Metlakatla

CEM

CUMULATIVE EFFECTS MANAGEMENT

Methods, Results, and Future Direction of a First Nation-led CEM Program

NOVEMBER 2019

ACKNOWLEDGEMENTS

The Metlakatla Cumulative Effects Management (CEM) Program is made possible by the leadership and staff of the Metlakatla First Nation and the generosity of the Metlakatla people. The program is co-funded by Metlakatla Stewardship Society (MSS), Metlakatla Development Corporation and Metlakatla Governing Council in partnership with MITACS. MITACS is a national, not-for-profit organization that has designed and delivered research and training programs in Canada for 20 years. The program is co-managed by Taylor Zeeg (initially with Compass Resource Management and subsequently, Tributary Project Services Ltd.) and Katerina Kwon (Simon Fraser University's School of Resource and Environmental Management; SFU REM). The collaboration with MITACs was made possible by Dr. Tom Gunton and Dr. Murray Rutherford of SFU REM and Ross Wilson and Anna Usborne of MSS. Dr. Gunton and Dr. Rutherford provide academic supervision to the numerous graduate students participating in community-based research in support of the CEM Program. Profiles of the SFU graduate students that supported the Metlakatla CEM Program are found on pages 62 and 63. The CEM Program recognizes and thanks Proponents who have carried out assessments or are operating within Metlakatla Territory for providing funding to support the ongoing development of this program. The Synopsis is funded through a contribution from Crown-Indigenous Relations and Northern Affairs Canada and its emerging Indigenous Centre for Cumulative Effects.

DOCUMENT PURPOSE

The CEM Synopsis is intended to:

1. Effectively communicate successes and challenges of the Metlakatla CEM Program
2. Continue to inform the Metlakatla membership about CEM activities
3. Guide other Indigenous, NGO and government groups on techniques and practices for developing and implementing a CEM Program
4. Contribute to growing knowledge and research on cumulative effects

CONTACT INFORMATION

For more information on the Metlakatla CEM Program, please visit www.MetlakatlaCEM.ca

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STATEMENT OF LIMITATIONS

This report was prepared by Taylor Zeeg and Katerina Kwon on behalf of Metlakatla Stewardship Society. This document represents the best professional judgment of the authors, based on the information available at the time of its completion and as appropriate for the intention of the Synopsis. The Synopsis is intended as a communication and extension tool of the CEM Program, and not intended as peer-reviewed academic literature, though many of the underlying ideas in the Synopsis are derived from and hopefully contribute to the growing body of CEM literature and CEM implementation at the community level.

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smaller (top left): Metlakatla First Nation
(top right and bottom): Lonnie Wishart
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Message from the Chief

Metlakatla Chief Harold Leighton

In 2014, during the Liquefied Natural Gas gold rush experienced on BC's North Coast, Metlakatla leadership started asking questions about the full extent of benefits and impacts to its lands and people as a result of major development. Metlakatla supports development, but not at the expense of our lands and waters and culture. We learned about cumulative effects and knew it was important to address, we just weren't sure how. So, we gave Metlakatla Stewardship Society a mandate to pursue cumulative effects management and asked them to not only assess cumulative effects, but also manage them. Five years later, we have a successful Cumulative Effects Management Program that supports our planning and decision making efforts. It was always our intent to share what we learned, and it is our hope that this Synopsis will be of use to other Indigenous groups wanting to undertake cumulative effects management.

Story of Metlakatla

Metlakatla First Nation

Metlakatla is a progressive Tsimshian community located in a highly productive environment near Prince Rupert, British Columbia. Metlakatla means ‘saltwater pass’ in Sm’algyax, the language of the Coast Ts’msyen (Tsimshian). Today, Metlakatla members continue to enjoy their inherent rights and freedom to harvest traditional foods, practice traditional ceremonies, and honour their history.

Photo: Metlakatla First Nation

Metlakatla History

Metlakatla people are proud of their Tsimshian history and culture. Metlakatla people are descendants of the nine tribes of the Coastal Tsimshian. The Nine Tribes each owned and occupied winter villages in the Prince Rupert Harbour and along Metlakatla Pass. Metlakatla Village is located on an ancient village site and has been occupied for thousands of years by the Metlakatla people.

Metlakatla Territory and the Seasonal Round

Metlakatla Territory is a vibrant and diverse area comprised of 20,000 square kilometres in the Great Bear Rainforest. The Territory includes the ancestral lands and waters held by the nine tribes of the Coast Tsimshian. The Metlakatla people have occupied, accessed, and used these lands and waters for subsistence, trade and barter, economic, cultural, social, and ceremonial purposes.

Metlakatla Territory is characterized by temperate coniferous forests, bordered by rugged coastal mountains to the east and the Pacific Ocean to the west. The Territory includes parts of the Skeena and Nass River systems, numerous islands, and extensive intertidal and wetland areas. The deep ocean valleys found in this region create unique and varied bottom topography. The marine and foreshore areas in their territory provided and continue to provide the Metlakatla with diverse and abundant resources.

The Coast Tsimshian have always enjoyed a productive ecosystem that provided a consistent supply of resources. The annual subsistence pattern, or seasonal round, entails many activities, including as examples: eulachon fishing on the Skeena and Nass Rivers during early Spring; harvesting of seaweed, herring roe-on-kelp, salmon, and other marine species from May to mid-Autumn; and settling at winter villages to process and preserve the summer's catch, hold feasts, and harvest shellfish, fish, and land-based mammals through late Autumn and the Winter. Many Metlakatla families carry on this seasonal round of harvesting activities today.

Metlakatla Government

The Metlakatla Governing Council (MGC) solely manages approximately 3,439 hectares of land on 10 Reserves under the Metlakatla First Nation Land Code. MGC also manages approximately 4,302 hectares of land on 11 Shared Reserves with the Lax Kw'alaams Band under the Indian Act. As of May 2018, Metlakatla had a population of 985 members, with 90 members residing on-reserve in Metlakatla Village, 370 members living in Prince Rupert and other areas in the Territory, and the remainder outside of Metlakatla Territory.

The MGC is the representative government for the Metlakatla membership. The Governing Council is comprised of an elected chief and six councillors. Council functions as the governing unit of the band and as an administrator of social services. MGC established the Metlakatla Stewardship Society and the Metlakatla Development Corporation as separate entities to carry out stewardship and economic development mandates, respectively. Currently in stage 5 of 6 of the BC Treaty Process, Metlakatla First Nation is committed to achieving self-governance of its lands and people.

Photos: Metlakatla First Nation

Starting Out

"What are the combined impacts of the proposed development on our territory and people? What are we doing to understand and manage those impacts?"
– Metlakatla Leadership, 2014

Metlakatla CEM Program

The Metlakatla CEM Program is a resource management system for monitoring the status of priority Metlakatla values and responding proactively to cumulative change in Metlakatla Territory over time. The goal of the CEM Program is to manage and improve the condition of priority Metlakatla values.

The Metlakatla CEM Program includes many interconnected values. Trade-offs are an integral component of the CEM Program. In certain situations, Metlakatla might be willing to accept a level of cumulative change in one value if it means another connected value is improved.

Photo: Lonnie Wishart

Photo: Metlakatla First Nation

Forming the CEM Team

Metlakatla Stewardship Society organized a team of staff, consultants, and university researchers to begin what is now the Metlakatla CEM Program, 5 years and running. The three key groups needed to establish a program similar to the Metlakatla CEM Program are: an innovative and open First Nation community partner, community-based research capacity, and content expertise. For the Metlakatla CEM Program, forming a research partnership between the Metlakatla First Nation and Simon Fraser University was important to the continued success of the program.

Metlakatla CEM

Metlakatla First Nation

The active participation of Metlakatla organizations and community members is the foundation of the CEM Program. The CEM Program was enabled beyond the mandate of any one Metlakatla organization, allowing the team to explore a broad range of Metlakatla values and to find equally broad solutions.

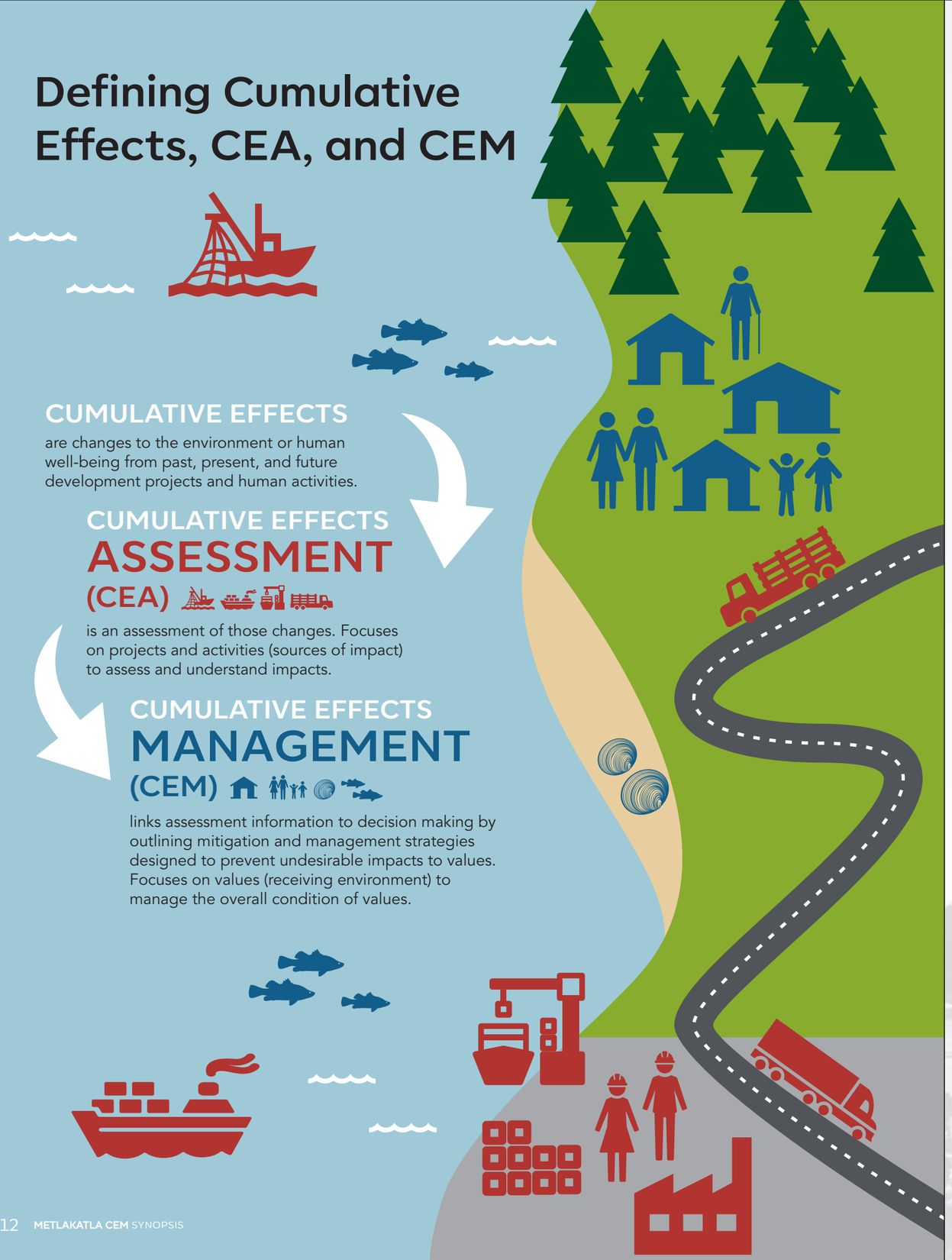
Research Capacity

SFU researchers and graduate students from the School of Resource and Environmental Management provide valuable capacity, skills, and a readiness to tackle unique challenges of the Metlakatla CEM Program. SFU participation started as community-based research support but evolved to more of a program co-management role through the participation of Katerina Kwon, a SFU PhD student.

Cumulative Effects and Decision Analysis Expertise

Compass Resource Management was engaged early in the program's development to work closely with the community and university researchers to develop a framework and manage the value and indicator prioritization process.

Defining Cumulative Effects, CEA, and CEM



CUMULATIVE EFFECTS

are changes to the environment or human well-being from past, present, and future development projects and human activities.

CUMULATIVE EFFECTS ASSESSMENT (CEA)

is an assessment of those changes. Focuses on projects and activities (sources of impact) to assess and understand impacts.

CUMULATIVE EFFECTS MANAGEMENT (CEM)

links assessment information to decision making by outlining mitigation and management strategies designed to prevent undesirable impacts to values. Focuses on values (receiving environment) to manage the overall condition of values.

Guiding Principles of the Metlakatla CEM Program

The CEM Program must be **CULTURALLY RELEVANT.**

The Metlakatla worldview is a unique expression of Metlakatla culture. A culturally relevant CEM Program will incorporate that worldview into methods to ensure a culturally appropriate outcome.

CEM is **A PROGRAM NOT A PROJECT.**

There are many Metlakatla values, and those values can change over time, as can the development context. As a result, the CEM Program is designed to be long-term and iterative, with multiple opportunities for critical reflection and improvements.

INTERNAL AND EXTERNAL COLLABORATION is necessary to manage priority Metlakatla values.

Cooperation among Metlakatla departments results in more informed decision making. Collaboration with other orders of government and First Nations can help increase awareness of impacts and lead to better management. CEM will strive to pool resources among implementation partners to increase the long-term success of the program.

LEARNING MESSAGE:

When we began, there was limited work being done on cumulative effects on BC's North Coast, little guidance on undertaking CEM in an Indigenous context, and very few examples of addressing cumulative effects on cultural, health, and socioeconomic values (in contrast to the large body of work available on environmental values). What we lacked in available guidance, we made up for in a willingness to begin the work, remain engaged with the community, and develop strategies to navigate uncertainty. Many of the lessons we learned through the Metlakatla CEM experience came from starting the work and trying things out.

Photo: Metlakatla First Nation

“Made for Metlakatla” Framework

The Metlakatla CEM Program is a First Nation-led resource management tool uniquely designed to support Metlakatla First Nation decision making and the needs of Metlakatla people. Metlakatla values, ethics, and principles are taught by Metlakatla Elders and history, and guide how the CEM Program is developed and conducted. Guidance on cumulative effects methods developed through research and various initiatives over the past 20 years also informed the Metlakatla CEM Program framework and its methods.

Photo: Lonnie Wishart

Upon initiating CEM, the first question we asked is “How will CEM information be used?” Understanding the way in which CEM outcomes could inform other Metlakatla initiatives was instructive for the project team. The illustration below shows at a conceptual level how activities in the Metlakatla Territory are filtered through the CEM Program to inform decision making in several areas.

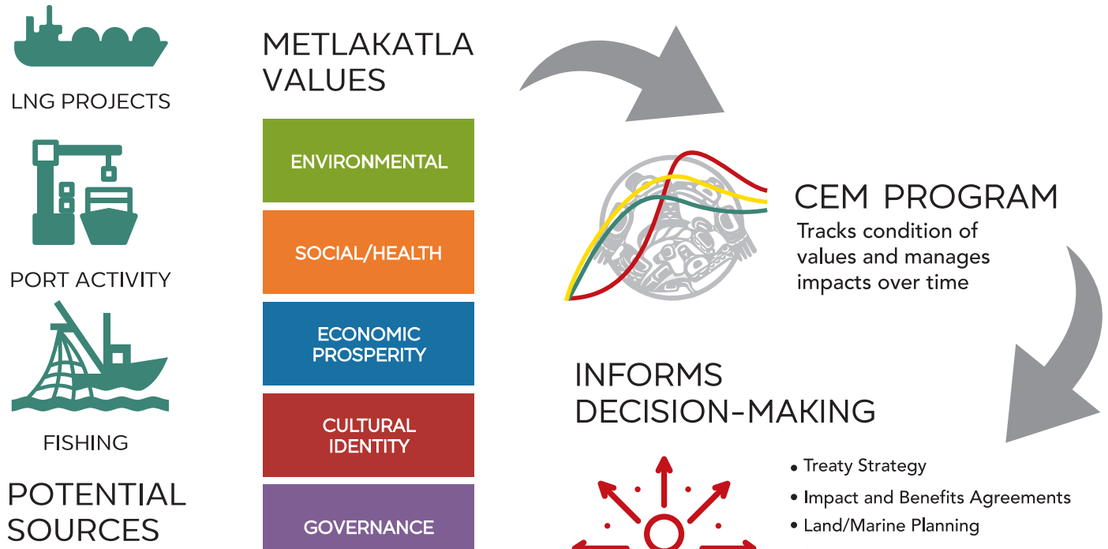


Photo: Lonnie Wishart

CEM Framework Cornerstones

The CEM Program is
VALUE-FOCUSED

Metlakatla values are the foundation of the CEM Program. Most project-level environmental assessments and cumulative effects frameworks focus on stressors, the sources of impacts, rather than values, the receiver of impacts. Knowing that the development context will change, a focus on values ensures that the CEM Program stays relevant and consistent. In addition, values, not stressors, are the most direct expression of Metlakatla priorities and concerns.

The CEM Program is
IMPLEMENTABLE

To be useful as a resource management tool, CEM methods and outcomes have to be practical and within Metlakatla's ability to implement. Sources of implementation capacity can be internal (e.g., from within Metlakatla departments) or external (e.g., through partnerships).

The CEM Program is
INTERDISCIPLINARY

Priority values will span cultural, environmental, social/health, economic, and governance pillars. The program will draw from a diverse body of resource management, planning, and policy guidance and experts and incorporate Metlakatla's traditional and local knowledge. The program will seek out ways to bridge gaps in knowledge and capacity across disciplines within and external to Metlakatla.

The CEM Program
EMBRACES UNCERTAINTY

There is no blueprint for undertaking this work. There is often a lack of baseline data. The development context is always changing. Embracing uncertainty is a necessary attitude for overcoming obstacles and achieving practical outcomes. Whenever facing uncertainty, we refer back to core guidance for this program: how can we best inform decision making; how can we best align with Metlakatla's cultural values; how can we best be consistent with methods recognized by other CEM practitioners?

Photo: Metlakatla First Nation

Summary of Methods and Frameworks

PHASE 1 2014 – 2015

What does Metlakatla care about and want to manage?

Phase 1 was led by Compass Resource Management as an expert resource to Metlakatla Stewardship Society with research support from SFU. Through community-based research on values and indicators, Metlakatla identified 10 priority values and chose 4 as pilot values: Food, Social, and Ceremonial (FSC) Activity, Housing, Butter Clam, and Employment.

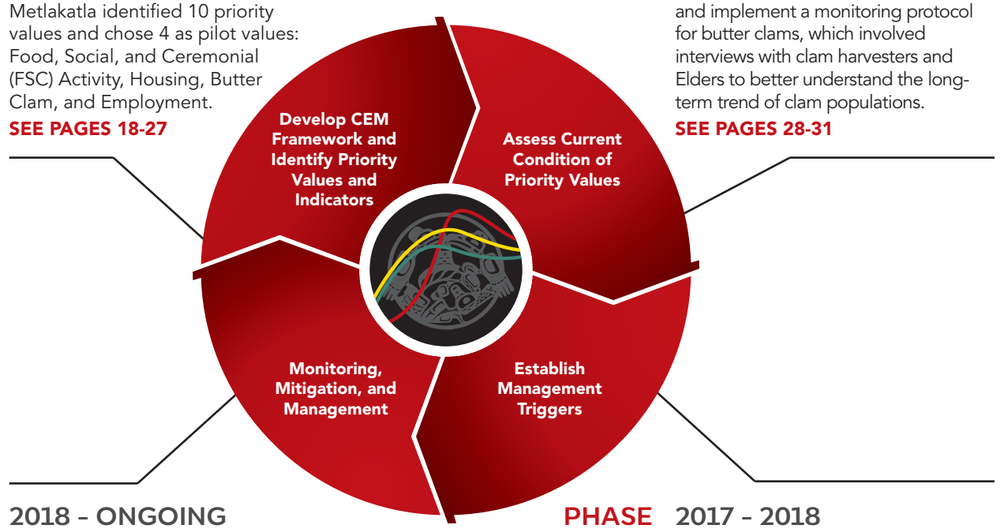
SEE PAGES 18-27

PHASE 2 2015 – ONGOING

What is the condition of Metlakatla values?

SFU increased its role by building on previous work to design and administer the Metlakatla Membership Census to collect much-needed baseline data on socio-economic values. SFU researchers consulted with clam experts to design and implement a monitoring protocol for butter clams, which involved interviews with clam harvesters and Elders to better understand the long-term trend of clam populations.

SEE PAGES 28-31



PHASE 4 2018 – ONGOING

How does Metlakatla take action to manage values?

At time of publication, several initiatives are currently underway to monitor, manage, and mitigate cumulative effects for pilot values. A governance component has also been initiated that examines how CEM results can be extended to environmental assessment, land/marine use planning, and the Metlakatla treaty process.

SEE PAGES 56-59

PHASE 3 2017 – 2018

When do we start getting worried about values and decide to act?

Management triggers are a series of markers that reflect increasing levels of concern about the condition of a value. The triggers mark the points at which new or more intensive management actions are taken to restore or improve the condition of the value. We decided to use the structured decision-making process with a Metlakatla member-based working group to set management triggers for 3 pilot values.

SEE PAGES 32-39

LEARNING MESSAGE:
It was very important for CEM personnel to have a presence in the community to better understand the community's interests, work closely with staff and leadership, and better appreciate the development context.

Rooted in Metlakatla Values

The Metlakatla CEM Program is built upon 5 value pillars, equally weighted in terms of importance to ensure a holistic approach and to recognize the interdependency among pillars.

Photo: Metlakatla First Nation

Priority Values

The process for identifying priority values is shown on the next page. The result of that process was the identification of 20 candidate values, the selection of 10 priority values, 4 of which became the focus of a pilot project.

ENVIRONMENTAL
Lax̲ Yuubm

BUTTER CLAM (PILOT VALUE) Butter clams are large, hardshell clams generally found in the lower intertidal zone. They are an important historical, traditional, and cultural resource for Metlakatla.

CHINOOK SALMON Chinook salmon are the largest of the seven Pacific salmon species. They are an important cultural, traditional, and commercial resource for Metlakatla and a good indicator of estuary health

ECONOMIC PROSPERITY
sagayt gat lledm

EMPLOYMENT (PILOT VALUE) The ability of Metlakatla individuals to earn income to be self-sufficient. A core indicator for economic development.

WEALTH DISTRIBUTION The degree to which wealth is distributed among Metlakatla people. A measure of economic and social disparity.

SOCIAL/HEALTH
Yugyetk

HOUSING (PILOT VALUE) Housing that is affordable, in good condition, and not overcrowded is important for the overall health and well-being of Metlakatla members. Rental housing in Prince Rupert is under pressure from development activity.

CHRONIC HEALTH CONDITIONS Linked to overall physical, mental, and spiritual well-being of Metlakatla individuals. Focused on Diabetes (Type 2) and Hypertension.

ACCESS TO HEALTH SERVICES Access to primary health care services, notably hospital emergency services, is important for the overall health and well-being of Metlakatla members. Health care capacity is strained in Prince Rupert.

PERSONAL SAFETY Metlakatla individuals' actual and perceived degree of safety.

CULTURAL IDENTITY
Łooda Goo Wilaaym

FOOD, SOCIAL, AND CEREMONIAL (FSC) ACTIVITY (PILOT VALUE) Harvesting, gathering, processing, and preparing of any traditional foods and materials. An indicator of the resilience of Metlakatla culture across generations.

GOVERNANCE
Int Ałbaga̲n Kwduunm

ABILITY TO STEWARD The ability of the Metlakatla to manage lands, waters, and resources within Metlakatla Territory.

DEFINITION:

In simplest terms, values are the things people care about and want to protect or restore. Values are important to the overall well-being of individuals, communities, economies, and ecosystems. Examples are Pacific salmon, housing, and employment. In the CEM Program, we use the term "values" instead of "valued components" because CEM is applicable beyond environmental assessment and very few people outside of the environmental assessment sector refer to values as valued components.

Identifying and Selecting Values

We followed six steps to select and identify priority values in the Metlakatla CEM Program. An example from the environmental pillar is provided below.

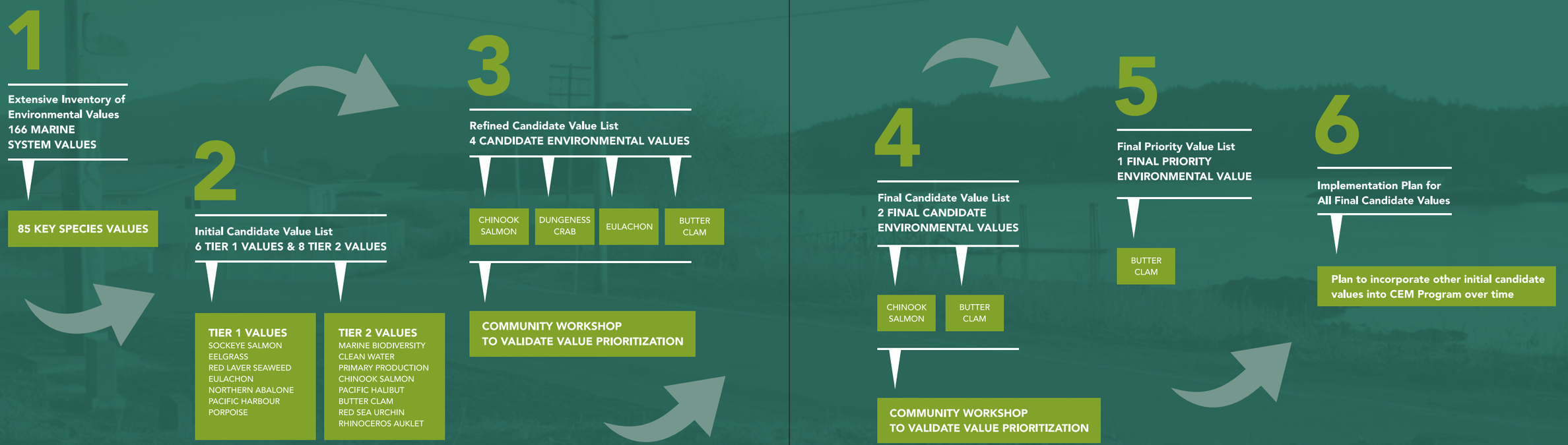


Photo: Metlakatla First Nation

Building a Comprehensive Values Inventory (Step 1):

Review all relevant documents to identify a long list of Metlakatla values for each pillar. A value was included if it was referred to as a value or management priority or frequently emphasized as important to the Metlakatla.

Well-defined Criteria for Selecting Values (Step 2):

Selection criteria provide clear and justifiable rationale for narrowing the long list to a candidate values list. For example, in the environmental pillar:

1. Does the value hold traditional importance to the Metlakatla First Nation?
2. Is the value sensitive to current and future development and other activities?
3. Are there responsive, measurable, and practical indicators for tracking the value's condition?
4. Is the value representative of important habitats?
5. Does the value hold an important role in the ecosystem?
6. Are there species at risk considerations associated with this value?

Working with Experts (Step 3):

Interviews with subject matter experts were an important part of the value selection method. The experts advised how the list of candidate values could be improved, whether selected values were appropriate, and whether the values overlapped with each other.

Community Workshop to Validate Value Prioritization (Steps 3 and 4):

We held two workshops with Metlakatla leadership, managers, staff, and community members. The workshops brought together Metlakatla decision-makers to review, discuss, and confirm the priority values and to confirm we were on the right path. Having representation from all Metlakatla departments ensured that a broad range of values and priorities were reflected in the final choice of values. The keys to success were open dialogue and a willingness to work through differing opinions, coupled with good facilitation and clear presentation of the best available information.

Selecting Priority and Pilot Values (Steps 4 and 5):

A critical part of the value selection process was an explicit consideration of real-world implementation constraints (costs and capacity). Metlakatla identified 4 values as the focus of a pilot project using the following implementation criteria:

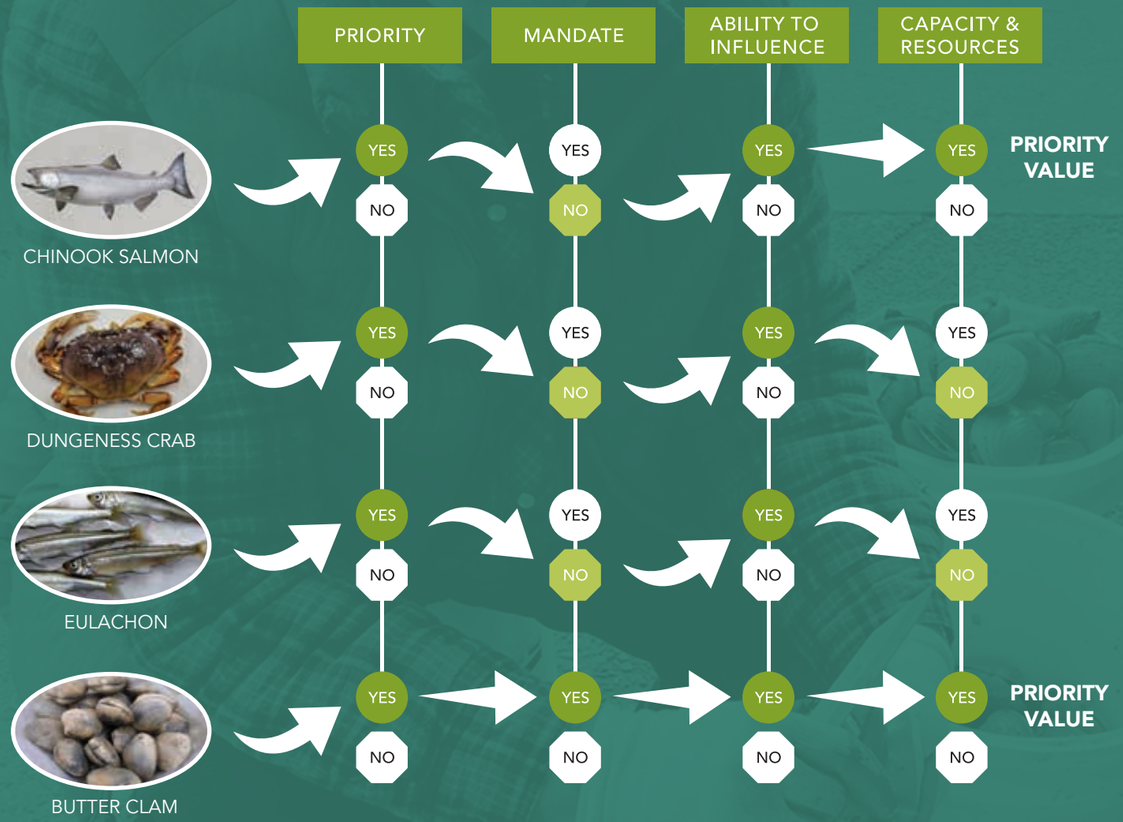
1. Is the value a **priority** given the current development context and current perceived condition of that value?
2. Does Metlakatla have an existing **mandate** to manage and effect change for this value?
3. If the Metlakatla does not have an existing mandate, do they have the **ability to influence** change for this value, particularly through partnerships?
4. Does Metlakatla have the **capacity** to implement a monitoring and management program for this value? If not, are there available data for this value that can be monitored by the Metlakatla?

Growing the CEM Program to Include More Values (Step 6):

The four priority pilot values do not represent the full extent of Metlakatla's priorities and values. An implementation plan will be developed to incorporate the other initial candidate values into the CEM Program.

Photo: Metlakatla Development Corporation

The illustration below shows how the implementation criteria (Steps 4 and 5) guided our thought process for identifying two priority environmental values (chinook salmon and butter clam) and subsequently, one pilot value (butter clam). A similar exercise was undertaken to identify priority and pilot values for cultural, social/health, economic, and governance values.



Note about Future Development Scenarios:
Understanding the current and future development context for the region was considered in several steps in the values selection process. More information can be found on page 27 in the "Measuring Values" section.

LEARNING MESSAGE:
Start with fewer values to test approaches and methods, but have a plan to build from there. Science and traditional and local knowledge play an important role in identifying values by providing decision-makers with the best available information to inform their choices. Values and implementation considerations play an important role in selecting values through discussions about community concerns, goals, and priorities to guide those choices.

Photo: Metlakatla First Nation

Photo: Shutterstock

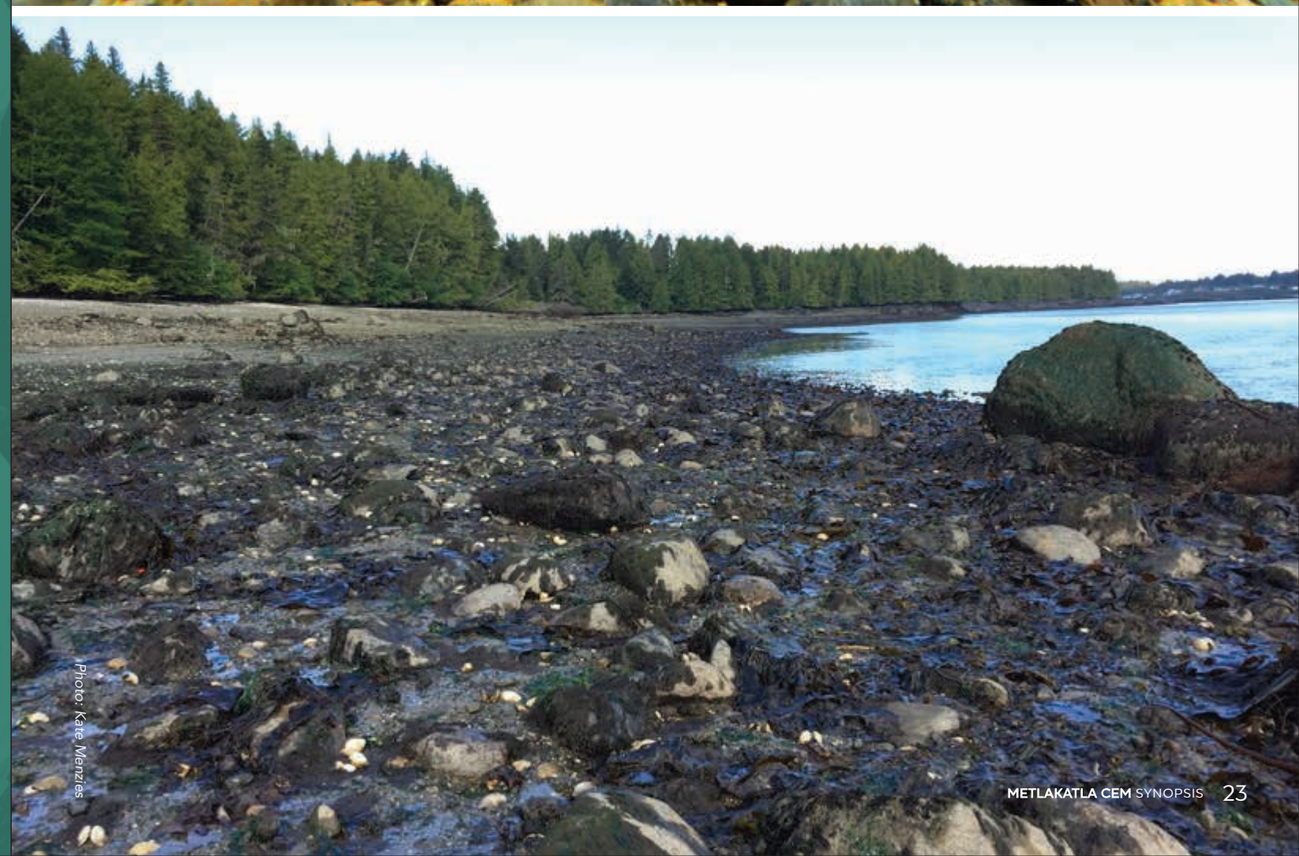


Photo: Kate Menzies

Measuring Values

Values are the things people care about and want to protect or restore. Indicators are measures of those values and when monitored over time, can illustrate trends in a value's condition. In selecting indicators, our goal was to maintain an emphasis on the overall condition of a value as opposed to the impacts from individual projects. Development projects will come and go, so it was important for us to focus on the values themselves through *condition indicators* rather than *stressor indicators*.

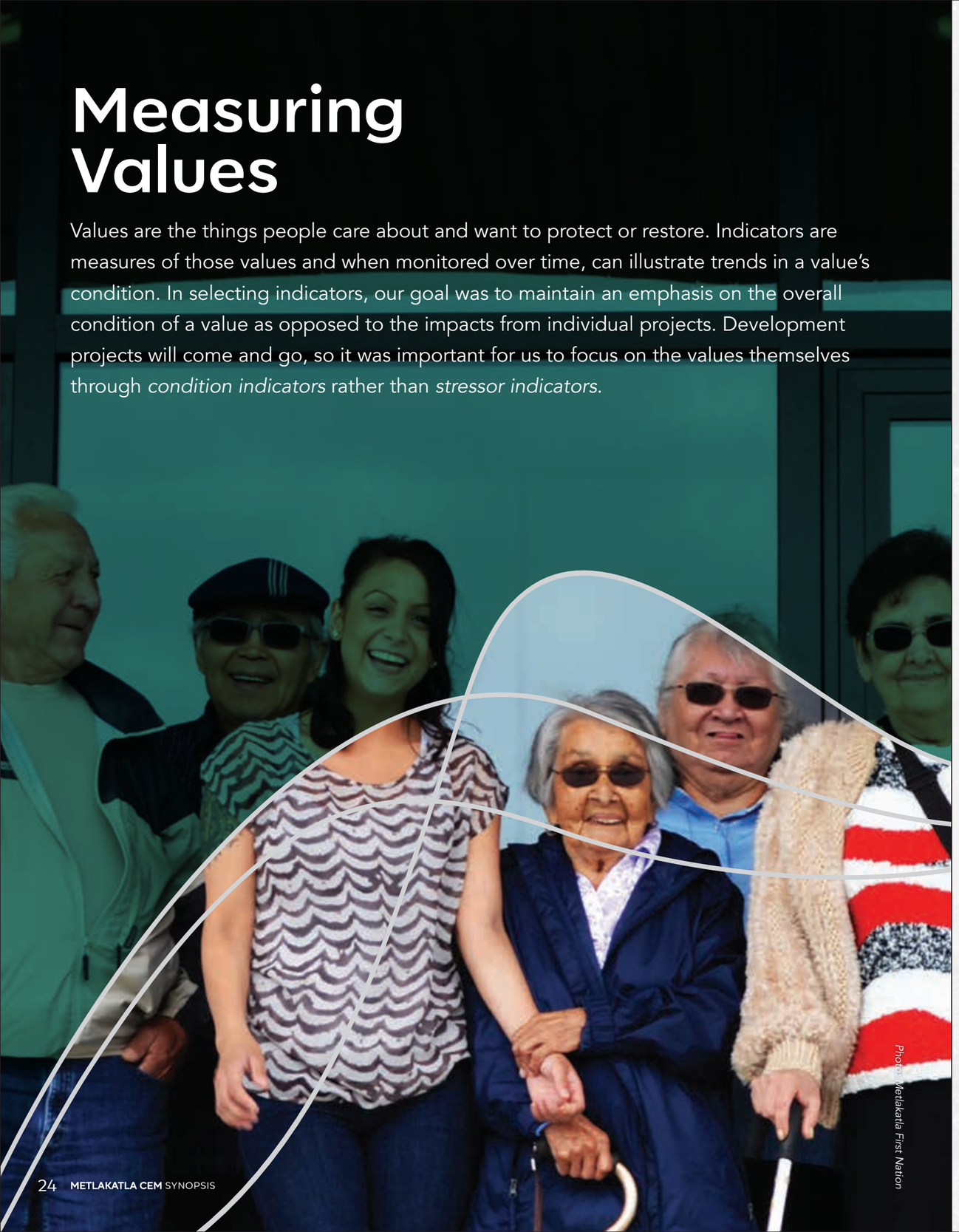


Photo: Metlakatla First Nation

Defining Indicators

CONDITION INDICATOR

An indicator that measures the overall condition of a value.

(Example: Condition indicator is hypertension prevalence)

Condition indicators help track the condition of the value but typically require further investigation and the use of stressor indicators to isolate what is causing the change. For example, a condition indicator of health could be prevalence of hypertension or diabetes whereas a stressor indicator could be exercise levels or diet.

STRESSOR INDICATOR

An indicator that measures the underlying factors that exert pressure on the condition of a value.

(Example: Stressor indicator is physical exercise levels)

Stressor indicators are better suited to assessing specific project level effects because they isolate the effect of specific activities on a value but may not capture other important effects on a value's condition. For example, the stressor indicator of physical exercise levels, due to reduced recreational opportunities or overworking, can influence the condition indicator, hypertension prevalence.

Selecting Indicators

There are an unlimited number of indicators for any given value. The challenge; therefore, is selecting the best indicator given the community's context. For Metlakatla, it is important that CEM methods are consistent with best practices, so we opted to adapt indicator selection criteria from the BC Environmental Assessment Office's (2013) *Guidelines for the Selection of Valued Components and Assessment of Potential Effects*.

ACCURATE

Does the indicator accurately reflect changes in the value and is it appropriate to the spatial scale of the value?

PRACTICAL

Is the indicator feasible to monitor and unambiguous for users?

SENSITIVE

Is the indicator sensitive to development and/or possible mitigation efforts?

RELEVANT

Can the indicator inform the work of Metlakatla organizations?

The list of selected indicators for priority values in the CEM Program can be found on pages 40 and 41.

Photo: Metlakatla First Nation

Influence Diagrams

Influence diagrams were developed for each priority Metlakatla value to map potential interactions between development and Metlakatla values. Influence diagrams are conceptual models that show cause-effect linkages between activities that occur in Metlakatla Territory and priority values. Draft diagrams were developed and refined through multiple reviews and two community workshops.

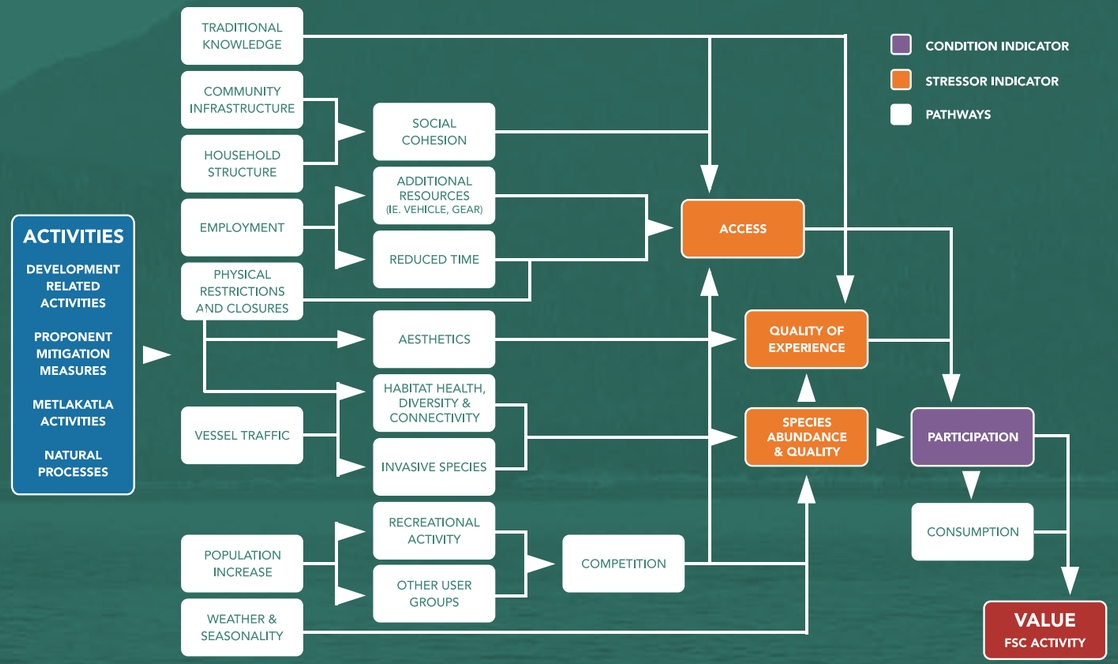
In the FSC Activity influence diagram below, purple boxes and orange boxes represent condition and stressor indicators, respectively. The influence diagram needs to be instructive enough to guide indicator selection while flexible enough to capture a broad range of potential future projects and activities.

Indicator Selection

The condition indicator for FSC Activity is FSC Participation, measured in 2 ways to capture the most important facets of participation: Youth participation rate and Level of effort. Additional detail on priority values and indicators can be found on pages 40-41.

Community Engagement

The initial influence diagram was developed with community members during a 2-day workshop as part of a Socioeconomic Impact Assessment in 2013. The diagram was revised with the community via 2 workshops in 2014 and 2015 and through workshops in 2017 with the Metlakatla CEM Working Group.



Literature and Experts

The influence diagram was further refined with relevant data, reports, and literature. Attempts were made to engage expert reviewers to better understand the cause-effect linkages between projects and activities, and participation in FSC activities.

Primary Research

An SFU graduate student conducted interviews with Metlakatla Elders and knowledge holders to develop an improved methodology for identifying and assessing cultural values. The findings led to confirmation of the FSC activity value as a representation of Metlakatla culture and an improved way of measuring FSC indicators.

Photo: Metlakatla First Nation

LEARNING MESSAGE:

Influence diagrams are effective tools for engaging people in indicator selection and helping them understand how their values could be affected by projects and activities. Building influence diagrams is an enjoyable and intuitive process for people and allows them to highlight the interconnectedness of values. People can help draw all the linkages, and then help the facilitator narrow down important pathways, which become clues to help with indicator selection. We revisited influence diagrams at every phase of the CEM Program to educate new participants, communicate with the community, and reassess development activity and related impacts.

A NOTE ON DEVELOPMENT SCENARIOS

Much of the guidance on cumulative effects assessment calls for a fairly detailed exploration of past, current, and future project development and activities to determine the types of values that may be impacted and how they may be impacted. We exercised caution on this method due to the dynamic and uncertain economic conditions on BC's North Coast at the time. Developing accurate baseline and future scenarios can be resource intensive and the future of the development context was quite uncertain. However, we also recognized the importance of thinking about potential futures and how those futures could affect Metlakatla and their values. We chose to "sketch" plausible futures for the purposes of identifying priority values while not spending resources on exploring a single potential future in depth.

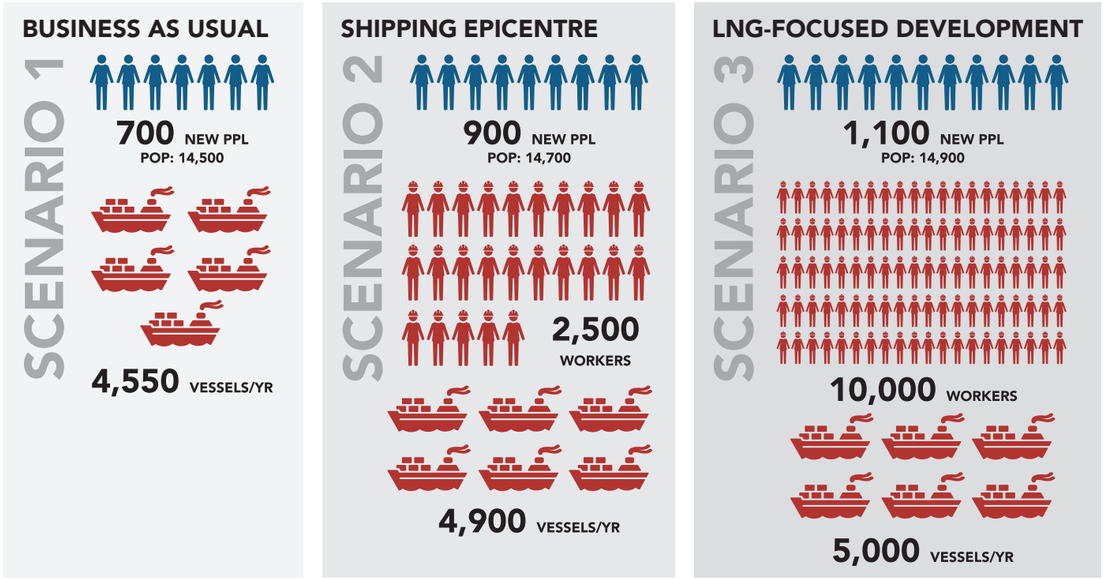
Our decision turned out to be good judgment. In 2014, there were approximately 21 proposed LNG projects in Metlakatla Territory totaling an estimated $140 billion. A plausible future would be one that includes multiple LNG projects. Then in 2017, declining gas commodity prices stalled LNG activity and instead, port-related development increased significantly. Ironically, at time of writing this publication in 2019, LNG interest is increasing once again, further evidence of the benefits of flexible future-casting.

A brief illustration of the types of plausible futures is illustrated below. Vessel traffic remains relatively constant whereas the influx of workers and their families can vary considerably.

Future Development Scenarios

TIME FRAME FOR THESE SCENARIOS IS 10-25 YEARS FROM 2017

2017 POP SIZE: 13,766 | CURRENT VESSEL TRAFFIC: 3,600/YR



INCREASING POTENTIAL IMPACTS AND BENEFITS

Gathering Knowledge about Values

Identifying priority values and indicators (Phase 1) revealed a significant data gap: the lack of Metlakatla-specific data that measures the current condition of priority values. We responded by initiating the Metlakatla Membership Census (MMC) to gather data on socio-economic, health, and cultural values and a Metlakatla Clam Community Monitoring Program to gather data on butter clams and contaminants.

Photo: Metlakatla First Nation

Metlakatla Membership Census

Socio-Economic Data Collection

2015 RESPONSE RATE	2016 RESPONSE RATE	2017 RESPONSE RATE
66% OF TARGET POPULATION OVER 5 WEEKS	69% OF TARGET POPULATION OVER 2.5 WEEKS	38% OF TARGET POPULATION OVER 4 WEEKS

AGE	17% YOUTH	63% ADULTS	20% ELDERS
LOCATION	79% PRINCE RUPERT		21% VILLAGE
GENDER	54% FEMALE	45% MALE	

PERCENTAGE OF 2016 RESPONDENTS

The MMC was conducted annually between 2015 and 2017, resulting in 3 years of data. The Census was designed and administered by a team of SFU master's students and Metlakatla members, with oversight by Metlakatla managers. Census questions link directly to CEM indicator information requirements. The MMC was designed to be a standard survey tool for the Metlakatla and included several non-CEM questions to support other departmental data needs. We plan to resume data collection through the MMC in 2020.

The 2015 and 2016 Censuses were a tremendous success, achieving over a 65% response rate among the target Metlakatla population. The 2017 Census was less successful due to a variation in our data collection approach and consultation fatigue experienced among Metlakatla members. The 2016 Census dataset is the most credible because we attained the highest response rate and asked more accurate and refined questions than the 2015 version. We plan to further examine any differences among the censuses and compile the three years of data to represent the baseline condition for socio-economic, health, and cultural values.

Photo: Metlakatla First Nation

Key Features of the MMC

Census survey that targets all members 15+ years old in territory

Self-administered (each member fills out)

Focused on in-person, paper-based surveys with online option

Prize draw for participants

Steps of MMC

STEP 1 Designing the MMC

- Research best practices for survey design and surveying small First Nation communities
- Engage Metlakatla to better understand community goals and characteristics
- Prepare census questions by referencing broad range of sources
- Hold census testing workshop to validate questions and suitability

STEP 2 Administering the MMC

- Identify eligible respondents and their locations
- Establish data collection teams consisting of 1 community member and 1 SFU researcher
- Promote the MMC through all available means within the Metlakatla community
- Contact respondents, drop off paper Census, follow up, collect completed forms

STEP 3 Analyzing the MMC Results

- Enter paper responses into online census platform (SurveyMonkey)
- Export and "clean" data according to a set of guidelines
- Calculate CEM indicators and descriptive statistics for other topic areas
- Summarize and report on results to Metlakatla leadership, managers, and community members

LEARNING MESSAGE:

A major challenge in self-reported socio-economic data is low response rates. Values like wealth distribution and housing rely on self-reported income data, but for a number of reasons, respondents are reluctant to share this information, or fail to account for all income sources when self-reporting. The proportion of people that responded to the income questions increased from 2015 to 2017, perhaps an indication of greater trust in the MMC as a legitimate tool intended to improve the conditions of Metlakatla Territory and its people.

Photo: Kate Menzies

Metlakatla Clam Community Monitoring Program

Environmental Data Collection

Prior to CEM, no extensive clam surveys had been conducted on Metlakatla beaches. The goal of the Metlakatla Clam Community Monitoring Program is to determine the status of clam populations, specifically butter clams, in Metlakatla Territory and to collect data on key stressors including, contaminants, habitat changes, and harvest levels.

We started with an exploratory survey in April 2017 on a small, unharvested beach and increased the program to 3 more beaches in Summer 2018, with plans to continue surveys each summer on more beaches. Long-term data on clam populations will allow Metlakatla managers to see whether the condition of clams is improving or getting worse, and by how much. A map of the surveyed clam beaches can be found on page 48.

An opportunity emerged to collect data on contaminants, which can affect butter clam health and density. We partnered with Vancouver Aquarium's PollutionTracker Program to collect samples to assess the types and relative levels of contaminants found at sites in the territory.

LEARNING MESSAGE:

Collecting baseline data through the Metlakatla Census and the Clam Community Surveys was a huge success due largely to SFU graduate students working closely with Metlakatla community members. Hiring Metlakatla members enables greater community engagement, builds capacity and in the case of clams, promotes interest in harvesting practices. Furthermore, Metlakatla team members provided valuable knowledge about the community and harvesting locations. Continued resources and support are required to ensure that censuses and clam surveys are carried out in the long-term.

Photo: Metlakatla First Nation

Setting Management Triggers and Actions

Cumulative Effects Management Regime

The management framework for each priority value in the Metlakatla CEM Program consists of a broad desired goal, a set of management zones and triggers (i.e., critical and cautionary management triggers), and an associated list of management actions that are designed to be effective and implementable (i.e., management action strategy). Tiered management triggers and actions provide leadership and managers with clear information about when and what kind of action should be taken to manage the condition of priority values.

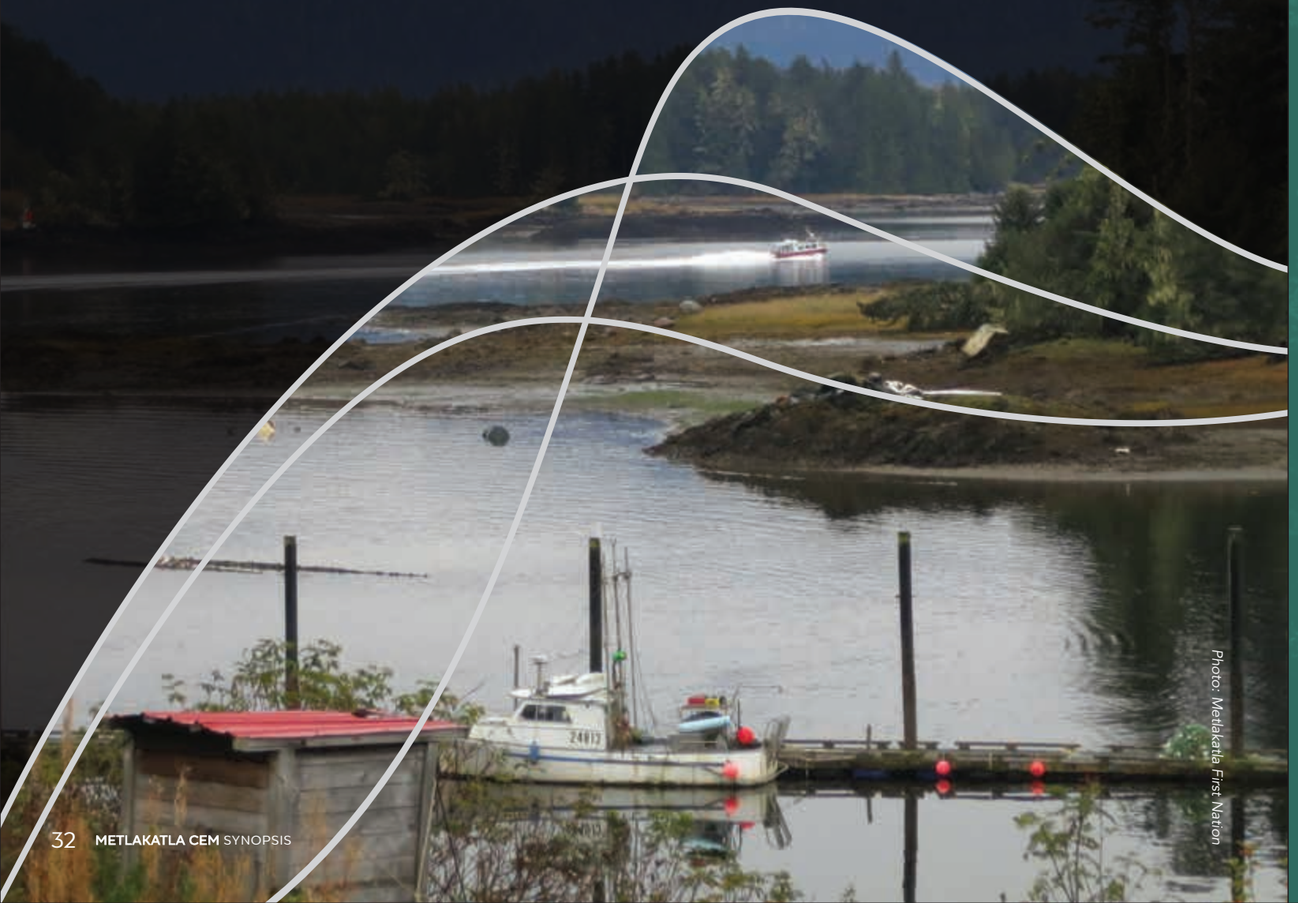


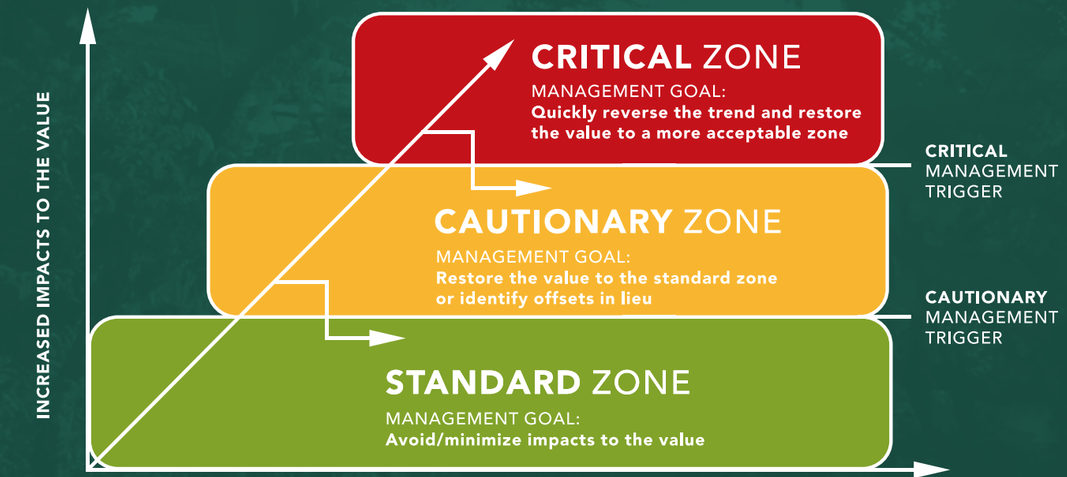
Photo: Metlakatla First Nation

Tiered Management Triggers and Actions

Broad Desired Goal
as decided by the Metlakatla CEM Working Group, represents Metlakatla's long-term management goal for the priority value in the Metlakatla CEM Program.

Tiered Management Triggers
are a series of markers that reflect increasing levels of concern about the condition of a priority value. The triggers mark the points at which new or more intensive management actions are taken to restore or improve the condition of the value.

Management Actions
include activities, processes, strategies, and/or policies that a group undertakes to maintain or restore a value's condition. The actions are what will help bring the priority value back to a more acceptable zone (i.e., cautionary or standard zone). A management action strategy includes four types of actions.



Prerequisite Actions

Actions that need to be implemented before the management framework can be initiated. For example, information or knowledge gathering.

Standard Actions

Actions linked to the standard management (green) zone are ongoing and reflect current management priorities, strategies, and actions required to manage the value. For example, follow standard procedures or maintain routine monitoring.

Enhanced Actions

Actions linked to the cautionary management (yellow) zone are taken when the cautionary management trigger is exceeded. For example, convene working group or implement mitigation actions. In some cases, offsets that benefit other values or are acceptable to the community can be implemented in lieu.

Stringent Actions

Actions linked to the critical management (red) zone are undertaken when the critical management trigger is surpassed. These actions are intended to quickly restore a value's condition. For example, revise or implement a new policy or restrictions.

Photo: Metlakatla First Nation

Metlakatla's Approach to Management Triggers

Management triggers are widely recognized as an important part of an effective CEM framework. At its core, CEM is about managing priority values in the context of ever-changing development, natural changes, and human activities. Management triggers support CEM by: (1) providing a direct link between assessment and monitoring information, and decision-making processes, (2) allowing decision-makers and community members to place limits on the amount of change that is considered acceptable for a value or resource, and (3) introducing a proactive and precautionary approach to monitoring and management.

To our knowledge, a practical method for setting robust management triggers in a First Nation CEM context has not previously been developed. We are aware of thresholds based on regulated targets or standards determined by federal and provincial bodies, and other researchers have used long-term data, modeling, and stakeholder survey methods to set trigger levels mainly in species conservation or protected area management.

We believe the process of setting management triggers and actions is one of social choice that is informed by the best available science, local and traditional knowledge, and grounded in community values. In addition, the management triggers decision is complex with high uncertainty; therefore, the approach requires an understanding of the community's attitude towards risk, and an open discussion of trade-offs.

GUIDING PRINCIPLES FOR SETTING MANAGEMENT TRIGGERS

The Metlakatla CEM Program adopted Antoniuk, Kennett, Aumann, Weber, Schuetz, McManus, McKinnon and Manuel's (2009) *Valued Component Threshold (Management Objectives) Project* guiding principles for setting management triggers in a cumulative effects' context:

Technically defensible but grounded in traditional/local knowledge, values, and implementation considerations;

Acceptable from the perspective of decision-makers, managers, and community members;

Linked to management actions;

Precautionary;

Readily understandable; and

Well-documented.

Photo: Lonnie Wishart

Metlakatla CEM Working Group

To set management triggers and actions for pilot values, we formed a Metlakatla member-based working group. We focused on 3 of the 4 pilot values: housing, butter clam, and FSC activity. The working group included four Metlakatla members and four Metlakatla staff members from different departments and with different management perspectives. The working group members agreed to "respectful frankness" during discussions throughout the workshops to allow for different opinions and a productive process.

MANAGEMENT TRIGGERS PROCESS

WORKING GROUP

- **4 COMMUNITY MEMBERS**
- **4 MANAGERS & STAFF**

WORKING GROUP GOALS

- (1) IDENTIFY WHERE **"CAUTIONERY" & "CRITICAL"** MANAGEMENT TRIGGERS SHOULD BE
- (2) IDENTIFY **WHAT ACTIONS** ARE TAKEN IF/WHEN THOSE MARKERS ARE PASSED

When setting management triggers and actions for priority values, the following key considerations were important for informing the working group's final decision:

- Understanding Metlakatla's values, concerns, and priorities as related to the pilot value
- Understanding the current condition and future trend of the pilot value
- Understanding the development context in the region by creating alternative future development scenarios to determine how development will potentially affect pilot values
- Understanding acceptability, risk tolerance, and uncertainty for Metlakatla decision-makers and members
- Understanding the implementation considerations (financial and human capacity) of setting management triggers and actions
- Identifying tools available to Metlakatla to restore or improve the condition of priority values
- Figuring out what we can change and what we cannot change through management actions
- Figuring out if community members are willing to adapt to changes or are being forced to adapt to changes

Structured Decision Making Process

We decided to use Gregory, Failing, Harstone, Long, McDaniels and Ohlson's (2012) Structured Decision Making (SDM) Process, a framework for making choices in settings with multiple interests, high stakes, and high uncertainty. SDM brings together science and values by combining analytical methods with dialogue. The process also openly deals with trade-offs and risk by framing problems as choices – what do we lose or gain by choosing one option over another?

The key questions for setting tiered management triggers were:

How do we represent Metlakatla values in terms of management zones and trigger levels?

Where is that highly undesirable zone for Metlakatla? At what level does Metlakatla start getting worried about the value?

The key questions for selecting management action strategies were:

How do we link appropriate management actions to specific management trigger levels?

How will we know whether an action will be effective enough to bring a value back to a more acceptable zone?

LEARNING MESSAGE:

Rarely is perfect information available about the condition of a priority value. Uncertainty is not a good reason to avoid setting management triggers. We believe setting management triggers and actions is a process of social choice and does not necessarily need to be a highly technical process that requires long-term data. It was important for us to present the management triggers as non-static decisions that will be regularly revisited and revised as we learn more.

We adapted each step in the SDM process to ensure the overall process worked well for our specific setting and group. We also decided early in the process to separate the selection of management triggers from the identification of management actions. Although they are inherently linked, a lot of time and resources are required to model all the possible interactions. Combining these two decisions into one process would have added a level of complexity to the working group's overall recommendation. As a result, we viewed these two processes as two separate decisions. The final outcomes (i.e., management trigger levels and action strategy for pilot values) can be found on the subsequent "Status of Pilot Values" pages.

1 CLARIFY THE DECISION CONTEXT

Define question or problem being addressed and establish the bounds for the decision: What decisions need to be made, by whom, where, and when?

The working group's role was to provide recommendations to Metlakatla Chief and Council, who will make the final decision about management triggers and actions for pilot values. Information needed by the working group to understand the decision context included: current condition and future trend of each value, Metlakatla's values, priorities, and concerns for each value, and future development scenarios.

2 DEFINE CRITERIA AND MEASURES

Choose a set of well-defined evaluative criteria and measures that clarify "what matters" and needs to be assessed to compare alternative management options.

The working group was tasked with answering the following questions in order to define a set of criteria:

Management Triggers Decision:

What are the most important things we should consider when we choose "critical" and "cautionary" levels as management triggers?

Management Actions Decision:

What matters about the value? Why is it important to Metlakatla?

3 DEVELOP ALTERNATIVES

Develop and agree on a set of alternative options for consideration by the working group.

We used different methods for developing alternative options for the working group to consider:

Management Triggers Decision:

There are different ways to set management triggers or limits. For example, you could look at comparative data from similar areas and set triggers at levels where conditions are starting to decline in those areas. We were not sure which approach would work best and decided to ask the working group to use 2 approaches to come up with 2 different sets of management trigger levels.

Management Actions Decision:

We first compiled a list of all possible management actions and asked the working group to bundle actions into themed categories. There are different ways to manage priority values. Each alternative management action strategy had a different approach for improving the condition of the value.

4 ESTIMATE CONSEQUENCES OF ALTERNATIVES

Estimate the outcomes of the alternatives for each criterion using a consequence table, which shows how the alternatives compare to each other and exposes key trade-offs.

We developed consequence tables using a mix of qualitative scores and quantitative analyses. The consequence table was more important to the working group as a communication tool rather than an accurate estimation of potential outcomes, and as a result, we relied more on informed judgment for coming up with estimated consequences. An example table is shown below.

	ALTERNATIVE MANAGEMENT ACTION STRATEGIES			
CRITERIA	MEASURE	LOW COST STRATEGY	HIGH IMPACT STRATEGY	COLLABORATIVE STRATEGY
Condition of Value	**% Households in Core Housing Need**	40% Households in Need	10% Households in Need	20% Households in Need
Cost	**$/year**	$2,000	$1,000,000	$5,000
Risk	**Constructed Scale: 1 to 5 (low to high)**	4	4	5
Etc.				

5 EVALUATE TRADE-OFFS AND SELECT A PREFERRED ALTERNATIVE

Discuss key trade-offs between alternatives and select the preferred option through dialogue or other decision methods.

The working group chose a set of management triggers and an associated management action strategy based on a group discussion about what is gained and lost (i.e., trade offs). Each working group member gave their choice and rationale as part of the consensus-building process. It was important to the working group that the final decisions were made by consensus.

6 IMPLEMENT, MONITOR, AND REVIEW

Commit to regularly revisit the decision, especially when new information becomes available and identify what learning is needed to improve future management trigger processes.

Selected management triggers and actions will be regularly revisited to ensure they align with Metlakatla's values and priorities over time and to account for new information when it becomes available. Assessment and monitoring will be a part of the management framework – when a management trigger is crossed, decision-makers will assess the situation to decide which set of identified actions will be implemented – an important consideration given that the decision context will change over time.

Photo: Lonnie Wishart

CEM Values Foundation

An important decision-making tool of the Metlakatla CEM Program is the Values Foundation, which will form the basis of the CEM Program website (www.MetlakatlaCEM.ca). The Values Foundation dashboard illustrates the up-to-date status of Metlakatla CEM values and indicators in relation to established management triggers. It also provides key information for understanding the value's current and future condition, as well as potential implementation challenges for managing the value.

PILOT VALUES

CULTURAL IDENTITY

FOOD, SOCIAL, CEREMONIAL (FSC) ACTIVITY

BROAD DESIRED GOAL
To strengthen and protect Metlakatla's continued participation in important cultural practices for future generations.

IMPLEMENTATION PATHWAY
INTERNAL

INDICATOR
- Distribution of the level of effort *(% of members participating 6-20 species-days/year or more in harvesting activities)*

MANAGEMENT ZONES

- **STANDARD** — **More than 60%** of members harvesting 6–20 species-days/year or more
- **CAUTIONARY** — **Between 60–40%** of members harvesting 6–20 species-days/year or more
- **CRITICAL** — **Less than 40%** of members harvesting 6–20 species-days/year or more

CURRENT CONDITION

CAUTIONARY ZONE
47% of members reported harvesting 6-20 species-days/year or more (2016)

INDICATOR
- Youth participation rate *(% of youth participating in any FSC activities) — Youth are 15-24 years old*

MANAGEMENT ZONES

- **STANDARD** — **More than 75%** of youth participating in any FSC activities
- **CAUTIONARY** — **Between 65-75%** of youth participating in any FSC activities
- **CRITICAL** — **Less than 65%** of youth participating in any FSC activities

CURRENT CONDITION

CRITICAL ZONE
51% of youth reported participating in any FSC activities (2016)

ENVIRONMENT

BUTTER CLAM

BROAD DESIRED GOAL
To protect and improve the health and abundance of bivalve populations for the continued harvesting by Metlakatla First Nation

INDICATOR
Population density *(# individuals/m^2) — includes juveniles and adults*

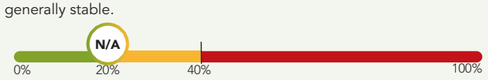
IMPLEMENTATION PATHWAY
INTERNAL/EXTERNAL

MANAGEMENT ZONES

- **STANDARD** — **Less than 20%** reduction in population density from stable butter clam population level
- **CAUTIONARY** — **Between 20–40%** reduction in population density from stable butter clam population level
- **CRITICAL** — **More than 40%** reduction in population density from stable butter clam population level

CURRENT CONDITION

STANDARD ZONE
Currently unknown across Metlakatla's Territory. We are working towards collecting multi-year data to establish baseline. Populations are likely generally stable.



SOCIAL/HEALTH

HOUSING

BROAD DESIRED GOAL
Metlakatla First Nation strives to have all members living in housing which meets their needs in terms of condition, size, and affordability.

INDICATOR
Core housing need *(% of Metlakatla renter households in core housing need in Prince Rupert)*

IMPLEMENTATION PATHWAY
EXTERNAL

MANAGEMENT ZONES

- **STANDARD** — **Less than 15%** of renter households in core housing need in Prince Rupert
- **CAUTIONARY** — **Between 15–30%** of renter households in core housing need in Prince Rupert
- **CRITICAL** — **More than 30%** of renter households in core housing need in Prince Rupert

CURRENT CONDITION

CRITICAL ZONE
42–50% of renter households in core housing need in Prince Rupert (2016)

OTHER PRIORITY VALUES

SOCIAL/HEALTH

CHRONIC HEALTH CONDITIONS

INDICATORS
- Diabetes prevalence *(% of members with Type 2 diabetes)*
- Hypertension prevalence *(% of members with hypertension)*

IMPLEMENTATION PATHWAY
EXTERNAL

CURRENT CONDITION
- Approximately 10% of members reported having type 2 diabetes (2016)
- Approximately 18% of member reported having hypertension (2016)

SOCIAL/HEALTH

ACCESS TO HEALTH SERVICES

INDICATOR
Ambulatory care sensitive conditions rate – *measure of the degree to which chronic and reoccurring medical conditions are treated through emergency care*

IMPLEMENTATION PATHWAY
EXTERNAL

CURRENT CONDITION
Currently unknown for Metlakatla population in territory
- Ambulatory care sensitive conditions data should be available from local health authority

SOCIAL/HEALTH

PERSONAL SAFETY

INDICATOR
Crime severity index – *measured by the amount of crime reported by police for an area and the relative seriousness of these crimes*

IMPLEMENTATION PATHWAY
EXTERNAL

CURRENT CONDITION
Crime severity index for City of Prince Rupert is 140.51 (2018, Statistics Canada)

ECONOMIC PROSPERITY

EMPLOYMENT

INDICATOR
High school completion rate *(Six-year completion rate)*

IMPLEMENTATION PATHWAY
INTERNAL/EXTERNAL

CURRENT CONDITION
79% of Metlakatla respondents took 6 years or less to complete high school (2016)
- Six-year completion data should be available from local school district

ECONOMIC PROSPERITY

WEALTH DISTRIBUTION

INDICATOR
Income equality ratio *(Ratio of low-income households to middle-income households)*

IMPLEMENTATION PATHWAY
EXTERNAL

CURRENT CONDITION
Income equality ratio for Metlakatla households is 1.97 (2016)

Current condition data is derived from the 2016 Metlakatla Membership Census and is shown for illustrative purposes only. The indicator statuses will be regularly updated after future censuses.

ENVIRONMENT

CHINOOK SALMON

INDICATORS
- Population abundance *(# adults returning to spawn/stream in Metlakatla Territory)*
- Critical juvenile habitat *(areal extent (ha) of eelgrass beds)*

IMPLEMENTATION PATHWAY
INTERNAL/EXTERNAL

CURRENT CONDITION
Currently unknown across Metlakatla's entire territory.
- Population abundance data available from DFO for Skeena River Watershed
- Estuary habitat data available from Pacific Salmon Foundation

GOVERNANCE

ABILITY TO STEWARD

INDICATOR
Stewardship of priority lands (constructed scale from 1-5)

IMPLEMENTATION PATHWAY
INTERNAL

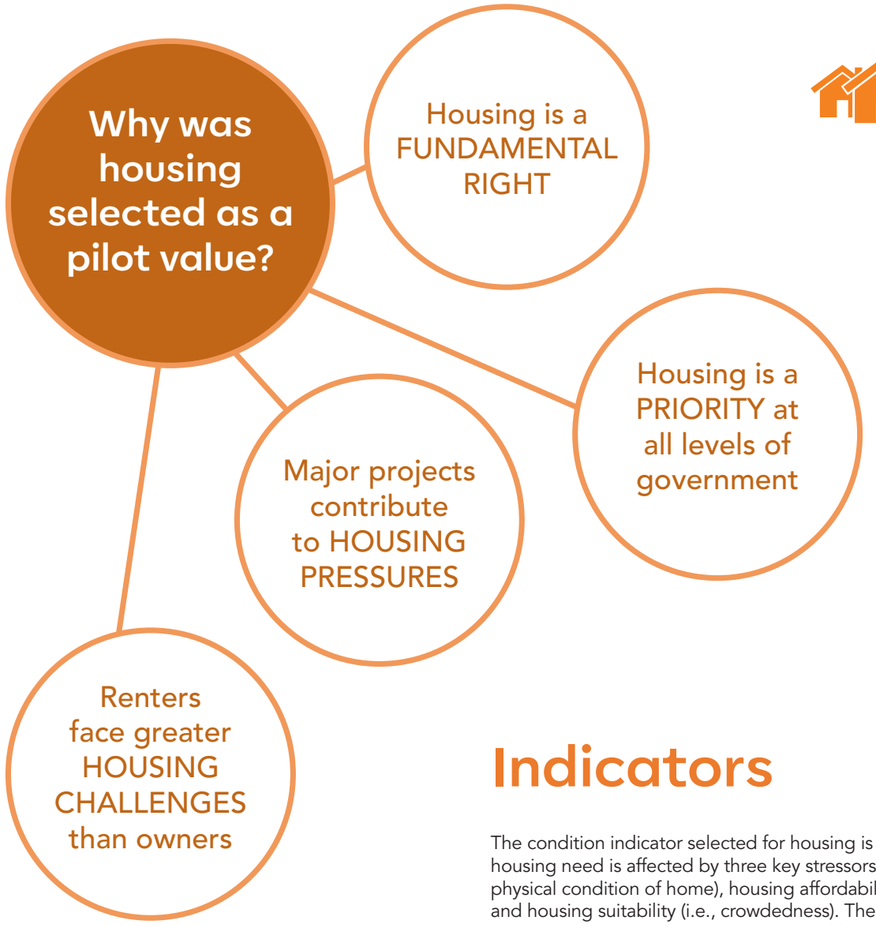
CURRENT CONDITION
Currently unknown across Metlakatla's entire territory.

Photo: Metlakatla First Nation

Status of Pilot Values: Housing

Rental housing in Prince Rupert is under pressure from development activity. The need for rental housing that is affordable, in good condition, and not overcrowded is a priority for Metlakatla. This value is focused on off-reserve renter households in Prince Rupert, where the greatest need currently exists.

Photo: Lorraine Wishart



Indicators

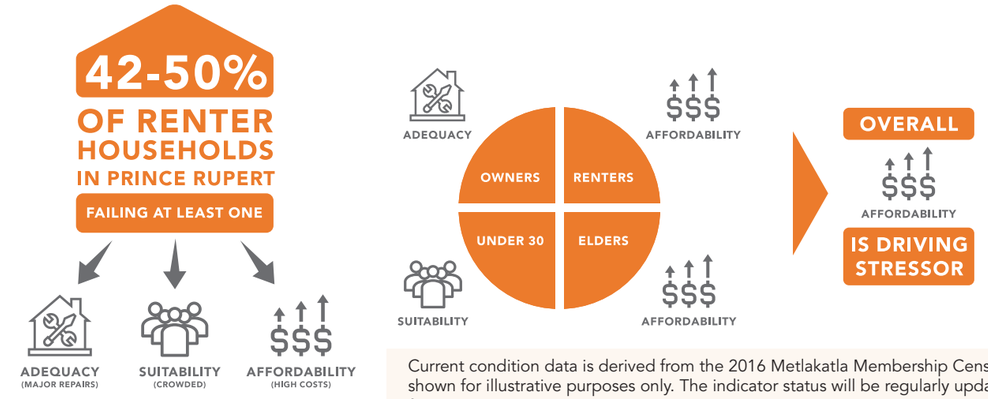
The condition indicator selected for housing is core housing need. Core housing need is affected by three key stressors: housing adequacy (i.e., physical condition of home), housing affordability (i.e., housing costs), and housing suitability (i.e., crowdedness). The influence diagram for the housing value can be found on the www.MetlakatlaCEM.ca website.

CONDITION INDICATOR	UNIT	DESCRIPTION / RATIONALE
Core Housing Need	% of Metlakatla renter households in core housing need in the City of Prince Rupert	A household is in core housing need if its housing fails to meet one or more of the following standards: **Adequate housing** – homes do not require any major repairs (as reported by residents) **Affordable housing** – housing costs are less than 30% of total before-tax household income **Suitable housing** – has enough bedrooms for the size and make-up of resident households

Current Condition and Future Trend

CURRENT CONDITION:

Based on the 2016 Metlakatla Membership Census results, 42-50% of Metlakatla renter households in Prince Rupert are in core housing need. The main reason depends on the demographic group but overall, affordability is the driving issue.



Current condition data is derived from the 2016 Metlakatla Membership Census and is shown for illustrative purposes only. The indicator status will be regularly updated after future censuses.

FUTURE TREND:

Based on forecasted population changes, rental demand, and proposed development in Prince Rupert, core housing need for Metlakatla renters will likely increase. According to BC Non-Profit Housing Association, Community Development Institute, and Compass Resource Management Ltd.:

- Prince Rupert total population will increase at a moderate rate of 6% from 2011 to 2036
- Overall senior (65+) population will increase significantly in Prince Rupert
- Overall new renter households have been forecasted to increase by 135 to 193 by 2036

EXTERNAL IMPLEMENTATION PATHWAY:

Off-reserve housing is primarily managed by external agencies, including the federal government, provincial government, and the City of Prince Rupert. Metlakatla Governing Council does not have a direct mandate to manage off-reserve housing; that mandate applies only to on-reserve housing. They are responsible for representing off-reserve members and can help address housing issues through support and policy advocacy actions. Metlakatla will need to work with external agencies to manage and fund housing management actions.

IMPLEMENTATION CHALLENGES:

- **Requires Broad Approach and Long-term Perspective:** Core housing need should be addressed through a variety of actions. Working together with other organizations will encourage a broader approach to solving housing issues over the long term.
- **Capacity Constraints:** Effective collaboration with other groups requires hiring new staff or assigning tasks to an existing Metlakatla department or staff member.

Cumulative Effects Management Regime

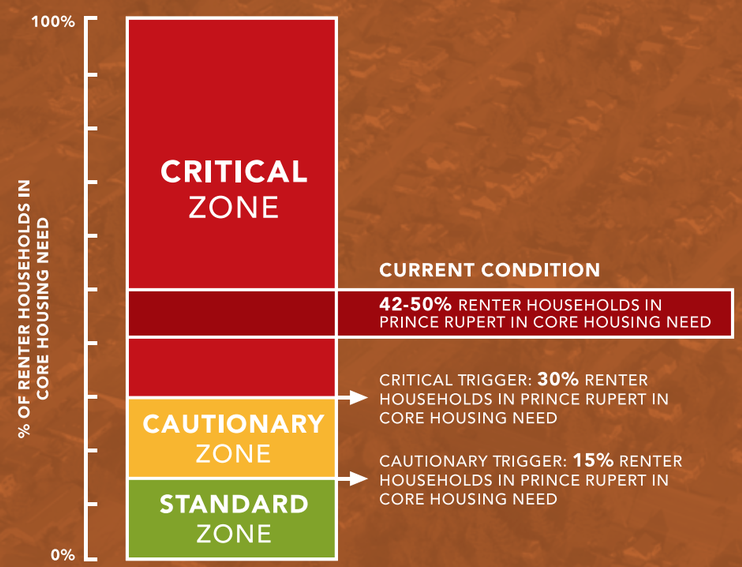
BROAD DESIRED GOAL:

As decided by the Metlakatla CEM Working Group, "Metlakatla First Nation strives to have all members living in housing which meets their needs in terms of condition, size, and affordability."

TIERED MANAGEMENT TRIGGERS:

The rationale for the final tiered management trigger levels are:

1. Cautionary management trigger reflects Metlakatla values and represents the working group's lower risk tolerance. A lower level allows for actions to be implemented earlier and leaves more time for funding to be secured.
2. Critical management trigger reflects the historical level of core housing need in Prince Rupert and other similar communities. Potential government partners often rely on data when making decisions about housing and may consider this level more defensible.



Examples of Management Actions:

Stringent Action

Housing Committee pursues partnerships to develop housing targeting core housing need populations.

Enhanced Action

Provide the Ready to Rent course to Metlakatla members.

Standard Action

Support the City of Prince Rupert in establishing an advisory housing committee with members representing a range of stakeholders.

Prerequisite Action

Raise the profile of the CEM housing work to take advantage of the current housing climate in BC and Canada.

Current condition data is derived from the 2016 Metlakatla Membership Census and is shown for illustrative purposes only. The indicator status will be regularly updated after future censuses.

MANAGEMENT ACTION STRATEGY:

"Work together with other groups to fix housing" Of the options discussed, the working group chose the Collaborative Housing Management Action strategy, with a focus on increasing partnerships and communication with other agencies in order to reduce core housing need. The strategy includes 4 prerequisite actions, 7 standard actions, 6 enhanced actions, and 3 stringent actions.

Photo: *Lonnie Wishart*

Status of Pilot Values: Butter Clam

Butter clams are a large, hardshell clam species generally found in the lower intertidal zone.

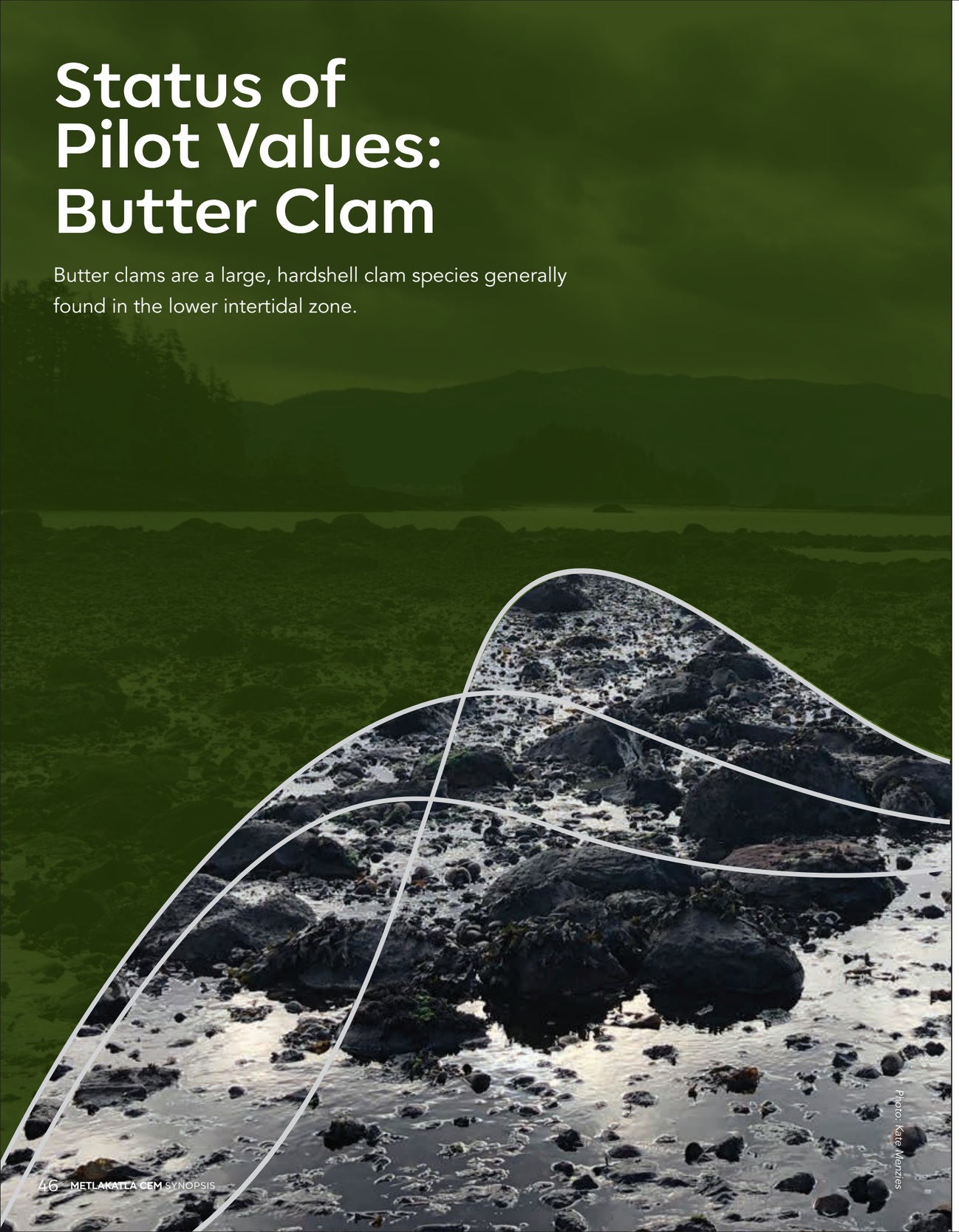
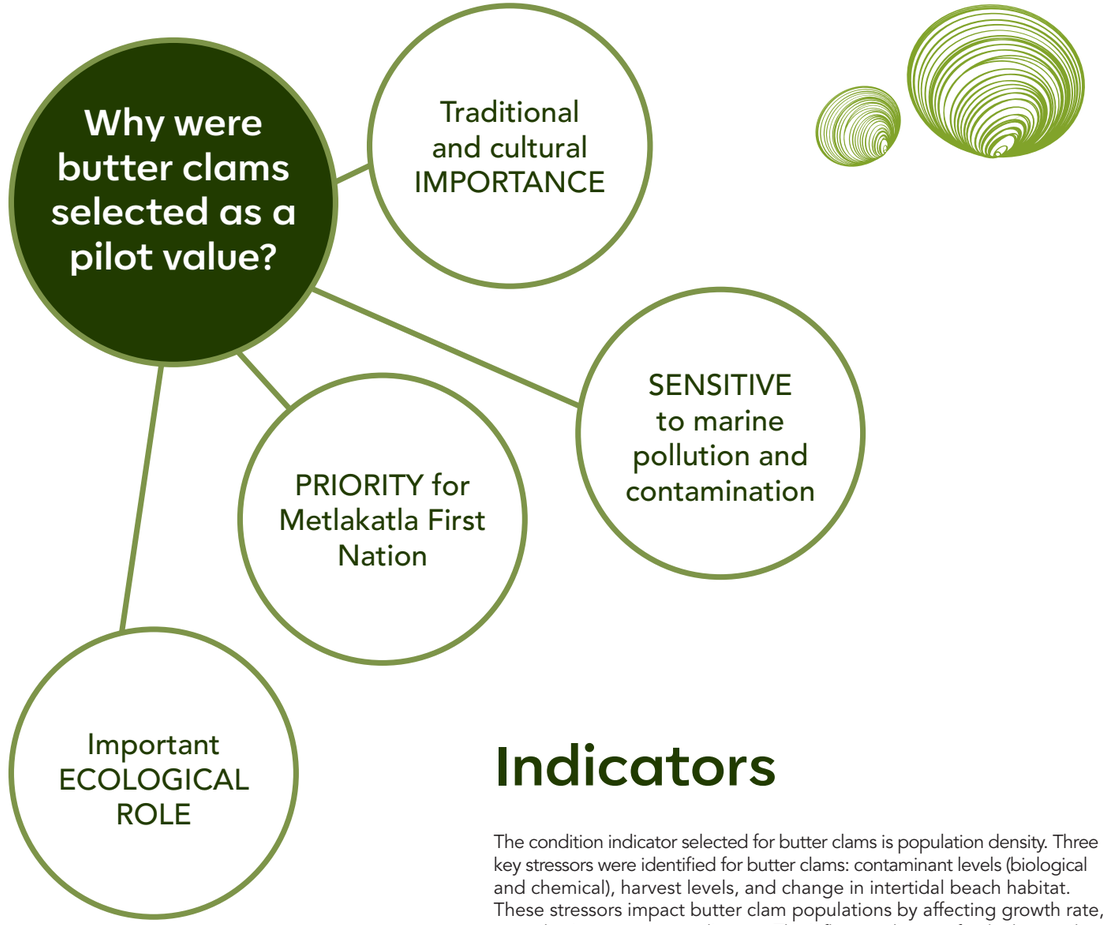


Photo: Kate Menzies



Indicators

The condition indicator selected for butter clams is population density. Three key stressors were identified for butter clams: contaminant levels (biological and chemical), harvest levels, and change in intertidal beach habitat. These stressors impact butter clam populations by affecting growth rate, reproductive rate, or mortality rate. The influence diagram for the butter clam value can be found on the www.MetlakatlaCEM.ca website.

CONDITION INDICATOR	UNIT	DESCRIPTION / RATIONALE
Butter Clam Population Density	# of individuals/m^2	Common measure of population condition for bivalve species. Bivalve population densities are specific to the time, place, and species.

Current Condition and Future Trend

CURRENT CONDITION:

Current condition is unknown at this time. Extensive clam surveys are underway in the territory (2018-2020) and the survey results will be supplemented with interview data from Metlakatla clam harvesters and knowledge holders. Population density estimates from the 2017 and 2018 clam surveys are shown in the figure below.

Current condition data is derived from the 2017/18 Metlakatla Clam Surveys and is shown for illustrative purposes only. The indicator status will be regularly updated after future surveys.

FUTURE TREND:

Currently, there are no available forecasts for butter clams in Metlakatla Territory or on the north coast of BC. Fisheries and Oceans Canada shellfish biologists and butter clam survey results from neighbouring First Nations indicate that butter clam populations on BC's North Coast (including Metlakatla beaches) are likely stable, with regularly harvested beaches having higher productivity. Butter clam populations have a wide range of sizes and ages on the north coast, which mean there is likely good recruitment and stability in the populations.

INTERNAL/EXTERNAL IMPLEMENTATION PATHWAY:

Intertidal clams, including butter clams, and subtidal clams are managed by the Metlakatla Aquatic Resources Department. They continue to work together with Fisheries and Oceans Canada to develop and implement a co-management program for a FSC bivalve harvest in Metlakatla Territory.

IMPLEMENTATION CHALLENGES:

- **Requires Long-Term Monitoring Strategy:** A lack of baseline intertidal clam surveys has resulted in some uncertainties about the current condition of clam populations on Metlakatla beaches. A long-term monitoring program will be resource-intensive, both in terms of capacity and financial resources.
- **Important Environmental Considerations:** Intertidal clam population densities are specific to the time, place, and species; there is natural interannual variability in different populations and under different environmental conditions. As a result, management decisions about clams should consider multi-year population and habitat data.

Cumulative Effects Management Regime

BROAD DESIRED GOAL:

As decided by the Metlakatla CEM Working Group, "To protect and improve the health and abundance of bivalve populations for continued harvesting by Metlakatla First Nation."

TIERED MANAGEMENT TRIGGERS:

The rationale for the final tiered management trigger levels are:

1. Working group felt that the incorporation of Metlakatla values and priorities was the most important criterion. These management triggers explicitly take into account local values.
2. The working group did not want to base management triggers on international standards for species protection because they might not be best suited for a specific regional or local context. In addition, they felt the international standards were not precautionary enough.

CURRENT CONDITION The current condition for butter clams is unknown at this time. Butter clam populations often change from year to year, so it is important to use multi-year data to determine the current condition. We are working towards that through clam surveys and interviews with Metlakatla harvesters. Based on the information we are gathering, current populations are likely stable.

Examples of Management Actions:

Stringent Action

Develop monitoring and management policies and plans for key contaminants and find partners to fund and implement plans.

Enhanced Action

Organize 1 or 2 clam digs per year to teach members where, when, and how to harvest and process butter clams with volunteers.

Standard Action

Identify and map highly productive and high-quality butter clam (and other bivalves) habitat within territory.

Prerequisite Action

Develop a long-term monitoring strategy for butter clam populations on Metlakatla beaches with regular surveys.

MANAGEMENT ACTION STRATEGY:

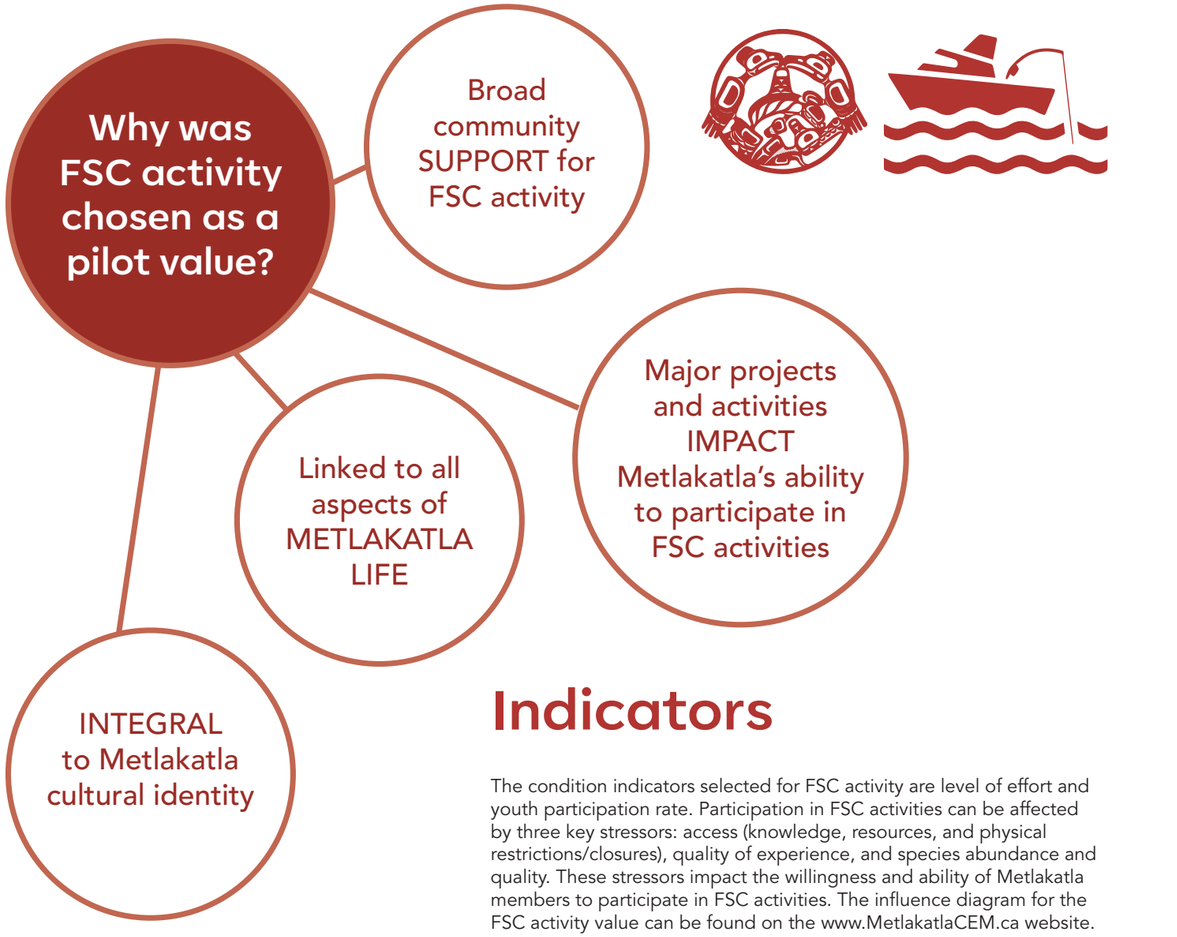
"Gather information and involve the community to maintain butter clam populations" Of the options discussed, the working group chose the Butter Clam Management Action strategy that focuses on relatively low-cost actions, including data collection, community-based actions, and promotion of existing butter clam policies. The strategy includes 2 prerequisite actions, 12 standard actions, 4 enhanced actions, and 4 stringent actions.

Photo: Kate Menzies

Status of Pilot Values: FSC Activity

Food, Social, and Ceremonial (FSC) Activity consists of harvesting, gathering, processing, and preparing (e.g., jarring, canning, or smoking) of any traditional foods and materials. FSC participation is distinguished from FSC consumption by active practice and potential transfer of traditional knowledge.

Photo: Metlakatla First Nation



Indicators

The condition indicators selected for FSC activity are level of effort and youth participation rate. Participation in FSC activities can be affected by three key stressors: access (knowledge, resources, and physical restrictions/closures), quality of experience, and species abundance and quality. These stressors impact the willingness and ability of Metlakatla members to participate in FSC activities. The influence diagram for the FSC activity value can be found on the www.MetlakatlaCEM.ca website.

CONDITION INDICATORS	UNIT	DESCRIPTION / RATIONALE
Distribution of the Level of Effort	% of members participating 6-20 species-days/ year or more in harvesting activities	The level of effort indicates how much time people spend on FSC activities. The Metlakatla CEM Working Group decided that a good minimum level of effort for members was 6-20 or more species-days/year for harvesting activities. Species-days/year counts the total number of days per year spent harvesting across all species, not accounting for the fact that one might harvest multiple species in one day.
Youth Participation Rate	% of youth participating in any FSC activities	Youth is defined as members between the ages of 15 and 24. Youth participation is critical for knowledge transfer and sustainability of FSC activity across generations.

Current Condition and Future Trend

CURRENT CONDITION:

Based on the 2016 Metlakatla Membership Census results, 47% of members reported participating in harvesting activities 6-20 species-days/year or more. The top three harvested species were salmon, crab, and halibut.

Current condition data is derived from the 2016 Metlakatla Membership Census and is shown for illustrative purposes only. The indicator status will be regularly updated after future censuses.

LEVEL OF EFFORT (2016)

WHAT IS LEVEL OF EFFORT AND HOW TO CALCULATE IT?
Level of Effort shows how much time people spent on harvesting activities **in the past year**

DISTRIBUTION OF LEVEL OF EFFORT

Based on the 2016 Metlakatla Membership Census results, 51% of youth reported participating in any FSC activities (harvesting, gathering, processing, and/or preparing). The top three harvested species for youth were salmon, berries, and halibut. Most youth participation occurs during the summer months.

YOUTH PARTICIPATION (2016)

WHAT IS YOUTH PARTICIPATION AND HOW TO CALCULATE IT?
Youth participation is the % of members aged 15 to 24 years old that reported participating in any FSC activities **in the past year**

51% OF YOUTH RESPONDENTS

REPORTED

Photos: Metlakatla First Nation

FUTURE TREND:

Currently, there are no available forecasts for FSC activity in Metlakatla Territory or on the north coast of BC. There are concerns that FSC participation will continue to decline based on current participation levels and current boat ownership among members. The Metlakatla Census data suggests that most respondents who participated in FSC activities more than 61 days per year (i.e., high-level participants) were adults (aged 25-64). No youth respondents participated in harvesting or processing/preparing activities more than 61 days per year. The current youth participation rates may not replace high-level adult participation rates in the future.

INTERNAL IMPLEMENTATION PATHWAY:

Participation in FSC activity within the Territory is specific to the Metlakatla First Nation and is internally managed by the Metlakatla First Nation.

IMPLEMENTATION CHALLENGES:

- **Closely Linked to Species Abundance and Quality:** FSC activity is interconnected to many other Metlakatla values. The ability of Metlakatla members to participate in FSC activities depends on the abundance and quality of the resources themselves. Managing FSC activity will require monitoring the condition of key traditional resources.
- **Requires New Programs:** Improving FSC participation levels could require the implementation of new programs for youth and members. The proposed management actions are mostly low-cost and focused on education, outreach, and community-related activities, where all members could help organize and carry out the actions.

Cumulative Effects Management Regime

BROAD DESIRED GOAL:

As decided by the Metlakatla CEM Working Group, "To strengthen and protect Metlakatla's continued participation in important cultural practices for future generations."

TIERED MANAGEMENT TRIGGERS:

The rationale for the final tiered management trigger levels are:

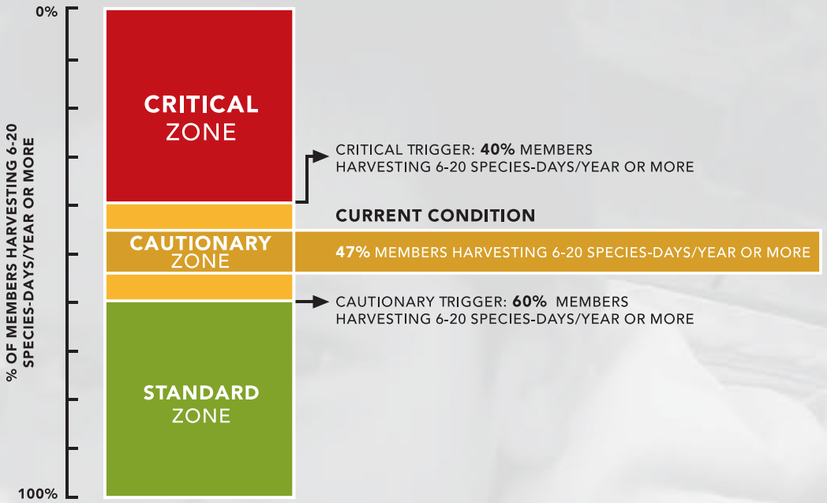
1. All working group members acknowledged that youth participation is key to cultural continuity and knowledge transfer for Metlakatla. As a result, they wanted to set more stringent levels for youth participation.
2. Given the current state of the level of effort indicator, the working group recognized that significant barriers exist for increasing participation by community members. As a starting point, they set less stringent management triggers levels to acknowledge implementation challenges.

MANAGEMENT ACTION STRATEGY:

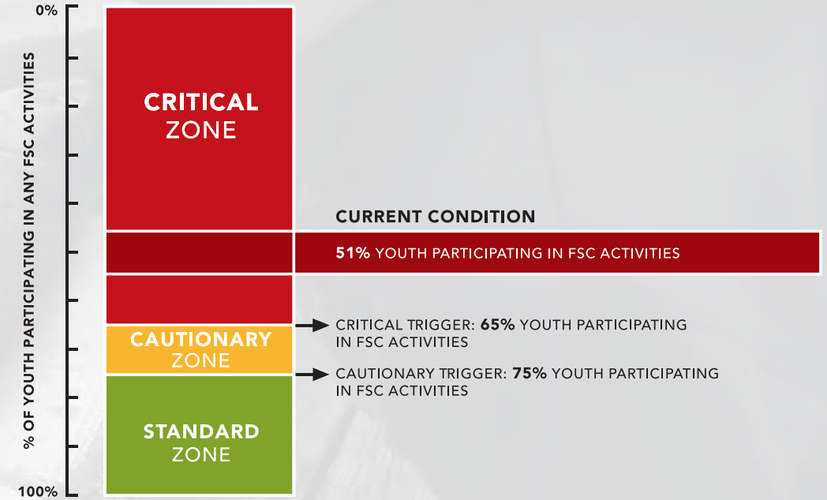
"High impact strategy to improve FSC participation" Of the options discussed, the working group chose the FSC Activity Management Action strategy that focuses on highly effective actions, including new actions or programs that can provide members with infrastructure and skills to participate in FSC activities. The strategy includes 3 prerequisite actions, 13 standard actions, 3 enhanced actions, and 5 stringent actions.

Photo: Lonnie Wishart

FSC LEVEL OF EFFORT



FSC YOUTH PARTICIPATION



Current condition data is derived from the 2016 Metlakatla Membership Census and is shown for illustrative purposes only. The indicator status will be regularly updated after future censuses.

Examples of Management Actions:

Stringent Action

Include a teaching component in the Food Fish program that teaches youth and other interested members harvesting knowledge and skills.

Enhanced Action

Organize regular cultural harvest days in each season to teach members harvesting skills. Could focus on species that are easier to harvest.

Standard Action

Create conservation-focused education program for youth and other members to ensure that new harvesters understand the importance of conservation.

Prerequisite Action

Talk to other First Nations that have strong FSC participation levels to find solutions and actions that might work for Metlakatla.

Photo: Metlakatla First Nation

Looking Forward: Finding Implementation Solutions

Implementation Plans for Pilot Values

We are currently in Phase 4 of the CEM Program, developing implementation plans for the monitoring and management of pilot values. These plans involve determining what organizational changes or adjustments need to be made across Metlakatla departments to implement CEM regimes for each pilot value. After completing the CEM pilot project, Metlakatla will begin to consider how the other priority values can be further advanced through the 4-phase CEM framework.

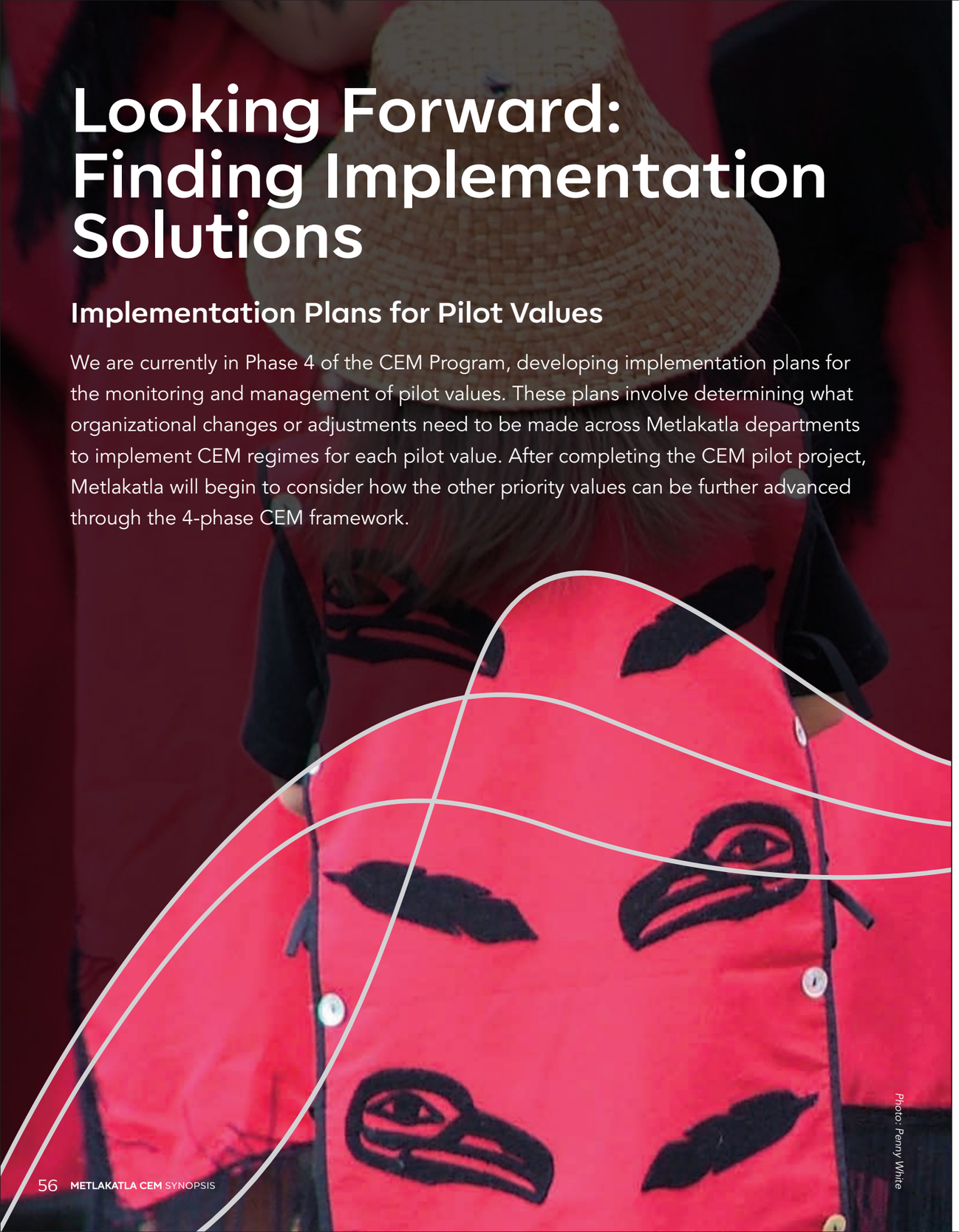


Photo: Penny White

HOUSING

Given its external implementation pathway, the key implementation challenges for the housing value include:

- How does Metlakatla advance its off-reserve housing interests when working with external agencies that are more focused on improving housing for a broader population?
- How does Metlakatla effect change over a social value that is largely outside of their mandate?

CURRENT FOCUS: WORKING WITH EXTERNAL PARTNERS

To address these implementation challenges, we are first developing a housing external engagement strategy for working with other agencies to address core housing need among Metlakatla renter households in Prince Rupert.

BUTTER CLAM

Given its internal/external implementation pathway, the key implementation challenges for the butter clam value include:

- How does Metlakatla respond to changes in the condition of butter clams (i.e., when a trigger is crossed)?
- What do management actions look like on-the-ground?

CURRENT FOCUS: IMPLEMENTING MANAGEMENT ACTIONS

To address these implementation challenges, we are first piloting a management action that was identified by the working group for butter clams: restore one Metlakatla clam beach using traditional clam garden practices and other restoration techniques. A clam garden restoration and monitoring protocol will be developed in 2019/2020.

FSC ACTIVITY

Given its internal implementation pathway, the key implementation challenges for the FSC activity value include:

- How can adaptive management be effectively used in CEM, as a way to deal with uncertainty?
- How does the Metlakatla CEM Program improve the condition of interconnected values where trade-offs might be involved?

CURRENT FOCUS: INCORPORATING ADAPTIVE MANAGEMENT INTO CEM

To address these implementation challenges, we are first designing an adaptive management plan for FSC activity that includes a plan for implementing specific management actions identified in the CEM regime. The plan will also consider interconnected values, such as the protection of key harvested species.

Looking Forward: Linking CEM to Decision Making

It was important for us to first understand how CEM results could be used in order to ensure the program outcomes could affect change, when necessary. The next phase of work entails linking CEM to decision-making: how can the identification of priority values and indicators, collection of current condition data, setting of management triggers, and development of management strategies support decision making for Metlakatla?

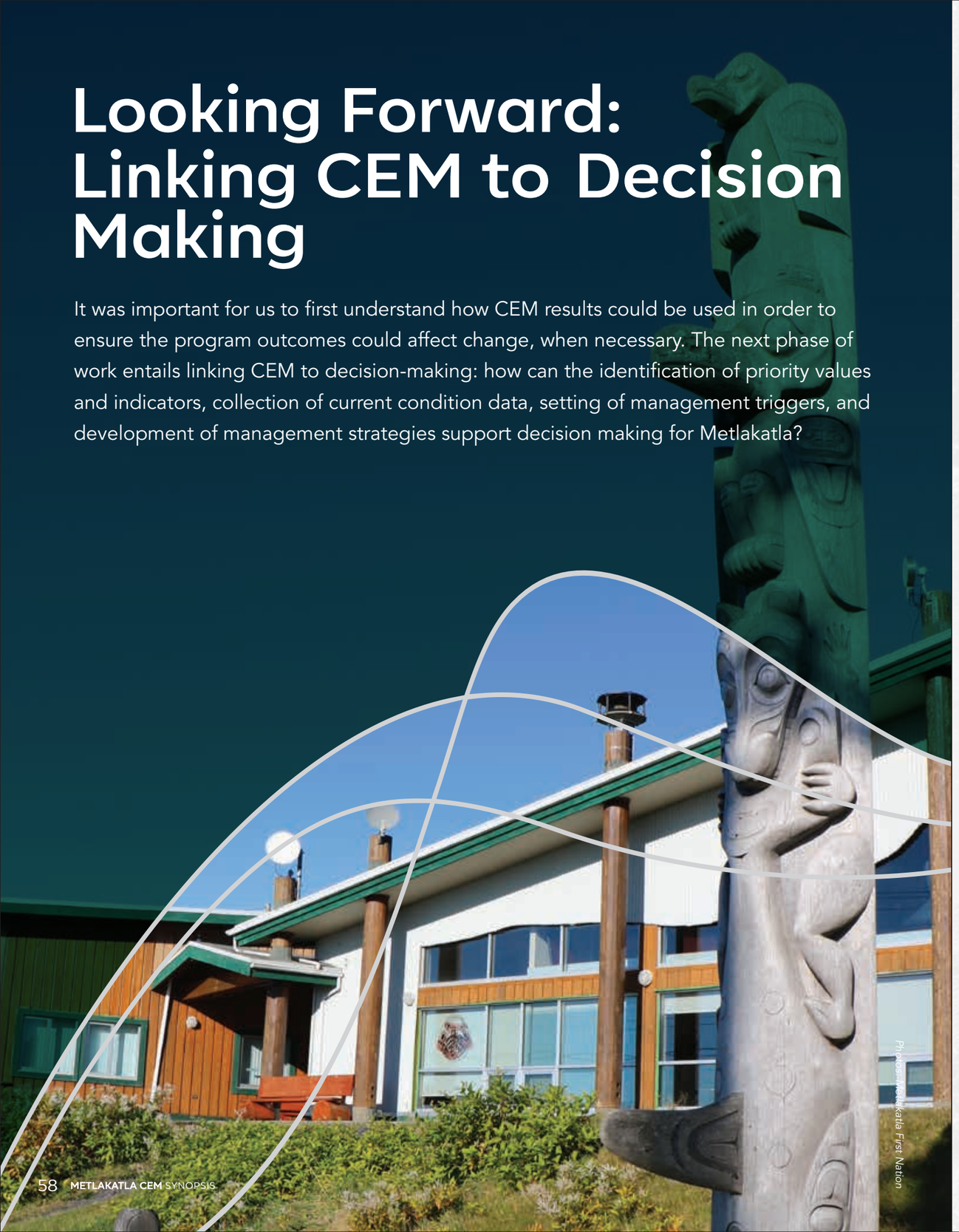


Photo: Metlakatla First Nation

CEM Governance Policy

The application of CEM in decision making is broad and varied, so moving forward, we are applying the lessons we learned over the past 5 years to decision making through several CEM Governance Pilot Projects as the basis of a comprehensive Metlakatla CEM Governance Policy. Our ultimate goal is to incorporate the results of the CEM Program – assessment, management, and decision making – into an overarching CEM Governance Policy that can guide future efforts. We recognize that the governance policy could have been developed at the outset of the CEM Program; however, given the Metlakatla CEM Program is one of few Indigenous-led CEM programs, we still have a lot to learn about on-the-ground application of CEM before venturing into broad policy development that will guide future work.

1 **DEVELOPING OVERALL MONITORING AND MANAGEMENT STRATEGY FOR PILOT VALUES**

We are developing a long-term monitoring program, cumulative effects management regime, and implementation plan for the 3 pilot values: Housing, Butter Clam, and FSC Activity.

2 **GROWING THE CEM PROGRAM TO INCLUDE MORE VALUES**

The development context in the region is changing and Metlakatla goals, priorities, and concerns could have also changed since the initial value selection process. We plan to advance the other priority values through the 4-phase CEM framework, while also considering that new values could be incorporated into the CEM Program.

3 **INTEGRATING CEM PROGRAM WITH OTHER CUMULATIVE EFFECTS INITIATIVES AND EA PROCESSES**

Since the development of the Metlakatla CEM Program in 2014, several other new cumulative effects initiatives are underway in BC, including BC's Cumulative Effects Framework. In addition, both federal and BC governments are in the process of introducing new EA legislation. A strategy should be developed to outline how the CEM Program can inform or support these new initiatives and processes. There may also be opportunities to coordinate regional monitoring and management efforts for regional values on BC's North Coast, such as Pacific Salmon.

4 **APPLYING CEM TO METLAKATLA TREATY**

At the time of publication, Metlakatla Treaty Office has reached stage 5 of the BC Treaty process. In order for Metlakatla to prepare for eventual ownership and/or jurisdictional control over Treaty areas of interest, the Treaty Office is seeking to characterize these areas through a cumulative effects decision making lens in order to explore long term governance and management structures. The goal is to characterize areas of interest in terms of intended use, risks to intended uses, and the lands/waters carrying capacity for the intended use. The challenge with applying CEM to Treaty lands and waters characterization is learning how to extend CEM tools and methods to the landscape level with more than one priority value.

METLAKATLA CEM COMMUNICATION INITIATIVES

From the outset, it was Metlakatla's intent to share lessons with a broader audience. To help share lessons, we secured a federal grant to undertake several communication initiatives:

CEM SYNOPSIS
(THIS DOCUMENT)

The report offers insight from 5 years of CEM experience to other CEM practitioners and communities that want to undertake CEM work.

SYMPOSIUM

Metlakatla will participate in a national conference to showcase the results of the Metlakatla CEM Program. As well, we are organizing a session in Prince Rupert to bring together community members, practitioners, and other groups to guide the next phase of CEM work.

WEBSITE

We are developing a web-based dashboard that illustrates up-to-date status of Metlakatla CEM values and indicators in relation to management triggers. The website will also provide background information about the Metlakatla CEM Program.

Summary of Successes and Challenges

Benefits to the Metlakatla First Nation and its Membership

1. Recognition

Metlakatla First Nation has been widely recognized as leaders in the area of cumulative effects management and the CEM Program itself has been acclaimed as an innovative, first of its kind, Indigenous-led CEM initiative in BC and Canada. Since 2014, several groups have reached out to Metlakatla to learn about the program and Metlakatla's experience tackling CEM in its Territory. More specifically, Metlakatla has offered guidance in cumulative effects exchanges with the World Wildlife Fund, Environment Canada and Climate Change, BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, BC's Environmental Stewardship Initiative, BC Hydro, Other First Nations, and Cumulative Effects Academics.

2. Leveraging CEM Results

A major component of the Metlakatla CEM Program is data collection, both socio-economic data through the Metlakatla Membership Census and intertidal clam data through the Metlakatla Clam Surveys. Having access to its own data collection methods and data has allowed Metlakatla to leverage CEM results in environmental assessment processes and treaty negotiations. For example, off-reserve housing was included as a valued component in the Aurora LNG project review application as a direct result of Metlakatla Census housing data. Metlakatla was able to show the proponent that core housing need was a significant issue for Metlakatla households in Prince Rupert.

3. Capacity Building

The Metlakatla CEM Program has hired more than 20 Metlakatla community members in various roles since 2014. The CEM Program has also led to several large funding agreements with the provincial and federal government, including the federal Oceans Protection Plan Baseline Fund, BC's Environmental Stewardship Initiative Restoration Fund, and funding from CIRNAC's Indigenous Centre of Expertise on Cumulative Effects Management. These funding opportunities have resulted in long-term staff hires for the Metlakatla Stewardship Society that has allowed Metlakatla to increase their internal capacity. In order to sustain a Metlakatla-led program, we are looking to hire a Metlakatla member as a CEM Program Coordinator in a full-time position to support ongoing CEM projects.

4. Metlakatla-Specific Data Collection

Good baseline information helps Metlakatla managers make good decisions because we cannot manage what we don't know. When it comes to available data on important values, Metlakatla has typically had to rely on existing data systems such as the Canadian Census and DFO catch monitoring programs. These systems are rarely built in ways that can support Metlakatla-specific data needs. The Metlakatla Membership Census and the Metlakatla Clam Monitoring Program are specifically developed to meet the unique needs, interests, and values of the Metlakatla community. As a result, Metlakatla now has 3 years of Metlakatla-specific socio-economic data and intertidal clam data for 4 Metlakatla beaches.

5. Raising the Bar for Resource Management

Since the Metlakatla CEM Program was first developed in 2014, we have seen several regional and provincial cumulative effects initiatives on BC's North Coast. Many of these initiatives have looked to the Metlakatla CEM Program for guidance, which results in better resource management at the regional level and indirectly benefits Metlakatla.

Photos: Metlakatla First Nation

CEM Program Successes

When we started Metlakatla CEM there was little practical guidance on undertaking CEM in an Indigenous context, administering a census in an Indigenous community, incorporating socio-economic and cultural values into CEM, setting management triggers, and engaging community members in developing a CEM Program. We learned by adapting best practices from other contexts to the Metlakatla context and involving the community. We found our way over obstacles by following CEM guiding principles and by trying out new methods or solutions. The CEM Program is a success as long as it helps Metlakatla make better decisions about the things that matter to Metlakatla people.

Ongoing Challenges and Our Response

1. Community Buy-in is Slow but Necessary

Fortunately, Metlakatla leadership strongly supported CEM from the beginning. However, due to being inherently complex, it is challenging to engage community members in a comprehensive discussion about CEM from year to year. We've enjoyed greater success engaging people in aspects of CEM such as the Metlakatla Membership Census, a specific value they may be interested in, or linking a CEM value to an actual project currently underway. All potential strategies to engage a wide range of community members need to be employed.

2. Dependence on SFU Researchers

Graduate students are an valuable resource to the CEM Program; however, it is equally important and sometimes challenging to build the internal capacity within Metlakatla to carry on the CEM work. We are in the process of identifying individual Metlakatla members that can be mentored over the next few years to take on the long-term management of the CEM Program.

3. Extending Metlakatla CEM at Regional Scale

The Metlakatla CEM Program is rooted in Metlakatla values and these values may not be shared or identified as priorities by other First Nations or governments working within the region. Sharing results of specific values is not always a realistic expectation. However, we've enjoyed success sharing methods with regional initiatives because we are hopeful that broader understanding of CEM will improve overall decision making in the region to support Metlakatla goals.

Supporting Cast

SFU School of Resource and Environmental Management (REM) Graduate Student Researchers

As of 2019, there have been 11 graduate students from REM that have worked on community-based research projects in support of the Metlakatla CEM Program. Metlakatla's decision to form a research partnership with SFU was a beneficial element of the CEM Program's successes to date. SFU researchers provide capacity, skills, and a readiness to tackle unique challenges of the Metlakatla CEM Program. SFU graduate students' participation in this research was made possible by funding through MITACS and SSHRC. Metlakatla and SFU have recently agreed to another multi-year research grant through MITACS to continue funding community-based CEM research in Metlakatla Territory.

We offer sincere gratitude to the following students in recognition of their contribution to the success of the Metlakatla CEM Program. We asked students what they personally learned from doing community-based research with the Metlakatla First Nation and their responses can be found in their profiles below. For students currently working on research projects, we asked what they hope to learn from their experience.

CUMULATIVE EFFECTS ASSESSMENT AND MANAGEMENT: A FRAMEWORK FOR THE METLAKATLA FIRST NATION
(2014-2015) – JOINT STUDENT PROJECT

Melissa Lucchetta

Strategic Projects Coordinator and Policy Analyst for BC's CEF (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development)

"The development of the framework was one of the first projects in support of the CEM Program. I quickly learned that Metlakatla is incredibly advanced and proactive in addressing issues around cumulative effects."

Melissa's research has contributed to work that has been summarized on pages 15-17.

CUMULATIVE EFFECTS ASSESSMENT AND MANAGEMENT: A FRAMEWORK FOR THE METLAKATLA FIRST NATION
(2014-2015) – JOINT STUDENT PROJECT

Marina Steffensen

Policy Analyst (Environment and Climate Change Canada)

"What stands out to me is how outcomes of the research are vital to the livelihoods of a community. I feel like I was contributing to something more than just a paper; I was investing time in helping a community understand a problem and develop a tangible and feasible solution."

Marina's research has contributed to work that has been summarized on pages 15-17.

THE DEVELOPMENT AND APPLICATION OF THE METLAKATLA MEMBERSHIP CENSUS
(2015-2016) – JOINT STUDENT PROJECT

Tanishka Gupta

Environmental Asssessment Officer (Impact Assessment Agency of Canada)

"Every day of my experience working with Metlakatla was a learning opportunity, from learning Metlakatla's history and culture to understanding how to adapt good practices from academic literature into the Metlakatla context. The biggest lesson was realizing the importance of involving community members at every step of designing and implementing the Census."

Tanishka's research has contributed to work that has been summarized on pages 29-30.

THE DEVELOPMENT AND APPLICATION OF THE METLAKATLA MEMBERSHIP CENSUS
(2015-2016) – JOINT STUDENT PROJECT

Celina Willis

Conservation Project Development Officer (Canadian Wildlife Service)

"I learned that research methods are not always going to be the same across communities and will depend on their unique needs, interests, and values. Spending time in communities and developing relationships is a key component of respectful and successful research projects."

Celina's research has contributed to work that has been summarized on pages 29-30.

IDENTIFYING CULTURAL VALUES IN THE METLAKATLA CEM PROGRAM
(2016-2017)

Brennan Hutchison

Project Assessment Officer (BC Environmental Assessment Office)

"I learned this type of research is complex and should not be measured by the number of participants, but rather, the quality of participation and that there is no one-size-fits-all solution to community-based research. I discovered that culture should only be defined and assessed by community members themselves. As a result, I had the unforgettable privilege of spending time with community members and building genuine connections."

Brennan's research has contributed to work that has been summarized on pages 25-26 and 51-52.

ESTABLISHING BASELINE CONDITIONS FOR BUTTER CLAMS IN THE METLAKATLA CEM PROGRAM
(2018-2019) – CURRENT PROJECT

Kate Menzies

Master's Candidate (SFU REM)

"Metlakatla is such a welcoming community that cares deeply about protecting their beautiful territory. I learned this work has many spin-off benefits, including social connection, celebration of culture, bringing youth and Elders together in hands-on learning experiences, and building social and ecological resilience."

Kate's research has contributed to work that has been summarized on pages 31 and 47-48.

ENGAGING WITH EXTERNAL STAKEHOLDERS TO IMPLEMENT A CEM STRATEGY FOR HOUSING IN PRINCE RUPERT
(2019-2020) – CURRENT PROJECT

Alex Haalboom

Master's Candidate (SFU REM)

"I feel incredibly fortunate to find myself in such a rich learning environment for my graduate studies. Being able to develop the tangible skills of social science research in a community context is an invaluable experience. I am learning from and with Metlakatla community members about how decisions are made and how a deep connection to place influences those choices."

A summary of Alex's research can be found on page 57.

ESTABLISHING TIERED MANAGEMENT TRIGGERS AND ACTIONS: HOUSING PILOT VALUE
(2017-2018) – JOINT STUDENT PROJECT

Mikayla Roberts

Community and Policy Planner (Township of Langley)

"I learned about the importance of communicating with the people you are undertaking the research for and making time to understand all perspectives and listen. When working with community members, it is important not to rush a process of understanding and discussion -- revelations emerge when all voices are heard. I am so grateful to Metlakatla for allowing me to be involved in this research."

Mikayla's research has contributed to work that has been summarized on pages 36-39 and 43-45.

DEVELOPING A PROTOCOL FOR RESTORING INTERTIDAL CLAM BEACHES USING TRADITIONAL CLAM GARDEN PRACTICES
(2019-2020) – CURRENT PROJECT

Emily Spiler

Master's Candidate (SFU REM)

"I am learning about how Metlakatla members interact with, monitor, manage, or decide the use of marine resources like clams. What interested me initially about the project was the story of a clam garden being restored in the Gulf Islands, and the history and story of clam gardens."

A summary of Emily's research can be found on page 57.

ASSESSING ENERGY VALUES AND MANAGEMENT OPTIONS FOR METLAKATLA VILLAGE
(2019-2020) – CURRENT PROJECT

Chris Ray

Master's Candidate (SFU REM)

"I am learning about Metlakatla's values with regard to their energy system and which energy management options align with these values. This is the first time that Metlakatla has engaged in energy-related research; therefore, I am excited to be part of new research that is important from environmental, social, and economic perspectives."

Chris's research is the first student project exploring connections between CEM and climate change (mitigation and adaptation).

Photo: Metlakatla Development Corporation

Metlakatla Community Member Groups

We are honoured to work with Metlakatla leadership, managers, staff, and community members on research in support of the Metlakatla CEM Program. Everyone we have worked with, particularly Metlakatla Elders and leadership, have been generous with their knowledge and time. Thank you for inviting us to work with you on this very important work.

Photo: Jordan Leask

Photos: Jordan Leask

METLAKATLA MEMBERSHIP CENSUS TEAM (2015-2017) ***Team Members: Yvonne Ryan (2015-2017), Mona White (2015), Sharon Morven (2015), Jordan Leask (2015), Rebecca Ryan (2016), Patty Leighton (2016), Darlene Harris-Wolfe (2017), Roberta Barker (2017)***

Metlakatla community members were hired as survey assistants to work with SFU graduate students to deliver the Metlakatla Membership Census each year. The Census teams went door-to-door to Metlakatla households to hand out Census forms, answer questions, and gather completed responses. The Metlakatla survey assistants were integral to the success of the Metlakatla Census every year because they knew everyone in the community and the best place and time to talk to Metlakatla households. We could not have done the Metlakatla Census without them!

METLAKATLA MEMBER-BASED CEM WORKING GROUP (2017-2018) ***Working Group Members: Roberta Barker, Dillon Buerk, Gary Doolan, Darlene Harris-Wolfe, Erin Mutrie, Fanny Nelson, William Nelson, Ron Smith***

The Metlakatla CEM Working Group included four Metlakatla members and four Metlakatla staff members. The Metlakatla members in the working group represented a good diversity of the broader community, in terms of age, gender, socio-economic status, level of FSC participation, and other characteristics. They participated in 7 full day workshops to identify tiered management triggers and actions for 3 pilot values. The working group was committed to the entire 11-month process, putting in hours of undivided attention to the work-at-hand. At the end of the final workshop, it felt like a true celebratory moment to accomplish what we had set out to do.

Photo: Kate Menzies

METLAKATLA CLAM SURVEY TEAM (2018-2019) ***Team Members: Teanna Azak, Cordel Brown, Ryan Brown, Cassidy Danes, Savanna Danes, Braden Etzerza, Ed Fitzgerald, Danny Leighton, Patty Leighton, Alexis Mintenko, Fanny Nelson, Kayla Robinson, Terrance Robinson, Chelsey Ryan, Cliff Ryan, Kyle Ryan, Rebecca Ryan, Reuben Ryan, Tristen Ryan, Ted (Jr.) Wilson***

The Metlakatla Clam Survey Team has been instrumental in gaining a better understanding of the distribution, abundance, and condition of clams in the territory. The team works hard each summer to collect important data needed to track changes to the clam populations over time. Following Metlakatla's clam survey methods, the survey team has counted and weighed over 6000 clams! Their work involves digging test plots, collecting the clams they find, and then identifying, counting, and weighing them. Most of these clams are returned to the beach, but a small sub-sample of butter clams are kept by the survey team to measure shells, weigh meat, and determine age at the Metlakatla lab.

Metlakatla CEM Program Team

Taylor Zeeg and Katerina Kwon have been involved in the development and implementation of the Metlakatla CEM Program since its inception in 2014. Their roles as CEM Program Co-managers are to (1) ensure the CEM Program is moving forward and goals are being met, (2) maintain coordination between Metlakatla and SFU REM, (3) manage SFU graduate student projects, and (4) ensure the CEM Program is in accordance with broader Metlakatla objectives. In 2016, the Metlakatla CEM Advisory Committee was formed to provide strategic level advice to the CEM Program. The Committee includes representation from both Metlakatla and SFU REM. The roles of the CEM Advisory Committee are to (1) foster collaboration between Metlakatla and SFU REM, (2) integrate CEM Program work with other related initiatives (i.e., EA work, regional work), and (3) provide guidance to CEM Program Co-managers on engaging Metlakatla membership and external stakeholders.

Taylor Zeeg

Metlakatla CEM Program Co-manager

Taylor Zeeg is a consulting economist and planner with Tributary Project Services Ltd. He began working with Metlakatla in 2013, moved to Prince Rupert in 2014 to manage the Metlakatla CEM Program, and continues to co-manage the program with Katerina Kwon. Taylor's primary interest is expanding CEM to include the much less understood areas of socio-economics, culture, and public health, particularly in an Indigenous context. In addition to his consulting practice, Taylor is a volunteer board member for Cedar Village Housing Society and the Indigenous Centre for Cumulative Effects.

Katerina Kwon

SFU CEM Program Co-manager

Katerina is a PhD candidate in the REM Program at Simon Fraser University. She started working with Metlakatla during her master's research, which involved developing an improved methodology for identifying and selecting environmental values in the Metlakatla CEM Program. Her PhD research is focused on linking cumulative effects assessment and monitoring information to Indigenous decision-making processes.

Katerina's research has contributed to work that has been summarized on pages 14-17, 18-22, 32-39, 47-49, 51-55, and 58-59.

Metlakatla CEM Advisory Committee

Ross Wilson
Metlakatla Stewardship Society Director

Anna Usborne
Metlakatla Stewardship Society, Strategic Stewardship Initiatives

Erin Mutrie
Metlakatla Stewardship Society, Environmental Assessment Manager

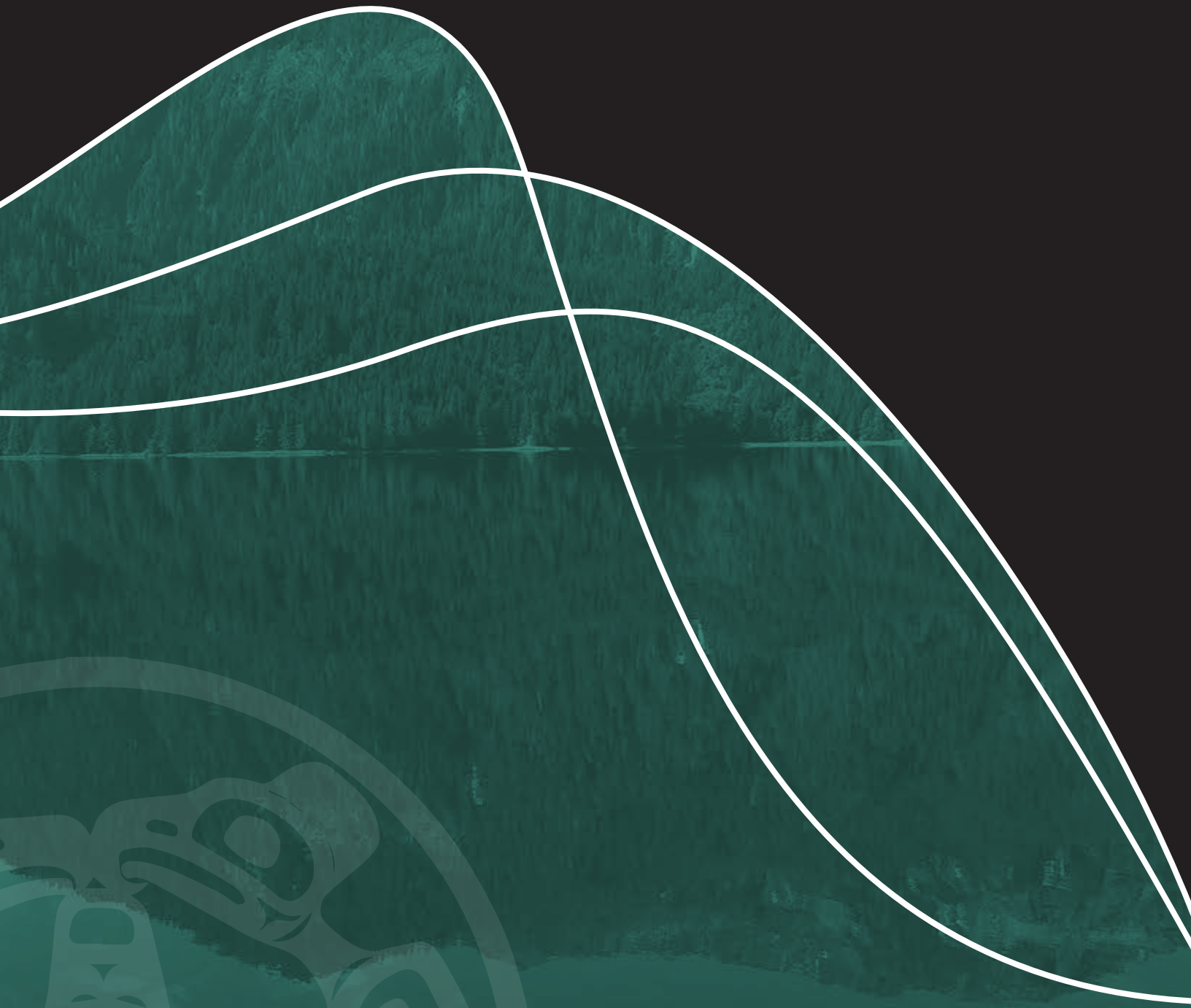
Dr. Tom Gunton
SFU REM, Professor and Director of the REM Planning Program

Dr. Murray Rutherford
SFU REM, Associate Professor

We would also like to acknowledge the people involved in the initial development of Metlakatla CEM Program. From Compass Resource Management Ltd, Lee Failing, David Angus, Chris Joseph, and Holly Nesbitt and from Simon Fraser University's School of Resource and Environmental Management, Dr. Sean Broadbent. We would also like to thank Jessica Hawryshyn, who provided project support and participated in the Metlakatla CEM Advisory Committee in 2017-2019.

Photo: Metlakatla Development Corporation

Metlakatla
CEM
CUMULATIVE EFFECTS MANAGEMENT



www.MetlakatlaCEM.ca
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