiversity while thinking about their own place and how it connects to the Great Bear Sea. The idea of the land and sea being interconnected, and everything having a distinct and important role in an ecosystem will be presented. Students will begin to think about how the resources of the Great Bear Sea are important to future generations.

Learning Activities

Activity 1: The Great Bear Sea (45-60 minutes)

1. Ask the students if they have heard of the Great Bear Sea or the Great Bear Rainforest. Discuss as a class to understand what the students already know.

2. Introduce the students to the Great Bear Sea and the four sub-regions. Show the students two maps: **Great Bear Sea MaPP Study Area Map*** and **Great Bear Sea MaPP Study Area With Sub-Regions Map***. Continue to look at the individual maps of each sub region **(Central Coast Map, Haida Gwaii Map, North Coast Map, North Vancouver Island Map*)**. Let the students pinpoint other land areas on the maps that they are familiar with including where they live in relation to the Great Bear Sea (additional local maps may be necessary).

3. Have students create a Know/Wonder/Learn (KWL) chart on the Great Bear Sea in their Science journal or notebook.

4. Watch the film clip **Introduction**.

5. Provide students with **1.1: Importance of the Great Bear Sea** and have them examine the ecological, economic, cultural and social importance of the region. Review these terms with the class. Have the students classify different components of the film clip. For example, the diversity of life in this region, the research that is happening here, the First Nations communities living in the region by the sea and land, the industry and people working in this area, etc. Then, pair/share to see what the students recalled and classified from the film clip and add to their list. Have students add to **1.1: Importance of the Great Bear Sea** as the lesson continues and they learn more about the region.

6. Have students add to their Know/Wonder/Learn chart after viewing the film.

Activity 2: Ecosystem (45-60 minutes)

1. Write the word **ecosystem** on the board. Ask the students to think about what the word means. Provide students with **1.2: Connections to the Great Bear Sea** and have them record their initial thoughts and the definition of the word ecosystem.

2. Introduce the terms **biotic** and **abiotic** and discuss what they mean. Continue using **1.2: Connections to the Great Bear Sea** to record definitions.

3. Have the students identify and classify the biotic and abiotic factors that they can recall from the film clip. Then, have the students work in small groups to share the biotic and abiotic parts identified and classified. As a class, discuss some of the following key points:
   - Did the students identify and classify the same parts?
   - Did everyone classify the parts the same way?
   - Discuss any differences in classification.

4. Review the location of the Great Bear Sea and the proximity to your local community. Have the students list how their community is similar and different to the Great Bear Sea region. Some points to consider:
   - Coastal or interior community
   - Water body near them? Fresh vs. salt water?
   - Industry and jobs
   - Tourism
   - First Nation territories
   - Animal and plant life

5. Explain to the students that no matter where in British Columbia they live the Great Bear Sea is an important ecosystem to everyone. Brainstorm as a class how the Great Bear Sea is important and how it's connected to them in their "place".

6. Have each student make their own web/collage connecting the Great Bear Sea to themselves in their place. Some potential guiding questions may include:
   - Have you visited the Great Bear Sea?
   - Do any animals that live in your region pass through the Great Bear Sea?
   - Do any of your parents' or other family members' jobs connect to the Great Bear Sea?
   - Do you like to eat salmon?
   - What do you breathe? How is oxygen connected to the Great Bear Sea?
   - Are you a steward of Earth? How does this help the Great Bear Sea?

Activity 3: Biodiversity (45-60 minutes)

1. Ask the students to think about the word **biodiversity**. What does it mean? Discuss as a class. Provide each student with **1.3: Biodiversity in the Great Bear Sea** and have them record the definition of biodiversity.

2. Continue using **1.3: Biodiversity in the Great Bear Sea** and have the students recall and identify the different species that are found in the Great Bear Sea from the film clip **Introduction**. Next, head outside using the school field or green space near by and have the students go on a digital scavenger hunt to find as many different species as possible by taking pictures in this outdoor location (option to sketch species if cameras/phones are not available). Share the pictures with a partner. As a class, discuss the biodiversity of species living in the Great Bear Sea region and living in their own community. How are the species similar or different? Can any of these living organisms be classified into groups? For example, plants and animals or invertebrates and vertebrates or marine and land mammals, or threatened and endangered species, etc., and have the students list examples of organisms from the film that fit into the classification groups.

3. Have the students write a paragraph in their Science journal about why they think biodiversity is important in the Great Bear Sea, how humans fit into the region, and similarities and differences between their community.

Activity 4: Respect (45-60 minutes)

1. Watch the **Respect** film clip, Underwater Big House, Story of Gitnuganaks as told by Vernon Brown, Kitasoo/Xai'xais Nation.

2. Using the **Respect** film clip, discuss with the students how the Great Bear Sea is home to many different First Nations who have lived in their territories for thousands of years, having close relationships with the land and sea. Some potential guiding questions may include:

   - Who is telling the story? From what cultural perspective?
   - How is the land and sea important to the First Nation culture?
   - What is the lesson of the story?
   - Why is respecting animals important?
   - Why do we need to protect ecosystems?

3. Give the students time to add to **1.1: The Importance of the Great Bear Sea** or their Know/Wonder/Learn chart.

4. Share the quote:

   "The sea, the great unifier, is man's only hope. Now, as never before, the old phrase has a literal meaning: we are all in the same boat."
   — Jacques Yves Cousteau, Oceanographer

   Discuss with the students what this quote means to them, how we are all connected and how this quote could be connected to the Great Bear Sea ecosystem.

5. To close, have the students each share one part of the Great Bear Sea that they respect.

Extension Ideas

- Learn more about ratfish by watching the film clip **Ratfish**. Do additional research to learn more about the ratfish. Have the students design a poster, brochure or fact sheet on the ratfish.
- Have students organize key terms using cue cards, Science journal/notebook or electronically using a program such as Quizlet www.quizlet.com.
- Create a puzzle poster using actual puzzle pieces or hand made puzzle pieces to display the diversity living in the Great Bear Sea and how the ecosystem is interconnected through the biotic and abiotic parts. Each puzzle piece would represent a biotic or abiotic part of the Great Bear Sea. The students can use the biotic and abiotic parts that were identified throughout the film clips. Students could write their own quotes about how their puzzle piece is connected to the Great Bear Sea.

Assessment Ideas

- Formatively assess students' engagement in individual work, group work and large group discussion.
- Assess student work from the lesson.

Teacher Background – Lesson 1

The Great Bear region of British Columbia's north coast is one of Canada's unique ecological treasures. It is home to islands, wild rivers and cold-water seas, a rich marine ecosystem and one of the world's last intact temperate rainforests. The Great Bear region is interconnected between the land and the sea and truly is an ecosystem that is unlike anything else in the world.

The Great Bear Sea covers a large area from the northern tip of Vancouver Island to the Alaska border. It can be divided into four sub-regions: North Coast, Haida Gwaii, Central Coast, and North Vancouver Island, as described in the film. The Great Bear Sea is home to many species of living organisms and many different kinds of habitat. For example, 20% of the world's remaining Pacific salmon are in this area, moving from the rivers to the sea and returning to spawn in their life cycle. It is home to two species of bears including a special type, or sub-species, of black bear called the spirit bear that lives nowhere else on Earth. Many types of marine mammals such as sea otters, dolphins, porpoises, humpbacks and killer whales call this area home or migrate through the waters. The area contains globally significant populations of breeding seabirds as well as important foraging habitat for transequatorial migrants that spend the summer in BC when it is winter in Australia and New Zealand. The area also is part of the Pacific Flyway and each fall and spring, hundreds of thousands of shorebirds, ducks, geese and other birds fly between the breeding grounds in the Arctic and their wintering areas in Mexico and South America, stopping at the nutrient-rich estuaries and mud flats to refuel and regain body fat for the long journey. The Great Bear Sea contains important habitats for threatened and endangered species, and supports a rich, complex food web ranging from tiny pteropods to the giant whales – this is one of the most biodiverse temperate regions of the world.

The Great Bear region is the traditional, ancestral and unceded territory for many First Nations that have depended on the resources of the land and sea for thousands of years. This area is also very rich in culture, with various species, artefacts and landscapes holding great significance to the communities that call this area home. The Great Bear Sea provides employment for many in the region in a variety of industries such as fishing and tourism. At the same time, there are many threats to this region including overfishing, increased marine traffic, oil spills and development. The biodiversity of the region, the fact that so many communities depend on this area for sustenance, and the increasing global competition for natural resources and waterways, provides a good framework for understanding the importance of ecosystem protection and planning for the future.

The year 2015 marked an important milestone for shaping the future of Canada's North Pacific Coast and the Great Bear Sea. A co-led partnership between the Government of British Columbia and 18 First Nations – called the Marine Planning Partnership (MaPP) – developed marine plans for the purpose of guiding marine management and the future of the Great Bear Sea region. On April 27, 2015 the marine plans for the four sub-regions

were publicly announced. This collaborative planning process is extremely innovative, and can be used as a model for considering community engagement on planning for a sustainable future.

The Great Bear Sea: Reflecting on the Past, Planning for the Future explores the marine planning process from the perspective of the four sub-regions (North Coast, Haida Gwaii, Central Coast, and North Vancouver Island). The following First Nations* in each sub-region were involved in the MaPP:

Central Coast

- Nuxalk Nation, Heiltsuk Nation, Kitasoo/Xai'xais First Nation, Wuikinuxv Nation

Haida Gwaii

- Council of the Haida Nation, Old Massett Village Council, Skidegate Band Council

North Coast

- Gitga'at First Nation, Gitxaała First Nation, Haisla First Nation, Kitselas First Nation, Kitsumkalum First Nation, Metlakatla First Nation

North Vancouver Island

- Mamalilikulla Qwe'Qwa'Sot'Em First Nation, Tlowitsis Nation, Da'naxda'xw Awaetlatla First Nation, Gwa'sala-'Nakwaxda'xw First Nations, We Wai Kum First Nation, Kwiakah First Nation, K'ómoks First Nation

** This list contains over 18 First Nations. Some Nations and territories had been amalgamated post-contact and have very recently been re-defining traditional territories and spaces.*

Vocabulary

Ecosystem: the interactions between the living and non-living parts in an area. The Great Bear Sea is an example of an ecosystem that is truly unique and is interconnected to other ecosystems.

Biotic factors: living parts of an ecosystem examples: animals and plants.

Abiotic factors: non-living parts of an ecosystem examples: clouds, sun, rocks, water, sand etc.

Biodiversity: the variety of living organisms in a habitat or ecosystem.

Name:_____

1.1: Importance of the Great Bear Sea

The Great Bear Sea region is important for many reasons. Use the headings to classify different components captured from the film clips in this lesson.

Ecological (relation of living organisms to one another and their environment)	**Economy** (resources and management of those resources)	**First Nations Importance** (culture and social)

Name:_____

1.2: Connections to the Great Bear Sea

What does the word ecosystem mean to you?

Definitions:

Ecosystem:

Biotic:

Abiotic:

List of Biotic and Abiotic Examples in the Great Bear Sea

Biotic Examples	Abiotic Examples

List how your community is similar and different to the Great Bear Sea.

Similar	Different

Great Bear Sea and Me

Name:_____

1.3: Biodiversity in the Great Bear Sea

Definition of biodiversity:

List of Different Species in the Great Bear Sea	List of Different Species in your community

Classification of Species in the Great Bear Sea

Identify three ways to classify species from your list. Make sure to include your sorting rule and examples of what would be in each group.

Sorting Rule:	**Sorting Rule:**	**Sorting Rule:**
Examples:	**Examples:**	**Examples:**

Lesson 2: Traditional Knowledge

Overview: Students will be introduced to the concept of Traditional Knowledge, and how this knowledge contributes to sustainability and planning for the future of the Great Bear Sea. They will explore examples of Traditional Knowledge and consider how this learning is passed on from one generation to the next.

Subjects: Science, Language Arts

Suggested Time: 3 classes (45-60 minutes)

*** Teacher Note:** Other seasonal rounds that may be available from your local community could also be incorporated into this lesson. Materials with a ***** are available on the Great Bear Sea USB, or at www.greatbearsea.net.

Materials and Resources:

- Computer, projector and screen
- Lesson 2 Film Clips:
  - Traditional Knowledge (8 mins)
  - SEAS1 (3 mins)
  - SEAS2 (3 mins)
  - Clam Gardens (2 mins) – *optional*
- Teacher Background – Lesson 2
- 2.1: Seasonal Round and Seasonal Use Cycle
- 2.2: Traditional Knowledge
- Haida Marine Seasonal Round*
- Haida Ocean & Way of Life Brochure*
- Kwakwaka'wakw Seasonal Use Cycle*

Learning Objectives:

Students will:

1. Understand the value of Traditional Knowledge and how it contributes to sustainability and planning for the future.
2. Describe and identify examples of Traditional Ecological Knowledge.
3. Explore the concept of interconnectedness of all living things in an ecosystem using First Nations Traditional Knowledge examples.
4. Learn that harvesting and taking care of marine resources is important in First Nation culture.

Lesson Context

This lesson will introduce the students to Traditional Knowledge (or Indigenous Knowledge), and how knowledge is built and continues to evolve based on relationships with and understanding of place. Students will also discover how this knowledge can be passed from generation to generation and continues to change as time passes and new learning occurs. Students will learn more about Traditional Ecological Knowledge by looking at seasonal rounds and seasonal use cycles from the Haida and Kwakwaka'wakw Nations. Seasonal rounds or seasonal use cycles map the Traditional Knowledge of an area, displaying the when and what of harvesting around the seasons for a specific place.

Learning Activities

Activity 1 - 2 classes

Part A: Traditional Knowledge (45-60 minutes)

1. Share the following quote and discuss students' understanding of the quote.

   > *"That's a saying that we think all of the kids that grew up in the coastal communities hear from their parents and grandparents, that "when the tide is out, the table is set," meaning that once the tide recedes and the shoreline is exposed there's opportunity to get out and harvest clams, chitons, mussels, our seaweeds, abalone, if you're lucky enough, sea scallops. There's so many different little creatures out there that you can harvest and have a good meal from."* – Trevor Russ, Vice President, Council of the Haida Nation

   First Nations depend on the oceans. The ocean provides many resources to harvest. These resources are important to the First Nation cultures.

2. Ask the students what **harvest** means. Ensure they understand that harvest means something that is collected, gathered or taken from an ecosystem.

3. Inform the students they are going to watch a film clip and ask them to keep in mind the following discussion questions:

   - What are some of the different resources that were harvested?
   - How did different people learn what and when to harvest?

4. Watch the film clip **Traditional Knowledge**.

5. Brainstorm together the key learning from the film clip.

   In the film they were taught where and when to harvest from others. This is an example of **Traditional Knowledge** that is passed along from one generation to the next. The idea of place is important as communities have gathered knowledge

around specific places to harvest specific resources, which can also be known as **Traditional Ecological Knowledge (TEK)**. Explain to students that one particular type of Traditional Knowledge – the local knowledge First Peoples have about the natural world in their traditional environment – is sometimes referred to as TEK. See **Teacher Background – Lesson 2** for more information.

Some discussion points may include:

- TEK is local knowledge pertaining to the particular territories in which people live, which has been (and continues to be) passed down from generation to generation. While First Peoples share some common values and worldviews, local knowledge captures the nuances and specifics of place, about local ecosystems, sustainable use of resources and the interconnectedness of all living and non-living things.
- TEK is knowledge about how to live and thrive in a particular place. For Indigenous peoples around the world (and First Peoples here in BC), TEK has allowed communities to flourish for thousands of years, with knowledge passed on from one generation to the next.

It is important to recognize that Traditional Knowledge encompasses a vast and sophisticated system of knowledge, including stories (such as Underwater Big House, Story of Gitnuganaks from Lesson 1), values (such as, harvesting only what one can eat, process or distribute), governance systems (such as, where specific families or groups hold rights to marine harvests).

Part B: Seasonal Round and Seasonal Use Cycle (45-60 minutes)

1. Divide the class into small groups. Give each group the example of the **Haida Marine Seasonal Round*** and **2.1: Seasonal Round and Seasonal Use Cycle**. Allow the groups time to study the seasonal round and identify the seasonal examples of Traditional Knowledge on the organizer. Some discussion points may include:
   - Over thousands of years, communities have gathered knowledge around seasons and life cycles of species to better understand harvesting cycles.
   - In the past (and still today), this knowledge and the sharing of this knowledge from generation to generation (for example, knowing when to collect food, how to preserve for months with little harvest potential, etc.) is important.
   - Seasonal rounds or seasonal use cycles map the local knowledge of an area, displaying the when and what of harvesting around the seasons for a specific place.
2. Pass out the **Kwakwaka'wakw Seasonal Use Cycle***. Have the groups compare and contrast the two different organizers. These are both examples of Traditional Knowledge that have been made into graphic organizers that connect to specific places. Some discussion questions may include:

- What months seem to be most abundant in each region?
- What months have sparse harvest opportunities? Can you think of some ways that communities could plan for this time?
- Do you think that these seasonal rounds are static, or do they change? (Here is where you can present the idea that knowledge is cumulative – it grows over time).

Reiterate the importance of harvesting at certain times of the year and how managing resources is a critical step to ensure those resources are available for the future. When one thing changes in an ecosystem, other things (including humans) are impacted. Everything is interconnected.

3. Have each group member share if they have ever participated in a harvest. Example: fishing, picking berries, etc. How did you learn about this spot to harvest? This is knowledge that is passed on to you which is similar to traditional knowledge of First Peoples.

Activity 2: Making Connections (45-60 minutes)

1. Watch the film clips **SEAS1** and **SEAS2**.
2. Brainstorm together the key learning from the film clips. Discuss how these participants of the Supporting Emerging Aboriginal Stewards (SEAS) program are connecting to Traditional Knowledge in their territory. These students want to learn more about the language, culture and tradition from their Elders.
3. Discuss what the students can learn from their own parents, grandparents or community members about their past.
4. Have each student create some interview questions to interview a family member about their past and what life was like growing up.
5. Together as a class, have students share who they selected to interview and the questions they asked the individual.
6. Use **2.2: Traditional Knowledge** to read the students a statement from Doug Neasloss, Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority. His text shows Traditional Knowledge from his and Elders' perspectives.
7. For homework students could carry out the interview with the family or community member and write a paragraph about one thing they learned from conducting their interview.

Extension Ideas

- Explore the **Haida Ocean & Way of Life Brochure*** (pages 4-7) by the Council of the Haida Nation – Marine Planning Program. Divide the class into groups and assign each group an organism to learn more about (salmon, herring, abalone, clams & cockles, seabirds & shorebirds, rockfish and seaweed). Learn how these organisms are connected to the Haida way of life.
- Watch the film clip **Clam Gardens** and research more about Ancient Clam Gardens as an example of Traditional Knowledge.
- Plant a school garden for the students to take care of and harvest throughout the seasons. Create a harvest map for the school garden using the ideas in the seasonal round and seasonal use cycle.
- Head outdoors and find your favourite place on the school grounds or in a green space near by. Using school cameras or student cameras have each student take a picture of this spot. Reflect on why it is special to you. How did you discover it? Has this space changed over the years? Will it remain the same? Could it change in the future? Why? What do think it will it be like in 5 years, 10 years, 20 years? Write about why this special place should remain the same for future generations to enjoy and one thing you would want to share with others about this place in the future.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.

Teacher Background – Lesson 2

Indigenous and Traditional Ecological Knowledge (TEK)

Thinking generally about these concepts, Indigenous or Traditional Knowledge refers to the vast, diverse and sophisticated body of knowledge of a group of peoples that has been generated over thousands of years, is passed down from one generation to another, and continues to evolve over time. It is knowledge that pertains not only to cultures and beliefs, but also physical space, environments and place. As noted by the Assembly of First Nations:

> "Although there is no universally accepted definition of "traditional knowledge", the term is commonly understood to refer to collective knowledge of traditions used by Indigenous groups to sustain and adapt themselves to their environment over time. This information is passed on from one generation to the next within the Indigenous group. Such Traditional Knowledge is unique to Indigenous communities and is rooted in the rich culture of its peoples. The knowledge may be passed down in many ways, including: storytelling; ceremonies; dances; traditions; arts and crafts; ideologies; hunting and trapping; food gathering; food preparation and storage; spirituality; beliefs; teachings; innovations; medicines."

The term Traditional Ecological Knowledge (TEK) is perhaps the most popular term used to refer more directly to the knowledge that First Peoples' have in relation to the natural world, and specifically the distinct ecosystems and landscapes in their traditional environments. Again, there is not a universally recognized definition of TEK, but in helping students understand this concept, the following points may be useful:

- TEK is local knowledge pertaining to the particular territories in which people live, which has been (and continues to be) passed down from generation to generation. While First Peoples share some common values and worldviews, local knowledge captures the nuances and specifics of place, about local ecosystems, sustainable use of resources and the interconnectedness of all living and non-living things.
- TEK is knowledge about how to live and thrive in a particular place. For Indigenous peoples around the world (and First Peoples here in BC), TEK has allowed communities to flourish for thousands of years, with knowledge passed on from one generation to the next.
- The environmental knowledge of generations about a specific local place is very important in the study of science, and thus TEK is used widely in various fields of science, such as resource management, climate change and sustainability.

It is important to recognize that Indigenous Knowledge or Traditional Knowledge does not just encompass ecological knowledge (TEK), but also a variety of other systems of knowledge including (but not limited to) cultural, historical, economic, political and societal information belonging to a group of peoples. Consider some of these additional resources to learn more:

Appendix A: Interview with Doug Neasloss

Appendix B: Indigenous Knowledge

Assembly of First Nations Environmental Stewardship – Traditional Knowledge
www.afn.ca/uploads/files/env/ns_-_traditional_knowledge.pdf

First Nations Education Steering Committee Science First Peoples Resource
www.fnesc.ca/science-first-peoples

Traditional Ecological Knowledge Prior Art Database
http://ip.aaas.org/tekindex.nsf/TEKPAD?OpenFrameSet

World Intellectual Property Organization
www.wipo.int/freepublications/en/tk/920/wipo_pub_920.pdf

Supporting Emerging Aboriginal Stewards (SEAS)

Supporting Emerging Aboriginal Stewards (SEAS) Community Initiative is a youth program initiated by First Nation community partners together with TNC Canada. As noted on their website at www.emergingstewards.org:

> "Local programs are designed to engage, develop, prepare and empower Indigenous youth to become the next generation of stewards in their communities and territories. First started in 2009, the SEAS Initiative has supported youth in four communities in the Great Bear Rainforest of British Columbia as well as the Lutsel K'e Dene community in the Northwest Territories. Working collaboratively with TNC Canada, each community partner develops and designs a program uniquely suited to the community's priorities, needs and opportunities for engaging youth in stewardship learning and activities. Programs integrate traditional and cultural knowledge with western science approaches, and typically have both a school component and a summer internship component."

Haida Ocean & Way of Life Brochure* by Council of the Haida Nation – Marine Planning Program is referred to in this lesson plan and is a great additional resource to read.

Vocabulary

Harvest: the action of some living resource that is collected, gathered or taken from an ecosystem.

Name:_____

2.1: Seasonal Round and Seasonal Use Cycle

Study the Haida Seasonal Round provided and discuss with your group your observations for each season. Record what you notice in each season.

Spring	Summer
Fall	**Winter**

Explain in your own words how the Haida Seasonal Round is connected to Traditional Knowledge. Think about the process that would be used to collect and document this information over time.

Describe why the seasons are important for harvesting these resources?

Examine the Seasonal Use Cycle of the Kwakwaka'wakw. Note your observations about this organizer.

General Observations	Similarities?	Differences?

It is important to harvest at certain times of the year and manage the resources. Think about the current season. Describe what could be harvested in each territory.

2.2: Traditional Knowledge

Doug Neasloss – *Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority*

This is a passage from an interview with Doug Neasloss talking about some of the history from the Central Coast as well as how resources were preserved. This knowledge continues to be passed on to future generations.

"I've sat down and had a lot of discussion with our Elders about life, and even, you know, we live in a pretty isolated area, so we didn't have actually a lot of contact until quite late. The first contact we had was actually Captain Vancouver. I believe that was in 1793, when he came up and it was what people, the Elders always talk about how nomadic the lifestyles were. They talked about the seasonal camps, and the permanent camps. They said the food harvest would start in the wintertime. It would start with the clams and cockles in the winter. And then early spring, around March, the halibut would start to come in and they would start harvesting halibut. And then once the halibut was finished, they would start to move over to the herring and the herring eggs. And that was huge. That was probably one of the most important foods in our community, because it wasn't just used for food consumption, but it was also used for trade. And there was a huge trade route along the Coast amongst different families up and down the coast. So Klemtu used to harvest the herring eggs and trade it with the Bella Coola people [Nuxalk] and also the Kitamaat people [Haisla], and they used to trade for eulachon grease, and that was huge because we didn't have eulachons in Klemtu area, and then once that was finished, we'd move over to seaweed in May, and right after seaweed was finished then you would go on to salmon, in particular sockeye salmon, and then later on in the summer, late summer, you would start to get all the salmon, so the coho, pink, and chum would start to come in.

So people were very dependent on all of these resources, and especially because it was such an isolated community, those aquatic resources are extremely important because food costs here in the community are so expensive. People, you know, depended on those, and we had different camps based on different things. Like Marvin Island is a herring camp. People just went there to go and harvest herring eggs. And while they were there, they would dry the herring eggs, they would dry the Halibut, because a long time ago there were no refrigerators or freezers, so they would dry everything. Everything was sun dried. Or they would smoke it. And that's how they'd preserve things."

Lesson 3: Collaborative Research - Case Study on Bears

Overview: Students will learn about the concept of collaborative research. This lesson will highlight the research on bears that is taking place in the Great Bear Sea region.

Subjects: Science, Language Arts, Math

Suggested Time: 2 classes (45-60 minutes)

*** Teacher Note:** The following lesson (Lesson 4) continues to look at this topic using a kelp research project and provides students the opportunity to learn more about kelp, how a plot study works and examine data collected in a different study. If time permits, both of the case studies can be explored. Or, Lesson 3 could be presented to Grades 4-5 and Lesson 4 could be presented to Grades 6-7. If you are only using Lesson 4 with your class, you may also want to use Activity 1 from Lesson 3 to teach your students about collaborative research, which includes viewing the Collaborative Science film clip. Materials with a ***** are available on the Great Bear Sea USB, or at www.greatbearsea.net.

Materials and Resources:

- Computer, projector and screen
- Chart paper and markers
- Lesson 3 Film Clips:
  - Collaborative Science (9 mins)
  - Bear Research (5 mins)
- Teacher Background – Lesson 3
- 3.1: Bear Research Project
- 3.2: Bear Data
- 3.3: Research Questions for Bear Data
- Bear Identification*
- Bear Images*
- Central Coast Map*
- North Coast Map*

Learning Objectives:

Students will:

1. Understand the Great Bear Sea is an ecosystem that is important for its ecology, economy as well as culture and social elements.
2. Be introduced to an example of collaborative research, which includes traditional knowledge, local knowledge and science.
3. Understand the value of traditional knowledge and how it contributes to sustainability and planning for the future.
4. Explore the ideas of stewardship and leadership in planning for the future of marine resources and ecosystems in the Great Bear Sea.

Lesson Context

This lesson will introduce the students to some of the collaborative research that is taking place in the Great Bear Sea region on bears. They will learn that the research that is taking place is partnering with various universities as well as First Nations to learn more about the bear movement across the territories and how much salmon they have been eating. By gathering data and learning more about the animals through these key partnerships planning can move forward with proper decisions to conserve and protect the Great Bear Sea region for the future. Students will learn more about the concept of collaboration, including what collaboration looks like from a science/research perspective. This example of collaborative research pairs traditional and local knowledge with academic research methods and is a key component to marine planning, helping communities make informed decisions while ensuring stewardship and conservation. There are various activities that students will engage in throughout this lesson including examining data collected from the bear research project and doing some analysis with specific target questions.

Learning Activities

Activity 1: Collaborative Research (45-60 minutes)

1. Write the word collaboration on the board. Ask students to explain what they think this word means? Some discussion points may include:
   - Ask the students their thoughts on group work – collaboration within the classroom.
   - What are the advantages and disadvantages to working in a group?
2. Watch the film clip **Collaborative Science**.
3. Write the word **collaborative research** on the board. Ask the students to name the groups collaborating in the research shown in the film clip. Brainstorm together the different research projects that were mentioned in the film clip and why research is important in the Great Bear Sea.
   - Salmon
   - Rockfish
   - Dungeness crab
   - Bears
   - Birds
   - Kelp
4. Review the key information of the bear research using **3.1: Bear Research Project**. Discuss how bears are connected to the Great Bear Sea through their diet of salmon.

5. Watch the film clip **Bear Research**.

6. Use the **Bear Identification*** to review characteristics to identify black and grizzly bears (colour, size, shoulder hump, face shape and ear size). Next, try identifying different pictures of bears that are included.

7. Show the students **Bear Images*** that were collected by the researchers.

8. Have the students list further questions they are wondering about regarding the bear research on **3.1: Bear Research Project**. Discuss the questions the students have about the research project.

Activity 2: The Bear Research Project (45-60 minutes)

1. Provide copies of the **Central Coast Map***. Find and shade on the map the different communities (a-d) that are working together on the Central Coast for this research project. Hartley Bay (e) is on the North Coast and is located at the mouth of Douglas Channel. Find this using the **North Coast Map***.

    a. Klemtu
    b. Bella Bella
    c. Bella Coola
    d. Rivers Inlet
    e. Hartley Bay

    What does this tell you about the bear habitat? Can the students think of advantages of having the different communities working together and sharing the data that they have collected on bear?

2. Divide the class into three groups. (Option: You could divide your class into six or nine groups and have multiple groups working on the same research question noted in step #3) Pass out the data **3.2: Bear Data**. Allow the students time to examine the data. Use chart paper and have the students record any trends noticed, questions about the data, etc. Then in a large group share their observations and questions about the data.

3. Pass out **3.3: Research Questions for Bear Data** and discuss each of the three research questions. Assign each group one of the research questions to investigate using data from the bear research project. Each group will use the same data but will be researching different questions. The data is based on many factors: the seasons of spring and fall; the years of 2012, 2013, 2014; species of grizzly and black bears as well as gender. Ensure the students understand what to do with the numbers in the data and how to calculate the answers. See **Teacher Background – Lesson 3** for information on the calculations.

4. Provide each group with time to create a poster that summarizes their findings to present to the class.
5. Share findings for each research question and discuss how Traditional Knowledge is connected in this research project and why this research project is important to the Great Bear Sea region.

Extension Ideas

- Using the data provided, brainstorm additional research questions to investigate. For example, the students could continue to look at differences between 2012 and 2014.
- Research more about bears. Put together a poster, brochure or fact sheet on bears. Or integrate a technology component to create a class blog on bears.
- Have the students design a research study to learn more about bear movement and the diet of bears. What would they want to investigate and how? Use the scientific method to come up with an investigation of their own.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.
- Have students check each others' data calculations.

Teacher Background – Lesson 3

Collaborative research is very important in the Great Bear Sea region, with several examples of academic institutions and First Nations working together to gather data and knowledge to inform decision making for marine planning. Students could consider all of the potential partners (such as the government and various other organizations) who could all work together to gather information to inform planning.

Collaborative Research

Contributed by Alejandro Frid - Science Coordinator/Ecologist Central Coast Indigenous Resource Alliance (27 April 2016). Do not duplicate without permission from the author.
www.alejandrofridecology.weebly.com/marine-resources-and-first-nations.html

Modern Indigenous people embrace new technologies and do not isolate themselves from contemporary culture and economy, yet maintain a tradition of deep interconnection with our non-human kin. Their gathering of edible and medicinal plants, their hunting and fishing, bring nourishment that not only is physical but also essential to sustaining worldviews that have been rooted in place for many generations. The implication is that habitat destruction and biodiversity loss are inseparable from the demise of cultural diversity, and therefore the rights of many human beings. Not surprisingly, Indigenous people have become conservation leaders in many parts of the world. Their efforts to conserve the ecosystems that sustain their traditional foods — mainly through protected areas that exclude large-scale exploitation — could make ecosystems more resilient to climate change and other stressors.

In the Central Coast of British Columbia, the Heiltsuk, Kitasoo/Xai'xais, Nuxalk, and Wuikinuxv First Nations have joined forces to proactively manage their resource, fostering collaborative research between scientists and holders of traditional knowledge. The elements of this collaboration are complementary.

On the one hand, science tests for explicit mechanisms that might affect ecological communities — such as fisheries and climate change — and uses empirical findings to predict future conditions. Yet science often occurs in short spurts and in few places, suffering from short-term, narrow perspectives that limit understanding.

In contrast, Indigenous Knowledge derives from cumulative and collective observations made by many generations of people who are connected to the resources of vast ecosystems. Oral traditions preserve this knowledge as Indigenous laws and stories that transcend many limitations of science.

In concert, science and traditional knowledge can merge the holistic and long-term perspectives of Indigenous people and the predictive abilities of science. The potential result is a stronger foundation for conservation and resource management policies.

Vocabulary

Collaboration: the action of working with someone to produce or create something.

Background on Bear Identification

This information and data was submitted by Rosie Child – Field Technician, University of Victoria and Spirit Bear Research Foundation.

People often assume that black bears are black and that grizzly bears are brown. Grizzly bears are usually brown but can be very light to very dark in colouring. Black bears are usually black but can also be white, blue, cinnamon, or brown. It is best to use multiple characteristics to ID bears, such as colour, size, shoulder hump, face shape, and ear size.

Colour

- Grizzly bears are usually brown and black bears are usually black, but there is lots of variation so colour is not the best way to identify bears.

Size

- Adult grizzly bears are usually larger than adult black bears but females and young bears are smaller and make size unreliable.

Shoulder Hump

- Grizzly bears have a prominent shoulder hump that is a mass of muscle that helps them dig.

Face Shape

- Black bears have a straight face profile, while grizzly bears have a more dished face profile.

Ear Size

- Black bears have taller ears in proportion to their head than grizzly bears shorter rounded ears.

Claws

- Grizzly bears have longer front claws that are usually lighter than black bear claws.

Answer Key to Research Questions

Below you will find specific research questions and answers. You will find tips to help the students solve the calculations below using the data. If students have not done these kinds of calculations some pre-teaching will be required on how to calculate averages.

Question One: What do you notice about the diet of these bears? What bear eats the most salmon? What bear eats the least salmon?

Answer: There is individual variation. Least is a female black bear (10635) that eats 3% salmon. Most is a male grizzly (10567) that eats 88% salmon.

Calculations Required: The students need to find the bear that eats the most and least amount of salmon by looking at the numbers in the salmon column. Tip: The number can be converted into whole numbers by working with percentages and multiplying the decimal by 100.

Question Two: Which species eats more salmon? Why? Which species do we have more bears for? Why?

Answer: Grizzly bears eat more salmon than black bears. They can calculate averages if time permits. Grizzly bears average 72%; black bears average 23%.

Calculations Required: The students will notice by looking at the data in the salmon column that the amount of salmon consumed for each grizzly bear is significantly more than for black bears. In order to calculate the average students will need to add up all the numbers in the salmon column for grizzly bears and divide by the total number of grizzly bears in the data set. Then repeat with the black bears by adding up the data in the salmon column and divide by the number of grizzly bears.

Question Three: Does the gender of the bear make a difference to salmon consumption? Why or why not?

Answer: Males eat more salmon than females. They can calculate averages if time permits. Males average 52%; females average 35%. Also the class can talk about differences between proportion and amount. What else do bears eat? Why do you think males eat more salmon?

Calculations Required: The students will notice by looking at the data in the salmon column that the amount of salmon consumed for males is generally more than females. In order to calculate the average students will need to add up all the numbers in the salmon column for the male bears and divide by the total number of male bears in the data set. Then repeat with the female bears by adding up the data in the salmon column and divide by the number of female bears.

Name:_____

3.1: Bear Research Project

Purpose:

To monitor the bears using non-invasive methods to see which bears are around, how they are moving across the territory and how much salmon they have been eating.

Methods:

- Remote cameras that show us that bears are around and how they are moving through the territory.
- Collecting hair samples using barbed-wire and hair corrals. The spring is the best time to collect samples as the bears are just waking up and are shedding hair from last fall.

How:

Track the bear movement and use stable isotope analysis to tell the proportion of the bears diet that is salmon, marine mammal or plant based.

Questions: I Want To Know More About…

3.2: Bear Data

Season	Year	Bear	Species	Sex	Salmon
spring	2014	25721	grizzly	female	0.634
spring	2014	23534	grizzly	female	0.594
spring	2014	14642	grizzly	female	0.617
Spring	2014	28132	grizzly	female	0.632
Spring	2014	10911	grizzly	female	0.637
Spring	2014	25852	grizzly	female	0.658
Spring	2014	10466	grizzly	female	0.671
Spring	2013	10680	grizzly	female	0.704
Spring	2013	10466	grizzly	female	0.705
Spring	2012	10911	grizzly	female	0.738
Spring	2014	23860	grizzly	female	0.746
Spring	2012	10667	grizzly	female	0.757
Spring	2012	10992	grizzly	male	0.827
Spring	2012	10567	grizzly	male	0.88
Spring	2012	10663	grizzly	male	0.636
Spring	2012	139903	grizzly	male	0.718
Spring	2012	10853	grizzly	male	0.736
Spring	2012	10981	grizzly	male	0.744
Spring	2012	10640	grizzly	male	0.744
Spring	2012	10303	grizzly	male	0.758
Spring	2012	10665	grizzly	male	0.809
Spring	2012	149691	grizzly	male	0.81
Spring	2012	10786	grizzly	male	0.812
Spring	2013	14256	black	female	0.035
Spring	2012	10936	black	female	0.037
Fall	2014	25723	black	female	0.052
Spring	2014	10646	black	female	0.07
Spring	2013	13723	black	female	0.071
Spring	2013	11706	black	female	0.074
Spring	2013	23452	black	female	0.084
Spring	2012	10646	black	female	0.103
Fall	2014	14837	black	female	0.254
Spring	2014	28476	black	female	0.449
Spring	2012	10635	black	female	0.032

Season	Year	Bear	Species	Sex	Salmon
Spring	2012	10602	black	female	0.036
Spring	2014	28080	black	female	0.039
Spring	2012	10585	black	female	0.046
Spring	2014	26964	black	female	0.167
Spring	2014	26396	black	female	0.172
Spring	2013	11497	black	female	0.309
Spring	2014	26999	black	female	0.471
Spring	2012	10598	black	male	0.195
Spring	2012	10320	black	male	0.225
Spring	2012	10592	black	male	0.342
Spring	2012	10820	black	male	0.344
Spring	2012	10429	black	male	0.406
Spring	2012	10622	black	male	0.422
Spring	2012	10607	black	male	0.043
Spring	2012	10603	black	male	0.079
Spring	2012	10714	black	male	0.266
Spring	2012	10484	black	male	0.351
Spring	2012	10533	black	male	0.517
Spring	2012	10526	black	male	0.586
Spring	2012	10660	black	male	0.834

NOTE: Permission was granted to use the data in the context of this lesson. The data are not available for publication or use outside of the classroom.

Name:_____

3.3: Research Questions for Bear Data

Question One
What do you notice about the diet of these bears? What bear eats the most salmon? What bear eats the least salmon?

Question Two

Which species eats more salmon? Why? Which species do we have more bears for? Why?

Question Three

Does the gender of the bear make a difference to salmon consumption? Why or why not?

My Group is responsible for Research Question: # _____

Hypothesis: Our predictions are...

Results: Our Findings…

Our new questions…

Lesson 4: Collaborative Research - Case Study on Kelp

Overview: Students will continue to learn about the concept of collaborative research and how this approach is being used to inform future planning for the Great Bear Sea region. This lesson will highlight the research on kelp forests that is taking place in the Great Bear Sea region.

Subjects: Science, Language Arts, Math

Suggested Time: 3 classes (45-60 minutes)

*** Teacher Note:** Throughout this resource, additional materials, several images and colour resources are noted with a ***** in the materials list. See **Teacher Note in Lesson 3** for other ideas. These resources are available on the Great Bear Sea USB, or at www.greatbearsea.net.

Materials and Resources:

- Computer, projector and screen
- Chart paper and markers
- Several hula-hoops, string and tape
- Lesson 4 Film Clip:
  - Otter Kelp Research (8 mins)
- Teacher Background – Lesson 4
- 4.1: Kelp Research Project
- 4.2: Kelp and Map of Sites
- 4.3: Kelp Data
- 4.4: Research Questions for Kelp Data
- Picture of hula-hoop plot*
- Kelp Research Images*

Learning Objectives:

Students will:

1. Understand the Great Bear Sea is an ecosystem that is important for its ecology, economy as well as culture and social elements of First Peoples.
2. Be introduced to collaborative science, which includes traditional knowledge, local knowledge, and science.
3. Understand the value of traditional knowledge and how it contributes to sustainability and planning for the future.
4. Explore the ideas of stewardship and leadership in planning for the future of marine resources and ecosystems in the Great Bear Sea.

Lesson Context

This lesson will introduce the students to some of the collaborative research that is taking place in the Great Bear Sea region on kelp. They will learn that the research that is taking place is partnering with various universities as well as First Nations to learn more about the kelp harvest and rates of re-growth of the kelp after harvest. By gathering data and learning more about the plants through these key partnerships planning can move forward with proper decisions to conserve and protect the Great Bear Sea region for the future. Students will learn more about the concept of collaboration, including what collaboration looks like from a science/research perspective. This example of collaborative research pairs traditional and local knowledge with academic research methods and is a key component to marine planning, helping communities make informed decisions while ensuring stewardship and conservation. There are various activities that students will engage in throughout this lesson including examining data from a kelp research project and doing some analysis with specific target questions.

Learning Activities

Activity 1: Plot Study (45-60 minutes)

1. Write the word **plot study** on the board. What do students think this means? Some discussion points may include:
   - What is a plot?
   - What is a study?
   - Show the students the picture of the **hula-hoop plot***. How might this connect to a plot study?
   - What organisms could be studied using this technique?

   Explain to the students what a plot study is and how plots are used to conduct research using a small sample size. See **Teacher Background – Lesson 4** for more information.

2. Divide the class into small groups and explain that the groups will create a plot study using a hula-hoop. Give each group a hula-hoop, string and tape. Have each group make a plot, by placing 3 pieces of string horizontally and 3 pieces of string vertically to divide the hula-hoop into quadrants. See example picture of **hula-hoop plot***.

3. Head outside to the field, playground, school garden or green space. Have each group place their plot study down on the ground. Observe and record what is in their plot by sketching the hula-hoop grid in their Science journal. Draw pictures or list what they see in each section of the plot.

4. Discuss what the students found in their plots. Some discussion points may include:
    - Were the plot study findings similar or different for the class?
    - Would the findings be the same in a different area? For a larger plot?
    - How does a small plot connect to the larger sample area?

Activity 2: Collaborative Research (45-60 minutes)

1. Review the meaning of **collaborative research** – collaborative research in this context is when the researchers and scientists are working with First Nations territories to learn more about something.
2. Let the students know that they will be learning more about a collaborative research study on kelp. Review the key information of the kelp research using **4.1: Kelp Research Project**.
3. Show the students the **Kelp Research Images*** where kelp is being harvested and measured by researchers. Let the students know that these researchers are using a plot that measures 30 x 30m. Measure out the size of this on the field so the students understand the size of this plot compared to their hula-hoop plot.
4. Write the word **kelp** on the board. Have the students work in small groups to brainstorm their current knowledge of kelp. Do the students know what kelp is? Can students classify it, list any species of kelp and discuss how it's important to the ecosystem?
5. Share the students' brainstorming on kelp and then share with the students some additional information on kelp and the purpose of this research project on giant kelp.

    Key points to cover:
    - Kelp is a producer which is an organism including green plants that can produce its own food through photosynthesis
    - Giant kelp is the fastest growing primary producer on the planet
    - Kelp is a plant and also contributes to releasing oxygen and taking in carbon dioxide in the ecosystem
    - Provides a habitat and source of food to many species
    - Giant kelp is harvested on the coast of British Columbia
    - Kelp is also used to collect herring eggs in the spring – the eggs get caught in the kelp and can be eaten with the kelp when it is harvested
    - Kelp has other commercial uses such as producing fertilizers, food additives and cosmetics

- Purpose of the research study was to investigate how quickly kelp recovers from harvest and the factors that influence how quickly it recovers and to determine whether commercial kelp harvesting is a sustainable activity

6. Ask the students what challenges the researchers might have by studying something that lives in the water? How would this be done in an extreme environment?

7. Watch the film clip **Otter Kelp Research**.

Activity 3: The Kelp Research Project (45-60 minutes)

1. Use **4.2: Kelp and Map of Sites** to review the basic anatomy of kelp with the students and the sites of the kelp plots where the research is taking place. Discuss with the students why it would be important to examine different sites. For example are they finding the same trends in all sites or just one site? The researchers want to compare different site locations.

2. Divide the class into three groups. (Option: You could divide your class into six or nine groups and have multiple groups working on the same research question noted in step #3) Pass out the data **4.3: Kelp Data**. Allow the students time to examine the data. Use chart paper and have the students record any trends noticed, questions about the data, etc. Then in a large group share their observations and questions about the data.

3. Pass out **4.4: Research Questions for Kelp Data** and discuss each of the three research questions. Assign each group one of the research questions to investigate using data from the kelp research project. Each group will use the same data but will be researching different questions. The data is based on many factors: different site locations; water temperature; kelp density as well as kelp growth rates. Ensure the students understand what to do with the numbers in the data and how to calculate the answers. See **Teacher Background – Lesson 4** for information on the calculations.

4. Provide each group with time to create a poster that summarizes their findings to present to the class.

5. Share findings for each research question and discuss how Traditional Knowledge is connected in this research project and why this research project is important to the Great Bear Sea region.

Extension Ideas

- Using the data provided, brainstorm additional research questions to investigate.
- Explore some additional research provided from the project:

  Question: Did larger kelp individuals regrow more quickly than smaller kelps?

  Answer: There was only a weak relationship between the initial size of the kelp and how quickly it regrew. This means that other variables were likely more important in determining recovery rates.

  Question: Did the density of kelps at a site influence how quickly kelps recovered?

  Answer: There was a slight negative relationship between kelp density and re-growth rate, indicating that kelps regrew more slowly at sites with denser kelp. This may be because harvested kelps are competing with other kelps at the same site for light. With less light available at higher kelp densities, kelp regrowth rate declined.

  Question: Does the water temperature influence how quickly kelps regrow?

  Answer: Yes, kelp re-growth rate decreased at higher average water temperature.

  Question: Which factor out of those you considered do you think was most important in determining kelp recovery rates? What implications does this have for harvest?

  Answer: Temperature was the most important variable determining kelp re-growth rates. Climate change is expected to cause increases in water temperature, which may impact the ability of kelps to recover from harvest in the future. Harvest managers should consider monitoring water temperatures in association with harvest so that they can reduce or avoid harvesting during years with warm water.
- Have the students continue to do more research on kelp harvesting and whether or not it is sustainable. What further research would the students recommend? Discuss the students' ideas on kelp harvest being sustainable.
- If possible, explore and identify different species of kelp by heading to the beach at low tide to see if any species of kelp can be observed on the beach. Get the students to sketch the different species of kelp and then use ID books to identify the species.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.
- Have students check each others' data calculations.

Teacher Background – Lesson 4

Collaborative research is very important in the Great Bear Sea region, with several examples of academic institutions and First Nations working together to gather data and knowledge to inform decision making for marine planning. Students could consider all of the potential partners (such as the government and various other organizations) who could all work together to gather information to inform planning.

Collaborative Research

Contributed by Alejandro Frid - Science Coordinator/Ecologist Central Coast Indigenous Resource Alliance (27 April 2016). Do not duplicate without permission from the author.
www.alejandrofridecology.weebly.com/marine-resources-and-first-nations.html

Modern Indigenous people embrace new technologies and do not isolate themselves from contemporary culture and economy, yet maintain a tradition of deep interconnection with our non-human kin. Their gathering of edible and medicinal plants, their hunting and fishing, bring nourishment that not only is physical but also essential to sustaining worldviews that have been rooted in place for many generations. The implication is that habitat destruction and biodiversity loss are inseparable from the demise of cultural diversity, and therefore the rights of many human beings. Not surprisingly, Indigenous people have become conservation leaders in many parts of the world. Their efforts to conserve the ecosystems that sustain their traditional foods — mainly through protected areas that exclude large-scale exploitation — could make ecosystems more resilient to climate change and other stressors.

In the Central Coast of British Columbia, the Heiltsuk, Kitasoo/Xai'xais, Nuxalk, and Wuikinuxv First Nations have joined forces to proactively manage their resource, fostering collaborative research between scientists and holders of traditional knowledge. The elements of this collaboration are complementary.

On the one hand, science tests for explicit mechanisms that might affect ecological communities — such as fisheries and climate change — and uses empirical findings to predict future conditions. Yet science often occurs in short spurts and in few places, suffering from short-term, narrow perspectives that limit understanding.

In contrast, Indigenous Knowledge derives from cumulative and collective observations made by many generations of people who are connected to the resources of vast ecosystems. Oral traditions preserve this knowledge as Indigenous laws and stories that transcend many limitations of science.

In concert, science and traditional knowledge can merge the holistic and long-term perspectives of Indigenous people and the predictive abilities of science. The potential result is a stronger foundation for conservation and resource management policies.

Vocabulary

Plot Study: a small-scale study that uses a plot to observe and record information in an area.

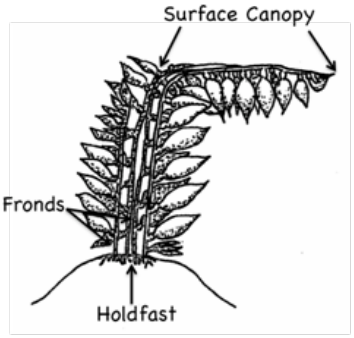
Collaboration: the action of working with someone to produce or create something.

Background on Kelp:

This information and data was submitted by Kira Krumhansl, Postdoctoral Researcher at Simon Fraser University and Hakai Institute.

Giant kelp (Macrocystis pyrifera) is the fastest growing primary producer on the planet. This species has been harvested by First Nations on the coast of British Columbia for millennia, and is still being used to collect herring eggs in the spring for subsistence and commercial fisheries (i.e. spawn on kelp fishery). Giant kelp is also being considered for other commercial uses, such as the production of fertilizers, food additives, and cosmetics. Before commercial harvests begin for these purposes, the Heiltsuk First Nation worked in collaboration with researchers at the Hakai Institute and Simon Fraser University to investigate how quickly the kelp recovers from harvest, and what factors influence how quickly kelp recovers. This information helps Heiltsuk Research Managers to determine whether commercial kelp harvesting is a sustainable activity, and if so, how best to manage it.

The basic anatomy of giant kelp is shown in the diagram below. Giant kelps are anchored to the substrate via a root-like structure known as a holdfast. Each **holdfast** has multiple stems or **frond** that grow up through the water column towards the surface of the water. Once the frond reaches the surface, it grows along the surface to form a **surface canopy**. This surface canopy is where most of the kelp's photosynthesis occurs, and is visible from a boat (maybe you've seen one!). Harvesting involves cutting the surface canopy portion of the kelp.



We harvested kelps at 5 sites on the Central Coast of BC near Bella Bella in 2014, and measured how quickly the kelps regrew (meters of canopy growth per day). We were interested in understanding what factors influence how quickly the kelp regrows following harvest. Some of the questions we were interested in were:

Would larger kelp individuals regrow more quickly?

Would kelps grow back more quickly when they are in sparse kelp beds or dense kelp beds?

Does the water temperature influence how quickly kelps regrow?

To answer these questions, we measured the water temperature at each site (°C), the initial size of each harvested kelp before harvest (surface canopy length in meters), and the density of kelps at each site (kelps m^{-2}, i.e. how many kelps there are per meter of ocean bottom). We did an analysis of the data to investigate which factor was most important.

Answer Key to Research Questions

Below you will find specific research questions and answers. You will find tips to help the students solve the calculations below using the data. If students have not done these kinds of calculations some pre-teaching will be required on how to calculate averages.

Question One: Did kelps grow back at the same rate at each site? Find the average growth rate at each site. What is the range of the average kelp growth rate for each site?

Answer: No, kelps grew back at different rates across sites. The average growth rates are: Golden 0.053; Meay 0.53; Simonds 0.62; Strykeer 0.045; Triquet 0.009 m per day (i.e. surface canopy growth per day). The range of growth rates was 0.009 (Triquet)-0.062 (Simonds) m per day.

Calculations Required: The students need to find the average kelp growth rate for each site. In order to calculate the average students will need to add up each kelp growth rate for each site and divide by the number of samples in that site. Note: The sample number varies between sites.

Question Two: Is the water temperature the same at each site? What is the range of average water temperatures? What is the average water temperature?

Answer: No, the average water temperature varied among the fives sites. The average temperatures ranged from 11.96 (Simonds)-12.70 (Triquet)°C. The average temperature among the five sites was 12.32°C.

Calculations Required: The students need to find the site with the coolest temperature and the warmest temperature. In order to calculate the average students will need to add the average water temperate for each site and divide by the number of sites in the data set.

Question Three: Is the kelp density the same at each site? What is the average kelp density?

Answer: No, the average kelp density ranged from 0.15 (Meay)-0.49 (Triquet) kelps m^{-2} (i.e. how many kelps there are per meter of ocean bottom). The average kelp density (rounding to the nearest ten thousandths) among the five sites was 0.4005 m^{-2} (per meter of ocean bottom).

Calculations Required: The students need to find the site with the smallest and largest density. In order to calculate the average students will need to add up each average density and divide by the number of sites in the data set.

Name:_____

4.1: Kelp Research Project

Purpose:

To see if kelp can be taken from the ecosystems without having a negative impact on other species in the ecosystem. As well to investigate how quickly the kelp recovers after being harvested, and what factors influence how quickly kelp recovers to understand whether commercial kelp harvesting is a sustainable activity, and if so, how best to manage it.

Methods:

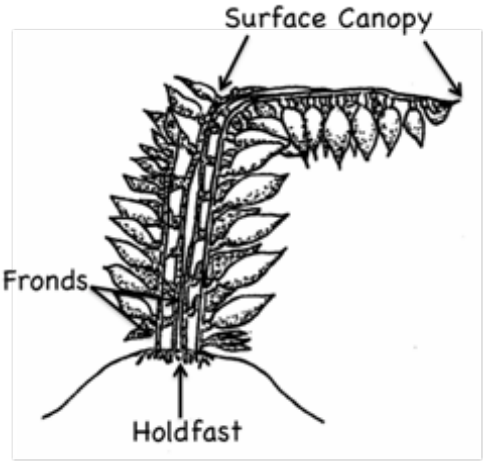
- 5 sites near Bella Bella on the Central Coast of BC
- Plots measuring 30 by 30m

How:

Harvest kelp (cutting the surface canopy portion of the kelp) and measure how quickly the kelp regrew (meters of canopy growth per day) to understand what factors influence the regrowth following the harvest.

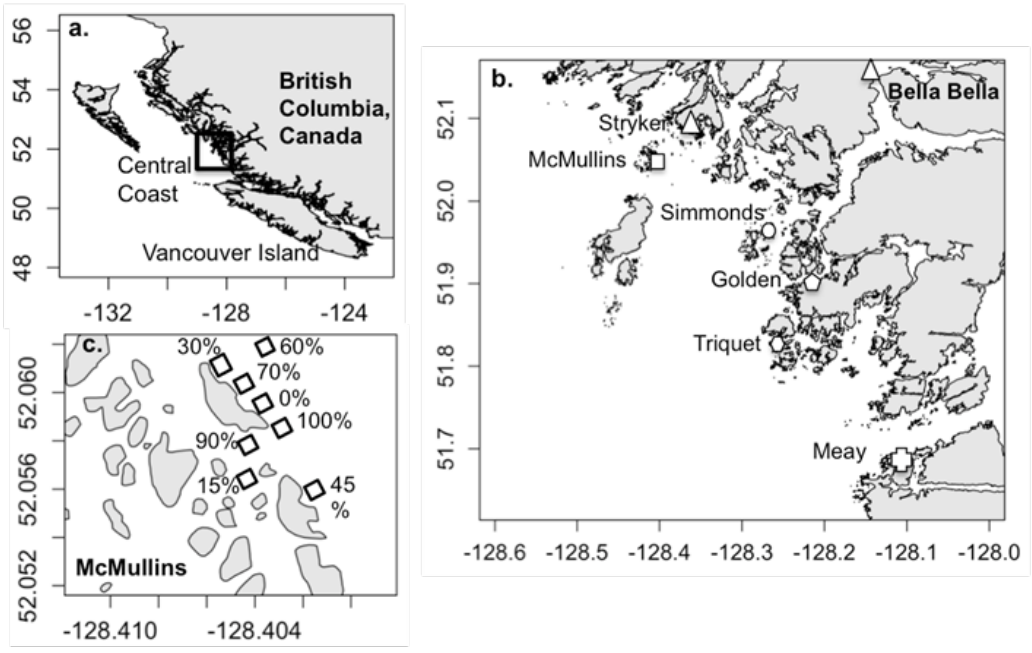
Questions: I Want To Know More About…

4.2: Kelp and Map of Sites



Giant kelps are anchored to material that the plant grows on (for example rocks) via a root-like structure known as a **holdfast**. Each holdfast has multiple stems or **frond** that grow up through the water column towards the surface of the water. Once the frond reaches the surface, it grows along the surface to form a **surface canopy**. This surface canopy is where most of the kelp's photosynthesis occurs, and is visible from a boat. **Harvesting** involves cutting the **surface canopy portion** of the kelp.

Kelp was harvested at 5 sites on the Central Coast of BC near Bella Bella in 2014.



4.3: Kelp Data

Site	Average Water Temperature (^{0}C)	Kelp Density at Site (m^{-2})	Initial Kelp Size (m)	Kelp Growth Rate (m per day)
Golden	12.4	0.336	10.9	0.067
Golden	12.4	0.336	6.4	0.051
Golden	12.4	0.336	10.9	0.068
Golden	12.4	0.336	6.4	0.028
Golden	12.4	0.336	3.8	0.049
Meay	12.12	0.147	9	0.065
Meay	12.12	0.147	5.4	0.042
Meay	12.12	0.147	7	0.051
Simonds	11.96	0.233	7.6	0.067
Simonds	11.96	0.233	2.15	0.053
Simonds	11.96	0.233	4.4	0.043
Simonds	11.96	0.233	2.05	0.046
Simonds	11.96	0.233	7.3	0.101
Stryker	12.425	0.464	4.85	0.012
Stryker	12.425	0.464	7	0.047
Stryker	12.425	0.464	3	0.055
Stryker	12.425	0.464	2.8	0.074
Stryker	12.425	0.464	2.5	0.034
Triquet	12.702	0.486	4	0.007
Triquet	12.702	0.486	4.7	0.004
Triquet	12.702	0.486	6.05	0.012
Triquet	12.702	0.486	5.95	0.014

NOTE: Permission was granted to use the data in the context of this lesson. The data are not available for publication or use outside of the classroom.

Name:_____

4.4: Research Questions for Kelp Data

Question One
Did kelps grow back at the same rate at each site? Find the average growth rate at each site. What is the range of the average kelp growth rate for each site?

Question Two

Is the water temperature the same at each site? What is the range of average water temperatures? What is the average water temperature?

Question Three

Is the kelp density the same at each site? What is the average kelp density?

My Group is responsible for Research Question: # _____

Hypothesis: Our predictions are...

Results: Our Findings…

Our new questions…

Lesson 5: Marine Planning and Perspectives

Overview: Students will learn about marine planning and various perspectives that are important to this process to ensure sustainable and healthy ecosystems. Students will engage in a critical thinking activity by taking on the role of different perspectives and thinking about resources in the Great Bear Sea.

Subjects: Science, Language Arts

Suggested Time: 3 classes (45-60 minutes)

Materials and Resources:

- Computer, projector and screen
- Lesson 5 Film Clips:
  - Marine Planning (10 mins)
  - Shipping (2 mins) – *optional*
- Teacher Background – Lesson 5
- 5.1: Perspectives on the Great Bear Sea
- 5.2: Traditional Knowledge
- 5.3: Self and Group Assessment

Learning Objectives:

Students will:

1. Understand that marine planning is key to creating a sustainable future for all British Columbians.
2. Learn about collaborative decision-making and how it is an important step when making decisions in the Great Bear Sea region.
3. Identify some of the aims of marine plans, including appropriate and sustainable economic development that will endure over generations.

Lesson Context

This lesson will allow students to learn about marine plans and how these marine plans are important to a sustainable future. It will introduce students to the terrestrial planning with the Great Bear Rainforest and how things have shifted to marine planning in the Great Bear Sea. The students will learn about the Marine Planning Partnership (MaPP) and how 18 First Nations and the Province of British Columbia co-led a collaborative decision-making process to establish four area-specific marine plans and a regional planning framework for the Great Bear Sea. This process included input from stakeholders, which incorporated different types of Traditional Knowledge, local knowledge and science. This lesson will have the students engaging in a critical thinking activity by looking at four groups and their different perspectives of the Great Bear Sea.

Learning Activities

Activity 1: Marine Planning (45-60 minutes)

1. Ask the students what they think “marine plans” are? Brainstorm together and break down the words “marine” and “plan”. Explain to the students that there are many effects of ocean use and activities on marine life and coastal communities so 18 First Nations and the Province of British Columbia worked together to plan for ocean health and marine uses now and into the future on the North Pacific Coast.

2. Write the date **April 27, 2015** on the board. Explain to the students that this was a very important date in British Columbia. This date marks a milestone for the Great Bear Sea. On this date 18 First Nations and the Province of British Columbia released the marine plans for each of the four sub-regions the Great Bear Sea.

3. Watch the film clip **Marine Planning**.

4. Brainstorm together the key learning from the film clip.

5. The film clip makes reference to terrestrial (Great Bear Rainforest) and marine (Great Bear Sea) planning. Discuss the differences with the students. Explain to the students that terrestrial planning in the Great Bear Rainforest was done first and now the shift has moved to marine planning in the Great Bear Sea. Ensure that the students understand that the land and ocean are interconnected but the plans were done separately. Can the students think of an animal that calls the Great Bear Sea region home that lives on land but is connected to the sea? Discuss how bears are connected to the land and sea.

6. The film clip highlights a theme of access to place and more pressures on the marine environment with the need to access resources. Past pressures were

logging and fisheries while the present pressures include much more. Brainstorm as a large group to see if the students can recall some of those pressures mentioned in the film clip:

- Oil and gas industry
- Renewable energy industry
- Cruise ship industry
- Recreation and sport fisheries

7. Write the quote on the board and the words **resource** and **sustainable**. Divide the class into small groups. Have each group try to connect the quote and the words resource and sustainable/sustainability to create their own definition of a marine plan.

   "I think in our communities we're prepared to do whatever it takes to make sure that we protect these resources and make sure that things are done in a sustainable way. We have a lot of people that come to our territory and they want access to these resources." - Doug Neasloss, Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority

8. Share the group's definitions about marine plans. Remind the students that marine plans help guide appropriate economic and social development that will provide access to place and ensure that the resources are sustainable for future generations.

Activity 2: Perspectives on the Great Bear Sea (2 classes)

Part A (45-60 minutes)

1. Write the word **stakeholder** on the board. Use **5.1: Perspectives on the Great Bear Sea - Part One** for this activity. Using a think/pair/share strategy, have the students consider what the word means.

2. Continue using **5.1: Perspectives on the Great Bear Sea** to create a list of different groups of people that may have different perspectives on the resources in the Great Bear Sea. Discuss the student lists and how the various groups of people have different knowledge and views on resources in the Great Bear Sea.

   Teacher Note: It is important for the students to understand that during the Marine Planning Partnership (MaPP) 18 First Nations and the Province of British Columbia co-led a collaborative decision-making process to establish four area-specific marine plans and a regional planning framework for the Great Bear Sea with input and advice from stakeholders. Examples of stakeholders include: commercial fisheries, aquaculture, recreation, tourism, scientists, the general public, etc. See **Teacher Background – Lesson 5** for more information.

3. Draw a line on the board. Label the line with the word “agree” at one end and the word “disagree” at the other. Inform the class they are going to divide into eight groups and take on the role of different groups that use resources in the Great Bear Sea. The task is to agree or disagree with the statement and decide where on the line the group would stand based on the unique perspective.

   Agree----------**Disagree**

   Draw a perspective randomly from a bag with the following list (there should be two groups of each):

   - People who live in the communities in the Great Bear Sea region
   - Researchers
   - Tourism industry – ecotourism, sport fishers, etc.
   - Commercial fisheries

   Read the statement and task aloud to the students.

   Statement: There are plenty of salmon in the Great Bear Sea.

   Task: Decide your viewpoint from the perspective you have been assigned using the statement and where on the line your group would stand. You must try to support your position if other groups question it or have a different viewpoint. Think about where other groups would stand with the statement.

   Continue using **5.1: Perspectives on the Great Bear Sea - Part Two** for this activity.

4. With students in eight groups, provide time for them to discuss their views on the statement, think about the views of others and provide support for their positions.

Part B (45-60 minutes)

1. Once the eight small groups have their positions decided and a plan to support it, have the groups join the matching group to discuss opinions. The class will now be in four groups. Do the positions match? How are the positions the same? How are the positions different? Have students share information and opinions. Use **5.1: Perspectives on the Great Bear Sea – Part Three** for this activity.

2. Have each group representing a different perspective share their opinions on the statements with the whole class and their rationale for agreeing or disagreeing with the statement. Allow questions and comments from the other groups as each of the four perspectives present.

3. Discuss additional information that may still be missing or need to be researched. Where could you find this information?

4. Continue to discuss why marine plans are important and how salmon is a vital

resource for many people as well as the ecosystem. It is important to plan for ocean health and marine uses now and into the future. Using **5.1: Perspectives on the Great Bear Sea – Part Four** discuss and record recommendations that could be passed along to the decision makers.

5. Use **5.2: Traditional Knowledge** to read the students a statement from Doug Neasloss, Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority. His text shares Traditional Knowledge from his region about some of the harvested resources in the area.

6. Use **5.3: Self and Group Assessment** to conduct a self and group assessment.

Extension Ideas

- Ask the students what marine traffic is and brainstorm the issues connected to marine traffic. Marine traffic is a federal issue so the marine plans do not include this but it is something that is being brought to attention and the implementation process is underway so this can be incorporated into future planning in the marine environment. Watch the film clip **Shipping**. Have the students come up with their own guidelines on marine traffic for the Great Bear Sea.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.
- Collect the self and group assessment using **5.3: Self and Group Assessment**.

Teacher Background – Lesson 5

The Marine Planning Partnership for the North Pacific Coast (MaPP) represents an innovative response and approach to the challenge of ensuring sustainable use of the MaPP study area, or Great Bear Sea for generations to come. The MaPP is a co-led process between 18 First Nations (listed below) and the Province of British Columbia to establish four area-specific marine plans and a regional planning framework. Over the course of four years, the planning teams created new marine plans in consultation with marine stakeholders from the fishing, tourism, recreation, academia, local government, renewable energy, and other sectors. See more at www.mappocean.org.

The plans include special management zones for tourism, aquaculture, and First Nations culture and protection management zones for marine life and habitat. The plans address a variety of marine uses, activities and values and contain hundreds of strategies that will lead to solutions and revitalise the North Coast. The year 2015 marked an important milestone for shaping the future of Canada's North Pacific Coast and the Great Bear Sea. On April 27, 2015, after four years of planning, marine plans for four sub-regions (North Coast, Central Coast, Haida Gwaii, North Vancouver Island) were released and made public on the MaPP website. The 18 First Nations* working on the MaPP include:

Central Coast

- Nuxalk Nation, Heiltsuk Nation, Kitasoo/Xai'xais First Nation, Wuikinuxv Nation

Haida Gwaii

- Council of the Haida Nation, Old Massett Village Council, Skidegate Band Council

North Coast

- Gitga'at First Nation, Gitxaała First Nation, Haisla First Nation, Kitselas First Nation, Kitsumkalum First Nation, Metlakatla First Nation

North Vancouver Island

- Mamalilikulla Qwe'Qwa'Sot'Em First Nation, Tlowitsis Nation, Da'naxda'xw Awaetlatla First Nation, Gwa'sala-'Nakwaxda'xw First Nations, We Wai Kum First Nation, Kwiakah First Nation, K'ómoks First Nation

** This list contains over 18 First Nations. Some Nations and territories had been amalgamated post-contact and have very recently been re-defining traditional territories and spaces.*

It is important to note that the land and sea is interconnected and not separate but the levels of government that oversee these areas are different. The Great Bear Sea represents an interesting area where both provincial and federal jurisdiction comes into play. Traditionally, the federal and provincial governments have taken a sector-by-sector approach to management, rather than looking at the space in an integrated way.

This approach has been challenged by groups calling for the need to look at economic, social, ecological and cultural factors across all sectors when making decisions that will impact the area.

The marine plans were created using a collaborative government-to-government planning process. This is innovative and globally significant; there is no other country where a marine plan has been developed by Indigenous and provincial governments. The First Nations, as sovereign governments, are thus owners of the decision-making and planning that is happening in their traditional territories, in collaboration with the provincial government. Stakeholders were consulted and their input incorporated, but it's the province and First Nations as governments that developed the plans and sought stakeholder participation and input. The stakeholders included the various marine sectors like fishing, recreation, aquaculture, marine transportation, conservation, etc. The marine plans were made using informed scientific, traditional and local knowledge. The goal of the marine plans are to provide recommendations for areas of marine management including use, activity in the region, protection, and guidance to make well-informed decisions regarding sustainable economic development and stewardship. The marine plans help plan for the future while creating economic opportunities, reducing conflicts and ensuring the resources continue to be accessible and that the ecosystem of the Great Bear Sea remains healthy.

The activities modelled in this lesson are not meant to model the processes used in regions in the MaPP, but engage students in critical thinking skills by focusing on the perspectives of different groups of people that use the resources in the Great Bear Sea. Worldwide, there is great interest in MaPP and learning more about how the planning was done, and what was achieved. The MaPP website is a very useful resource to learn more about the process, watch a video on "10 Things You Need to Know About MaPP", read stories from the First Nations and the MaPP stakeholder members, as well as a research tool for students. www.mappocean.org

Vocabulary

Resource: the natural wealth of a "place" which can be living or non-living.

Sustainable: the ability to be supported or maintained at a certain rate or level and creating a long-term ecological balance. It is not being harmful to the environment or depleting natural resources.

Stakeholder: a person with an interest or concern in something.

Name:_____

5.1: Perspectives on the Great Bear Sea

PART ONE

My definition of a stakeholder...

After talking with a partner, my new definition of a stakeholder…

A stakeholder is…

List different partners and stakeholders in the Great Bear Sea…

PART TWO

Statement: There are plenty of salmon in the Great Bear Sea.

Perspectives:

- People who live in the communities near the Great Bear Sea
- Researchers
- Tourism industry – ecotourism, sport fishers, etc.
- Commercial fisheries

My group has been assigned: _____

Statement… Agree or Disagree? Where on the line will you be?

Agree ---------- **Disagree**

Perspective: _____

Our position…

Why…

Your thoughts on where the other groups sit on this statement:

Other group _____

Agree ----------Disagree

Other group_____

Agree ----------Disagree

Other group_____

Agree ----------Disagree

Explain why different groups could have different positions on this statement.

What is your plan to support your position?

What else do you want to know or need to consider in order to support your position?

PART THREE

Our final grouping...

Agree ---------- Disagree

Support for your position...

Did your position on the line change? Explain.

PART FOUR

What recommendations does your group have to conserve salmon and the Great Bear Sea that could be passed along to the decision-makers?

5.2: Traditional Knowledge

Doug Neasloss – *Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority*

This is a passage from an interview with Doug Neasloss talking about some of changes to the resources that have been noted and shared.

"We've watched a lot of those resources dwindle over the last number of years. Partly because of mismanagement, and people coming in and harvesting too much. And, you know, in my lifetime, we've witnessed huge declines. Everything from abalone. Abalone used to be a once abundant shellfish in our territories. And the Elders talk about it … that is was some areas they said you couldn't even touch the ground there was so many abalone. They were all over the place. Today, you probably will never see an abalone. In my lifetime I've never actually tried an abalone in the last probably 20-something years now because they've all just been wiped out. You know, the commercial fishery came in and harvested way too many and they just haven't been able to come back in numbers. With things like abalone you need large numbers because they're broadcast spawners and so the population just hasn't been able to come back and do that.

Same thing with salmon. I listen to the historical numbers of salmon. Some the Elders will say some of the rivers and the estuaries would be full of salmon. They said some rivers were just plugged wall to wall with salmon. And I looked at the historical numbers of them, and there were about 80,000 fish in some of those systems. Today, we are down to about 5 or 6 thousand in some of those same rivers.

So, you know, I think there's been way too much over harvesting. I think with things like global warming, there's a number of different impacts that are effecting salmon. So, I think we have a long way to go."

Name:_____

5.3: Self and Group Assessment

Self-Assessment

Please rate **yourself** on the activity:

1 = I could do better.
2 = I did okay.
3 = I did a great job.

I shared my opinions in discussions	1	2	3
I allowed my group members to share their opinions.	1	2	3
I remained focused on the task.	1	2	3
I did my fair share of the work during the activity.	1	2	3

Please comment on the following:

One thing I will work on in the next group activity is…

One wish I have for the next group activity is…

Group Assessment

Group Members: _____

Please rate **your group** on the activity:

1 = My group could do better.
2 = My group did okay.
3 = My group did a great job.

My group members participated in the activity.	1	2	3
My group remained focused on the task	1	2	3
My group worked well together.	1	2	3
We all did our fair share of the work.	1	2	3

Please comment on the following:

One thing my group did well was…

One thing my group could work on is…

Lesson 6: Collaborative Decision-Making

Overview: Students will learn about collaborative decision-making with regards to the Great Bear Sea region. As an example of collaborative decision-making they will look at moving the location of a "wind farm" from their schoolyard to another place in the community.

Subjects: Science, Language Arts

Suggested Time: 2 classes (45-60 minutes)

*** Teacher Note:** Throughout this resource, additional materials, several images and colour resources are noted with a ***** in the materials list. These resources are available on the Great Bear Sea USB, or at www.greatbearsea.net.

Materials and Resources:

- Computer, projector and screen
- Chart paper and markers
- Lesson 6 Film Clip:
  - North Coast Development (10 mins)
- Teacher Background – Lesson 6
- 6.1: Skeena River Estuary
- Development Images – (Coal, Container Port, Development Site, Fishing Boats, Kitimat, LNG, Port of Prince Rupert)*
- North Coast Map*

Learning Objectives:

Students will:

1. Learn about collaborative decision-making and how it is an important step when making decisions in the Great Bear Sea region.
2. Understand the value of traditional knowledge and how it contributes to sustainability and planning for the future.

Lesson Context

This lesson will allow students to learn about collaborative decision-making. The students will learn about the levels of government that have responsibility for decision-making for the land (Provincial) and for the water (Federal). In addition, students will start to think about development in the Great Bear Sea and the various partners that make the decisions with input from the stakeholders that live, work or use the region and have knowledge about the resources and the impacts of development for decision-making purposes. Specifically, the students will look at renewable energy in terms of development of marine based wind farms and think about how decisions impact different groups of people living and working in the Great Bear Sea region. There are various activities that students will engage in throughout this lesson, but the culminating activity will be looking at development locations for wind farms in their own community and thinking about stakeholders that should be consulted.

Learning Activities

Activity 1: Development (45-60 minutes)

1. Draw a circle on the board and write the word classroom inside. Ask the students to create a web around the circle of everyone who helps influence the classroom. Discuss how there are many people working together inside and outside of the classroom (teachers, students, principal, parents, other professionals in the classroom, the government, etc.) to ensure it is a good a school year and the students are learning. Everyone has a different role in the classroom and are experts in different areas.

2. There are many people working together to ensure the Great Bear Sea and its resources remain healthy. Have the students brainstorm some of the people working together to protect the Great Bear Sea. Inform the students that the Provincial government is responsible for the land while the Federal government is responsible for the water. Remind the students that 18 First Nations and the Province of British Columbia co-lead a collaborative decision-making process to establish the four area-specific marine plans for the Great Bear Sea with input from stakeholders.

3. Set the classroom up in a 4-corner debate by posting agree, disagree, strongly agree and strongly disagree in each corner. Read the statement “development is a good thing” aloud to the students. Have students move to the sign that reflects their opinions without any discussion. Note how many students are in each corner.

4. Make a T chart on the board and have the students list the pros and cons of “development” on the North Coast. Discuss why students selected their corner. Show the students the **development images*** that have been proposed or

implemented in the North Coast. Continue to add to the T chart.

5. Watch the film clip **North Coast Development**.

6. Discuss the changes to the North Skeena estuary that were mentioned in the film clip. Look at the **North Coast Map*** to see where the estuary is located. Use **6.1: Skeena River Estuary** to discuss and record information:

   - The definition of an estuary.
   - The importance of an estuary.
   - Possible development projects proposed for the North Coast.
   - Implications from development in the estuary.

   See **Teacher Background – Lesson 6** for information on estuaries.

7. Repeat the 4-corner debate by re-reading the statement aloud "development is a good thing". Have students move to the sign that now reflects their opinion. Did their opinion change or not? If opinions have changed, discuss why opinions have changed. Also discuss how different perspectives (examples: developers, scientists, people who live in the community, etc.) could look at this statement in different ways. It is important to plan for sustainable development while protecting ocean health, having economic opportunity, reducing conflicts among marine users and fostering marine stewardship in the Great Bear Sea.

Activity 2: Renewable Energy (45-60 minutes)

1. Write the words **renewable energy** on the board. Discuss with the students their understanding of renewable energy.

2. Highlight the idea of a wind farm. Ask the students if they have seen a wind farm locally or on their travels and why we have wind farms. Explain to the students that wind energy is one of the fastest growing renewable energy sources. Wind farms can be created on land or in the water. Turbines are placed in locations with wind activity. The wind turns propeller-like blades connected to a rotor that spins a generator and creates electricity.

3. Go outside to the school playground and inform the students that it has just been discovered that the "school playground" would be an excellent location for a wind farm. Effective tomorrow the school playground is CLOSED and construction starts! Discuss this announcement with the students. Some discussion questions may include:

   - What are the students' reactions to this?
   - Is this fair? Why or why not?
   - Did the students have input into the decision?

- Did the school have input into the decision?

There are impacts to closing a school and installing a wind farm! It is important in collaborative decision-making that the stakeholders provide input.

4. In small groups, have the students provide recommendations that could be passed on to decision makers. Use chart paper to record the recommendations of other places in the community where a wind farm may be better located. Some discussion points may include:
   - How are you supporting your recommendations?
   - What stakeholders in the community would they suggest be given the opportunity to provide input?
5. Share the recommendations and reinforce the idea that collaborative decision-making through marine planning is an important step to ensuring ocean health and marine uses now and into the future on the North Pacific Coast.

Extension Ideas

- Have the students start to think about impacts both positive and negative of wind farms in one of the regions of the Great Bear Sea. Students could be divided into four groups to examine the marine plans for the region in terms of renewable energy . Use the MaPP website www.mappocean.org and look at areas that have been designated “ok” for renewable energy in each region.
- Head to a green space and think about the impacts of development in this place. What are the impacts to the surrounding ecosystems if development happens in this place?
- Write a letter to the government explaining why it is important to think about development projects critically for communities in the North Coast region.

Assessment Ideas

- Formatively assess students’ engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.

Teacher Background – Lesson 6

In Canada, regulation in relation to environmental issues generally falls within three categories: federal jurisdiction, provincial jurisdiction or a combination of both. Particular scenarios can be quite complicated, but for the purpose of this lesson, it will be helpful for students to make the general distinction that most land issues (as well as land-locked lakes/rivers) are under provincial jurisdiction, while marine and ocean related issues like fisheries, shipping and navigation are generally under federal jurisdiction. You can find more information on the Parliament of Canada website by searching "Federal and Provincial Jurisdiction to Regulate Environmental Issues" (www.parl.gc.ca).

There are many development projects that have been put forth for the North Coast including pipelines, wind farms, refineries, LNG projects, etc. These development projects will create jobs but also have potentially great impacts on the ecosystems. The film clip in this lesson shows how these development projects are being reviewed to inform future decision-making. Marine plans are an important step in the development projects as it gives additional information about the areas where development is being proposed. There are cumulative effects in terms of the past, present and future activities in areas that people care about.

This collaborative government-to-government planning process is innovative and globally significant; there is no other country where a marine plan has been developed by Indigenous and provincial governments. Worldwide, there is great interest in MaPP, particularly learning more about how the planning was done, and what was achieved.

The activities modelled in this lesson are not meant to model the processes used in regions in the MaPP, but engage students in critical thinking skills by focusing on the perspectives of different groups of people that use the resources in the Great Bear Sea. Worldwide, there is great interest in MaPP and learning more about how the planning was done, and what was achieved. The MaPP website is a very useful resource to learn more about the process, watch a video on "10 Things You Need to Know About MaPP", read stories from the First Nations and the MaPP stakeholder members, as well as a research tool for students.

Vocabulary

Estuary: a tidal mouth of a river where the ocean water and fresh water meet and mix together. It is a very rich nutrient area that is also important to provide habitat to plants and animals.

Estuaries are important to animals:

- To make homes
- To have babies and raise young
- To find food
- To stop to rest for those animals that migrate

Renewable energy: energy that is collected from resources, which are naturally replenished in a human lifespan. This includes sunlight, wind, rain, tides, waves and geothermal heat

Name:_____

6.1: Skeena River Estuary

What is an estuary?

Estuaries are important because…

List some potential development projects that have been proposed for the North Coast.

Who and what could be impacted by development in the Skeena River estuary?

What are your recommendations to protect the estuary in the North Coast?

Lesson 7: Marine Planning and Eelgrass Beds

Overview: Students will learn more about marine planning, including the differences between marine reserves and marine protected areas. Using eelgrass beds as an example, students will learn about this important habitat and make recommendations on how to conserve eelgrass beds for future generations.

Subjects: Science, Language Arts

Suggested Time: 2 classes (45-60 minutes)

Materials and Resources:

- Computer, projector and screen
- Lesson 7 Film Clips:
  - Collaborative Decision-making (10 mins)
  - Protected Areas Oveview (2 mins)
  - Eelgrass (9 mins)
- Teacher Background – Lesson 7
- 7.1: Conservation in the Great Bear Sea
- 7.2: Marine Reserves and Marine Protected Areas
- 7.3: Protecting Eelgrass Beds

Learning Objectives:

Students will:

1. Understand that marine planning is key to creating a sustainable future for all British Columbians
2. Learn the positive impacts that Marine Protected Areas have on fish stocks and how different knowledges help contribute to marine planning.

Lesson Context

This lesson will allow students to continue examining marine planning and start thinking about the differences between Marine Reserves and Marine Protected Areas. The students will examine eelgrass beds and will focus on why these habitats should be protected. Students will work collaboratively to design presentations that teach others about why eelgrass beds should be protected and make recommendations on how to conserve these habitats.

Learning Activities

Activity 1: Marine Plans and Conservation (45-60 minutes)

1. Read this quote to the students and ask the students what it means to them.

   > *"We know that if we can get our ecosystems back in balance, and make sure that we don't pollute the water, make sure that all the nutrients that are required in the ocean and the rivers and the lakes and everything that feed our salmon and feed our halibut and feed everything that there – if we can get that balance back, the natural capital that exists in that region will begin to bear fruit for us again. And that's the objective that Coastal First Nations has. That's the objective that we have in the terrestrial side, that's he objective we have on the marine side."*
   > – Art Sterritt, Executive Director, Coastal First Nations

2. Watch the film clip **Collaborative Decision-making**.

3. Review with students what the word **ecosystem** means. Discuss the idea of a balanced ecosystem in the Great Bear Sea and how this balance is being worked on to ensure the health of the ecosystem. Some discussion points may include:
   - In order to create balance marine plans are being designed for each sub region in the Great Bear Sea.
   - This means the marine plans are customized to that specific area.
   - The needs of communities are different just like the needs of sub regions in the Great Bear Sea.
   - Each region is unique and plans must be made for that region taking into account its diversity.

4. Review the four regions of the Great Bear Sea (Central Coast, Haida Gwaii, North Coast, North Vancouver Island) and how each sub-region is unique. See **Teacher Background – Lesson 7** for more information on each sub-region.

5. Remind the students that marine plans are guides to help conserve the Great Bear

Sea for the future, including stewardship, sustainable development, economic opportunities, and reducing conflicts among marine users. Discuss with the students that these marine plans were created using a collaborative approach, taking into consideration traditional knowledge, local knowledge and science.

6. Provide students with **7.1: Conservation in the Great Bear Sea** and have them complete by brainstorming what **conservation** means to them. Share the brainstorming together in a class discussion.

Activity 2: Protecting the Great Bear Sea (45-60 minutes)

1. Ask the students if they can think of ways to participate in conservation actions in their community. Can they think of ways to help conserve the Great Bear Sea?
2. Watch the film clip **Protected Areas Overview**.
3. Inform the students that Marine Reserves and Marine Protected Areas are two ways to help with conservation efforts. There are many others that will be discussed in future lessons. Use **7.2: Marine Reserves and Marine Protected Areas** to see if students can recall the differences between **Marine Reserves** and **Marine Protected Areas**.
4. Discuss with the students the differences between Marine Reserves and Marine Protected Areas and why it is important to have these areas of protection in the Great Bear Sea.
5. Watch the film clip **Eelgrass**.
6. Review with the students why eelgrass beds are important habitats.
    - Nurseries for animals: provides protection for eggs and young animals
    - Food: many animals can find food in the eelgrass beds
    - Home: many species make this habitat a home
    - Place to visit: some animals that migrate will stop and rest in eelgrass beds and other animals will come and visit the eelgrass beds
7. Divide the class into six groups and use **7.3: Protecting Eelgrass Beds** to help plan their presentation. The groups will be need to design a presentation that focuses on why eelgrass beds should be protected and their recommendations on how to conserve these important habitats. The presentation can be done as a poster, role-play, song/rap, poem, etc. Another option could be have the students create their own film clips to protect eelgrass beds.
8. Share presentations with the class.

Extension Ideas

- Have the students do additional research on eelgrass beds and the species that use eelgrass beds. Students could select an animal featured in the film clip to learn more about its connection to eelgrass beds. Put together a poster, brochure or fact sheet on the selected animal. Or integrate a technology component to create a class blog on eelgrass beds.
- Research, visit and observe habitats that are important in the community. Examples: eelgrass beds, tidal flats, estuaries, wetlands, bogs, marshes, beaches, lakes, rivers, shorelines, etc. Reflect on why these habitats are important to the ecosystems in the community and how these habitats can be conserved. Clean this habitat if any garbage is present.
- Find out if marine reserves, marine protected areas or other protected habitats such as rivers, wetlands, etc. are in the community.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.
- Assess the eelgrass bed presentations including the recommendations to conserve these habitats.

Teacher Background – Lesson 7

Marine planning is underway all over the world. Currently the Great Bear Sea is one of the areas with the largest marine plans in the world. The marine plans must be customized to each sub-region, as each area is unique in its own way. Ecosystem based management integrates human well-being, ecological integrity and governance as well as considers the effects of ocean use and activity on marine life and coastal communities.

There are three management zones that benefit human well-being, economic opportunity and conservation.

1. General Management Zones are areas that allocate space for public, private and community marine uses and are managed using ecosystem management approach.
2. Special Management Zones are areas that allocate space for high priority or high potential marine uses.
3. Protection Management Zones are areas that allocate space for primarily for conservation purposes.

Note: There are pictures from the Marine Plans of each sub-region for the Great Bear Sea so that the students can see how each sub-region is unique. The marine plans with pictures are available at www.mappocean.org.

Marine Protected Areas

Marine Protected Areas (MPAs) are an important tool for protecting ecosystems from overuse and exploitation. MPAs restrict human activity in a protected area of seas, oceans or large lakes for a conservation purpose, typically to protect natural, historic or cultural resources. MPAs can allow for fish and marine life restoration, increasing both the size and number of species, and protecting species in critical stages of the life cycle. MPAs can also act as a baseline for research purposes, to judge management processes in nearby areas. To date, Canada has just over 60,000 km^2 of protected oceans and lakes. In June 2010, Gwaii Haanas National Marine Conservation Area Reserve and Haida Heritage Site (3500 km^2) in British Columbia (in the region of the Great Bear Sea) was established under the Canada National Marine Conservation Areas Act.

Northern Shelf Bioregion MPA Network

The Government of Canada, Province of British Columbia and 17 First Nations are working together to develop a marine protected area network in the Northern Shelf Bioregion (NSB), which extends from the top of Vancouver Island (Quadra Island/ Bute Inlet) and reaches north to the Canada – Alaska border, in the region of the Great Bear Sea. The Northern Shelf Bioregion Marine Protected Area Network planning process aims to build a network of MPAs that will help to ensure that future generations will inherit the beauty and productivity of our Pacific Ocean. For more information on the Northern Shelf Bioregion MPA Network visit: www.mpanetwork.ca/bcnorthernshelf.

Vocabulary

Conservation: the act of preserving, protecting or restoring the natural environment of a specific area.

Marine Reserve: areas that prohibit fishing/harvesting. It is a safe haven for marine life so stocks can be replenished. Plants, invertebrates and fish can spread into surrounding water, which is open to fishing.

Marine Protected Area: areas that are less restrictive than marine reserves. They may allow crabbing, salmon trolling, sport fishing and other activities.

Name:_____

7.1: Conservation in the Great Bear Sea

Brainstorm

CONSERVATION

Name:_____

7.2: Marine Reserves and Marine Protected Areas

Marine Reserves

Marine Protected Areas

Quote from film clip – What does this mean to you?

"Marine protected areas provide an insurance policy for the ocean…" Russ Jones, Hereditary Chief, Haida Nation Project Manager, Haida Oceans Technical Team

Name:_____

7.3: Protecting Eelgrass Beds

Why are eelgrass beds important ecosystems?

Our conservation recommendations…

Presentation notes and ideas:

Lesson 8: Great Bear Sea Careers

Overview: Students will learn about the different careers presented in the film and the importance of sustainable job development in the Great Bear Sea region and how this relates to the overall health and well being of a region.

Subjects: Science, Career Education, Art

Suggested Time: 3 classes (45-60 minutes)

*** Teacher Note:** The information in the biographies varies from person to person. Using **Featured Career Biographies*** you will find twelve featured careers that include short biographies about a small group of people who work in the Great Bear Sea region. These biographies should be printed and used in Lesson 8 from the Great Bear Sea USB or at www.greatbearsea.net.

Materials and Resources:

- Computer, projector and screen
- Lesson 8 Film Clip:
  - Sustainable Development (10 mins)
- Teacher Background – Lesson 8
- 8.1: List of Featured Careers
- 8.2: Great Bear Sea Career Guiding Questions
- Featured Career Biographies*

Learning Objectives:

Students will:

1. Understand the Great Bear Sea is an ecosystem with ecological, economic, cultural and social significance, particularly for First Nations communities.
2. Discover that marine plans aim to guide appropriate and sustainable economic development that will endure over generations.
3. Explore the ideas of stewardship and leadership in planning for the future of marine resources and ecosystems in the Great Bear Sea.

Lesson Context

This lesson will introduce students to a variety of people who work in the Great Bear Sea region and allow them to consider what types of careers may be possible. The students will learn about the importance of creating jobs that are sustainable. In addition, the idea of marine plans will be presented and how marine plans are also being used to create economic development that will endure over generations. The culminating activity will be looking at featured careers in the Great Bear Sea and has the students creating an idea for an ecotourism business in the Great Bear Sea.

Learning Activities

Activity 1: Jobs (45-60 minutes)

1. Using the students' current knowledge of the Great Bear Sea, ask them what jobs they think are connected to the region and list these on the board. What do all of these jobs have in common?
2. Watch the film clip **Sustainable Development**.
3. Add any additional jobs to the list after viewing the film clip.
4. Discuss how the film focuses on creating balance with development and protecting the economy as well as sustaining culture. See if the students remember jobs that the marine plans mentioned, such as aquaculture, fisheries, biologists, scientists, researchers, technicians and tourism, etc. Discuss how jobs help the local and world economy. Use the example of Haida Wild Seafoods. See **Teacher Background – Lesson 8** for more information on this.
5. Review the role of marine plans to help to advocate for sustainable job development. Many jobs depend upon the resources of the Great Bear Sea ecosystem. In order to maintain sustainability (healthy ecosystems and jobs for people in the community), economic needs and ecosystem needs both need to be considered in planning for the future.
6. Write the words skills, interests and values on the board. See if the students can connect these words with careers. For example:
    - Everyone has different skills and our skills can be applied to the jobs we do, such as working with computers, being artistic, singing, etc. Discuss other skills that people may have from the list of jobs created earlier in this activity.
    - People also have interests that often can be connected to their jobs. For example: nature, technology, animals, etc. Discuss other interests that people may have from the list of jobs created earlier in this activity.
    - We also develop values as we learn about the world and often our values are

connected to our jobs. For example, conserving nature and living resources. Discuss other values that people may have from the list of jobs created earlier in this activity.

7. Have the students reflect in their science journals using the following prompts:
    - My skills are…
    - My interests are…
    - My values are…
    - When I grow up I might want to be…

Activity 2: Featured Careers (45-60 minutes)

1. Review with the class the list of people and careers in the Great Bear Sea using **8.1: List of Featured Careers**.
2. Provide each student with **8.2: Great Bear Sea Career Guiding Questions** that will be used to guide this activity. Discuss any predictions and ideas about the list of the careers.
3. Divide the class into groups. Groups can be assigned according to career interest or be assigned by the teacher. Give each group a featured career using **Featured Career Biographies***. Each group will read about the featured career and work together to learn about the job using the information provided.
4. Have each group present their featured career and how it is connected to the Great Bear Sea to the class.
5. Have the students reflect in their Science journals about one job from the Great Bear Sea region that surprised them or interested them. Why did they find the job interesting? Would they consider this career in the future?

Activity 3: Ecotourism (45-60 minutes)

1. Discuss with the students the idea of **ecotourism**. Brainstorm ecotourism businesses that could be featured in the Great Bear Sea.
2. Read aloud the following passage from an interview, with Doug Neasloss, Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority. As a class, discuss how this is an example of ecotourism and the creation of sustainable jobs. Clarify any information that students don't understand from the passage.

"I've been a part of helping develop the tourism industry in my community. We started out as two people, and we really started to grow it from there. I started back in 2000. We slowly started to grow it, but we always had this belief in a conservation-based economy. We believed that you could create an industry that was long term, and that it was sustainable. In my younger days a lot of communities were very dependent on forestry and fishing. That was very common for a lot of communities, so we were trying to introduce this new industry of viewing bears, of viewing cultural sites, and we are not taking out a fish or cutting down a tree. We are going out and viewing bears, and having no impact in some of the areas, which I think is huge and really important.

I think the career possibilities are endless with that. We are constantly training guides in our communities on interpretation. We are also training boat operators, chefs, hotel staff, there are so many different things that come out of tourism. On top of that there is the spin-off that comes off of tourism, like the fuel station, or purchasing food at our Band store has been huge as well. So, it perfectly fits in line with First Nations culture in terms of respecting the areas and again it's non-extractive, which is huge as well."

3. Have students imagine the future when they have finished school and are starting up their own business in the ecotourism industry of the Great Bear Sea region. Have students design a brochure or poster promoting the ecotourism business. The business must take place in one of the four sub-regions of the Great Bear Sea and it must teach its guests about the Great Bear Sea region and why it's important to respect the environment.

4. Have students share their business ideas in small groups or with the whole class.

Extension Ideas

- Have the students journal about the careers that they examined in the lesson. Select one of the careers to research further. How does this career connect to their skills, interests and values? What is the career path and steps they could look at for the future if they would like to consider a career in this area?

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.
- Assess students' presentations of featured careers.
- Collect the brochures/posters with ecotourism ideas.

Teacher Background – Lesson 8

There are many different careers that are represented in the film. In the past the focus of economic development was more on a boom and bust cycle (examples: logging and canneries that have been abandoned). At the moment the focus is on creating economic development that has long-term growth including aquaculture and ecotourism. Development of shellfish aquaculture has been identified as a sustainable economic opportunity in British Columbia waters. Marine plans designate management zones for shellfish aquaculture in all sub-regions of the Great Bear Sea.

The sub-regions in the Great Bear Sea are trying to create balance with economic development as well as protecting resources and culture. The sub-regions have value to the world economy with its resources but this must be done in a sustainable way – building it slowly and planning.

Jobs must be profitable but the environment also must be factored in and plays a critical role. Marine plans have identified key areas such as aquaculture, fisheries and tourism as important areas to contribute to the world economy. If we do not take care of the environment then some of the jobs may be eliminated. Marine plans play an important role in moving towards the future to create sustainable businesses for future generations.

Haida Wild Seafoods

As noted in the film, Haida Wild Seafoods is an example of a local business that is trying to create benefits for the Haida territory. They buy from local commercial fisherman and then process (preparing and packaging to be sent out) the seafood in Haida Gwaii. This business used to employ a staff of 10-12 people but in one year they have grown their staff to 23 people. Using marine planning they are growing these opportunities locally.

Vocabulary

Ecotourism: tourism that promotes conservation and using the natural world without impacting the environment.

8.1: List of Featured Careers

1. Karen Anspacher-Meyer - Executive Director, Green Fire Productions (Central Coast, Haida Gwaii, North Coast, North Vancouver Island)
2. Vernon Brown - Data & Referrals Coordinator Kitasoo/Xai'xais Integrated Resource Stewardship Authority (Klemtu, Central Coast)
3. Jenn Burt - Doctorate in Resource Management – Marine Ecology Simon Fraser University (Central Coast)
4. Rosie Child - Operations Manager and a Research Technician for the Spirit Bear Research Foundation (Klemtu, Central Coast)
5. Molly Clarkson - Marine Communication and Technical Support Officer (Skidegate, Haida Gwaii)
6. Alejandro Frid - Science Coordinator/Ecologist Central Coast Indigenous Resource Alliance (Central Coast)
7. Kira Krumhansl - Postdoctoral Researcher at Simon Fraser University and Hakai Institute (Bella Bella and Calvert Island, Central Coast)
8. Doug Neasloss - Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority (Klemtu, Central Coast)
9. Dan Okamoto - Postdoctoral Researcher, Simon Fraser University (Klemtu, Central Coast)
10. Chantal Pronteau - Guardian Watchman & Researcher (Klemtu, Central Coast)
11. Trevor Russ - Vice President, Council of the Haida Nation (Old Massett, Haida Gwaii)
12. Markus Thompson - Masters of Resource in Environment Management Simon Fraser University (Central Coast)

Name:_____

8.2: Great Bear Sea Career Guiding Questions

Name:
Job:
Education:
Skills:
Interests:
Values:
Connection to Great Bear Sea:
Sub-region this person works or lives in:
Describe why marine planning is important to this person:
Other Information:

Lesson 9: The Future of the Great Bear Sea

Overview: Students will learn more about the cultural significance of weaving and totem pole art specific to the Haida territory.

Subjects: Science, Art, Language Arts

Suggested Time: 3-5 classes (45-60 minutes)

Materials and Resources:

- Computer, projector and screen
- Lesson 9 Film Clips:
  - Chiefs Robe (2 mins)
  - Interview Carver (4 mins)
  - Legacy Pole (7 mins)
  - First Nations History Overview (sound clip or film clip) (14 mins) – *optional*
- Teacher Background – Lesson 9
- 9.1: First Nation Art

Learning Objectives:

Students will:

1. Understand that marine planning is key to creating a sustainable future for all British Columbians.
2. Understand the value of traditional knowledge and how it contributes to culture and sustainability and planning for the future.
3. Explore the ideas of stewardship and leadership in planning for the future of marine resources and ecosystems in the Great Bear Sea.

Lesson Context

Students will look specifically at culture through weaving and totem pole art that has been created by First Peoples in Haida Gwaii. The students will explore how cultural artefacts can hold history, mark events and tell stories. Students will consider how these cultural components of the Great Bear Sea region and First Nations history can contribute to marine planning, as an important step for the future of the Great Bear Sea and its resources. Students will create their own symbolism of the collaboration on the marine plans in the Great Bear Sea to mark this event and create their own art to tell their own story of this stewardship.

Learning Activities

Activity 1: Culture and Tradition (45-60 minutes)

1. Divide the class into eight groups. Each group will receive a word to discuss and describe in one sentence. Four groups will be given the word **culture** and four groups will be given the word **tradition**.
2. Once all eight groups have a sentence to describe the word, consolidate the eight groups into four groups. Have two groups who were working on the description of culture meet and two groups who were working on the description of tradition meet. Have the groups share their descriptions and create a new description using the new ideas presented.
3. If time permits repeat this process, so that the four groups consolidate into two groups. Have the groups share their descriptions and create one last new description using the new ideas presented.
4. Share the descriptions with the other half of the class.
5. Brainstorm some the examples of culture and traditions that the students can think of with respect to the First Nations in the Great Bear Sea region, or others that they are familiar with. (Additional resources may be needed depending upon students knowledge of First Nations culture and traditions).

Activity 2: Designing Art (45-60 minutes – 2-4 classes)

1. Watch the film clip **Chiefs Robe** and **Interview Carver**.
2. Use **9.1: First Nation Art** to highlight key points and have the students fill out information as you discuss the Haida Gwaii region as a large group.
3. Review the purpose of the marine plans and how collaboration is involved to

create these marine plans to help conserve the Great Bear Sea.

4. Explain to students that they will now have an opportunity to create their own work of art about the Great Bear Sea and how people are coming together to plan for the future and protect this special area. By creating this work of art, they will be marking the special event of collaborative marine plans. Their art must celebrate the collaboration of all groups and conservation efforts in the Great Bear Sea.

5. As a class, brainstorm on the board words and ideas that come to mind that could be included in their art. For example: environment, tradition, culture, marine plans, teamwork, Traditional Knowledge, research, stewardship, First Nations, collaboration, future, etc.

6. Provide students with some options for creating 2D or 3D art pieces. For example, 2D versions can be done with paper and pencil crayon/felts as sketches to create a weave pattern or a totem pole sketch. Or 3D versions can be done weaving construction paper or building totem poles using construction paper or cardboard.

   Teacher Note: Remind the students that weaving or the carving of a pole often has protocols associated with the process so as the students create their own versions it is important the students do this with respect.

7. Provide students time to construct their artwork and create an artist statement explaining the symbolism and meaning.

8. Share the artist statements and remind the students that it takes collaboration to put up a totem pole just like how it takes collaboration to create marine plans to conserve the Great Bear Sea.

9. Watch the film clip **Legacy Pole** and note the teamwork that it takes to place the pole.

Extension Ideas

- Research First Peoples art and artists in your community. Take a field to trip to visit art in the area or consider hosting an artist in the classroom.
- Listen to the sound clip or watch the film clip **First Nations History Overview** to learn more about the history of First Nations as told by Doug Neasloss, Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Assess student work from the lesson.
- Assess students' completed artwork and artist statement.

Teacher Background – Lesson 9

Weaving and totem poles are two types of First Peoples art. Both forms of art can tell stories, mark events and hold history. This is important to showcase culture, traditions and knowledge. Art connects the past to the world now and is another way that history can be shared through generations.

Two examples of art from the Haida Nation are included in this lesson. There is international recognition of Haida art that has helped the Haida Nation in ways politically because people know who they are because of that connection to art. Art is also used for feasts, vests or blankets with their crests. At graduation students will get a name and a blanket to mark the occasion. Art is very much integrated into the culture and tradition.

Weaver

Evelyn Vanderhoop, a master weaver from the Haida Nation, was working on a chief's robe. The pattern that she was weaving and creating in the film is called Qinga who the ancestors depended upon. He controls the ocean, the weather and he's a leader and ruler of many sea creatures. The Haida people have been very concerned about the environment and ocean and the ability to provide for future generations. They are looking back at the stories told from their ancestors about the power of the ocean and how to be respectful. These stories still connect to world now and it is important to carry on these traditions. In the past the weaving used to be done with mountain goat wool. The Haida Nation did not have mountain goats on the islands so they would travel by canoe to the inland people who would climb the mountains in the spring when the goats were losing their warm undercoat to trade for the mountain goat wool.

Pole Carver

Jaalen Edenshaw, a Haida carver, shares the Gwaii Haanas pole that he worked on to celebrate the anniversary of the creation of Gwaii Haanas and the agreement between Canada and the Haida Nation. It also pays respect to the Haidas who stood in the line at Athlii Gwaii (Lyell Island) to stop the logging. It marks a pivotal turning point for the Haida Nation asserting their authority over the land.

Vocabulary

Culture: the sum of attitudes, customs, and beliefs that distinguishes one group of people from another. Culture is transmitted, through language, material objects, ritual, institutions and art from one generation to the next.

Tradition: customs, beliefs, knowledge that is passed from one generation to the next.

Name:_____

9.1: First Nation Art

First Nation art is more than art. It...

- **Holds history**
- **Marks events**
- **Tells stories**

Additional Notes:

Both the chief's robe and the Gwaii Haanas pole are connected to the ocean. Use your own words to describe how these examples of Haida art are connected to the ocean.

How is art in the Haida Nation connected to culture and tradition?

List any symbolism or knowledge of the meaning of certain animals used in First Nation art from the film clips and other knowledge or research.

Lesson 10: Stewards of the Great Bear Sea

Overview: Students will reflect on their learning about the Great Bear Sea region, and consider what it means to be stewards of an area.

Subjects: Science, Art, Language Arts

Suggested Time: 5-7 classes (45-60 minutes)

Materials and Resources:

- Computer, projector and screen
- Lesson 10 Film Clips:
  - Intertidal Walk (10 mins)
  - Coastal Guardian Watchmen (12 mins)
- Teacher Background – Lesson 10
- 10.1: Watchmen and Stewardship
- 10.2: Game Criteria
- 10.3: Summative Assessment

Learning Objectives:

Students will:

1. Understand that marine planning is key to creating a sustainable future for all British Columbians.
2. Understand the value of traditional knowledge and how it contributes to culture and sustainability and planning for the future.
3. Explore the ideas of stewardship and leadership in planning for the future of marine resources and ecosystems in the Great Bear Sea.

Lesson Context

This lesson will allow students to reflect on their overall learning of some of the key themes presented in this unit and consider how to become stewards of the Great Bear Sea as well as thinking about being stewards in their own communities. Students will create a board game that highlights the collaboration to create the marine plans for the sub-regions in the Great Bear Sea. They will work to create a vision for the future through a board game that highlights various themes: the importance of the biodiversity of the Great Bear Sea, marine planning, traditional and local knowledge, collaborative science, sustainable resource management, sustainable economic development and stewardship. The students will understand that the plans are visions and the implementation of the plans are key to preserving the Great Bear Sea for future generations.

Learning Activities

Activity 1: Stewardship (45-60 minutes)

1. Ask the students what **stewardship** means to them. Record ideas on the board.
2. Watch the film clip **Intertidal Walk**.
3. Can anything be added or changed to their initial ideas about stewardship after watching the film clip? Add any new ideas to the board.
4. Review with the class how everyone can be a steward of Earth no matter where one lives. Brainstorm with the students ways to be stewards in their own communities.

Activity 2: Coastal Guardian Watchmen (45-60 minutes)

1. Watch the film clip **Coastal Guardian Watchmen**.
2. Discuss the role the Guardian Watchmen play in the Great Bear Sea. Some discussion points may include:
    - Guardian Watchmen are stewards.
    - Discuss how the Guardian Watchmen are stewards of both the land and sea.
    - Discuss how traditional and local knowledge help the Guardian Watchmen monitor and protect resources in the Great Bear Sea.
    - The role that Guardian Watchmen play in protecting traditional values and culture.
3. Use **10.1: Watchmen and Stewardship** to share with the students more about Watchmen and Stewardship in action as told by Doug Neasloss, Chief Councillor,

Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority.

4. Use a T-chart to brainstorm with the class threats to the Great Bear Sea and stewardship actions that are taking place in the Great Bear Sea region.
5. Inform the class that they will be making board games in small groups to represent stewardship in the Great Bear Sea. As a class, brainstorm ideas about what makes a game fun to play.

Activity 3: Designing A Board Game (45-60 minutes – 2-4 classes)

1. Divide the class into small groups and pass out the game criteria using **10.2: Game Criteria**. Review the criteria as a class and address any questions.
2. Provide the students with several classes to create the games.

Activity 4: Playing the Games (45-60 minutes)

1. Play the board games!

Extension Ideas

- Discuss how to be stewards in their own local area and how this stewardship role connects to the Great Bear Sea.
- Carry out direct stewardship actions in their local community such as a clean up, observing and checking on it, educating others about it, etc.

Assessment Ideas

- Formatively assess students' engagement in individual and group work as well as large group discussion.
- Using the game criteria, assess group games and rules.
- Summative assessment of the board game using **10.3: Summative Assessment**.

Teacher Background – Lesson 10

Everyone can be a steward of the Earth and everyone can make a difference. People live, work, visit and explore the Great Bear Sea. This ecosystem is important to many individuals for jobs and resources. Everyone can be part of the future plan to conserve the Great Bear Sea. People can conserve the Great Bear Sea by acting as stewards. Everyone can be a steward by taking care of their place by checking on it, observing it, picking up garbage, telling others about it and doing what they can. There are many little things that everyone can do to protect the Great Bear Sea no matter where you live. After all, everyone is living on one planet and all ecosystems are interconnected. There are many threats to the Great Bear Sea and marine plans are helping to conserve the Great Bear Sea for future generations.

Threats indicated in the film clip:	**Others threats:**	**Conservation efforts:**
• Poaching • Illegal fishing practices • Trophy Hunting • High impact tourism • Climate change • Over harvesting	• Development • Pollution • Oil Spills • Logging • Marine traffic • Etc.	• Marine Plans • Research • Traditional Ecological Knowledge • Ecotourism • Coastal Guardian Watchmen Program • Etc.

Coastal Guardian Watchmen

First Nations Guardian Watchmen have safeguarded the health of their territorial lands and waters on BC's coast since time immemorial. Today local Guardian Watchmen monitor the health of the plants and animals that have ecological and cultural importance to their communities. They also monitor the impacts of activities such as commercial and sport fishing, logging, and tourism.

Local Guardian Watchmen programs play a critical role in successful resource management by helping to implement land and marine use agreements and ensuring rules and regulations are followed in their territories.

The Coast Guardian Watchmen Network is an initiative of the Coastal First Nations Great Bear Initiative. Their video – *Eyes and Ears on the Land and Sea* – is provided in this lesson with permission. See their website for more information:
www.coastalguardianwatchmen.ca.

Vocabulary

Stewardship: taking care and being responsible for the environment by specifically managing resources within the ecosystem.

10.1: Watchmen and Stewardship

Doug Neasloss – *Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority*

This is a passage from an interview with Doug Neasloss sharing about the Watchmen program and stewardship.

Watchmen

"In my department alone, we started out close to 13-14 years ago, a Watchmen program, which is a monitoring program. We don't see a lot of monitoring efforts by other groups in our territory, so my community said we need to have a presence out in the water. We need to get out there, and have our Watchmen out in the field, monitoring and patrolling the territory but also collecting data. Our watchmen are out there collecting data on crab traps, prawn traps, boat sightings, bear sightings, whale populations, etc. They are out there for about 6 or 7 months out of the year, and they have to go through a bunch of training prior to becoming a watchman to know how to use a boat. You have to have good people skills and interact with all the different groups that come into the territory. Obviously you have to know the territory fairly well, and that's something we do training for with our Watchmen. You have to learn how to use things like GPS and a radio. It's a really neat job to get out there and monitor and patrol. Having a presence out there has been huge, and so that's one of the opportunities.

We also have science programs. Our community has invested quite heavily in some of the science. Right now our Stewardship Office is involved in rock fish, sea cucumber, and bear research. This year we're going to move into frogs, marbled murrelet, northern goshawk, mountain goats, and salmon research.

We try and encourage people to get out there. We run youth programs in our community. One of our programs that we run is called the "SEAS Program" and the intent of the SEAS Program is to connect youth to the outdoors and tie them to their culture. They can see it, they can feel it, and they know what the issues are. They know what's at risk and what they have to do to get out there and protect it. It is a bit scary because you have all these different commercial groups want to come in and cut it all down or fish it all out to make some money. On top of that we're dealing with things like global warming, and temperatures are getting warmer and warmer, and it's changing the way certain species come back to certain areas. I think there's a lot we have to do to really understand what's going on. I think everyone can play a role. There's a lot of things people can get involved it to help with some of these efforts.

But again, we want to make sure that we have all the information at our disposal so that we can go there with the strongest information and make solid decisions based on the best information available. That's pretty important that we can take our traditional ecological knowledge from our Elders, but also take the best available science and go and make decisions on things."

Stewardship

"I think things are starting to change, and I just look at all the areas where species or forests have all been wiped out. I think the more people that get involved in the stewardship, learn how to take responsibility, and have respect is key. It is something that is taught in all of our songs and our dances, our culture and our stories. I think if everyone had respect, this place would be a better place for all of us. I think we need to pass on to other young people that my Elders always say to us: What we have here is not ours. It doesn't belong to us. We're holding it for the next generation. I think that when we think of it like that, we want to make sure and take care of these areas so we have something to pass on. I think that's something that's really important. Have respect. Get involved. It's the best thing they can do.

I think it's really important for as many people as possible to get involved in the conservation efforts and the protection. I think one of the biggest things is just having a connection to certain areas. Get out there and do it, and I think people can play some really important roles. I always look at universities, colleges, even high schools, and think people have the potential, the opportunity to really do some really great work to help. This work could help with the protection, the conservation of a lot of these areas. I've talked to some students at universities that will do a paper and don't really know why they're doing it. I think if they were to focus their efforts and look at certain species or look at different areas, I think there's a lot that someone can do that can help, even if they're in a remote area."

10.2: Game Criteria

Stewards of Great Bear Sea Board Game

In class we discussed what makes a game fun and exciting to play. You will create a board game in small groups that represents being a steward of the Great Bear Sea. Remember your board game must be original and creative. You must work collaboratively with your group to create the game.

You must represent all four sub-regions of the Great Bear Sea:

- Central Coast
- Haida Gwaii
- North Coast
- North Vancouver Island

You must include the following ideas:

- The biodiversity of the Great Bear Sea – the plants and animals
- First Nations – traditional and local knowledge
- Collaborative science - research
- Different perspectives of the Great Bear Sea
- Marine plans and resource management
- Threats on the Great Bear Sea
- Careers in the Great Bear Sea
- Stewardship Roles

You must also produce game rules so that others can play your game and include all of the game pieces that you create. Don't forget to give your game a title!

Name:_____

10.3: Summative Assessment

	1 Not Meeting the criteria listed below; limited or no understanding and does not incorporate the ideas and concepts	2 Meeting the criteria listed below; has some understanding and incorporates the ideas and concepts	3 Fully meeting criteria listed below; clearly understands and incorporates the ideas and concepts
4 sub-regions of the Great Bear Sea	1	2	3
Biodiversity in the Great Bear Sea	1	2	3
First Nations – traditional and local knowledge	1	2	3
Collaborative science	1	2	3
Different perspectives	1	2	3
Marine plans and resource management	1	2	3
Includes Threats on the Great Bear Sea	1	2	3
Represents careers	1	2	3
Includes stewardship ideas	1	2	3
Game includes rules, game pieces and is creative!	1	2	3

TOTAL: /30

Comments:

_____

_____

_____

_____

Appendix A: Interview with Doug Neasloss

The following is an excerpt from an interview with Doug Neasloss, Chief Councillor, Kitasoo/Xai'xais Band Council & Resource Stewardship Director, Kitasoo/Xai'xais Integrated Resource Stewardship Authority. Doug shares some of the history of the First Nations in the Central Coast region of BC.

Doug: My name is Doug Neasloss. I am from a small community called Klemtu, which is right on the central coast of British Columbia, and it is home to the Kitasoo/Xai'xais Nation. I have a few different titles. I work as a Marine Planning Coordinator. I work as a Resource Stewardship Director, with land and marine stewardship and a whole bunch of other things that come out of that as well. I also work as the elected Chief of the community, and my background's mostly been in tourism for the last 14 years.

To me, I think, this is one of the most special areas in all of the coast. I think the Great Bear Rainforest is definitely a very special and unique area. A place that still has intact old growth forests. We live in the largest intact temperate rainforest on the planet. It's one of the last strongholds you'll get for bears and other wildlife that are in the region. And it's just full of life. And I think that's something that's really neat. It still has the aquatic resources. It still has a lot of the land animals and I think there's not too many places on the planet that have what we have here and that's what keeps me here.

Karen Meyer (Great Bear Sea film maker): Taking a look back, talk about things that had a really significant impact on First Nations.

Doug: I think there's been a bit of a rough past when it comes to First Nations, I mean, I think just not long ago, whether it's 150 years to 200 years there was nobody else here, it was just First Nations communities, you know, in my area here we have two different nations from Klemtu. We have the Kitasoo, who are Tsimshian and they're the southernmost Tsimshian group and lived on the islands and then we have the Xai'xais people who lived on the mainland and in both Nations moved in the Klemtu in the 1850's, but prior to that, people lived, you know, quite nomadic lifestyles, and they followed the food resources in all of these different areas. At the time our cultures were very complex. It wasn't just as simple as following food. People had very complex governance structures, they had very complex relationships with different families. We had clan systems that distinguished different family groups and who had access to different areas based on different seasons. So it was a really complex relationship.

Around 1884 the government at the time decided to ban the Potlatch, which was the Potlatch in our community, our culture was the glue that held everything together. The singing, the dancing, the storytelling, the governance, coming-of-age ceremonies, passing of chieftainship, passing of copper shields. All those things were really important in our culture and in our community. And people used to prepare years in advance for Potlatch. So if I was going to host a Potlatch, some people would prepare 4 or 5 years in advance. But the Canadian government wanted to assimilate First Nations people into

the mainstream society so at the time they banned the Potlatch in 1884 to 1951. And the same thing happened in other regions. In the U.S. it happened in 1884 to 1936. But 1884-1951 during the banning of the Potlatch, it was illegal to Potlatch. And if you were caught potlatching, you were arrested for doing that.

So at the time the government sent what they called the "Indian Agent," and it was a person up here to monitor the activities of the local communities. And so everyone was paranoid about potlatching. People didn't want to Potlatch. But it was such an integral part of our culture and our community, people decided to take it underground in a way and Potlatch in secret. So what people used to do is they used to take the regalia and put it in the cedar bentwood boxes to make it look like it was a burial box, but it was actually their storage area for all of their regalia. And they used to paddle out to this one place we call it Dis'Ju, and it's a gathering place for people. And this Big House is hidden in the forest, you can't tell it's there going by in the boat, and people used to paddle out there in the roughest times of the year to go and Potlatch, so the Indian Agent wouldn't follow them out there.

Unfortunately around the early 1900s, there were so many families that did not make it back. A lot of families died trying to go out and Potlatch in secret. So by the early 1900s Klemtu stopped potlatching altogether. And that was a huge loss for the culture. Again, because that was the glue that held everything together. And that was just, you know, one of the reasons why we, during that time, we lost a lot.

Karen: What are some of the key things that your Elders tell you about what life was like here pre-contact?

Doug: Yeah, I've sat down and had a lot of discussion with our Elders about life, and even, you know, we live in a pretty isolated area, so we didn't have actually a lot of contact until quite late. The first contact we had was actually Captain Vancouver. I believe that was in 1793, when he came up and it was what people, the Elders always talk about how nomadic the lifestyles were. They talked about the seasonal camps, and the permanent camps. They said the food harvest would start in the wintertime. It would start with the clams and cockles in the winter. And then early spring, around March, the halibut would start to come in and they would start harvesting halibut. And then once the halibut was finished, they would start to move over to the herring and the herring eggs. And that was huge. That was probably one of the most important foods in our community, because it wasn't just used for food consumption, but it was also used for trade. And there was a huge trade routes along the Coast amongst different families up and down the coast. So Klemtu used to harvest the herring eggs and trade it with the Bella Coola people [Nuxalk] and also the Kitamaat people [Haisla], and they used to trade for eulachon grease, and that was huge because we didn't have eulachons in Klemtu area, and then once that was finished, we'd move over to seaweed in May, and right after seaweed was finished then you would go on to salmon, in particular sockeye salmon, and then later on in the summer, late summer, you would start to get all the salmon, so the coho, pink, and chum would start to come in.

So people were very dependent on all of these resources, and especially because it was such an isolated community, those aquatic resources are extremely important because food costs here in the community are so expensive. People, you know, depended on those, and we had different camps based on different things. Like Marvin Island is a herring camp. People just went there to go and harvest herring eggs. And while they were there, they would dry the herring eggs, they would dry the halibut, because a long time ago there were no refrigerators or freezers, so they would dry everything. Everything was sun dried. Or they would smoke it. And that's how they'd preserve things.

We've watched a lot of those resources dwindle over the last number of years. Partly because of mismanagement, and people coming in and harvesting too much. And, you know, in my lifetime, we've witnessed huge declines. Everything from abalone. Abalone used to be a once abundant shellfish in our territories. And the Elders talk about it … that in some areas they said you couldn't even touch the ground there was so many abalone. They were all over the place. Today, you probably will never see an abalone. In my lifetime I've never actually tried an abalone in the last probably 20-something years now because they've all just been wiped out. You know, the commercial fishery came in and harvested way too many and they just haven't been able to come back in numbers. With things like abalone you need large numbers because they're broadcast spawners and so the population just hasn't been able to come back and do that.

Same thing with salmon. I listen to the historical numbers of salmon. Some of the Elders will say some of the rivers and the estuaries would be full of salmon. They said some rivers were just plugged wall to wall with salmon. And I looked at the historical numbers of them, and there were about 80,000 fish in some of those systems. Today, we are down to about 5 or 6 thousand in some of those same rivers.

So, you know, I think there's been way too much over harvesting. I think with things like global warming, there's a number of different impacts that are effecting salmon. So, I think we have a long way to go.

Karen: What happened as a result of banning of Potlatches and other events, post-contact?

Doug: Well, I think the loss of culture during the ban of the Potlatch, I mean that was huge. I mean we had, you know, very strict ceremonies for different seasons. The return of salmon. The return of eulachons. The return of herring. The return of all these separate things were celebrated in a way, but also it was a ceremony to let the community know what time of the year it was, and food harvesting, I think there was traditional stories that were lost during that time and traditional stories that taught lessons of respect for certain resources and you know I think the governance structure, I think there was a lot that was lost, you know, songs and dances, and songs in our culture was a way of documenting an event, you know, that was going on so it wasn't just a simple song it had some meaning to it, and it came from a certain area, and it belonged to a certain family.

The passing of chieftainship. You know we have a very complex hereditary chief system in our community. So hereditary chiefs, you weren't just born a hereditary chief, you were groomed to be a chief, and you know the rule of the hereditary chief is you're there to steward, you had a responsibility to take care of a certain area, and so if you were a chief you would carry title to a certain inlet, or a certain estuary, and it was your responsibility to make sure that what was going on there was sustainable and "chief" in our language means "to serve." It means that you're there to maintain order of a house. So we had chiefs that had … they're responsible for a Raven House. And that house, they had to make sure people were keeping the songs alive, keeping the stories alive. You know, harvesting the different berries, or harvesting deer, and salmon, and things that hunters and gatherers harvested.

But they would also grant permissions to certain people to access certain areas, and that was all based on sustainability. So you had to make sure that the stocks were there, and if they weren't there, they would deny access to certain areas.

And we also had very complex arranged marriages as well, so if you wanted to access an area, today people just go on there and fish in an area. A long time ago it wasn't like that. You had to get very strict permission or it was often done through arranged marriage. So, if I was a chief and I wanted to access some else's area, you'd do an arranged marriage, and I would have access to their salmon, they would have access to my berries. So it wasn't just anybody that could go in. And that could get you in big trouble, I think, a long time ago if you just waltzed in there today and go and access certain areas. So I think that system, the hereditary system they used, a lot of that was lost during that time. Luckily we do have some Elders that still have some of that knowledge.

You know, I think the appetite of the time was really to assimilate First Nations people to mainstream society. And it started off with the governments and the church at the time banning things like the Potlatch and I guess just before the Potlatch, disease ran fairly rampant in our communities in around the 1860s.

I think at the time there was this huge movement to assimilate First Nations people into the mainstream society, so banning the Potlatch was a huge step in terms of trying to assimilate and get First Nations people to forget their culture, but prior to the banning of the Potlatch came disease. So disease ran rampant in all of our communities and we estimated we had a population of about 3,500 to 4,000 people out in Kitasoo Bay alone and disease swept through there around the 1860s and there was a smallpox epidemic that killed off quite a bit of the communities. In some cases it was like 99% of the communities. So we have some stories where one or two people survived the smallpox epidemic. Also around 1913, there was also the flu epidemic as well, and that decimated, again, quite large populations. I heard stories from our Elders where so many people died that they didn't really have time to give them a proper burial. It was just dig a big hole, put them in the ground, and hopefully you don't get sick. So I think those introduction of diseases played a huge role and a lot was lost.

So not just did we have to deal with smallpox and the flu epidemic, and the banning of the

Potlatch. Communities were still around in the early 1900s so the government started to introduce Reserve systems. They started to take First Nations nomadic people and started to push them all to these small parcels of Reserve and basically said "You're not going to live in these areas anymore." And they sort of pushed these people into small little blocks. So, my community was settled here in Klemtu and this is about 100 acres here in the community. It's not very big, but our community, our territory is massive because we followed all the foods and that's what our territory is based on today.

You know, unfortunately, now if you look at our system now, we only have about, we have less that 1% of our land base, if you were to go by their reserve system today. Although my people have always said they never signed a treaty. They've never surrendered rights and titles, so they've always said "this is theirs" and it's based on the chieftainship that's there.

So, it wasn't just all of those things – disease, the banning of the Potlatch. Another major event was residential schools. In the 1930s the government created these residential schools and basically, you know, we have some of the literature from the churches that said the banning of the Potlatch wasn't working – people were still speaking the language, people were still practicing their culture, whether that was being done in secret. So they needed some ways to really try and get people to forget their culture, forget their language, and become, to be assimilated into mainstream society, so the idea of residential schools was created.

There were boats that came into the community in the early 1930s and basically scooped up all the kids in the community and people had no choice, and they had to go and they were taken on the boats and they were taken out to schools, and they were spread out all over. A lot of people from Klemtu went down to Vancouver Island. And around Alert Bay area. Some people went down to Port Alberni. Some people from Klemtu went as far over as Edmonton in the 1930s. Some people went to Vancouver, to the mission school that was there. And the idea was to separate young people from their parents so that oral tradition wasn't passed on. And people, if you listen to the Elders who have gone through these residential schools, they were strapped for speaking their language. They had to cut their hair a certain way. The food quality wasn't good and there was a lot of other things that went on in the background that were not the best things to happen to young kids. And that really changed a whole generation of kids, because now you take a bunch of kids, you put them in these residential schools so that that love you get from your parents was not passed on throughout families and that had a trickle down generation, we still feel the effects today of that generation because some parents grew up without the parenting skills that you would learn from your parents.

Some people grew up with no love and that really affected households, families and communities, and so I think it's my generation, kind of the first generation, that are fortunate and hasn't had to deal with all of that stuff now, and I think things are a bit different today than they were back then. So I think you're going to start to see a bit of a resurgence of stewardship and I think you're going to get this new generation that's

going to come up and start to reassert their stewardship responsibilities, reassert their authority as hereditary chiefs, as owners, or stewards of the land. And I think that's something that we want to be able to work with provincial and federal governments. And we want to stop the mismanagement of these resources and we want to work together and somehow come out with some sort of strategy to best take care of these areas.

Appendix B: Indigenous Knowledge

The following is an excerpt from:

Source: Science First Peoples Teacher Resource Guide © 2016, First Nations Education Steering Committee and First Nations Schools Association. Used with permission from the First Nations Education Steering Committee Society.

The full resource can be found at www.fnesc.ca.

Indigenous Knowledge

What is Indigenous knowledge, and how can it be brought into science classes? This section looks at important concepts in understanding Indigenous knowledge, the importance of Interconnectedness, Sense of Place, Language, Place Names, Story and Traditional Ecological Knowledge.

Interconnectedness

First Peoples are diverse, and the unique knowledge each group holds is part of their individual worldviews. However, they share a common belief that we are all connected to nature and to each other. This notion that we are all connected with everything in the world is expressed by many First Peoples in the phrase "All my relations."

Inherent in this view of the world is the understanding that everything in the universe has a place there and deserves respect. From this vantage point, people view their relations with others as well as the natural world differently than someone who only sees it through a microscope or telescope.

Sense of Place

Connection with place, with the land, is the foundation of Indigenous Knowledge. This means that each Indigenous group holds unique world views, technologies and pedagogies according to their environment and territories. Indigenous knowledge, passed on through the generations, was essential for survival. Survival for First Peoples depended on and depends on their particular knowledge of the land, their unique relationship with the environment, and their shared values and practices through which they made sense of the world.

The concept of Place goes far beyond the physical space. It includes a crucial Sense of Place, the memories, emotions, histories, spiritualities that bind the people to the land.

Five concepts of place have been identified, common to most First Peoples[1]:

- Place is multidimensional. More than the geographical space, it also holds cultural, emotional and spiritual spaces which cannot be divided into parts.
- Place is a relationship. All life is interrelated.

1 Adapted from Michell et al., *Learning Indigenous Science From Place*, p. 27-28.

- Place is experiential. Experiences a person has on the land give it meaning.
- Place is local. While there are commonalities, each First Nation has a unique, local understanding of Place.
- Place is land-based. Land is interconnected and essential to all aspects of culture.

Making connections with place in science curricula is an integral part of bringing Indigenous science into the classroom. That means including experiential learning in local natural and cultural situations.

Language

Language is the vessel that contains Indigenous knowledge. Understanding is embedded in language, and knowledge is structured and transmitted through language. Learning through oral language is part of its experiential nature.

Through the processes of colonization, First Nations languages have undergone attack. Most communities suffered significant language loss, and one of the results of the loss of language is the loss of knowledge. As well, learning has moved from the oral to the written.

Some languages face extinction, but others are experiencing renewal. People are working to revitalize languages which in turn will serve to keep traditional knowledge alive.

Like most languages, strong Indigenous languages continue to grow and sometimes new words have been added to the language for contemporary objects. For example, in the Ts'msyen language Sm'algyax, the word flashlight is *laawksm ts'amti* (light lightning or lightning from a light). In Tsilhqot'in, the word for helicopter is *betŝit'ay naghedalt'ex* (Something that has something spinning on top of it.)

Incorporating traditional languages into experiential science activities wherever possible is an important part of bringing Indigenous Science into the classroom. There may be local community language resources in the school or community to support this. An online source that students can access is firstvoices.com which gives students searchable vocabularies in many of BC's diverse First Nations languages.

Place Names

Traditional place names provide information about First Peoples and their relationship with the land. Traditional knowledge is often embedded in place names. Paying attention to the name of places in traditional territories can lead to a wealth of information about local ecosystems, land use or plant and animal behaviour.

Many First Nations communities have documented the traditional place names of their traditional territories and they may be available as a classroom resource. However, some place names may be considered private and to be used only by community members.

Story

Story is one of the main methods of traditional Indigenous learning and teaching. Combining story and experience is a powerful strategy that has always been used by First Peoples, and its power can also be brought to the science classroom.

Stories enable holistic learning. They meld values, concepts, protocol, practices and facts into a narrative. They also develop important skills of listening and thinking.

Story can be an important part of the science curriculum. Oral storytelling can be incorporated by inviting First Nations storytellers into the class, or the teacher can read a written version of a traditional story where appropriate. Reading published stories that are relevant to the science class can integrate with English Language Arts, or where First Nations languages are taught.

Traditional Ecological Knowledge

Traditional Ecological Knowledge, or TEK, is the most popular term to denote the vast local knowledge First Peoples have about the natural world found in their traditional environment. As with the definition of science, there are differing meanings of TEK. Sometimes the term is expanded as Traditional Ecological Knowledge and Wisdom. Other terms used are Aboriginal Traditional Knowledge, Naturalized Knowledge Systems, local knowledge, and Indigenous Knowledge. Some view TEK as a construct of other contemporary sciences. Others fear the word “traditional” suggests the knowledge is stuck in the past, where in fact it is dynamic and continually being renewed.

TEK is widely used in biological and environmental sciences, and is largely considered to be complimentary to, and equivalent with, Western scientific knowledge. The environmental knowledge of generations is important to fields such as resource management, climate change and sustainability. For example, at the federal level, an ATK subcommittee reports to the Committee on the Status of Endangered Wildlife in Canada which make recommendations to the Minister based on TEK in their own local regions on species that may need to be listed.

TEK is, above all, local knowledge based in people’s relationship to place. It is also holistic, not subject to the segmentation of contemporary science. Knowledge about a specific plant may include understanding its life cycle, its spiritual connections, its relationship to the seasons and with other plants and animals in its ecosystem, as well as its uses and its stories.

It is important to recognize that TEK is the intellectual property of the First Nations who hold it. Many people share much of their knowledge with others, but there is other knowledge and wisdom that is considered private and is not shared.