In response to recent and proposed development activity within Metlakatla Territory, the Metlakatla First Nation initiated a cumulative effects management (CEM) project for the Metlakatla Territory. Cumulative effects in simplest terms are changes to Metlakatla values due to past, present and future human actions. Cumulative effects management attempts to track and manage the condition of priority values in the context of an evolving landscape of individual projects and activities.

The Metlakatla’s approach to CEM is intended to inform decisions at two levels: 1) the individual project scale via the environmental assessment (EA) process and 2) at a Territory-wide scale to guide broader land, marine, and community planning and establish parameters and key considerations for future development. The Metlakatla are aware of other CEM efforts underway on the North Coast and so have adopted methods that are consistent with best practices and compatible with other processes. The steps followed in phase 1 and proposed for phase 2 are summarized in the illustration below.

### Steps of Metlakatla Approach to CEM

1. Clarify the decision context (i.e. how will CEM results be utilized?)
2. Identify candidate values (i.e., “the things that matter”)
3. Examine current and future development scenarios (i.e. projects and activities).
4. Clarify how development may affect priority values using pathway diagrams.
5. Select indicators for priority values.
6. Identify interim management triggers or benchmarks for each indicator.
7. Assess the condition and trend of each indicator. Re-assess whether a priority.
8. Determine management triggers, zones and responses.
9. Implement monitoring program, as required.
10. Re-assess priority values (return to Step 1).

### Phase 1: Develop CEM Values Foundation

The focus of phase 1 was the identification of priority values and associated indicators, comparison benchmarks and in some cases, preliminary management triggers. Ten priority values and 12 indicators spanning a range of environmental, socio-economic, cultural and governance values were prioritized for a phase 2 pilot implementation project. The priority values (indicators in parentheses) include:

- Chinook (abundance and critical juvenile habitat)
- Butter Clams (population density)
- Adequate housing (# of households in core housing need)
- Access to health services (Ambulatory Care Sensitive Conditions rates)
- Chronic health conditions (diabetes and hypertension prevalence)
- Wealth distribution (income equality)
- Economic self-sufficiency (high school completion rate)
- Personal safety (crime severity)
- Governance of Metlakatla lands (stewardship ability)
- FSC activity (FSC participation rates)

A Values Foundation Implementation Guide and ten detailed Indicator Guide Sheets were prepared as companion documents to this report. Each CEM indicator guide sheet includes a description of the indicator and rationale for its selection; associated stressor indicators to support project-level assessments; indicator limitations, calculations and data sources; comparison benchmarks (socio-economic values) or preliminary management triggers (biophysical values); and
implementation considerations. Due to a lack of baseline data, a Community Survey Guide Sheet was prepared to support socio-economic data collection and an Assessment and Monitoring Guide Sheet was developed to inform the development of a biophysical value data collection program.

Managing the condition of priority values necessitates the identification of management triggers, zones, actions and goals. A tiered management trigger is proposed for the Metlakatla CEM system, illustrated in the figure below.

**Metlakatla CEM Concept**

Maintaining the condition of priority values in the green zone is preferred. Values in acceptable condition may warrant standard procedures and routine monitoring. A value in the middle zone is characterized as cautionary and triggers restorative action, or, in cases where the costs of restorative measures outweigh the benefits (from a societal perspective) offsets that benefit other priority values or are acceptable to stakeholders can be implemented in lieu. The red tier is a no-go zone that triggers stringent measures intended to quickly restore a value’s condition. In a well-designed CEM system, a value’s condition would never reach the red zone due to increased and effective management responses in the yellow zone.

Several themes emerged in phase 1 that may be instructive for phase 2:

- **CEM is a program not a project.** There are many Metlakatla values. The purpose of a CEM system is to track and manage those values most likely to be impacted by current and future development and requiring management attention. Because projects and activities are constantly changing, priority values and/or indicators can change over time. CEM is inherently iterative and therefore ongoing.
- **CEM must be culturally relevant.** Many departmental mandates and activities are organized around strengthening an understanding and practice of Tsimshian culture. A culturally relevant CEM will identify values, indicators and management triggers that incorporate cultural perspectives.
- **There is a need for current condition data (e.g. baseline data).** Data is required in many cases to accurately assess the current condition of priority values. In cases where the value is in poor or deteriorating condition, partners may collaborate to implement management responses (e.g. ongoing monitoring program, mitigation measures, etc.).
- **Metlakatla values can benefit from partnerships.** Partnerships among the Metlakatla, other Tsimshian First Nations, and government can help increase management effectiveness. For example, improving health care services for
members living in Prince Rupert would be challenging without the participation of Northern Health; addressing impacts to marine species would be easier with support from Environment Canada and/or Department of Fisheries and Oceans; and reducing crime-related impacts requires involvement of the RCMP. Collaboration with other Tsimshian First Nations will help motivate government and agency action on issues that are relevant to the Prince Rupert area Aboriginal population (e.g. adequate housing). Further, pooling resources among all partners can reduce the capacity burden (financial and human resources) of long-term monitoring programs.

- *Tiered management triggers* (*i.e.* red, yellow, green zones). The emerging consensus among cumulative effects practitioners suggests the use of tiered triggers is required to address uncertainty and incorporate a precautionary approach. Triggers should be developed deliberatively, incorporating science, traditional and local knowledge, stakeholder values and a consideration of implementation considerations. The Metlakatla have adopted a tiered trigger approach to CEM, identifying a number of strategies during phase 1 to aid with CEM implementation.

**Phase 2: CEM Implementation**

The Phase 2 implementation plan is a 9-step process intended to engage internal and external implementation partners in validating/refining phase 1 work, collecting required baseline data, seeking alignment on management goals, triggers and actions for priority values/indicators, and designing and implementing an ongoing monitoring program. Upon completing the phase 2 pilot, the Metlakatla and its partners may elect to revisit values and indicators that were not addressed through the pilot. A mark of success of the Metlakatla’s efforts on CEM would be the formation of a multi-party institution tasked with tracking and managing the condition of priority values over time on the North Coast.

See the following pages for:
- A summary of the Phase 1 Values Foundation, and
- Phase 2 Implementation Pathways.
<table>
<thead>
<tr>
<th>METLAKATLA VALUE</th>
<th>INDICATOR - METRIC</th>
<th>COMPARATIVE BENCHMARKS (socio-economic values)</th>
<th>IMPLEMENTATION PATH</th>
<th>POTENTIAL IMPLEMENTATION PARTNERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth Distribution</td>
<td>Income equality&lt;br&gt;Ratio of low-income households (&lt;$40k/yr) to middle-income households ($50k - $80k/yr) (Aboriginal population data shown)&lt;br&gt;Directionality: lower is better</td>
<td>Prince Rupert: 2.4&lt;br&gt;Terrace: 2.8&lt;br&gt;Kitimat: 1.9&lt;br&gt;Prince George: 1.5&lt;br&gt;Port Alberni: 2.6&lt;br&gt;British Columbia: 1.8</td>
<td>Pathway A or B&lt;br&gt;Metlakatla (Development Corporation)&lt;br&gt;Other Tsimshian First Nations&lt;br&gt;Prince Rupert and Port Edward Economic Development Corporation</td>
<td></td>
</tr>
<tr>
<td>Economic Self Sufficiency</td>
<td>High School Completion&lt;br&gt;Six Year Completion Rate = (# of graduates) / (total number of grade 8 Metlakatla cohort – Metlakatla attrition factor) (Aboriginal population data shown)&lt;br&gt;Directionality: higher is better</td>
<td>Prince Rupert (SD#52): 63&lt;br&gt;Coast Mountains (SD#82): 44&lt;br&gt;Prince George (SD#57): 49&lt;br&gt;Port Alberni (SD#70): 42&lt;br&gt;British Columbia: 62</td>
<td>Pathway B&lt;br&gt;Metlakatla (Governing Council)&lt;br&gt;Other Tsimshian First Nations&lt;br&gt;School District 52&lt;br&gt;Prince Rupert Friendship House&lt;br&gt;City of Prince Rupert</td>
<td></td>
</tr>
<tr>
<td>Individual Health</td>
<td>Diabetes prevalence&lt;br&gt;% of population with diabetes (Total Population data shown)&lt;br&gt;Directionality: lower is better</td>
<td>Prince Rupert: 6.3&lt;br&gt;Terrace: 6.8&lt;br&gt;Kitimat: 7.6&lt;br&gt;Prince George: 6.1&lt;br&gt;Port Alberni: 5.8&lt;br&gt;British Columbia: 5.4</td>
<td>Pathway B&lt;br&gt;Metlakatla (Governing Council)&lt;br&gt;Other Tsimshian First Nations&lt;br&gt;Northern Health&lt;br&gt;First Nations Health Authority</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypertension prevalence&lt;br&gt;% of population with heart disease (Total Population data shown)&lt;br&gt;Directionality: lower is better</td>
<td>Prince Rupert: 21.8&lt;br&gt;Terrace: 21.6&lt;br&gt;Kitimat: 22.9&lt;br&gt;Prince George: 19.8&lt;br&gt;Port Alberni: 18.7&lt;br&gt;British Columbia: 18.0</td>
<td>Pathway B&lt;br&gt;Metlakatla (Governing Council)&lt;br&gt;Other Tsimshian First Nations&lt;br&gt;Northern Health&lt;br&gt;First Nations Health Authority</td>
<td></td>
</tr>
<tr>
<td>Access to health services</td>
<td>Access to health care&lt;br&gt;ambulatory care sensitive conditions per 10,000 in Prince Rupert (Total Population data shown)&lt;br&gt;Directionality: lower is better</td>
<td>Northwestern BC: 516&lt;br&gt;North Interior BC: 503&lt;br&gt;Northeast BC: 384&lt;br&gt;Northern Vancouver Isl.: 269&lt;br&gt;British Columbia: 258</td>
<td>Pathway B</td>
<td>Metlakatla (Governing Council)&lt;br&gt;Other Tsimshian First Nations&lt;br&gt;Northern Health&lt;br&gt;First Nations Health Authority</td>
</tr>
</tbody>
</table>

*One outcome from CEM will be the identification of management triggers for priority values. Comparison benchmarks are provided in some cases where triggers are yet to be determined. See Management Trigger section in final report for further detail.
<table>
<thead>
<tr>
<th>METLAKATLA VALUE</th>
<th>INDICATOR - METRIC</th>
<th>COMPARATIVE BENCHMARKS (socio-economic values)</th>
<th>IMPLEMENTATION PATH</th>
<th>POTENTIAL IMPLEMENTATION PARTNERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adequate Housing</strong></td>
<td>% of Tenants In Core Housing Need</td>
<td>Prince Rupert 37</td>
<td>Pathway B</td>
<td>Metlakatla (Governing Council) Other Tsimshian First Nations City of Prince Rupert Makola Housing Society North Coast Transition Society Aboriginal Housing Management Association</td>
</tr>
<tr>
<td></td>
<td>Failure on any one of the following:</td>
<td>Terrace 41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Affordability: housing costs &gt; 30% of household income</td>
<td>Prince George 45</td>
<td>Pathway B</td>
<td>Other Tsimshian First Nations North Coast Victim Support Services - RCMP Victim Services, Prince Rupert Community Enrichment Society</td>
</tr>
<tr>
<td></td>
<td>• Adequacy: condition of house</td>
<td>Port Alberni 47</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Suitability: # of occupants (Aboriginal population data shown)</td>
<td>British Columbia 39</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directionality: lower is better</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personal Safety</strong></td>
<td>Crime Severity Index</td>
<td>Prince Rupert 143</td>
<td>Pathway B</td>
<td>Metlakatla (Governing Council) Other Tsimshian First Nations North Coast Victim Support Services - RCMP Victim Services, Prince Rupert Community Enrichment Society</td>
</tr>
<tr>
<td></td>
<td>Crime rates weighted by seriousness (crimes include violent, property, and petty) (Total Population data shown)</td>
<td>Terrace 153</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Directionality: lower is better</td>
<td>Kitimat 91</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prince George 137</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Port Alberni 135</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>British Columbia 89</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chinook Salmon</strong></td>
<td>Spawner abundance</td>
<td>STOCK RECRUITMENT METHOD</td>
<td>Pathway A or B</td>
<td>Metlakatla (Stewardship Society) Other Tsimshian First Nations Pacific Salmon Foundation Department of Fisheries and Oceans Simon Fraser University researchers Skeena Estuary Research Centre Bulkley Valley Research Centre WWF-Canada</td>
</tr>
<tr>
<td></td>
<td># adults returning to spawn in each CU within Metlakatla territory (Lower Skeena CU Snapshot shown for illustration purposes and possible focus of CEM pilot project)</td>
<td>HISTORIC SPAWNSERS METHOD</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPawner ABUNDANCE (decreasing spawner #%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CRITICAL JUVENILE HABITAT (decreasing habitat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥20% decline relative to the baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥50% decline relative to the baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Critical juvenile habitat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Areal extent of eelgrass beds (ha) (i.e. eelgrass distribution)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Butter Clams</strong></td>
<td>Population density</td>
<td>POPULATION DENSITY (decreasing density)</td>
<td>Pathway A or B</td>
<td>Metlakatla (Stewardship Society) Other Tsimshian First Nations Simon Fraser University researchers Department of Fisheries and Oceans</td>
</tr>
<tr>
<td></td>
<td># individuals per m2 (per beach)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FSC Activity</strong></td>
<td>FSC Participation Rate</td>
<td>Will be developed further internally</td>
<td>Pathway A or B</td>
<td>Metlakatla (Stewardship Society) Other Tsimshian First Nations</td>
</tr>
<tr>
<td></td>
<td>Several options:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Youth participation rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Household participation rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Effort - # of person-days/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ability to Steward</strong></td>
<td>Stewardship of priority lands</td>
<td>Will be developed further internally</td>
<td>Pathway A</td>
<td>Metlakatla (Stewardship Society)</td>
</tr>
<tr>
<td></td>
<td>Constructed scale</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*estimated number of spawners from 2008 to 2012 in the Lower Skeena CU (source: NuSEDS database).*
**IMPLEMENTATION PATHWAYS**

**STEP 1**
(decision)

**STEP 2**
(task)

**STEP 3**
(decision)

**STEP 4**
(task)

**STEP 5**
(task)

**STEP 6**
(task)

**STEP 7**
(decision)

**STEP 8**
(task)

**STEP 9**
(task)

**IS THIS INDICATOR A METLAKATLA PRIORITY?**

- **NO**
  - Share indicator guide sheet with other parties that might benefit from Metlakatla work.

- **YES**
  - **PATHWAY A** Internal Process
    - Establish internal working group.
    - Review indicator guide sheets. Confirm indicator(s) and metric(s).
    - Collect baseline data. Review results.
    - After reviewing baseline results, is this indicator still a priority?
      - **YES** Seek alignment on management triggers, actions and goals.
      - **NO** Establish process to revisit indicator at a future date and assess status.
  
  - **PATHWAY B** External Process
    - Establish working group with external parties.
    - Review indicator guide sheets. Seek alignment on indicator(s) and metric(s).

- **NO**
  - Would the management of this indicator benefit from an external partnership?

  - **YES**
    - **PATHWAY A** Internal Process
      - Establish internal working group.
      - Review indicator guide sheets. Confirm indicator(s) and metric(s).
      - Collect baseline data. Review results.
      - After reviewing baseline results, is this indicator still a priority?
        - **YES** Seek alignment on management triggers, actions and goals.
        - **NO** Establish process to revisit indicator at a future date and assess status.
    
    - **PATHWAY B** External Process
      - Establish working group with external parties.
      - Review indicator guide sheets. Seek alignment on indicator(s) and metric(s).