

FSC® Management Plan – Appendix 3

# *Annual Monitoring Report 2017*



*From the Land and Spirit of the Haida*

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## Introduction

A monitoring report will be compiled on an annual basis, in support of FSC certification and the monitoring plan contained within the FSC Management Plan.

The Monitoring Report and development of indicators was completed by Jillene West, RPF and Shayne Boelk, RPF, BIT (Zimmfor Management Services Ltd.) and Laurie Kremsater, M.Sc., RPF, RPBio. Support and data were also provided by several key staff at Taan Forest LP (and BC Timber Sales for their activities within the Management Unit). Performance reporting for several key indicators was also generated utilizing the Forest and Range Evaluation Program (FREP) monitoring data.

Indicators have been developed to address the FSC requirements for monitoring (i.e., Elements) and progress on indicators has been used as benchmarks to assess trends. Targets have been developed in addition to reporting current status or benchmarks, to reflect internally established “goal posts” that in some cases may be the same as the benchmark or historical performance (for example any indicators based on legal requirements) and at times may vary from the benchmark (for example where we are striving for improved performance or continual improvement). It is anticipated that in some cases, targets will be periodically reviewed and revised to drive continual improvement or to reflect current operational conditions, where applicable. Management Strategies associated with each indicator outline typical management actions to achieve targets and also outline adaptive strategies should targets fail to be met. These approaches form the backbone of the ‘Adaptive Management’ cycle and ensure results of monitoring will feedback to appropriately change management.

The default timeline for indicator reporting and the period which targets should be met is one year (based on annual reporting). Where specific indicators and targets are to be measured on alternate timeframes, it will be specified under the indicator descriptions. In general, the reporting period includes January 1 to December 31 of each year. These may be revised in future to coincide with fiscal year reporting.

The monitoring report is provided to the Haida Nation, stakeholders and to the general public under the FSC Consultation requirements in the FSC Management Plan.

In addition, the results of monitoring are also reviewed during the Taan Forest Management Review process under the Corporate Management System to review and discuss continual improvement and adaptive management in terms of both implementation and effectiveness (documentation of the review and any proposed changes to the FSC Management Plan, Assessments, Monitoring Plan and/ or indicators, benchmarks and targets are recorded within the Management Review meeting minutes and/ or the Taan Corporate Tracker (action plan tracking)).

The indicators are organised in the same order as the principles of the FSC® Forest Management Standard.

## Summary of Changes

This section includes a summary of the changes to the Indicators, Targets or Management Strategies that have been made since the last version (see dates in table below) as a result of continual improvement, management review, monitoring and adaptive management, results of audits, or feedback from Haida Nation and stakeholders.

In addition, throughout the Monitoring Report, where text has been revised or added, it is indicated in purple font to help focus attention to the revisions.

| Date    | Indicator                          | Summary of Changes  |
|---------|------------------------------------|---|
| May '18 | HCVF Large Landscape Level Forests | Revision of the permitted disturbance threshold from 5% of the entire intact forest polygon to reflect the new requirements established under FSC International Motion 65, which establishes a maximum threshold of 20% of the portion of the intact forest located within the Management Unit (MU), or preservation of a minimum of 80% of the area within the MU. |

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## Summary of Results

In 2017, Taan achieved the established targets on 35 of 36 indicators (overall performance score of 97%) which demonstrates continual improvement compared to 2016 (92%), 2015 (83%), 2014 (89%), 2013 (89%) and 2012 (75%).

The following table provides an overview summary of the indicators where the targets were not achieved, as well as the proposed action items to address deficiencies and adapt management strategies to achieve improved performance.

These items must be addressed as part of the adaptive management cycle. Management Review meetings must review and consider the proposed actions below and revise management strategies where required to address the issues and concerns (actions are tracked in the Taan Corporate Tracker):

| Indicator                          | Summary of Results – Target not Met  | Action Required   |
|------------------------------------|--|---|
| Windthrow Management Effectiveness | Windthrow not completed when prescribed<br>Windthrow impacts to LUO reserves & Features Impacted | <p>An Internal Investigation (and meeting) was conducted to examine the immediate and root causes of the continued challenges with windthrow management in Haida Gwaii:</p> <ul style="list-style-type: none"> <li>Manual TCM crew is off-island, thus Taan has to wait periods of time until there is a sufficient number of blocks to treat to bring the crew up for work (manual treatments are completed in old growth blocks). Heli TCM was tested in old growth but was not effective.</li> <li>Helicopter TCM treatment scheduling has to factor in availability of the helicopter (not always available). Heli treatments cannot be completed prior to harvesting, has to be completed afterwards. New blades have been used for the last 1.5 years and are more effective than the first type that was used.</li> <li>Protection of LUO Features has resulted in “fingers” or protrusions of timbered patches into the cutblock (vulnerable to windthrow).</li> <li>Windthrow Assessors are not putting enough consideration/ emphasis on secondary windthrow directions</li> <li>Taan Windthrow prescriptions are not clear, leading to some LUO features in old growth not having TCM prescribed along all edges</li> <li>All blocks noted in the monitoring results have since had their TCM completed.</li> </ul> <p>Action Plans:</p> <ol style="list-style-type: none"> <li>Taan staff to document TCM assessments during Inspections (to ensure that treatments are occurring as prescribed, with sufficient crown removal and distance into the stand)</li> <li>Taan to complete a windthrow workshop with staff and contractors regarding windthrow assessments, primary vs secondary wind directions, the need to treat all protruding fingers/ edges and the need to make those wider in size to minimize vulnerability.</li> <li>Windthrow prescription field card to be revised to include required TCM treatments for all edges of LUO features, for old growth (already in place for second growth).</li> </ol> |

At this time, Taan does not have an indicator for Visual Quality Effectiveness. FREP completed two visual assessments in the Management Unit in 2017, on blocks SKI006 and AER001. SKI006 has an established visual quality objective of Modification, and AER001 is Partial Retention. SKI006 was assessed as meeting the objectives, and AER001 was reported as well met.

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## ***Additional Action Items***

The results of the annual report have generated action items in addition to those noted above directly linked to specific indicators. These will be added to management review discussions and are tracked for follow-up and completion in the Taan Corporate Tracker:

1. NOGO Implementation Plan (Feb 2018) - obtain the updated modelling data and complete a review of the proposed changes in the Implementation Plan and potential impacts to operations. A series of reports and analysis is scheduled for Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) in January/ April 2018.

\*Note, the acronym MFLNRO has recently been changed to MFLNRORD (and has changed many times over the last few years), but for simplicity, MFLRNO will be used throughout this report.

2. In the absence of any recent assessment completed by FREP for Stand Development, explore options for development of a new indicator for stand development (stand growth) and potential ways that Taan could assess/ report (e.g., using LiDAR).

## Yield of all Forest Products

### Indicator: Forest Products

| Element  | Objective   | Indicator   | Target   |
|--|---|---|--|
| FSC 8.2.1 & 5.2.2: Yield of all products harvested | Ensure optimal yield and value of forest products | Volume and species harvested is relatively consistent with the forecasted harvesting profile;<br>Amount of monumental cedar provided to the Cultural Wood Program | Harvest Volumes within 5% over a 10-year period; report the amount of monumental cedar provided to the Cultural Wood Program |

#### Rationale for Indicator & Target

By ensuring a balanced harvest profile that is consistent with the forecasted profile, Taan can help demonstrate that optimal yield is achieved without high-grading (i.e., harvesting only the best timber). The target is based on the results of the recent Timber Supply Review by the Haida Gwaii Management Council (Analysis Report, Figure 10 and associated data tables) demonstrating the allocation of the harvest by species forecasted into the future; a twenty-year term was selected out of the forecasted 400 years for relevance to annual reporting periods. This target assumes that the species profile is evenly apportioned across tenure holders (which it may not be in reality). However, since the current ACC does not include partitions based on species, assuming even distribution was the most achievable scenario.

#### Current Status/ Results

##### Volume Harvested by Species

| Year | Description          | Total Volume Harvested (m <sup>3</sup> ) | Volume Harvested by Species (m <sup>3</sup> ) |               |                |                |              | Custom Cut/ Lumber Sales (fbm) | Value Added     | Target Met (Y/N)    |
|------|----------------------|--|---|---------------|----------------|----------------|--------------|--------------------------------|-----------------|---------------------|
|      |                      |  | Red Cedar                                     | Cypress       | Hemlock        | Spruce         | Other        |                                |                 |                     |
| 2017 | Taan                 | 266,526                                  | 82,026<br>31%                                 | 23,116<br>9%  | 65,276<br>24%  | 95,576<br>36%  | 532<br>0%    | 16,661,000                     | High Value Cuts | To be reported 2021 |
|      | BCTS in Haida Tenure | 0  | -   | -             | -              | -              | -            |                                |                 |                     |
|      | <b>Total</b>         | <b>266,526</b>                           | <b>82,026</b>                                 | <b>23,116</b> | <b>65,276</b>  | <b>95,576</b>  | <b>532</b>   |                                |                 |                     |
| 2016 | Taan                 | 376,260                                  | 99,608<br>26%                                 | 12,866<br>3%  | 118,985<br>32% | 135,164<br>36% | 9,126<br>2%  | 15,247,993                     | Piano Wood      | To be reported 2021 |
|      | BCTS in Haida Tenure | 0  | -   | -             | -              | -              | -            |                                |                 |                     |
|      | <b>Total</b>         | <b>376,260</b>                           | <b>26%</b>                                    | <b>3%</b>     | <b>32%</b>     | <b>36%</b>     | <b>2%</b>    |                                |                 |                     |
| 2015 | Taan                 | 370,234                                  | 73,492<br>20%                                 | 15,175<br>4%  | 123,373<br>33% | 157,981<br>43% | 209<br>0.06% | 7,079,580                      | Piano Wood      | N                   |
|      | BCTS in Haida Tenure | 0  | -   | -             | -              | -              | -            |                                |                 |                     |
|      | <b>Total</b>         | <b>370,234</b>                           | <b>20%</b>                                    | <b>4%</b>     | <b>33%</b>     | <b>43%</b>     | <b>0.06%</b> |                                |                 |                     |
| 2014 | Taan                 | 276,603                                  | 55,899<br>20%                                 | 6,540<br>2%   | 84,015<br>30%  | 118,663<br>43% | 11,486<br>4% | 2,612,436                      | Guitar Wood     | N                   |
|      | BCTS in Haida Tenure | 0  | -   | -             | -              | -              | -            |                                |                 |                     |
|      | <b>Total</b>         | <b>276,603</b>                           | <b>20%</b>                                    | <b>2%</b>     | <b>30%</b>     | <b>43%</b>     | <b>4%</b>    |                                |                 |                     |
| 2013 | Taan                 | 269,462                                  | 83,035<br>31%                                 | 14,643<br>5%  | 83,165<br>31%  | 79,975<br>30%  | 8,644<br>3%  | 4,710,105                      | 0               | Y                   |
|      | BCTS in Haida Tenure | 54,696                                   | 0   | 0             | 15,824<br>29%  | 38,601<br>71%  | 271<br>0.5%  |                                |                 |                     |
|      | <b>Total</b>         | <b>324,158</b>                           | <b>24%</b>                                    | <b>4%</b>     | <b>28%</b>     | <b>34%</b>     | <b>2.5%</b>  |                                |                 |                     |

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| Year             | Description | Total Volume Harvested (m <sup>3</sup> ) | Volume Harvested by Species (m <sup>3</sup> ) |         |         |        |       | Custom Cut/ Lumber Sales (fbm) | Value Added | Target Met (Y/N) |
|------------------|-------------|--|---|---------|---------|--------|-------|--------------------------------|-------------|------------------|
|                  |             |  | Red Cedar                                     | Cypress | Hemlock | Spruce | Other |                                |             |                  |
| 2012             | Taan        | 183,438                                  | 94478   | 15,237  | 54425   | 10169  | 9,129 | 2,893,353                      | 700 planks  | Y                |
|                  |             |  | 50%   | 8%      | 30%     | 7%     | 5%    |                                |             |                  |
| 2011             | Taan        | 186,050                                  | 72,319  | 7,616   | 35,957  | 68,820 | 1,338 | 466,485                        | 0           | N                |
|                  |             |  | 39%   | 4%      | 19%     | 37%    | 1%    |                                |             |                  |
| 20-year forecast |             |  | 41%   | 7%      | 39%     | 11%    | 2%    | -                              | -           |                  |

<sup>1</sup> Other species include minor species such as pine and deciduous species.

In 2017, Taan completed 24 custom cuts at sub-contract mills in the lower mainland, several of which were completed to produce small volume high value products of red and yellow cedar lumber. Taan sold 16,660,000fbm and 2,238m<sup>3</sup> of lumber to various customers. A small portion of lumber was sold to local residents/ companies (5,500 fbm). Approximately 400m<sup>3</sup> of logs were sold to local residents.

BCTS did not conduct any harvesting within the Haida Tenure in 2017.

Overall harvest of spruce continues to be fairly high in relation to the target (5-yr average is 24% above the target in 2015 and 2016). An action item was created in 2015 to discuss future harvesting plans and potential opportunities to harvest more Cw and Hw with Taan Management, but it will take a few years to implement the change (i.e., planning and block layout is completed 1-3 years prior to harvesting). In 2016, Taan produced 44,759fbm of piano wood (value added). BCTS did not conduct any harvesting within the Taan Tenure in 2016.

A detailed breakdown of the various log grades can be obtained upon request to the Taan Forest CMS Administrator. Data corrections were made for the 2012 and 2013 data.

Lumber Sales and value added products for Taan are also reported under this indicator. While there are no specific targets set, they provide valuable additional information in relation to reporting of the forest products produced in the Management Unit. Taan lumber sales to date are comprised of mostly western red cedar and a small amount of cypress and spruce.

The recent Timber Supply Review completed by the Haida Gwaii Management Council indicates (Analysis Report section 3.1.5-Species Distribution) that the harvesting profile is anticipated to change during the next 80 years, as the volume of harvested cedar declines as a result of the lag between diminishing harvestable old growth and contributions from second growth stands to the harvest profile. The amount of available old growth cedar is impacted by the new protected areas and LUO cultural objectives. The “downfall” is diminished once the second growth cedar reaches harvestable age. Refer to the Planting Indicator to compare harvested versus planted species.

#### Support for the Cultural Wood Program

| Year | Monumental Cedar Provided to the Cultural Wood Program |                | Target Met (Y/N) |
|------|--|----------------|------------------|
|      | # of Pieces  | m <sup>3</sup> |                  |
| 2017 | 13   | 152.5          | Y                |
| 2016 | 15   | 147.6          | Y                |
| 2015 | 40   | 363.8          | Y                |
| 2014 | 3  | 48.8           | Y                |
| 2013 | 17   | 160            | Y                |
| 2012 | 18   | 160            | Y                |
| 2011 | 0  | 0              | Y                |

Of the 13 monumental set aside in 2017, 2 were >120cm. 7 were picked up and utilized by Haida and 5 remain in storage (none were put back into production). 1 monumental is still at roadside (loading and hauling is still in progress).



From of the trees set aside in 2016, 8 were utilized (i.e., sold or donated) and 6 were put back into production in 2016. Fifteen additional trees were set aside in 2016 at the Skidegate sort and 10 of them were utilized. Starting in 2017, the Council of the Haida Nation will begin long term storage of Monumental cedar logs in a log sort near Port Clements.

In 2015, several monumental cedar trees (large diameter cedar meeting the cultural program specifications) were put aside at the Skidegate and Ferguson sort with 11 being utilized.

The 2014 data were corrected to include the 2 additional logs that were provided at the end of 2014 (and did not show up in the initial reports).

### **Summary of Management Strategies**

The general management strategies related to optimizing yield for Taan are based on balancing the economic returns with available markets with planning and development of blocks. The goal is to work towards increasing planning and development to enable a more diverse selection of areas to choose from when examining economic margins and markets when doing harvest planning. The objective is to allow for annual variations and flexibility in harvesting the forecasted profile, but ensure that over the long term, the harvesting profile is generally consistent with the forecast in the timber supply analysis. In addition, Taan maintains bucking specifications in order to ensure maximum utilization based on the parameters of the current market conditions and sale orders.

Waste and residue generated from harvesting is a key component to assessing optimal utilization and is discussed under the Waste & Residue Indicator.

### ***Adaptive Management Strategies***

Not applicable at this time.

### **Database & Reporting Parameters**

Annual harvest volumes are recorded and maintained by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) [Harvest Billing System Database](#) (based on submitted scale data). The database can be accessed by members of the public, industry and government. Various options exist for generating queries and reports that can be downloaded or emailed to the recipient generating the query.

The query report includes Harvest Reports by Date of scale: volume harvested January 1 to December 31 for all of Haida Gwaii, including normal and waste, by client/ licensee, volume, species and grade (for reference, parameters of each report are also recorded at the bottom of the report print-out).

Taan also maintains internal records related to production (harvest volume) by species (reports can be generated by log scaling personnel through the Netscale software). Volume provided to the Cultural Wood program is communicated by Taan Operations personnel.

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## Indicator: Non-Timber Forest Products

| Element                                    | Objective   | Indicator   | Target  |
|--|---|---|---|
| FSC 8.2.2: Yield of all products harvested | Ensure optimal yield of harvested forest products | Communication/ cooperation and volume of NTFP by type (m <sup>3</sup> , kg, etc.) | Cooperate with local organizations/ groups requesting access to NTFPs |
|  |   | Hectares of age class 35-50 in the CWH wh1 01 for the Skidegate Landscape Unit    | Not applicable at this time; monitor changes.                         |

### Rationale for Indicator & Target

The Indicator is based on the FSC requirements to ensure optimal use of forest products, including non-timber forest products (NTFPs), as well as monitor the harvesting profile of NTFPs to compare with management objectives over time, where applicable. The target reflects that harvesting of non-timber forest products (NTFPs) is currently not regulated/ measured (i.e., there are no established maximum cut levels nor is any 'stumpage' or fees charged to user groups for accessing the forests for NTFPs).

### Current Status/ Results

| Year | # of Requests for access to the MU for NTFP | # of Requests Granted | Summary of Communication/ Cooperation to develop NTFP   | NTFP Type               | Volume Harvested (various units) | Target Met (Y/N) |
|------|---|-----------------------|---|-------------------------|----------------------------------|------------------|
| 2017 | 1   | 1                     | Cooperation with local Haida for cedar bark collection<br>Contact and consultation with a group of local mushroom pickers | Mushrooms<br>Cedar Bark | Not available                    | Y                |
| 2016 | 1   | 1                     | Cooperation with local Haida for cedar bark collection<br>Contact and consultation with a group of local mushroom pickers | Mushrooms<br>Cedar Bark | Not available                    | Y                |
| 2015 | 1   | 1                     | Cooperation with local Haida for cedar bark collection  | Cedar Bark              | Not available                    | Y                |
| 2014 | 2   | 2                     | Cooperation with mushroom picker request for access<br>Cooperation with local Haida for cedar bark collection             | Mushrooms<br>Cedar Bark | Not available                    | Y                |
| 2013 | 1   | 1                     | Cooperation with local Haida for cedar bark collection  | Cedar Bark              | Not available                    | Y                |
| 2012 | 1   | 1                     | Cooperation with local resident for Conifer Oil Extraction Pilot Project  | Conifer Oil             | Not available                    | Y                |
| 2011 | 1   | 1                     | Cooperation with local resident for Conifer Oil Extraction Pilot Project  | Conifer Oil             | Not available                    | Y                |

In 2017, Taan continues to have regular communication with a local Haida Person regarding cedar bark collection areas. On-going communication was also held with a group of local mushroom pickers (regarding a submitted Grievance under our FSC® Certification). In 2018, HaiCo is facilitating a bark stripping field trip (Taan is supporting with location and vehicles) with Old Massett Men's Group, Haida Child and Family Services and the Adult Day Program.

In 2016, Taan continued to have regular communication with a local Haida person regarding potential cedar bark collection areas. Contact was also made with the local Wild Harvest Festival organizer regarding consultation for development plans in mushroom areas. There were no specific yew wood or mushroom requests from the public, however seasonal mushroom picking activities were conducted by many individuals.

In 2015, Taan continued to have regular communication with a local Haida person regarding potential cedar bark collection areas (specifically LOG18 and GEI001). Taan also received a request regarding access to yew wood at roadside for Haida youth to make bows and is now yarding yew wood to roadside where it is harvested.

In 2014, Taan placed ads in the local paper and on our website regarding mushroom pickers, access to the Management Unit and maps of proposed harvesting operations for the next three years (<http://www.taanforest.com/index.php?page=news>). Communications received from one mushroom picker commended Taan on posting of the advertisements for the three-year harvesting plan in the mushroom picking areas of Skidegate Lake and the efforts to work with other forest users.

Part way through 2012, the conifer oil extraction project ceased (perhaps as a result of lack of funding). Regular communication continues with local Haida residents regarding opportunities for cedar bark collection (spring is the best time of year).

At the request of the Council of the Haida Nation (CHN), the following information has been added to the indicator reporting to reflect the amount of suitable mushroom habitat available in Taan tenures within the CWH wh1 01 ecosystem in the Skidegate LU (as identified in the Chanterelle Habitat Suitability Study):

| Year   | Chanterelle Habitat Description | Stand Age in Years (CWH wh1 01) – Skidegate LU |                |                |                 |                |                |                | Total Area (ha) |
|--|---------------------------------|--|----------------|----------------|-----------------|----------------|----------------|----------------|-----------------|
|  |                                 | 0-19   | 20-34          | 35-50          | 51-65           | 66-90          | 91-250         | 250+           |                 |
| 2017   | Mushroom Habitat Mapped         | 212.6  | 0.7            | 13.7           | 969.9           | 362.4          | 23.9           | 26.0           | 1,609.2         |
|  | Mushroom Habitat GIS Analysis   | 233.3  | 240.4          | 630.1          | 3,879.8         | 1,549.8        | 78.4           | 0.0            | 6,511.8         |
|  | Not Mushroom Habitat            | 2,117.5  | 6,880.2        | 5,490.9        | 6,106.4         | 2,300.4        | 4,993.7        | 7,859.6        | 35,972.6        |
|  | <b>Total</b>                    | <b>2,563.3</b>                                 | <b>7,021.3</b> | <b>6,134.7</b> | <b>10,956.1</b> | <b>4,212.6</b> | <b>5,096.0</b> | <b>7,885.6</b> | <b>43,869.6</b> |
| 2016   | Mushroom Habitat Mapped         | 213.3  | 0.0            | 39.1           | 1,140.5         | 166.4          | 23.9           | 26.0           | 1,609.2         |
|  | Mushroom Habitat GIS Analysis   | 239.3  | 134.3          | 837.8          | 4,157.0         | 1,065.0        | 78.4           | 0.0            | 6,511.8         |
|  | Not Mushroom Habitat            | 2,233.2  | 7,357.5        | 4,924.4        | 6,150.7         | 2,178.1        | 5,006.5        | 7,898.2        | 35,972.6        |
|  | <b>Total</b>                    | <b>2,685.7</b>                                 | <b>7,491.9</b> | <b>5,801.4</b> | <b>11,448.2</b> | <b>3,409.5</b> | <b>5,108.8</b> | <b>7,924.2</b> | <b>43,869.6</b> |
| <i>*Past Reporting, using differing analysis criteria and errors in reporting:</i> |                                 |  |                |                |                 |                |                |                |                 |
| 2015   | Within                          | 219.1  | 0.0            | 39.2           | 1,220.6         | 160.3          | 4.1            | 26.0           | 1,669.3         |
|  | Outside                         | 2,245.9  | 8,890.1        | 7,731.6        | 10,743.8        | 3,277.5        | 6,681.4        | 9,683.9        | 49,254.2        |
|  | <b>Total</b>                    | <b>2,465.0</b>                                 | <b>8,890.2</b> | <b>7,770.8</b> | <b>11,964.4</b> | <b>3,437.7</b> | <b>6,685.5</b> | <b>9,709.9</b> | <b>50,932.5</b> |
| 2014   | Within                          | 179.0  | 0.1            | 43.8           | 1,195.4         | 165.5          | 0.0            | 29.2           | 1,613.0         |
|  | Outside                         | 11,384.0                                       | 6,824.6        | 5,759.0        | 9,788.3         | 2,351.3        | 920.5          | 7,668.0        | 44,695.8        |
|  | <b>Total</b>                    | <b>11,563.1</b>                                | <b>6,824.6</b> | <b>5,802.8</b> | <b>10,983.7</b> | <b>2,516.8</b> | <b>920.5</b>   | <b>7,697.2</b> | <b>46,308.8</b> |
| 2013   | Within                          | 179.0  | 0.1            | 44.5           | 1,252.0         | 154.8          | 0.0            | 29.2           | 1,659.6         |
|  | Outside                         | 11,665.6                                       | 6,739.7        | 5,826.4        | 9,810.0         | 2,060.0        | 883.8          | 7,663.7        | 44,649.2        |
|  | <b>Total</b>                    | <b>11,844.6</b>                                | <b>6,739.8</b> | <b>5,871.0</b> | <b>11,062.0</b> | <b>2,214.8</b> | <b>883.8</b>   | <b>7,692.9</b> | <b>46,308.8</b> |

In 2017, analysis was re-run with new VRI inventory data. Errors were discovered in the 2016 reporting and were corrected in 2017 (e.g., harvest depletions, polygons with missing data). Analysis criteria was clearly documented to file, to ensure consistent reporting moving forward. The new results for 2016 and 2017 demonstrate that the total mushroom habitat area within the Taan tenures in the Skidegate LU does not change over time, but the area distribution amongst the age classes will shift with harvesting and aging of the timber not harvested and is now a true indication of monitoring of the changes to age class distribution within the prime mushroom age classes of approximately 35-65. In addition, analysis was also completed to summarize the amount of suitable mushroom habitat using GIS analysis of the suitable habitat criteria from the Chanterelle Suitability Study (refer to the FSC Management Plan for details). This information is presented, in addition to the mapped habitat polygons that were produced through the Study, and included public/ mushroom picker input to identify the picking areas).

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In 2016, there were four blocks harvested in the Skidegate Landscape Unit, AER003, AER004, AER005 and AER032, however they were not within the target mushroom areas. Data shifts from the previous are due to aging stands and the inclusion of previous areas identified as null (recently updated with projected ages). The most notable shifts are a reduction in the 1-19 and 20-35 age classes and an increase in the 35-50, 66-90 and 250+ age classes. An apparent overall reduction in the total area is due to the correction of an error regarding sections of the LU polygons that were extending into waterbodies.

In 2015, there were four blocks harvested SKI008, SKI009, SKI010 and AER001. The analysis was completed using the new VRI forest cover data which resulted in some significant changes from the previous data. Overall, there is a reduction in the habitat area in the 35-50 (4.6 ha) and increase in the 51-65 (25.2 ha).

In 2014, there was a small amount of harvesting completed within mushroom habitat in the Skidegate Lake Area, demonstrated by a small decrease in the habitat area in the 35-50 (0.7 ha) and 51-65 (56.5 ha) age class. There was a slight increase in the hectares within mushroom habitat in the 66-90 age class. No change to the other age classes. Outside of mushroom habitat areas, the general trend follows the same pattern, with a small amount of harvesting in the 35-50 (67.4 ha) and 51-65 (22 ha) age class.

In 2013, the table shows that a significant portion of the 01 in the Landscape Unit is over the prime mushroom habitat age of 35-50 years old. Currently, 26% is represented in the 0-19 age class, 15% in the 20-34, 13% in the 35-50 and 47% in the rest of the older age classes. While there is a significant portion of the LU in the younger age classes, the majority of those areas are not located in the high suitable mushroom habitat areas. A significant area is located in the 51-65 age class, seeming to indicate that this is the age class that should be targeted for harvesting to develop future habitat area.

An age class map of the mushroom habitat areas is provided below, and will be updated every three to five years (as currently the annual changes are too small to observe). [The next update to the age class map is planned for 2018.](#)

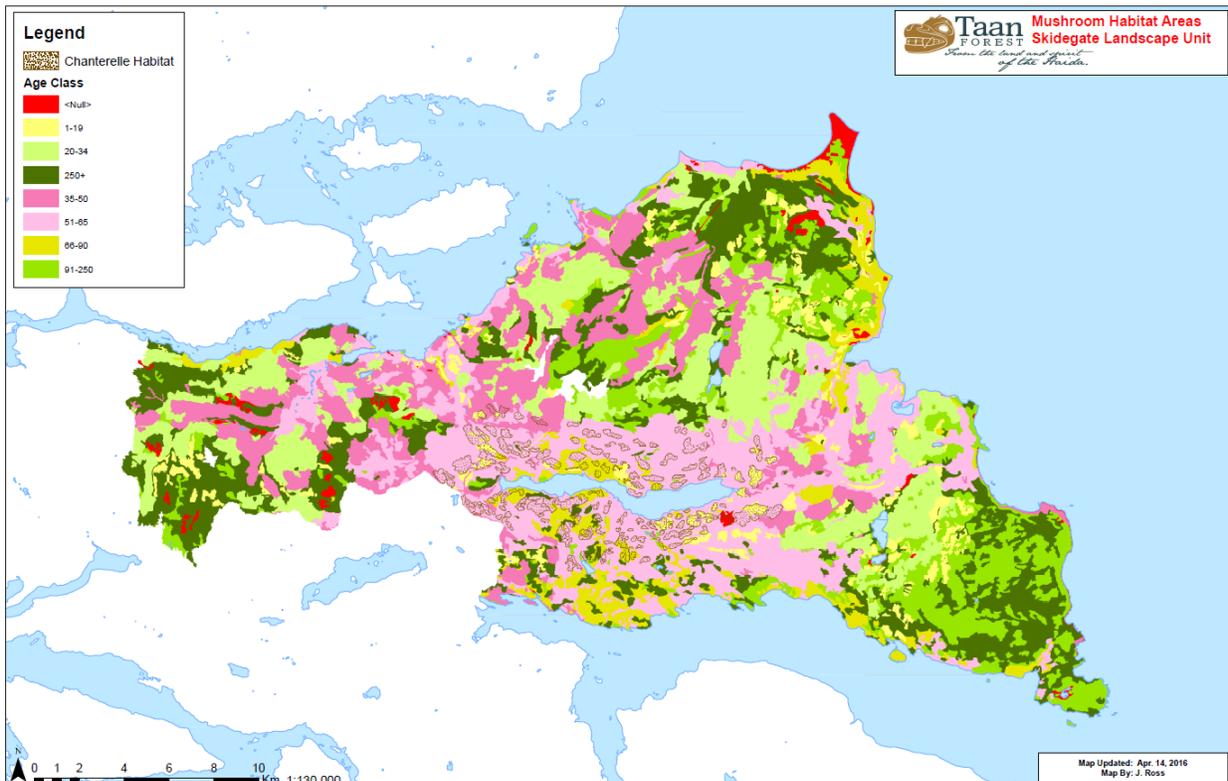


Figure 1: Age Class Distribution in Chanterelle Mushroom Habitat Areas (Skidegate Lake) – 2015

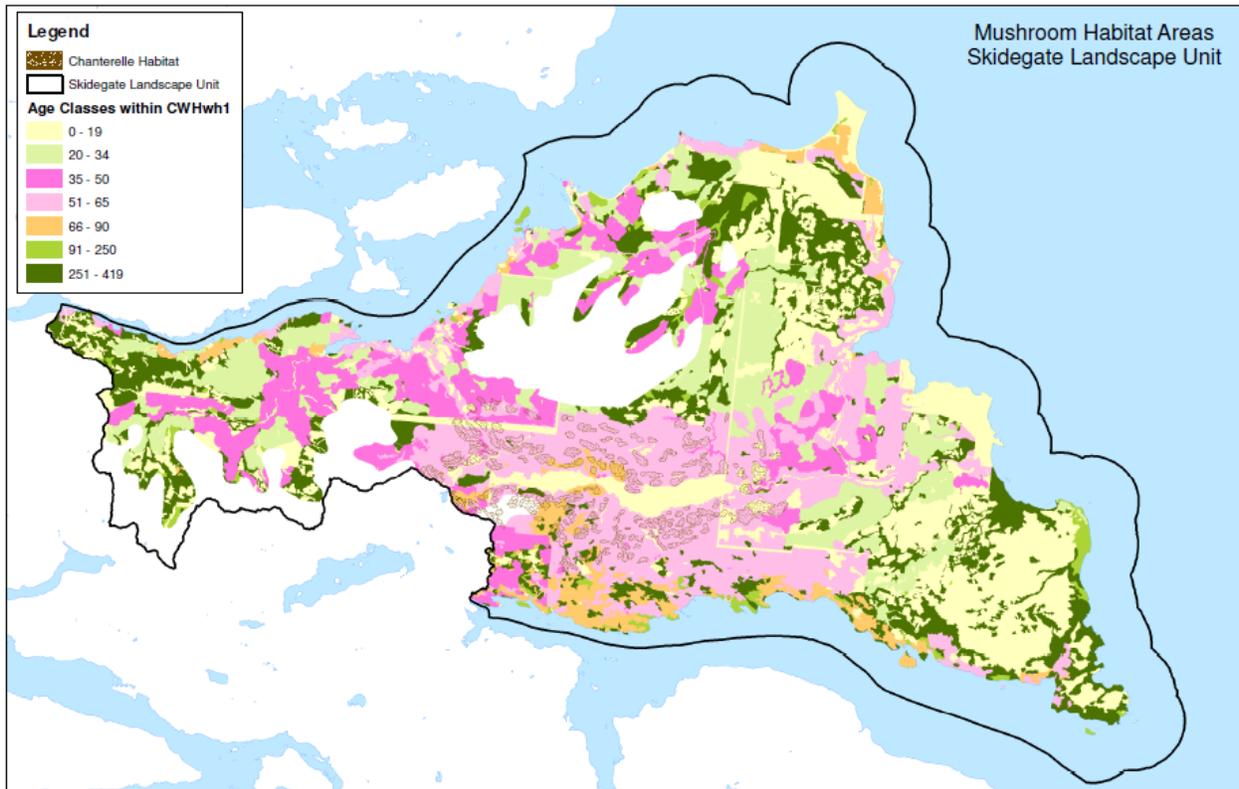


Figure 2: Age Class Distribution in Chanterelle Mushroom Habitat Areas (Skidegate Lake) – 2013. 35 to 59 year age class is considered prime potential habitat.

### **Summary of Management Strategies**

Taan is committed to continuing to explore cooperative efforts with interested parties in regard to maintaining access to the forests for NTFPs, including the mushroom habitat areas. At this time, NTFPs are not regulated, measured or tracked on the Management Unit.

Mushroom picking occurs across Haida Gwaii but harvests are not currently regulated. Key mushroom habitat areas have been identified in various studies and are highlighted on overview maps provided in the FSC Management Plan. A significant amount of mushroom habitat is located within protected areas and other Land Use Order constrained areas as well as in the non-contributing land-base (i.e., areas that are typically not economical to be harvested). These protected areas include a range of seral stages (reported annually above to assess changes over time and amount of suitable habitat). In addition, for mushroom habitat areas located in the harvestable area, Taan includes consideration of mushroom picking during cutblock level planning by reviewing the ecosystem classification in relation to habitat suitability for mushrooms as well as noting the level of mushroom populations to determine potential for activity. Placement of stand-level reserves can also assist in protecting any specific areas noted with higher populations of mushroom habitat.

In future, Taan may explore regulation of NTFPs through the new First Nations Woodland Licence that includes provisions to permit regulation of botanicals. In the event that progress is achieved in regard to a regular non-timber forest products program, the target will be re-visited to consider developing a numerical target.



### ***Adaptive Management Strategies***

Monitor the change to age class distribution in the CWH wh1 01 ecosystem in the Skidegate Landscape Unit over the next few years and determine whether any specific targets or management strategies should be considered.

The CHN also recommended attempting to contact some local mushroom pickers to permit opportunities for information sharing on harvest planning to allow for picking prior to harvest. This has proven to be challenging as the Culinary Co-Op has disbanded and the key contacts could not be reached. In addition, we spoke with the local Tourism Centers and they did not have any available contacts. The Village of Port Clements noted that a local buyer usually sets up in an abandoned lot in the village (July-November) and they would pass on contact information to the buyer if they are interested in contacting Taan and they also offered to pass on contact information to local pickers that they know of. We will continue to make efforts. We will also consider advertising of upcoming development plans for local pickers.

### **Database & Reporting Parameters**

Communication regarding cooperation with local organizations/ groups in relation to non-timber forest products is maintained within Taan's central File System.

In the event that an industry is developed, associated volumes harvested from the Management Unit will be recorded (likely excel format or within accounting systems) and reported.

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## Indicator: Sustainable Harvest Rates

| Element   | Objective  | Indicator   | Target  |
|---|--|---|---|
| FSC 5.6.5 & 5.6.6:<br>Sustainable Harvest Rates | Maintain sustainable harvest rates consistent with the FSC Standard requirements | Total volume harvested (m <sup>3</sup> ) as a % of Long Term Harvest Level (LTHL) | Annual harvest rate is ≤125% of the projected LTHL (plus any permitted undercut volume carried forward); the ten-year average following initial certification is ≤ 100% of the projected LTHL |

### Rationale for Indicator & Target

The indicator and target reflect specific FSC requirements for Indicator 5.6.5 and 5.6.6.

### Current Status/ Results

| Year | Description | Tenure                         | Volume Harvested (m <sup>3</sup> ) | Annual LTHL (m <sup>3</sup> )                 | % of LTHL | Target Met (Y/N) |
|------|-------------|--------------------------------|------------------------------------|---|-----------|------------------|
| 2017 | Taan        | TFL 60 & Haida Tenure combined | 266,526                            | 462,462 (TSR)<br>460,000 (AAC)                | 58        | Y                |
|      | BCTS        | Haida Tenure                   | 0                                  | 15,605 (TSR)<br>14,200 (AAC)                  | 0         |                  |
| 2016 | Taan        | TFL 60 & Haida Tenure combined | 376,260                            | 462,462 (TSR)<br>460,000 (AAC)                | 81        | Y                |
|      | BCTS        | Haida Tenure                   | 0                                  | 15,605 (TSR)<br>14,200 (AAC)                  | 0         |                  |
| 2015 | Taan        | TFL 60 & Haida Tenure combined | 370,234                            | 462,462 (TSR)<br>460,000 (AAC)                | 80        | Y                |
|      | BCTS        | Haida Tenure                   | 0                                  | 15,605 (TSR)<br>14,200 (AAC)                  | -         |                  |
| 2014 | Taan        | TFL 60 & Haida Tenure combined | 276,603                            | 462,462 (TSR)<br>460,000 (AAC)                | 60        | Y                |
|      | BCTS        | Haida Tenure                   | 0                                  | 15,605 (TSR)<br>14,200 (AAC)                  | -         | Y                |
| 2013 | Taan        | TFL 60 & Haida Tenure combined | 296,412                            | 462,462 (TSR)<br>460,000 (AAC)                | 64        | Y                |
|      | BCTS        | Haida Tenure                   | 54,696                             | 15,605 (TSR)<br>14,200 (AAC)                  | 350       |                  |
|      | Taan & BCTS | Haida Tenure                   | 151,394                            | 135,605 (TSR)<br>134,200 (AAC)                | 112       |                  |
| 2012 | Taan        | TFL 60 & Haida Tenure          | 193,517                            | 476,169 (TSR)<br>460,000 (AAC)                | 40.6      | Y                |
|      | BCTS        | Haida Tenure                   | 0                                  | 14,210 (TSR)<br>9,300 (interim harvest level) | 0.0       | Y                |
| 2011 | Taan        | TFL 60 & Haida Tenure          | 186,049                            | 471,762 (interim harvest level)               | 39.4      | Y                |
|      | BCTS        | Haida Tenure                   | 15,125                             | 47,000 (interim harvest level)                | 32.2      | Y                |

BCTS did not complete any harvesting in the Haida Tenure during 2017 (none since 2013). Taan continues to harvest at a rate that is well within the long term sustainable level, although it is below the AAC (difficulties finding development area on the land-base considering all of the Land Use Order Constraints, planning capacity and harvesting approvals). As capacity increases, Taan has increased their total annual harvest levels over the past five years.



The Long-Term Harvest Level (LTHL) is derived from the Haida Gwaii Management Council Timber Supply Review Analysis Package (January 2012) and resulting Allowable Annual Cut (AAC) determination for Haida Gwaii. For past reporting, interim harvest levels noted above reflect those indicated in the FSC Management Plan in lieu of the AAC determinations.

### **Summary of Management Strategies**

Harvest rates are determined through the *Forest Act*, Allowable Annual Cut requirements. In consideration of establishing the AAC for Haida Gwaii, the Haida Gwaii Management Council considers the Long-Term Harvest Level indicates by the various inventory layers and management scenarios.

At this time, no special management strategies are required to meet the target, as they are generally consistent with legal requirements. However, this indicator must be monitored closely on an annual basis and in the event results are showing significant deviation from the target, then appropriate management strategies will need to be developed within the FSC Management Plan, in order to ensure that targets are maintained.

### ***Adaptive Management Strategies***

Not applicable at this time.

### **Database & Reporting Parameters**

Annual harvest volumes are recorded and maintained by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) [Harvest Billing System Database](#) (based on submitted scale data). Various options exist for generating queries and reports that can be downloaded or emailed to the recipient generating the query.

The query report parameters include Harvest Reports by Date of scale: volume harvested January 1 to December 31 for all of Haida Gwaii, including normal and waste, by client/ licensee, volume, species (for reference, parameters of each report are also recorded at the bottom of the report print-out).

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## Indicator: Waste & Residue

| Element  | Objective   | Indicator  | Target                                      |
|--|---|--|---|
| FSC 5.2.2, 5.3.1, 8.2.1 & 8.2.9: Yield of all products harvested | Ensure optimal yield of harvested forest products | Average billable waste results of as a function of harvest area (m <sup>3</sup> /ha) | Avoidable Waste is ≤ 100 m <sup>3</sup> /ha |

### Rationale for Indicator & Target

The indicator is based on FSC requirements to minimize waste and ensure maximum utilization. Avoidable waste is the portion of the waste and residue that is evaluated for penalties under the *Forest Act*. Avoidable waste above thresholds of 10 m<sup>3</sup>/ha for second growth and 35 m<sup>3</sup>/ha for old growth are subject to penalties (though pulp grade logs are not applied to the benchmarks). Ideally, the target would reflect the thresholds established in the Waste and Residue Manual. However, historically these thresholds have not been achieved coast wide on a consistent basis as a result of a combination of market conditions and harvesting practices. In addition, the target does not exclude pulp logs, but those logs can contribute significantly to the level of waste dependant on markets. Therefore, our target is based on discussions with operations personnel to set a threshold that demonstrates the commitment to continual improvement in harvesting practices to increase utilization but reflects results that operations feel are achievable based on allowing for some flexibility to respond to poorer market conditions. The target was changed in 2013 to reflect a more realistic goal post of 100 m<sup>3</sup>/ha (as the avoidable waste includes all lower grade logs that have minimum penalties applied to reflect the market conditions and challenges on Haida Gwaii related to high transportation costs).

Maintenance of a component of Large Woody Debris (LWD) is also very important or biodiversity values and further work is needed to explore the relationship between minimizing waste and still providing for biodiversity values provided by LWD (also refer to the Stand-level Biodiversity Indicator for Coarse Woody Debris (CWD) values).

### Current Status/ Results

| Year | Description          | Avoidable Waste (m <sup>3</sup> /ha) |            |         |               | Target Met (Y/N) |
|------|----------------------|--------------------------------------|------------|---------|---------------|------------------|
|      |                      | Second Growth                        | Old Growth | Average | # of Samples  |                  |
| 2017 | Taan                 | -                                    | 93.9       | 93.9    | 3 blocks      | Y                |
|      | BCTS in Haida Tenure | -                                    | -          | -       | -             |                  |
|      | Coast Region         | 63.76                                | 149.09     | 106.425 | 10,731        |                  |
| 2016 | Taan                 | 98.83                                | 80.87      | 89.85   | 8 Blocks      | Y                |
|      | BCTS in Haida Tenure | -                                    | -          | -       | -             |                  |
|      | Coast Region         | 70.45                                | 177.8      | 118.72  | -             |                  |
| 2015 | Taan                 | 75.28                                | 100.12     | 90.57   | 13 Blocks     | Y                |
|      | BCTS in Haida Tenure | -                                    | -          | -       | -             |                  |
|      | Coast Region         | -                                    | -          | 117.7   | -             |                  |
| 2014 | Taan                 | 66.0                                 | 103.63     | 84.82   | 8 blocks      | Y                |
|      | BCTS in Haida Tenure | -                                    | -          | -       | -             |                  |
|      | Coast Region         | -                                    | -          | 119.0   | -             |                  |
| 2013 | Taan                 | 97.4                                 | 73.9       | -       | 13 blocks     | Y                |
|      | BCTS in Haida Tenure | -                                    | -          | -       | -             |                  |
|      | Coast Region         | -                                    | -          | 115.6   | -             |                  |
| 2012 | Taan                 | 80.43                                | 79.95      | -       | 4 blocks      | Y                |
|      | HG Forest District   | 99.23                                | 85.14      | -       | 1,316 plots   |                  |
|      | Coast Region         | 67.52                                | 138.20     | -       | Not available |                  |
| 2011 | Taan                 | 99.72                                | 37.48      | -       | 5 blocks      | Y                |
|      | HG Forest District   | 95.26                                | 80.77      | -       | 309 plots     |                  |
|      | Coast Region         | 67.30                                | 123.90     | -       | Not Available |                  |

<sup>1</sup> Historical waste and residue records for Haida Gwaii and the Coast Region were obtained via email communication from MFLNRO Coast Cruising and Waste Specialist (generated from the MFLNRO WASTE System database) and includes data from 2004-2011. Discussion with the MFLNRO Waste Specialist indicates that waste levels for the last few years have been higher than historical averages as a result of the poor markets for lower grade and pulp.

In 2017, waste and residue was completed on three blocks within the Haida Tenure (none in TFL 60). Average waste for Taan was lower than the average for the coast region once again.

In 2016, the proportion of the total waste related to pulp logs (anything less than a utility grade) was 23% for second growth blocks and 26% for old growth. Average combined (second and old growth) waste for Taan was 89.85 m<sup>3</sup>/ha, which is lower than the 118.72 m<sup>3</sup>/ha average reported for the coast region. BCTS did not conduct any harvesting within the FLTC in 2016.

### **Summary of Management Strategies**

Specific management strategies in relation to minimization of waste and optimization of large coarse woody debris are located within the FSC Management Plan – Coarse Woody Debris section. The general management strategies are to increase development opportunities (cutblock planning) so that operations have a greater selection of areas to choose from when developing harvesting schedules to better facilitate responding to market conditions (e.g., when pulp markets are low, avoiding harvesting of blocks with identified high contents of pulp). Secondly, close monitoring of harvesting operations to ensure optimal utilization and adherence to bucking specifications helps to minimize waste.

Taan is also exploring the potential to focus material and wood fibre collection priorities on cutblocks with high waste and residue results, through the bioenergy program (under development), the salvage program and firewood cutting. The bioenergy project will involve moving more small diameter material to roadside for collection and use and thus leaving less small debris dispersed in the cutblock.

### ***Adaptive Management Strategies***

Taan completed a detailed review of the waste and residue results for 2012 and determined that waste levels due to bucking are higher than optimal. Work was done in 2013 to seek a quality control person and in early 2014, someone was hired to actively monitor quality control. Quality Control actively monitors the harvesting and dry land sort Contractors to ensure that waste levels are kept to a minimum while maximizing the value of the log. While the level of waste associated with second growth has not changed much, there have been improvements in the level of waste for old growth blocks.

In addition, Taan has recently implemented a firewood permitting process to permit operations to direct individuals to previously harvested blocks (that have waste and residue completed) and to focus efforts on directing firewood cutting from debris piles to increase utilization of the waste (which won't change the waste and residue reporting, but will increase utilization).

Stand structure data were obtained from the MFLNRO for the Biogeoclimatic Ecosystem Classification (BEC) work that was done in Haida Gwaii over the past few years as part of the Vegetation Resource Inventory (VRI) project. Analysis of the data showed that the sampled stands ranged from 150-495 years old and the CWD averaged 186 m<sup>3</sup>/ha and the average number of pieces/ ha was 30.5 (due to low sample size, there is a high degree of potential variation). This seems to indicate that the current benchmark and targets for waste and residue are significantly lower than the natural levels for dispersed waste within the cutblocks, but more information is needed to support this.

Management of CWD continues to present a challenge as the biodiversity requirements for LWD weigh against the MFLRNO waste and residue charges in relation to the utilization standards (i.e., if too much LWD is left, then fines are implemented by MFLRNO).



### **Database & Reporting Parameters**

The [Logging Residue and Waste System \(WASTE\)](#) allows for the recording, viewing, updating and printing of logging waste information, to allow the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) to invoice licensees for monetary and cut control charges. WASTE is a web-based system which allows clients to enter, view, update print and submit waste assessment plans and data via the internet. A “ledger” report can be generated for specified date ranges and generates an excel spreadsheet report detailing the avoidable and unavoidable waste in m<sup>3</sup>/ha for immature (2<sup>nd</sup> growth) and mature (old growth). In addition, waste reports can also be generated out of the MFLNRO Harvest Billing System database, although the database is more limited in ability to create queries of more detailed information.

Taan also maintains internal records that include the waste and residue survey and reporting status for the year.

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# Growth Rates, Regeneration & Condition of the Forest

## Indicator: Growth & Yield Plots

| Element   | Objective            | Indicator   | Target   |
|---|----------------------|---|--|
| FSC 8.2.3: Growth rates, regeneration and condition of the forest | Monitor growth rates | # of PSP/ G&Y plots identified during forest management planning; # harvested | No MFLNRO PSP/ G&Y plots are harvested unless 'approval' is received from MFLNRO |

### Rationale for Indicator & Target

The indicator represents the provincial initiatives for monitoring of forest growth rates in support of the timber supply review processes and calculations of the Allowable Annual Cuts for licensees. The target is based on the results of re-measuring monitoring in 2010 that demonstrated that a significant number of Permanent Sample Plots (PSPs) had been harvested and valuable data/ information was lost. There are currently no legal requirements established to protect PSPs from harvesting. However, Taan is working closely with MFLNRO to identify critical plot locations and ensure that they are protected from harvesting. There may be specific cases where MFLNRO consents to harvesting of specific PSPs (e.g., if not needed for future monitoring for various reasons, sufficient number of additional plots exist in the same stand composition/ site series, re-measurement is completed prior to harvesting, etc.).

### Current Status/ Results

| Year | Description          | # of Plots <sup>2</sup> | # of Growth & Yield Plots Identified <sup>1</sup> |                      | # of Growth & Yield Plots Harvested |                      | Target Met (Y/N) |
|------|----------------------|-------------------------|---|----------------------|-------------------------------------|----------------------|------------------|
|      |                      |                         | MFLNRO Established                                | Licensee Established | MFLNRO Established                  | Licensee Established |                  |
| 2017 | Taan                 | 145                     | 22  | 123                  | Not permitted                       | 0                    | Y                |
|      | BCTS in Haida Tenure |                         |   |                      |                                     |                      |                  |
| 2016 | Taan                 | 145                     | 22  | 123                  | Not permitted                       | 0                    | Y                |
|      | BCTS in Haida Tenure |                         |   |                      |                                     |                      |                  |
| 2015 | Taan                 | 145                     | 22  | 123                  | Not permitted                       | 3                    | Y                |
|      | BCTS in Haida Tenure |                         |   |                      |                                     |                      |                  |
| 2014 | Taan                 | 148                     | 22  | 126                  | Not permitted                       | 0                    | Y                |
|      | BCTS in Haida Tenure |                         |   |                      |                                     |                      |                  |
| 2013 | Taan                 | 148                     | 22  | 126                  | Not permitted                       | 4                    | Y                |
|      | BCTS in Haida Tenure |                         |   |                      |                                     | (FLO001)             |                  |
| 2012 | Taan                 | 148                     | 22  | 126                  | Not permitted                       | 0                    | Y                |
| 2011 | Taan                 | 148                     | 22  | 126                  | Not permitted                       | 0                    | Y                |

<sup>1</sup> Taan plot information is a combination of review of LRDW, MFLNRO data and Taan GIS data.

<sup>2</sup> Further work is needed to rectify the discrepancies in the different data sets and determine and accurate count of the active PSPs and ensure that mapping is accurate for the identified plots. Total plots are reported for 2011 and 2012, as it appears that the active status information varies between the data sets.

No growth and yield plots were harvested in 2017.

Licensee established whitewood (i.e., spruce, hemlock) plots are permitted to be harvested but cedar plots are not at this time.

No cedar plots were harvested in 2016, but three Taan whitewood plots were harvested in 2015 in MCL003.

The MFLRNO has identified that their 22 plots within Taan tenures are priority plots that need to be protected from harvesting.

G&Y plots is one of the items that the Solutions Table considers during their review process.

Plot Data received from MOF in early 2013 indicates that there are approximately 378 “active” and “other” plots in Haida Gwaii, and total including dropped and logged is 411. Taan has received the spatial files for the known plot locations and have incorporated them into their GIS layer. They also ground truth the locations once they have been identified near new development areas.

The MFLNRO conducted a Vegetation Resource Inventory (VRI) for Haida Gwaii from 2012-2014 (Strategic Plan released June 20, 2011). The VRI contains information related to forest inventory and is comprised of photo interpretation and ground sampling. The updated base layer/ inventory information (now available) has the potential to be a valuable asset for many monitoring aspects (depending on whether they are protected from harvesting).

### **Summary of Management Strategies**

The BC Forest Branch (now MFLNRO) began installing permanent G&Y plots in the 1920's, many of which are still active today. The program evolved over time and in 1986, many different programs and plots were amalgamated into one provincial Permanent Sample Plot (PSP) program. Long-term PSP data are an exceptionally important source of stand dynamics, regeneration and mortality data for Growth and Yield modelling. Recently, long term PSP data and age cores have been used in calibration of Carbon/Climate models.

MFLNRO has the responsibility for maintaining the Ministry Permanent Sample Plots (PSPs) and the associated data base for the province. There are approximately 9,000 Permanent Sample Plots located in the province of which approximately 5,000 are owned or managed by the Ministry (<http://www.for.gov.bc.ca/hts/vri/psps/psp.html>). Some of the sample data has been re-measured several times over many years and have provided the ministry with valuable information.

PSP's are not officially protected from harvesting; however, Taan has committed to ensuring that the specific plots identified by MFLNRO and/ or the licensee are not harvested through the Corporate Management System (e.g., Taan Planning SOP).

The total MFLNRO plots identified above within the reporting data for Taan Forest, have been identified by MFLNRO as being of importance and selected for protection from harvesting (i.e., there are additional plots that may be located within the MU, but these have not been selected for keeping by MFLNRO).

All proposed harvesting and road construction is submitted to the Joint Solutions Table for review and “approval” prior to issuance of permits. G&Y/ PSP plots and proposed harvesting forms part of the review.

### ***Adaptive Management Strategies***

MFLRNO has identified 22 plots as priority for maintaining and these have been identified on Taan overview and planning maps to ensure that they are identified and maintained.

Taan may consider developing a strategic level plan in relation to identifying priority licensee established PSP plots, completing re-measurements and exploring establishing some new plots within second growth stands to help facilitate creation of local, second growth stand growth curves for use in future timber supply analysis at a later date. Current resources have been focused on developing a five-year development plan and increasing layout activities to have cutting permits available for one year ahead.

### **Database & Reporting Parameters**

Taan maintains GIS mapping layers related to previously identified MFLNRO and individual licensee PSPs, where applicable. Planning procedures include provisions to ensure that these known locations are considered during planning, field locations confirmed, and measures established during site level planning to ensure that priority/ required PSPs are not harvested.

The Province of British Columbia maintains a [Geographic Discovery Database](#) containing the majority of the known locations of established PSPs (among other data) in BC. GIS personnel are responsible for ensuring that the GIS database remains current and is updated periodically to match the data sources.

## Indicator: Stand Development

| Element   | Objective            | Indicator  | Target  |
|---|----------------------|--|---|
| FSC 8.2.3: Growth rates, regeneration and condition of the forest | Monitor growth rates | Actual growth rates compared to those used in the Timber Supply Review (mid seral) | Develop and implement monitoring plan; respond to results |

### Rationale for Indicator & Target

The recent Timber Supply Review (TSR) completed by the Haida Gwaii Management Council identified a need to evaluate actual growth rates in comparison to those used in the Timber Supply Analysis in order to provide for more accurate analysis in the future. Assessment of actual growth rates in comparison to the models used in the TSR is paramount to ensuring sustainable harvest rates.

This indicator and target are based on the Forest and Range Evaluation Program (FREP) monitoring for Stand-level Development. The Stand Development Monitoring (SDM) protocol has been designed to assess the health and productivity of young stands between the ages of 15 and 40 years. Stands in this age range will have typically achieved the FG milestone, and are currently assumed to remain in that healthy well-stocked condition. SDM collects and provides introductory analysis of data in five specific areas: stand density (total, well-spaced (WS) and free-growing (FG) stems per hectare), stand species composition, pest incidence, tree volume and site index. SDM data can be used for a variety of purposes in tracking how stand attributes change in managed forests. Given its direct tie to management practices through the use of operational silviculture records, SDM is uniquely positioned to provide a benchmark measure on which to base a systematic approach of adaptive management for many silvicultural practices” (FREP SDM Protocol). This indicator will be reported annually, but assessed against the target on a five-year reporting period to better assess trends (larger sample size). There are four objectives to SDM:

- Assess the health and productivity of young stands under changing environmental conditions;
- Review the effectiveness of government policies and forest management practices that govern stand initiation, resource sustainability and risk to the Crown;
- Support sustainable forest management (SFM) certification processes; and
- Develop in-house expertise within the Ministry regarding the health and productivity of managed stands in all Timber Supply Areas (TSAs).

### Current Status/ Results

Haida Gwaii results:

| Year | Change in FG Well-spaced at SDM from FG date | Live, Damaged Trees at SDM (sph) | Dead Trees at SDM (sph) | Damage/ Pest <sup>1</sup>                               | Change Leading Inventory Species – Polygon Summary | Sample Size | Target Met (Y/N) |
|------|--|----------------------------------|-------------------------|---|--|-------------|------------------|
| 2017 | -  | -                                | -                       | -   | -  | -           | -                |
| 2016 | -  | -                                | -                       | -   | -  | -           | -                |
| 2015 | -  | -                                | -                       | -   | -  | -           | -                |
| 2014 | -  | -                                | -                       | -   | -  | -           | -                |
| 2013 | -  | -                                | -                       | -   | -  | -           | -                |
| 2012 | 878 to 749 (-14%)                            | 140                              | 0                       | ID-1.6%<br>TM-0.4%<br>K-0.4%<br>AX-0.4%                 | Cw6Hw4 to<br>Cw5Hw4Ss1                             | 2 blocks    | -                |
|      | 920-737 (-20%)                               | 580                              | 0                       | DMH-10.2%<br>DFD-1.9%<br>IDH-0.5%<br>SW-0.5%<br>AD-0.5% | Hw8Ss1Cw1 to<br>Hw8Ss2                             |             |                  |

<sup>1</sup> FREP Damage Codes: SW = sweep, K = fork, AX = bird damage, DFD = spruce needle cast, IDH = western black headed budworm, ID = defoliator, TM = mechanical stem damage, DMH = mistletoe, AD = deer.



FREP did not complete any stand development monitoring in 2017 (and has not completed any since 2012). An internal action item has been generated to explore alternative indicators and monitoring methods to achieve stand development monitoring.

Approximately 30 samples were planned for this indicator between 2013-2015, 12 of which are located within Taan's tenure (TFL 60). Contrary to those initial plans, there has not been any stand development monitoring completed for Taan tenures since 2012 and there are no current plans to complete any as the monitoring protocols are being re-worked by FREP. No additional stand development surveys are being completed by Taan, the Inventory Branch or other Haida Gwaii Licensees at this time.

A FREP training session for field data collection to meet this indicator (and support several other indicators) was held in July 2012 (Taan sent 2 staff to the training).

### ***Adaptive Management Strategies***

This monitoring program is in the early stages and therefore not prudent to draw conclusions until the sample size grows.

An Action item already exists in the Corporate Tracker in relation to exploring opportunities to support the FREP program with monitoring of this indicator and others. Efforts will continue.

### **Summary of Management Strategies**

Taan is working with FREP representatives in Haida Gwaii to cooperate and support the FREP monitoring program in general, and specifically in relation to this indicator as well.

The primary focus of the FREP stand development monitoring is to report on forest health issues, but also to compare growth rates to those expected. Taan will assess FREP results for the blocks in the Taan area (FREP plans to assess 9 plots in Taan Tenures) and determine if additional plots would be useful that are targeted to specific areas (e.g., BEC, productivity class). Opportunities exist to cooperate with MFLRNO to augment or participate in FREP's stand development monitoring activities which will be explored as FREP ramps up.

Taan has also acquired LIDAR imagery which will enable a high level of accuracy in analysis of forest inventory, growth rates, etc. from the LIDAR data (e.g., accurate tree heights can be obtained from LIDAR imagery).

### **Database & Reporting Parameters**

FREP Information Management System database (reports received from MFLNRO FREP contacts).

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## Indicator: Planting

| Element   | Objective   | Indicator   | Target                                   |
|---|---|---|--|
| FSC 8.2.4: Growth rates, regeneration and condition of the forest | Ensure areas harvested are successfully regenerated; maintain the natural species profile | # of trees planted by species; % seed source from Haida Gwaii | ≥85 % of seed source is from Haida Gwaii |

### Rationale for Indicator & Target

The indicator is based on ensuring that in general terms, areas are being reforested in similar compositions as was harvested (variations are permitted based on ecological conditions of the site and the selection of the best species to meet reforestation objectives, consistent with the approved stocking standards under the Forest Stewardship Plan (which accounts for ecosystems, microsites and best suited species selection)). The use of seed orchard sources from local provenances is the best practice for ensuring that reforestation is consistent with the Range of Natural Variation. The target allows for slight variation to account for possible initiatives to respond to forest health events such as pests and climate change (i.e., planting resistant species or varieties or trials to assess climate change). Trends will also be assessed on a five-year reporting period to better account for annual fluctuations that can occur.

Reforestation may also utilize natural regeneration and monitoring of these areas is captured under the Reforestation Monitoring indicator in terms of achievement of Free Growing status.

### Current Status/ Results

| Year      | Description  | Trees Planted by Species (# and % of total) |                 |                 |                |                  |           | % of Seed from Haida Gwaii | Target Met (Y/N)         |
|-----------|--------------|---|-----------------|-----------------|----------------|------------------|-----------|----------------------------|--------------------------|
|           |              | Red Cedar                                   | Cypress         | Hemlock         | Pine           | Spruce           | Total     |                            |                          |
| 2017      | Taan         | 94,735<br>57%                               | 10,290<br>6%    | 10,020<br>6%    | 2,640<br>2%    | 49,400<br>30%    | 167,085   | 92                         | Y                        |
|           | % Harvested  | 31%   | 9%              | 24%             | 0%             | 36%              |           |                            |                          |
|           | BCTS         | 2,135                                       | -               | -               | -              | -                | 2,135     | 100                        |                          |
|           | % Harvested  | -   | -               | -               | -              | -                |           |                            |                          |
| 2012-2016 | Taan Planted | 40%   | 5%              | 11%             | 3%             | 42%              | 1,269,836 | 95                         | Y                        |
|           | % Harvested  | 28%   | 4%              | 31%             | 3%             | 34%              |           |                            |                          |
| 2016      | Taan         | 82,858<br>(38%)                             | 13,900<br>(6%)  | 8,640 (4%)      | 6,060 (3%)     | 106,815<br>(49%) | 218,273   | 93                         | Y                        |
|           | % Harvested  | 26%   | 3%              | 32%             | 2%             | 36%              |           |                            |                          |
|           | BCTS in MU   | 2,280                                       | -               | -               | -              | -                | 2,280     | 100                        |                          |
|           | % Harvested  | -   | -               | -               | -              | -                |           |                            |                          |
| 2015      | Taan         | 140,433<br>(58%)                            | 20,160<br>(8%)  | -               | -              | 82,650<br>(34%)  | 243,243   | 88                         | Y*<br>(meets new target) |
|           | % Harvested  | 20%   | 4%              | -               | -              | 43%              |           |                            |                          |
|           | BCTS in MU   | -   | -               | -               | -              | -                | -         | N/A                        |                          |
|           | % Harvested  | -   | -               | -               | -              | -                |           |                            |                          |
| 2014      | Taan         | 62,190<br>(28%)                             | 29,970<br>(14%) | 20,160<br>(9%)  | 0              | 109,670<br>(49%) | 221,990   | 86                         | N                        |
|           | % Harvested  | 20%   | 2%              | 30%             | 4%             | 43%              |           |                            |                          |
|           | BCTS in MU   | 2,820                                       | -               | -               | -              | 3,785            | 6,605     | 0%                         |                          |
|           | % Harvested  | -   | -               | -               | -              | -                |           |                            |                          |
| 2013      | Taan         | 105,630<br>(29%)                            | 0               | 65,520<br>(18%) | 14,310<br>(4%) | 180,360<br>(49%) | 365,820   | 100                        | Y                        |
|           | % Harvested  | 31%   | 5%              | 31%             | 3%             | 30%              |           |                            |                          |
|           | BCTS in MU   | 1,950<br>(12%)                              | 0               | 0               | 0              | 14,865<br>(88%)  | 16,815    | 11.5                       | N                        |
|           | % Harvested  | -   | -               | 29%             | 71%            | 0.5%             |           |                            |                          |
| 2012      | Taan         | 112,770<br>(51%)                            | 0               | 39,240<br>(18%) | 12,000<br>(5%) | 56,500<br>(26%)  | 220,510   | 100                        | Y                        |
|           | % Harvested  | 44%   | 6%              | 25%             | 3%             | 22%              |           |                            |                          |
| 2011      | Taan         | 0   | 0               | 0               | 0              | 0                | 0         | n/a                        | n/a                      |



In 2017, all seed was local except for the pine and cypress, which was sourced from Vancouver Island. No pesticides were applied at the nursery for Taan seedlings. BCTS seedlings had some pesticides applied to control insects and fungus/ mold.

In 2016, three seedlots used did not originate from Haida Gwaii. One of the two yellow cedar (cypress) seedlots purchased by Taan was from Frederick Arm, the red cedar trees purchased from Teal (53724) were from the mainland and the Pine seedlot (42462) was from the Yellow Point Nursery (parent trees originated from Qualicum). BCTS planted setting (LOG006) in the Taan FLTC in 2016. The intent is to acquire as much local seed as possible, however some operational flexibility is required and allowed under FSC.

In 2016, Taan sowed all of their seed (for all species) at Woodmere nursery, which has a no pesticide use policy. The seedlings given to Taan from Teal were grown at Sylvanvale Nursery which uses Pounce and Ripcord. The planting contractor was familiar with where the trees originated and had the MSDS sheets already from their previous planting contract with Island Timberlands. The use of pesticides is permitted to be used on the seedlings at the nursery, so long as pesticides are not directly applied onto the FMU.

In 2016, Taan sowed all of their seed (for all species) at Woodmere nursery, which has a no pesticide use policy. The seedlings given to Taan from Teal were grown at Sylvanvale Nursery which uses Pounce and Ripcord. The planting contractor was familiar with where the trees originated and had the MSDS sheets already from their previous planting contract with Island Timberlands. The use of pesticides is permitted to be used on the seedlings at the nursery, so long as pesticides are not directly applied onto the FMU.

Annual comparisons are expected to fluctuate, but after a five-year period will be reviewed to assess a longer term trend. The 5-year trend from 2012 to 2016 indicates that Taan is planting significantly more red cedar and spruce than the 5-year average harvesting profile. Cypress and pine (and other minor species) are similar to the average harvest profile. Hemlock is being planted at lower rates than is harvested. Given the cultural significance of red cedar, the preference is to overplant cedar to ensure that the cedar regeneration objectives are met. Cedar is also most commonly used in fill plants where regeneration targets have not been achieved. Hemlock is being under planted as it regenerates naturally where the sites are suitable (e.g., west and north facing mesic sites). Foresters may only prescribe the planting of cedar, expecting hemlock to regenerate naturally, and the stand will develop into a mixed hemlock and cedar stand (confirmed during regeneration surveys). Spruce is subject to browse and is also commonly used for fill plants.

Up until the 2014 plant, all seedlings were pesticide free. In 2013, in response to comments from the Council of the Haida Nation regarding planting of yellow cedar, Taan purchased some yellow cedar seedlings from a nursery that had applied pesticides prior to Taan making inquiries and purchasing.

### **Summary of Management Strategies**

The Forest Stewardship Plan (FSP) includes the approved stocking standards for regeneration for the Management Unit, based on legal requirements under the Land Use Order (cedar regeneration) and the *Forest and Range Practices Act*. Silviculture Plans/ Regimes are developed for each cutblock as part of the –pre-harvest planning to prescribe the planned regeneration methods and species for the specific ecosystems and site characteristic. A combination of planting and natural regeneration is completed on the Management Unit.

Taan is committed to managing for cedar (red and yellow) regeneration levels as ecologically appropriate to the site and at target densities that are typically higher than the legally required minimum cedar densities in order to ensure that cedar regeneration more closely reflects the cedar harvest levels.

Work continues regarding potential seed collection in Haida Gwaii (in cooperation with other licensees) as well as reviewing potential to revive the seed orchard breeding program using Haida Gwaii parent trees/ seed source.

### **Adaptive Management Strategies**

Taan will explore the possibility/ feasibility of obtaining more local yellow cedar seed for future use. We are also monitoring research results related to yellow cedar decline to determine if there are any mitigative strategies that can be implemented to reduce future impacts (planting strategies).

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### **Database & Reporting Parameters**

The total planted trees by species are generated from internal allocation reports and Taan's Silviculture Tracking Database.

The provincial government Seed Planning and Registry System database contains the Seedlot Detail reports on seedlings planted within the Management Unit such as registration, genetic gain (where applicable), and seed source information/ location.

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## Indicator: Reforestation Monitoring

| Element   | Objective   | Indicator  | Target   |
|---|---|--|--|
| FSC 8.2.3: Growth rates, regeneration and condition of the forest | Ensure areas harvested are successfully regenerated and free growing status is achieved | Hectares of interim surveys/ stand monitoring completed by category (e.g., survival, regeneration/ stocking, brushing, etc.); % of area with free growing due that meet free growing | Report on the areas monitored for reforestation to demonstrate it is occurring over time; 100% of areas with free growing due are declared FG (5% variance is acceptable provided strong rationale is provided to describe the variance) |

### Rationale for Indicator & Target

The indicator and target are based on legal requirements for reforestation (regeneration delay and free growing milestones) and the due diligence monitoring that is required to ensure that legal milestones for reforestation are successfully achieved.

### Current Status/ Results

| Year | Description | Assessment Type/ Area Surveyed (ha) |                 |                   | % of area with FG due that meet FG | Target Met (Y/N)     |
|------|-------------|-------------------------------------|-----------------|-------------------|------------------------------------|----------------------|
|      |             | Walk Through                        | Stocking/ Regen | Free Growing (FG) |                                    |                      |
|      | Taan        | 429.3                               | 74.0            | 496.0             | 100%                               | Y                    |
|      | BCTS in MU  | 251.5                               | -               | 140.2             | 100%                               |                      |
| 2016 | Taan        | 117.0                               | 788.3           | 1320.4            | 100%                               | Y                    |
|      | BCTS in MU  | 6.2                                 | -               | 101.22            | 100%                               | Y                    |
| 2015 | Taan        | 256.4                               | 932.2           | 991.9             | 99.2%                              | Y* (with new target) |
|      | BCTS in MU  | 51.6                                |                 | 86.0              | 69.0%                              | N                    |
| 2014 | Taan        | 876.4                               | 352.6           | 901.4             | 93.3%                              | N                    |
|      | BCTS in MU  | 0.0                                 | 165.9           | 50.8              | 100%                               | Y                    |
| 2013 | Taan        | 278.1                               | 244.4           | 155.8             | 99.1%                              | N                    |
|      | BCTS in MU  | 0.0                                 | 128.4           | 22.1              | Not reported                       | N                    |
| 2012 | Taan        | 1048.4                              | 568.3           | 767.7             | 97.0%                              | N                    |
| 2011 | Taan        | 0                                   | 0               | 195.0             | n/a                                | Y                    |

In 2017, all blocks with late free growing due were met. A few blocks surveyed within the early free growing date require more growing time to meet free growing (FG), but are expected to meet the late FG date.

In 2016, a continued large survey program was completed that targeted inherited liability blocks from WFP. A drone was also used which resulted in 615ha being declared FG. All blocks met the late FG date.

BCTS has silviculture liabilities within the Management Unit, which are ongoing (new block planned for 2017). In 2016, 5 free and 2 brushing/spacing growing surveys were completed (by block) and all blocks met the FG dates.

### Summary of Management Strategies

Taan maintains internal procedures relating to assessment and confirmation of achievement of the reforestation requirements established under the Land Use Order (cedar regeneration) and the Forest Stewardship Plan (cedar regeneration and stocking standards). The overall objective is to ensure that periodic reforestation monitoring takes place in order to ensure that the legally required free growing objective and results can be achieved within the specified timeframes.

### Adaptive Management Strategies

Not applicable at this time.



### **Database & Reporting Parameters**

Taan's Silviculture Tracking Database; records of surveys are maintained by Taan and summaries are recorded within the database (e.g., stocking, species, height, etc.). Free Growing obligations and compliance are maintained within the MFLNRO RESULTS database (data is entered and maintained by Industry and MFLNRO).

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## Indicator: Forest Health

| Element   | Objective             | Indicator   | Target   |
|---|-----------------------|---|--|
| FSC 8.2.3: Growth rates, regeneration and condition of the forest | Monitor forest health | Report on the status of the forest health for Haida Gwaii; (and Management Unit where possible) | Act on trends of importance that can be managed; minimize possibilities of outbreaks; early detection of any new introduced species. |

### Rationale for Indicator & Target

The indicator is established to monitor and track forest health and utilizes the data collected by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). Forest health, primarily insects and disease, can affect expected products from the forest. Although losses to forest health agents are relatively low on Haida Gwaii and on the coast (as compared to other areas of the province), the potential for outbreaks and disease centres exists and should be monitored. Although large areas may be affected, mortality caused by pests on Haida Gwaii is usually low and effects on growth do not usually require a management response. However, Taan can note and act on trends of importance. It is possible that management can target outbreak areas or act to prevent conditions that enable outbreaks. For example, root rot pockets can be planted with resistant species; if extensive Hemlock looper or western black-headed budworm outbreaks cause mortality, then those can be harvested while the wood is still sound; planting of yellow cedar should focus on areas where the trees are doing relatively well and avoid where they are stressed and in decline. With climate change there is potential for outbreaks to increase, so trends should be tracked. Monitoring can note areas affected and levels of mortality. If mortality due to insects and disease increases that should be reflected in TSR. As well, new pest species should be reported if noticed; any outbreaks of new species should be acted on quickly.

### Current Status/ Results

For Haida Gwaii:

| Year | Category | Summary of Impacts to Forest Health (ha) <sup>1</sup> |                    |                             |                      |               |                 |           |           |          | Target Met (Y/N) |
|------|----------|---|--------------------|-----------------------------|----------------------|---------------|-----------------|-----------|-----------|----------|------------------|
|      |          | Pine Sawfly   | Green Spruce Aphid | Western Blackheaded Budworm | Yellow Cedar Decline | Spruce Beetle | Mt. Pine Beetle | Windthrow | Landslide | Flood    |                  |
| 2017 | Trace    | -   | -                  | -                           | -                    | -             | -               | -         | -         | -        | Y                |
|      | Light    | -   | -                  | -                           | 710.29               | -             | 79.96           | 11.99     | -         | -        |                  |
|      | Moderate | 233.00  | -                  | -                           | 233.85               | -             | 14.45           | 80.92     | 187.86    | 34.29    |                  |
|      | Severe   | -   | -                  | -                           | 42.45                | 1.50          | 1.75            | 229.88    | 510.29    | 68.67    |                  |
|      | V.Severe | -   | -                  | -                           | -                    | -             | -               | 9.92      | 216.70    | 15.42    |                  |
| 2016 | Trace    | 16.31   | -                  | -                           | 3,660.73             | -             | -               | -         | -         | -        | Y                |
|      | Light    | 389.77  | -                  | 153.05                      | 221.14               | -             | -               | -         | 16.74     | -        |                  |
|      | Moderate | 175.92  | -                  | 56.35                       | -                    | -             | -               | 248.99    | -         | 20.84    |                  |
|      | Severe   | 187.67  | -                  | -                           | 151.43               | 1.00          | -               | 451.66    | 816.00    | 119.51   |                  |
|      | V.Severe | -   | -                  | -                           | -                    | -             | -               | 110.71    | 376.21    | 136.10   |                  |
| 2015 | Light    | 2,665.21  | 55.26              | 104.30                      | 1,248.75             | 1,291.35      | -               | 120.22    | 215.67    | 1,185.28 | Y                |
|      | Moderate | 2,295.79  | 522.77             | 144.75                      | 2,524.68             | -             | -               | 425.38    | 1,152.06  | 1,623.49 |                  |
|      | Severe   | 43.54   | -                  | 35.00                       | 2,551.03             | -             | -               | 1,591.84  | 3,774.00  | 1,173.52 |                  |
|      | V.Severe | -   | -                  | -                           | 431.18               | -             | -               | 571.71    | -         | 17.05    |                  |
| 2014 | Light    | -   | -                  | -                           | 1,162.40             | -             | -               | 39.98     | -         | 21.04    | Y                |
|      | Moderate | -   | -                  | -                           | -                    | -             | -               | 552.03    | 14.35     | -        |                  |
|      | Severe   | -   | -                  | -                           | 29.69                | -             | -               | 847.49    | 617.51    | 159.51   |                  |
|      | Grey     | -   | -                  | 1,108.68                    | -                    | -             | -               | -         | -         | -        |                  |
| 2013 | Light    | 916.23  | -                  | 594.88                      | -                    | -             | -               | -         | -         | -        | Y                |
|      | Moderate | 118.23  | -                  | 127.95                      | -                    | -             | -               | -         | -         | -        |                  |
|      | Severe   | -   | -                  | -                           | -                    | -             | -               | 2,362.87  | 715.47    | -        |                  |

| Year | Category | Summary of Impacts to Forest Health (ha) <sup>1</sup> |                    |                             |                      |               |           |           |        | Target Met (Y/N) |
|------|----------|---|--------------------|-----------------------------|----------------------|---------------|-----------|-----------|--------|------------------|
|      |          | Pine Sawfly   | Green Spruce Aphid | Western Blackheaded Budworm | Yellow Cedar Decline | Spruce Beetle | Windthrow | Landslide | Flood  |                  |
| 2012 | Light    | -   | -                  | 5,753.94                    | -                    | 723.33        | -         | -         | -      | Y                |
|      | Moderate | -   | -                  | 361.58                      | -                    | -             | -         | -         | -      |                  |
|      | Severe   | -   | -                  | -                           | -                    | -             | -         | 2,055.29  | 907.46 |                  |
| 2011 | Light    | -   | -                  | 22,578.24                   | -                    | -             | -         | -         | -      |                  |
|      | Moderate | -   | -                  | 22,578.24                   | -                    | -             | -         | -         | -      |                  |
|      | Severe   | -   | -                  | 22,578.24                   | -                    | -             | 1,348.23  | 84.41     | -      |                  |
| 2010 | Light    | -   | -                  | 43,515.25                   | 658.96               | -             | -         | -         | -      |                  |
|      | Moderate | -   | -                  | 20,303.87                   | -                    | -             | -         | -         | -      |                  |
|      | Severe   | -   | -                  | 23,677.62                   | -                    | -             | 215.56    | 251.39    | -      |                  |
| 2009 | Light    | -   | -                  | 3,406.72                    | 121.16               | -             | -         | -         | -      | Y                |
|      | Moderate | -   | -                  | 5,369.13                    | -                    | -             | -         | -         | -      |                  |
|      | Severe   | -   | -                  | 5,161.28                    | -                    | -             | -         | -         | -      |                  |
| 2008 | Light    | -   | -                  | -                           | 3,033.53             | -             | -         | -         | -      |                  |
|      | Moderate | -   | -                  | -                           | -                    | -             | -         | -         | -      |                  |
|      | Severe   | -   | -                  | -                           | 1,735.34             | -             | -         | -         | -      |                  |
| 2007 | Light    | -   | -                  | -                           | 3,033.53             | -             | -         | -         | -      |                  |
|      | Moderate | -   | -                  | -                           | -                    | -             | -         | -         | -      |                  |
|      | Severe   | -   | 604.11             | -                           | 1,735.34             | -             | 116.1     | -         | -      |                  |

<sup>1</sup> Information is reported for all of Haida Gwaii, including protected areas and is not limited to the Management Unit. Fire has played a relatively small role in forest health, with 8.95 hectares assessed as severe damage in 2007. Mountain pine beetle played a minor role with 134.17 ha rated as light and severe in 2012. Spruce Labrador Tea Rust had a light occurrence in 2012 of 723.33ha. No other occurrences have been reported. There was also 42.9 4ha of moderate drought and 182ha of moderate defoliator noted in 2015. In 2016 there was 19.81ha of light foliage disease and 93.02ha of trace and moderate drought.

MFLNRO damage codes (sourced from the annual forest health report):

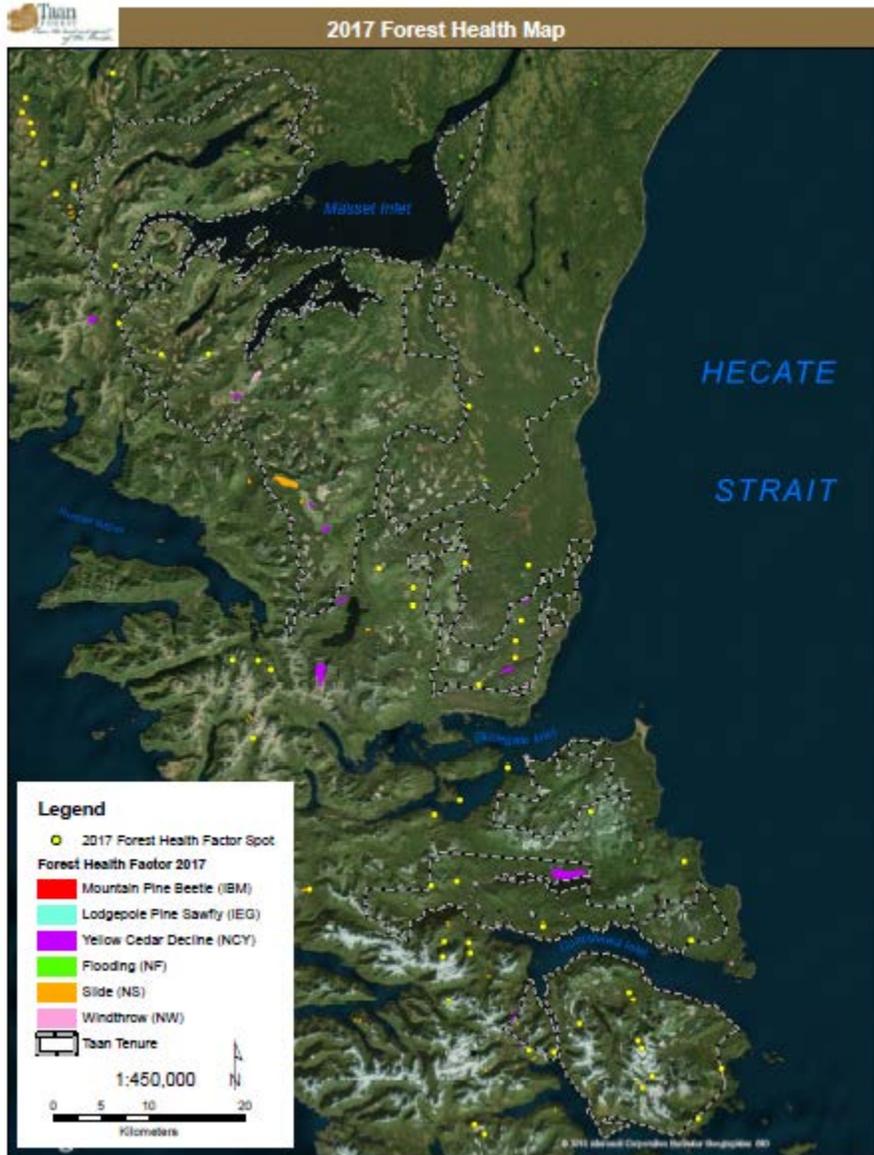
| Disturbance  | Intensity Class | Description  |
|--|-----------------|--|
| Mortality (bark beetle, abiotic, and animal damage)    | Trace           | <1% of the trees in the polygon recently killed.   |
|  | Light           | 1-10% of the trees in the polygon recently killed.                                       |
|  | Moderate        | 11-29% of the trees in the polygon recently killed.                                      |
|  | Severe          | 30-49% of the trees in the polygon recently killed.                                      |
|  | Very Severe     | 50%+ of the trees in the polygon recently killed.  |
| Foliage Damage (defoliating insect and foliar disease) | Light           | Some branch tip and upper crown damage, barely visible from the air.                     |
|  | Moderate        | Noticeably damaged foliage, top third of many trees severely damaged.                    |
|  | Severe          | Completely damaged tops, most trees sustaining more than 50% total foliage damage.       |
|  | Grey            | Cumulative foliage damage resulting in mortality, recorded at end of damage agent cycle. |

2017

Silviculture surveys within the Management Unit identified some cases of Conifer Seedling Weevil, Keithia Blight, Giant Conifer Aphid, Sirococcus Tip Blight and deer browse.

MFLRNO overview surveys indicate that no blackheaded budworm or green spruce aphid damage was noted; and yellow cedar decline, pine sawfly, windthrow floods and landslides decreased in occurrences (landslides just slightly). Mt. Pine Beetle was observed for the first time in Haida Gwaii, with estimated 95ha.

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## 2016

Total area affected is 7,427.26 ha, which is a very significant decrease from the total damage reported in 2015. The following is a summary of the notable increases in biotic and abiotic factors negatively impacting the health of the forests in Haida Gwaii (including a review of the 2016 Forest Health Survey Map):

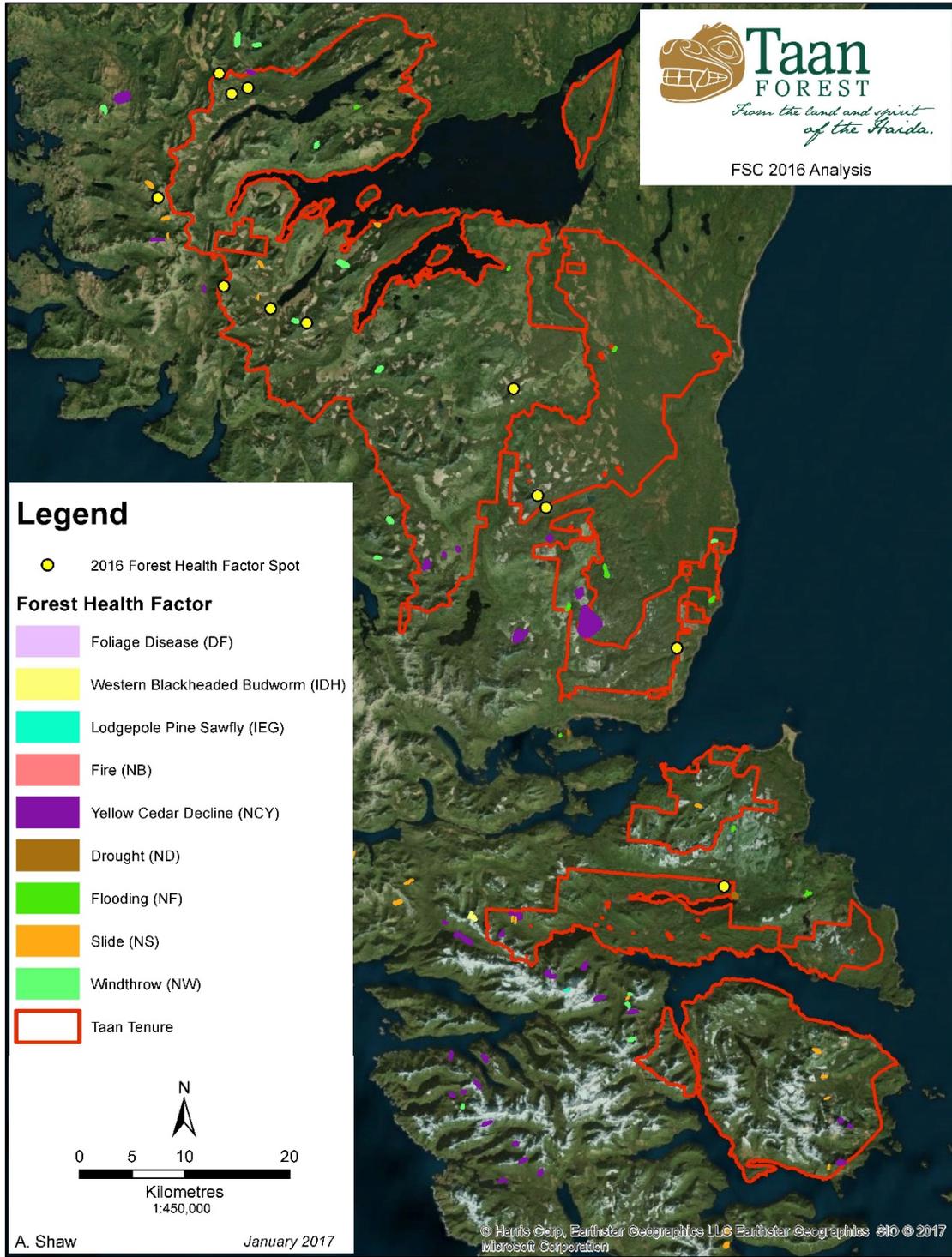
### Forest Health concerns within the Management Unit

- Yellow cedar decline - Continues to be a major issue for the coast and now for Haida Gwaii. There was less decline noted than in the previous year. An action item was created in 2015 to review the silviculture and planting strategies for yellow cedar. Taan continues to collaborate with UBC on research aimed at identifying suitable sites and strategies for successful regeneration.
- Windthrow - Damage was at its lowest recorded level since 2010. There are patches identified throughout the Taan FLTC, however most are not easily accessible. An action item has been generated to review potential salvage opportunities for the patch near Shannon 10.
- Landslides – There was a significant decrease in the reported slides compared to 2015. The areas are comparable to the previous years (with the exception of 2015). There are 3 slides that are near harvested cutblocks: L470C on Louise Island, between AWN 71 and 72 and between Ira5A and Ira6. The shapefiles for the polygons are very large in size, and a review of the ortho imagery does not seem to show any slide activity. The areas should be reviewed in more detail either in the field or with more recent imagery.
- Flooding – The flooding area was reduced significantly from 2015 to numbers comparable to 2014. There are some flooded areas identified in the FLTC, however these appear to be associated with natural waterbodies (e.g., rivers and lakes).

### Forest Health Concerns outside of the Management Unit

- Fire – There was 4.5ha of fire damage.
- Sawfly – 769.66 ha of sawfly damage (*Neodiprion spp.*) was identified (which is significantly less than 2015).
- Budworm – The outbreak peaked in 2009 at 87,497 ha and has continued to decline. This year there was new damage (209 ha) with the majority as light and moderate infestations.
- Spruce Beetle – There was a significant decrease in the reported spruce beetle compared to 2015. Only 1ha was identified.

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## 2015

Total area affected is 25,989.23 ha, which is a very significant increase from the total damage reported in 2013 and 2014. The following is a summary of the notable increases in biotic and abiotic factors negatively impacting the health of the forests in Haida Gwaii (including a review of the 2015 Forest Health Survey Map):

- Yellow cedar decline - Continues to be a major issue for the coast and now for Haida Gwaii. There was an additional 5,563 ha of decline noted in Haida Gwaii. The decline is believed to be linked to the susceptibility of yellow cedar (fine roots) to spring freezing injury in areas of little snowpack resulting from climate change. There are no specific management strategies being advocated at this time (by the MFLNRO), however advice is to avoid shallow rooting situations and seepage areas where subject to freezing soils. There are new large patches in the Dinan and Ferguson Areas. An action item has been generated to review the silviculture and planting strategies for yellow cedar.
- Windthrow - Damage has almost doubled from 2014 (2,709 ha). There are patches identified in the Ferguson area and on Louise Island. An action item has been generated to review potential salvage opportunities for patches near or associated with cutblocks. *Action item still outstanding.*
- Landslides – There was a significant increase in the damage from slides (total of 5,142 ha). There are 20 on Louise Island and several more scattered throughout the MU. Several on Louise Island appear to have originated in old cutblocks (from an old road grade on north Louise). Taan reported 4 slides. An action item has been generated to potentially assess slides that appear to have originated in cutblocks on Louise Island. *Action item still outstanding.*
- Flooding – There was significant damage noted from flooding (3,999 ha). Data from 2014 flooding was also added (181 ha). There are some flooded areas identified in the FLTC (Hoodoo road system), however these appear to be associated with natural waterbodies (e.g., rivers and lakes)
- Sawfly – 5,004 ha of sawfly damage (*Neodiprion spp.*) was identified. This is a large new occurrence (previously only 1,034ha was identified in 2013). The outbreak is not located in the MU.
- Budworm – The outbreak peaked in 2009 at 87,497 ha and continued to decline with no occurrences in 2014. This year there is was new damage (284 ha) with the majority as light and moderate infestations. The outbreaks are not located in the MU.
- Green Spruce Aphid - New infestations for the green spruce aphid (578 ha) were noted. The outbreak is not located in the MU.
- Spruce Beetle – New infestations for the spruce beetle (1,291 ha) were noted. The outbreaks are not located in the MU.

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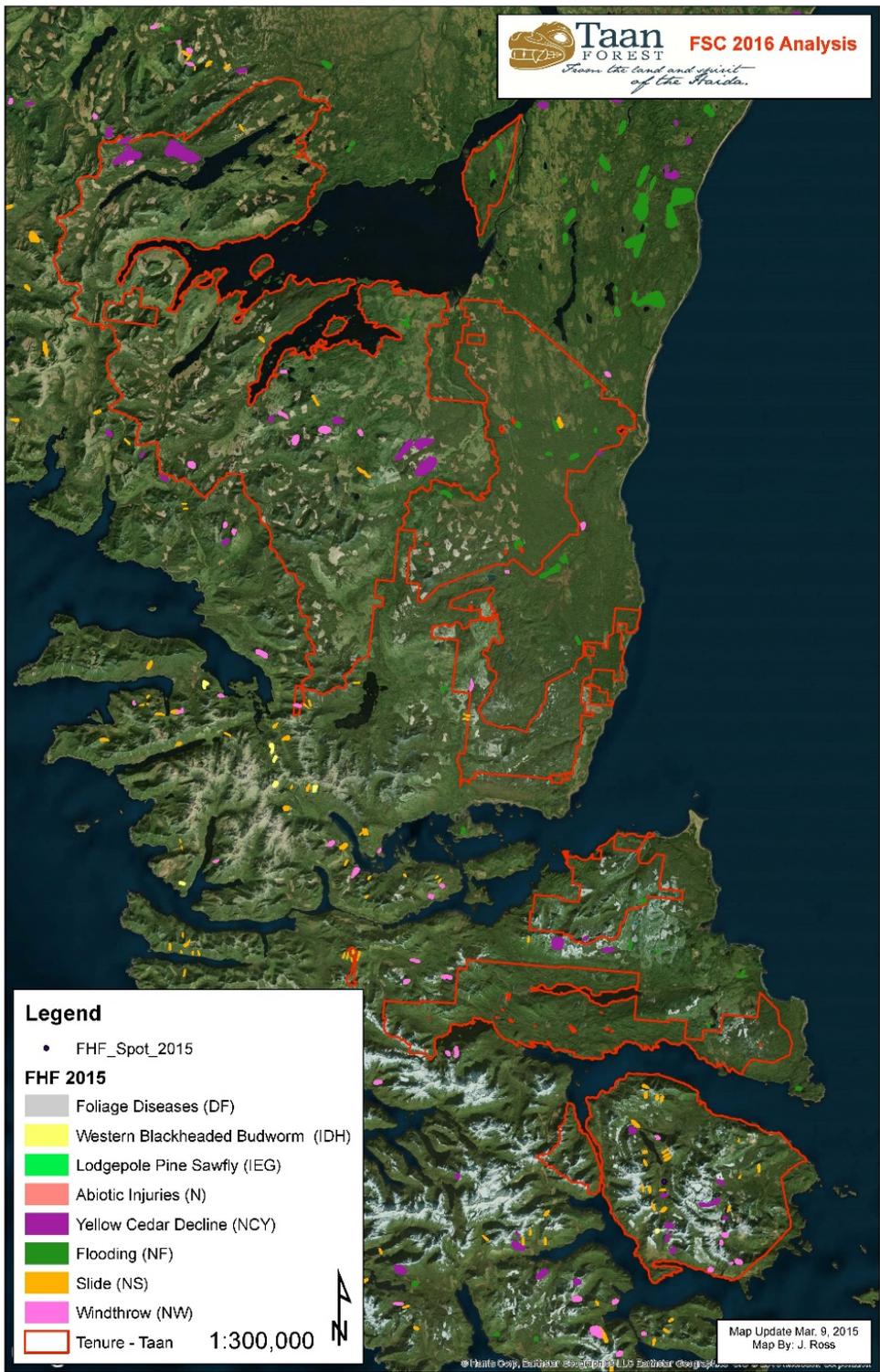


Figure 3: 2015 Forest Health Concerns in the Management Unit

2014

1,108.68 hectares of “grey” or cumulative damage resulting in mortality from blackheaded budworm was identified. An additional 6,242.13 hectares of “unknown disease” was also identified (1,613.32 hectares of “grey”). Total area of mortality is 2,722.00 ha. Taan will continue to monitor the changes.

Yellow cedar decline increased significantly from previous years (although less than 2008 and 2007), but is noted as trace to light intensity class. Taan will continue to monitor the changes.

Windthrow levels were significantly less in 2014 from previous years and landslides were slightly less (roughly 100ha less). The map indicates some new areas of windthrow in the south end of Ian Lake (on the north facing slope in the middle to top of the hill and the Mamin 16/25 area.

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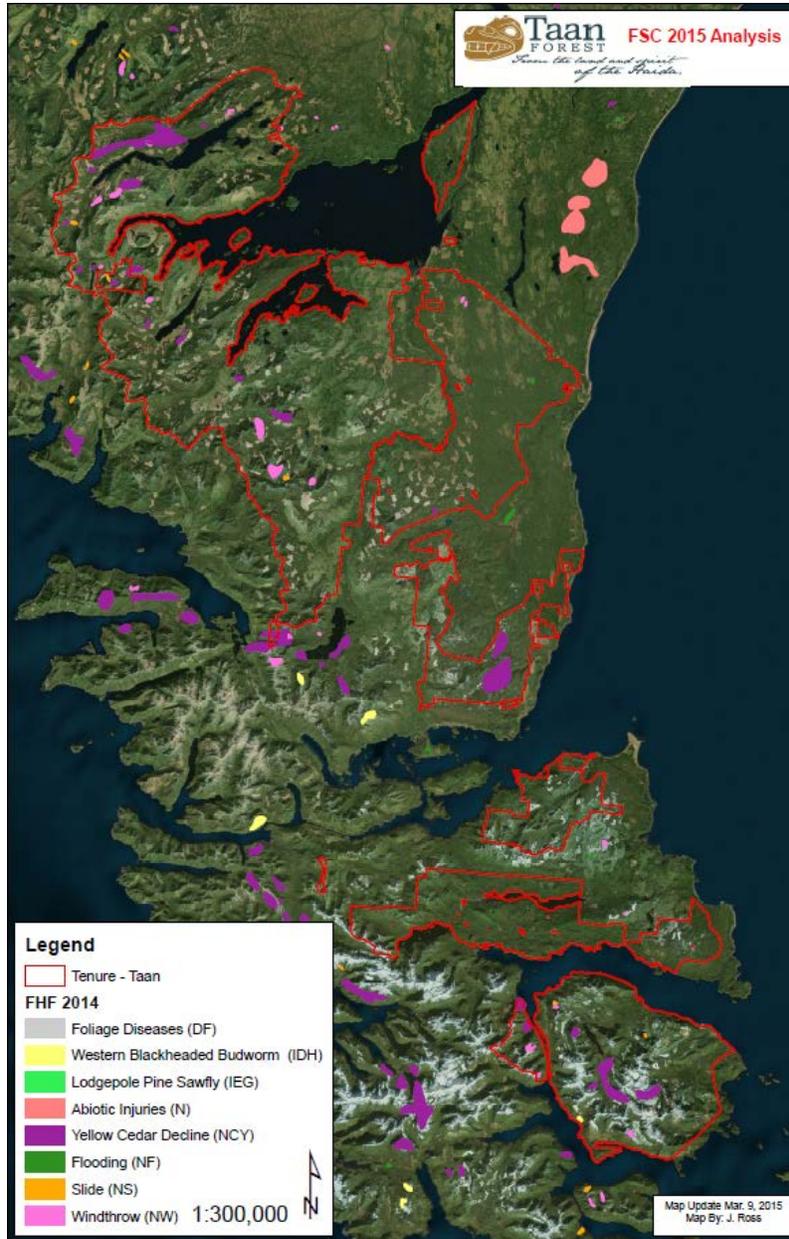


Figure 4: 2014 Forest Health Concerns in the Management Unit

## 2013

The Ministry completed aerial forest health surveys on an estimated 92% of the province. Bark beetles continue to be the leading damage agent for BC but are continuing to decline. A review of the 2013 MFLNRO Forest Health Report noted the following in relation to Haida Gwaii:

- Windthrow - Damage was 40% less than the last two years with 4,230 ha recorded provincially. Mortality intensity was assessed as 105 ha (3%) light, 62 ha (1%) moderate, 4,055 ha (96%) severe and 8 ha (<1%) very severe. More than half of the damage occurred in Haida Gwaii TSA in the West Coast Region with 2,363 ha of western hemlock and Sitka spruce severely affected.
- Sawfly - 1,034 ha of sawfly damage (*Neodiprion annulus contortae*) was identified. The majority of the defoliation occurred at the south tip of Moresby Island around the Yatza Mtn. area.
- Budworm - Outbreak peaked in 2009 at 87,497 ha and continued to decline as expected this year to 723 ha of primarily (83%) light defoliation. Small scattered polygons were delineated from Masset Inlet south to Puffin Cove. An additional 225 ha of mortality caused by repeated western blackheaded budworm defoliation was mapped at Alliford Bay on Skidegate Inlet.
- Landslides - All disturbances were small and scattered. Haida Gwaii TSA had 715 ha of damage, with levels under 180 ha for other TSAs in the region.

A review of the forest health survey map (below) indicates that there is a new patch of mortality caused by repeated budworm attack noted in the area near the Alliford Bay ferry terminal (225ha), within Taan's TFL 60. Discussions with staff indicate that this area is comprised of immature stands (not harvestable for salvage operations). Louise Island also has one patch of budworm noted, as well as a few landslides and two fairly large patches of windthrow. The windthrow areas were reviewed in Google Earth and appear to be located in un-harvested areas.

Windthrow and landslides continue to be significant in Haida Gwaii. A few cases were noted in the Management Unit (see the 2013 results summary). However, Taan staff did not observe/ report any landslides in 2013 and Taan continues to implement windthrow treatments on harvested areas to a much more significant level than what was done in the past on the management unit by the previous tenure holder.



Figure 5: 2013 Forest Health Concerns in the Management Unit

2012

The following excerpt is provided from the 2012 MFLNRO Forest Health Report:

*In 2012, a small area of mountain pine beetle was identified in Haida Gwaii in the south near Staki Point and Huston Inlet. Spruce-labrador tea was identified near Port Clements, additional ground reports were documented, particularly in younger spruce on roadsides near Watt Lake and Nadu Road. Western Blackheaded Budworm damage began in Haida Gwaii in 2009 and peaked in 2010 continued to subside in both size and intensity in 2012. Windthrow damage increased from 2011 levels in Haida Gwaii. Landsides across the province doubled and most damage was rated as severe, though all disturbances were noted as small and scattered. Haida Gwaii had fairly significant slide damage noted.*

In 2012, the Group Manager continued to follow up with this indicator and obtained the GIS files associated with the forest health surveys from MFNRLO so that the information can be reviewed for applicability to the Management Unit:

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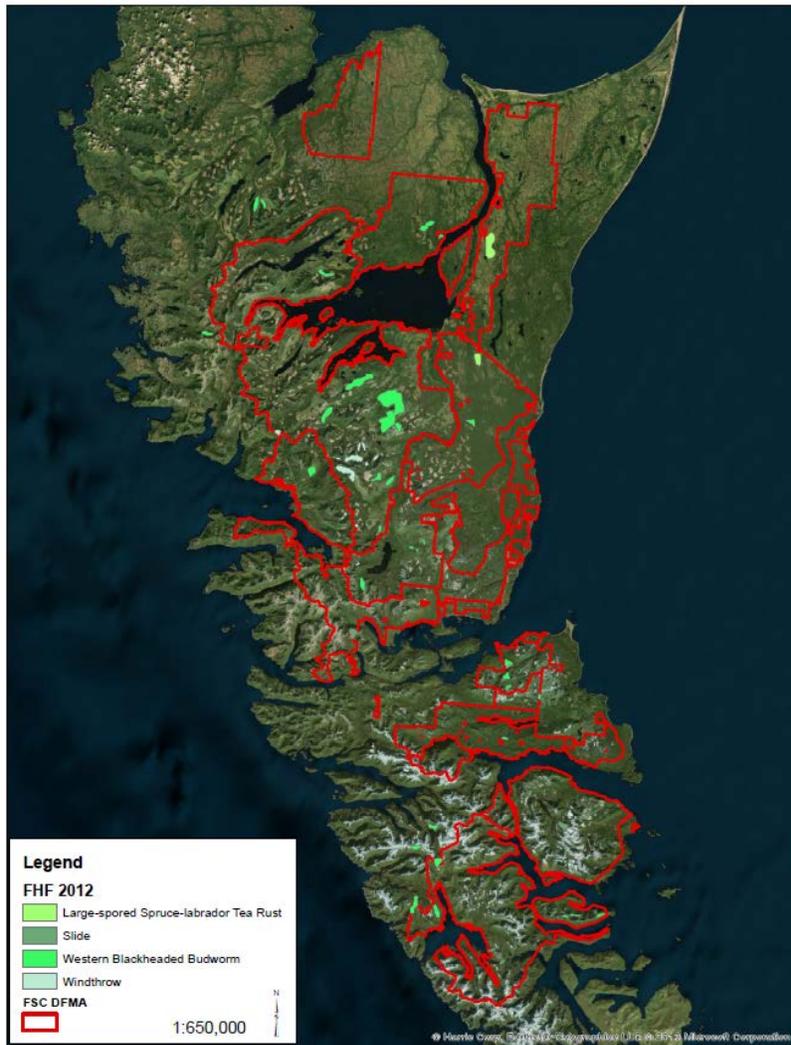


Figure 6: 2012 Forest Health Concerns in the Management Unit

A review of the forest health survey results within the context of the Management Unit was completed. The items of most concern for Haida Gwaii appeared to be windthrow and slides. One slide was observed on Louise Island (Taan TFL 60). Windthrow in the MU appeared to be concentrated in Taan TFL 60, one area appears to be located in non-harvested area at the head of GHOST. The other areas are located above GHOST in the Mamin River area that appear at least in part to be associated with harvested edges and some on Louise Island. To date, Taan has not been active in Louise Island. Taan Planners are aware of the substantial windthrow in the GHOST/ Mamin area and have been discussing potential salvage opportunities in the area. Access is a challenge and some of the blowdown is thought to be located in a Wildlife Habitat Area.

In 2012, Taan completed tree crown modification windthrow treatments on 53% of the areas harvested (8/15 cutblocks) with a total of 3.6Km of edge treated.

Recent research completed by the U.S. Forest Service indicates that the yellow cedar decline in Alaska and BC is caused by climate change impacts relating to a decline in snow cover causing the roots to freeze in the cold winter months, particularly in cases where yellow cedar is planted in shallow, wet soils. MFLNRO was working on an Assisted Migration climate change research project that may have assisted with development of mechanisms to adjust management, but this program was cancelled.

### **Summary of Management Strategies**

During the FSP development, Taan had discussions with MFLNRO regarding windthrow concerns and has included some results and strategies to address windthrow, as well as established the guidelines for completing assessments consistent with current best practices (FSP Supporting Information document). Taan has also been working with the Joint Solutions Table to address windthrow concerns and ensuring that windthrow treatments are implemented in high risk situations.

Taan will work in cooperation with the MFLNRO and the Forest Health Program to report any new sightings/ information of infestations. In addition, forest health concerns that are identified in the Management Unit, either through this process or otherwise (e.g., planning activities, comments received, etc.) will be assessed to determine severity and evaluate appropriate action plans (such as salvage harvesting to capture volume before it is lost, grass seeding and/ or planting of landslides, planting of alternate species, etc.).

If MFLRNO reports high severity outbreaks, Taan will work with the Ministry to ensure that more detailed assessments/ sample areas are completed to assess mortality levels.

Losses to the Timber Harvesting Land-Base (THLB) as a result of both abiotic and biotic factors on Haida Gwaii were considered in the recent Timber Supply Review completed by the Haida Gwaii Management Council, and appropriate deductions from the THLB were factored in.

### **Adaptive Management Strategies**

Not applicable at this time, as there are no serious forest health concerns in the Management Unit.

MFLNRO is monitoring the new presence of yellow cedar decline in Haida Gwaii. An action item has been generated to assess the damage and review suggested silviculture strategies.

Taan has developed a windthrow monitoring program in order to assess the effectiveness of the windthrow management strategies being applied, particularly as they relate to boundaries for key resource features such as riparian, cultural, wildlife, etc.

### **Database & Reporting Parameters**

Since 1999, the B.C. Ministry of Forests has surveyed the majority of the forested land in the province using an overview survey to record general trends in disturbance patterns across the provincial forested land base (including provincial parks, private land, and Tree Farm Licences but not Federal parks). The Ministry develops an annual summary report (<http://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/aerial-overview-surveys>). Copies of the annual report spreadsheet are downloaded from the website and filed in the monitoring records. GIS information is also included in the available information and has been added to Taan's GIS database for future tracking.

## Indicator: Soil Conservation Effectiveness

| Element  | Objective                       | Indicator   | Target  |
|--|---------------------------------|---|---|
| FSC 6.3.14 & 8.2.3: Growth rates, regeneration and condition of the forest | Maintain ecosystem productivity | Average % permanent access; % of cutblocks where soil conservation objectives are being met | Maintain average of ≤ 7% permanent access; 100% of cutblocks achieve soil conservation objectives |

### Rationale for Indicator & Target

The indicator is established to track effectiveness of soil conservation practices. Taan’s approach is to follow legal guideline to stay below 7% permanent access and follow soil conservation objectives set and monitored by the Forest and Range Evaluation Program (FREP). Considerable thought went into the objectives set by FREP and the monitoring methods they use were designed to be efficient and practical while still providing important information. The permanent access portion of this indicator is derived from actual results from each year and the soil conservation data is reported using FREP data. This indicator will be reported annually, but assessed against the target on a five-year reporting period to better assess trends (larger sample size).

The FREP objectives for soil conservation are derived from the *Forest and Range Practices Act* (FRPA) and include:

- to limit the extent of soil disturbance caused by harvesting and silviculture activities that negatively affect the physical, chemical, and biological properties of the soil;
- to conduct forest practices in a manner that addresses the inherent sensitivity of a site to soil-degrading processes to minimize detrimental soil disturbance, landslides, soil erosion, and sediment delivery to streams; and
- to limit the area of productive forest land that is occupied by permanent roads, landings, pits, quarries, and trails to the minimum necessary to safely conduct forest practices.

Under FRPA, disturbance is classified into two main types: areas occupied by permanent access structures; and areas occupied by soil disturbance in the net area to be reforested. Soil disturbance in the net area to be reforested is further categorized as the area occupied by corduroyed trails, compacted areas, areas of dispersed disturbance, and un-rehabilitated temporary access structures. The target for Permanent Access remains conservative in relation to past performance as it is anticipated that implementation of the Land Use Order will result in smaller cutblocks, which may lead to increased PAS calculations. This will be somewhat off-set by using the Total Area under Prescription (TAUP) that includes stand-level retention areas to calculate the PAS.

FREP Soil Conservation Assessments have not been completed in the MU since 2011. Until FREP Assessments are completed again, soil conservation objectives will be met through internal inspection results.

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**Current Status/ Results**

| Year      | Description          | Average % Permanent Access <sup>1</sup> | Soil Conservation   |   | Target Met (Y/N)  |
|-----------|----------------------|---|---|---|---|
|           |                      |   | # Post- Harvest Surveys Identifying Soil Disturbance  | # of Soil Rehabilitation Activities Completed |   |
| 2017      | Taan                 | 4.2                                     | 3 (CAN001, TOW001 MFZs not respected; PHT005 slide)   | 1 prescribed; 1 completed                     | Y   |
|           | BCTS in Haida Tenure | N/A                                     | N/A   | N/A   |   |
| 2012-2016 | Taan                 | 4.1                                     | 0   | 0   | Y   |
| 2016      | Taan                 | 4.2                                     | 0   | 0   | -   |
|           | BCTS in Haida Tenure | N/A                                     | -   | -   |   |
| 2015      | Taan                 | 3.9                                     | <i>Previously reported on FREP Soil Conservation Assessment Results which have not been sampled since 2011.</i> |   | -   |
|           | BCTS in Haida Tenure | N/A                                     |   |   |   |
| 2014      | Taan                 | 5.2                                     |   |   |   |
|           | BCTS in Haida Tenure | N/A                                     |   |   |   |
| 2013      | Taan                 | 3.5                                     |   |   |   |
|           | BCTS in Haida Tenure | 4.1                                     |   |   |   |
| 2012      | Taan                 | 3.7                                     |   |   |   |
| 2011      | Taan                 | 5.0                                     |   |   | FREP Results: 100% of the sampled blocks achieved objectives. (5 blocks reviewed with aerial photos). |

<sup>1</sup> The permanent access calculations were determined for all cutblocks harvested in the year.

In 2017, post-harvest inspections prescribed some minor corrective actions related to rehabilitation of machine trails (to disperse puncheon and create plantable spots), clearing of plugged culverts, road deactivation and grass seeding. Inspection results noted that in two blocks (CAN001, TOW001), the operator did not respect the machine free zone established within a sensitive soil area and for CAN001, corrective actions were prescribed and completed. A small slide also occurred in PHT005.

In 2016, no observations of excessive soil disturbance were noted within any Taan harvest inspections (no action items noted in the Operations Tracker). BCTS did not conduct any road construction or harvesting within the Taan FLTC during 2016. The 5-year average PAS is 4.1% which is well below the maximum allowable permanent access of 7%.

The soil conservation data reported for 2011 reflects results of the Forest and Range Evaluation Program (FREP) from 2006-2010, for all of Haida Gwaii but is based on a small sample size that was limited to a review of aerial photos for five helicopter blocks (i.e., no field verification was completed). The results for Taan in 2011 indicate that 100% of the cutblocks and the Province of BC as a whole demonstrated a range of 77-86% of cutblocks that achieved the soil conservation objectives.

Further work is being planned under FREP to evaluate the role of large coarse woody debris on effectiveness of soil conservation. CWD is addressed under a separate indicator within this monitoring report.

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### **Summary of Management Strategies**

The Forest Stewardship Plans contain thresholds for the maximum allowable permanent access (7%) and soil disturbance limits (5% for sensitive soils, 10% for non-sensitive soils, 25% for roadside work areas) that are consistent with legal requirements under the *Forest and Range Practices Act* and FSC. The majority of soils in Haida Gwaii are categorized as sensitive soils under the legal definitions as a result of soil texture, moisture, etc. As such, the soil disturbance limit for sensitive soils is 5%.

In order to ensure that soil conservation thresholds are met, Taan's Corporate Management System includes appropriate field procedures relating to minimizing soil disturbance, use of punchon and other means to reduce impacts on machine trails, rehabilitation of trails, maintaining natural drainage patterns, following designated trails and/ or stream crossing locations, etc. Soil disturbance and permanent access limits are also addressed within Site Plans (site level planning document).

Internal pre-works, inspections and audits also monitor adherence to the procedures and plans.

Effectiveness monitoring of the management strategies is partially addressed through the internal inspections (i.e., whether procedures are adequate to ensure limits are consistently being met and whether procedures are being implemented/ followed) and is also measured as part of the FREP program.

Permanent access calculations are based on the Total Area under Prescription (TAUP) and the area of the cutblock planned / occupied by permanent access structures (roads, pits).

### **Adaptive Management Strategies**

To date, soil conservation monitoring has not been a focus for FREP resources (instead focus is on water quality, riparian, stand-level biodiversity and stand density), but Taan will continue to explore potential opportunities to assist with monitoring for this indicator.

### **Database & Reporting Parameters**

FREP Soil Conservation Effectiveness Monitoring – Information Management System database Extension Note #23 and Report #31. Specific parameters for data collection and analysis are recorded under the FREP procedures for each indicator. Explanatory notes are also provided within the exported data reports (MS Excel).

Taan's Silviculture Tracking Database; Records of internal inspections are maintained.

Permanent access is measured for blocks with harvesting completed within the calendar year.





**Indicator: Stand-level Biodiversity Effectiveness**

| Element   | Objective   | Indicator  | Target  |
|---|---|--|---|
| FSC 5.1.4, 8.2.3, 9.4.1 & 9.4.3: Growth rates, regeneration and condition of the forest; HCVF effectiveness | Monitor the condition of the forest and disturbances resulting from forest operations; maintain stand-level biodiversity; contribute to coarse filter maintenance of habitat and HCVF | Stand-level biodiversity as evaluated using key indicators   | Specific targets are identified below   |
|   |   | Stand-level retention includes spatial records of area and attributes of each specific retention area                  | Develop a complete spatial database of stand-level constraints/ retention (area and attributes) |
|   |   | Skidegate Landscape Unit – Stand-level Retention (vulnerable LU under Landscape Level Biodiversity Overview Indicator) | Skidegate LU: maintain an average of 20% stand-level retention                                  |

**Rationale for Indicator & Target**

Stand-level Biodiversity is an important component of monitoring overall landscape level biodiversity and is intended to capture some of the values and indicators that may not be fully captured in landscape level analysis. The indicator utilizes the indicators of the Forest and Range Evaluation Program (FREP). The target reflects the anticipation that the benchmarks will improved over time as full implementation of the Land Use Order occurs. It is expected that new benchmarks may be established following several complete years of LUO implementation. The benchmark data and future monitoring can provide valuable management direction to ensure that stand-level biodiversity attributes are maintained over time. Because the level of stand-level retention is such an important part of maintaining biodiversity, Taan also intends to track all retention in the MU, both numerically and with spatially explicit maps. This provides an indication of the level of retention under the Land Use Order (while current FREP data pre-dates the Land Use Order). The indicator and target are based on initiatives to spatially record and monitor stand-level implementation of the Land Use Order by recording all LUO no harvest areas within the Total Area Under Prescription as well as record information within the GIS database to ensure that the restrictions to harvesting these areas are recorded and tracked (i.e., what each specific retention area is set aside for). This indicator will be reported annually, but assessed against the target on a five-year reporting period to better assess trends (larger sample size).

This information may assist with future timber supply analysis/ reviews.

**Current Status/ Results**

**Stand-level Biodiversity Effectiveness (FREP data):**

| Targets          | 23 ha (coast wide avg.); use range of opening sizes       | Average patch size is ≥ 2.0ha (permitting a range of patch sizes across blocks) | Average patch size is ≥ 2.0ha (permitting a range of patch sizes across blocks) |  | 23% (coast wide average, but 31% in CWH wh2 and 16% in CHW wh1 and wh2)) | Stay above 50% of baseline. Baseline is 44.76 snags >30 cm dbh and 10 m height /ha (coast wide CWH wh1/ wh2) | Stay above 50% of baseline. Baseline is 64 pieces /ha (coast avg.) | Stay above 50% of baseline; Use patch CWD as baseline | Stay below 8.9 % (coast wide avg.) | N/A                                   |
|------------------|---|---|---|--|--|--|--|---|------------------------------------|---------------------------------------|
| Year             | Avg. Gross Harvest (ha)                                   | Avg. Patch Size (Retention ha)  | # of blocks >10ha that have internal retention                                  | Average Internal Patches for blocks ≥10ha (%)      | Avg. Stand-level Retention (%)   | Avg. Large Snag in Patch (sph)   | Avg. Large CWD in Patch (piece/ha)                                 | Avg. Large CWD in Harvest Area (piece/ ha)            | Avg. Windthrown Trees (%)          | Sample Size                           |
| 2017             | 3.1   | N/A   | N/A   | N/A  | To be reported in 2018 – data not received for 2017 reporting.           |  |  |   | N/A                                | 1 Salvage Block                       |
| 2016             | 31.5 (range 2.3-45.5)                                     | 11.5  | 1/4   | 9 (1/11 patches, 0.1ha)                            | 33.8   | 28 (63% of baseline)   | 36.9   | 50.6  | 3.0                                | 4 Cutblocks, 1 Salvage block (CWH wh) |
| Target Met (Y/N) | Y*  | Y   | N/A   | Y  | Y  | Y*   | Y  | N   | Y                                  | 10 cutblocks (CWH wh)                 |
| 2011-2015        | 26.0 (range 6.8-42.5) MU Actual = 23.5 (range 1.78-41.86) | 7.0   | 9/28  | 30 (3/10 patches) Range is 0.2ha-12.4ha Avg. 3.1ha | 26.9   | 18.2 (41% of the baseline) *Live & dead >70cm = 43.4   | 49.6 404 m³/ha   | 17.3 (35% of baseline) 282m³/ha                       | 4.3                                |                                       |
| Target Met (Y/N) | Y   | N (anticipate improvement under LUO)  |   | N  | N (but met now with LUO implementation)                                  | N (anticipate improvement under LUO)   | N (anticipate improvement under LUO)                               | Y   | Y                                  | 33 cutblocks (CWH wh, CWH wh)         |
| 2006-2010        | 20.6 (range 2.5-55.4)                                     | 2.7 (range 2.7-2.9)   |   | 24 (6 internal /25 total patches)                  | 13.2 (range 12.9-15.3)   | 11.9-22.4 (25-50% of baseline)   | 20 (31% of baseline)   | 61 (95% of baseline)                                  | 8.0                                |                                       |

Large Snag refers to the stems per hectare of dead trees that are ≥ 30cm dbh and ≥ 10m height; baselines come from cruise data collected coast wide by FREP for CWH wh1 and wh2). Large Coarse Woody Debris (CWD) includes species with diameter >= 20cm and length = 10m (no./ha Coast wide average refers to FREP data for CWH wh2, CWHwh1 and CWH wh2).

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In 2017, FREP completed stand level biodiversity assessments on one salvage block (YAK015S). The assessment noted that based on the opportunities available, Taan did a good job ensuring that leave trees were left standing, maintaining an irregular boundary, leaving good quality coarse woody debris on-site and ensuring that leave trees were not damaged by the harvest activity.

In 2016, comments associated with FREP monitoring indicate that the blocks assessed contained large contiguous reserves and good diversity of wildlife tree classes, sizes and species. The salvage blocks also contained retention of some single trees within the harvest area.

In 2015, coarse woody debris levels are also reported in m<sup>3</sup>/ha, as FREP is now providing that data. Moving to setting a target and reporting in m<sup>3</sup> ha will be considered in 2016, to allow for easier comparison between CWD targets and waste and residue targets. A new indicator was added in 2015 to also record the number of cutblocks that are greater than 10 ha in size that have internal retention patches.

The 2011-2015 summary shows significant improvement in meeting the targets for stand-level biodiversity (as was projected due to implementation of the Land Use Order). Although the target for large snags within patches was not met, results show that there is a significant number of large diameter live and dead trees within the patches that will meet the target over the long term, through recruitment over time. The target for average opening size was deemed to have been met, target 23 ha, and actual was calculated at 23.5 with demonstration of a wide range of opening sizes. The other indicator that did not meet target was large CWD within the harvest area. The data shows that there is significant variation in CWD levels from year to year. In 2015, four out of the five blocks assessed had no large CWD sampled in the harvested area, and one block had 43.6/ha large CWD.

The data reported above reflects results of the Forest and Range Evaluation Program (FREP), for the Management Unit. Baselines are generated under the FREP program using natural stands. It is important to note that 2012 & 2013 FREP monitoring had just started to sample LUO implementation areas and still included some pre—LUO samples. Therefore, for some indicators above, reporting was also calculated using the recent harvested areas to generate some data that is more indicative of the full LUO implementation.

**Taan Stand-level Retention Data**

| Year | Description   | Total Area Under Prescription (TAUP ha) | Area Harvested (gross ha) | Stand-level Retention (TAUP ha – gross ha) | Average <sup>2</sup> % Stand-level Retention <sup>1</sup> (includes 'retention' areas) | % Forest Influence (avg.) | % of Blocks with >50% Forest Influence | Target Met (Y/N) |
|------|---|---|---------------------------|--|--|---------------------------|--|------------------|
| 2017 | Taan  | 908.7                                   | 423.3                     | 485.4                                      | 86   | 48                        | 44 (8/18)                              |                  |
|      | BCTS did not completed any harvesting in Haida Tenure |   |                           |  |  |                           |  |                  |
| 2016 | Taan  | 1434.4                                  | 719.4                     | 715.0                                      | 60   | 68                        | 92 (24/26)                             | Y                |
|      | BCTS did not completed any harvesting in Haida Tenure |   |                           |  |  |                           |  |                  |
| 2015 | Taan  | 1095.9                                  | 504.1                     | 591.8                                      | 93   | 73                        | 95 (18/19)                             | Y                |
|      | BCTS did not completed any harvesting in Haida Tenure |   |                           |  |  |                           |  |                  |
| 2014 | Taan  | 489.3                                   | 325.0                     | 156.4                                      | 48   | 59                        | 70 (7/10)                              | Y                |
|      | BCTS did not completed any harvesting in Haida Tenure |   |                           |  |  |                           |  |                  |
| 2013 | Taan  | 680.3                                   | 380.2                     | 300.1                                      | 79   | 66                        | 77 (17/22)                             | Y                |
|      | BCTS in Haida Tenure                                  | 99.7                                    | 69.2                      | 29.0                                       | 42   | Not available             | Not available                          | Y                |
| 2012 | Taan  | 544.3                                   | 342.2                     | 202.0                                      | 66   | 63                        | 71 (10/14)                             | Y                |
| 2011 | Taan  | 441.2                                   | 329.0                     | 112.2                                      | 25   | -                         | -                                      | Y                |

<sup>1</sup> Area constrained includes any areas excluded from the block at the stand level to address implementation of the Land Use Order such as riparian, cultural features, monumental cedar, bear dens, red and blue listed ecosystems, etc. It does not include the protected reserves such as cedar stewardship areas and forest reserves. Retention areas must be established as long term reserves for at least one rotation to contribute to stand-level retention calculations. Each specific feature is identified in the GIS to allow for future queries and tracking of specific stand-level retention areas.

<sup>2</sup> Average stand-level retention is a calculation of the average retention based on all of the cutblocks harvested in the year, and is not a direct calculation of the retention divided by the gross harvest area.

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In 2017, the majority of this retention reported above is external/ adjacent to the cutblocks with very little internal retention. However, average forest influence is calculated at 68%. Forest influence extends into the cutblock from an edge or group of trees for a maximum of 1 tree length from a forested edge (>50yrs) with a minimum of a 0.25ha patch size. Taan is currently exploring options for alternative harvesting that will focus on increasing stand level retention and maintaining more forest structure.

In 2016, BCTS did not complete any harvesting within the Taan FLTC. The average stand-level retention is 60% for cutblocks harvested in 2016. The majority of this retention is external/ adjacent to the cutblocks with very little internal retention. However, average forest influence is calculated at 68%. Forest influence extends into the cutblock from an edge or group of trees for a maximum of 1 tree length from a forested edge (>50yrs) with a minimum of a 0.25ha patch size.

In 2012, the stand-level retention information is more clearly demonstrating the implications of the full implementation of the LUO. The average stand-level retention is 58.9%. This trend continues in 2013, with stand-level retention calculated at 78.9%. It is important to note that the majority of this retention is external/ adjacent to the cutblocks with very little internal retention in 2013. However, average forest influence is calculated at 65.6%.

Implementation of the LUO was in progress during 2011, and harvesting during the year included a significant portion of previously developed cutblocks, prior to the LUO. This indicator demonstrates that stand-level retention under the LUO is significantly higher than under FRPA, as reported in the previous Stand-level Biodiversity Indicator (FREP data).

Refer to the Land Use Order Reporting Indicator for a detailed description of the various LUO features that are protected on an annual basis that contribute to the stand-level retention reporting.

Landscape Level Biodiversity Overview – Annual Reporting Indicators at the Stand Level

The Skidegate Lake is the only Landscape Unit (LU) assessed as having less than 30% old forest and is therefore considered vulnerable in terms of overall biodiversity health. In addition, the more detailed analysis also identified the Masset LU as a medium to high vulnerability for overall biodiversity health due to low representation of old forest and high levels of roads. Refer to the Landscape Level Biodiversity Overview Indicator for details.

In order to address these vulnerable LUs, the following reporting tables have been added to the monitoring report to specifically report on activity within these LUs:

| Year | Description              | Average % Stand-level Retention (Skidegate LU) | Ecosystem Representation Management Area (Skidegate LU) | Target Met (Y/N) |
|------|--------------------------|--|---|------------------|
| 2017 | Taan                     | 83   | Old forest – 900.8ha<br>Mature forest – 127ha           | Y                |
|      | BCTS within Haida Tenure | N/A – no harvesting                            |   |                  |
| 2016 | Taan                     | 74.5   | Old forest – 900.8ha<br>Mature forest – 127ha           | Y                |
|      | BCTS within Haida Tenure | N/A – no harvesting                            |   |                  |
| 2015 | Taan                     | 62.0   | Old forest – 900.8ha<br>Mature forest – 127ha           | Y                |
|      | BCTS within Haida Tenure | N/A – no harvesting                            |   |                  |
| 2014 | Taan                     | 79.8   | Old forest – 901ha<br>Mature forest – 127ha             | Y                |
|      | BCTS within Haida Tenure | N/A – no harvesting                            |   |                  |
| 2013 | Taan                     | 77.3   | Old forest – 901ha<br>Mature forest – 127ha             | Y                |
|      | BCTS within Haida Tenure | 42.3   |   |                  |
| 2012 | Taan                     | N/A – no harvesting                            | In Progress   | Y                |

In 2017, there was no harvesting within the eco-rep management zones in the Skidegate LU.

In 2016, Taan harvested AER003, AER004, AER005 and AER032 within the Skidegate LU. There was 31.2ha of mature forest and 50.3ha of old forest identified within these blocks. The Site Plans note that sufficient old forest exists to meet the eco-rep targets.

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In 2015, Taan harvested SKI008, SKI009, SKI010 and AER001 within the Skidegate LU. All blocks were mainly comprised of second growth timber therefore did not impact the mature and old age classes in the Eco-Rep Management Zone. A very small section of overlap onto old forest occurred (0.1927ha). Additional overlap occurred with harvesting within the Eco-Rep MZ in the mid and early seral stages (48.7 ha), however the Site Plans note that sufficient old forest exists to meet the eco-rep targets.

| Year | Description  | New Road Construction by LU (m) |        | Target Met (Y/N)                            |
|------|--|---------------------------------|--------|---|
|      |  | Skidegate                       | Masset |   |
| 2017 | Taan   | 1,435                           | -      | Y   |
|      | BCTS did not complete any harvesting within the Haida Tenure |                                 |        |   |
| 2016 | Taan   | 4,725                           | 7,490  | Y   |
|      | BCTS did not complete any harvesting within the Haida Tenure |                                 |        |   |
| 2015 | Taan   | 11,596                          | 18,763 | Y*  |
|      | BCTS did not complete any harvesting within the Haida Tenure |                                 |        |   |
| 2014 | Taan   | 7,803                           | 5,334  | Y*  |
|      | BCTS did not complete any harvesting within the Haida Tenure |                                 |        |   |
| 2013 | Taan   | 780                             | 8,803  | Y   |
|      | BCTS within Haida Tenure                                     | 1,311                           | 0      | Y   |
| 2012 | Taan   | 0.0                             | 3,144  | To be determined – target under development |

In 2017, very little road construction occurred in the Skidegate LU, and none was completed in the Masset LU (construction was completed in 2016 for the 2017 harvesting blocks). After 2018, activity will cease in the Skidegate LU as we have reached the LUO restrictions for sensitive watersheds of 5% over 5 years.

In 2016, Taan constructed road in AER003 and AER005 within the Skidegate LU and in AWN010, BUC001, BUC002, BUC003 and BUC004 within the Masset LU. The 2015 values were updated to include the road construction for TOW002 that was built in 2015 (and missed in the 2015 analysis). Road construction has decreased in both LUs from the previous year and the permanent access continues to be well below the legal target of 7%. Blocks continue to be grouped close together to allow for efficiencies in road construction and re-habilitation.

In 2015, Taan harvested SKI008, SKI009, SKI010 and AER001 within the Skidegate LU (average retention of 62%). Road Construction was fairly significant in both LUs. However, the average permanent access remains low at 4% and 3% for both LUs, well under the 7% legal target. \*The target was determined to be achieved but, again, will continue to be monitored relating to total new road construction in these vulnerable LUs.

In 2014, Taan harvested SKI005 and SKI006 within the Skidegate LU. While SKI006 had low retention (8%), SKI005 had a significant level of retention (145%), consisting of LUO reserves, internal retention patches, wildlife tree patches and other retention areas. Road construction was fairly significant in both LUs. However, the average permanent access remains low at 5% for both LUs, well under the 7% legal target. Several of the blocks did utilize existing road. Taan also completed several salvage areas with no new road construction undertaken. \*The target was determined to be achieved but will continue to be monitored relating to total new road construction in these vulnerable LUs. There is a fair bit (7 blocks) of proposed activity within the Skidegate LU in the next three years, but they are grouped close together to allow for efficiencies in road construction and re-construction.

One block has been deferred from harvesting due to location of a Blue Heron nest (no harvesting planned). The Masset LU also has an additional 5-7 blocks planned in the next three years (2014-2017) but they all appear to be located fairly close to existing blocks and roads.

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In 2013, the Masset Inlet LU had several (10) cutblocks harvested and two cutblocks were harvested in the Skidegate LU (see notes above). While the total length of road constructed by Taan seems quite high, the average permanent access structure percent for the Masset LU is 3.45% and the Skidegate LU is 4.6%, which is still quite low and well below the legal limits of 7%. FLO003 did not have any new road construction completed. COW004 had 450 m of road reconstruction completed. COW006 had 2,233 m of road reconstruction. In addition, several of the cutblocks were accessed using existing mainline roads, with additional spur roads constructed as needed. Taan also completed 7 salvage blocks, with no new road construction needed.

Landscape Level Biodiversity Ecosystem Representation – Annual Reporting at the Stand Level

The following data table has been added to support monitoring of ecosystem representation (results are summarized from the FSP Implementation Ledger) and are reported annually:

| Year | Harvesting within any Site Series that has Deficit |                     |            |              |             |            | Target Met (Y/N) |
|------|--|---------------------|------------|--------------|-------------|------------|------------------|
|      | Landscape Unit                                     | BEC and Site Series | Deficit ha | Harvested ha | Reserved ha | Balance ha |                  |
| 2017 | n/a  | n/a                 | -          | -            | -           | -          | Y                |
| 2016 | Skidegate lake                                     | CWHwh1-11           | 63         | 1.8          | 0           | -64.8      | Y*               |
| 2015 | n/a  | n/a                 | n/a        | n/a          | n/a         | n/a        | Y                |
| 2014 | n/a  | n/a                 | n/a        | n/a          | n/a         | n/a        | Y                |
| 2013 | Masset Inlet                                       | CWH wh2 – 03        | 0.0        | 0.0          | 16.0        | +1.0       | N                |

\*The target is considered to be met considering the site was a mosaic, but the deficit will be monitored and an action item has been created to determine the appropriate management of mosaics as they relate to ecosystem deficits.

In 2017, no harvesting was completed within any site series identified as having a deficit of old forest representation under the LUO targets. In addition, since 2014, Taan has reduced the eco-rep deficit of old forest needed to be recruited from 9,989ha in 2014 to 7,426ha in 2018.

In 2016, GRA002 was harvested in areas with an old growth deficit CWHwh1-11 of 63ha. The CWHwh1-11 site series represented 5% of a mosaic stand (04(85%) 01(10%) 11(5%)) and was not considered suitable for retention to meet eco-rep targets, 1.8ha was harvested. The Site Plan states that Taan will look for areas in the Skidegate Lake landscape unit that meet the CWHwh1 11 site series and allocate the remaining 64.8ha into reserves.

All other harvested blocks did not create any deficits for ecosystem representation (tracked within the FSP Ledger). A detailed review determined that the FSP Ledger is not being completed correctly (information getting recorded in the wrong areas). An action item has been created within this report.

In 2013, Taan harvested within one site series that had a deficit identified in the spatial dataset (CWH wh2 03). However, the harvested area (SHN004) was not spatially identified as 03 site series and thus was supplemental to the current inventory and harvesting was permitted. Field work was also done in the vicinity of the block to identify additional 03 site series in a mosaic adjacent to the block. This area totalled 27.0 ha, with a net representation of 03 at 16.0 ha. This area will be added to the Ecosystem Representation Management Area and has eliminated the deficit of 03 on the land-base and has resulted in a current surplus of 1.0 ha of 03 (note that if the additional surplus area of 03 had not been located, then we would not have been able to harvest SHN004 03 ecosystem type).

**Forecast**

Taan is exploring potential mechanisms to forecast anticipated levels of snags and CWD in the future in relation to natural stands and harvested areas.

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## **Summary of Management Strategies**

The management objectives for stand-level biodiversity are a combination of the legal requirements under the Land Use Order (and related Forest Stewardship Plan), the *Forest and Range Practices Act* (FRPA), the FSC Management Plan, and Taan's Corporate Management System (e.g., planning procedures) and relate to Stand-level Retention, windthrow management, and coarse woody debris management.

Where monitoring indicates targets are not being achieved, further investigation will be completed by Taan to evaluate the specific contributing factors and provide direction regarding alterations to management strategies so that targets can be achieved (e.g., increasing stand-level retention, retention of large woody debris, increasing wind-firming treatments, minimum patch size parameters and focussing stand-level retention placement to meet values such as forest influence, snags, etc.).

Taan has also implemented a unique tracking mechanism to permit spatial tracking of stand-level implementation of the Land Use Order constraints (using the Total Area under Prescription). This will allow for future tracking of constrained areas, as well as improved analysis of the full impacts of the LUO over time. There are no quantifiable targets at this time associated with this indicator, as the objective is to establish and implement a recording and tracking system for implementation of the Land Use Order at the stand level, and to provide a live inventory of the stand-level impacts to assist in other monitoring related to the FSC Assessments (Environmental Risk, Riparian and HCVF). Moreover, these data will be used to build on the existing constraints that have been spatially identified (e.g., forest reserves, cedar stewardship areas, etc.).

Annual reporting by Haida Gwaii licensees is required under the Land Use Order and Forest Stewardship Plan for a number of items, including but not limited to: information on regionally significant species; cultural features; cedar retention areas; western yew patches & individual yew tree retention; cultural cedar stands; CMTs; Monumental Cedar; Type I & II Fish Habitat; Active Fluvial Units; Forested Swamps; Old Forest Reserves; Red & Blue-listed Plant Communities; Black Bear Dens; Forest Reserves; and any associated Reserves, Reserve Zones, Management Zones and Stand-level Retention. Refer to Indicator LUO Reporting for details.

### ***Adaptive Management Strategies***

Explore potential for future reporting on large trees and snags /ha for blocks (retention and harvest area) using Site Plan data, aerial photos, etc.

Taan discussed proposed adaptive management strategies from the 2011 annual report to consider for larger cutblocks >10 ha, setting some requirements for internal retention or connected to edges component and a target patch size of at least 2 ha for internal retention (but still permitting a range of patch sizes to be utilized). Management determined that we did not want to adopt this strategy at this time as we don't yet fully understand the impacts of full LUO implementation and we want to maintain operational flexibility to plan for a portion of blocks with little LUO constraints to remain larger in size and allow for maximizing harvest in those areas (to help balance the blocks that contain many LUO constraints to harvesting). We need to continue to monitor the changes to stand-level biodiversity as a result of implementation of the Land Use Order, and review those changes considering more recent report data. More recent reporting data should demonstrate improvements in stand-level biodiversity from past years, as LUO implementation nears completion. Managers did approve a target of achieving an average internal patch size of at least 2 ha (which allows for flexibility of maintaining a range of sizes). However, average retention patch size for 2014 was 1.3 ha (FREP data) and 1.0 ha (Taan data for all harvested areas 2014). Despite the small are and low number of internal patches, the forest influence of the harvested areas remain high with 70% of the blocks showing more than 50% forest influence and the overall trend appears to be decreasing average block harvest area (FREP data 9.2 ha average, Taan 2014 data 22.0 ha average harvest size, not including the salvage areas).

Forest influence is also a very important consideration in assessing stand-level biodiversity. FREP monitoring does a preliminary assessment of forest interior conditions by looking at interior versus external retention patches. Taan has developed cutblock planning procedures to assess forest influence on proposed blocks as part of the planning assessment process and may consider establishing forest influence targets in the future.



Taan has also completed a review of monitoring data for stand structure information (species, diameters, snags, CWD) from work done by the BC Timber Sales Windthrow Study on Haida Gwaii as well as from the recent MFLNRO BEC zone work. From the BEC data, the average CWD levels was 186 m<sup>3</sup>/ha (+/- 504) and the average number of pieces per hectare was 30.5 (+/- 55.5). The number of sites samples was 7, ranging in age from 150 years to 495 years. The average snags per hectare was 8 (+/-30) from a sample size of 103 sites (206 plots) ranging in age from 73-300 years. The BCTS information was also reviewed and confirmed that only estimates were recorded, therefore was not reviewed further. Further work is needed to examine natural benchmarks for CWD levels in relation to minimum utilization standards to determine if they are reasonable and comparable to natural levels. Taan may also look at supplementing the FREP monitoring program by increasing the sample size of assessments to attempt to gain a more accurate picture of current CWD levels post-harvest. Consideration should be given to utilizing the FREP methods for completing some assessments in natural stands to provide comparable benchmarks, as direct comparison between FREP methodology and waste and residue assessment methodology is not possible. No further work has been completed on supplementing the FREP program or completing any assessments in natural stands. It is important to note that stand level retention and cutblock edges will contribute to long-term CWD inputs into the harvest area.

A pilot project was proposed in 2012 for Taan to assess the efficiencies/ costs of establishing some sample cruise plots within retention areas for the sole purposes of collecting FSC information on snags, merchantable trees and coarse woody debris to contribute to this indicator reporting. However, the pilot project was only conducted in 2012 (later samples were not completed).

Windthrow impacts in 2012 did not meet the targets that are determined based on coastal averages, indicating that windthrow is occurring at higher levels in Haida Gwaii, which is consistent with the monitoring of forest health being done by the MFLNRO. A factor contributing to the increased windthrow is the WFP Variable Retention strategy that has been implemented over the past several years. In some cases, fairly significant windthrow is observed along edges and salvage opportunities focused on those areas in 2013. Taan has been actively improving the windthrow assessment process and has significantly increased the treatment program compared to WFP in the past.

Taan developed a windthrow monitoring program in 2015 in order to assess the effectiveness of the windthrow management strategies being applied, particularly as they relate to boundaries for key resource features such as cultural, riparian, wildlife, etc.

In 2016, Taan began a pilot project to assess feasibility of placing LWD back into cutblocks, specifically second growth harvest areas, using potential sources of roadside piles, old culvert logs during replacement activities and old boom sticks (we are looking into whether there are any negative impacts from high salt content). Any boom-sticks treated with creosote will not be used.

To increase large downed wood on blocks, in early 2017, plans include placing boom sticks and other CWD in BU001, 002 and 003 from the Dinan area and sort. Boomsticks from the Ferguson sort will be placed in TOW001 and TOW002. Logs will be placed in the blocks using a self loader.

### **Database & Reporting Parameters**

Data were obtained from FREP Stand-level Biodiversity Effectiveness Monitoring – Information Management System database (exported reports received from MFLNRO for the Management Unit) and Report #30. Specific parameters for data collection and analysis are recorded under the FREP procedures for each indicator. Explanatory notes are also provided within the exported data reports (MS Excel).

Under RESULTS, stand-level retention is also required to be reported on an annual basis.

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During development area planning, all areas removed from the development area as a result of the Land Use Order objectives, are mapped and tracked within the GIS database, including descriptions relating to the specific stand-level values protected within the constrained areas (e.g., Haida Features, bear dens, red and blue listed ecosystems, riparian reserves and management zones, monumental cedars, yew, Pacific crabapple, etc.). A GIS query is completed annually to provide data for this indicator, for all areas with harvest completion in the reporting year. LUO/ FSP reporting requirements are maintained within GIS Database/ Inventories. LUO Reporting parameters have not yet been established by the Haida Gwaii Management Council (but discussions are underway).

Taan maintains established procedures for measuring and calculating forest influence. Refer to the specific procedures for details (Taan Planning SOP).

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## Indicator: Environmental Incidents

| Element   | Objective  | Indicator   | Target  |
|---|--|---|---|
| FSC 5.1.4 & 8.2.3: Growth rates, regeneration and condition of the forest | Report on condition of the forest resulting from disturbance related to forest operations or otherwise; mitigate environmental & social cost | Report on the number and size (ha) of environmental incidents related to forest management activities: reportable spills, fires, landslides and avalanches. | Minimize the number and size of environmental incidents; ≤ 5 events |

### Rationale for Indicator & Target

The indicator is based on corporate commitments under the Corporate Management System to record and monitor environmental incidents. The current target is based on a review of the benchmark status, while considering that operations were not running at full capacity in 2011 and 2012.

### Current Status/ Results

In general terms, incidents will be considered to be related to forest management activities under the following conditions: all reportable spills; fires caused by industrial activities (excluding naturally caused fires); Landslides and avalanches initiating within cutblocks and/ or road prisms or those determined to be caused by forest management activities (i.e., excluding natural landslides).

| Year | Reportable Spills | Fires      | Landslides  | Avalanche | Target Met (Y/N) |
|------|-------------------|------------|-------------|-----------|------------------|
| 2017 | 0                 | 0          | 5           | 0         | Y                |
| 2016 | 0                 | 0          | 0           | 0         | Y                |
| 2015 | 0                 | 3 (0.04ha) | 1 (3.75)    | 0         | Y                |
| 2014 | 0                 | 0          | 2 (2.07 ha) | 0         | Y                |
| 2013 | 1                 | 0          | 0           | 0         | Y                |
| 2012 | 0                 | 0          | 1 (2.0 ha)  | 0         | Y                |
| 2011 | 0                 | 0          | 1 (0.18 ha) | 0         | Y                |

In 2017 there were 28 minor spills reported (all to land). None were reportable spills. One fire was reported that involved the Taan Boat trailer. A total of seven landslide reports were completed, five of which were located within older cutblocks or roads (plus two natural slides).

IN 2016, There were three minor spills related to logging truck and equipment mechanical failures and repairs. None were reportable to external agencies. The 2016 External Audit identified a non-conformance related to internal reporting of minor spills (not getting reported). An internal investigation was completed and corrective and preventative action was prescribed. Other incidents that were investigated included the disturbance of a heritage feature (midden site) from the development of a rock quarry and a harvesting boundary trespass. An internal investigation for the heritage feature was completed. An incident involving a minor slump of a ditch wall was also reported as it caused sedimentation, and corrective actions were entered into the Taan Operations Tracker but were not yet identified as completed at the time of developing this monitoring report.

### Summary of Management Strategies

Taan maintains a Corporate Management System that includes evaluation of risk to the environment (and to some degree safety) as a result of various forest management activities. The risk assessment drives the development of operational controls or field procedures to mitigate the identified risks. In addition, the CMS contains procedures to address emergency preparedness and response and incident reporting/ investigations for all of the above incident types. Incident Report/ Investigation forms include an evaluation of immediate and root causes and require development of action items to address both the immediate and root causes. Action plans are then monitored for follow up and completion in a timely manner. Action plans would include remediation of the site and reforestation where applicable. Part of the evaluation includes determination whether the management system procedures were adequate or not to prevent the occurrence and whether persons involved were following the procedures. This helps to determine the appropriate corrective actions such as changes to existing procedures where they are determined to be inadequate, or training of personnel to ensure that they know the procedures to be followed.



The proposed target is intended to allow for some variation from year to year among different events and considers that weather conditions impacting fires, landslides and avalanches can vary significantly from year to year based on weather cycles. The target was arbitrarily selected and may need to be revised over time as data are obtained to develop a historical benchmark.

Incidents are reviewed periodically by management through the Management Review process that consider trends and severity and develops further action items to address any deficiencies as required.

### ***Adaptive Management Strategies***

Not applicable at this time.

### **Database & Reporting Parameters**

Taan environmental (& safety) incident reporting is required under the Corporate Management System (C-04-Incident Reports). Reports are reviewed and summarized above.

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## Composition & Observed Changes to Flora & Fauna

### Indicator: Species at Risk

| Element   | Objective   | Indicator   | Target  |
|---|---|---|---|
| FSC 8.2.4 & 9.4:<br>Composition and observed changes in the flora and fauna | Monitor status of species at risk or species of high conservation concern known to occur in the Management Unit | Species at risk identified within Haida Gwaii; and those identified as dependent on old forests | Species status is tracked and appropriate management responses are undertaken |

#### Rationale for Indicator & Target

The indicator is derived from recommendations of the High Conservation Value Forest Assessment peer review. The High Value Conservation Framework describes high priority species (including species at risk) for Haida Gwaii. We considered high priority species to include species of global concern (G1 or G2), BC's red or blue listed species, COSEWIC's endangered, threatened or special concern; and/or species ranking priority 1 for any of the 3 goals of BC's Conservation Framework, identified as high priority by the BC Ministry of Environment or identified under the Land Use Order. Those categories yielded 132 (previously 129) high priority species on Haida Gwaii.

There are several areas of overlap between these selections of species. When determining how to manage and monitor for these species, it is helpful to assign species to groups that have similar habitat requirements, and then evaluate how forest management will likely affect those habitats. Only when habitats appear limiting or trending in a negative direction would species be selected for direct monitoring.

Therefore, we assigned the list of 132 species to six 'species groups' to enable efficient monitoring and help direct management. Detailed discussion of the species lists and tables of high priority species are in the HCVF report.

#### Current Status/ Results

| Species Group                             | Number of high priority species | Types of management  | Target Met (Y/N) |
|---|---------------------------------|--|------------------|
| Non-forested (group 6)                    | 60                              | n/a  | Y                |
| Generalists (group 1)                     | 15                              | None needed  | Y                |
| Seral Distribution (group 2)              | 17                              | Mostly provision of adequate old forest                        | Y                |
| Habitat Structures and Riparian (group 3) | 34                              | Protection of riparian habitats; supply of snags and down wood | Y                |
| Localized habitats (group 4)              | 4                               | Protect when sites are known                                   | Y                |
| Forest Distribution (group 5)             | 2                               | Provision of habitat and monitoring of MAMU and NOGO           | Y                |
| <b>Total high priority species</b>        | <b>132</b>                      |  |                  |

In 2017, there were a few minor changes in addition to the changes already noted in the 2016 report from changes in spring 2017:

- Pink Footed Shearwater latin name change from *Puffinus creatopus* to *Ardennas creatopus*
- Greater sandhill Crane latin name change from *Grus canadensis* to *Antigone canadensis*

The six monitoring groups developed by Bunnell et al. (*Bunnell, F.L., L.L Kremsater, A. Moy, and P. Vernier. 2009. Coarse filter assessment of the contribution of dying and dead wood to sustaining biodiversity on TFL 48. Final Report to Canadian Forest Products and BC Forest Sciences Program. 62 pp plus appendices*) are:

- Group 1 – generalists, species that inhabit many habitat types or respond positively to forest practices;
- Group 2 – species that can be statistically assigned broad habitat types as defined within VRI (e.g. non-treed, recently disturbed, old conifer); in total, 9 habitat modifiers were used to classify group 2 habitats; the first 7 (shaded) are mappable from VRI data.

| Group                               | Group Modifier | Description   |
|-------------------------------------|----------------|---|
| 2 Habitat type; most often forested | NV             | Non-Vegetated upland: less than 5% vegetation cover; includes roadsides, oil and gas developments (excludes lakes, rivers and ponds)                |
|                                     | NT             | Non-Treed upland or wetland: less than 10% tree cover; includes tundra, wetland, and other sparsely treed sites such as non-commercial brush (NCBR) |
|                                     | RD             | Recent Disturbance: 0 to 20 yrs old; intended to represent the period of shrub abundance post disturbance   |
|                                     | H              | Hardwoods: landclass 127, 128, 129  |
|                                     | C1             | Conifer and mixed: 21-60 yrs and landclass >129   |
|                                     | C2             | Conifer and mixed: age 61-140 yrs and landclass >129  |
|                                     | C3             | Conifer and mixed: age >140 yrs and landclass >129  |
|                                     | open           | Open areas of low vegetation, may only be a single tree present   |
|                                     | R              | Riparian forest - streams, lakes and rivers; not wetlands   |
|                                     | all            | uses All forested types, but little NT or NV  |

- Group 3 – species with strong dependencies on specific habitat elements (e.g. snags or understory), so may be useful in effectiveness monitoring. Group 3 species also have modifiers indicating the element with which they are most closely associated.

| Group              | Group Modifier | Description                                  |
|--------------------|----------------|--|
| 3 Habitat elements | c              | Uses cavities                                |
|                    | dw             | Uses or found on down wood                   |
|                    | t              | Uses or found on trees                       |
|                    | u              | Uses of found on understory shrubs           |
|                    | r              | Uses or found in riparian areas of streams   |
|                    | w              | Uses or found in wetland or very moist areas |

- Group 4 – species restricted to specialized and highly localized habitats; and
- Group 5 – species for which patch size and connectivity are considered important.
- Group 6 is included for completeness. It contains species known or expected to occur in the area, but that are not dependent upon forested environments. Some group 6 species have modifiers (On Haida Gwaii the modifiers include: cl = uses cliffs; sh= uses shore; mm = uses man-made structures).
- Boundaries between groups or classes are necessarily arbitrary and influenced by: natural history features (primary) and the approach to monitoring (secondary).

The tables below put the high priority species on Haida Gwaii into species habitat groups. Where a species is assigned multiple groups, the first is the primary assignment. For example, the western screech owl is assigned 3c/2(H, R). That indicates that the Group 2 habitat types hardwood and riparian should be assessed for their ability to provide cavity sites (3c) *before* using amount of habitat type as the sole index of suitable habitat.

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In relation to classification of high priority species on Haida Gwaii for management and monitoring, we first discuss the high priority species of least management concern from a forestry perspective, then discuss in more detail those species more affected by forest practices. As a consequence, the species groups are not addressed in numerical order.

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**Group 6: species that prefer non-forested habitat**

Group 6 was added to the Species Accounting System of Bunnell et al. (2009) when it became apparent that public advisory groups frequently wanted to know the status of all species present even if they preferred non-forested habitat. Providing them with information indicating that practitioners were aware of species' presence and the kind of non-forested habitat preferred proved helpful. Sixty (almost half) of the 132 high priority species in the management unit area do not preferentially use forests and are usually not found in forests. Some of the mosses (*Oedipodium griffithianum*, *Entodon concinnus*, *Wijkia carlottae*) in group 6 may sometimes be found in forests and inventory may be useful.

| Scientific name                                       | English Name           | Global Status | Prov Status | COSEWIC      | BC List | Identified Wildlife | SARA           | BGC                            | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp. Acc. Group |
|---|------------------------|---------------|-------------|--------------|---------|---------------------|----------------|--------------------------------|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Abronia latifolia</i>                              | yellow sand-verbena    | G5            | S2          |              | Red     |                     |                | CDFmm;CWHvh;CWHxm              | N       | 5                    | 1                    | 2                    | 6               |
| <i>Andreaea mutabilis</i>                             | moss                   | G5            | S1S2        |              | Red     |                     |                | CWH                            | N       | 4                    | 6                    | 2                    | 6               |
| <i>Andreaea rupestris</i> var. <i>papillosa</i>       | moss                   | G5TNR         | S1          |              | Red     |                     |                | BAFA;CMA;CWH;ESSF;SWB          | N       | 5                    | 6                    | 2                    | 6               |
| <i>Andreaea sinuosa</i>                               | moss                   | G2            | S1S2        |              | Red     |                     |                | CMA;CWHvm;CWHwh;MHmm;          | N       | 1                    | 6                    | 2                    | 6               |
| <i>Asplenium adulterinum</i>                          | corrupt spleenwort     | G3?           | S3          |              | Blue    |                     |                | CMA;CWHvm;CWHwh;MHmm           | N       | 2                    | 6                    | 3                    | 6               |
| <i>Calystegia soldanella</i>                          | beach bindweed         | G5            | S2          |              | Red     |                     |                | CWHvh;CWHwh;CWHxm              | N       | 6                    | 2                    | 3                    | 6               |
| <i>Campylopus schimperi</i>                           | moss                   | G3G4          | S1S2        |              | Red     |                     |                | CWH;MH                         | N       | 2                    | 6                    | 3                    | 6               |
| <i>Cerastium fischerianum</i>                         | Fischer's chickweed    | G4            | S3          |              | Blue    |                     |                | BAFA;CMA;CWHvh;CWHwh;MHwh      | N       | 6                    | 6                    | 6                    | 6               |
| <i>Claopodium pellucinerve</i>                        | moss                   | G3G5          | S1S2        |              | Red     |                     |                | CWH                            | N       | 2                    | 6                    | 2                    | 6               |
| <i>Crumia latifolia</i>                               | moss                   | G3            | S3          |              | Blue    |                     |                | CDF                            | N       | 3                    | 6                    | 2                    | 6               |
| <i>Dermochelys coriacea</i>                           | Leatherback            | G2            | S1S2N       | E (May 2012) | Red     |                     | 1-E (Jun 2003) | CWH                            | N       | 4                    | 6                    | 2                    | 6               |
| <i>Dicranodontium asperulum</i>                       | moss                   | G4G5          | S3          |              | Blue    |                     |                | CWH;MH                         | N       | 3                    | 4                    | 4                    | 6               |
| <i>Didymodon giganteus</i>                            | moss                   | G5?           | S2          |              | Red     |                     |                | CWH;MH                         | N       | 4                    | 6                    | 3                    | 6               |
| <i>Didymodon subandreaeoides</i>                      | moss                   | GU            | S1S3        |              | Red     |                     |                | CWH;ESSF                       | N       | Not Assessed         | 6                    | 3                    | 6               |
| <i>Discelium nudum</i>                                | moss                   | G3G4          | S1          |              | Red     |                     |                | CDF;CWH                        | N       | 4                    | 6                    | 1                    | 6               |
| <i>Douglasia laevigata</i>                            | smooth douglasia       | G3            | S3          |              | Blue    |                     |                | BAFA;CMA;ESSFmw;IMA;MHmm;MHwh  | N       |                      |                      |                      | 6               |
| <i>Draba chamissonis</i>                              | Cape Thompson draba    | G1G3Q         | S3S4        |              | Yellow  |                     |                | CMAun                          |         |                      |                      |                      | 6               |
| <i>Eleocharis parvula</i>                             | small spike-rush       | G5            | S3S4        |              | Yellow  |                     |                | CDFmm;CWHvm;CWHwh;CWHxm        | N       | 6                    | 6                    | 3                    | 6               |
| <i>Epilobium hornemannii</i> ssp. <i>behringianum</i> | Hornemann's willowherb | G5T4          | S2S3        |              | Blue    |                     |                | CWHwh;ICHmm;IC Hvc;SWBmk;SWBun | N       | 5                    | 6                    | 3                    | 6               |

| Scientific name                                    | English Name                                   | Global Status | Prov Status | COSEWIC       | BC List | Identified Wildlife | SARA            | BGC  | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp. Acc. Group |
|--|--|---------------|-------------|---------------|---------|---------------------|-----------------|--|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Eschrichtius robustus</i>                       | Grey Whale                                     | G4            | S3          | SC (May 2004) | Blue    |                     | 1-SC (Jul 2005) |  | N       | 5                    | 6                    | 4                    | 6               |
| <i>Eumetopias jubatus</i>                          | Steller Sea Lion                               | G3            | S3B, S4n    | SC (Nov 2003) | Blue    |                     | 1-SC (Jul 2005) | CDF;CWH;MH   | N       | 2                    | 6                    | 3                    | 6               |
| <i>Geum schofieldii</i>                            | Queen Charlotte avens                          | G2Q           | S3          |               | Blue    |                     |                 | CMA;CWHvh;MHwh;MHwhp   | Y       | 1                    | 6                    | 3                    | 6               |
| <i>Glehnia littoralis</i> ssp. <i>leiocarpa</i>    | American glehnia                               | G5T5          | S2          |               | Red     |                     |                 | CWHvh;CWHwh;CWHxm  | N       | 5                    | 2                    | 3                    | 6               |
| <i>Gollania turgens</i>                            | moss   | G2            | S1          | C (Jul 2011)  | Red     |                     |                 | CWH;MH   | N       | 1                    | 6                    | 2                    | 6               |
| <i>Hageniella micans</i>                           | moss   | G3G5          | S2S3        |               | Blue    |                     |                 | CWH  | N       | 2                    | 6                    | 3                    | 6               |
| <i>Haliotis kamtschatkana</i>                      | Northern Abalone                               | G3G4          | S2          | T (May 2000)  | Red     |                     | 1-T (Jun 2003)  | CDF;CWH  | N       | 3                    | 6                    | 2                    | 6               |
| <i>Lathyrus littoralis</i>                         | grey beach peavine                             | G5            | S2          | C (Jul 2011)  | Red     |                     |                 | CDFmm;CWHvh;CWHwh;CWHxm                                      | N       | 4                    | 6                    | 2                    | 6               |
| <i>Lescurea saxicola</i>                           |  | G4G5          | S3          |               | Blue    |                     |                 | BAFA;CWH;ESSF;SWB  | N       | 3                    | 6                    | 2                    | 6               |
| <i>Limnodromus griseus</i>                         | Short-billed Dowitcher                         | G5            | S2S3B       |               | Blue    |                     |                 | BG;BWBS;CDF;CWH;ICH;IDF;PP;SWB                               | N       | 6                    | 6                    | 3                    | 6               |
| <i>Lloydia serotina</i> var. <i>flava</i>          | alp lily                                       | G5T3          | S3S4        |               | Yellow  |                     |                 | CMAunp;CWHvh;CWHvm;CWHwh;ESSFmc                              | Y       | 2                    | 4                    | 4                    | 6               |
| <i>Mertensia maritima</i>                          | sea bluebells                                  | G5            | S2          |               | Red     |                     |                 | CWHvh;CWHwh  | N       | 6                    | 6                    | 2                    | 6               |
| <i>Micranthes nelsoniana</i> var. <i>carlottae</i> | dotted saxifrage                               | G5T3          | S3          |               | Blue    |                     |                 | BAFA;BWBSdk;CMA;CWHds;CWHvh;CWHwh;IMA;MHwh;SWBdk;SWBmk;SWBun | N       | 2                    | 4                    | 4                    | 6               |
| <i>Molendoa sendtneriana</i>                       |  | G3G4          | S2S3        |               | Blue    |                     |                 | BAFA   | N       | 4                    | 6                    | 2                    | 6               |
| <i>Ostrea conchaphila</i>                          | Olympia Oyster                                 | G5            | S3          | SC (May 2011) | Blue    |                     | 1-SC (Jun 2003) |  | N       | 5                    | 4                    | 4                    | 6               |
| <i>Packera cymbalaria</i>                          | northern butterweed                            | G5            | S1S2        |               | Red     |                     |                 | CMA;CWHvh  | N       | 6                    | 6                    | 2                    | 6               |
| <i>Phalacrocorax pelagicus pelagicus</i>           | Pelagic Cormorant, <i>pelagicus</i> subspecies | G5TU          | S2B         |               | Red     |                     |                 | CDF;CWH  | N       | 6                    | 6                    | 2                    | 6               |
| <i>Ptychoramphus aleuticus</i>                     | Cassin's Auklet                                | G4            | S3B,S4N     | C (Jul 2011)  | Blue    | Y (Jun 2006)        |                 | CDF;CWH  | N       | 3                    | 6                    | 2                    | 6               |

| Scientific name                          | English Name                    | Global Status | Prov Status | COSEWIC        | BC List | Identified Wildlife | SARA           | BGC   | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp. Acc. Group |
|--|---------------------------------|---------------|-------------|----------------|---------|---------------------|----------------|---|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Ardenna creatopus</i>                 | Pink-footed Shearwater          | G3            | S3N         | T (May 2004)   | Blue    |                     | 1-T (Jul 2005) |   | N       | 3                    | 2                    | 3                    | 6               |
| <i>Puffinus bulleri</i>                  | Buller's Shearwater             | G3            | S3?N        |                | Blue    |                     |                |   | N       | 4                    | 4                    | 4                    | 6               |
| <i>Rhodobryum roseum</i>                 | moss                            | G5            | S2S3        |                | Blue    |                     |                | CWHvh;ICHwk;SBSwk   | N       | 4                    | 6                    | 2                    | 6               |
| <i>Salix reticulata</i>                  | net-veined willow               | G5T2Q         | S2          |                | Red     |                     |                | CMA;CWHvh;CWHwh;MHwh  | N       | 1                    | 6                    | 3                    | 6               |
| <i>Sanguisorba menziesii</i>             | Menzies' burnet                 | G3G4          | S2S3        |                | Blue    |                     |                | CWHvh;CWHvm;CWHwh;CWHxm;MHmm                                | N       | 3                    | 6                    | 3                    | 6               |
| <i>Schistidium trichodon</i>             | moss                            | G2G4          | S3          |                | Blue    |                     |                | BAFA;BWBS;CMA;CWH;SWB                                       | N       | 3                    | 4                    | 4                    | 6               |
| <i>Seligeria careyana</i>                | moss                            | G1            | S2          |                | Red     |                     |                | CWH   | N       | 1                    | 6                    | 2                    | 6               |
| <i>Seligeria tristichoides</i>           | moss                            | G4            | S3          |                | Blue    |                     |                | CMA;CWH;ICH;SWB   | N       | 3                    | 6                    | 2                    | 6               |
| <i>Senecio pseudoarnica</i>              | beach groundsel                 | G5            | S2          |                | Red     |                     |                | CWHvh;CWHwh   | N       | 4                    | 6                    | 2                    | 6               |
| <i>Tetodontium brownianum</i>            | moss                            | G3G4          | S3          |                | Blue    |                     |                | CWH   | N       | 2                    | 6                    | 3                    | 6               |
| <i>Thaleichthys pacificus</i>            | Eulachon                        | G5            | S2S3        | E/T (May 2011) | Blue    |                     |                | CWH   | N       | 5                    | 6                    | 2                    | 6               |
| <i>Trichostomum recurvifolium</i>        | moss                            | G3?           | S3          |                | Blue    |                     |                | CWH;MH  | N       | 1                    | 6                    | 3                    | 6               |
| <i>Uria aalge</i>                        | Common Murre                    | G5            | S2B, S3S4N  |                | Red     |                     |                | CDF;CWH   | N       | 6                    | 6                    | 2                    | 6               |
| <i>Zygodon gracilis</i>                  | moss                            | G2            | S1S2        |                | Red     |                     |                | CWH   | N       | 1                    | 6                    | 2                    | 6               |
| <i>Fratercula cirrhata</i>               | Tufted Puffin                   | G5            | S2S3B, S4N  |                | Blue    |                     |                | CDF;CWH   | N       | 5                    | 2                    | 3                    | 6(cl,sh)        |
| <i>Fratercula corniculata</i>            | Horned Puffin                   | G5            | S2B         |                | Red     |                     |                | CDF;CWH   | N       | 6                    | 6                    | 2                    | 6(cl,sh)        |
| <i>Hirundo rustica</i>                   | Barn Swallow                    | G5            | S3S4B       | T (May 2011)   | Blue    |                     |                | BAFA;BG;BWBS;CDF;CWH;ESSF;ICH;IDF;JMA;MH;MS;PP;SBPS;SBS;SWB | N       | 6                    | 2                    | 3                    | 6(mm)           |
| <i>Oedipodium griffithianum</i>          | moss                            | G5            | S1          |                | Red     |                     |                | CWH;MH  | N       | 4                    | 6                    | 2                    | 6; 3(dw)        |
| <i>Entodon concinnus</i>                 | cylinder moss                   | G4G5          | S3          |                | Blue    |                     |                | CWH;SWB   | N       | 3                    | 6                    | 2                    | 6:2(H)          |
| <i>Wijkia carlottae</i>                  | moss                            | G2G3          | S3?         |                | Blue    |                     |                | CMA;CWH;MH  | N       | 1                    | 6                    | 3                    | 6:3(t)          |
| <i>Potentilla furcata</i>                | forked cinquefoil               | G5T3T5        | SH          |                | Red     |                     |                |   | N       |                      |                      |                      | 6               |
| <i>Festuca pseudovivipara</i>            | pseudoviviparous fescue         | GNR           | S2S3        |                | Blue    |                     |                |   | N       |                      |                      |                      | 6               |
| <i>Castilleja parviflora var. albida</i> | white small-flowered paintbrush | G5?T3T4       | S3S4        |                | Yellow  |                     |                |   | N       |                      |                      |                      | 6               |

**Group 1: generalists**

Overall, 15 species are **habitat generalists (Group 1)**, that are highly unlikely to be affected by forest practices. Some Group 1 species benefit from forest harvest. Four generalists also use riparian habitats and hence could be affected by riparian practices (small-flowered lousewort, whorled lousewort, hairy butterwort, and Ermine *haidarum* subspecies). Those riparian generalist plants could be included in simple habitat monitoring of riparian areas to see if indeed they occur in reserve and management zones; however, monitoring group 1 species is not a priority.

| Scientific name  | English Name                       | Global Status | Prov Status | COSEWIC      | BC List | Identified Wildlife | SARA           | BGC  | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group |
|--|------------------------------------|---------------|-------------|--------------|---------|---------------------|----------------|--|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Bryum gemmiparum</i>                                | moss                               | G3G5          | S3          |              | Blue    |                     |                | CWH;ESSF;IDF   | N       | 2                    | 6                    | 2                    | 1               |
| <i>Diphyscium foliosum</i>                             | moss                               | G5            | S2S3        |              | Blue    |                     |                | CWH  | N       | 4                    | 6                    | 3                    | 1               |
| <i>Epipterygium tozeri</i>                             | moss                               | G4?           | S3S4        |              | Yellow  |                     |                | CDF;CWH  | N       | 3                    | 6                    | 2                    | 1               |
| <i>Hymenostylium recurvirostre</i> var. <i>insigne</i> | moss                               | G3            | S2S3        |              | Blue    |                     |                | CWH  | N       | 2                    | 6                    | 3                    | 1               |
| <i>Pohlia columbica</i>                                | moss                               | G3G5          | S3          |              | Blue    |                     |                | CWH  | N       | 2                    | 6                    | 2                    | 1               |
| <i>Pohlia elongata</i>                                 | moss                               | G4G5          | S3          |              | Blue    |                     |                | BAFA;CWH;ESSF;ICH;I MA   | N       | 5                    | 6                    | 3                    | 1               |
| <i>Pohlia lescuriana</i>                               | moss                               | G4?           | S2          |              | Red     |                     |                | ESSF   | N       | 3                    | 6                    | 2                    | 1               |
| <i>Pohlia pacifica</i>                                 | moss                               | GU            | S1S2        |              | Red     |                     |                | CWHvh;CWHwh  | N       | Not Assessed         | 6                    | 2                    | 1               |
| <i>Polystichum setigerum</i>                           | Alaska holly fern                  | G3            | S2S3        |              | Blue    |                     |                | CMA;CWHvm;CWHwh;CWHws  | N       | 3                    | 6                    | 3                    | 1               |
| <i>Trematodon montanus</i>                             | moss                               | G1            | S1?         |              | Red     |                     |                | CWH  | N       | 1                    | 6                    | 2                    | 1               |
| <i>Pedicularis parviflora</i> ssp. <i>parviflora</i>   | small-flowered lousewort           | G4T4          | S2          |              | Red     |                     |                | CWHvh;ICHmk;ICHwk;MHwh;MSxv;SBSmh;SBSmk;SBSwk;SWBun                      | N       | 4                    | 4                    | 4                    | 1; 3(r)         |
| <i>Pedicularis verticillata</i>                        | whorled lousewort                  | G4            | S2S3        |              | Blue    |                     |                | BAFA;BWBSdk;CMA;CWHvh;CWHwh;MHwh   | N       | 4                    | 6                    | 3                    | 1; 3(r)         |
| <i>Pinguicula villosa</i>                              | hairy butterwort                   | G4            | S2S3        |              | Blue    |                     |                | BWBSdk;CWHvh;CWHwh   | N       | 5                    | 6                    | 2                    | 1;2;3(r)        |
| <i>Mustela erminea haidarum</i>                        | Ermine, <i>haidarum</i> subspecies | G5T2          | S2          | T (May 2001) | Red     |                     | 1-T (Jun 2003) | CWH;MH   | Y       | 2                    | 6                    | 3                    | 1;3(w,r)?       |
| <i>Martes caurina</i>                                  | Pacific Marten                     | G4G5          | S5?         |              | Yellow  |                     |                | BAFA, BG, CDF, CMA, CWH, ESSF, ICH, IDF, IMA, MH, MS, PP, SBPS, SBS, SWB | N       |                      |                      |                      | 1               |

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**Group 4: species using localized habitats**

Group 4 species would be expensive to monitor effectively until locations of their localized habitat sites were known. They exploit highly localized habitat that rarely can be map-based. Once the location of the habitat is known, however, appropriate management measures can be implemented. For such species, the most cost-efficient approach is to develop measures akin to Standard Operating Procedures to be implemented should the species be encountered. If falcon nests are discovered, then harvesting nearby can be organized to avoid breeding and fledging periods. Ancient Murrelet nesting areas are generally known and can be avoided (none are in areas outside of reserve areas). The moss *Sphagnum willfi* (status unknown) if found outside of the reserve, then large stand-level reserves could be created as protection and local populations tracked for extent.

| Scientific name                  | English Name                               | Global Status | Prov Status | COSEWIC       | BC List   | Identified Wildlife | SARA            | BGC   | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. group |
|----------------------------------|--|---------------|-------------|---------------|-----------|---------------------|-----------------|---|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Sphagnum willfi</i>           |  | G2G3          | SU          |               | U         |                     |                 | CWH   | N       | 2                    | 6                    | 2                    | 4               |
| <i>Synthliboramphus antiquus</i> | Ancient Murrelet                           | G4            | S2S3B, S4N  | SC (Nov 2004) | Blue      | Y (May 2004)        | 1-SC (Aug 2006) | CDF;CWH                                       | N       | 2                    | 6                    | 1                    | 4               |
| <i>Falco peregrinus</i>          | Peregrine Falcon                           | G4            | S3B         | SC (Apr 2007) | No Status |                     |                 | BG;BWBS;CDF; CWH;ESSF;ICH; IDF;MS;PP;SBS; SWB | N       | 5                    | 2                    | 3                    | 4/6(cl)         |
| <i>Falco peregrinus pealei</i>   | Peregrine Falcon, <i>pealei</i> subspecies | G4T3          | S3B         | SC (Apr 2007) | Blue      |                     | 1-SC (Jun 2003) | CDF;CWH                                       | N       | 2                    | 1                    | 2                    | 4;6(cl)         |

Group 2: species associated with broad forest habitat types.

Group 2 consists of 17 high priority species associated with broad forest habitat types. The first five noted in the Table below are found in any seral stages (2(all)) or prefer young forest (2(open)). Most high priority group 2 species, however, are associated with mature forest cover. GIS analyses to track amounts of mature and old forest and availability of hardwoods are key to monitoring this group. If old seral falls below 50% in a LU, then monitoring becomes important, and especially important if levels fall below 30%. Useful focal species would be those associated with older seral stages such as brown creeper and old-growth specklebelly lichen. (Members of group 5 (species for which forest distribution is important) are also associated with old forest and would be useful to monitor directly). The great blue heron is considered a group 2 species here because it can use old hardwood and conifer stands as rookeries; however, existing rookeries should be considered a local feature and protected from harvesting and buffered from activity (either physically by removing harvest activities from the area, or temporally by altering timing of harvesting or other management activities to avoid active nesting and fledging periods).

The Haida Buttercup has recently (2013) been identified as an endemic species. Information on its habitat needs mentions only “open forest”; and it is unclear if it is widespread or rare. Until more information is available, when it is encountered, site level protection should be considered.

| Scientific name  | English Name                               | Global Status | Prov Status | COSEWIC        | BC List | Identified Wildlife | SARA | BGC                           | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group |
|--|--|---------------|-------------|----------------|---------|---------------------|------|-------------------------------|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Avenula Hookeri</i>                                 | spike-oat                                  | G5            | S3          |                | Blue    |                     |      | BWBSdk;BWBSmw ;CWHvh          | N       | 6                    | 6                    | 2                    | 2 (open)        |
| <i>Ursus americanus</i>                                | American Black Bear                        | G5            | S5          | NAR (May 1999) | Yellow  |                     |      |                               | N       | 6                    | 6                    | 6                    | 2(all)          |
| <i>Viola biflora</i> ssp. <i>carlottae</i>             | Queen Charlotte twinflower violet          | G5T3          | S3          |                | Blue    |                     |      | BAFA;CMA;CWHvh ;CWHwh;IMA;MWh | Y       | 2                    | 4                    | 4                    | 2(all)          |
| <i>Cirriphyllum pilliferum</i>                         | moss                                       | G5            | S2S3        |                | Blue    |                     |      | SWB                           | N       | 6                    | 6                    | 2                    | 2(all); 1       |
| <i>Oxalis oregana</i>                                  | redwood sorrel                             | G5            | S2S3        |                | Blue    |                     |      | CWHvh;CWHvm                   | N       | 4                    | 6                    | 3                    | 2(C)            |
| <i>Sphagnum quinquefarium</i>                          |  | G5            | S3          |                | Blue    |                     |      | CWH                           | N       | 6                    | 6                    | 3                    | 2 (all)         |
| <i>Oxypolis occidentalis</i>                           | western cowbane                            | G4?           | S3          |                | Blue    |                     |      | CWHwh                         | N       | 3                    | 6                    | 2                    | 2(C)            |
| <i>Ranunculus occidentalis</i> var. <i>hexasepalus</i> | Haida buttercup                            | G1G3          | S1S3        |                | Red     |                     |      | CWHwh, CHWvh                  | Y       | Not Assessed         |                      |                      | 2(C,H)          |
| <i>Pinicola enucleator carlottae</i>                   | Pine Grosbeak, <i>carlottae</i> subspecies | G5T3          | S3B         |                | Blue    |                     |      | CWH;MH                        | P       | 2                    | 2                    | 3                    | 2(C)            |
| <i>Staala gwaii</i>                                    | Haida Gwaii Slug                           | G3            | S2?         | C (Jul 2011)   | Red     |                     |      | CWH                           | Y       | Not Assessed         | 4                    | 4                    | 2(C)            |
| <i>Malaxis diphyllus</i>                               | Aleutian adder's-mouth orchid              | G3            | S1          |                | Red     |                     |      | CWHwh                         | N       | 4                    | 6                    | 3                    | 2(C);3(r)       |

| Scientific name                       | English Name                                | Global Status | Prov Status | COSEWIC       | BC List | Identified Wildlife | SARA            | BGC   | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group |
|---------------------------------------|---|---------------|-------------|---------------|---------|---------------------|-----------------|---|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Daltonia splachnoides</i>          | moss  | G1G2          | S1          | C (Jul 2011)  | Red     |                     |                 | CWH   | N       | 1                    | 6                    | 2                    | 2(C,H)          |
| <i>Cyanocitta stelleri carlottae</i>  | Steller's Jay, <i>carlottae</i> subspecies  | G5T3          | S3          |               | Blue    |                     |                 | CWH;MH  | Y       | 2                    | 4                    | 4                    | 2(C1)           |
| <i>Dendragapus fuliginosus</i>        | Sooty Grouse                                | G5            | S4          |               | Yellow  |                     |                 | CDF;CMA;CWH;MH                                  | N       | 5                    | 2                    | 3                    | 2(C1)           |
| <i>Certhia americana</i>              | Brown Creeper                               | G5            | S5          |               | Yellow  |                     |                 | BWBS;CDF;CWH;ESSF;ICH;IDF;MH;MS;PP;SBPS;SBS;SWB | N       | 6                    | 1                    | 3                    | 2(C2)           |
| <i>Pseudocypbellaria rainierensis</i> | oldgrowth specklebelly                      | G3G4          | S2S3        | SC (Apr 2010) | Blue    |                     | 3 (Mar 2005)    | CWHms;CWHvh;CWHvm;CWHwh;MHmm                    | N       | 2                    | 6                    | 2                    | 2(C2,H2)        |
| <i>Ardea herodias fannini</i>         | Great Blue Heron, <i>fannini</i> subspecies | G5T4          | S3?         | SC (Mar 2008) | Blue    | Y (May 2004)        | 1-SC (Feb 2010) | CDF;CWH   | N       | 3                    | 6                    | 1                    | 2:NV(C2, H,R)   |

Group 5 species: species for which distribution of habitat is very important.

Two species were designated as **Group 5**, species for which the **distribution of habitat** appears more important than amount – Northern Goshawk and Marbled Murrelet. We consider Marbled Murrelet as a group 5 species because of its sensitivity (nesting success) to predation at edges. Most goshawk nest sites are known on Haida Gwaii but operators should be always alert for others. Nest sites are protected by reserves. Management should seek to maintain foraging opportunities (mature and old forest) close to nest sites. Detailed prescriptions are available. Marbled Murrelet nest areas are also protected by reserves and by protecting set levels of potential nesting habitat. Both species are useful focal species for monitoring. If populations are healthy it is likely other species associated with old forests are also well-accommodated by forest management.

| Scientific name                  | English Name                               | Global Status | Prov Status | COSEWIC      | BC List | Identified Wildlife | SARA           | BGC        | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group |
|----------------------------------|--|---------------|-------------|--------------|---------|---------------------|----------------|------------|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Accipiter gentilis laingi</i> | Northern Goshawk, <i>laingi</i> subspecies | G5T2          | S2B         | T (Nov 2000) | Red     | Y (May 2004)        | 1-T (Jun 2003) | CDF;CWH;MH | N       | 1                    | 6                    | 1                    | 5; 2(C)         |
| <i>Brachyramphus marmoratus</i>  | Marbled Murrelet                           | G3            | S3B,S3N     | T (May 2012) | Blue    | Y (May 2004)        | 1-T (Jun 2003) | CDF;CWH;MH | N       | 1                    | 1                    | 2                    | 5:2(C2)         |

Group 3 species: strong dependencies on specific habitat elements

**Group 3 species show strong dependencies on specific habitat elements**, such as cavity sites (3c), down wood (3dw) and understory (3u) or are dependent on wetland or riparian areas (3w or 3r). All can be affected by forest practices. Group 3 includes 33 high priority species. Most (29) are dependent on wetland or riparian sites, four on cavities and one on down wood. Riparian practices are clearly important, and some of the plants dependent on riparian zones can be included in monitoring to assess effectiveness of stream-side practices. Practices around wetlands should also be assessed, as many species are also dependent on wetlands. Wetlands can be difficult to assess in a map-based approach because many small wetlands are significant biologically but do not appear in GIS layers. Breeding bird surveys could be used to assess presence of cavity-nesting birds.

The value of recognizing Group 3 species is that more readily sampled members can be selected as focal species to evaluate effects of forest practice.

| Scientific name                     | English Name                                 | Global Status | Prov Status | COSEWIC      | BC List | Identified Wildlife | SARA | BGC   | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group |
|-------------------------------------|--|---------------|-------------|--------------|---------|---------------------|------|---|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Bucephala islandica</i>          | Barrow's Goldeneye                           | G5            | S4S5        |              | Yellow  |                     |      | BG;BWBS;CDF;CWH;ESSF;ICH;IDF;MS;PP;SBPS;SBS;SWB             | N       | 4                    | 1                    | 3                    | 3(c)            |
| <i>Picoides villosus picoides</i>   | Hairy Woodpecker, <i>picoides</i> subspecies | G5T3          | S3          |              | Blue    | Y (Jun 2006)        |      | CWH;MH  | Y       | 1                    | 1                    | 2                    | 3(c)/2(C1, C3)  |
| <i>Ulota drummondii</i>             | moss   | G3G5          | S3          |              | Blue    |                     |      | CWH   | N       | 2                    | 6                    | 3                    | 3(d,t);2(H)     |
| <i>Histrionicus histrionicus</i>    | Harlequin Duck                               | G4            | S4B,S3N     |              | Yellow  |                     |      | BWBS;CDF;CWH;ESSF;ICH;IDF;MH;MS;PP;SBPS;SBS;SWB             | N       | 4                    | 1                    | 3                    | 3(r)            |
| <i>Hygroamblystegium fluviatile</i> | moss   | G5            | S3          |              | Blue    |                     |      |   | N       | 4                    | 6                    | 3                    | 3(r)            |
| <i>Myriophyllum quitense</i>        | waterwort water-milfoil                      | G4?           | S3          |              | Blue    |                     |      | CDFmm;CWHvh;CWHh;CWHxm                                      | N       | 5                    | 6                    | 3                    | 3(r)            |
| <i>Oncorhynchus clarkii clarkii</i> | Cutthroat Trout, <i>clarkii</i> subspecies   | G4T4          | S3S4        |              | Blue    |                     |      | BWBS;CDF;CWH;ICH;SBS  | N       | 4                    | 2                    | 3                    | 3(r)            |
| <i>Oncorhynchus kisutch</i>         | Coho Salmon                                  | G4            | S4          | E (May 2002) | Yellow  |                     |      | BAFA;BG;BWBS;CDF;CMA;CWH;ESSF;ICH;IDF;MH;MS;PP;SBPS;SBS;SWB | N       | 4                    | 2                    | 4                    | 3(r)            |
| <i>Pleuroziopsis ruthenica</i>      | moss   | G3            | S4          |              | Yellow  |                     |      | CWH   | N       | 2                    | 6                    | 2                    | 3(r)            |
| <i>Sparganium fluctuans</i>         | water bur-reed                               | G5            | S3S4        |              | Yellow  |                     |      | CWHds;CWHvh;CWHvm;CWHwh;CWHxm;ICHdw;IDFww;SBdk;SBSdw;SBSmk  | N       | 4                    | 6                    | 3                    | 3(r)            |
| <i>Cardamine angulata</i>           | angled bittercress                           | G5            | S1S2        |              | Red     |                     |      | CWHdm;CWHvh;CWHh  | N       | 5                    | 6                    | 2                    | 3(r);2(all)     |

| Scientific name                                   | English Name                     | Global Status | Prov Status | COSEWIC         | BC List | Identified Wildlife | SARA            | BGC   | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group |
|---|----------------------------------|---------------|-------------|-----------------|---------|---------------------|-----------------|---|---------|----------------------|----------------------|----------------------|-----------------|
| <i>Eleocharis kamtschatica</i>                    | Kamchatka spike-rush             | G4            | S3          |                 | Blue    |                     |                 | CWHvh;CWHvm;CWHw;CWHwm                                    | N       | 3                    | 6                    | 2                    | 3(r,w)          |
| <i>Gasterosteus aculeatus</i>                     | Threespine Stickleback           | G5            | S5          | SC (May 1983)   | Yellow  |                     |                 | BWBS;CDF;CWH;ICH;IDF;MH;PP;SWB                            | N       | 6                    | 6                    | 6                    | 3(r,w)          |
| <i>Gasterosteus aculeatus pop. 1</i>              | Charlotte Unarmoured Stickleback | G5TNR         | S2          | SC (May 1983)   | Red     |                     | 3 (Mar 2005)    | CWH   | Y       | 1                    | 6                    | 2                    | 3(r,w)          |
| <i>Gasterosteus sp. 1</i>                         | Giant Black Stickleback          | G1            | S1          | SC/C (May 1980) | Red     |                     | 3               | CWH   | Y       | 1                    | 6                    | 1                    | 3(r,w)          |
| <i>Callitriche heterophylla var. heterophylla</i> | two-edged water-starwort         | G5T5          | S2S3        |                 | Blue    |                     |                 | BAFAunp;CDFmm;CWHvm;CWHwh;CWHxm                           | N       | 6                    | 6                    | 3                    | 3(w)            |
| <i>Campylopus sinensis</i>                        | moss                             | GNR           | S1          |                 | Red     |                     |                 | CWHwh   | N       |                      |                      |                      | 3(w)            |
| <i>Carex enanderi</i>                             | Enander's sedge                  | GNR           | S5?         |                 | Yellow  |                     |                 | ESSFmc;ESSFmk;ESSFvc;ESSFwk;ESSFww;ICHwc;IDFwk;Mhm;SBPsmc | N       | 3                    | 6                    | 3                    | 3(w)            |
| <i>Carex glareosa ssp. glareosa</i>               | lesser saltmarsh sedge           | G4G5T3T5      | S3          |                 | Blue    |                     |                 | CWHds;CWHms;CWHvh;CWHwh                                   | N       | 4                    | 6                    | 3                    | 3(w)            |
| <i>Carex gmelinii</i>                             | Gmelin's sedge                   | G4G5          | S2S3        |                 | Blue    |                     |                 | CWHvh;CWHwh;CWHwm   | N       | 5                    | 6                    | 2                    | 3(w)            |
| <i>Carex lenticularis</i>                         | lakeshore sedge                  | G5            | S3          |                 | Blue    |                     |                 | ESSFmc;ESSFmk;ESSFvc;ESSFwk;ESSFww;ICHwc;IDFwk;Mhm;SBPsmc | N       |                      |                      |                      | 3(w)            |
| <i>Glyceria leptostachya</i>                      | slender-spiked mannagrass        | G3            | S3          |                 | Blue    |                     |                 | CDFmm;CWHdm;CWHwh;CWHxm                                   | N       | 3                    | 6                    | 2                    | 3(w)            |
| <i>Malaxis paludosa</i>                           | bog adder's-mouth orchid         | G4            | S2S3        |                 | Blue    |                     |                 | CWHvh;CWHvm;CWHw;SBSdw;SBSwk                              | N       | 5                    | 6                    | 3                    | 3(w)            |
| <i>Rana aurora</i>                                | Northern Red-legged Frog         | G4            | S4          | SC (Nov 2004)   | Blue    | Y (May 2004)        | 1-SC (Jan 2005) | CDF;CWH;MH  | N       | 3                    | 1                    | 2                    | 3(w)            |
| <i>Sphagnum subobesum</i>                         |                                  | G3G5          | S2S3        |                 | Blue    |                     |                 | CWH   | N       | 3                    | 6                    | 2                    | 3(w)            |
| <i>Triglochin concinna</i>                        | graceful arrow-grass             | G5            | S3S4        |                 | Yellow  |                     |                 | CDFmm;CWHvh;CWHw  | N       | 6                    | 6                    | 3                    | 3(w)            |

| Scientific name                  | English Name                                     | Global Status | Prov Status | COSEWIC        | BC List | Identified Wildlife | SARA            | BGC   | Endemic | CF – Priority Goal 1 | CF – Priority Goal 2 | CF – Priority Goal 3 | Spp Acct. Group          |
|----------------------------------|--|---------------|-------------|----------------|---------|---------------------|-----------------|---|---------|----------------------|----------------------|----------------------|--------------------------|
| <i>Malaxis brachypoda</i>        | white adder's-mouth orchid                       | G4Q           | S2S3        |                | Blue    |                     |                 | BWBSdk;BWBSmw;CDFmm;CWHdm;CWHvm;CWHwh;CWHws;CWHxm;SBSvk   | N       | 4                    | 6                    | 3                    | 3(w);2(all)              |
| <i>Epilobium leptocarpum</i>     | small-fruited willowherb                         | G5            | S4S5        |                | Yellow  |                     |                 | BAFA;CMA;CWHdm;CWHds;CWHvm;CWHwh;CWHxm;ESSFmw;ESSFwc;ESSFwk;ESSFvx;ICHmc;ICHmw;ICHwk;IMA;MSdk;SBSwk;SWBmk | N       | 5                    | 6                    | 3                    | 3(w,r)                   |
| <i>Aegolius acadicus brooksi</i> | Northern Saw-whet Owl, <i>brooksi</i> subspecies | G5T2T3        | S2S3        | T (Apr 2006)   | Blue    | Y (May 2005)        | 1-T (Dec 2007)  | CWH;MH  | Y       | 1                    | 6                    | 2                    | 3c/2(C2)                 |
| <i>Myotis keenii</i>             | Keen's Myotis                                    | G2G3          | S3?         | DD (Nov 2003)  | Blue    | Y (May 2004)        | 3 (Mar 2005)    | BWBS;CDF;CWH;MH   | N       | 1                    | 6                    | 1                    | 3c; 2(C2)                |
| <i>Myotis lucifugus</i>          | Little brown myotis                              | G3            | S4          | E              | Yellow  |                     |                 | all   | N       | 6                    | 6                    | 5                    | 3c; 4 (caves; buildings) |
| <i>Anaxyrus boreas</i>           | Western Toad                                     | G4            | S4          | SC (Nov 2002)  | Yellow  |                     | 1-SC (Jan 2005) | BG;BWBS;CDF;CWH;ESSF;ICH;IDF;PP;SBS;SWB   | N       | 3                    | 2                    | 4                    | 3w                       |
| <i>Antigone canadensis</i>       | Greater Sandhill Crane                           | G5            | S4B         | NAR (May 1979) | Yellow  | Y (June 2006)       |                 | BWBS, CWH, ESSF, ICH, IDF, MS, PP, SBPS, SBS  | N       | 6                    | 6                    | 5                    | 3 (w)                    |
| <i>Sphagnum balticum</i>         |  | G4            | S2S3        |                | Blue    |                     |                 | BAFA, CWH, SBS, SWB   | N       | 3                    | 6                    | 3                    | 3 (r)                    |

## **Summary of Management Strategies**

Very little information is available related to most species at risk habitat requirements and population dynamics. The majority of species at risk are managed through coarse filter habitat and biodiversity conservation measures, and the species accounting groups help focus management and monitoring. For example, monitoring and management are not needed for the species that do not usually use forests, or are habitat generalists (57 of the 129 species). In contrast, it is necessary to know the seral stages and broad habitat types available across the Management Unit to be able to assess if any group 2 species (those associated with broad seral stages and forest habitat types) are likely at risk. Several species associated with broad forest seral stages use the older ones and maintaining old forest with both conifer and deciduous components is important. If old forest levels drop below 30% in an LU then some of the group 2 species will be chosen to monitor. Above 30% old forest we will assume those species have adequate habitat to persist. This indicator will therefore be directly linked to the Landscape Level Biodiversity Indicator performance reporting as dropping below these thresholds would trigger additional monitoring under this indicator.

Two species are quite sensitive to the distribution of their old forest habitat (group 5 species) and merits monitoring even when levels of old forest are above 50% – Northern Goshawk and Marbled Murrelet. Taan will track trends in habitat, maintain levels as required by LUO (refer to Sensitive Species Indicator for further details) and support/assist efforts of MoE and Recovery Teams for any direct species monitoring on the MU.

Twenty-nine of the 34 species associated with particular stand structure (group 3 species) are associated with riparian zones. Careful attention to riparian zones is required by the LUO and Forest Stewardship Plan and adequate habitat is likely provided. Any monitoring of riparian zones will also track presence of some of those species to ensure current riparian practices are providing habitat. If species using localized habitats (group 4 species) are found (falcon nest sites, Ancient Murrelet nest sites; and *Sphagnum wilfi* habitat) then their habitats will be protected using appropriate methods. At present all group 4 species are found either offshore or in protected areas.

Coarse filter measures support the group 2, 3 and 5 species; these coarse filter measures are established by the Land Use Order's landscape and stand-level retention requirements and implemented through the Forest Stewardship Plan. The LUO specifies reserves that increase for retention of old growth forests (e.g., forest reserves, cedar stewardship areas, ecosystem representation, wildlife habitat, etc.) -- all these measures contribute to the coarse filter provisions of habitat. In addition to general habitat management strategies, the Land Use Order places special emphasis on the key species that have been identified to be of particular importance to the Haida Nation and Haida Gwaii: Marbled Murrelet, Northern Goshawk, Northern Saw-whet Owl, Great Blue Heron and black bear. All those species have been included in the species accounting groups noted above and approaches for their management and monitoring are noted in data reports maintained on file (contact Taan Forest for more information).

## ***Adaptive Management Strategies***

Per the current results of the Landscape Level Biodiversity indicators, one Landscape Unit (Skidegate) falls below the 30% old forest condition (current status is 18.6% old forest).

In order to address the ecosystem representation deficits per the Land Use Order for the Skidegate LU, an additional 2,000 ha (approximately) of mature timber must be recruited and not harvested to meet the targets. The additional area has the potential to increase the overall old forest representation of the LU to roughly 23% over time.

In early 2013, Taan established new management objectives for stand-level management for the Skidegate LU targeting an average of 20% for stand-level retention. Refer to the Landscape Biodiversity Indicators for further details and reporting.

This indicator will be monitored closely in future annual reports to assess the overall proportion of the Skidegate LU that is represented in old forest (or reserve areas that will progress to old forest over time) and determine if additional species specific monitoring is required in the event that the 30% target cannot be achieved (unlikely).



Additional monitoring may include support for MAMU or NOGO monitoring if relevant in the Skidegate LU, assessing whether Brown Creeper or old growth specklebelly lichen exists in the remaining old growth in the Skidegate LU. As only one LU falls below the 30%, and remedial efforts are intended to increase that amount, monitoring species directly is not yet a high priority.

The project, that commenced in 2016, to capture 10,000 ha of LiDAR to be utilized for Object RAKU is ongoing in 2017. Object RAKU is a system of automated software components that analyzes LiDAR data to determine the location and species of individual trees. One of the targets will be to include the identification of Northern Goshawk areas (through the identification of individual nest trees).

The Coast Forest Products Association is leading a coordinated response in consultation with MFLNRO from the coastal licensees (including Taan). Information sessions were held throughout BC in 2016.

MFLRNO recently published Implementation Plans for both NOGO and MAMU.

The Haida Nation recently announced the stads k'un (Goshawk) as the national bird of Haida Gwaii. At the recent Haida Nation's annual House of Assembly, the House unanimously endorsed a resolution to develop an Islands-based recovery strategy that includes monitoring inventories of potential habitat, habitat recruitment and restoration, introduced species mitigation, and proper foraging habitat management to ensure this unique forest species survives.

Taan Advisory Group comprised of Taan, CHN, Skidegate Band Council and Old Massett Village Council will be drafting a Goshawk Terms of Reference to assist in the development of the NOGO Strategy as defined by the House of Assembly.

Taan also conducted some alternative harvesting methods in SUR002 (increased retention) for Goshawk management.

#### NOGO Implementation Plan (Feb 2018)

A new Implementation Plan (MFLNRO) was published in February 2018. The report identifies both short and long term objectives, with the primary focus of completing required research to determine distribution and habitat requirements for the transition zone (area of overlap between sub-species) and forage areas and report results to MFLRNO by 2020.

The most imminent threats to populations of Northern Goshawk, laingi subspecies identified in the plan, are roads and forest harvesting that result in loss and fragmentation of nesting and foraging habitats. Ecosystem modification and subsequent reductions in prey diversity and abundance in Haida Gwaii related to introduced Black-tailed Deer (*Odocoileus hemionus columbianus*) are also a concern.

The Implementation Plan includes plans for the establishment of 5 new breeding reserves on Haida Gwaii (implemented under the LUO) and to develop provincial foraging habitat management recommendations by 2020 (no legal mechanism for protecting forage areas). Engagement events were held in early 2016 (Jan 29, 2016 in Haida Gwaii) and Taan participated and provided collaborative feedback (through the Coast Forest Products Association).

The long-term objective for Haida Gwaii is to retain 25 home ranges. An analysis was completed to compare the current protected areas and home range requirements and identified a gap of 7 home ranges for Haida Gwaii. The implementation objectives identified a minimum 5 breeding areas on Haida Gwaii for protection by 2020 (along with the plans to conduct further research on forage area requirements).

Modelling for foraging, nesting and territories have been updated with the new VRI and depletions (May 2017). MFLNRO is also scheduled to complete a report of updated foraging habitat around nest sites by January 2018 and complete analysis of foraging areas by April 2018. An action item has been generated to obtain the updated modelling data and complete a review of the proposed changes.

### NOGO SAR Recovery Strategy (Proposed)

The federal recovery strategy was finalised December 2017 but is still undergoing consultation (not yet approved).

A new draft federal recovery strategy was released for consultation December 2014 (final draft expected late 2016) and is intended to replace the previous draft strategy (2012) and support the BC Management Plan (2013). Preliminary review of the updated draft seems to indicate that the strategy is moving to a more flexible management approach. It includes the same 18 critical habitat areas for Haida Gwaii as the 2012 draft. It also seems to indicate that critical forage habitat targets include maintaining 61% suitable habitat within a 5.2 km radius (the previous strategy indicated 60% within a 5.4km radius). The revised strategy indicates that critical breeding habitat is 75.5 ha (previous draft indicates 200 ha). In Haida Gwaii, the Land Use Order already establishes reserve areas that meet the 200 ha requirements.

Once the recovery strategy is finalised or more information is made available, more work will be completed to conduct analysis and develop management strategies for the foraging areas consistent with the recovery strategy (which may include LiDAR and Object Raku).

A detailed review of the 2012 draft recovery strategy and analysis of the data were completed in 2012/2013 (Kristin Storry, RPF, RPBio from Zimmfor Management Services Ltd.). The main goal of the recovery planning for this species is to ensure sufficient amounts of breeding and foraging habitat are protected and maintained. The strategy provides information to assess and manage operations in order to avoid the destruction of critical breeding and foraging habitat and to ensure its protection. While the Haida Gwaii Land Use Order (LUO) and Wildlife Habitat Areas (WHA's) provide sufficient breeding areas for the goshawk territories, these territories are not considered sustainable without sufficient foraging habitat.

The Strategy defines suitable foraging habitat as 60% (with a minimum of 40%) of the total forested area of the territory remaining as mature or old growth timber types. The Strategy identifies critical Northern Goshawk habitat areas on Haida Gwaii and includes an analysis of the breeding and foraging habitat suitability of the forest cover types within these areas.

A further analysis was completed to assess the implications of the management strategies described in the Strategy and to identify the territories that may not meet the proposed target. A GIS analysis was completed to assess the current status of the breeding and foraging habitat targets described in the Strategy and based on the following buffer areas around the known nesting locations:

- Breeding area = 800 m Buffer (area = 200 ha), of old/ mature forest types
- Foraging area = 5.4 km Buffer (area = 9161 ha), 60% of the forested area maintained as old/ mature forests

For the foraging buffer areas, the analysis defined the forested area as any polygon in the forest cover layer that had a leading species. Within the forested areas, any old/ mature forests (high or moderate suitability) that were constrained were identified and tallied first.

Constraints include the following:

- LUO Areas - Cedar Stewardship Areas, Forest Reserves, Marbled Murrelet Habitat, Northern Saw Whet Owl and Northern Goshawk Reserves, Riparian Reserves
- Provincial and National Parks and Conservancies

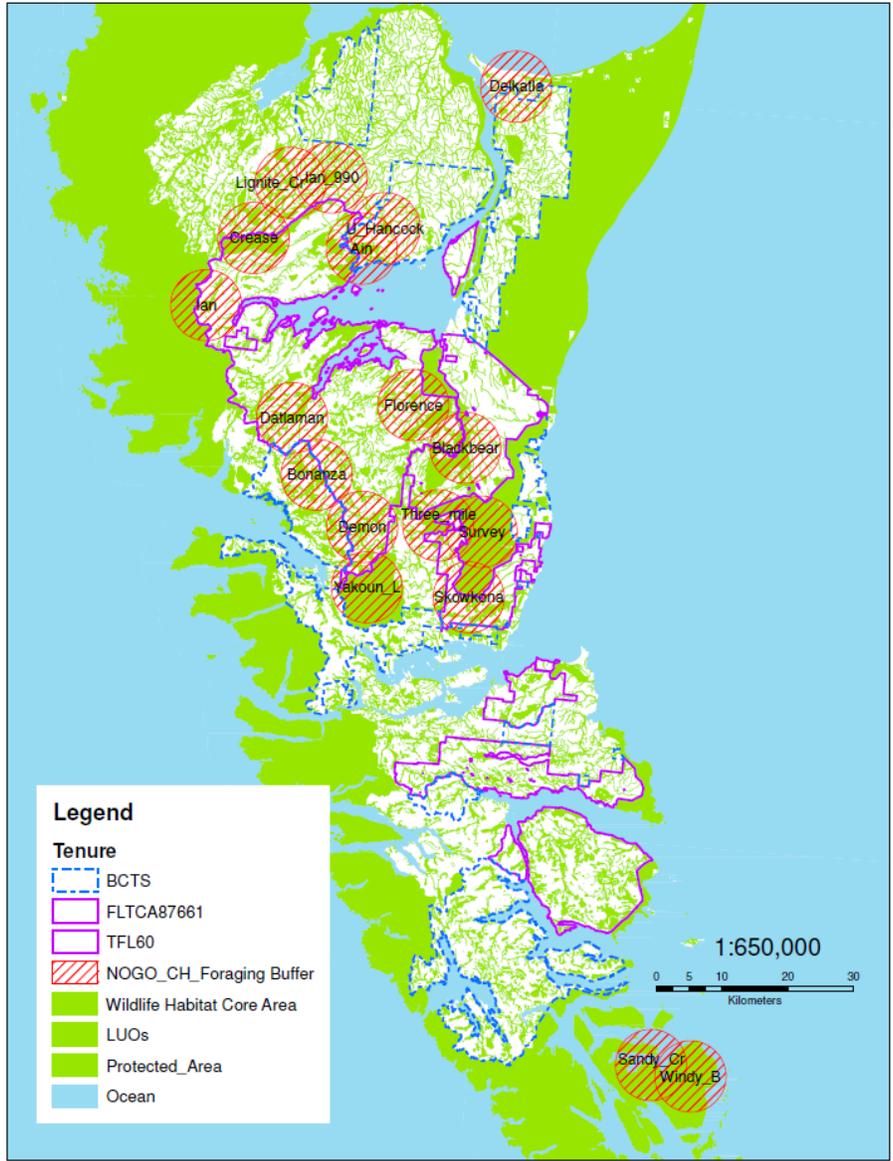


Figure 7: NOGO Critical Habitat Areas (High and Moderate Suitable Breeding & Forage Habitat)

Where the foraging buffer areas extended over several tenures (i.e., not entirely within the Taan tenure) the total remaining forested area required to meet the target (i.e., after deducting the suitable habitat within the constrained areas) was apportioned accordingly. Where foraging buffers overlapped with the neighbouring buffers, an analysis was completed for each to ensure that each territory met the target.

The Strategy identifies 18 critical habitat areas in the Haida Gwaii Conservation Region. All of these areas have been previously identified. For this analysis, only the areas that had breeding and foraging areas totally, or partially, contained within the Taan tenures (TFL 60 and FLTCA87661) were considered (15 total). The Sandy\_Cr and Windy\_B areas were excluded as they are located entirely within the Gwaii Hannas Park. The Delkalta area was excluded as it is located entirely within urban areas (Masset) or other tenures (BCTS).

The following territories (15) were included in the analysis:

- Ain
- Blackbear
- Bonanza
- Crease
- Datlaman
- Demon
- Florence
- Ian
- Ian\_990
- Lignite\_Cr
- Skowkona
- Survey
- Three\_mile
- U\_Hancock
- Yakoun\_L

#### Breeding Areas

The breeding areas for all 15 territories are already constrained by provincial reserves (WHA's and Schedule 12 of the LUO). All the breeding areas are within the target of 200 m ± 3 ha. Considering that the entire polygon is constrained and already meets or will meet the suitable breeding habitat requirements (200ha of old/mature timber) further analysis was not completed.

#### Foraging Areas

Two of the foraging buffers within the territories (Survey and Yakoun\_L) meet the target within the existing constrained areas (Parks and LUO). Yakoun\_L only has 57.8% of the constrained area within high and moderate suitability index, however there is an additional 19.7% available in the low suitability index. It is expected that some of the low index forested areas will mature and move into the moderate category and will meet the target.

Once the constrained areas were excluded from the analysis, the remaining territories and the area required to meet the 60% target were apportioned according to the percent coverage of the total ground area within the foraging buffers (i.e., water excluded).

Both the Datlaman and Bonanza have foraging areas constrained within a WHA, that have very specific management and retention requirements under the orders it is important to note that the eco representation layer has fluid polygons (based on field verifications), the LUO targets are static and will continue to contribute to the suitable foraging habitat.

When considering the constraints of the LUO in addition to the Taan Ecosystem Representation Management Areas, five territories (Bonanza, Datlaman, Lignite\_Cr, Skowkona and Three\_Mile) meet the 60% target (the required area to meet the 60% target for Lignite\_Cr foraging buffer is 0.1% or 0.6 ha and was considered therefore considered to meet the target).

The following territories (8) do not meet the 60% target requirement:

- Ain
- Blackbear
- Crease
- Demon\*
- Florence\*
- Ian\*
- Ian\_990\*
- U\_Hancock\*

\* The foraging areas of these territories have less than the 40% minimum.

Discussion of Results - Critical Habitat Areas

**Breeding Areas** - The 15 analyzed critical habitat areas meet the intent of the draft strategy (>200 ha). The analysis does show that eight of the breeding areas are slightly below the 200ha target (1-3 ha), however the draft strategy has approved and adapted these breeding area boundaries (included in the WHA and LUO Schedule 12). No further action is required.

**Foraging Areas** - Eight of the foraging buffer areas (5.4km radius area surrounding a breeding area) did not meet the 60% high and moderate foraging index target requirements, refer to the list above. 6 of the buffer areas are less than the 40% minimum proposed: Ain, Demon, Florence, Ian, Ian\_990 and U-Hancock). Analysis shows that in order to achieve the Recovery Strategy targets, Taan would have to retain a portion of their contributing THLB (for 7 of the territories) and all of their non-contributing and partially contributing THLB in these areas. This is quite substantial and has the potential to have significant impacts on an already heavily constrained land-base.

The sample data table below demonstrates the projected area (hectares) that would be required to be set-aside to meet the proposed 60% target for high and moderate foraging habitat, after considering existing constrained areas under the Land Use Order as well as Taan internal Ecosystem Representation Management Zone areas:

| Critical Habitat Area | Total Land Area (ha) | Total Land Area Protected & Constrained (ha) | Total Land Area Protected & Constrained (%) | Total High & Moderate Forage Habitat Protected & Constrained (ha) | Total High & Moderate Forage Habitat Protected & Constrained (%) | Area Required to Meet 60% High & Moderate Target (ha) | Proportion of Area Required to meet 60% High & Moderate Target from Taan Tenures (%) | Proportion of Area Required to meet 60% High & Moderate Target from Taan Tenures (ha) | Taan EcoRep Management Zone Areas (ha) | Remaining Area Required from Taan Tenures to meet the Proposed 60% Target (ha) | Remaining Area Required from Taan Tenures to meet the Proposed 40% Minimum (ha) |
|-----------------------|----------------------|--|---|---|--|---|--|---|--|--|---|
| Ain                   | 8760.1               | 3097.2                                       | 35%   | 2433.2  | 27.8%  | 2822.8  | 13.5%  | 380.7   | 97.5                                   | 283.2  | 46.9  |
| Blackbear             | 8817.9               | 4166.1                                       | 47%   | 3005.7  | 34.1%  | 2285.0  | 52.8%  | 1205.4  | 605.5                                  | 599.9  | -330.4  |
| Bonanza               | 9126.1               | 4548.7                                       | 50%   | 2653.7  | 29.1%  | 2821.9  | 19.5%  | 551.2   | 695.1                                  | -143.8   |   |
| Crease                | 7951.1               | 4664.0                                       | 59%   | 3358.0  | 42.2%  | 1412.6  | 17.9%  | 252.8   | 205.4                                  | 47.4   | -237.1  |
| Datlaman              | 8918.9               | 4090.8                                       | 46%   | 2932.9  | 32.9%  | 2418.4  | 49.0%  | 1184.3  | 1651.5                                 | -467.1   |   |
| Demon                 | 9056.9               | 3241.7                                       | 36%   | 2147.7  | 23.7%  | 3286.4  | 45.5%  | 1496.4  | 377.4                                  | 1119.0   | 294.2   |
| Florence              | 9030.0               | 4102.3                                       | 45%   | 2664.5  | 29.5%  | 2753.5  | 54.4%  | 1498.0  | 59.4                                   | 1438.6   | 456.0   |
| Ian                   | 9075.4               | 4673.1                                       | 51%   | 1899.1  | 20.9%  | 3546.1  | 46.9%  | 1663.7  | 689.7                                  | 974.0  | 122.4   |
| Ian_990               | 7643.8               | 2710.3                                       | 35%   | 1748.1  | 22.9%  | 2838.2  | 6.5%   | 183.3   | 17.6                                   | 165.7  | 67.0  |
| Lignite_Cr            | 8299.0               | 3408.4                                       | 41%   | 2255.1  | 27.2%  | 2724.2  | 0.1%   | 1.7   | 1.1                                    | 0.6  |   |
| Skowkona              | 8926.9               | 4412.1                                       | 49%   | 3589.2  | 40.2%  | 1767.0  | 39.7%  | 701.1   | 883.5                                  | -182.3   |   |
| Survey                | 8820.2               | 7511.1                                       | 85%   | 7116.2  | 80.7%  | -1824.1   |  |   |  | 0.0  |   |
| Three_mile            | 8951.5               | 4635.3                                       | 52%   | 3917.7  | 43.8%  | 1453.2  | 29.3%  | 426.4   | 586.3                                  | -160.0   |   |
| U_Hancock             | 8728.4               | 2245.2                                       | 26%   | 1740.1  | 19.9%  | 3497.0  | 1.8%   | 64.4  | 8.0                                    | 56.4   | 24.3  |
| Yakoun_L              | 8277.3               | 6509.4                                       | 79%   | 4782.3  | 57.8%  | 184.0   |  |   |  | 0.0  |   |

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MAMU Implementation Plan (Feb 2018)

A new Implementation Plan (MFLNRO) was published in February 2018. The federal recovery strategy considers management measures for the marine environment, while this implementation plan addresses terrestrial nesting habitat and contains habitat management commitments for provincial Crown lands.

The Plan identifies the main terrestrial threats to Marbled Murrelets as historic and ongoing loss and fragmentation of old-growth nesting habitat, resulting in insufficient functional nesting habitat, increased predation risk, and adverse changes to microclimate near forest edges.

The short-term objective identified for Haida Gwaii includes the retention of at least 68% of 2002 populations by retention of proportionate amounts of 2002 nesting habitat.

The long-term population and distribution objective for the recovery of the Marbled Murrelet is to ensure the species has a high probability of persistence after 2032 across its range. This will be achieved by maintaining sufficient nesting habitat within each conservation region to stabilize the Canadian population. The East Vancouver Island Conservation Region is the only region where recruitment of nesting habitat is required to achieve the minimum habitat threshold over the long term.

Action plans are in place under the plan for further work on the regions other than Haida Gwaii, as well as to develop monitoring plans across all regions.

The habitat protection targets for Haida Gwaii are met through existing protected areas (hard and soft reserves) under the Land Use Order.

| Source              | Description                      | Baseline Habitat | Target % | Target (ha) | Suitable Habitat 2016 | Minimum Habitat Threshold – Crown Land (ha) | Protected Suitable Habitat (ha) |
|---------------------|----------------------------------|------------------|----------|-------------|-----------------------|---|---------------------------------|
| Implementation Plan | All Suitable Habitat & Class 1-3 | 221,071 (2002)   | 68%      | 150,328     | 209,894               | 148,542                                     | 155,331                         |

MAMU Recovery Strategy

The MAMU Recovery Strategy was finalised in June 2014. The short-term goals identified in the strategy include retention of 70% or greater of the 2002 population and habitat levels within the six primary conservation regions identified. This will be achieved by maintaining or restoring sufficient suitable nesting and marine habitat. The strategy focuses on nesting habitat, as there is currently not sufficient marine information available. The Recovery Strategy is based on several different classification systems all rolled together and mapped as suitable habitat for Haida Gwaii (225,145ha) and includes Class 1-3 habitat. The LUO targets are based on just considering the Class 1 and Class 2 habitat (high and very high suitability).

The Recovery Strategy states that there is currently sufficient habitat available to meet the short-term target. However, it is important to note that the LUO targets are based on a different set of criteria, limited to Class 1 and 2 habitat. Moreover, there is currently no assurance that the Recovery Strategy targets will be met in the long term without additional action plans/ implementation being implemented.

A comparison of the Recovery Strategy Targets and LUO Targets is as follows:

| Source            | Description                      | Baseline Habitat | Target % | Target (ha) | Area Available 2011 | Excess Area | % Habitat > RS Target |
|-------------------|----------------------------------|------------------|----------|-------------|---------------------|-------------|-----------------------|
| Recovery Strategy | All Suitable Habitat & Class 1-3 | 225,145 (2002)   | 68%      | 153,099     | 212,628             | 59,530      | +38.9                 |
| LUO               | Class 1 & 2 Habitat              | 108,722          | 75%      | 81,540      | -                   | 10,315      | -                     |

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A comparison was completed in August 2015 to review the potential overlap of the MAMU and NOGO areas (for consideration for good candidates for potential reserves) as well as how much Class 3 MAMU habitat is located within protected areas and other LUO constrained areas to allow for a more direct comparison of the two strategies (RS and LUO); the Recovery Strategy analysis and targets are based on assessment of MAMU Class 1, Class 2 and Class 3 habitat while the LUO analysis and targets use only Class 1 and Class 2 habitat.

| Source                     | Description                      | Location    | Habitat LUO Constrained | Habitat Non-Contributing Landbase (ha) | Habitat Partially Contributing Landbase (ha) | Total Constrained & Non-Contributing (ha) | Habitat Contributing Landbase (ha) |
|----------------------------|----------------------------------|-------------|-------------------------|--|--|---|------------------------------------|
| MAMU R/S                   | Class 3 habitat                  | Haida Gwaii | 73,635                  | 81,870                                 | 11,433                                       | 166,938                                   | 19,123                             |
|                            |                                  | MU          | 6,925                   | 7,597                                  | 5,233  | 19,755                                    | 9,856                              |
| MAMU R/S                   | Critical Habitat Area (Suitable) | Haida Gwaii | 165,757                 | 178,712                                | 18,654                                       | 363,123                                   | 29,434                             |
|                            |                                  | MU          | 21,146                  | 20,727                                 | 8,502  | 50,375                                    | 14,959                             |
| Goshawk R/S, MAMU R/S, LUO | Overlap area                     | Haida Gwaii | 203,619                 | 227,276                                | 30,818                                       | 461,713                                   | 55,681                             |
|                            |                                  | MU          | 32,570                  | 35,886                                 | 15,047                                       | 83,503                                    | 31,110                             |

The recovery strategy target area is 153,099 ha of suitable habitat (class 1-3).

The Land Use Order (Schedule 9) establishes protection of 75% of the identified suitable MAMU habitat within each Landscape Unit, for a total of 81,540ha. Taan's FSP Analysis results show a total of 91,855 ha of MAMU habitat located in reserves. However, some Landscape Units do show that additional area from the Management Unit is required to be retained to meet the target (Louise Island requires an additional 59 ha to be set aside from harvest from the Management Unit). Approximately 60% of the recovery strategy target is met with the LUO schedule 9 reserves.

Taan analysis shows an additional amount of Class 3 MAMU habitat that is located in protected and constrained areas and in the non-contributing landbase for Haida Gwaii is an additional 166,938 ha.

Therefore, the total amount of suitable habitat (class 1-3), that can be identified as protected/ constrained and located within the non-contributing (& partially contributing) landbase is 91,855 ha + 166,938 ha = 258,793 ha. This exceeds the recovery strategy target of 153,099 ha. The recovery strategy critical habitat identified shows 363,123 ha protected/ constrained and within the non-contributing (& partially contributing), which is also well in excess of the target area of 153,099 ha.

Those calculations indicate Taan should not have to constrain any additional areas to meet the recovery strategy target for MAMU habitat.



### **Database & Reporting Parameters**

The BC Government (Ministry of Environment), Conservation Data Center (CDC) maintains a central database on plants, animals and ecosystems at risk in the province. The database includes information on status, locations and level of protection for key species. A web page is also dedicated to updates and changes: <http://www.env.gov.bc.ca/atrisk/changes.htm>.

The FSC High Conservation Value Forest (HCVF) Assessment contains a full list of the species identified within the Management Unit as of March 2011. These lists are updated through this Monitoring Report each year.

This indicator is intended to monitor status of species at risk. In the event that changes are made within the interim period between updates to the HCVF Assessment, a report will be generated from the database on an annual basis and the full list of species will be evaluated against the list from the previous year, and any changes to the species listed will be reported. Changes will be evaluated as they occur to attempt to determine whether forest management activities in the MU may have impacted the changes to the species status and adjust management strategies where appropriate.

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## Indicator: Sensitive Species Habitat

| Element   | Objective  | Indicator  | Target  |
|---|--|--|---|
| FSC 8.2.4 & 8.2.5:<br>Composition and observed changes to the flora and fauna | Monitor the habitat for sensitive species and observed changes over time | MAMU Class 1 and 2 habitat area<br>Northern Goshawk reserve area<br>Northern Saw-whet Owl reserve area<br>Great Blue Heron reserve area<br>Black Bear den area | Maintain reserves; protect MAMU habitat as guided by LUO; maintain NOGO foraging habitat near known nest sites. |

### Rationale for Indicator & Target

The indicator is based on available known information for the key sensitive species identified through the Land Use Order to be of special significance to the Haida Nation and Haida Gwaii. For some of the sensitive species (see current status table below), targets can be met by respecting reserve boundaries; for others, information on availability and location of habitat is required to enable its protection.

### Current Status/ Results

The following table is intended to report on sensitive species habitat within the Management Unit. It is important to note that a significant level of protection has also been established outside of the Management Unit for some of the key species.

| Sensitive Species Habitat (ha)        | Total Habitat in Parks (Haida Gwaii) (ha) | Total habitat within the Management Unit |  |   |                                    | Target   | Target Met (Y/N)   |
|---------------------------------------|---|--|--|---|------------------------------------|--|--|
|                                       |   | Total Habitat in MU (ha)                 | Habitat in Reserve + LUO Constrained <sup>2</sup> (ha) | Habitat in NCLB (ha)                        | Total Habitat outside of THLB (ha) |  |  |
| MAMU Class 1 & 2 habitat              | Not reported                              | 20,280                                   | 14,143   | 460<br>(2,992 partially contributing)       | 14,603                             | Targets by LU set in the LUO                       | Y; Targets are addressed in Site Plans for each development area (Taan requires identification of an additional 72 ha of MAMU habitat to be identified within the operable land-base and reserved) |
| Northern Goshawk high forage habitat  | 57,725.70 ha                              | 58,140.2 ha                              | 902.1  | 162.0<br>(12,673.1 partially contributing)  | 1,064.1                            | Keep apprised of the progress of the Recovery Team | Y  |
| Northern Goshawk high nesting habitat | 27,810.20 ha                              | 12,363.3 ha                              | 397.7  | 27.3 ha<br>(2,726.6 partially contributing) | 425.0                              |  |  |
| Northern Goshawk Reserve              | -   | -  | 1,583 in reserve                                       | N/A   | N/A                                | Respect reserve boundaries                         | Y  |
| Northern Saw-whet Owl Reserve         | -   | -  | 204 in -reserve  | N/A   | N/A                                | Respect reserve boundaries                         | Y  |

| Sensitive Species Habitat (ha) | Total Habitat in Parks (Haida Gwaii) (ha) | Total habitat within the Management Unit |   |                      |                                    | Target   | Target Met (Y/N)                                       |
|--------------------------------|---|--|---|----------------------|------------------------------------|--|--|
|                                |   | Total Habitat in MU (ha)                 | Habitat in Reserve + LUO Constrained <sup>2</sup> (ha)                            | Habitat in NCLB (ha) | Total Habitat outside of THLB (ha) |  |  |
| Great Blue Heron Reserve       | -   | -  | 450 in reserve; 366 management zone – 17 nests (overlap between nests netted out) | N/A                  | N/A                                | Respect reserve boundaries                                   | Y  |
| Black Bear Den Reserve         | -   | Refer to LUO Annual Reporting Indicator  | N/A   | N/A                  | N/A                                | Diligent searches for bear dens; Respect reserve boundaries; | Y; dens and monumental cedar have appropriate reserves |
| Monumental Cedars #            | -   | Refer to LUO Annual Reporting Indicator  | N/A   | N/A                  | N/A                                | Locate and reserve monumental cedars, buffer as per LUO      | Y; All monumental cedars have appropriate reserves.    |

<sup>1</sup> Potential habitat for Northern Goshawk currently available from the analysis report by Cortex Consulting for Coastal BC in 2008 (Reviewed and revised in 2012). The hectares reported above represent the actual current habitat that is available within the high ranked polygons, and does not include any previously harvested stands located in the high ranked polygons.

<sup>2</sup> LUO Constrained refers to parks, conservancies, cedar stewardship areas, forest reserves, goshawk reserves, saw-whet owl reserves and Type I and II fish habitat not already accounted for within reserve areas noted. Overlap of reserve areas has all been netted out.

<sup>3</sup> MAMU Data sourced from FSP Analysis June 2012.

There were no changes to the species at risk/ sensitive species management areas in the Management Unit for 2017. One new Goshawk nest has been identified in the Ian area, but not within Taan tenures. Work is being initiated to develop a Haida Gwaii management plan for Goshawk. Several monumental cedars and a few new bear dens were identified, refer to the LUO reporting indicator for details.

Several bear dens and numerous monumental cedars were identified in 2016, refer to the LUO Reporting indicator for details. There was an eagles nest identified on the edge of Cowhoe Bay within the vicinity of FLO004, a reserve was established and included in the LUO Management zone.

A Great Blue Heron nest was identified in 2014 within a Taan development area (AER004). A 350m buffer and 45 ha No Harvest Zone were established and a 150m (added to the buffer) timing restriction was put in place (during breeding season, Feb 15 to Aug 31).

There have not been any updates to the draft Species Recovery Strategies for NOGO since the 2014 report (draft has been submitted for peer review). There is progress (MLFNO implementation team) towards establishment of 5 new breeding reserves on Haida Gwaii (will be designated under the LUO). These are not expected to impact the MU.

The MAMU Species Recovery Strategy was finalized and Taan should have not have to constrain any additional areas to meet the recovery strategy target.

### **Summary of Management Strategies**

The Land Use Objectives Order provides objectives related to the management of the key indicator species of importance to the people of Haida Gwaii, including the Haida Nation. In addition to the landscape level protection of old forests through the established protected areas, cedar stewardship areas, forest reserves, and ecosystem representation, the LUO also directly provides objectives for high value habitat and reproduction sites for Marbled Murrelet, Northern Goshawk, Northern Saw-whet Owl, Great Blue Heron and the Black Bear such as reporting identified reproduction areas and implementing required no harvest zones (these are captured and reported annually under the LUO).

Several Recovery Teams have also been jointly established through cooperation with government, industry and environmental groups, including the [Marbled Murrelet Recovery Team](#), the Northern Goshawk Recovery Team, and the Northern Saw-Whet Owl Recovery Team. Background work related to key wildlife and their recovery recommendations was considered during the development of the Land Use Order.

Reserve boundaries will be carefully respected. All known Goshawk nests on Haida Gwaii are in reserves and the area has been carefully surveyed. Nonetheless Taan field staff will be aware of Goshawks and look for nests during timber cruises and other field work. Any new nests will be protected by reserves (as required under the LUO) which includes provisions for retaining target levels for forage habitat. Efforts are being undertaken to address deficits in MAMU habitat in protected status. Bear dens are protected both by reserves around den trees, and also by reserves around monumental cedars. That essentially protects all cedars over 100 cm dbh and provides a good distribution of potential den sites. Recruitment of 100 cm trees is planned. Habitat for Saw Whet Owl is provided both by reserves and by coarse filter habitat provisions (older forest near mix of seral stages). As well as monitoring habitat and maintaining habitat, Taan will also assist in any direct species monitoring by MoE or Recovery Teams.

Bear dens and monumental cedars are identified and assessed during the Cultural Features Identification survey (completed by certified assessors). These assessments are required on every development area per the Land Use Order.

### ***Adaptive Management Strategies***

Updated modelling for NOGO nesting and forage habitat was obtained in the winter of 2012/spring 2013. Work was completed in 2013 to review and assess the new modelling information in comparison to the previous model as well as to assess the suitable habitat that is located in the vicinity of the known nest sites. The results of the review help to assess for planning considerations of ensuring proportion of forage habitat is conserved in the vicinity of known nest sites and potential areas for new nest sites based on nesting potential. Analysis included a review the LUO reserve zones and forage habitat, as the reserve zones have been established to consider inclusion of forage areas.

Taan will continue to keep apprised of the work being done by the Recovery Team and update this report as new information and progress is made known.

Taan also continues to support the Goshawk breeding monitoring program.

### **Forecast**

Consider developing maps to demonstrate the projected changes over time to the nest and forage habitat from the model and review in comparison to management strategies.



### **Database & Reporting Parameters**

The LUO incorporated MAMU habitat suitability mapping and reserve areas for Northern Goshawk and Northern Saw-whet Owl (and established related objectives). Recording and tracking is also required for several objectives such as newly identified nest locations and bear dens. This information is included within the GIS layers and reported annually to the Council of the Haida Nation and the Province of BC (refer to the LUO Reporting indicator for details).

Cortex Consultants produced a NOGO habitat modelling report for Coastal BC in 2008. The report includes modelling habitat under past, present and future conditions and different forest management scenarios. A separate model was developed for Haida Gwaii. The results show that for both nesting and foraging habitat under Current management (Base Case 2), across a time series from 200 years in the past to 250 years into the future, the greatest changes in habitat occurs in the period leading up to the present (25 and 26). The amount of foraging habitat in the landscape reaches equilibrium about 20 years into the future, and nesting habitat reaches equilibrium in about 50 years. That model has been updated and new information was available after September 2012. The most recent work done by the Recovery Team includes analysis of potential nest sites in the proposed critical habitat areas, as well as existing nests. Further development of actions for goshawk analysis will follow the advice of the Recovery Strategy Team as it develops.

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## Environmental & Social Impacts

### Indicator: Watershed Disturbance

| Element   | Objective  | Indicator  | Target   |
|---|--|--|--|
| FSC 5.1.4, 8.2.6 & 9.4: Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate environmental & social cost; maintain landscape level biodiversity | # of watersheds with ECA >25%; # of sensitive watersheds with ECA >20% | # of watersheds exceeding the established thresholds improves over time until all watersheds are within the allowable thresholds |

#### Rationale for Indicator & Target

The indicator is based on FSC requirements for all watersheds and legal requirements under the Land Use Order for Sensitive Watersheds. The target is based on expected outcome of implementation of the Land Use Order over time as harvesting within watersheds in excess of the allowable thresholds is curtailed until such time that the thresholds allow harvesting to occur (as recruitment and growth of previously harvested areas occur).

#### Current Status/ Results

Watershed Results that are reported for all of Haida Gwaii and are not split by tenure as watershed boundaries and Landscape Units cross tenure boundaries in many cases. A detailed analysis is available that demonstrates the watershed distributions based on representation within each tenure.

| Year      | Description | # of Watersheds | FSC Requirement          |                                   | Legal Requirement                  |                                       | Target Met (Y/N) |
|-----------|-------------|-----------------|--------------------------|-----------------------------------|------------------------------------|---------------------------------------|------------------|
|           |             |                 | # of Watersheds ECA >25% | Area for Watersheds ECA >25% (ha) | # of Sensitive Watersheds ECA >20% | Area of Sensitive Watersheds ECA >20% |                  |
| 2017      | Taan        | 149             | 3                        | 4,911                             | 0                                  | 0                                     | Y                |
| 2016      | Taan        | 149             | 5                        | 11,728                            | 2                                  | 4,754                                 | N/A              |
| 2015      | Taan        | 158*            | 22                       | 13,905                            | 10                                 | 9,033                                 | Y                |
| 2014      | Taan        | 158*            | 22                       | 13,905                            | 10                                 | 9,033                                 | Y                |
| 2013      | Taan        | 161             | 25                       | 17,165                            | 10                                 | 9,033                                 | Y                |
| 2012-2013 | Haida Gwaii | -               | 30                       | 31,053                            | 17                                 | 35,507                                | Y                |
| 2011      | Haida Gwaii | -               | 31                       | 38,450                            | 19                                 | 43,150                                | N/A - Benchmark  |

Between 2015 and 2017, watershed boundaries were refined, resulting in several watersheds that previously showed a very small overlap with Taan tenures, being re-mapped and removed from Taan tenures. In 2017, there are only three watersheds with ECA >25%, Bill Creek, Brian Creek2 and Log Creek3 and no sensitive watersheds that are over 20% ECA. In 2016, there were only two sensitive watersheds with ECA >20%, Brent Creek and Mamin River 4. These results show significant improvement in watershed condition with the full implementation of the Land Use Order.

In 2016, there was one block (LEL001) that had a noted deficit in the Honna River 1 watershed, sub-basin 360. The SP stated that harvesting was not to occur in the small section of the block (southernmost portion) until a review of the 2016 FSP analysis was completed to confirm that the sub basin was no longer in deficit. The analysis was not completed and the block was harvested. A minor non-conformance has been issued through this Monitoring Report, refer to the Action Items section of this report.

The report for 2014 was added to the 2015 report (the results were not available at the time of developing the 2014 report). The 2014 results demonstrate continued improvement in the hydrological recovery of watersheds. Only one cutblock is located in a sensitive watershed, LEL001 in the Honna River 1 watershed which is below the allowable 20% ECA threshold.



To summarize, in 2017 the Sensitive Watersheds that currently exceed the allowable 20% ECA threshold under the LUO, and where no harvesting is permitted within the Management Unit are:

Brent Creek

Mamin River 4

The 2017 non-sensitive watersheds that have ECA restrictions under FSC requirements, where no harvesting is currently permitted under the LUO within the Management Unit are as follows:

Bill Creek

Brian Creek 2

Log Creek 3

Breakdown by ECA categories for Taan tenures (updated every 5 years):

| Year      | Watershed ECA Category | # of Watersheds | ECA Area (ha) | Sensitive Watershed Category | # of Watersheds | ECA Area (ha) |
|-----------|------------------------|-----------------|---------------|------------------------------|-----------------|---------------|
| 2014-2018 | 0                      | 8               | 0             | 0.1-5.0                      | 14              | 435           |
|           | 0.1-10                 | 54              | 3,096         | 5.1-10.0                     | 10              | 906           |
|           | 10.1-20                | 61              | 14,358        | 10.1-15.0                    | 7               | 2,227         |
|           | 20.1-25                | 13              | 3,041         | 15.1-20.0                    | 13              | 4,879         |
|           | 25.1-30                | 12              | 3,497         | 20.1-25.0                    | 4               | 1,340         |
|           | 30.1-40                | 6               | 669           | 25.1-30.0                    | 2               | 789           |
|           | 40.1-60                | 5               | 103           | 30.1-40.0                    | 2               | 2.4           |
|           | 60.1-70                | 2               | 120           | 40.1-60.0                    | 1               | 15            |
|           | 100                    | 0               | 0             | 60.1-70.0                    | 1               | 118           |
|           | Total                  | 161             | 25,008        | Total                        | 54              | 10,712        |

Breakdown by ECA categories for Taan & BCTS tenures (updated every 5 years), provided for informational purposes to demonstrate historical reporting:

| Year                       | Watershed ECA Category | # of Watersheds | ECA Area (ha) | Sensitive Watershed Category | # of Watersheds | ECA Area (ha) |
|----------------------------|------------------------|-----------------|---------------|------------------------------|-----------------|---------------|
| 2011-2014<br>(Taan & BCTS) | 0                      | 37              | 4.95          | 0.1-5.0                      | 14              | 503.15        |
|                            | 0.1-10                 | 163             | 9,488.07      | 5.1-10.0                     | 12              | 1,537.18      |
|                            | 10.1-20                | 95              | 24,604.5      | 10.1-15.0                    | 15              | 3,738.13      |
|                            | 20.1-25                | 33              | 13,302.03     | 15.1-20.0                    | 16              | 6,700.24      |
|                            | 25.1-30                | 18              | 6,236.64      | 20.1-25.0                    | 11              | 6,404.39      |
|                            | 30.1-40                | 6               | 2,861.29      | 25.1-30.0                    | 6               | 2,667.19      |
|                            | 40.1-60                | 7               | 4,134.84      | 30.1-40.0                    | 1               | 1,106.7       |
|                            | 100                    | 1               | 10.53         | 50.1-60.0                    | 1               | 698.35        |
|                            |                        | Total           | 360           | 60,642.85                    | Total           | 76            |

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### **Summary of Management Strategies**

Sensitive watersheds are managed through the legal requirements under the Land Use Order and the Forest Stewardship Plan, which establishes a maximum disturbance level of 20% for each designated watershed. Analysis and tracking of watershed condition in relation to harvest planning is a requirement of the FSP.

In addition, under the FSC certification, every watershed must be managed to maintain the ECA or disturbance level at less than or equal to 25% (i.e., up to one quarter of the watershed area may be harvested at any given time). This is implemented through the FSC Management Plan and site level planning (including Site Plans).

In the event that watersheds exceed allowable ECA thresholds, no harvesting is permitted until the targets are achieved. In addition, the allowable thresholds can also limit harvesting levels to ensure that proposed harvesting continues to maintain the watershed at the allowable ECA thresholds.

### ***Adaptive Management Strategies***

None at this time.

### **Database & Reporting Parameters**

Watershed status is maintained within GIS. Under the Haida Gwaii FSP, analysis is required to confirm current status of each watershed unit in relation to the allowable thresholds to harvest planning. As a result of the analysis, a Ledger has also been developed to ensure periodic maintenance of the current status in relation to harvested and planned areas as part of the FSP maintenance and agreements.

Copies of the FSP Analysis results were utilized to generate the watershed disturbance categories to generate meaningful reporting information for this report.

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## Indicator: Riparian Management Effectiveness

| Element  | Objective                          | Indicator                         | Target  |
|--|------------------------------------|-----------------------------------|---|
| FSC 5.1.4 & 8.2.6: Environmental and social impacts of harvesting and other operations | Maintain riparian function/ values | Stream conditions by stream class | Continually improve the percentage of properly functioning streams. |

### Rationale for Indicator & Target

The indicator is developed to evaluate the effectiveness of the implementations of the Land Use Order and site specific management strategies and selection of location for site level riparian buffers (where flexibility is permitted in legislation) and utilizes the indicators and data from the Forest and Range Evaluation Program (FREP). The FREP riparian indicators are intended to assess:

- Are riparian forestry and range practices effective in maintaining the structural integrity and functions of stream ecosystems and other aquatic resource features over both short and long terms?
- Are forest road stream crossings or other forestry practices maintaining connectivity of fish habitats?
- Are forestry practices, including those for road systems, preserving aquatic habitats by maintaining hill-slope sediment supply and the sediment regimes of streams and other aquatic ecosystems?

The target is focussed on improved management of the smaller stream classes (S4-S6) and reflects the anticipation that the benchmarks will improved over time as full implementation of the Land Use Order and the FSC Management Plan Riparian Budgets occurs. It is expected that new benchmarks may be established following a two to three complete years of LUO and FSC implementation (i.e., 2013-2014). This indicator will be reported annually, but assessed against the target on a five-year reporting period to better assess trends (larger sample size).

### Current Status/ Results

| Year            | Class   | FREP Riparian Indicators |          |                                  |          |                                     |          |                          |                     |              | Target Met (Y/N) |   |
|-----------------|---|--------------------------|----------|----------------------------------|----------|-------------------------------------|----------|--------------------------|---------------------|--------------|------------------|---|
|                 |   | Properly Functioning     |          | Properly Functioning but at risk |          | Properly Functioning with high risk |          | Not Properly Functioning |                     | # of samples |                  |   |
|                 |   | Adj.                     | In block | Adj.                             | In block | Adj.                                | In block | Adj.                     | In block            |              |                  |   |
| 2017            | FREP did not complete any Riparian assessments in 2017. |                          |          |                                  |          |                                     |          |                          |                     |              |                  |   |
| 2016            | LUO Type 1  | S3                       | -        | -                                | -        | -                                   | -        | -                        | 100%                | -            | 1                | - |
|                 | LUO Upland Stream                                       | S5                       | -        | -                                | -        | 100%                                | -        | -                        | 100%                | -            | 2                |   |
| 2011-2015       | LUO Type 1  | S3                       | 50%      | -                                | 50%      | 100%                                | -        | -                        | -                   | -            | 3                | N |
|                 | LUO Upland Stream                                       | S5                       | -        | -                                | 100%     | -                                   | -        | -                        | -                   | 1            |                  |   |
|                 | LUO Upland Stream                                       | S6                       | -        | -                                | -        | -                                   | -        | -                        | 100%                | 3            |                  |   |
| Total MU        |   |                          | 14%      | -                                | 28%      | 14%                                 | -        | -                        | -                   | 43%          | 7                |   |
| Total 2006-2015 |   |                          | 31%      |                                  | 27%      |                                     | 27%      |                          | 14%                 |              | 29               |   |
| 2015            | LUO Type 1  | S3                       | 100%     | -                                | -        | -                                   | -        | -                        | -                   | -            | 1                | - |
|                 | LUO Upland Stream                                       | S6                       | -        | 0%                               | -        | -                                   | -        | -                        | -                   | 100%         | 2                | - |
| 2014            | LUO Upland Stream                                       | S5                       | -        | -                                | -        | -                                   | -        | -                        | -                   | -            | 0                | - |
|                 | LUO Upland Stream                                       | S6                       | -        | -                                | -        | -                                   | -        | -                        | -                   | -            |                  |   |
| 2013            | LUO Upland Stream                                       | S5                       | -        | -                                | -        | -                                   | -        | 100% (windthrow)         | -                   | -            | 2                | - |
|                 | LUO Upland Stream                                       | S6                       | -        | -                                | -        | -                                   | -        | -                        | 100% (road erosion) | -            |                  |   |
| 2012            | LUO Type I  | S3                       | 0%       | 0%                               | 0%       | 0%                                  | 100%     | 0%                       | 0%                  | 0%           | 1                | - |

| 2011            | LUO Type I        | S3                       | 0%          | 100%                             | 0%       | 0%                                  | 0%       | 0%                       | 0%       | 0%           | 0%  | 1                | -         |
|-----------------|-------------------|--------------------------|-------------|----------------------------------|----------|-------------------------------------|----------|--------------------------|----------|--------------|-----|------------------|-----------|
| Year            | Class             | FREP Riparian Indicators |             |                                  |          |                                     |          |                          |          |              |     | Target Met (Y/N) |           |
|                 |                   | Properly Functioning     |             | Properly Functioning but at risk |          | Properly Functioning with high risk |          | Not Properly Functioning |          | # of samples |     |                  |           |
|                 |                   | Adj.                     | In block    | Adj.                             | In block | Adj.                                | In block | Adj.                     | In block |              |     |                  |           |
| 2006-2010       | LUO Type I        | S1                       | -           | -                                | -        | -                                   | -        | -                        | -        | -            | -   | 0                | Benchmark |
|                 |                   | S2                       | 100%        | -                                | -        | -                                   | -        | -                        | -        | -            | -   | 3                |           |
|                 |                   | S3                       | 75%         | -                                | 25%      | -                                   | -        | -                        | -        | -            | -   | 4                |           |
|                 | LUO Type II       | S4                       | 33%         | -                                | -        | 33%                                 | -        | 33%                      | -        | -            | -   | 3                |           |
|                 | LUO Upland Stream | S5                       | 50%         | -                                | -        | 25%                                 | 25%      | -                        | -        | -            | -   | 4                |           |
|                 |                   | S6                       | 7%          | 7%                               | -        | 29%                                 | -        | 50%                      | -        | 7%           | 14  |                  |           |
|                 | Total MU          | 10                       | 1           | 1                                | 6        | 1                                   | 8        | 0                        | 1        | 28           |     |                  |           |
|                 |                   |                          | 39%         |                                  | 25%      |                                     | 32%      |                          | 4%       |              |     |                  |           |
| 2006-2011 Coast |                   |                          | S1          | 75%                              |          | 25%                                 |          | -                        |          | -            | 4   | N/A              |           |
|                 |                   |                          | S2          | 56%                              |          | 24%                                 |          | 21%                      |          | -            | 34  |                  |           |
|                 |                   |                          | S3          | 51%                              |          | 32%                                 |          | 8%                       |          | 9%           | 53  |                  |           |
|                 |                   |                          | S4          | 40%                              |          | 32%                                 |          | 12%                      |          | 16%          | 25  |                  |           |
|                 |                   |                          | S5          | 58%                              |          | 16%                                 |          | 15%                      |          | 11%          | 73  |                  |           |
|                 |                   |                          | S6          | 20%                              |          | 28%                                 |          | 30%                      |          | 23%          | 266 |                  |           |
|                 |                   |                          | Total Coast | 34%                              |          | 26%                                 |          | 23%                      |          | 17%          | 455 |                  |           |

Streams were assessed by FREP for indicators of intactness, % disturbance, maintenance of morphology, sufficient windthrow protection, connectivity unimpeded and sediment minimized. Most questions are evaluated using a yes (pass) or no (fail) answer/ response. A portion of negative results are related to natural events such as windthrow.

**FREP did not complete any Riparian Assessments in 2017 on the Management Unit.**

In 2016, there were only 3 streams sampled in the MU. Stream 13 in MCL004 (adjacent) and Stream 2 in PHT002 (in block) were not properly functioning. Both were harvested in 2015 and logging activities were attributed to their poor function (road erosion in block and old logging activity adjacent to block). Stream 1 in DEM002 is functioning but at risk due to windthrow. An action item has been generated to review the concerns to determine if any corrective actions can be taken to improve stream function.

The results of 2011-2015 were also compiled and reviewed. Performance on management of S6 streams appears to need improvements, as all 3 S6 streams were identified as not properly functioning. Falling and yarding disturbance, including machine disturbance and road erosion appear to be the leading issues. Some windthrow also noted. 2/3 of the streams were assessed in 2015 and were harvested in 2013. The one S6 stream from assessment in 2013 has been reviewed in the field as part of past corrective actions.

In 2015, there were three streams samples in the Management Unit. Both Upland Stream (S6) were assessed as not properly functioning (Cutblock SHN003 stream #4 and DAT006 stream #9). Issues noted include road running surface, ditches, fill/cut slopes eroding into stream. DAT006 also identified as portion of the stream channel diverted from natural pattern. Both prescriptions included fall and yard away preferred, fall and yard across only permitted where adequate deflection or bridging can be completed. SHN003 also noted as invasive plant bull thistle present and DAT006 notes groundsel and Canada thistle present.

In 2014, there were no samples completed in the Management Unit. Haida Gwaii and Coast Region results for 2006-2014 show 36% of steams properly functioning, 25% properly functioning but at risk, 23% properly functioning but at high risk and 16% not properly functioning.

In 2013, Taan provided some assistance to MFLNRO with completing FREP monitoring in Haida Gwaii. Some attempts were also made for Taan personnel to attend FREP training courses but were not successful. Taan will continue to explore opportunities for staff to work with MFLNRO representatives to assist with monitoring work. A preliminary review of the combined coastal data from 2016-2014 was completed and indicates that the stream classes most commonly impacted at risk include the S4, S5 and S6 streams (16% not properly functioning on average; S4s 17%, S5 1% and S6 30%). Results indicate that condition of S4 and S6 streams is not improving, but S5s has improved.

Regardless of performance in relation to the coast averages, the established target under the monitoring program is for Taan to demonstrate continual improvement over time, as it relates to both local performance and in comparison to the coast averages ([specifically in relation to S6 streams](#)).

The primary forestry-related causes for the coast region are: road-associated generation and transport of fine sediments, low levels of Riparian Management Area (RMA) tree retention, windthrow, falling and yarding trees across streams, and harvest-related machine disturbance in the RMA (FREP Report #27).

For the 2006-2010 reporting period, in the Coast Region, low tree retention was cited most often for S6 headwater stream reaches (65% of affected sites), followed by S4 fish-bearing streams (40%) and non-fish-bearing S5 streams (36%). Low tree retention was also identified as a cause of impacts for several S2 and S3 stream reaches where mandatory reserves were left in place. For these sites, low tree retention in the outer management zone of the RMAs was a main factor contributing to excessive windthrow in the streamside reserve zone. On streams without reserves, impacts associated with low retention were primarily attributed to reduced LWD supply to streams and (or) significant changes to the composition of the riparian vegetation and its form, vigour, or recruitment and the consequences for the aquatic environment (FREP Report #27). Indicators of maintenance of morphology and large woody debris show very positive results (100%).

### **Summary of Management Strategies**

Riparian management is legislated under the Land Use Order and through the overlap requirements under the *Forest and Range Practices Act* which are implemented through the Forest Stewardship Plan and site level planning. In addition, Taan maintains standard operating procedures/ field procedures to guide operations in harvesting and road building related to sediment management, streamside protection, required machine free zones, etc.

In addition to the legal requirements, there are specific riparian retention requirements under the FSC Certification. Taan has completed a Riparian Assessment according to the FSC requirements and has assessed the overlap and gaps between the legal requirements and those under FSC. Specific management strategies to address the identified gaps for Upland Streams (S5/S6) and ocean edges have been included in the FSC Management Plan. This is implemented through site level planning.

FREP recommends the following best management practices to improve the monitoring results for streams and fish management (FREP Report #27):

- Limiting the introduction of logging-related woody debris in channels (leave natural debris in place);
- Avoiding physical contact with the streambed and stream banks (e.g., through falling and yarding away from channels whenever feasible);
- Retaining riparian vegetation, at minimum, non-merchantable trees, understory, and smaller vegetation within 10 m of the channel;
- Minimizing fine sediment delivery to channels from roads and stream crossings throughout the entire road life cycle; and
- Focussing best practices on those S6 streams connected to downstream fish habitat and (or) downstream water quality concerns; this will likely result in the most improved outcomes for the least cost

Within the Management Unit, FREP data indicates that the following areas are of concern to riparian management effectiveness:

- S4, S5 and S6 streams – low retention, machine disturbance, falling and yarding across streams and stream crossings demonstrated erosion and sedimentation into the streams (road surface and cut/ fill slope).

Specific procedures for FREP data collection, including descriptions of the indicators (e.g., 'intact', 'undisturbed', etc.) are described within the FREP Riparian Management Effectiveness indicator protocols and can be accessed on the [FREP website](#). 'In block' refers to a stream reach located within the cutblock being assessed. 'Adjacent' is defined as any stream reach that lies within two Riparian Management Area widths of the block boundary for a minimum stream length equal to 30 channel widths.

Implementation of the Corporate Management System (CMS) procedures and FSC requirements in the FSC Management Plan address several of the recommended best practices above and should contribute to reducing the impacts: SOPs require crews to leave natural LWD in place in the streams (e.g., do not disturb embedded large woody debris), falling and yarding away prescriptions (where possible to implement), FSC machine free zones and understory vegetation retention of 7m (except for crossings) and FSC requirements for riparian buffers on the portions of S5 and S6 streams that are located directly upstream of fish habitat (250m).

Road and Bridge inspection and maintenance schedules should also contribute to minimizing fine sediment delivery to channels from road and stream crossings throughout the entire road life cycle.

Further monitoring will demonstrate whether current procedures under the CMS and under the Land Use Order are effective in improving the results of the riparian management (particularly sedimentation and cross stream falling/ yarding).

### ***Adaptive Management Strategies***

Taan should consider working with FREP representatives to review the sample plans annually and where required, complete some additional sampling on Taan harvested areas to better assess whether management under the LUO and FSC is improving the stream conditions. In 2013, we also changed the reporting cycle for FREP indicators to be based on a five-year period rather than annual to allow for improved trend analysis and large sample sizes (low sample sizes on an annual basis).

Taan has implemented a commitment that riparian management prescriptions for upland streams should strive to implement fall and yard away prescriptions wherever possible and limit fall and yard across to situations only where there is no other practicable option (refer to the Planning SOP). Examples include for specific streams and situations where it is feasible to be more specific and utilize “fall and yard away” or “fall to span and lift away, yard across only where deflection is adequate to ensure the stream bank is not impacted”. *Post-harvest Assessments indicate that stream prescriptions are being adhered to. This will be reviewed for effectiveness during the 2018 internal audit (action item generated).*

In 2013, the following areas were identified with concerns:

- DAT130 was identified with natural windthrow along an S5 stream adjacent to the block and is being impacted (not impacted or caused by harvesting/ roads). An action item has been generated within this report (refer to the Action Item section) to follow up and assess this area for potential remediation.
- AWUN53 was noted with an S6 stream in block that is not properly functioning due to road surface erosion into the stream. An action item has been generated for Taan personnel to visit the site and assess the hazards and prepare a mitigation strategy/ action plan.

These areas were field assessed in 2014. A summary report was completed that included proposed action items (these were entered into the corporate tracker for follow up). All recommended remedial action items were confirmed completed in September 2014.

In 2012, one sample site was completed and identified the reach as properly functioning but at high risk for TFL 60 cutblock FLO1003. While this meets the target of reducing the number of streams identified as not properly functioning, due to the high risk rating, it warrants further review. The FREP assessment indicates disturbed ground resulting from falling/ yarding and windthrow. In 2011, one sample site was completed and identified a high risk for TFL 60 cutblock FEA519 related to harvesting and windthrow. Both these areas were harvested prior to LUO implementation (Feather in 2008 and FLO in 2010).

These areas were field assessed in 2014. A summary report was completed that included proposed action items (these were entered into the corporate tracker for follow up). All recommended remedial action items were confirmed completed in September 2014.

Following a review of the 2015 monitoring results, Taan revised the Post-Harvest Assessment Form to include more detailed assessment of implementation of stream prescriptions and assessment of adherence to machine free zones. The Harvest Plan template has been modified to include more detailed prescriptions. Taan has also recently implemented penalties in the contracts related to non-conformance with the EMS (such as machine free zones) to address some contractors not following the prescriptions at all times. At this time, it is not known if there have been any penalties issued that are specific to riparian areas or machine free zones.



### **Database & Reporting Parameters**

FREP Riparian Effectiveness Monitoring – Information Management System database (exported reports received from MFLNRO for the Management Unit) and Report #27. Specific parameters for data collection and analysis are recorded under the FREP procedures for each indicator. Explanatory notes are also provided within the exported data reports (MS Excel).

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## Indicator: FSC Riparian Budgets – Watershed Level

| Element   | Objective                        | Indicator   | Target                                    |
|---|----------------------------------|---|---|
| FSC 5.1.4 & 8.2.6:<br>Environmental and social impacts of harvesting and other operations | Maintain riparian function/value | % of FSC riparian budgets maintained at the watershed level | 100% (for both fish and non-fish streams) |

### Rationale for Indicator & Target

The indicator and the target are based on FSC Requirements for riparian budgets (includes riparian buffer targets based on a watershed level “budget” approach that allows for some flexibility of not necessarily establishing buffers on every stream, provided the overall “budgets” are met for the stream class within the watershed).

In general, the riparian requirements for FSC are largely met through the Land Use Order requirements for Type I and II streams. The FSC Riparian Assessment identified some gaps between the LUO and FSC requirements for upland streams/ lakes and ocean edges.

As a result, the FSC Riparian Budget requirements are implemented and maintained at two levels: watershed level (required by FSC) and stand level (implemented by Taan to address watershed level deficits for meeting FSC requirements related to non-fish streams).

This indicator addresses the watershed level management of FSC riparian Budgets. An additional indicator has been developed to address the stand level management.

### Current Status/ Results

| Year                    | Total # of Watersheds | # of Watersheds that meet FSC Budgets for fish streams | % of Watersheds meeting FSC Budgets for fish streams | # of Watersheds that meet FSC Budgets for non-fish streams | % of Watersheds Meeting FSC Budgets for non-fish streams | Target Met (Y/N)   |
|-------------------------|-----------------------|--|--|--|--|--|
| 2011-2017 (Taan Only)   | 161                   | 149  | 92.5%  | 112  | 69.6%  | N (However, targets will be achieved through the implementation of the stand-level riparian budget analysis and tracking). |
| 2011-2015 (BCTS & Taan) | 282                   | 258  | 91.5%  | 224  | 79.4%  |  |

A detailed summary table is available by request to Taan Forest (data files are quite large and were not included within this report). An updated analysis was not completed in 2017, as this indicator is not included in the new draft FSC Canada Standards and is anticipated to be dropped once the new standard is finalised.

It is anticipated that errors in site series information in the forest inventory data resulted in underestimates of the contributions of the riparian buffers under the Land Use Order for Type I and Type II streams (fish streams). Recommendations for future analysis include correcting or using alternate methods that may be more accurate.

### Summary of Management Strategies

The overall objective is to ensure that FSC Riparian Budgets are met at the watershed level, providing for flexibility to vary riparian retention by stream class within each watershed (i.e., focussing retention on key areas/ streams within the watershed).



Specific stand-level requirements have been implemented through the FSC Management Plan to address the gaps and implement stand-level retention requirements for non-fish streams and ensure that at the stand level, 100% of the FSC Riparian Buffer requirements are met. A cutblock Riparian Budget Tracker has been developed to ensure that FSC requirements are maintained at the cutblock level for non-fish streams.

Further work will be done in the future analysis to evaluate the updated mapping information and analysis criteria and determine if further analysis work can fill the gaps to demonstrate FSC requirements can be met at the watershed levels using the analysis. In the interim, stand-level riparian management strategies have been developed to ensure FSC riparian budgets can be met at the stand level.

As we gain more information, correct data errors, fine tune analysis methods and monitor the implementation and effectiveness, that management strategies will likely evolve over the next few years.

### ***Adaptive Management Strategies***

Review of the parameters used and the potential to refine criteria are still ongoing to allow for improved watershed level analysis (as recommended in the Riparian Assessment Report) that may negate the need for a cutblock level assessment.

In addition, discussions in early 2013 indicated that the current approach using tree heights based on site series (per the LUO) as the cut-off for riparian forest influence may be short changing Taan from meeting the FSC Riparian Budgets (at the stand level and watershed level analysis) that are not based on tree height, but are reflected in minimum distance in meters. An example is for a Type 1 stream with tree height under the LUO of 30m, the required LUO reserve is 60m. Under the past procedures, the maximum riparian budget permitted to be included in the calculations was 50m, regardless of whether additional forested area is included in the reserve beyond the 50m edge. Stand-level management strategies were revised in 2013 to allow for up to 120m of riparian reserve adjacent to riparian areas to be counted as credits to riparian budgets (justified by research into how far the adjacent forests can be away from a riparian feature and still contribute to functioning as riparian forest and influencing the riparian feature). This change will be incorporated into the watershed level GIS analysis in 2017.

### **Database & Reporting Parameters**

Analysis and data for was generated through the FSC Riparian Assessment report. Due to the complexity of the analysis, it is anticipated that it will be updated once every five years and not on an annual basis.

In addition, Taan has developed and is implementing a cutblock level Riparian Budget Tracker in order to assist in recording/ tracking of information at the cutblock level to fill the 'gaps' in the watershed level data (refer to the report for details) for non-fish waterbodies and ocean edges.

Specific parameters for conducting the analysis, as well as recommendations for improvements for the next analysis are recorded within the Riparian Assessment report.

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## Indicator: FSC Riparian Budgets – Stand Level

| Element   | Objective                        | Indicator   | Target |
|---|----------------------------------|---|--------|
| FSC 5.1.4 & 8.2.6:<br>Environmental and social impacts of harvesting and other operations | Maintain riparian function/value | % of Riparian budgets maintained at the stand level | 100%   |

### Rationale for Indicator & Target

The indicator is based on FSC Requirements for riparian budgets, that have been applied at the stand level to assist implementation of management strategies (i.e., FSC requires maintenance of riparian budgets at the watershed level). The target is based on demonstrating that stand-level riparian retention fills the gaps in the results for demonstrating that Taan is achieving the FSC requirements at the watershed level.

### Current Status/ Results

| Year | Description          | # of Cutblocks Harvested | # of Site Plans/ Riparian Trackers Reviewed      | % Conformance with Stand-level Riparian Budgets | Target Met (Y/N) |
|------|----------------------|--------------------------|--|---|------------------|
| 2017 | Taan                 | 18<br>(+4 salvage)       | 17*  | 100   | Y                |
|      | BCTS in Haida Tenure | N/A                      | N/A  | N/A   | N/A              |
| 2016 | Taan                 | 27<br>(+1 Salvage)       | 24   | 95.7  | N                |
|      | BCTS in Haida Tenure | N/A                      | N/A  | N/A   | N/A              |
| 2015 | Taan                 | 19                       | 18   | 100   | Y                |
|      | BCTS in Haida Tenure | N/A                      | N/A  | N/A   | N/A              |
| 2014 | Taan                 | 14<br>(+12 salvage)      | 14   | 100   | Y                |
|      | BCTS in Haida Tenure | N/A                      | N/A  | N/A   | N/A              |
| 2013 | Taan                 | 14<br>(+8 salvage)       | 15<br>(7 small scale salvage no SPs or trackers) | 68  | N                |
|      | BCTS in Haida Tenure | 3<br>(2 TSLs)            | 3  | 0   | N                |
| 2012 | Taan                 | 15                       | 15   | 100   | Y                |
| 2011 | Taan                 | N/A                      | N/A  | N/A   | N/A              |

In 2017, all blocks confirmed with FSC riparian budgets. \*One block CAN001 did not have any upland streams identified and therefore an assessment was not required.

In 2016, Taan completed Riparian Budget Assessments for 24 conventional harvest blocks. Two blocks (THR002 and THR002A, one combined assessment) did not conform with stand-level riparian budgets (had a 0.25ha deficit in the S6B stream) in a deficit watershed (three mile creek). Follow up actions are prescribed in the Summary of Results section of this report. Three blocks (BUC003, CAN001, THR003) did not have any streams within the block and a Riparian Budget Assessments was not required. Taan harvested one salvage block in 2016, however a riparian assessment was not required (no streams associated with block). BCTS did not conduct any harvesting within Taan's Haida Tenure in 2015.

In 2015, Taan completed Riparian Budget Assessments for 18 conventional harvest blocks; all blocks conformed with stand-level riparian budgets. One additional block (MCL003) did not have any streams associated with the block and a Riparian Budget Assessments was not required. BCTS did not conduct any harvesting within Taan's Haida Tenure in 2015. Taan did not harvest any salvage blocks in 2015.

In 2014, Taan completed Riparian Budget Assessments for all 14 conventional harvest blocks. All blocks met the budgets at the stand level, and where stand-level budgets were not met, it was confirmed that there were no deficits at the watershed level, thus the blocks were not exacerbating or creating any watershed level deficits. Note that not all salvage blocks have full SPs completed with Riparian Budget Assessments; depending on size, whether any streams are present, etc. Salvage SP amendments have been complete for all of the blocks that were missed in 2013. BCTS did not conduct any harvesting within Taan's Haida Tenure in 2014.

In late 2014, Taan revised the stand-level Riparian Budget Tracking requirements to remove stand-level analysis for Type 1 and Type 2 streams, as the analysis demonstrates that the riparian reserves required under the LUO far exceed the FSC requirements (therefore stand-level analysis is not required).

In 2013, Taan completed salvage harvesting on seven areas without completing any Site Plans or Site Plan amendments therefore riparian budgets were not considered or addressed. A review of the 15 Site Plans and related Riparian Trackers was completed and confirmed that the Riparian Budgets were met. In addition, BCTS had two timber sales (three blocks) in the FLTC that did not have the FSC Site Plan Considerations page or a Riparian Budget Tracker completed. This is a non-conformance with planning requirements and appropriate action items will be developed to address the deficiencies.

The cutblock Riparian Budget management strategies and Tracker were not finalised and implemented until March 2012. Reporting on this indicator is therefore not available for 2011.

### **Summary of Management Strategies**

The overall objective is to ensure that FSC Riparian Budgets are met at the watershed level, providing for flexibility to vary riparian retention by stream class within each watershed (i.e., focus retention on key areas/ streams within the watershed).

FSC Riparian Budget requirements are implemented and maintained at two levels: watershed level and stand level. In general, the riparian requirements for FSC are largely met through the Land Use Order requirements for Type I and II streams. The FSC Riparian Assessment identified some gaps between the LUO and FSC requirements for upland streams (S5, S6, lakes) and ocean edges. Specific stand-level requirements have been implemented through the FSC Management Plan to address the gaps and implement stand-level retention requirements for these areas.

As part of the Adaptive Management plan and per the Riparian Assessment recommendations, an investigation was completed in 2012 on a sample (10-20%) of development areas (six cutblocks) to assess implementation of the Riparian Budget requirements at the stand level. The review included the Site Plan and related assessment reports, Harvest Plan and the Riparian Budget Tracker and evaluated how the flexibility of implementing the riparian buffers was applied (i.e., effectiveness of choices made by planners) and whether calculations are being completed correctly. The results of the investigation assigned action plans where further work was determined to be needed (e.g., revisions to the tracker were completed to provide more detailed instructions, additional training was completed with SP foresters, etc.) and these action items have all been completed (refer to the Corporate Tracker).

### ***Adaptive Management Strategies***

During implementation of the Riparian Tracker in 2012, some challenges arose in relation to the previously established 2 tree length maximum distance permitted to be counted as contributing towards meeting FSC riparian budgets. Previously, Taan determined that both the watershed level assessment and stand-level tracking should limit the attributed area to within 2 tree lengths of the stream. Challenges became apparent for lower productivity sites that under the LUO, a 2 tree length LUO reserve could be as low as 30m. In some specific examples reviewed by Taan, actual riparian reserves established were greater than required under the LUO, but under the existing internal rules, were not permitted to be counted towards meeting the budget. In these cases, due to the lower tree heights, the LUO requirements alone, were sometime much lower than the FSC Budget requirements. Taan completed some research into riparian forests attributes and functions and therefore amended the procedures in early 2013 to permit riparian reserves within 120m of a stream (any size stream) to count as credit towards meeting riparian budgets (details of the review and supporting rationale are available on file). This new maximum distance applies to the stand-level tracker and will be incorporated into the Watershed Level Assessment update (when it occurs) for consistency.



Taan explored the potential to generate the cutblock level riparian budget assessment through the use of GIS rather than the manually completed Excel Worksheet, but determined that this was not feasible and did not create any efficiency over manual completion of the tracker at the block level.

The next update to the Watershed Level Analysis and the Riparian Assessment Report will also include a review of the parameters used and the potential to refine criteria to allow for improved analysis that may negate the need for a cutblock level assessment.

### **Database & Reporting Parameters**

Data will be maintained within completed cutblock Riparian Budget Trackers and maintained in planning files. The Site Plan also contains a section related to documentation of due diligence for meeting FSC requirements, including the FSC Riparian Budgets. Taan will also explore data management/ database options for tracking the information collected at a larger scale (an action item has been added to the Taan Corporate Tracker).

These results will be compared with the overall change to the status of the watershed level benchmarks over time to assess effectiveness of the riparian budget management strategies.

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## Indicator: Water Quality Effectiveness

| Element  | Objective   | Indicator   | Target   |
|--|---|---|--|
| FSC 5.1.4 & 8.2.6: Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate environmental & social cost; maintain water quality | Level of fine sediment generated from forest harvesting, road construction/ maintenance/ deactivation and landslides within cutblocks and road prisms | ≥90% of areas measured have very low-low potential for amount of fine sediment entering a stream |

### Rationale for Indicator & Target

The indicator is developed to assess water quality effectiveness in relation to impacts from harvesting and road activities on the Management Unit and is based on the indicator and data reported by the Forest and Range Evaluation Program (FREP) from their water quality effectiveness monitoring. The target is based on current benchmarks for Haida Gwaii, considering current management practices under the *Forest and Range Practices Act* and Taan's Corporate Management System (it is anticipated that under the new Riparian Budget management strategies under the FSC Management Plan, that improvements may occur over the next few years, particularly on the non-fish stream class). This indicator will be reported annually, but assessed against the target on a five-year reporting period to better assess trends (larger sample size).

The FREP program uses the following criteria to assess water quality effectiveness:

- the connectivity, or ability to transport generated fine sediments, from the identified surface to a natural drainage, whether a stream, river, or lake;
- the area of exposed soil and active road (or other disturbed) surface drained by overland flow towards a water body. This included road surfaces, ditches, cut banks, slope failures, and any other forestry-related disturbance features; and
- the relative degree to which the identified surfaces may erode and generate sediment.

### Current Status/ Results

| Year      | Description  | Potential for Amt. of Fine Sediment Entering Stream (%) |     |          |      |           | # of Sites Assessed | # of Blocks | Target Met (Y/N) |
|-----------|--|---|-----|----------|------|-----------|---------------------|-------------|------------------|
|           |  | Very Low  | Low | Moderate | High | Very High |                     |             |                  |
| 2013-2017 | To be reported in 2018. FREP did not complete Water Quality Assessments in 2017. |   |     |          |      |           |                     |             |                  |
| 2016      | Taan   | 22  | 54  | 24       | -    | -         | 37                  | 5           | -                |
|           | W. Coast Region  | N/A   | N/A | N/A      | N/A  | N/A       | N/A                 | N/A         | -                |
| 2015      | Taan   | 52  | 43  | 5        | -    | -         | 21                  | 3           | -                |
|           | W. Coast Region  | N/A   | N/A | N/A      | N/A  | N/A       | N/A                 | N/A         | -                |
| 2014      | Taan   | 56  | 33  | 11       | -    | -         | 18                  | 4           | -                |
|           | W. Coast Region  | 33  | 45  | 20       | -    | -         | 213                 | -           | -                |
| 2013      | Taan   | 78  | 22  | -        | -    | -         | 9                   | 2           | -                |
|           | Haida Gwaii  | 44  | 40  | 11       | 4    | 2         | 57                  | 10          | -                |
|           | Coast Region   | 35  | 44  | 52       | 1    | -         | 271                 | -           | -                |
| 2008-2012 | Taan   | N/A   | N/A | N/A      | N/A  | N/A       | N/A                 | N/A         | Y                |
|           | Haida Gwaii  | 58  | 38  | 4        | -    | -         | 116                 | unknown     | -                |
| 2012      | MU   | 85  | 15  | -        | -    | -         | 13                  | 4           | Y                |
|           | Coast Region   | 34  | 45  | 20       | 1    | -         | 281                 | -           | -                |
| 2011      | MU   | 60  | 40  | -        | -    | -         | 5                   | 3           | Y                |
|           | Coast Region   | 34  | 45  | 20       | 1    | -         | 314                 | -           | -                |
| 2008-2010 | MU   | 58  | 34  | 8        | -    | -         | 62                  | 6           | Y                |
|           | Coast  | 38  | 37  | 22       | 2    | 1         | 1,282               | -           | -                |
|           | BC   | 34  | 36  | 25       | 4    | 1         | -                   | -           | -                |



Per the FREP sampling protocols, several sites may be assessed within one cutblock. Note that for Taan Forest, FREP results prior to 2012 represent data collected when the tenure was owned and managed by Western Forest Products Inc. and thus are not reported under Taan results.

**There were no FREP assessments of water quality completed for the Management Unit in 2017.**

In 2016, there were five blocks sampled (one was a salvage block). The results show 76% of the samples demonstrated very low to low potential for fine sediment to enter a stream. The sites identified as having a moderate potential for fine sediment to enter the stream had issues with long ditch lines and water running along the road surface. Suggested management strategies at these crossings include removing grader berms, adding cross ditches and armoring a culvert. The grader berm (MCL004) and culvert armoring (PHT002) issues were communicated to Taan. Taan entered the action into their Operations Tracker for follow up and it was confirmed that both action items have been completed. Coastal data was still not available at the time of the report due to database issues.

In 2015, there were three blocks sampled in the Management Unit. The results show 95% of the samples demonstrated very low to low potential for fine sediment to enter a stream. Haida Gwaii and Coastal data were not available at the time of the report, due to glitches in the database.

In 2014, there were four blocks sampled in the Management Unit. The results show for the year, 89% of the samples demonstrated very-low to low potential for fine sediment to enter a stream.

In 2013, the Management Unit samples included on pre-LUO Block (FLO1003) and one Taan LUO block (LAW005). This is a low sample size and is difficult to assess trends with a low sample size. Consider moving to a five-year reporting period for FREP indicators.

Ratings of very low to low represent effective management strategies for minimizing sediment inputs to streams. In comparison with the water quality results from the coast region and for the province, the Management Unit is demonstrating better results in effectiveness of water quality management and is showing improvements, likely in part due to implementation of the Land Use Order and larger riparian buffers on streams as the rest of the coast has not demonstrated much change.

The thresholds used by FREP to assign water quality impact ratings were as follows (copied from FREP Extension Note #22):

| VOLUME OF FINES*<br>GENERATED (M3) | SITE CLASS | SITE DESCRIPTION  | TYPICAL SITE  | EFFECTIVENESS OF MANAGEMENT |
|------------------------------------|------------|---|---|-----------------------------|
| < 0.2                              | Very Low   | Site does not generate significant amounts of sediment. Reflects best management practices.   | Most deactivated roads; recent, well-engineered crossings                           |                             |
| 0.2–0.99                           | Low        | Site generating some sediment but would still be within the range considered normal for background levels.  | Light to moderate used, well-managed, industrial roads                              |                             |
| 1–4.99                             | Moderate   | Site generating measureable levels of fine sediment and, under special situations, of interest to watershed managers.   | Moderate to heavy used industrial roads under a range of conditions                 |                             |
| 5–19.99                            | High       | Site generating unacceptable levels of fine sediment having a significant impact on water quality in a watershed. Remedial action required to reduce water quality impacts. | Heavily used main lines built more than 20 years ago in sensitive location          |                             |
| > 20                               | Very High  | Site generating very high levels of fine sediment with major consequences for water quality within a watershed. Remedial action critical for protection of water resources. | Slope failure caused by load or harvesting. Poor location and (or) water management |                             |

\* ≤ 1 mm in diameter.

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### **Summary of Management Strategies**

FREP concluded that the conditions most associated with water impacts at sites repeatedly emphasized the importance of artificial drainage management and ensuring that disturbed sites are either quickly re-vegetated or armoured.

Taan Corporate Management System includes appropriate planning and field procedures relating to minimizing sedimentation and maintaining water quality (e.g., road locations, stream crossing design and construction, culvert placement, erosion and sediment control through grass seeding and armoured, road maintenance/ deactivation etc.). Availability of rock material for armoured can be a challenge in some areas of Haida Gwaii.

Internal pre-works, inspections and audits also monitor adherence to the procedures. Effectiveness monitoring is completed through the Forest and Range Evaluation Program (FREP).

### ***Adaptive Management Strategies***

For 2008-2010 monitoring, three areas were identified in the Management Unit with moderate sedimentation potential (these areas were harvested and managed by Western Forest Products Inc.): TFL 60 GHOST401A, HOODOO200 and DAT280. These areas were field assessed in 2014. A summary report was completed that included proposed action items (these were entered into the corporate tracker for follow up). All recommended remedial action items were confirmed completed in September 2014.

Taan has moved to a five-year reporting period for FREP indicators (due to low annual sample sizes).

### **Database & Reporting Parameters**

FREP Water Quality Effectiveness Monitoring – Information Management System database (exported reports received from MFLNRO for the Management Unit) and Extension Note #22.

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## Indicator: Research & Monitoring Projects

| Element   | Objective   | Indicator   | Target   |
|---|---|---|--|
| FSC 5.1.4 & 8.2.7:<br>Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate environmental & social cost | # of Haida Gwaii research and/ or monitoring projects participated in, or supported | Report on participation and cooperation levels |

### Rationale for Indicator & Target

The indicator was developed as part of the evaluation of impacts for forest management on social and environmental values, considering potential measures to mitigate the impacts. Participation or cooperation in advances in local research and monitoring is one venue to assess impacts. The target is a simply to report and communicate such participation and specific numerical targets have not been set at this time to account for variables affecting participation such as available projects and funding capacity.

### Current Status/ Results

| Year | # of Haida Gwaii Research & Monitoring Projects Supported   | Target Met (Y/N) |
|------|---|------------------|
| 2017 | 8<br><ul style="list-style-type: none"> <li>-Support for the funding application for Forest Enhancement Society of BC for habitat enhancement in second growth stands</li> <li>-Continued support for UBC yellow cedar die back project</li> <li>-Support for the UBC red cedar arbuscular mycorrhizal research project</li> <li>-Continued support for the MFLNRO FREP Monitoring program</li> <li>-Continued Collaborative data sharing initiative (CHN &amp; BC Government)</li> <li>-Support for the NoGo monitoring by Wildlife Dynamics Consulting</li> <li>-Work with CHN &amp; MFLNRORD part of NoGo Recovery Strategy Development for Haida Gwaii</li> <li>-Support for Simon Fraser University project related to genomic approach to yellow cedar decline in BC</li> <li>-UBC and Harvard U of Graduate Design. Thesis support - Knowledge Grounds, A Landscape-Based Art School on Haida Gwaii – Mapping&amp; lidar support, hosting presentation in May</li> </ul> | Y                |
| 2016 | 7<br><ul style="list-style-type: none"> <li>-Support for the funding application for Forest Enhancement Society of BC for habitat enhancement in second growth stands</li> <li>-Support and donation of LiDAR data for karst identification</li> <li>-Continued support for UBC yellow cedar die back project</li> <li>-Support for the UBC red cedar arbuscular mycorrhizal research project</li> <li>-Continued support for the MFLNRO FREP Monitoring program</li> <li>-Continued Collaborative data sharing initiative (CHN &amp; BC Government)</li> <li>-Support for the NoGo monitoring by Wildlife Dynamics Consulting</li> </ul>   | Y                |
| 2015 | 5<br><ul style="list-style-type: none"> <li>-Support provided to Goshawk Monitoring Project (\$10,000)</li> <li>-Support for UBC yellow cedar die back project</li> <li>-Support for UBC Western red cedar studies</li> <li>-Continued support for the MFLNRO FREP Monitoring program (but little activity in 2015)</li> <li>-Collaborative data sharing initiative (CHN &amp; BC Government).</li> </ul>   | Y                |
| 2014 | 2<br><ul style="list-style-type: none"> <li>-Support provided to Goshawk Monitoring Project (\$5,000); focussed on occupancy of known and predicted breeding areas and use of automated recording units to determine occupancy</li> <li>-Continued support for the MFLNRO FREP Monitoring program (but little activity in 2014)</li> </ul>  | Y                |
| 2013 | 2<br><ul style="list-style-type: none"> <li>-Support provided to Goshawk Monitoring Project (\$10,000)</li> <li>-Committed to support for Haida Gwaii Economic Analysis Opportunity Project (project to occur in 2014); (\$10,000)</li> </ul>   | Y                |
| 2012 | 3<br><ul style="list-style-type: none"> <li>-Support provided to Grouse Monitoring project (relates to Goshawk)</li> <li>-Work towards LIDAR pilot continues. Initial discussions also underway for cooperative Satellite Imagery project with other licensees and BCTS.</li> <li>-Initiated cooperation and support for the FREP monitoring program through staff training and participation in some monitoring</li> </ul>   | Y                |

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|                       |   |   |   |
|-----------------------|---|---|---|
| 2011<br>(and earlier) | 6 | -Preliminary discussions underway to complete a LIDAR trial to improve inventory information and forest planning. Target is summer 2012.<br>-Research and monitoring regarding the economic and employment components of the Taan Strategic Plan – specifically Bioenergy technology assessments (40-50 person days and \$5,000 in expenditures); on island Music Blank manufacturing opportunities (20 person days and \$2,000 in expenses); on island manufacturing trial of moulding material from Hemlock planning for 2012; and working with FP Innovations on Bioenergy Biomass assessments scheduled for completion March 31, 2012 (costs approximately \$3,500).<br>-MFLNRO Assisted Migration Adaptation Trial (AMAT) – province wide climate change trial, three test sites on Haida Gwaii. Note that this research project was cancelled in late 2011/ early 2012. | Y |
|-----------------------|---|---|---|

In 2017/18, Taan continued to support or work collaboratively with a number of groups and organisations to support research and monitoring projects on Haida Gwaii. Taan also worked closely with a Hydrologist to study LiDAR data of some specific watersheds in order to better assess Hydrological Recovery and improve forward planning.

In 2016, Taan hosted a field tour for students of a UBC Haida Gwaii semester course, and continues to assist Sue Grayston, PhD, with access and support for her western red cedar studies (effects of deer on below ground organisms and processes).

Taan continues to maintain a collaborative effort with the Council of the Haida Nation (CHN), BC Parks, FP Innovations and MFLNRO to provide data sharing opportunities (since 2015). In 2016 they met to discuss collaboration opportunities to reduce redundancy and overlap. Taan has made available the recently flown LiDAR data to MFLNRO at no cost.

**Summary of Management Strategies**

Taan is generally committed to providing support (including in-kind support) for research projects located within, or with applicability to, Haida Gwaii, where sufficient resources exist to provide support. Priority will be allocated to Haida Gwaii specific research projects, particularly to those that are conducted through association or participation of local groups/ organisations.

**Adaptive Management Strategies**

Not applicable at this time.

**Database & Reporting Parameters**

Updates to support for research projects are completed through communications with Taan Management.

## Indicator: Government Revenue

| Element   | Objective                                       | Indicator                                     | Target  |
|---|---|---|---|
| FSC 5.1.4, 8.2.7 & 8.2.9: Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate social cost | \$ paid to government (stumpage, taxes, etc.) | 100% of required payments are completed in a timely manner (within 30 days) |

### Rationale for Indicator & Target

The indicator is intended to provide information related to support for social objectives through revenue that is payable to government as a result of forest operations. The target is based on legal requirements to submit required payments on time, corporate objectives, as well as FSC requirements for stumpage payments to be current.

### Current Status/ Results

| Year | \$ Paid to Government | \$ Outstanding Payments | Target Met (Y/N) |
|------|-----------------------|-------------------------|------------------|
| 2017 | 1,828,266             | 0                       | Y                |
| 2016 | 1,079,442             | 0                       | Y                |
| 2015 | 633,111               | 0                       | Y                |
| 2014 | 894,171               | 0                       | Y                |
| 2013 | 838,847               | 0                       | Y                |
| 2012 | 359,431               | 0                       | Y                |
| 2011 | 545,073               | 0                       | Y                |

A detailed breakdown of the expenditures is available on file. Outstanding payments are defined as more than 30 days overdue.

### Summary of Management Strategies

There are no specific management strategies related to payments to government other than to ensure that all payments to government are made within allowable timeframes (per legal requirements, corporate objectives and FSC requirements).

### Adaptive Management Strategies

Not applicable at this time.

### Database & Reporting Parameters

The Taan accounting software contains all of the accounts receivable and accounts payable records. A report is generated annually to summarize the total payments to government for CPP, EI, Taxes, Stumpage and License Payments.

The Ministry of Forests, Lands and Natural Resource Operations, [Forest Revenue Branch](#) no longer publishes the statement of accounts for forestry revenues. Taan receives regular statements regarding any outstanding payments.

## Indicator: Local Support & Agreements

| Element   | Objective                                       | Indicator  | Target  |
|---|---|--|---|
| FSC 5.1.4 & 8.2.7:<br>Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate social cost | Donations made to Haida Gwaii organizations/ groups (\$ or in-kind); # of Agreements/ Joint Ventures with local businesses | Report on support/ donation levels; maintain completed agreements |

### Rationale for Indicator & Target

The indicator was developed as part of the evaluation of impacts for forest management on social and values, considering potential measures to mitigate the impacts. Participation or cooperation in advances in local support for promoting local employment is one venue and is one of the primary objectives of the Haida Nation, the Haida Development Corporation and Taan Forest. The target is simply to report and communicate such participation and specific numerical targets have not been set at this time to account for variables affecting participation such as available projects and funding capacity.

### Current Status/ Results

| Year | \$/ In-Kind Support for Local Groups  | # of Agreements/ Joint Ventures with Local Businesses                                  | Target Met (Y/N) |
|------|---|--|------------------|
| 2017 | Haida Gwaii Youth Soccer<br>Susan Ellis<br>Skidegate Band Council<br>Old Massett Village Council<br>Masset Haida Lions Club<br>Ministry of Forests, Lands and Natural Resource Operations<br>Public (firewood)<br><b>Approximate Total = \$9,000</b>  | Waste Wood Agreement – Old Masset Forestry Corp  | Y                |
| 2016 | Taan supported 15 training sessions for 324 workers (details below)<br>Support for Forestry Forum<br>Village of Port Clements<br>Sandspit Logger's Sports<br>Skidegate Band Council<br>University of British Columbia<br>Susan Ellis<br>Public (firewood and pole ends)<br><b>Approximate Total = \$24,400</b>  | Skidegate Band Council – Pole Plant<br>Waste Wood Agreement – Old Masset Forestry Corp | Y                |
| 2015 | Public (firewood and pole ends)<br>Queen Charlotte Secondary School**<br>Susan Ellis<br>Literacy Haida Gwaii<br>Bandstra Transportation Ltd.<br>Sandspit Loggers Sports Day<br>Helijet International Inc.<br>Haida Gwaii Recreation<br>Silvacare Inc.<br>Queen Charlotte Volunteer Fire Department<br>Local Fallers*<br><b>Approximate Total = \$20,500</b> | Skidegate Band Council – Pole Plant  | Y                |

| Year | \$/ In-Kind Support for Local Groups  | # of Agreements/ Joint Ventures with Local Businesses   | Target Met (Y/N) |
|------|---|---|------------------|
| 2014 | Haida Gwaii Museum<br>Haida Gwaii Recreation<br>Literacy Haida Gwaii<br>Tlell Fall Fair Committee<br>Sandspit Loggers Sports<br>Port Clements Spruce Trail – gravel<br>Port Clements – Canada Day Celebration<br>Sandspit Rod and Gun Club<br>Old Masset Jr. Girls Basketball<br>Mount Moresby Adventure Camp – visits/ forestry presentations<br>Chief Matthews Elementary School – visits/ forestry presentations<br>Queen Charlotte Secondary School<br>Local Resident – support for Triathlon<br><b>Approximate Total = \$13,300</b>                                      | Timber Supply Agreement-Old Masset<br>FLP & Abfam Enterprises<br>Skidegate Band Council – Pole Plant<br>Cooperative Management Agreement-<br>BCTS & Taan                  | Y                |
| 2013 | Village of Port Clements (Canada Day, Christmas Billboard)<br>Moresby Island Management Committee (Loggers Sports)<br>Skidegate Band Council (Skidegate Days)<br>Tlell Fall Fair Committee<br>Masset Services Ltd.<br>Sound Spars Ent. Ltd. (Canucks Event)<br>West Coast Resorts<br>Sandspit Rod & Gun Club<br>Forest Stewardship Program – seedling donation<br>Gwaii Haanas Celebration – seedling donation (1000)<br>Mount Moresby Adventure Camp – visit/ forestry presentation<br><b>Approximate Total = \$17, 700</b>  | Timber Supply Agreement-Old Masset<br>FLP & Abfam Enterprises<br>Skidegate Band Council – Pole Plant<br>Cooperative Management Agreement-<br>BCTS & Taan                  | Y                |
| 2012 | Edge of the World Music Festival<br>Tlell Volunteer Fire Department<br>Skidegate Band Council<br>QC Secondary School<br>Gaaw Tl'aga Tournament Committee<br>Moresby Island Management Committee<br>Village of Port Clements – Christmas Billboard<br>Pole donated to QC City for Tsunami Warning System<br>Provided areas for Honey Bees<br>Provided areas for bark stripping for local Haida resident (from areas planned for harvesting)<br>Search & Rescue Maps created and provided to local fire departments, RCMP, Ambulance, etc.<br><b>Approximate Total: \$5,000</b> | Timber Supply Agreement-Old Masset<br>FLP & Abfam Enterprises<br>Skidegate Band Council – Pole Plant<br>Cooperative Management Agreement-<br>BCTS & Taan                  | Y                |
| 2011 | Skidegate Band Council – Skidegate Days<br>Village of Port Clements<br>Skidegate Junior Saints<br>Moresby Island Management Committee<br>Edge of the World Music Festival<br>Slim Pickings – 2011 Graduation<br>Training Program for development of on-island Scaling Services<br><b>Approximate Total: 11, 700</b>   | Timber Supply Agreement-Old Masset<br>FLP & Abfam Enterprises<br>Skidegate Band Council – Pole Plant<br>(in progress)<br>Cooperative Management Agreement-<br>BCTS & Taan | Y                |



In 2016 Taan supported several local organisations and provided support for the Forestry Forum (community forum to learn about and discuss forestry on Haida Gwaii). Taan hosted a field tour for students of a UBC Haida Gwaii semester course and with the Haida Gwaii Youth Stewardship Team.

A Waste Wood agreement is in now place with the Old Masset Forestry Corp to access post-harvest areas (after residue surveys are complete) for the purposes of chipped wood briquette fiber supply.

324 Forest workers also attended training courses held or supported by Taan Forest. Training, in 2016, included:

- Wildlife Danger Tree Assessment
- Ecological Identification
- Wildfire Danger Tree assessment
- Wildfire Safety and Suppression
- Cultural Feature identification
- AFU identification
- Falling Supervision
- Karst identification
- Species at risk
- Invasive Plants
- WHMIS
- Taan CMS
- FSC Certification
- Danger Tree Blasting
- Bear Den identification

\*In 2015, Taan co-funded a dangerous tree blasting course with the Coast Sustainability Trust to provide the course to local fallers (previously too cost prohibitive for individual contractors). This training assists fallers to eliminate dangerous trees that would have otherwise been felled in a conventional manner potentially putting the faller's life at risk.

\*\*From the dry land sort waste, Taan provided free firewood, pole shavings and pole ends to public and firewood to a QC secondary fundraiser (value of approx. \$1000).

Taan has also completed a Timber Supply Agreement with the Skidegate Band Council for the pole plant and is managing the operations of the pole plant.

**Summary of Management Strategies**

Taan is committed to building a strong local economy that provides employment and benefits to the local communities. This includes providing support to local organisations/ groups, where possible.

***Adaptive Management Strategies***

Not applicable at this time.

**Database & Reporting Parameters**

Monetary contributions are tracked and reported from the accounting software.

Records relate to in-kind support are maintained on file and communicated by Taan Management, as applicable.

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## Indicator: Local Supplies & Services

| Element   | Objective                                       | Indicator                                    | Target  |
|---|---|--|---|
| FSC 5.1.4, 8.2.7 and 8.2.9: Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate social cost | Expenditures for local supplies and services | Preference is given to local supplies and services (all other qualifications being equal) |

### Rationale for Indicator & Target

The indicator is based on FSC requirements and corporate objectives to support local supplies and services. However, the target reflects the challenges associated with operating in a remote location such as Haida Gwaii and considers that some supplies and services may not be locally available and significant variations in price may exist between Haida Gwaii and other locations.

### Current Status/ Results

| Year | # of Local Vendors | Expenditures for Haida Gwaii Supplies and Services (as a % of total expenditures) | Target Met (Y/N) |
|------|--------------------|---|------------------|
| 2017 | 89                 | 54%   | Y                |
| 2016 | 80                 | 48%   | Y                |
| 2015 | 75                 | 63%   | Y                |
| 2014 | 77                 | 59%   | Y                |
| 2013 | 53                 | 57%   | Y                |
| 2012 | 59                 | 51%   | Y                |
| 2011 | 35                 | 52%   | Y                |

A significant component of the services and expenditures continues to be provided by local companies and contractors and has increased significantly (from 25 in 2010).

### Summary of Management Strategies

Taan is committed to supporting the procurement of local supplies and services wherever feasible and economical. Refer to the FSC Management Plan, Local Supplies and Services section for details.

### Adaptive Management Strategies

Not applicable at this time.

### Database & Reporting Parameters

Reports are generated annually from accounting software to demonstrate annual expenditures for local supplies and services by vendor. Local contract services for forest planning, harvesting and road construction etc. are also included.

## Indicator: Local Employment

| Element  | Objective                                       | Indicator  | Target  |
|--|---|--|---|
| FSC 4.1.1, 5.1.4 & 8.2.7:<br>Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate social cost | % of employees from Haida Gwaii; % of contractors from Haida Gwaii (based on exposure hours) | Employment opportunities are advertised locally and preference is given to local hires (provided other qualifications are met). |

### Rationale for Indicator & Target

The indicator is based on FSC requirements and corporate objectives to support and promote local employment. The target reflects variables that cannot be directly controlled by Taan such as available skilled/ qualified workforce in some aspects of forest management.

### Current Status/ Results

| Year | Description                | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Target Met (Y/N) |
|------|----------------------------|------|------|------|------|------|------|------|------------------|
| Taan | % Local Employees          | 43   | 73   | 93   | 80   | 71   | 75   | 65   | Y                |
|      | % Employees Haida Nation   | 17   | 64   | 64   | 53   | 57   | 56   | 53   |                  |
|      | % Local Contractors        | 89   | 89   | 91   | 80   | 91   | 94   | 91   |                  |
|      | % Contractors Haida Nation | 44   | 46   | 39   | 32   | 23   | 23   | 26   |                  |

In 2017, Taan finished the year with 17 employees (11 local and 9 Haida).

As of 2016, 12 of 16 employees at Taan Forest live on Haida Gwaii and 9 are Haida. There are over 30 local contracting companies that work directly for Taan Forest, creating 117 full time equivalent local jobs. In 2016, Taan hired two full time locals to work in the planning department and 1 local high school summer student that were new to the forest industry. Taan provided mentoring and training to develop their career in forestry. Taan also hires one university student in a forestry related program each summer.

In 2015, Taan hired two new employees (one local, neither Haida). One new hire was in the Planning and Forestry department and the other was in Log Sales. Current total employees are 14; 10 of which are local and 8 of which are Haida (and local). Local contractors increased significantly from 2014 back up to pre-2014 numbers at 91%. Haida employment by contractors has been steadily decreasing.

### Summary of Management Strategies

Taan is committed to supporting local employment and ensuring that employment opportunities include preference to Haida Gwaii residents, while considering knowledge, experience and skill set. Refer to the FSC Management Plan, Local Employment section for details.

In particular, Taan Forest is a company under the Haida Enterprise Corporation (HaiCo) which has three principal objectives, one of which is to provide employment, career and business opportunities for Haida people.

### Adaptive Management Strategies

Not applicable at this time.

### Database & Reporting Parameters

Taan maintains employment statistics as part of the corporate tracker for Accident Frequency Rate (C10-02). Employment (and accidents) are reported monthly and typically updated on a quarterly basis.

## Indicator: Accident Frequency Rate

| Element                                   | Objective  | Indicator                     | Target            |
|---|--|-------------------------------|-------------------|
| FSC 5.1.4 & 4.2.2 Accident frequency rate | Provide multiple benefits/mitigate environmental & social cost | Accident frequency rate (AFR) | Taan - MIR ≤ 8.00 |

### Rationale for Indicator & Target

The indicator is based on FSC requirements and Corporate objectives to demonstrate low accident frequency rates. Little information is available on what constitutes a 'low' accident rate. Ultimately, the true target for accident rates is zero. However, this is difficult to achieve so in the spirit of continual improvement, a surrogate low accident rate was used as a target. A target for the MIR was also included as another measure to demonstrate accident rates, as this is the typical method used by industry to calculate accident frequency rates. At this time, Taan has determined an MIR of 8.0 and an accident frequency rate of one third of the provincial forestry average (as communicated by the BC Forest Safety Council as a possible measure) will be used for demonstrating a low accident rate.

### Current Status/ Results

| Year | Medical Incident Rate (MIR) | Target Met (Y/N) |
|------|-----------------------------|------------------|
| 2017 | 6.2                         | Y                |
| 2016 | 6.0                         | Y                |
| 2015 | 8.0                         | Y                |
| 2014 | 11.6                        | N                |
| 2013 | 11.2                        | N                |
| 2012 | 11.7                        | N                |
| 2011 | Taan - 0.0                  | Y                |
|      | Contractor - 6.3*           | N                |

In 2017 there were seven recordable incidents (one medical treatment and six lost time). Accidents included struck by, trip/fall, chainsaw cut, concussion, and a steam burn.

In 2016, the accident rate has improved slightly with 7 recordable incidents (from 9 in 2015). Contractors reported 4 lost time and 1 restricted work. Taan reported 2 lost time incidents. Incidents included two lower back strain, quad muscle strain, shoulder strain, broken femur, face/ teeth injury (struck by), eye injury (struck by) and one knee injury.

### Summary of Management Strategies

Taan maintains a Corporate Management System (CMS) that includes management for both safety and environmental considerations (consistent with legal requirements). Under the CMS, pre-works and internal inspections are completed for each development area to confirm employees and contractors are meeting the requirements.

Taan also includes provisions within contracts for adherence to safety and environmental legal requirements and maintenance of a safety program.

Safety statistics are received on a regular basis and are reviewed during data inputs to calculate accident rates. In the event that high accident rates are occurring, they will be reviewed and discussed to develop action plans in order to ensure that preventative action is occurring promptly.

### Adaptive Management Strategies

In 2013, Taan committed to requiring all contractors to be registered for SAFE certification with the BC Forest Safety Council by January 31, 2014, and certified by October 31, 2014. We are pleased to report that we have met this milestone and all contractors are now SAFE certified.



In 2013 Taan brought in a representative from the Forest Safety Council to complete an audit of operations and provide recommendations as needed to improve existing systems. Taan also completed a thorough investigation of the concerns raised to assess root cause and develop specific action items to address the safety issues. The corrective action was extensive and included measures such as requiring contractors to be SAFE certified, detailed review of accident reports and investigations, Taan attendance at contractor safety meetings, detailed review of contractor safety programs, etc. A follow up external audit was conducted in February 2014 to assess the implementation of the corrective actions and the auditors determined that the safety issues had been addressed and the non-conformance was closed. Taan continues to implement changes and focus efforts on increasing safety awareness and performance.

Taan initiated BC Forest Safety Council training sessions in Haida Gwaii (open to the public) in 2014 and in 2015 to help support the move to SAFE certification for all contractors. Training included Basic Forest Supervision, Incident Investigations, Independent Owner/ Operator and Small Employer training. Several Taan staff also participated in applicable training sessions.

Taan also achieved SAFE certification in spring 2015.

Taan completed a detailed investigation into all of the accidents for 2013, 2014 and 2015 to review trends and assess root cause analysis. The results of the investigation were communicated through a Safety Alert bulletin.

#### **Database & Reporting Parameters**

MIR is calculated using the industry standard formula of the sum of medical treatment, restricted work cases and lost time cases x 200,000/ total exposure hours. Note that fatalities are classified as Lost Time accidents.

Taan maintains an accident frequency spreadsheet (updated quarterly) that includes employee and contractor accident statistics (File C10-02).

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## Indicator: Public Consultation

| Element   | Objective                                       | Indicator  | Target  |
|---|---|--|---|
| FSC 5.1.4 & 8.2.7:<br>Environmental and social impacts of harvesting and other operations | Provide multiple benefits/ mitigate social cost | # of complaints and/ or disputes received by the Haida Nation, Stakeholders or related to forest resources and other impacts (e.g., noise, traffic, smoke, access, etc.) | 100% of comments, complaints and disputes are resolved in a timely manner |

### Rationale for Indicator & Target

The indicator is intended to represent overall level of satisfaction of local residents regarding forest management activities. It incorporates general complains and issues as well as a general summary of the outcome of public consultation (as required under certification) and whether any formal disputes have been submitted. The target is intended to reflect corporate objectives and FSC requirements to obtain general “free and informed consent” from local residents and rights holders.

### Current Status/ Results

| Year | Public Consultation (FSC related)– Comments Received   | “Complaints” Received | “Disputes”   | Target Met (Y/N) |
|------|--|-----------------------|--|------------------|
| 2017 | <p>United Steelworkers Union (USW) – Legal proceeding commencing over the structure of contracts and contractors (e.g., stump to dump vs each phase) – The Arbitrator in the matter ruled in favour of Taan; the USW is appealing.</p> <p>Grievance filed by a group of local residents related to proposed harvesting in Skidegate Lake (SKI112) and potential for losses to livelihood related to mushroom picking. Discussions are on-going.</p> <p>Consultation of the Forest Stewardship Plan was also completed in 2017, numerous comments were received. A summary is on file.</p> <p>OMVC Hatchery concerns about road maintenance and access to brood stock areas. Facilitated meeting with MFLNRO to review maps and plans.</p> <p>Local resident – concerns over the brush on Mamin mainline, Taan completed the brushing.</p>          | 0                     | <p>1 Dispute (USW)</p> <p>1 Grievance (Mushroom Pickers)</p> | Y                |
| 2016 | <p>MFLNRO – Issue with the gate not being installed on Spur 20 for Tansy Ragwort Control. Spur20 is within the Teal tenure and although Taan is willing to install a gate (did install a temporary one) they cannot lock it (public road).</p> <p>BCTS –Disagreement regarding FSC engineering costs. Information regarding the dispute resolution process was provided.</p> <p>United Steelworkers Union (USW) – Legal proceeding commencing over the structure of contracts and contractors (e.g., stump to dump vs each phase) – The Arbitrator in the matter ruled in favour of Taan; the USW is appealing.</p> <p>Moresby Mountain Adventure Camp (MMAC) – Requested operational maps for 2016-2025 development plans (maps provided).</p> <p>Local resident – concerns over the brush on Mamin mainline, Taan completed 7km of brushing.</p> | 0                     | 1 (USW)  | Y                |

| Year | Public Consultation (FSC related)- Comments Received   | "Complaints" Received                    | "Disputes" | Target Met (Y/N) |
|------|--|--|------------|------------------|
| 2015 | Planting Contractor – Planting contract bid results (Complaint)<br>Council of the Haida Nation – concerns over sedimentation to Crab Apple creek and assistance with Lidar project for new protected areas (Complaint)<br>Village of Queen Charlotte – concerns over the HON001 logging development<br>United Steelworkers Union (USW) – legal proceeding commencing over the structure of contracts and contractors (e.g., stump to dump vs each phase) – Dispute Arbitration in progress<br>Local resident – concerns over the accessibility of yew wood for Haida youth (Taan now bringing yew to roadside for easier access)   | 2  | 1 (USW)    | Y                |
| 2014 | Local Resident – concerns with harvesting of second growth (<80 years old), support for Taan's corporate commitment to local employment, hand versus mechanised falling, use of treated wood in bridges and boom sticks (Taan confirmed we do not use treated wood in our bridges or boom sticks) and desire for local processing and in particular, a co-gen plant<br>Mineral Tenure Holder – inquired about planned harvesting near his mineral claim<br>Local Resident – inquires about planned harvesting on QC48 and Yakoun River area<br>Village of Port Clements – commendations on improved communications and requested information on two topics, requested interview with FSC auditor<br>Local Resident – concerned with harvesting in the Skidegate Lake Area (mushroom habitat) | 0  | 0          | Y                |
| 2013 | Local Resident – visuals, windthrow, road access, etc. (Observer Article)<br>Planting Contractor– planting contract administration and local employment<br>Planting Contractor – planting contract administration and local employment<br>Local Resident – visuals in Juskatla Inlet, access, etc.<br>Village of Port Clements<br>Council of the Haida Nation, Natural Resource Committee<br>Local Resident – Elk Habitat<br>Local Resident – private property owner<br>Member of the Haida Nation – bark stripping<br>Mount Moresby Adventure Camp – recreation, visuals, rare plants, bear dens, etc.  | 3 (Local Resident, Planting Contractors) | 0          | Y                |
| 2012 | Village of Port Clements<br>Council of the Haida Nation, Natural Resource Committee<br>Local Resident – Elk Habitat  | 0  | 0          | Y                |
| 2011 | Mount Moresby Adventure Camp<br>Village of Port Clements (VPC)   | 1 (VPC)                                  | 0          | Y*               |

In 2017, consultation was completed for the proposed Forest Stewardship Plan and the FSC Management Plan, HCVF Assessment, Monitoring Report and FSC Controlled Wood Risk Assessment. Many communications from those consultations are on-going. Taan has established a public advisory group consisting of Haida representatives. The group has had several meetings.



In 2016, Taan participated in the Forestry Strategy Forums sponsored by the Haida Gwaii Management Council (HGMC), and has continually contributed to the HGMC discussions regarding the development of their comprehensive Forestry Strategy for Haida Gwaii. Taan also continued to provide input to the LUOO Amendment Work Plan. Taan also hosted a field tour with CHN executive and Band Council Members to review Taan's activities relating to the HGLUOO. Taan is also initiating a public advisory group in spring 2017. Also, Taan is a member of the Timber Supply Technical working group to review timber supply analyses, under the guidance and direction of the HGMC, and to support the process for determinations of the Allowable Annual Cut for Haida Gwaii.

The Haida Enterprise Corporate (HaiCo) has also hired a Haida resident (Sonia Rice) whose role includes public communications. Sonia has reached out to, and held meetings with several local residents and organizations to give them the opportunity to provide feedback on Taan's operations. Sonia is also involved with developing the public advisory group.

Taan maintains on-going communications with several parties and responds to public communication/ comments as they are received.

The Haida Enterprise Corporation (HaiCo) also hosts various public meetings throughout the year.

The TFL 60 Management Plan consultation concluded in 2013 and no specific comments were received (one general inquiry was received from a local trapper interested in learning more about forestry on Haida Gwaii).

### **Summary of Management Strategies**

The FSC Management Plan contains the management strategies in relation to Public Consultation, including definitions of terms and a dispute resolution process. A 'Dispute' refers to a formal complaint received in writing from a person or person's rights or interests are directly affected by Taan's forest management activities, after regular consultative avenues have been explored to resolve the differences. A complaint is intended to refer to concerns expressed either in writing or verbally during FSC consultation or otherwise (e.g., road conditions, smoke, logging traffic speed, etc.)

Information received in relation to specific complaints and/ or disputes will be considered for additional indicator development in future revisions to the FSC Monitoring Plan and Annual Report, where applicable (e.g., seedling protector waste management was raised in 2011 to Rainforest Alliance through the Public Consultation process and forwarded to the Taan and has been developed into a separate indicator to monitor progress).

### ***Adaptive Management Strategies***

Not applicable at this time.

### **Database & Reporting Parameters**

Public Consultation records are maintained on file by the Taan and tracked for follow up within the Corporate Tracker. Staff may also receive and record/ file comments, concerns, complaints or disputes in relation to the FSC Certification and/ or forest management activities within corporate files. A Communication Log has also been developed to centrally record communications. In the event that staff receive any complaints or disputes, they must communicate any concerns to the CMS Administrator and provide updates on progress towards resolution, as needed.

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## Indicator: Dryland Sort Wood Waste

| Element   | Objective   | Indicator  | Target   |
|---|---|--|--|
| FSC 5.1.4 & 8.2.8:<br>Environmental and social impacts of harvesting and other operations | Mitigate environmental & social cost; manage waste and other contaminants | Volume of waste disposal (e.g., m <sup>3</sup> , Kg, etc.) | DLS waste disposal is ≤10% of the volume harvested |

### Rationale for Indicator & Target

The indicator was selected as one of the available measures of waste generated by Taan Forest in response to social and environmental 'costs' or impacts of forest operations. The target is based on the comparison of waste volume to harvested volume to create a meaningful comparison over time, as harvest levels can change from year to year.

### Current Status/ Results

| Year | Waste Type                     | Quantity (m <sup>3</sup> ) | % of Volume Harvested | Method of Disposal        | Target Met (Y/N) |
|------|--------------------------------|----------------------------|-----------------------|---------------------------|------------------|
| 2017 | Dryland Sort (DLS) Wood Debris | 2,500.9                    | 0.9                   | Landfill/ Burning/ Public |                  |
| 2016 | Dryland Sort (DLS) Wood Debris | 2,640.9                    | 0.7                   | Landfill/ Burning/ Public | Y                |
| 2015 | Dryland Sort (DLS) Wood Debris | 2,032.8                    | 0.5                   | Landfill/ Burning/ Public | Y                |
| 2014 | Dryland Sort (DLS) Wood Debris | 1,630.0                    | 0.6                   | Landfill/ Burning         | Y                |
| 2013 | Dryland Sort (DLS) Wood Debris | 3,476.2                    | 1.3                   | Landfill/ Burning         | Y                |
| 2012 | Dryland Sort (DLS) Wood Debris | 3,295.6                    | 1.7                   | Landfill                  | Y                |
| 2011 | Dryland Sort (DLS) Wood Debris | 1,368.4                    | 0.7                   | Landfill                  | Y                |

In 2017, total waste at all of the dryland sorts is 0.9% of the harvested volume (266,526 m<sup>3</sup>). Approximately 172m<sup>3</sup> was provided to the public for firewood.

In 2016, waste was generated at the Ferguson, Skidegate, McClinton, Dinan Bay & Alliford Bay DLS. 2015 harvested volume was 376,260 m<sup>3</sup>. A total of 356m<sup>3</sup> was removed from the Ferguson sort for public firewood, with a portion donated to the graduating class for a firewood cut fundraiser. Pole shavings for public use (6m<sup>3</sup>) and pole ends for stake manufacturing (24m<sup>3</sup>) were also removed from the Ferguson sort.

In 2015, waste was generated at the Ferguson, Skidegate, McClinton & Alliford Bay DLS. 2015 harvested volume was 370,234 m<sup>3</sup>. Free firewood was provided to the public (366 m<sup>3</sup>, 62 dump truck loads) and to a Queen Charlotte Secondary fundraiser (150 m<sup>3</sup>, 3 pick up loads). Free pole shavings and pole ends (77 m<sup>3</sup>) for stakes was also provided to the public.

### Summary of Management Strategies

Taan hires a local contractor to transport waste related to the dryland sorts to authorized landfill sites or burn piles. Taan also provides access to waste wood for various local residents and groups to access for fundraising activities (e.g., firewood cuts, pole shavings and pole ends for stakes).

Taan also has a contract in place with Old Massett Forestry Corp for use of waste wood in a bioenergy facility (chipped wood briquette fiber supply).

### Adaptive Management Strategies

Not applicable at this time.

### Database & Reporting Parameters

Taan maintains records related to waste removal from the Dryland Sort in the Netscale database.

## Indicator: Inorganic Waste - Seedling Protectors

| Element  | Objective   | Indicator  | Target  |
|--|---|--|---|
| FSC 5.1.4, 8.1.3, 8.2.7 & 8.2.8: Environmental and social impacts of harvesting and other operations | Mitigate environmental & social cost; manage waste and other contaminants | Complete inventory of backlog areas with cones established | Develop action plans for removal over the next 5 years. Demonstrate implementation of removal plans |

### Rationale for Indicator & Target

The indicator is intended to directly respond to concerns of local residents related to inorganic waste related to the seedling protectors, and specifically, the older cutblock areas where cones are still present on the trees but are no longer required to protect the seedlings from browse damage (i.e., the seedling height has extended beyond the top height of the cones). The target is based on a continual improvement scenario at this time rather than a definitive target, as the full inventory of current regenerating areas with cones established is still in progress.

### Current Status/ Results

| Year | Description | Historical Inventory (ha) | Maintenance (ha) | Removed |         | New Installations |         | Re-used (#) | Target Met (Y/N) |
|------|-------------|---------------------------|------------------|---------|---------|-------------------|---------|-------------|------------------|
|      |             |                           |                  | (ha)    | (#)     | (ha)              | (#)     |             |                  |
| 2017 | Taan        | 235.5                     | 0                | 161.4   | 47,063  | 200.0             | 105,025 | 25,025      | Y                |
|      | BCTS in MU  | -                         | 139.1            | -       | 52,745  | -                 | 2,135   | -           |                  |
| 2016 | Taan        | 396.9                     | 0                | 342.1   | 87,174  | -                 | 96,758  | 31,000      | Y                |
|      | BCTS in MU  | -                         | -                | 98.8    | 37,830  | 6.1               | 2280    | -           |                  |
| 2015 | Taan        | 739.0                     | 274.4            | 4.1     | 1,301   | 488.8             | 141,134 | 6,200       | Y                |
|      | BCTS in MU  | -                         | -                | 14.1    | No data | -                 | -       | -           |                  |
| 2014 | Taan        | 743.1                     | 102.7            | 140.1   | 44,506  | 287.0             | 92,160  | -           | Y                |
|      | BCTS in MU  | -                         | -                | 13.9    | 1,200   | 8.8               | 1,620   | 1,200       |                  |
| 2013 | Taan        | 743.1                     | 448.2            | 489.8   | 80,500  | 384.3             | 105,630 | 60,000      | Y                |
| 2012 | Taan        | 1,002.3*                  | 117.1            | 189.0   | 68,964  | 448.2             | 112,705 | 52,702      | Y                |
| 2011 | Taan        | -                         | 247.3            | 50.9    | 69,500  | -                 | -       | -           | N                |

\*2012 historical inventory information was generated from newly acquired data from WFP and included all hectares of installation, maintenance, etc. which over-inflated the area reported with cones installed (6,130 ha). This has been corrected with the 2013 updated data set of current inventory plus new installations and minus removal area in 2012 (1,002.3).

Note: Maintenance refers to areas that receive various maintenance activities such as repositioning cones, re-tie, re-stake and also includes all areas that have partial removal completed, with additional area still required for final removal once the rest of the trees on site are ready for the remaining cones to be removed. Including these areas as maintenance rather than removal will avoid "double counting" of removal area in relation to the historical inventory.

**Taan continues to conduct maintenance and removal of older areas and re-using a high number of cones on newly planted areas, thereby reducing the amount of inorganic waste from seedling cones on the Management Unit.**

The 2016 results show that Taan (& BCTS) have steadily decreased the historical inventory of cones on the Management Unit since 2012. There was a large Land Based Investment Strategy (LBIS) project that removed several cones from previously declared FTG blocks (Crown Liability). Several cones were also removed from Taan liability blocks (COW001, COW002, KUM002 and LAW005) that totaled 98.6ha. BCTS removed cones from 5 blocks and installed 2280 cones during their cedar planting in LOG006.



### **Summary of Management Strategies**

During FSC Consultation in 2011, concerns were raised by local residents regarding non-biodegradable plastic wastes in the forest of Haida Gwaii as a result of use of the seedling protectors in the regenerated cutblocks (concerns raised to Rainforest Alliance).

Due to the significant deer population on Haida Gwaii, seedling protectors are required in order to ensure regeneration of cedar and cypress are achieved per the legal stocking standards and objectives under the Land Use Order. Local residents have expressed concern regarding seedling cone protectors, in relation to inorganic wastes in the forest.

The FSC Management Plan includes management strategies for waste in the Management Unit.

In 2011 and 2012, much work was completed to gather information regarding inventory of past seedling cone installations in order to establish priorities for removal and where possible, re-use of the cones. A work plan was developed in 2012.

Taan may also explore potential opportunities cooperation with the Haida Gwaii Youth Stewardship Program for cone removal projects. Discussion with MFLNRO in July 2012 indicated there may be some LBIP funding available for cone removal project for older areas that have been previously reported as free growing and no longer require protection from deer browse (Taan completed an LBIP funded cone removal project in 2013/2014).

The Cowichan Lake Research Center is also working on a breeding program to select for qualities that make the cedar less desirable to deer populations. They are planning some research trials on Vancouver Island. To date, they have not had any seedlings available for purchase to conduct some trials.

### ***Adaptive Management Strategies***

Not applicable at this time.

### **Database & Reporting Parameters**

Reports are generated out of Taan's silviculture tracking database; silviculture activity reports.

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## Costs, Productivity & Efficiency

### Indicator: Forest Management Efficiencies

| Element  | Objective   | Indicator                 | Target  |
|--|---|---------------------------|---|
| FSC 5.1.4 & 8.2.9: Costs, productivity and efficiency of forest management | Efficient forest management (evaluate costs and production) | # of completed pro-formas | Pro-formas are completed and evaluated for every development area |

#### Rationale for Indicator & Target

Cost and margins are evaluated on a regular basis by Taan as a normal function of business management processes during cutblock planning and cutting permit/ road permit preparations. This indicator is one representation of how development costs are evaluated in relation to log markets to determine whether development of specific areas is economical or not. Decisions on specific margins of loss or gain for each development area are made by upper management. The target is generic in nature to demonstrate that Taan is assessing costs and margins on a regular basis to ensure efficiencies. The indicator was selected as one means to demonstrate that costs are evaluated, as it does not contain confidential information of actual costs for forest management.

#### Current Status/ Results

| Year | # Pro-Formas | Target Met (Y/N) |
|------|--------------|------------------|
| 2017 | 40           | Y                |
| 2016 | 40           | Y                |
| 2015 | 30           | Y                |
| 2014 | 32           | Y                |
| 2013 | 56           | Y                |
| 2012 | 52           | Y                |
| 2011 | 45           | Y                |
| 2010 | 0            | Y                |

Evaluation of costs versus profit margins continues to be regularly assessed during harvest planning and is used to evaluate harvest scheduling.

#### Summary of Management Strategies

Taan record and monitor costs, productivity and efficiency of forest management activities on a regular basis as part of the corporate business structures and budget process.

In addition to corporate level evaluations, Taan also implements a Pro-Forma evaluation of every cutblock during the planning development stages to determine if harvesting is economical based on projected costs and value. Then a final pro-forma evaluation is completed following completion of planning.

#### Adaptive Management Strategies

Not applicable at this time.

#### Database & Reporting Parameters

Taan Pro-Forma worksheets filed under the Tenure Files (Pro-forma folders).



## ***High Conservation Value Forests***

It is important to note that several previous indicators all contribute to monitoring of High Conservation Value Forests (implementation and effectiveness) such as Species at Risk and watershed/ riparian indicators.

The following additional indicators have been developed to specifically assess effectiveness of management strategies for protection of landscape level biodiversity and High Conservation Value Forests and address several key indicators of landscape connectivity, ecosystem representation and large landscape level forests.

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## Indicator: Landscape Level Biodiversity – Overview

| Element   | Objective   | Indicator   | Target  |
|---|---|---|---|
| FSC 6.3.10, 9.4.1, 8.2.3 & 8.2.4: High Conservation Value Forests (HCVF) and attributes | Maintain landscape level biodiversity effectiveness | Seral stage, interior forest, roads in THLB, NCLB and protected areas | Maintain at least 30% of an LU in old seral, minimize roads (ensure careful road planning to avoid unnecessary roads), and maintain a geographic distribution of forest interior. |

### Rationale for Indicator & Target

The indicator is intended to provide a coarse filter overview of landscape level biodiversity and is based on the indicator being developed by the Forest and Range Evaluation Program (FREP) for landscape level biodiversity effectiveness. The status of basic indicators such as seral stage, forest interior, and roads in the main land classes (THLB, NCLB, and Protected Areas), gives a broad indication of the vulnerability or risk level of an LU. Until FREP develops targets or baselines, the target is to maintain at least 30% of an LU in old seral, minimize roads (ensure careful road planning to avoid unnecessary roads), and maintain a geographic distribution of forest interior. This is an overview indicator and most of these measures are developed further in subsequent indicators (see representation, connectivity and intact forests below).

### Current Status/ Results

Due to the complex nature of this indicator, it is unlikely that annual changes will have much impact to the reporting results. As a result, this indicator will be re-assessed once every five-years, or sooner if Taan determines that there have been any significant changes to any variables influencing the reporting results.

The following results are intended to report on similar indicators that FREP is considering for their Landscape Level Biodiversity indicator work under development and includes only the Landscape Units that are located within the Management Unit.

While these indicators are intended to be reported on a five-year interval, occasionally there are minor changes that are made annually, and where changes are made they are identified in **purple font**.

The results were initially reported in 2012 and then were updated in 2016.

The updated analysis was completed using the new Vegetation Resource Inventory (VRI) and forest inventory. The Timber Harvesting Land-base (THLB) layer was also updated. The new analysis also reports information for the entire Landscape Unit, while the 2012 analysis only included those areas of the LU that were within the Management Unit. Looking at the entire Landscape unit provides a more complete picture of landscape level biodiversity. Some work was also done to clean up the road data prior to the new analysis. As a result of all of the changes to the analysis, direct comparisons between the 2012 and the 2016 analysis results is not feasible.

The 2016 results show <30% old forest (indicator of vulnerable landscape units for biodiversity health) in the following landscape units:

- Lower Yakoun (17.4% old forest and 58.7% old + mature combined)
- Naikoon (11.6% old forest and 93.6% old + mature combined)
- Skidegate (19.2% old forest and 33.9% old + mature combined)
- Tlell (24.5% old forest and 62.1% old + mature combined)

Additional monitoring has been established for the Skidegate LU, which is vulnerable due to low old and mature forest composition (see adaptive management strategies below, and also Stand Level Biodiversity Indicator).

**Landscape Level Biodiversity Overview (2016):**

| Landscape Unit | Total LU landbase (ha) | Category        | Total Area ha | Total Area % | Non-Productive (ha) | Old ha   | Old % | Mature ha | Mature % | Old + Mature ha | Old + Mature % | Mid ha   | Mid % | Early ha | Early % | Kms Built Road | % Old Forest | >30% Old Forest (Y/N) | Old Forest (ha) |
|----------------|------------------------|-----------------|---------------|--------------|---------------------|----------|-------|-----------|----------|-----------------|----------------|----------|-------|----------|---------|----------------|--------------|-----------------------|-----------------|
| Honna          | 29529.73               | Protected Area  | 6.36          | 0%           | 0.00                | 3.8      | 0.0%  | 2.58      | 0.0%     | 6.4             | 0.0%           | 0.00     | 0.0%  | 0.00     | 0.0%    | 556.30         | 47.5%        | Y                     | 13901.02        |
|                |                        | LUO Constrained | 8920.86       | 30%          | 77.93               | 6161.0   | 21.1% | 743.61    | 2.5%     | 6904.6          | 23.6%          | 1104.99  | 3.8%  | 833.37   | 2.8%    |                |              |                       |                 |
|                |                        | NCLB            | 7668.71       | 26%          | 137.35              | 2227.9   | 7.6%  | 2437.02   | 8.3%     | 4664.9          | 16.0%          | 1564.48  | 5.3%  | 1301.95  | 4.5%    |                |              |                       |                 |
|                |                        | Partial         | 3916.71       | 13%          | 13.89               | 1794.5   | 6.1%  | 431.43    | 1.5%     | 2225.9          | 7.6%           | 843.81   | 2.9%  | 833.11   | 2.8%    |                |              |                       |                 |
|                |                        | CONT THLB       | 9017.08       | 31%          | 54.76               | 3713.9   | 12.7% | 1432.77   | 4.9%     | 5146.7          | 17.6%          | 1471.81  | 5.0%  | 2343.85  | 8.0%    |                |              |                       |                 |
| Total LU       | 29529.73               | 100%            | 283.93        | 13901.02     | 47.5%               | 5047.42  | 17.3% | 18948.4   | 64.8%    | 4985.09         | 17.0%          | 5312.28  | 18.2% |          |         |                |              |                       |                 |
| Ian            | 29950.13               | Protected Area  | 2.31          | 1%           | 0.00                | 0.0      | 0.0%  | 2.28      | 0.0%     | 2.3             | 0.0%           | 0.00     | 0.0%  | 0.00     | 0.0%    | 785.80         | 55.9%        | Y                     | 16635.37        |
|                |                        | LUO Constrained | 11393.16      | 38%          | 29.72               | 7886.7   | 26.5% | 2295.96   | 7.7%     | 10182.7         | 34.2%          | 90.02    | 0.3%  | 1090.71  | 3.7%    |                |              |                       |                 |
|                |                        | NCLB            | 4733.71       | 16%          | 44.21               | 1941.8   | 6.5%  | 2052.95   | 6.9%     | 3994.8          | 13.4%          | 41.79    | 0.1%  | 652.92   | 2.2%    |                |              |                       |                 |
|                |                        | Partial         | 3422.01       | 11%          | 16.96               | 1772.4   | 6.0%  | 700.20    | 2.4%     | 2472.6          | 8.3%           | 29.98    | 0.1%  | 902.44   | 3.0%    |                |              |                       |                 |
|                |                        | CONT THLB       | 10398.94      | 35%          | 77.00               | 5034.3   | 16.9% | 1608.26   | 5.4%     | 6642.6          | 22.3%          | 100.85   | 0.3%  | 3578.52  | 12.0%   |                |              |                       |                 |
| Total LU       | 29950.13               | 101%            | 167.89        | 16635.37     | 55.9%               | 6659.65  | 22.4% | 23295.0   | 78.2%    | 262.64          | 0.9%           | 6224.59  | 20.9% |          |         |                |              |                       |                 |
| Louise Island  | 27497.83               | Protected Area  | 1930.41       | 7%           | 35.95               | 392.3    | 1.4%  | 762.23    | 2.8%     | 1154.5          | 4.2%           | 449.70   | 1.6%  | 290.25   | 1.1%    | 522.80         | 30.3%        | Y                     | 8295.28         |
|                |                        | LUO Constrained | 8743.86       | 32%          | 24.25               | 4597.0   | 16.8% | 1865.10   | 6.8%     | 6462.1          | 23.6%          | 1408.14  | 5.1%  | 849.33   | 3.1%    |                |              |                       |                 |
|                |                        | NCLB            | 5660.15       | 21%          | 21.01               | 980.2    | 3.6%  | 3194.75   | 11.7%    | 4174.9          | 15.2%          | 760.68   | 2.8%  | 703.55   | 2.6%    |                |              |                       |                 |
|                |                        | Partial         | 2880.52       | 10%          | 3.37                | 853.6    | 3.1%  | 940.94    | 3.4%     | 1794.6          | 6.6%           | 377.61   | 1.4%  | 704.98   | 2.6%    |                |              |                       |                 |
|                |                        | CONT THLB       | 8282.88       | 30%          | 21.18               | 1472.2   | 5.4%  | 2258.06   | 8.2%     | 3730.2          | 13.6%          | 901.19   | 3.3%  | 3630.29  | 13.3%   |                |              |                       |                 |
| Total LU       | 27497.83               | 100%            | 105.76        | 8295.28      | 30.3%               | 9021.08  | 32.9% | 17316.4   | 63.2%    | 3897.32         | 14.2%          | 6178.39  | 22.6% |          |         |                |              |                       |                 |
| Lower Yakoun   | 30176.73               | Protected Area  | 2406.68       | 8%           | 20.55               | 761.8    | 2.6%  | 822.52    | 2.8%     | 1584.3          | 5.3%           | 191.59   | 0.6%  | 610.27   | 2.1%    | 835.70         | 17.4%        | N                     | 5153.50         |
|                |                        | LUO Constrained | 10965.53      | 36%          | 106.32              | 3354.1   | 11.3% | 4415.80   | 14.9%    | 7769.9          | 26.2%          | 1555.44  | 5.2%  | 1533.84  | 5.2%    |                |              |                       |                 |
|                |                        | NCLB            | 3970.89       | 13%          | 222.57              | 299.0    | 1.0%  | 2130.95   | 7.2%     | 2429.9          | 8.2%           | 402.80   | 1.4%  | 915.59   | 3.1%    |                |              |                       |                 |
|                |                        | Partial         | 2133.91       | 7%           | 14.43               | 225.5    | 0.8%  | 598.23    | 2.0%     | 823.8           | 2.8%           | 529.28   | 1.8%  | 766.43   | 2.6%    |                |              |                       |                 |
|                |                        | CONT THLB       | 10699.72      | 35%          | 122.65              | 513.1    | 1.7%  | 4311.94   | 14.5%    | 4825.0          | 16.3%          | 1479.18  | 5.0%  | 4272.85  | 14.4%   |                |              |                       |                 |
| Total LU       | 30176.73               | 100%            | 486.52        | 5153.50      | 17.4%               | 12279.44 | 41.4% | 17432.9   | 58.7%    | 4158.29         | 14.0%          | 8098.98  | 27.3% |          |         |                |              |                       |                 |
| Masset Inlet   | 53261.57               | Protected Area  | 6.89          | 0%           | 0.00                | 2.3      | 0.0%  | 4.60      | 0.0%     | 6.9             | 0.0%           | 0.00     | 0.0%  | 0.00     | 0.0%    | 1845.10        | 37.6%        | Y                     | 19772.69        |
|                |                        | LUO Constrained | 15507.00      | 29%          | 148.45              | 8901.7   | 16.9% | 1991.98   | 3.8%     | 10893.7         | 20.7%          | 2010.92  | 3.8%  | 2453.97  | 4.7%    |                |              |                       |                 |
|                |                        | NCLB            | 10079.96      | 19%          | 226.66              | 3048.7   | 5.8%  | 3350.32   | 6.4%     | 6399.0          | 12.2%          | 907.83   | 1.7%  | 2546.50  | 4.8%    |                |              |                       |                 |
|                |                        | Partial         | 6080.51       | 11%          | 50.91               | 2135.3   | 4.1%  | 694.87    | 1.3%     | 2830.1          | 5.4%           | 1034.13  | 2.0%  | 2165.34  | 4.1%    |                |              |                       |                 |
|                |                        | CONT THLB       | 21587.20      | 41%          | 192.71              | 5684.8   | 10.8% | 2964.72   | 5.6%     | 8649.5          | 16.4%          | 2739.46  | 5.2%  | 10005.51 | 19.0%   |                |              |                       |                 |
| Total LU       | 53261.57               | 100%            | 618.74        | 19772.69     | 37.6%               | 9006.49  | 17.1% | 28779.2   | 54.7%    | 6692.34         | 12.7%          | 17171.32 | 32.6% |          |         |                |              |                       |                 |
| Naikoon        | 109282.13              | Protected Area  | 67377.49      | 62%          | 5451.78             | 8385.1   | 8.2%  | 52150.38  | 51.0%    | 60535.5         | 59.2%          | 1179.93  | 1.2%  | 210.31   | 0.2%    | 473.50         | 11.6%        | N                     | 11878.03        |
|                |                        | LUO Constrained | 8977.25       | 8%           | 250.37              | 993.7    | 1.0%  | 6892.66   | 6.7%     | 7886.4          | 7.7%           | 451.04   | 0.4%  | 389.45   | 0.4%    |                |              |                       |                 |
|                |                        | NCLB            | 16730.47      | 15%          | 1355.06             | 782.4    | 0.8%  | 12384.63  | 12.1%    | 13167.0         | 12.9%          | 1154.29  | 1.1%  | 1054.11  | 1.0%    |                |              |                       |                 |
|                |                        | Partial         | 4533.46       | 4%           | 18.72               | 422.1    | 0.4%  | 3854.93   | 3.8%     | 4277.0          | 4.2%           | 60.91    | 0.1%  | 176.81   | 0.2%    |                |              |                       |                 |
|                |                        | CONT THLB       | 11663.45      | 11%          | 105.35              | 1294.7   | 1.3%  | 8534.65   | 8.4%     | 9829.4          | 9.6%           | 253.85   | 0.2%  | 1474.87  | 1.4%    |                |              |                       |                 |
| Total LU       | 109282.13              | 100%            | 7075.93       | 11878.03     | 11.6%               | 83817.25 | 82.0% | 95695.3   | 93.6%    | 3100.02         | 3.0%           | 3305.55  | 3.2%  |          |         |                |              |                       |                 |
| Sewell         | 46646.70               | Protected Area  | 9503.33       | 20%          | 127.69              | 3977.4   | 8.6%  | 5140.09   | 11.1%    | 9117.5          | 19.7%          | 234.96   | 0.5%  | 23.14    | 0.0%    | 441.30         | 36.2%        | Y                     | 16769.72        |
|                |                        | LUO Constrained | 8091.12       | 17%          | 39.23               | 3629.5   | 7.8%  | 1430.76   | 3.1%     | 5060.3          | 10.9%          | 2451.00  | 5.3%  | 540.59   | 1.2%    |                |              |                       |                 |
|                |                        | NCLB            | 16429.26      | 35%          | 119.96              | 6486.8   | 14.0% | 7159.16   | 15.4%    | 13645.9         | 29.4%          | 1714.81  | 3.7%  | 948.55   | 2.0%    |                |              |                       |                 |
|                |                        | Partial         | 3985.02       | 9%           | 1.70                | 1022.6   | 2.2%  | 451.46    | 1.0%     | 1474.0          | 3.2%           | 1839.11  | 4.0%  | 670.19   | 1.4%    |                |              |                       |                 |
|                |                        | CONT THLB       | 8637.98       | 19%          | 5.92                | 1653.4   | 3.6%  | 860.70    | 1.9%     | 2514.1          | 5.4%           | 4075.51  | 8.8%  | 2042.44  | 4.4%    |                |              |                       |                 |
| Total LU       | 46646.70               | 100%            | 294.50        | 16769.72     | 36.2%               | 15042.17 | 32.5% | 31811.9   | 68.6%    | 10315.39        | 22.3%          | 4224.92  | 9.1%  |          |         |                |              |                       |                 |
| Skidegate Lake | 52792.34               | Protected Area  | 4185.69       | 8%           | 95.64               | 1753.6   | 3.4%  | 1320.08   | 2.5%     | 3073.6          | 5.9%           | 745.85   | 1.4%  | 270.56   | 0.5%    | 1859.70        | 19.2%        | N                     | 9992.04         |
|                |                        | LUO Constrained | 12067.97      | 23%          | 204.23              | 3468.3   | 6.7%  | 1529.25   | 2.9%     | 4997.5          | 9.6%           | 4881.45  | 9.4%  | 1984.76  | 3.8%    |                |              |                       |                 |
|                |                        | NCLB            | 8022.40       | 15%          | 287.72              | 1555.2   | 3.0%  | 2275.50   | 4.4%     | 3830.7          | 7.4%           | 2319.79  | 4.5%  | 1584.17  | 3.0%    |                |              |                       |                 |
|                |                        | Partial         | 7490.45       | 14%          | 55.66               | 1052.8   | 2.0%  | 457.28    | 0.9%     | 1510.0          | 2.9%           | 3629.13  | 7.0%  | 2295.61  | 4.4%    |                |              |                       |                 |
|                |                        | CONT THLB       | 21025.83      | 40%          | 207.38              | 2162.2   | 4.2%  | 2016.95   | 3.9%     | 4179.2          | 8.0%           | 8103.02  | 15.6% | 8536.26  | 16.4%   |                |              |                       |                 |
| Total LU       | 52792.34               | 100%            | 850.63        | 9992.04      | 19.2%               | 7599.06  | 14.6% | 17591.1   | 33.9%    | 19679.25        | 37.9%          | 14671.37 | 28.2% |          |         |                |              |                       |                 |
| Tiell          | 41284.73               | Protected Area  | 17321.12      | 42%          | 224.51              | 5721.7   | 14.0% | 11278.33  | 27.7%    | 17000.1         | 41.7%          | 53.89    | 0.1%  | 42.66    | 0.1%    | 414.70         | 24.5%        | N                     | 9974.03         |
|                |                        | LUO Constrained | 4632.33       | 11%          | 80.43               | 1712.8   | 4.2%  | 2088.65   | 5.1%     | 3801.5          | 9.3%           | 97.01    | 0.2%  | 653.40   | 1.6%    |                |              |                       |                 |
|                |                        | NCLB            | 6454.65       | 16%          | 206.62              | 542.5    | 1.3%  | 3702.81   | 9.1%     | 4245.3          | 10.4%          | 481.70   | 1.2%  | 1521.07  | 3.7%    |                |              |                       |                 |
|                |                        | Partial         | 1523.41       | 4%           | 3.46                | 243.3    | 0.6%  | 955.90    | 2.3%     | 1199.2          | 2.9%           | 6.04     | 0.0%  | 314.68   | 0.8%    |                |              |                       |                 |
|                |                        | CONT THLB       | 11353.22      | 27%          | 37.70               | 1753.7   | 4.3%  | 7286.24   | 17.9%    | 9039.9          | 22.2%          | 151.33   | 0.4%  | 2124.29  | 5.2%    |                |              |                       |                 |
| Total LU       | 41284.73               | 100%            | 552.72        | 9974.03      | 24.5%               | 25311.92 | 62.1% | 35286.0   | 86.6%    | 789.96          | 1.9%           | 4656.09  | 11.4% |          |         |                |              |                       |                 |
| Yakoun Lake    | 25948.11               | Protected Area  | 7096.65       | 27%          | 27.17               | 4781.2   | 18.6% | 2222.45   | 8.6%     | 7003.6          | 27.2%          | 23.22    | 0.1%  | 42.60    | 0.2%    | 563.50         | 38.5%        | Y                     | 9897.25         |
|                |                        | LUO Constrained | 6098.07       | 24%          | 62.52               | 2499.4   | 9.7%  | 1290.21   | 5.0%     | 3789.6          | 14.7%          | 1162.49  | 4.5%  | 1083.48  | 4.2%    |                |              |                       |                 |
|                |                        | NCLB            | 6440.57       | 25%          | 98.68               | 1239.9   | 4.8%  | 1574.65   | 6.1%     | 2814.6          | 10.9%          | 1363.61  | 5.3%  | 2163.69  | 8.4%    |                |              |                       |                 |
|                |                        | Partial         | 1499.24       | 6%           | 7.30                | 387.5    | 1.5%  | 259.74    | 1.0%     | 647.3           | 2.5%           | 291.15   | 1.1%  | 553.53   | 2.2%    |                |              |                       |                 |
|                |                        | CONT THLB       | 4813.59       | 19%          | 20.17               | 989.2    | 3.8%  | 741.87    | 2.9%     | 1731.1          | 6.7%           | 659.40   | 2.6%  | 2402.92  | 9.3%    |                |              |                       |                 |
| Total LU       | 25948.11               | 100%            | 215.85        | 9897.25      | 38.5%               | 6088.92  | 23.7% | 15986.2   | 62.1%    | 3499.88         | 13.6%          | 6246.22  | 24.3% |          |         |                |              |                       |                 |

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*Forest Interior 2016:*

| Landscape Unit | Total LU Landbase (Ha) | Total Forested (Ha) | Interior Forest (Ha) | % of Interior Forest per Total Forested |
|----------------|------------------------|---------------------|----------------------|---|
| Honna          | 29,375                 | 29,246              | 21,800               | 75%                                     |
| Ian            | 29,950                 | 29,782              | 20,525               | 69%                                     |
| Louise Island  | 27,498                 | 27,392              | 19,447               | 71%                                     |
| Lower Yakoun   | 30,177                 | 29,690              | 17,540               | 59%                                     |
| Masset Inlet   | 53,262                 | 52,643              | 29,299               | 56%                                     |
| Naikoon        | 109,282                | 102,101             | 95,661               | 94%                                     |
| Sewell         | 46,647                 | 46,352              | 39,150               | 84%                                     |
| Skidegate Lake | 52,792                 | 51,942              | 29,823               | 57%                                     |
| Tlell          | 41,285                 | 40,732              | 33,909               | 83%                                     |
| Yakoun Lake    | 25,948                 | 25,732              | 17,398               | 68%                                     |

Notes: LLBD Overview

Protected Areas include parks and conservancies. LUO constrained includes forest reserves, cedar stewardship areas, Type I and II stream reserves, Northern Goshawk reserves, Northern Saw-whet Owl reserves and MAMU habitat.

Only those landscape units that are located within the MU are included.

The numbers above reflect the entire landscape unit (not limited to Taan tenure area that overlaps with the landscape unit). Data for just Tan tenures has been generated as well and is available on file.

Landscape units that do not overlap with Taan tenures (i.e., outside of the Management Unit) have not been included.

Forest interior was calculated using a

50m buffer. Analysis will be completed in winter 2017/18 to also calculate forest interior with a 200m buffer to allow for improved analysis in the future.

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**Landscape Level Biodiversity Overview (2012):**

| Landscape Unit | Category        | Total Area ha | Total Area % | Non-Productive (ha) | Old ha   | Old % | Mature ha | Mature % | Mid ha  | Mid % | Early ha | Early % | Stand Level Retention (%) | Stand Level Retention (ha) | Interior Old & Mature (%) | Interior Old & Mature (ha) | Kms Road (by LU within the DFMA) | >30% Old Forest (Y/N) | Old Forest (ha) |
|----------------|-----------------|---------------|--------------|---------------------|----------|-------|-----------|----------|---------|-------|----------|---------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------------|-----------------------|-----------------|
| Naikoon        | Protected Area  | 69229.36      | 62.0         | 18211.8             | 29765.89 | 26.7  | 20200.21  | 18.1     | 830.78  | 0.7   | 220.69   | 0.2     | 25.7                      | 464.37                     | 19.2                      | 21403.76                   | 190.83                           | Y                     | 45662.38        |
|                | LUO Constrained | 23319.87      | 20.9         | 6435.2              | 11268.12 | 10.1  | 4930.18   | 4.4      | 375.43  | 0.3   | 310.90   | 0.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 2017.78       | 1.8          | 30.9                | 1529.37  | 1.4   | 381.79    | 0.3      | 13.89   | 0.0   | 61.84    | 0.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 5478.11       | 4.9          | 54.3                | 4608.06  | 4.1   | 671.88    | 0.6      | 44.05   | 0.0   | 99.78    | 0.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 9071.69       | 8.1          | 44.6                | 3807.08  | 3.4   | 3913.33   | 3.5      | 187.17  | 0.2   | 1119.53  | 1.0     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 111579.59     | 100.0        | 32580.3             | 45662.38 | 40.9  | 28502.46  | 25.5     | 1978.49 | 1.8   | 2856.00  | 2.6     |                           |                            |                           |                            |                                  |                       |                 |
| Otun           | Protected Area  | 6845.03       | 9.5          | 302.0               | 5985.72  | 8.3   | 543.77    | 0.8      | 10.59   | 0.0   | 2.95     | 0.0     | 21.6                      | 203.43                     | 29.8                      | 21532.92                   | 56.78                            | Y                     | 48997.52        |
|                | LUO Constrained | 19613.91      | 27.1         | 4492.1              | 14236.52 | 19.7  | 619.18    | 0.9      | 78.76   | 0.1   | 187.40   | 0.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 4267.78       | 5.9          | 72.9                | 3974.26  | 5.5   | 151.83    | 0.2      | 26.80   | 0.0   | 42.03    | 0.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 17403.65      | 24.1         | 145.9               | 16580.11 | 22.9  | 488.13    | 0.7      | 6.51    | 0.0   | 182.95   | 0.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 9499.03       | 13.1         | 48.0                | 7280.86  | 10.1  | 1491.14   | 2.1      | 196.70  | 0.3   | 482.33   | 0.7     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 72323.97      | 100.0        | 18185.9             | 48997.52 | 67.7  | 3820.67   | 5.3      | 334.30  | 0.5   | 985.63   | 1.4     |                           |                            |                           |                            |                                  |                       |                 |
| Eden Lake      | Protected Area  | 144.75        | 0.3          | 35.1                | 96.48    | 0.2   | 0.00      | 0.0      | 0.00    | 0.0   | 13.14    | 0.0     | 18.6                      | 1757.58                    | 3.6                       | 1788.95                    | 454.40                           | Y                     | 28318.89        |
|                | LUO Constrained | 16191.76      | 32.2         | 926.1               | 12624.60 | 25.1  | 115.31    | 0.2      | 101.24  | 0.2   | 2424.53  | 4.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 2945.70       | 5.8          | 15.1                | 1913.39  | 3.8   | 28.67     | 0.1      | 17.57   | 0.0   | 971.01   | 1.9     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 5389.24       | 10.7         | 33.5                | 3799.98  | 7.5   | 11.18     | 0.0      | 57.18   | 0.1   | 1487.41  | 3.0     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 15310.71      | 30.4         | 57.8                | 7816.39  | 15.5  | 156.55    | 0.3      | 191.64  | 0.4   | 7088.30  | 14.1    |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 50362.51      | 100.0        | 6631.8              | 28318.89 | 56.2  | 456.74    | 0.9      | 396.44  | 0.8   | 14558.67 | 28.9    |                           |                            |                           |                            |                                  |                       |                 |
| Ian            | Protected Area  | 2.31          | 0.0          | 2.3                 | 0.01     | 0.0   | 0.00      | 0.0      | 0.00    | 0.0   | 0.00     | 0.0     | 23.1                      | 999.38                     | 40.6                      | 13136.78                   | 383.12                           | Y                     | 17819.95        |
|                | LUO Constrained | 11004.30      | 34.0         | 1532.5              | 8105.30  | 25.1  | 129.48    | 0.4      | 38.47   | 0.1   | 1198.58  | 3.7     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 1673.21       | 5.2          | 8.1                 | 1053.48  | 3.3   | 43.63     | 0.1      | 0.88    | 0.0   | 567.08   | 1.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 3887.92       | 12.0         | 10.8                | 2926.37  | 9.1   | 127.38    | 0.4      | 0.69    | 0.0   | 822.63   | 2.5     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 8640.38       | 26.7         | 20.9                | 5010.00  | 15.5  | 213.72    | 0.7      | 32.91   | 0.1   | 3362.89  | 10.4    |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 32334.70      | 100.0        | 7112.8              | 17819.95 | 55.1  | 588.24    | 1.8      | 85.99   | 0.3   | 6727.72  | 20.8    |                           |                            |                           |                            |                                  |                       |                 |
| Masset Inlet   | Protected Area  | 6.89          | 0.0          | 0.4                 | 1.84     | 0.0   | 0.28      | 0.0      | 0.00    | 0.0   | 4.34     | 0.0     | 20.5                      | 1665.06                    | 42.8                      | 23131.67                   | 1087.57                          | Y                     | 19836.47        |
|                | LUO Constrained | 13834.62      | 25.6         | 584.8               | 8053.22  | 14.9  | 859.49    | 1.6      | 1740.66 | 3.2   | 2596.43  | 4.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 4392.69       | 8.1          | 12.6                | 2002.72  | 3.7   | 239.42    | 0.4      | 486.19  | 0.9   | 1651.79  | 3.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 5284.41       | 9.8          | 15.6                | 2985.23  | 5.5   | 200.94    | 0.4      | 583.67  | 1.1   | 1498.93  | 2.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 19254.95      | 35.7         | 55.3                | 5643.57  | 10.5  | 1858.55   | 3.4      | 1860.02 | 3.4   | 9837.46  | 18.2    |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 54000.34      | 100.0        | 6197.2              | 19836.47 | 36.7  | 3428.65   | 6.3      | 5312.75 | 9.8   | 19225.31 | 35.6    |                           |                            |                           |                            |                                  |                       |                 |
| Lower Yakoun   | Protected Area  | 4912.29       | 14.9         | 709.1               | 2242.53  | 6.8   | 358.24    | 1.1      | 275.73  | 0.8   | 1326.72  | 4.0     | 29.5                      | 1558.16                    | 38.7                      | 12754.62                   | 532.85                           | Y                     | 10926.30        |
|                | LUO Constrained | 12117.79      | 36.8         | 1131.4              | 6217.83  | 18.9  | 1182.09   | 3.6      | 1433.63 | 4.4   | 2152.84  | 6.5     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 1018.19       | 3.1          | 1.7                 | 392.29   | 1.2   | 67.86     | 0.2      | 141.32  | 0.4   | 415.06   | 1.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 2539.43       | 7.7          | 3.9                 | 1113.44  | 3.4   | 321.23    | 1.0      | 304.41  | 0.9   | 796.43   | 2.4     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 9608.13       | 29.2         | 14.6                | 1500.96  | 4.6   | 2648.79   | 8.0      | 904.68  | 2.7   | 4539.06  | 13.8    |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 32925.59      | 100.0        | 4250.8              | 10926.30 | 33.2  | 4882.52   | 14.8     | 3147.86 | 9.6   | 9718.07  | 29.5    |                           |                            |                           |                            |                                  |                       |                 |
| Rennell        | Protected Area  | 12209.00      | 30.8         | 2935.4              | 7427.38  | 18.7  | 1582.27   | 4.0      | 41.34   | 0.1   | 222.61   | 0.6     | 45.2                      | 904.14                     | 35.4                      | 14034.86                   | 151.68                           | Y                     | 24799.38        |
|                | LUO Constrained | 8391.42       | 21.1         | 363.2               | 6148.45  | 15.5  | 526.84    | 1.3      | 250.77  | 0.6   | 1102.16  | 2.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 3358.66       | 8.5          | 7.9                 | 2237.97  | 5.6   | 224.48    | 0.6      | 95.91   | 0.2   | 792.44   | 2.0     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 2319.96       | 5.8          | 8.3                 | 1885.46  | 4.8   | 31.53     | 0.1      | 29.55   | 0.1   | 365.13   | 0.9     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 6609.04       | 16.7         | 19.1                | 4961.05  | 12.5  | 580.88    | 1.5      | 69.53   | 0.2   | 978.43   | 2.5     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 39685.38      | 100.0        | 6441.1              | 24799.38 | 62.5  | 3394.97   | 8.6      | 685.25  | 1.7   | 4364.68  | 11.0    |                           |                            |                           |                            |                                  |                       |                 |
| Tiell          | Protected Area  | 17426.15      | 42.0         | 1567.7              | 8236.44  | 19.9  | 7551.85   | 18.2     | 14.25   | 0.0   | 55.89    | 0.1     | 12.7                      | 207.12                     | 36.5                      | 15123.03                   | 188.04                           | Y                     | 15799.69        |
|                | LUO Constrained | 7092.61       | 17.1         | 816.6               | 3672.56  | 8.9   | 1959.10   | 4.7      | 27.05   | 0.1   | 617.29   | 1.5     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 555.65        | 1.3          | 1.7                 | 265.42   | 0.6   | 215.30    | 0.5      | 1.00    | 0.0   | 72.20    | 0.2     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 3365.36       | 8.1          | 4.5                 | 2722.22  | 6.6   | 343.42    | 0.8      | 0.00    | 0.0   | 295.24   | 0.7     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 9579.15       | 23.1         | 15.7                | 2009.81  | 4.8   | 6049.20   | 14.6     | 37.93   | 0.1   | 1466.47  | 3.5     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 41451.88      | 100.0        | 4015.4              | 15799.69 | 38.1  | 17310.96  | 41.8     | 229.92  | 0.6   | 4095.95  | 9.9     |                           |                            |                           |                            |                                  |                       |                 |
| Yakoun Lake    | Protected Area  | 7963.88       | 29.6         | 2708.1              | 4637.25  | 17.2  | 315.40    | 1.2      | 14.07   | 0.1   | 289.06   | 1.1     | 14.7                      | 289.89                     | 18.5                      | 4975.11                    | 283.64                           | Y                     | 11157.06        |

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**Landscape Level Biodiversity Overview (2012):**

| Landscape Unit | Category        | Total Area ha | Total Area % | Non-Productive (ha) | Old ha   | Old % | Mature ha | Mature % | Mid ha   | Mid % | Early ha | Early % | Stand Level Retention (%) | Stand Level Retention (ha) | Interior Old & Mature (%) | Interior Old & Mature (ha) | Kms Road (by LU within the DFMA) | >30% Old Forest (Y/N) | Old Forest (ha) |
|----------------|-----------------|---------------|--------------|---------------------|----------|-------|-----------|----------|----------|-------|----------|---------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------------|-----------------------|-----------------|
|                | LUO Constrained | 6164.26       | 22.9         | 441.0               | 3119.39  | 11.6  | 288.61    | 1.1      | 885.41   | 3.3   | 1429.81  | 5.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 862.61        | 3.2          | 3.6                 | 442.90   | 1.6   | 3.99      | 0.0      | 99.84    | 0.4   | 312.32   | 1.2     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 1551.50       | 5.8          | 3.8                 | 789.41   | 2.9   | 23.96     | 0.1      | 160.83   | 0.6   | 573.55   | 2.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 4414.75       | 16.4         | 11.9                | 1442.84  | 5.4   | 109.54    | 0.4      | 464.00   | 1.7   | 2386.49  | 8.9     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 26898.50      | 100.0        | 4490.4              | 11157.06 | 41.5  | 879.85    | 3.3      | 2388.47  | 8.9   | 7982.76  | 29.7    |                           |                            |                           |                            |                                  |                       |                 |
| Gudal          | Protected Area  | 24093.85      | 78.7         | 7854.7              | 11101.16 | 36.3  | 4468.30   | 14.6     | 230.59   | 0.8   | 439.11   | 1.4     | 4.2                       | 6.35                       | 8.5                       | 2615.56                    | 10.24                            | Y                     | 14366.60        |
|                | LUO Constrained | 2515.46       | 8.2          | 196.3               | 1618.79  | 5.3   | 388.37    | 1.3      | 98.94    | 0.3   | 213.04   | 0.7     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 697.24        | 2.3          | 4.5                 | 600.82   | 2.0   | 20.32     | 0.1      | 20.99    | 0.1   | 50.61    | 0.2     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 297.58        | 1.0          | 2.5                 | 261.27   | 0.9   | 0.51      | 0.0      | 7.77     | 0.0   | 25.54    | 0.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 640.04        | 2.1          | 6.2                 | 540.20   | 1.8   | 25.07     | 0.1      | 22.26    | 0.1   | 46.36    | 0.2     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 30601.67      | 100.0        | 9485.5              | 14366.60 | 46.9  | 5480.23   | 17.9     | 343.75   | 1.1   | 925.59   | 3.0     |                           |                            |                           |                            |                                  |                       |                 |
| Honna          | Protected Area  | 6.37          | 0.0          | 1.6                 | 3.18     | 0.0   | 0.00      | 0.0      | 0.00     | 0.0   | 1.60     | 0.0     | 17.2                      | 289.18                     | 32.8                      | 9663.66                    | 176.56                           | Y                     | 13753.94        |
|                | LUO Constrained | 7510.98       | 25.5         | 213.0               | 4974.77  | 16.9  | 529.22    | 1.8      | 664.73   | 2.3   | 1129.21  | 3.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 2933.49       | 10.0         | 4.4                 | 1462.85  | 5.0   | 420.30    | 1.4      | 213.02   | 0.7   | 832.91   | 2.8     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 2663.16       | 9.1          | 1.9                 | 1600.42  | 5.4   | 112.31    | 0.4      | 266.75   | 0.9   | 681.76   | 2.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 8182.55       | 27.8         | 10.9                | 3600.55  | 12.2  | 939.94    | 3.2      | 874.72   | 3.0   | 2756.48  | 9.4     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 29423.39      | 100.0        | 2603.0              | 13753.94 | 46.7  | 2945.27   | 10.0     | 3210.06  | 10.9  | 6911.17  | 23.5    |                           |                            |                           |                            |                                  |                       |                 |
| Skidegate Lake | Protected Area  | 4190.75       | 7.8          | 1324.0              | 1056.88  | 2.0   | 194.45    | 0.4      | 227.26   | 0.4   | 1388.12  | 2.6     | 10.7                      | 504.94                     | 10.5                      | 5594.01                    | 392.34                           | N                     | 9973.39         |
|                | LUO Constrained | 12071.26      | 22.6         | 899.3               | 3461.30  | 6.5   | 595.96    | 1.1      | 4376.70  | 8.2   | 2737.99  | 5.1     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 4530.58       | 8.5          | 9.4                 | 1079.90  | 2.0   | 102.63    | 0.2      | 1717.38  | 3.2   | 1621.28  | 3.0     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 5727.91       | 10.7         | 5.5                 | 1318.37  | 2.5   | 155.32    | 0.3      | 2500.39  | 4.7   | 1748.36  | 3.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 18977.81      | 35.5         | 24.4                | 2485.34  | 4.6   | 472.75    | 0.9      | 6960.29  | 13.0  | 9035.04  | 16.9    |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 53526.67      | 100.0        | 6023.2              | 9973.39  | 18.6  | 1736.18   | 3.2      | 17372.57 | 32.5  | 18421.35 | 34.4    |                           |                            |                           |                            |                                  |                       |                 |
| Sewell         | Protected Area  | 9553.19       | 20.0         | 2932.6              | 5996.51  | 12.5  | 446.70    | 0.9      | 142.32   | 0.3   | 35.10    | 0.1     | 13.6                      | 192.43                     | 32.0                      | 15297.40                   | 346.77                           | Y                     | 20333.35        |
|                | LUO Constrained | 7589.73       | 15.9         | 407.8               | 3781.02  | 7.9   | 254.43    | 0.5      | 2170.27  | 4.5   | 976.26   | 2.0     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 2993.01       | 6.3          | 17.6                | 1004.56  | 2.1   | 67.54     | 0.1      | 992.75   | 2.1   | 910.56   | 1.9     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 1998.40       | 4.2          | 7.6                 | 636.29   | 1.3   | 41.76     | 0.1      | 828.16   | 1.7   | 484.58   | 1.0     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 7865.26       | 16.4         | 25.8                | 1598.44  | 3.3   | 222.82    | 0.5      | 3209.00  | 6.7   | 2809.15  | 5.9     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 47814.12      | 100.0        | 7945.6              | 20333.35 | 42.5  | 4019.82   | 8.4      | 8866.25  | 18.5  | 6649.05  | 13.9    |                           |                            |                           |                            |                                  |                       |                 |
| Louise Island  | Protected Area  | 1924.74       | 7.0          | 80.2                | 562.84   | 2.0   | 580.92    | 2.1      | 419.77   | 1.5   | 280.97   | 1.0     | 19.4                      | 298.17                     | 43.4                      | 12012.26                   | 319.52                           | Y                     | 10907.50        |
|                | LUO Constrained | 7170.37       | 25.9         | 274.8               | 4281.92  | 15.5  | 550.41    | 2.0      | 1358.36  | 4.9   | 704.88   | 2.5     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 2240.93       | 8.1          | 10.1                | 1275.42  | 4.6   | 161.38    | 0.6      | 260.11   | 0.9   | 533.94   | 1.9     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 2115.00       | 7.6          | 7.1                 | 1413.79  | 5.1   | 114.60    | 0.4      | 208.35   | 0.8   | 371.12   | 1.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 8088.55       | 29.2         | 19.5                | 2755.48  | 9.9   | 645.19    | 2.3      | 1155.25  | 4.2   | 3513.12  | 12.7    |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 27693.77      | 100.0        | 4440.4              | 10907.50 | 39.4  | 2175.56   | 7.9      | 4087.07  | 14.8  | 6083.28  | 22.0    |                           |                            |                           |                            |                                  |                       |                 |
| Tasu           | Protected Area  | 14320.26      | 40.9         | 5002.0              | 2960.46  | 8.5   | 6124.60   | 17.5     | 9.41     | 0.0   | 223.75   | 0.6     | 6.2                       | 93.11                      | 32.7                      | 11431.08                   | 285.91                           | Y                     | 11400.92        |
|                | LUO Constrained | 5270.86       | 15.1         | 400.7               | 2603.22  | 7.4   | 1082.12   | 3.1      | 40.79    | 0.1   | 1143.98  | 3.3     |                           |                            |                           |                            |                                  |                       |                 |
|                | NCLB            | 761.96        | 2.2          | 1.5                 | 63.75    | 0.2   | 63.61     | 0.2      | 41.34    | 0.1   | 591.74   | 1.7     |                           |                            |                           |                            |                                  |                       |                 |
|                | Partial         | 701.50        | 2.0          | 0.8                 | 118.21   | 0.3   | 7.12      | 0.0      | 7.27     | 0.0   | 568.09   | 1.6     |                           |                            |                           |                            |                                  |                       |                 |
|                | THLB            | 2727.85       | 7.8          | 2.6                 | 72.67    | 0.2   | 167.90    | 0.5      | 146.73   | 0.4   | 2337.98  | 6.7     |                           |                            |                           |                            |                                  |                       |                 |
|                | Total LU        | 34983.44      | 100.0        | 7858.2              | 11400.92 | 32.6  | 9273.31   | 26.5     | 325.89   | 0.9   | 6125.15  | 17.5    |                           |                            |                           |                            |                                  |                       |                 |

Protected Areas include parks and conservancies. LUO constrained includes forest reserves, cedar stewardship areas, Type I and II stream reserves, goshawk reserves, northern saw-whet owl reserves and MAMU habitat.

Interior forests were calculated using a 1.5 tree length buffer for stands <20 years old.

Stand level retention is calculated using actual development areas harvested within each landscape unit and is based on a comparison of data from the Ministry of Forests, Lands and Natural Resource Operations RESULTS reporting database, the records in the internal Cengea database and comparisons with aerial photos.

Grey shading indicates that Taan tenures are not located within the specific Landscape Unit (i.e., these LUs are outside of the Management Unit).

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A detailed review of the results of the above analysis in order to provide an overview of Landscape Unit health) was completed and the following summary of current status and recommended actions is presented below (connectivity is also discussed in more detail in the next indicator).

| <i>Landscape Level Biodiversity Overview – Vulnerability Rating (2016)</i> |                              |  |                     |                 |                      |                      |                    |
|--|------------------------------|--|---------------------|-----------------|----------------------|----------------------|--------------------|
| Landscape Unit   | Overall Vulnerability Rating | Comments   | Recommended Action  |                 |                      |                      |                    |
|  |                              |  | Increase Old Forest | Increase Forest | Improve Connectivity | Increase Stand Level | Use existing Roads |
| Honna  | Medium                       | 30% constrained; 26% NCLB; THLB 31%<br>21% of old in LU is in constrained; 7.6% in NCLB = low. Slight increase in the amount of old forest since 2012, high percentage of old and mature forest (65%)<br>75% interior<br>Med roads (relative to other HG LUs): 556.3 km<br>Slightly low reserved area (<30% constrained) and medium old forest (47.5%). Roads are moderate and forest interior is high.  | -                   | -               | Y                    | Y                    | -                  |
| Ian  | Medium                       | 38% constrained; 16% NCLB; THLB 35%<br>26% of old in LU is in constrained (6.5% in NCLB). Slight increase in the amount of old forest since 2012, high percentage of old and mature forest (78%)<br>69% interior<br>Med roads (relative to other HG LUs): 785.8km<br>Good amount of reserved land and forest interior, but currently has a low amount of old forest in reserve.  | Y                   | -               | -                    | Y                    | Y                  |
| Louise Island  | Low                          | 7% protected; 32% constrained; 21% NCLB; THLB 30%<br>1.4% of old in LU is in protected; 17% in constrained; 3.6% in NCLB = considerable (plus additional 20% protected, constrained and NCLB)<br>Slight decrease in the amount of old forest from 2012, but the level of mature plus old remains high (63%)<br>71% interior<br>Med roads (relative to other HG LUs): 522.8 km<br>The low vulnerability score results from the relatively low old amount of old forest in the reserves  | -                   | -               | -                    | Y                    | -                  |
| Lower Yakoun   | Low                          | 8% protected; 36% constrained; 13% NCLB; 35% THLB<br>2.6% of old in LU is in protected; 11% in constrained; 1% in NCLB = low (old plus mature is 39% in protected, constrained and NCLB)<br>Moderate decrease in the amount of old forest from 2012 (33% to 17%), and is less than 30%, but mature plus old has increased and remains high (59%)<br>59% interior<br>Med roads (relative to other HG LUs): 835.7 km<br>Large amount in reserve and good interior. Although there is currently a low amount of old in the reserved area, that should increase over time. | -                   | -               | -                    | -                    | Y                  |
| Masset Inlet   | Med-High                     | 29% constrained; 19% NCLB; THLB 41%<br>17% of old in LU is in constrained (6% in NCLB)<br>Slight increase in the amount of old forest since 2012, slight decrease in the amount of old plus mature forest (55%)<br>56% interior<br>High roads (relative to other HG LUs): 1845 km<br>Relatively low amount of reserved land, current low old forest, relatively high THLB, and high level of roadedness. Forest interior and stand-level retention levels under the LUO seem strong.   | Y                   | -               | -                    | -                    | Y                  |

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| <i>Landscape Level Biodiversity Overview – Vulnerability Rating (2016)</i> |                              |  |                     |                 |                      |                      |                    |
|--|------------------------------|--|---------------------|-----------------|----------------------|----------------------|--------------------|
| Landscape Unit   | Overall Vulnerability Rating | Comments   | Recommended Action  |                 |                      |                      |                    |
|  |                              |  | Increase Old Forest | Increase Forest | Improve Connectivity | Increase Stand Level | Use existing Roads |
| Naikoon  | Low                          | 70% protected or constrained; only 11% THLB<br>About 9% of LU old is in protected or constrained areas<br>Significant decrease in the amount of old forest from 2012 (41% to 11% but significant increase in the mature (25% to 82%). Total old plus mature increased (66% to 93.6%)<br>Low roads (relative to other HG LUs): 473.5 km<br>94% forest interior. Although there is currently a low amount of old in the reserved area, that should increase over time.   | -                   |                 | -                    | -                    | -                  |
| Sewell   | Low                          | 20% protected; 17% constrained; 35% NCLB; THLB 19%<br>9% of old in LU is in protected; 8% in constrained; 14% in NCLB= low<br>Slight decrease in the amount of old forest from 2012, but old plus mature remains high (69%)<br>84% interior<br>Med roads (relative to other HG LUs): 441.3 km<br>The LU has low THLB, and reasonable levels of reserves and interior.<br>Amounts of old forest in reserve are currently low, but should increase over time.  | -                   | -               | Y                    | -                    | Y                  |
| Skidegate Lake   | High                         | 8% protected; 23% constrained; 15% NCLB; THLB 40%<br>3.4% of old in LU is in protected; 7% in constrained; 3% in NCLB = low<br>Slight increase in the amount of old forest (18.6-19.2%). Old plus mature increased from 22% to 34%.<br>57% interior<br>High roads (relative to other HG LUs): 1860 km<br>Low amount of reserve area (<30% constrained), low amount of old forest (<11% of reserved forest), low amount of interior, low stand-level retention and relatively high THLB<br>This LU remains to be the most concerning in terms of landscape level biodiversity health related to low old forest. | Y                   | Y               | -                    | Y                    | Y                  |
| Tiell  | Low                          | 42% protected; 11% constrained; 16% NCLB<br>14% of old in LU is in protected; 4% in constrained; 1% in NCLB = low<br>Slight decrease in the amount of old forest from 2012, and is less than 30%, but mature plus old remains high (87%)<br>83% interior<br>Low roads (relative to other HG LUs): 414.7 km<br>Good amount of reserve area, old forest, and interior.   | -                   | -               | -                    | -                    | -                  |
| Yakoun Lake  | Low                          | 27% protected; 24% constrained; 25% NCLB; THLB 19%<br>19% of old in LU is in protected; 10% in constrained; 5% in NCLB=low<br>Slight decrease in the amount of old forest from 2012, but old plus mature remains high (62%)<br>68% interior = low<br>Med roads (relative to other HG LUs): 564 km<br>Good amount of reserve area and low THLB. However, there is a low amount of old forest, low interior and a low amount of stand-level retention so far.  | -                   | -               | -                    | Y                    | Y                  |

Additional stand-level indicators have been developed to annually monitor activities within the vulnerable landscape units, Skidegate Lake and Masset Inlet. Refer to the Stand-level Biodiversity Indicators for details on those indicators.

The 2016 analysis has similar overall results to the 2012 analysis (i.e., Skidegate Lake and Masset Inlet had high and med-high vulnerability ratings). The level of old and mature forest has increased slightly in the Skidegate LU, but is only slightly more than 30%.

| <i>Landscape Level Biodiversity Overview – Vulnerability Rating (2012)</i> |                              |  |                     |                          |                      |                                |                    |
|--|------------------------------|--|---------------------|--------------------------|----------------------|--------------------------------|--------------------|
| Landscape Unit   | Overall Vulnerability Rating | Comments   | Recommended Action  |                          |                      |                                |                    |
|  |                              |  | Increase Old Forest | Increase Forest Interior | Improve Connectivity | Increase Stand Level Retention | Use existing Roads |
| Skidegate Lake   | High                         | 8% protected; 23% constrained; 14% NCLB; THLB 37%<br>2% of old in LU is in protected; 6% in constrained; 3% in NCLB = low<br>10% interior = low<br>Stand level retention = 2% = low<br>Med roads (relative to other HG LUs): 393 km<br>Low amount of reserve area (<30% constrained), low amount of old forest (<11% of reserved forest), low amount of interior, low stand level retention and relatively high THLB | Y                   | Y                        | -                    | Y                              | Y                  |
| Masset Inlet   | Med-High                     | 26% constrained; 14% NCLB; THLB 37%<br>15% of old in LU is in constrained (7% in NCLB)<br>45% interior<br>Stand level retention 22%<br>High roads (relative to other HG LUs):: 1087 km<br>Relatively low amount of reserved land, current low old forest, relatively high THLB, and high level of roadedness. Forest interior and stand level retention levels seem strong.  | Y                   | -                        | -                    | -                              | Y                  |
| Eden Lake  | Medium                       | 35% constrained; 12% NCLB; 32% THLB<br>56% old in LU >30% in constrained if consider NCLB<br>Low interior: 3.5%<br>Med roads (relative to other HG LUs): 454 km<br>Relatively large amount of the LU in reserve and a large amount of old forest in that reserve, but the amount of forest interior is low.  | -                   | Y                        | -                    | -                              | Y                  |
| Honna  | Medium                       | 26% constrained; 15% NCLB; THLB 30%<br>17% of old in LU is in constrained; 8% in NCLB = low<br>33% interior<br>Low roads (relative to other HG LUs): 176 km<br>Slightly low reserved area (<30% constrained) and low old forest.<br>Roads are low and forest interior is high.   | -                   | -                        | Y                    | Y                              | -                  |
| Ian  | Medium                       | 34% constrained; 16% NCLB; THLB 28%<br>25% of old in LU is in constrained (12 in NCLB)<br>40% interior<br>Med roads (relative to other HG LUs): 383km<br>Good amount of reserved land and forest interior, but currently has a low amount of old forest in reserve.  | Y                   | -                        | -                    | Y                              | Y                  |
| Louise Island  | Medium                       | 7% protected; 26% constrained; 10% NCLB; THLB 30%<br>2% of old in LU is in protected; 15% in constrained; 6% in NCLB = low<br>45% interior<br>Med roads (relative to other HG LUs): 319 km<br>The medium vulnerability score results from the relatively low old amount of old forest in the reserves  | -                   | -                        | -                    | Y                              | -                  |
| Gudal  | Low                          | 79% protected; 8% constrained; 3% NCLB; THLB 2%<br>36% of old in LU is in protected; 5% in constrained; 2% in NCLB = low<br>8.5% interior = low<br>7% stand level retention<br>Low roads (relative to other HG LUs): 10 km<br>Good reserve area and low THLB.  | -                   | Y                        | -                    | Y                              | -                  |

| <i>Landscape Level Biodiversity Overview – Vulnerability Rating (2012)</i> |                              |   |                     |                          |                      |                                |                    |
|--|------------------------------|---|---------------------|--------------------------|----------------------|--------------------------------|--------------------|
| Landscape Unit   | Overall Vulnerability Rating | Comments  | Recommended Action  |                          |                      |                                |                    |
|  |                              |   | Increase Old Forest | Increase Forest Interior | Improve Connectivity | Increase Stand Level Retention | Use existing Roads |
| Lower Yakoun   | Low                          | 16% protected; 40% constrained; 13% NCLB; 33% THLB<br>7% of old in LU is in protected; 20% in constrained; 7% in NCLB = low<br>41% interior<br>17% stand level retention<br>Med roads (relative to other HG LUs): 532 km<br>Large amount in reserve and good interior. Although there is currently a low amount of old in the reserved area, that should increase over time.              | -                   | -                        | -                    | -                              | Y                  |
| Naikoon  | Low                          | >83% protected or constrained; only 8% THLB<br>About 40% of LU old is in protected or constrained areas<br>Low roads (relative to other HG LUs): 190 km<br>Low percentage of forest interior.   | -                   | Y                        | -                    | -                              | -                  |
| Otun   | Low                          | 36% protected or constrained; 14% THLB<br>28% of old in LU is in protected or constrained<br>29.7% interior<br>Low roads (relative to other HG LUs): 56km   | -                   | -                        | Y                    | -                              | -                  |
| Rennell  | Low                          | 31% protected; 21% constrained; 10% NCLB<br>19% of old in LU is in protected; 15% in constrained; 6% in NCLB = low<br>35% interior<br>17% stand level retention<br>Low roads (relative to other HG LUs): 151 km<br>Good amount of reserve area, old forest, interior and retention.   | -                   | -                        | -                    | -                              | -                  |
| Sewell   | Low                          | 20% protected; 16% constrained; 8% NCLB; THLB 17%<br>13% of old in LU is in protected; 8% in constrained; 2% in NCLB = low<br>33% interior<br>Med roads (relative to other HG LUs): 347 km<br>The LU has low THLB, and reasonable levels of reserves and interior.<br>Amounts of old forest in reserve are currently low, but should increase over time.                                  | -                   | -                        | Y                    | -                              | Y                  |
| Tasu   | Low                          | 42% protected; 16% constrained; 38% NCLB; THLB 8%<br>9% of old in LU is in protected; 8% in constrained; 0% in NCLB = low<br>33% interior<br>Med roads (relative to other HG LUs): 286 km<br>Although the amount of reserves is large (and THLB low and forest interior strong), the amount of protected old forest is low at present   | -                   | -                        | -                    | Y                              | -                  |
| Tiell  | Low                          | 42% protected; 17% constrained; 3% NCLB<br>20% of old in LU is in protected; 9% in constrained; 2% in NCLB = low<br>36.5% interior<br>16% stand level retention<br>Low roads (relative to other HG LUs): 188 km<br>Good amount of reserve area, old forest, and interior.   | -                   | -                        | -                    | -                              | -                  |
| Yakoun Lake  | Low                          | 30% protected; 23% constrained; 5% NCLB; THLB 17%<br>17% of old in LU is in protected; 12% in constrained; 3% in NCLB = low<br>18.5% interior = low<br>7% stand level retention<br>Med roads (relative to other HG LUs): 284 km<br>Good amount of reserve area and low THLB. However, there is a low amount of old forest, low interior and a low amount of stand level retention so far. | -                   | -                        | -                    | Y                              | Y                  |

Grey shading indicates that Taan tenures are not located within the specific Landscape Unit (i.e., these LUs are outside of the Management Unit).

## **Forecast**

Work has recently been completed to develop forecasting models into the future to assess potential impacts to the current status as a result of forest management activities in order to assess the effectiveness of management strategies in ensuring the targets are met in the future (as required under the certification standard under indicator 6.3.10). In general, the results of the analysis demonstrate an impressive increase (from 32% to 62%) in old forest over the next several hundred years into the future, as the full implementation of the Land Use Order moves through time and the new protected areas age.

## **Summary of Management Strategies**

The current management strategies related to landscape level biodiversity include strategies under the Land Use Order and related Forest Stewardship Plan (landscape level reserves such as forest reserves and cedar stewardship areas) as well as stand-level retention that supplements the landscape level reserves and can be used to increase values such as forest interior, connectivity and stand-level retention.

### ***Adaptive Management Strategies***

#### ***Strategic Planning (reserves & connectivity)***

Taan has completed a landscape level strategic plan to address ecosystem representation deficits identified under the Forest Stewardship Plan analysis through selection of Ecosystem Representation Management Areas to meet the ecosystem representation deficits from the LUO targets, while considering the results of the overall Landscape Unit vulnerability scores identified above as part of the landscape level biodiversity overview monitoring. This approach has been selected by Taan to address deficits, rather than a stand level approach (e.g., reviewing deficits on a block by block basis as site level planning is completed). Planning procedures have been developed to implement the management zones and set parameters for implementation.

In particular, this process focussed on establishing zones of old forest, considering both forest interior and landscape connectivity to existing reserves in areas identified for improvements in connectivity (refer to Landscape Connectivity indicator results below), and particular attention was focussed on the following Landscape Units (as a result of the analysis and recommended actions for this indicator: Skidegate Lake, Masset Inlet, Ian, Lower Yakoun and Yakoun Lake).

#### ***Site Level Planning***

The focus of adaptive management strategies for the next few years will be on the Skidegate Lake and Masset Inlet Landscape Units (LU), as they are the two rated as most vulnerable in regards to Landscape Level Biodiversity.

Adaptive management strategies for these two Landscape Units include consideration in relation to impacts from roads and stand-level retention. Management strategies will seek to minimize road construction and use of existing roads wherever possible (further work is needed to develop a measurable target for this objective and an action plan has been generated to follow up). In addition, stand-level retention targets have been established for the Skidegate LU at an average of 20% to facilitate a range of varying retention levels (e.g., some areas may require higher levels and some areas less based on values and features present in the area of the cutblock). Refer to the reporting table located in the Stand-level Biodiversity Indicator to see the results for this target.

The total area of the Skidegate LU is 52,531 ha and the current amount of old forest in the LU is 10,212 (20.7%) (up slightly from 9,973.4ha (18.6%)). The area of old, mature, mid and early seral stages located within LUO constrained areas is 12,047.1 (up from 7,710.6 ha) to create a total area of reserve and constrained area of 19,445.9ha (37%). The target for stand-level retention (noted above) in the Skidegate LU is therefore an interim target to help mitigate the deficiencies for old forest while the LUO reserve and constrained areas mature into old forest. However, it is important to note that the stand-level reserves for harvest areas may, or may not, be located in old forest depending on the specific stand types.

Under the LUO, the requirements for sensitive watersheds include a maximum ECA of 20% as well as a five-year harvesting limit of 5% over 5 years. For the Skidegate LU, this means that the maximum five-year harvestable area is approximately 230.5 ha, or 46.1 ha per year (roughly 2 blocks per year).



Additional management strategies may be developed in future to address the recommendations for the other LUs rated as low or medium vulnerability.

### **Database & Reporting Parameters**

Some preliminary data for Haida Gwaii was provided by FREP (email communication) for Landscape Biodiversity. However, the data set was not complete, as it was missing the TFL information. Taan will continue to review the status of the FREP program and provide information as it develops.

In the interim, we have developed our own parameters for GIS analysis to generate our own measures for landscape level biodiversity indicators for seral stage (old forest representation) and forest interior conditions. It is anticipated that this information will be updated every five years or more frequently in the event of any significant changes to the approach or strategies for this indicator.

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**Indicator: Landscape Level Biodiversity – Connectivity**

| Element   | Objective   | Indicator   | Target  |
|---|---|---|---|
| FSC 9.4.1, 8.2.3 & 8.2.4: High Conservation Value Forests (HCVF) and attributes | Maintain HCVF values of large landscape level intact forests; ensure viable populations of most or all naturally occurring species exist in natural patterns of disturbance and abundance | Connections between reserves at both the landscape and stand levels | Linkages of reserves exist from high to low elevation and from coast to inland. Stand retention creates a permeable matrix for old forest species |

**Rationale for Indicator & Target**

Connectivity is a term describing the linkages of habitats, species and processes throughout an area that allows the flow of energy, nutrients, organisms, and genes at many scales. Because connectivity includes so many things, measuring connectivity is a complicated endeavour. If we could answer “connected for what” then connectivity becomes more tractable, but when management for all of biodiversity is the goal, then the best approach is to maintain connections at a variety of scales, from landscape to stands. For coastal forests we are most often concerned about connections for old forest species because forestry impacts that habitat more than others. Part of ensuring connectivity is ensuring enough interior habitat for those species sensitive to edges.

**Current Status/ Results**

Due to the complex nature of this indicator, it is unlikely that annual changes will have much impact to the reporting results. As a result, this indicator will be re-assessed once every 5 years, or sooner if Taan determines that there have been any significant changes to any variables influencing the reporting results. The following results are intended to cover the reporting period of 2016-2020.

Ideally, the pattern of forest on the management unit should allow all native organisms to move through their habitats to 1) use areas within their home ranges during their typically movements, or 2) to disperse to establish in new areas. Because organisms vary in size, ability to move, habitat preferences and in what constitutes barriers to movement, assessing connectivity becomes very complicated. For coastal situations the organisms of greatest concern are those that require old forest or old and mature forest. Those are the habitats that forest practices have the most potential to affect; hence assessing connectivity focuses on old and mature forest.

Connectivity was addressed at two scales: across Haida Gwaii as a whole, and for each Landscape Unit.

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Landscape Connectivity – by Landscape Unit (2016)

Connectivity of mature and old forest was assessed according to each Landscape Unit and the following summary is provided after examining all of the various aspects of protected areas, non-contributing land-base, partially contributing land-base and the operable area:

| LU             | Licensee                           | Ocean to Elevation and cross valley   | Large patches   | Geographic distribution   | Overall  | Improvement Required?   |
|----------------|------------------------------------|---|---|---|--|---|
| Naikoon        | Minor overlap with MU              | good riparian connections. Taan maintains a 30m reserve along ocean edges.  | Portion of LU in large reserve has large patches, as well, there are large patches in the part of LU that is not in reserve | Half of LU in reserve and other half has good geographic distribution of reserves     | Good   | N   |
| Ian            | Taan (shared with other licensees) | Good elevational and cross valley but could add connections between adjacent LUs (Anthon Bay and Masset Inlet)                                  | Several large patches on both sides of Ian Lake. Some large patches make cross valley connections                           | Good geographic distribution  | Good, but could add connections across LU boundaries   | Recommended   |
| Masset Inlet   | Taan                               | Good elevational and cross valley but could add connections between adjacent LUs. Add ocean strips? Good riparian network in east, less in west | Some large patches  |   | Good, but could add connections across LU boundaries where riparian reserves end near the south by the boundary and to the west. Look to connect some of the isolated patches  | Recommended   |
| Lower Yakoun   | Taan                               | Is there opportunity to connect right to ocean? Connect to adjacent LUs. Good riparian network  | Some very large patches   | Good dispersion   | Good, but could add connections across LU boundaries and to ocean  | Recommended   |
| Tlell          | Taan (shared with other licensees) | Good  | Good  | Good  | Good   | N   |
| Yakoun Lake    | Taan                               | Large reserve in south; good connection LUs to north and west; good riparian network to east and inland   | Large patches in south and also to north of that  | Good  | Good but could improve connections to LUs to west and south  | Recommended   |
| <b>Honna</b>   | Minor overlap with MU              | Good connectivity to north of sound; patchy connectivity south of sound.; few connections among reserves in southern part                       | Good  | Good  | Improve connections to south and west. Many isolated patches in south and west corners of the LU and on the island.  | <b>N (Minor overlap with MU)</b>  |
| Skidegate Lake | Taan (shared with other licensees) | Good Lu to LU connections; good riparian network  | Some large patches; middle of LU could perhaps use a large patch  | Good  | Good. If there is more reserve budget, then build bigger patch in interior of LU   | Recommended   |
| Sewell         | Taan (minor overlap with MU – 18%) | Southern part in reserve. In other areas, connectivity not strong. Connections to other LUs could be strengthened                               | Some large patches close to Louise Island, but south of that area there are few larger areas                                | Scatter of reserves covers LU, but connection could be improved                       | Improve connections across LUs and connect more patches. Look at possible linkages through terrain class IV and V. Could widen riparian areas near the big inlet that comes in and the tiny lake (not located in the MU) | <b>N (Only two small portions of the MU are located within this LU)</b> |
| Louise Island  | Taan                               | Good elevational and cross valley connections   | Several large patches   | Good geographic distribution; could connect some of the smaller patches to other ones | Good; could work at connecting some of the isolated patches  | Recommended   |

### Landscape Connectivity Discussion

When Haida Gwaii is considered as a whole, [Figure 8](#) indicates that the **current** distribution of old and mature forest, combined with non-harvestable areas and reserves, provides a well-connected network of old and mature forest. Coastal areas have extensive connected forest, and inland areas have mostly old forest with interspersed areas of younger forest. A few areas have more extensive young forest – for example, areas on Louise Island, areas on the large peninsula south of Sandspit; and areas on the peninsula south of Masset, and areas to the east side of Hwy 16, appear to have been heavily harvested historically. Even in those areas, however, the reserve system and NCLB provide some current connectivity and will recruit old forest over time.

Clearly, the distribution of **current** old and mature forest is a snap-shot of connectivity which will change over time as some of that existing old and mature is harvested. [Figure 9](#) shows the distribution of reserves and NCLB which will provide old and mature forest even if all the THLB were harvested and became young forest. The distribution of reserves and NCLB shows less old and mature than at present but still a well-connected pattern of old and mature forest – there is good representation of coastal areas, many areas of forest interior (both coastal and inland), and connections run across valleys and from coast to inland.

There is some potential for parts of the NCLB to be harvested to some degree; hence it is prudent to examine the connectivity that results from the reserves alone ([Figure 10](#)). The reserve network provides a minimum/worst-case level of connectivity that will never be reached in reality (most of the NCLB will remain old and mature, and mature and old forest will also be present on the THLB). Even if only the reserves are considered, the level of connected forest is quite high. Reserves provide extensive connected forest in coastal zones, riparian zones provide networks of older forest, and large reserves speckle the more interior areas of the Islands.

An important aspect of providing connectivity is to supplement landscape-level reserves with stand-level retention that makes the harvested matrix permeable to organisms that require older trees or stand conditions but can't move easily or quickly in or away from harvested areas. Stand-level retention provides stepping stones for plants and relatively sessile organisms to allow them move from forest patches, or retained trees in harvested blocks, to adjacent forest (or persist in the patches until adjacent harvested areas become older). Again, the importance of retention depends on the context of the stand. Higher levels of stand-level retention should be used in LUs with already high levels of harvesting.

Stand-level retention and forest influence continue to be high (refer to Stand Level Biodiversity Indicator), provide those stepping stones and efforts are underway to ensure internal retention in large blocks will help provide those connections. For additional stand-level retention indicators, targets and results refer to the Stand-level Biodiversity Indicator (page 23).



Figure 8: Current Landscape Connectivity – reserves, non-timber harvesting land-base and mature/ old within the THLB

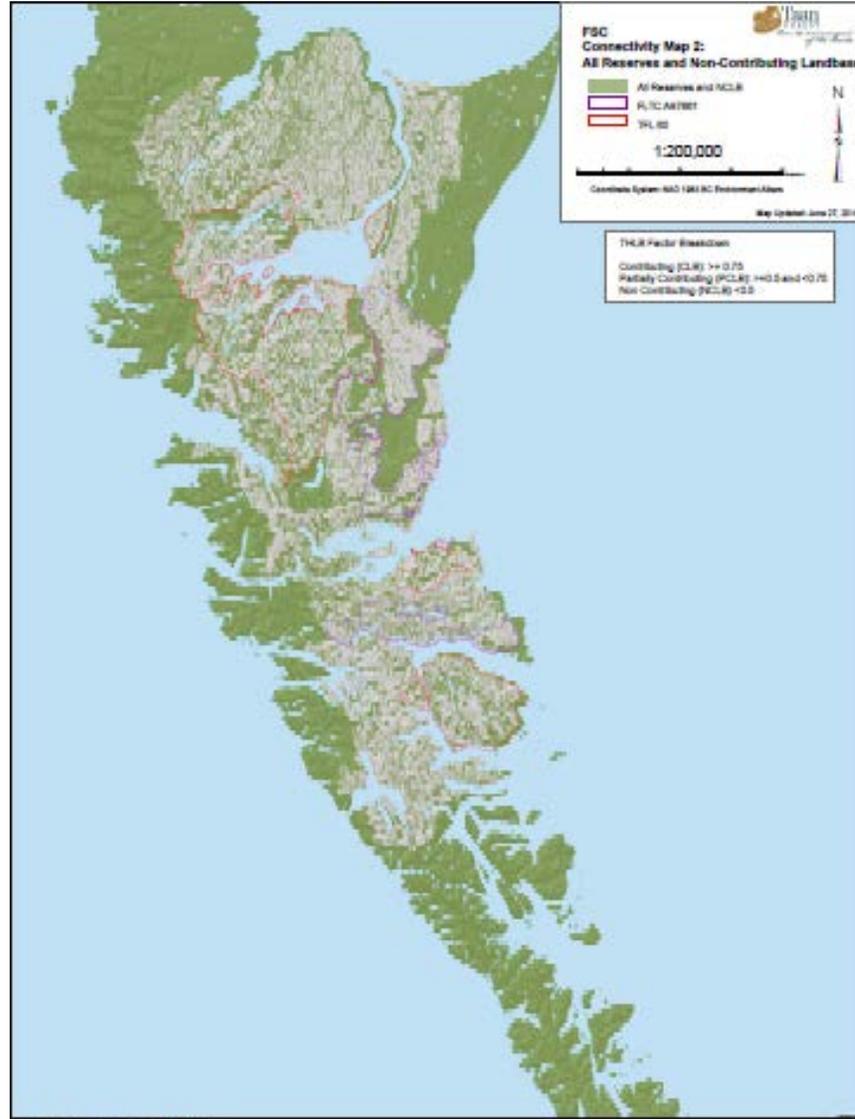


Figure 9: Likely Future Landscape Connectivity – all reserves and non-contributing land-base

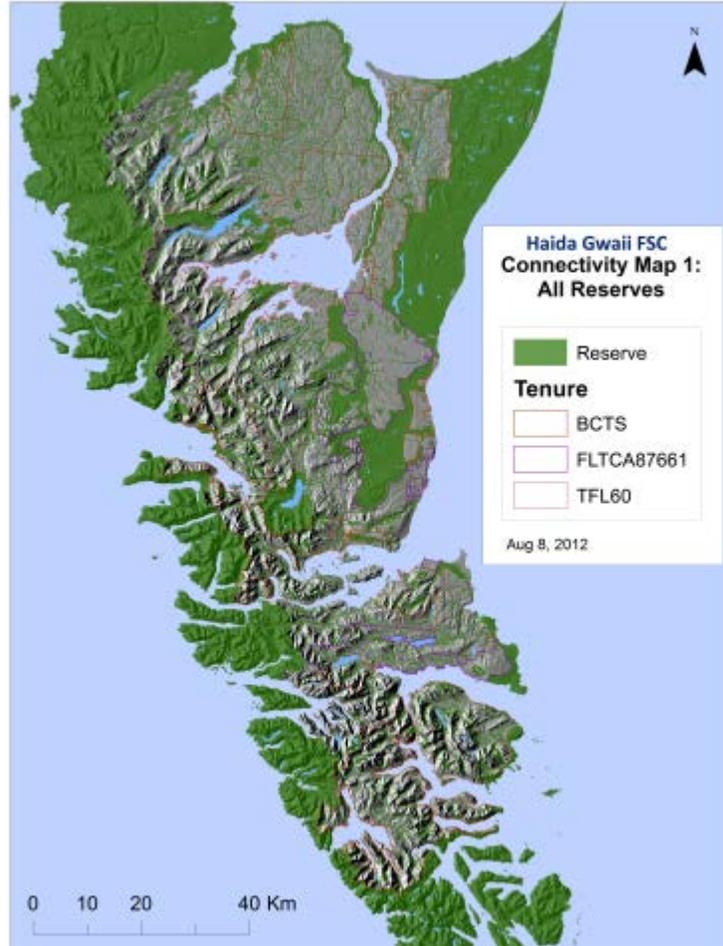


Figure 10: Likely Future Landscape Connectivity – all reserves

Landscape Connectivity – by Landscape Unit (2012)

Connectivity of mature and old forest was also assessed in more detail according to each Landscape Unit and the following summary is provided:

| LU           | Licensee                           | Ocean to Elevation and cross valley   | Large patches   | Geographic distribution   | Overall   | Improvement Required? |
|--------------|------------------------------------|---|---|---|---|-----------------------|
| Bereford     | N/A                                | All in reserve; natural levels of connectivity  |   |   |   | N                     |
| Jalun        | N/A                                | All in reserve; natural levels of connectivity  |   |   |   | N                     |
| Eden Lake    | N/A                                | Good elevational and cross valley connections; many riparian networks   | Large patches scattered throughout LU   | Good geographic spread of reserves  | Good except for low interior forest   | N                     |
| <b>Otun</b>  | N/A                                | Good ocean strip; good riparian network that has elevational and cross valley connections   | Few large patches away from ocean   | Good geographic spread with exception of lack of large inland patches             | Improve number of larger patches inland. Some riparian networks could be extended to provide connections that create larger patches   | <b>Required</b>       |
| Naikoon      | Minor overlap with MU              | Is there a default ocean strip; good riparian connections   | Portion of LU in large reserve has large patches, as well, there are large patches in the part of LU that is not in reserve | Half of LU in reserve and other half has good geographic distribution of reserves | Good  | N                     |
| Anthow Bay   | N/A                                | All in reserve; natural levels of connectivity  |   |   |   | N                     |
| Ian          | Taan (shared with other licensees) | Good elevational and cross valley but could add connections between adjacent LUs (Anthow Bay and Masset Inlet)                                  | Several large patches on both sides of Ian Lake. Some large patches make cross valley connections                           | Good geographic distribution  | Good, but could add connections across LU boundaries  | Recommended           |
| Masset Inlet | Taan                               | Good elevational and cross valley but could add connections between adjacent LUs. Add ocean strips? Good riparian network in east, less in west | Some large patches  |   | Good, but could add connections across LU boundaries where riparian reserves end near the south by the boundary and to the west. Look to connect some of the isolated patches | Recommended           |
| Lower Yakoun | Taan                               | Is there opportunity to connect right to ocean? Connect to adjacent LUs. Good riparian network  | Some very large patches   | Good dispersion   | Good, but could add connections across LU boundaries and to ocean   | Recommended           |
| Tlell        | Taan (shared with other licensees) | Good  | Good  | Good  | Good  | N                     |

| LU             | Licensee                           | Ocean to Elevation and cross valley   | Large patches  | Geographic distribution   | Overall  | Improvement Required?  |
|----------------|------------------------------------|---|--|---|--|--|
| Rennell        | N/A                                | Good. A few small areas of coastal strip located in protected area but is not a solid band. Good riparian network (elevational and cross valley)  | Large reserve in northern part of LU; good scatter of large reserves south of that           | Good  | Good, but could add connections across LU boundaries (to Masset inlet and Yakoun Lake). Look to connect the large patch in adjacent LU to the bottom right                                       | Recommended  |
| Yakoun Lake    | Taan                               | Large reserve in south; good connection LUs to north and west; good riparian network to east and inland   | Large patches in south and also to north of that   | Good  | Good but could improve connections to LUs to west and south  | Recommended  |
| Honna          | Minor overlap with MU              | Good connectivity to north of sound; patchy connectivity south of sound.; few connections among reserves in southern part   | Some large patches in north, but south has fewer   | Good  | Improve connections to south and west. Many isolated patches in south and west corners of the LU and on the island   | <b>Required – but only minor overlap with the MU</b>                                 |
| Gudal          | N/A                                | Majority in reserve; natural levels of connectivity   |  |   |  | N  |
| Hibben         | N/A                                | Mostly reserve to west; eastern part has low connectivity of reserves   | Few big patches in eastern part  | Eastern part a bit weak in connectivity, but overall good amount in reserve           | Mostly in reserve which balances poorer connectivity in eastern part   | Recommended  |
| Skidegate Lake | Taan (shared with other licensees) | Good Lu to LU connections; good riparian network  | Some large patches; middle of LU could perhaps use a large patch                             | Good  | Good. If there is more reserve budget, then build bigger patch in interior of LU   | Recommended  |
| Tasu           | N/A                                | Northern part of LU has large reserve. Riparian network encompasses elevation connections. Coastal strip could be wider along east. Good connections to LUs to north and east, not as good to south | Large patches to north and south but not in eastern portion                                  | Eastern portion weak connections  | Overall, connections are good, but west is strong and east is weak. Look to link up the south portion to the adjacent protected area and isolated patches where they exist                       | Recommended  |
| Sewell         | Taan (minor overlap with MU – 18%) | Southern part in reserve. In other areas, connectivity not strong. Connections to other LUs could be strengthened   | Some large patches close to Louise Island, but south of that area there are few larger areas | Scatter of reserves covers LU, but connection could be improved                       | Improve connections across LUs and connect more patches. Look at possible linkages through terrain class IV and V. Could widen riparian areas near the big inlet that comes in and the tiny lake | <b>Required – but only minor overlap with the MU and not in the area of concern.</b> |
| Louise Island  | Taan                               | Good elevational and cross valley connections   | Several large patches  | Good geographic distribution; could connect some of the smaller patches to other ones | Good; could work at connecting some of the isolated patches  | Recommended  |

Grey shading indicates that Taan tenures are not located within the specific Landscape Unit (i.e., these LUs are outside of the Management Unit).

The 2012 analyses showed that there were landscape level connectivity concerns in the Honna and Sewell landscape units. As a result of the 2016 analyses, the concern for Honna has been reduced because of its minor overlap with the MU. Although only a small portion of the Sewell is in the MU, Taan has looked more closely into connectivity in that area and to date, Taan has not completed any harvesting in the Sewell LU.

The Sewell LU was identified as benefitting from increased connectivity in 2012. That connectivity is no longer an issue in Taan Tenures. A map showing the Eco-rep Management Areas and the LUO reserve network in the Sewell Landscape Unit is provided below. The legend provides the following information:

- Taan tenure boundaries (management unit); black and grey dotted line
- Sewell Landscape Unit boundary (example); red dotted line
- Taan Eco-Rep Management Zone network; bright green polygons
- LUO Forest Reserve Network; brown hatched polygons
- LUO Spatial Reserves; red hatched polygons
- LUO Riparian Reserves; brown polygons
- Protected Areas/ Conservancies; dark green polygons

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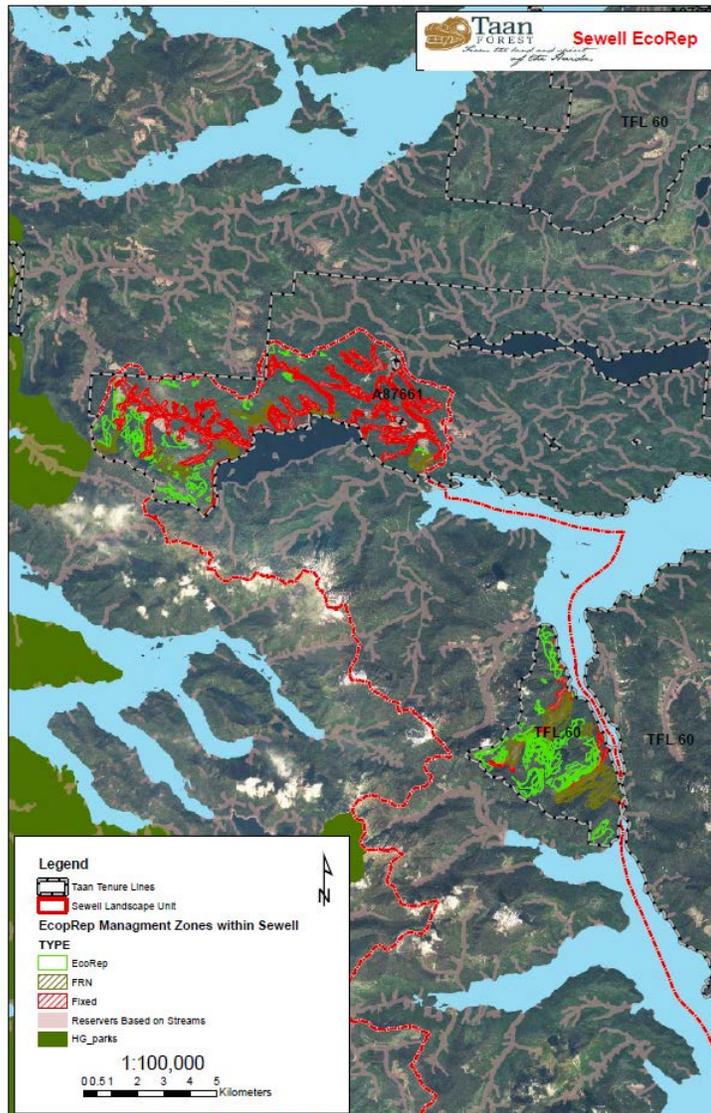


Figure 11: Taan Ecosystem Representation Management Areas in the Sewell Inlet Landscape Unit

The following results are reported as it relates to stand-level implementation of considerations for connectivity at a stand level basis annually:

| Year | Consideration of Connectivity (Site Plans) | Target Met (Y/N) |
|------|--|------------------|
|      | Sewell                                     |                  |
| 2017 | N/A - No harvesting                        | Y                |
| 2016 | N/A - No harvesting                        | Y                |
| 2015 | N/A - No harvesting                        | Y                |
| 2014 | N/A - No harvesting                        | Y                |
| 2013 | N/A - No harvesting                        | Y                |

### **Summary of Management Strategies**

Landscape level connections include linkages of reserves to each other by other reserves as well as linkages provided by the NHLB and by mature and old forest in the THLB. Riparian areas often serve as useful linkages as do coastal strips (in general though, reserves should be wide and large, not narrow). Connections at the stand level include reserved patches and dispersed trees. Patches that help maintain forest influence over the block are most useful, but patches between block (still at the stand level) are also useful. Research on how much habitat is sufficient to allow species to move (or to provide living space for those species that disperse slowly), is very limited.

At present, the only practical way to assess connectivity is by visual assessment. Are there connections between/among watersheds? Within watersheds, are reserves connected from ocean to high elevation, do cross-valley corridors exist? At the stand level, is retention well-distributed and does it carry old growth attributes (refer to Stand-level Biodiversity Indicator)?

### ***Adaptive Management Strategies***

There are no high priority species on Haida Gwaii for which connectivity of old forest is a key habitat factor. It has been suggested that Marten may require connectivity, however given the high population on Haida Gwaii, connectivity appears adequate at present. Nonetheless, if marten populations are healthy, that likely indicates populations of other old and mature forest species are also healthy, so monitoring marten could provide useful information (added to the species at risk indicator).

However, visual assessment suggests that improvements in connectivity need to be considered for certain areas in a handful of LUs (refer to the Landscape Connectivity 2016 table above). Future planning in these areas will consider connectivity during cutblock and road design. In addition, the Ecosystem Representation Management Areas strategic planning exercise considered landscape level connectivity (e.g., connections/linkages between existing riparian reserve networks).

**Potential Future Considerations:** Current and future distribution of the old forest lichen *P. rainerensis* could be assessed as an indicator of the adequacy of connectivity for a very old growth specific species with (probably) small dispersal distances. It may be too rare to assess and direct monitoring would only be recommended if connections appear low.

### **Database & Reporting Parameters**

Spatial maps of reserves that also show non-harvestable areas and late seral forest should be created every 5 years to assess any changes in connectivity. Data outputs (data tables and maps) are saved on the Taan server. Visual inspection should be undertaken to assess if reserves link from high to low elevation and from coast to inland. FREP stand assessments have data that could be used to begin to assess if stand retention likely creates a permeable matrix for old forest species.

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## Indicator: Landscape Level Biodiversity - Ecosystem Representation

| Element  | Objective   | Indicator  | Target  |
|--|---|--|---|
| FSC 6.4.1, FSC 9.4.1, 8.2.3 & 8.2.4: High Conservation Value Forests (HCVF) and attributes | Maintain HCVF values/ attributes through landscape level biodiversity | Evaluate whether ecosystems are represented across the landscape in time and space | Maintain representation levels as set by LUO (by site series) |

### Rationale for Indicator & Target

One of the key principals of conservation ecology is to keep all the pieces (Aldo Leopold). Representation of each ecosystem in an unmanaged state provides areas where natural processes can proceed, gives us areas to use as benchmarks to assess how managed areas compare, and provides habitat for the variety of plants and animals across the management area. Because of its fundamental role in conservation, the LUO sets targets for representation. Discussion is still ongoing as to what is the best ecological unit to use as a basis for representation – many plants and animals are found in several site series, so site series may be too small a unit. Groupings of site series may be better. The Land Use Order establishes ecosystem representation targets for each site series by Landscape Unit so this method was selected. Regardless of the representation unit chosen, the key concerns are:

- Are there enough reserves?
- Are reserves well distributed from high to low elevation?
- Do they encompass a variety of productivity classes; are most reserves large and functional?
- Are they well-distributed geographically throughout the area of interest?

In colloquial terms the questions follow a series: Do we have enough in reserves? OK, if you do, then, where are they -- in the valley bottoms too, or all rock and ice? Are they large or are they small and dominated by edge effects? Are they well-distributed or are they isolated entities clustered in a corner of an LU?

The question of 'is enough set aside' is addressed by the LUO targets which sets goals of 30% of common ecosystems and 70% of rare ones. The LUO sets targets based on natural disturbance and some precautionary approaches to avoid high risk.

To assess the other questions, representation needs to be evaluated by TEM/PEM classes (required under the Land Use Order). Representation by TEM/PEM or site series or site series groups should capture the full range of productivity and cause a wide distribution of reserves. Fragmentation of reserves could be an issue depending on the scale of representation, so should be examined. Other indicators assess connectivity, distribution and forest interior/fragmentation of reserves.

### Current Status/ Results

Due to the complex nature of this indicator, it is unlikely that annual changes will have much impact to the reporting results. As a result, this indicator will be re-assessed once every 5 years, or sooner if the Group Manager determines that there have been any significant changes to any variables influencing the reporting results. It is important to note however, that all licence holders are required as part of the FSP Implementation Agreement to update the Eco-rep analysis data on an annual basis as well as monitor harvest planning in relation to the analysis results to ensure that targets are met.

The following results are intended to cover the reporting period of 2012-2016. The table below represents the ecosystem representation analysis completed to support the Forest Stewardship Plan (and Land Use Order) and includes all of Haida Gwaii. It is important to note that the ecosystem representation deficits identified under this section are required to be addressed by all licensees and BC Timber Sales on Haida Gwaii under the Land Use Order and the Forest Stewardship Plan, whether at a landscape level or a stand-level development stage. A deficit does not mean that old forest doesn't exist, but simply means that after consideration of existing reserves, deficits exist in the form of reserved old forest. In this case, licensees must consider available old forest not reserved as a first priority in meeting the deficits and can move on to consider mature timber as a second option (e.g., if no other old forest is available to meet the deficit) followed by immature timber where required.



The deficits have been further analysed and broken out by each tenure under the Forest Stewardship Plan in relation to the proportion of the particular site series that is represented in the Landscape Unit within the respective tenure (only those applicable to the Management Unit are shown below).

Site Series that do not have eco-representation targets established under the LUO (e.g., targets are met with existing protected areas and/ or the ecosystems are classified as red or blue listed and thus are protected under different provisions under the LUO) are not included below.

The following ecosystem representation analysis was completed for the Forest Stewardship Plan implementation and demonstrates the deficits identified for Taan tenures (and was updated in 2015).

Reporting has been simplified to include only those ecosystems identified with deficits where Taan has old forest representation and is required to maintain and/ or recruit old forest proportional to representation in our tenure to meet the LUO targets (the full analysis report can be viewed upon request to the Taan Planning Manager).

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| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Total Area in LU, regardless of age (ha) | Total Old Forest - Tenure and Non-Tenure (ha) | Total Old Forest - In Reserved Area & within FDU (ha) | Total Old Forest - In Reserved Area & Outside FDU (ha) | Total Old Forest - In Reserves (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Total Old Forest - In Operable Area and within FDU (ha) | Area Required to be Recruited into Old Forest (ha) | Area Required from Taan FLTC A87661 (ha) | Area Required from Taan TFL 60 (ha) |
|----------------|-------------|-------------|-----------------|--|---|---|--|-------------------------------------|---|---|--|--|-------------------------------------|
| Honna          | CWHwh1      | 04          | 516             | 1,804                                    | 1,215   | 358   | 0  | 358                                 | 158   | 856   | 0  | 115                                      |                                     |
| Honna          | CWHwh1      | 10          | 218             | 892                                      | 725   | 210   | 0  | 210                                 | 8   | 514   | 0  | 4  |                                     |
| Honna          | CWHwh1      | 11          | 76              | 113                                      | 80  | 32  | 0  | 32                                  | 44  | 48  | 0  | 4  |                                     |
| Honna          | CWHwh2      | 01          | 510             | 2,394                                    | 1,683   | 471   | 0  | 471                                 | 39  | 1,212   | 0  | 9  |                                     |
| Honna          | CWHwh2      | 03          | 1,008           | 1,485                                    | 1,110   | 551   | 0  | 551                                 | 457   | 559   | 0  | 7  |                                     |
| Honna          | CWHwh2      | 05          | 586             | 862                                      | 749   | 126   | 0  | 126                                 | 460   | 623   | 0  | 165                                      |                                     |
| Honna          | MHwh        | 01          | 259             | 468                                      | 393   | 45  | 0  | 45                                  | 214   | 348   | 0  | 31                                       |                                     |
| Honna          | MHwh        | 04          | 158             | 393                                      | 360   | 76  | 0  | 76                                  | 82  | 285   | 0  | 5  |                                     |
| Ian            | CWHwh1      | 02          | 627             | 905                                      | 594   | 313   | 0  | 313                                 | 314   | 281   | 33   |  | 150                                 |
| Ian            | CWHwh1      | 11          | 478             | 709                                      | 686   | 354   | 0  | 354                                 | 124   | 332   | 0  |  | 19                                  |
| Ian            | CWHwh2      | 02          | 608             | 873                                      | 793   | 314   | 0  | 314                                 | 294   | 479   | 0  |  | 269                                 |
| Ian            | CWHwh2      | 03          | 20              | 29                                       | 26  | 18  | 0  | 18                                  | 2   | 8   | 0  |  | 2                                   |
| Ian            | CWHwh2      | 05          | 178             | 261                                      | 260   | 115   | 0  | 115                                 | 63  | 144   | 0  |  | 56                                  |
| Ian            | MHwh        | 01          | 309             | 559                                      | 501   | 152   | 0  | 152                                 | 157   | 349   | 0  |  | 135                                 |
| Ian            | MHwh        | 02          | 31              | 58                                       | 53  | 1   | 0  | 1                                   | 30  | 52  | 0  |  | 28                                  |
| Louise Island  | CWHwh1      | 02          | 1,030           | 1,486                                    | 823   | 418   | 51   | 469                                 | 561   | 352   | 207  |  | 352                                 |
| Louise Island  | CWHwh1      | 04          | 390             | 1,365                                    | 703   | 230   | 81   | 310                                 | 80  | 392   | 0  |  | 80                                  |
| Louise Island  | CWHwh1      | 09          | 128             | 185                                      | 29  | 21  | 5  | 26                                  | 102   | 3   | 99   |  | 3                                   |
| Louise Island  | CWHwh1      | 11          | 41              | 61                                       | 53  | 20  | 0  | 20                                  | 21  | 33  | 0  |  | 21                                  |
| Louise Island  | CWHwh2      | 01          | 750             | 3,523                                    | 2,304   | 668   | 1  | 668                                 | 82  | 1,635   | 0  |  | 82                                  |
| Louise Island  | CWHwh2      | 02          | 165             | 237                                      | 199   | 28  | 0  | 28                                  | 137   | 171   | 0  |  | 137                                 |
| Louise Island  | CWHwh2      | 03          | 36              | 53                                       | 19  | 11  | 0  | 11                                  | 25  | 8   | 17   |  | 8                                   |
| Louise Island  | CWHwh2      | 05          | 62              | 91                                       | 63  | 22  | 0  | 22                                  | 40  | 41  | 0  |  | 40                                  |
| Louise Island  | MHwh        | 01          | 424             | 766                                      | 695   | 210   | 0  | 210                                 | 214   | 485   | 0  |  | 214                                 |
| Louise Island  | MHwh        | 02          | 183             | 348                                      | 305   | 47  | 0  | 47                                  | 136   | 258   | 0  |  | 136                                 |
| Lower Yakoun   | CWHwh1      | 02          | 190             | 275                                      | 104   | 89  | 0  | 89                                  | 101   | 14  | 86   | 9  | 6                                   |
| Lower Yakoun   | CWHwh1      | 04          | 3,090           | 10,814                                   | 4,592   | 2,527   | 0  | 2,527                               | 563   | 2,065   | 0  | 379                                      | 171                                 |
| Lower Yakoun   | CWHwh1      | 11          | 478             | 710                                      | 498   | 228   | 0  | 228                                 | 250   | 269   | 0  | 221                                      | 27                                  |
| Lower Yakoun   | CWHwh2      | 01          | 204             | 958                                      | 404   | 136   | 0  | 136                                 | 68  | 267   | 0  | 3  | 65                                  |
| Lower Yakoun   | CWHwh2      | 02          | 123             | 177                                      | 95  | 66  | 0  | 66                                  | 57  | 29  | 28   |  | 29                                  |
| Lower Yakoun   | CWHwh2      | 05          | 41              | 61                                       | 49  | 27  | 0  | 27                                  | 14  | 23  | 0  |  | 14                                  |
| Lower Yakoun   | MHwh        | 01          | 32              | 57                                       | 56  | 14  | 0  | 14                                  | 18  | 42  | 0  |  | 18                                  |
| Lower Yakoun   | MHwh        | 02          | 31              | 59                                       | 58  | 0   | 0  | 0                                   | 31  | 58  | 0  |  | 31                                  |
| Masset Inlet   | CWHwh2      | 02          | 10              | 44                                       | 40  | 3   | 0  | 3                                   | 7   | 38  | 0  |  | 7                                   |
| Masset Inlet   | CWHwh1      | 02          | 2,181           | 3,144                                    | 1,512   | 619   | 0  | 619                                 | 1,562   | 893   | 669  |  | 893                                 |
| Masset Inlet   | CWHwh1      | 04          | 1,063           | 3,707                                    | 1,404   | 744   | 0  | 744                                 | 319   | 656   | 0  |  | 319                                 |
| Masset Inlet   | CWHwh1      | 11          | 65              | 96                                       | 68  | 19  | 0  | 19                                  | 46  | 49  | 0  |  | 46                                  |
| Masset Inlet   | CWHwh2      | 01          | 1,591           | 7,473                                    | 4,233   | 1,202   | 0  | 1,202                               | 389   | 3,031   | 0  |  | 389                                 |

| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Total Area in LU, regardless of age (ha) | Total Old Forest - Tenure and Non-Tenure (ha) | Total Old Forest - In Reserved Area & within FDU (ha) | Total Old Forest - In Reserved Area & Outside FDU (ha) | Total Old Forest - In Reserves (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Total Old Forest - In Operable Area and within FDU (ha) | Area Required to be Recruited into Old Forest (ha) | Area Required from Taan FLTC A87661 (ha) | Area Required from Taan TFL 60 (ha) |
|----------------|-------------|-------------|-----------------|--|---|---|--|-------------------------------------|---|---|--|--|-------------------------------------|
| Masset Inlet   | CWHwh2      | 02          | 1,868           | 2,676                                    | 2,076   | 399   | 0  | 399                                 | 1,469   | 1,678   | 0  |  | 1,469                               |
| Masset Inlet   | CWHwh2      | 03          | 76              | 133                                      | 61  | 44  | 0  | 44                                  | 32  | 17  | 15   |  | 17                                  |
| Masset Inlet   | CWHwh2      | 05          | 173             | 254                                      | 197   | 42  | 0  | 42                                  | 131   | 155   | 0  |  | 131                                 |
| Masset Inlet   | MHwh        | 01          | 779             | 1,409                                    | 1,092   | 270   | 0  | 270                                 | 509   | 822   | 0  |  | 509                                 |
| Masset Inlet   | MHwh        | 02          | 423             | 802                                      | 643   | 105   | 0  | 105                                 | 318   | 539   | 0  |  | 318                                 |
| Naikoon        | CWHwh1      | 11          | 5,634           | 8,368                                    | 6,605   | 1,436   | 2,672  | 4,108                               | 1,526   | 2,488   | 0  | 175                                      | 90                                  |
| Rennell        | CWHwh2      | 02          | 72              | 103                                      | 75  | 34  | 0  | 34                                  | 38  | 41  | 0  |  | 9                                   |
| Rennell        | CWHwh2      | 03          | 13              | 18                                       | 15  | 2   | 3  | 5                                   | 8   | 10  | 0  |  | 3                                   |
| Rennell        | MHwh        | 01          | 566             | 1,023                                    | 945   | 83  | 382  | 465                                 | 101   | 478   | 0  |  | 3                                   |
| Sewell         | CWHwh1      | 02          | 486             | 701                                      | 393   | 123   | 22   | 145                                 | 341   | 248   | 93   | 3  | 62                                  |
| Sewell         | CWHwh1      | 04          | 328             | 1,148                                    | 592   | 123   | 13   | 136                                 | 192   | 455   | 0  | 17                                       | 7                                   |
| Sewell         | CWHwh1      | 13          | 108             | 159                                      | 36  | 29  | 0  | 29                                  | 79  | 7   | 72   | 1  |                                     |
| Sewell         | CWHwh2      | 01          | 1,204           | 5,656                                    | 3,657   | 390   | 395  | 785                                 | 419   | 2,867   | 0  | 16                                       | 57                                  |
| Sewell         | CWHwh2      | 02          | 81              | 116                                      | 108   | 6   | 6  | 13                                  | 68  | 95  | 0  |  | 30                                  |
| Sewell         | CWHwh2      | 03          | 231             | 341                                      | 281   | 92  | 0  | 92                                  | 139   | 189   | 0  | 8  | 2                                   |
| Sewell         | CWHwh2      | 05          | 315             | 464                                      | 311   | 66  | 0  | 66                                  | 249   | 245   | 4  | 84                                       | 13                                  |
| Sewell         | MHwh        | 01          | 438             | 791                                      | 689   | 34  | 291  | 325                                 | 113   | 364   | 0  | 3  | 21                                  |
| Skidegate Lake | CWHwh1      | 01          | 3,147           | 28,596                                   | 5,055   | 1,683   | 749  | 2,432                               | 715   | 2,618   | 0  | 296                                      | 84                                  |
| Skidegate Lake | CWHwh1      | 02          | 396             | 572                                      | 102   | 34  | 3  | 37                                  | 359   | 64  | 294  | 10                                       | 14                                  |
| Skidegate Lake | CWHwh1      | 10          | 100             | 409                                      | 195   | 49  | 1  | 50                                  | 50  | 144   | 0  | 8  | 20                                  |
| Skidegate Lake | CWHwh1      | 11          | 258             | 383                                      | 195   | 48  | 21   | 69                                  | 189   | 126   | 63   | 22                                       |                                     |
| Skidegate Lake | CWHwh1      | 16          | 21              | 48                                       | 10  | 1   | 0  | 2                                   | 19  | 8   | 11   |  | 7                                   |
| Skidegate Lake | CWHwh2      | 01          | 1,090           | 5,119                                    | 1,563   | 376   | 0  | 376                                 | 714   | 1,187   | 0  | 37                                       | 159                                 |
| Skidegate Lake | CWHwh2      | 02          | 124             | 177                                      | 125   | 25  | 0  | 25                                  | 99  | 100   | 0  | 1  | 31                                  |
| Skidegate Lake | CWHwh2      | 03          | 259             | 382                                      | 148   | 55  | 0  | 55                                  | 204   | 93  | 111  |  | 17                                  |
| Skidegate Lake | CWHwh2      | 05          | 76              | 111                                      | 42  | 21  | 0  | 21                                  | 55  | 21  | 34   | 1  | 20                                  |
| Skidegate Lake | MHwh        | 01          | 219             | 397                                      | 118   | 51  | 0  | 51                                  | 168   | 67  | 101  | 2  | 31                                  |
| Skidegate Lake | MHwh        | 02          | 9               | 16                                       | 3   | 0   | 0  | 0                                   | 9   | 3   | 6  |  | 1                                   |
| Tiell          | CWHwh1      | 02          | 257             | 371                                      | 240   | 147   | 0  | 147                                 | 110   | 93  | 17   | 93                                       |                                     |
| Tiell          | CWHwh1      | 04          | 3,354           | 11,715                                   | 4,056   | 2,182   | 70   | 2,252                               | 1,102   | 1,797   | 0  | 845                                      |                                     |
| Tiell          | CWHwh1      | 10          | 1,530           | 6,257                                    | 2,368   | 1,070   | 117  | 1,187                               | 343   | 1,174   | 0  | 184                                      |                                     |
| Tiell          | CWHwh1      | 11          | 861             | 1,279                                    | 470   | 238   | 46   | 284                                 | 577   | 185   | 391  | 141                                      |                                     |
| Tiell          | CWHwh1      | 16          | 25              | 58                                       | 19  | 4   | 1  | 5                                   | 20  | 13  | 6  | 4  |                                     |
| Yakoun Lake    | CWHwh1      | 02          | 382             | 551                                      | 274   | 232   | 0  | 232                                 | 150   | 41  | 108  | 2  | 39                                  |
| Yakoun Lake    | CWHwh2      | 02          | 244             | 350                                      | 291   | 141   | 0  | 141                                 | 103   | 150   | 0  | 5  | 96                                  |
| Yakoun Lake    | CWHwh2      | 03          | 148             | 218                                      | 208   | 147   | 0  | 147                                 | 1   | 60  | 0  |  | 1                                   |
| Yakoun Lake    | CWHwh2      | 05          | 161             | 237                                      | 231   | 98  | 0  | 98                                  | 63  | 133   | 0  |  | 62                                  |
|                |             |             |                 |  |   |   |  |                                     | 23,603  | 138,717   | 2,809  | 2,910                                    | 7,070                               |



Taan maintains spatial tracking ledger (required under the Forest Stewardship Plan) to monitor harvest planning in relation to the eco-rep targets on an on-going basis to ensure that harvesting does not create or exacerbate any existing deficits.

In 2017, harvesting did not occur in any eco-rep deficit areas.

In 2016, the ledger shows one planned cutblock with harvesting in a deficit ecosystem within the Skidegate Landscape Unit, CWH wh 11 (GRA002). The Site Plan notes that the 11 site series represents about 5% of the mosaic and is therefore not suitable for retention to meet the ecological representation targets. A detailed review was conducted of the FSP ledger during data analysis for the monitoring report and it was determined that the Ledger is not getting completed correctly (data not being entered within the correct columns), refer to the action item within the Action item section of this report.

Comparison of the current data with the 2013-2014 data shows no changes to the list of ecosystems with deficits but does show an increase in area required to be recruited of 363ha for Haida Gwaii and change in area required to be recruited by Taan of an additional 183ha. Across Haida Gwaii, total old forest has decreased by 2,310 ha.



Taan has also complete a landscape level Ecosystem Representation Management Area project (see description below under Adaptive Management) and thus has addressed all ecosystem representation deficits within Taan tenures (Eco-Rep Management Zone Summary June 13, 2013); the table below includes those Landscape Units and Site series within Taan tenures that required LUO ecosystem representation deficits to be addressed (i.e., excludes those ecosystems where old growth targets are met through existing LUO reserves or through other reserves and/ or where Taan has included those site series within Eco-Rep Management Areas).

Taan Ecosystem Representation Management Areas 2013:

| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Area Required to be Recruited into Old Forest (ha) | Eco-Rep Management Zone in FLTC A87661 (ha) | Eco-Rep Management Zone in TFL 60 (ha) | Taan Eco-Rep Management Zone Surplus or Deficit | Remaining Unconstrained Old in Taan Tenure |
|----------------|-------------|-------------|-----------------|---|--|---|--|---|--|
| Honna          | CWHwh1      | 01          | 572             | 0   | 0  | 46  | 0                                      | 46  | 230  |
| Honna          | CWHwh1      | 04          | 516             | 159   | 0  | 292   | 0                                      | 176   | 332  |
| Honna          | CWHwh1      | 05          | 497             | 0   | 0  | 4   | 0                                      | 4   | 98   |
| Honna          | CWHwh1      | 10          | 218             | 9   | 0  | 129   | 0                                      | 125   | 111  |
| Honna          | CWHwh1      | 11          | 76              | 44  | 0  | 4   | 0                                      | 0   | 0  |
| Honna          | CWHwh2      | 01          | 510             | 40  | 0  | 173   | 0                                      | 164   | 116  |
| Honna          | CWHwh2      | 03          | 1,008           | 457   | 0  | 7   | 0                                      | 1   | 0  |
| Honna          | CWHwh2      | 04          | 0               | 0   | 0  | 21  | 0                                      | 21  | 9  |
| Honna          | CWHwh2      | 05          | 586             | 460   | 0  | 200   | 0                                      | 35  | 19   |
| Honna          | MHwh        | 01          | 259             | 214   | 0  | 46  | 0                                      | 17  | 0  |
| Honna          | MHwh        | 03          | 0               | 0   | 0  | 1   | 0                                      | 1   | 0  |
| Honna          | MHwh        | 04          | 158             | 83  | 0  | 19  | 0                                      | 14  | 0  |
| Honna          | MHwh        | 08          | 75              | 12  | 0  | 2   | 0                                      | 2   | 0  |
| Ian            | CWHwh1      | 01          | 778             | 0   | 0  | 0   | 147                                    | 147   | 1069                                       |
| Ian            | CWHwh1      | 02          | 627             | 314   | 33   | 0   | 150                                    | 0   | 0  |
| Ian            | CWHwh1      | 04          | 1,986           | 0   | 0  | 0   | 62                                     | 62  | 694  |
| Ian            | CWHwh1      | 05          | 20              | 0   | 0  | 0   | 46                                     | 46  | 18   |
| Ian            | CWHwh1      | 10          | 793             | 0   | 0  | 0   | 45                                     | 45  | 225  |
| Ian            | CWHwh1      | 11          | 478             | 129   | 0  | 0   | 46                                     | 27  | 0  |
| Ian            | CWHwh2      | 01          | 723             | 0   | 0  | 0   | 192                                    | 192   | 1378                                       |
| Ian            | CWHwh2      | 02          | 608             | 295   | 0  | 0   | 356                                    | 87  | 82   |
| Ian            | CWHwh2      | 03          | 20              | 2   | 0  | 0   | 8                                      | 6   | 0  |
| Ian            | CWHwh2      | 05          | 178             | 63  | 0  | 0   | 76                                     | 20  | 53   |
| Ian            | CWHwh2      | 06          | 0               | 0   | 0  | 0   | 3                                      | 3   | 1  |
| Ian            | MHwh        | 01          | 309             | 157   | 0  | 0   | 301                                    | 166   | 0  |
| Ian            | MHwh        | 02          | 31              | 30  | 0  | 0   | 42                                     | 14  | 7  |
| Ian            | MHwh        | 03          | 0               | 0   | 0  | 0   | 1                                      | 1   | 0  |
| Ian            | MHwh        | 09          | 0               | 0   | 0  | 0   | 1                                      | 1   | 1  |
| Louise Island  | CWHwh1      | 01          | 878             | 0   | 0  | 0   | 392                                    | 392   | 1224                                       |
| Louise Island  | CWHwh1      | 02          | 1,030           | 560   | 201  | 0   | 357                                    | 0   | 0  |

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***Taan Ecosystem Representation Management Areas 2013:***

| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Area Required to be Recruited into Old Forest (ha) | Eco-Rep Management Zone in FLTC A87661 (ha) | Eco-Rep Management Zone in TFL 60 (ha) | Taan Eco-Rep Management Zone Surplus or Deficit | Remaining Unconstrained Old in Taan Tenure |
|----------------|-------------|-------------|-----------------|---|--|---|--|---|--|
| Louise Island  | CWHwh1      | 03          | 0               | 0   | 0  | 0   | 45                                     | 45  | 214  |
| Louise Island  | CWHwh1      | 04          | 390             | 80  | 0  | 0   | 84                                     | 4   | 316  |
| Louise Island  | CWHwh1      | 05          | 103             | 0   | 0  | 0   | 16                                     | 16  | 185  |
| Louise Island  | CWHwh1      | 06          | 0               | 0   | 0  | 0   | 10                                     | 10  | 69   |
| Louise Island  | CWHwh1      | 08          | 0               | 0   | 0  | 0   | 3                                      | 3   | 2  |
| Louise Island  | CWHwh1      | 09          | 128             | 102   | 99   | 0   | 3                                      | 0   | 0  |
| Louise Island  | CWHwh1      | 10          | 263             | 0   | 0  | 0   | 57                                     | 57  | 384  |
| Louise Island  | CWHwh1      | 11          | 41              | 24  | 0  | 0   | 32                                     | 8   | 0  |
| Louise Island  | CWHwh2      | 01          | 750             | 81  | 0  | 0   | 270                                    | 189   | 1365                                       |
| Louise Island  | CWHwh2      | 02          | 165             | 137   | 0  | 0   | 171                                    | 34  | 0  |
| Louise Island  | CWHwh2      | 03          | 36              | 25  | 17   | 0   | 8                                      | 0   | 0  |
| Louise Island  | CWHwh2      | 04          | 0               | 0   | 0  | 0   | 14                                     | 14  | 8  |
| Louise Island  | CWHwh2      | 05          | 62              | 40  | 0  | 0   | 41                                     | 1   | 0  |
| Louise Island  | CWHwh2      | 06          | 0               | 0   | 0  | 0   | 4                                      | 4   | 4  |
| Louise Island  | MHwh        | 01          | 424             | 214   | 0  | 0   | 299                                    | 85  | 185  |
| Louise Island  | MHwh        | 02          | 183             | 136   | 0  | 0   | 182                                    | 46  | 76   |
| Louise Island  | MHwh        | 03          | 0               | 0   | 0  | 0   | 3                                      | 3   | 0  |
| Lower Yakoun   | CWHwh1      | 01          | 975             | 0   | 0  | 216   | 44                                     | 259   | 458  |
| Lower Yakoun   | CWHwh1      | 02          | 190             | 101   | 87   | 8   | 6                                      | 0   | 0  |
| Lower Yakoun   | CWHwh1      | 03          | 0               | 0   | 0  | 0   | 6                                      | 6   | 37   |
| Lower Yakoun   | CWHwh1      | 04          | 3,090           | 557   | 0  | 785   | 81                                     | 321   | 1179                                       |
| Lower Yakoun   | CWHwh1      | 05          | 15              | 0   | 0  | 0   | 1                                      | 1   | 44   |
| Lower Yakoun   | CWHwh1      | 06          | 0               | 0   | 0  | 0   | 1                                      | 1   | 40   |
| Lower Yakoun   | CWHwh1      | 09          | 51              | 39  | 39   | 0   | 0                                      | 0   | 0  |
| Lower Yakoun   | CWHwh1      | 10          | 796             | 0   | 0  | 121   | 69                                     | 189   | 531  |
| Lower Yakoun   | CWHwh1      | 11          | 478             | 250   | 0  | 238   | 28                                     | 18  | 0  |
| Lower Yakoun   | CWHwh1      | 12          | 0               | 0   | 0  | 0   | 1                                      | 1   | 23   |
| Lower Yakoun   | CWHwh2      | 01          | 204             | 68  | 0  | 12  | 63                                     | 6   | 193  |
| Lower Yakoun   | CWHwh2      | 02          | 123             | 57  | 28   | 0   | 29                                     | 0   | 0  |
| Lower Yakoun   | CWHwh2      | 04          | 0               | 0   | 0  | 0   | 4                                      | 5   | 6  |
| Lower Yakoun   | CWHwh2      | 05          | 41              | 14  | 0  | 0   | 22                                     | 8   | 0  |
| Lower Yakoun   | MHwh        | 01          | 32              | 18  | 0  | 0   | 42                                     | 24  | 0  |
| Lower Yakoun   | MHwh        | 02          | 31              | 31  | 0  | 0   | 58                                     | 27  | 0  |
| Lower Yakoun   | MHwh        | 05          | 0               | 0   | 0  | 0   | 3                                      | 3   | 0  |
| Masset Inlet   | CWHvh2      | 01          | 0               | 0   | 0  | 0   | 5                                      | 5   | 52   |
| Masset Inlet   | CWHvh2      | 02          | 10              | 7   | 0  | 0   | 8                                      | 1   | 32   |
| Masset Inlet   | CWHwh1      | 01          | 2,245           | 0   | 0  | 0   | 1,557                                  | 1,557   | 1672                                       |

***Taan Ecosystem Representation Management Areas 2013:***

| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Area Required to be Recruited into Old Forest (ha) | Eco-Rep Management Zone in FLTC A87661 (ha) | Eco-Rep Management Zone in TFL 60 (ha) | Taan Eco-Rep Management Zone Surplus or Deficit | Remaining Unconstrained Old in Taan Tenure |
|----------------|-------------|-------------|-----------------|---|--|---|--|---|--|
| Masset Inlet   | CWHwh1      | 02          | 2,181           | 1,561   | 653  | 0   | 908                                    | 0   | 0  |
| Masset Inlet   | CWHwh1      | 03          | 0               | 0   | 0  | 0   | 30                                     | 30  | 151  |
| Masset Inlet   | CWHwh1      | 04          | 1,063           | 317   | 0  | 0   | 345                                    | 28  | 335  |
| Masset Inlet   | CWHwh1      | 05          | 44              | 0   | 0  | 0   | 21                                     | 21  | 51   |
| Masset Inlet   | CWHwh1      | 06          | 0               | 0   | 0  | 0   | 35                                     | 35  | 100  |
| Masset Inlet   | CWHwh1      | 07          | 0               | 0   | 0  | 0   | 1                                      | 1   | 16   |
| Masset Inlet   | CWHwh1      | 10          | 272             | 0   | 0  | 0   | 119                                    | 119   | 132  |
| Masset Inlet   | CWHwh1      | 11          | 65              | 46  | 0  | 0   | 48                                     | 2   | 0  |
| Masset Inlet   | CWHwh1      | 12          | 0               | 0   | 0  | 0   | 10                                     | 10  | 16   |
| Masset Inlet   | CWHwh2      | 01          | 1,591           | 389   | 0  | 0   | 1,413                                  | 1,024   | 1698                                       |
| Masset Inlet   | CWHwh2      | 02          | 1,868           | 1,468   | 0  | 0   | 1,559                                  | 92  | 144  |
| Masset Inlet   | CWHwh2      | 03          | 76              | 32  | 14   | 0   | 17                                     | 0   | 0  |
| Masset Inlet   | CWHwh2      | 04          | 0               | 0   | 0  | 0   | 21                                     | 21  | 93   |
| Masset Inlet   | CWHwh2      | 05          | 173             | 131   | 0  | 0   | 156                                    | 25  | 0  |
| Masset Inlet   | CWHwh2      | 06          | 0               | 0   | 0  | 0   | 11                                     | 11  | 5  |
| Masset Inlet   | MHwh        | 01          | 779             | 509   | 0  | 0   | 664                                    | 155   | 158  |
| Masset Inlet   | MHwh        | 02          | 423             | 318   | 0  | 0   | 365                                    | 47  | 169  |
| Masset Inlet   | MHwh        | 03          | 0               | 0   | 0  | 0   | 1                                      | 1   | 1  |
| Masset Inlet   | MHwh        | 04          | 0               | 0   | 0  | 0   | 5                                      | 5   | 0  |
| Masset Inlet   | MHwh        | 05          | 0               | 0   | 0  | 0   | 21                                     | 21  | 4  |
| Masset Inlet   | MHwh        | 09          | 0               | 0   | 0  | 0   | 3                                      | 3   | 1  |
| Naikoon        | CWHwh1      | 04          | 6,090           | 0   | 0  | 114   | 233                                    | 347   | 1137                                       |
| Naikoon        | CWHwh1      | 10          | 7,665           | 0   | 0  | 123   | 0                                      | 123   | 135  |
| Naikoon        | CWHwh1      | 11          | 5,634           | 1,549   | 0  | 279   | 148                                    | 159   | 0  |
| Rennell        | CWHwh2      | 01          | 368             | 0   | 0  | 0   | 14                                     | 14  | 41   |
| Rennell        | CWHwh2      | 02          | 72              | 38  | 0  | 0   | 9                                      | 1   | 0  |
| Rennell        | CWHwh2      | 03          | 13              | 8   | 0  | 0   | 4                                      | 1   | 0  |
| Rennell        | MHwh        | 01          | 566             | 101   | 0  | 0   | 17                                     | 14  | 0  |
| Sewell         | CWHwh1      | 01          | 1,793           | 0   | 0  | 2   | 162                                    | 164   | 576  |
| Sewell         | CWHwh1      | 02          | 486             | 340   | 92   | 3   | 62                                     | 0   | 0  |
| Sewell         | CWHwh1      | 03          | 0               | 0   | 0  | 0   | 18                                     | 18  | 29   |
| Sewell         | CWHwh1      | 04          | 328             | 192   | 0  | 42  | 16                                     | 33  | 0  |
| Sewell         | CWHwh1      | 05          | 262             | 0   | 0  | 0   | 4                                      | 4   | 88   |
| Sewell         | CWHwh1      | 06          | 0               | 0   | 0  | 8   | 0                                      | 8   | 10   |
| Sewell         | CWHwh1      | 13          | 108             | 79  | 72   | 1   | 0                                      | -0  | 0  |
| Sewell         | CWHwh2      | 01          | 1,204           | 417   | 0  | 84  | 157                                    | 168   | 264  |
| Sewell         | CWHwh2      | 02          | 81              | 68  | 0  | 0   | 41                                     | 11  | 0  |

***Taan Ecosystem Representation Management Areas 2013:***

| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Area Required to be Recruited into Old Forest (ha) | Eco-Rep Management Zone in FLTC A87661 (ha) | Eco-Rep Management Zone in TFL 60 (ha) | Taan Eco-Rep Management Zone Surplus or Deficit | Remaining Unconstrained Old in Taan Tenure |
|----------------|-------------|-------------|-----------------|---|--|---|--|---|--|
| Sewell         | CWHwh2      | 03          | 231             | 139   | 0  | 11  | 3                                      | 4   | 0  |
| Sewell         | CWHwh2      | 04          | 0               | 0   | 0  | 0   | 1                                      | 1   | 51   |
| Sewell         | CWHwh2      | 05          | 315             | 249   | 4  | 84  | 13                                     | -1  | 0  |
| Sewell         | CWHwh2      | 06          | 0               | 0   | 0  | 3   | 0                                      | 3   | 14   |
| Sewell         | MHwh        | 01          | 438             | 113   | 0  | 9   | 26                                     | 11  | 42   |
| Sewell         | MHwh        | 02          | 184             | 0   | 0  | 0   | 22                                     | 22  | 46   |
| Sewell         | MHwh        | 05          | 0               | 0   | 0  | 0   | 1                                      | 1   | 14   |
| Skidegate Lake | CWHwh1      | 01          | 3,147           | 393   | 0  | 197   | 83                                     | 85  | 1119                                       |
| Skidegate Lake | CWHwh1      | 02          | 396             | 345   | 266  | 10  | 14                                     | 0   | 0  |
| Skidegate Lake | CWHwh1      | 03          | 0               | 0   | 0  | 3   | 7                                      | 9   | 20   |
| Skidegate Lake | CWHwh1      | 04          | 1,564           | 0   | 0  | 40  | 32                                     | 73  | 1185                                       |
| Skidegate Lake | CWHwh1      | 05          | 101             | 0   | 0  | 2   | 12                                     | 14  | 46   |
| Skidegate Lake | CWHwh1      | 06          | 0               | 0   | 0  | 5   | 6                                      | 11  | 26   |
| Skidegate Lake | CWHwh1      | 08          | 0               | 0   | 0  | 0   | 1                                      | 1   | 1  |
| Skidegate Lake | CWHwh1      | 10          | 100             | 44  | 0  | 21  | 19                                     | 18  | 40   |
| Skidegate Lake | CWHwh1      | 11          | 258             | 145   | 10   | 22  | 0                                      | 0   | 0  |
| Skidegate Lake | CWHwh1      | 12          | 0               | 0   | 0  | 3   | 0                                      | 3   | 108  |
| Skidegate Lake | CWHwh1      | 13          | 42              | 0   | 0  | 0   | 1                                      | 1   | 0  |
| Skidegate Lake | CWHwh1      | 14          | 0               | 0   | 0  | 4   | 0                                      | 4   | 26   |
| Skidegate Lake | CWHwh1      | 16          | 21              | 19  | 11   | 0   | 7                                      | 0   | 0  |
| Skidegate Lake | CWHwh2      | 01          | 1,090           | 705   | 0  | 14  | 264                                    | 99  | 47   |
| Skidegate Lake | CWHwh2      | 02          | 124             | 99  | 0  | 1   | 32                                     | 1   | 0  |
| Skidegate Lake | CWHwh2      | 03          | 259             | 203   | 109  | 0   | 17                                     | 0   | 0  |
| Skidegate Lake | CWHwh2      | 04          | 0               | 0   | 0  | 0   | 26                                     | 26  | 5  |
| Skidegate Lake | CWHwh2      | 05          | 76              | 55  | 34   | 1   | 20                                     | -0  | 0  |
| Skidegate Lake | CWHwh2      | 06          | 0               | 0   | 0  | 0   | 1                                      | 1   | 0  |
| Skidegate Lake | MHwh        | 01          | 219             | 154   | 82   | 2   | 31                                     | -0  | 0  |
| Skidegate Lake | MHwh        | 02          | 9               | 9   | 6  | 0   | 1                                      | -0  | 0  |
| Skidegate Lake | MHwh        | 04          | 0               | 0   | 0  | 0   | 1                                      | 1   | 0  |
| Tiell          | CWHwh1      | 01          | 1,084           | 0   | 0  | 579   | 0                                      | 579   | 479  |
| Tiell          | CWHwh1      | 02          | 257             | 110   | 13   | 97  | 0                                      | 0   | 0  |
| Tiell          | CWHwh1      | 03          | 0               | 0   | 0  | 1   | 0                                      | 1   | 3  |
| Tiell          | CWHwh1      | 04          | 3,354           | 1,104   | 0  | 1,054                                       | 0                                      | 205   | 340  |
| Tiell          | CWHwh1      | 05          | 34              | 0   | 0  | 30  | 0                                      | 30  | 10   |
| Tiell          | CWHwh1      | 06          | 0               | 0   | 0  | 13  | 0                                      | 13  | 33   |
| Tiell          | CWHwh1      | 07          | 0               | 0   | 0  | 1   | 0                                      | 1   | 7  |
| Tiell          | CWHwh1      | 10          | 1,530           | 350   | 0  | 468   | 0                                      | 279   | 165  |

***Taan Ecosystem Representation Management Areas 2013:***

| Landscape Unit | BEC Variant | Site Series | LUO Target (ha) | Area Required to meet Target, in addition to LUO Constrained Areas (ha) | Area Required to be Recruited into Old Forest (ha) | Eco-Rep Management Zone in FLTC A87661 (ha) | Eco-Rep Management Zone in TFL 60 (ha) | Taan Eco-Rep Management Zone Surplus or Deficit | Remaining Unconstrained Old in Taan Tenure |
|----------------|-------------|-------------|-----------------|---|--|---|--|---|--|
| Tlell          | CWHwh1      | 11          | 861             | 578   | 392  | 140   | 0                                      | 0   | 0  |
| Tlell          | CWHwh1      | 12          | 0               | 0   | 0  | 1   | 0                                      | 1   | 14   |
| Tlell          | CWHwh1      | 16          | 25              | 20  | 6  | 4   | 0                                      | 0   | 0  |
| Tlell          | CWHwh2      | 01          | 255             | 0   | 0  | 2   | 0                                      | 2   | 508  |
| Tlell          | CWHwh2      | 02          | 454             | 0   | 0  | 7   | 0                                      | 7   | 177  |
| Tlell          | CWHwh2      | 05          | 210             | 0   | 0  | 3   | 0                                      | 3   | 70   |
| Yakoun Lake    | CWHwh1      | 01          | 614             | 0   | 0  | 2   | 54                                     | 57  | 399  |
| Yakoun Lake    | CWHwh1      | 02          | 382             | 150   | 108  | 2   | 40                                     | 0   | 0  |
| Yakoun Lake    | CWHwh1      | 03          | 0               | 0   | 0  | 0   | 5                                      | 5   | 112  |
| Yakoun Lake    | CWHwh1      | 04          | 409             | 0   | 0  | 0   | 3                                      | 3   | 240  |
| Yakoun Lake    | CWHwh1      | 05          | 18              | 0   | 0  | 0   | 7                                      | 7   | 21   |
| Yakoun Lake    | CWHwh2      | 01          | 594             | 0   | 0  | 20  | 97                                     | 117   | 927  |
| Yakoun Lake    | CWHwh2      | 02          | 244             | 103   | 0  | 7   | 140                                    | 46  | 0  |
| Yakoun Lake    | CWHwh2      | 03          | 148             | 0   | 0  | 0   | 2                                      | 2   | 56   |
| Yakoun Lake    | CWHwh2      | 04          | 0               | 0   | 0  | 0   | 22                                     | 22  | 105  |
| Yakoun Lake    | CWHwh2      | 05          | 161             | 63  | 0  | 0   | 108                                    | 46  | 23   |
| Yakoun Lake    | CWHwh2      | 06          | 0               | 0   | 0  | 0   | 10                                     | 10  | 17   |
|                |             |             |                 |   | <b>Total</b>                                       | <b>5,845</b>                                | <b>13,262</b>                          | <b>9,309</b>                                    |  |

### Stand-level Ecosystem Representation (Annual Reporting)

Refer to the Stand-level Biodiversity Indicator for annual reporting results related to harvesting within any site series identified with deficits under the Landscape Level Analysis. Results will be compiled here in the future to facilitate analysis of trends on a five-year reporting cycle.

### Summary of Management Strategies

The management objectives for landscape level biodiversity are a combination of the legal requirements under the Land Use Order (and related Forest Stewardship Plan-FSP), the *Forest and Range Practices Act* (FRPA), the FSC Management Plan, and Taan's Corporate Management System (e.g., planning procedures).

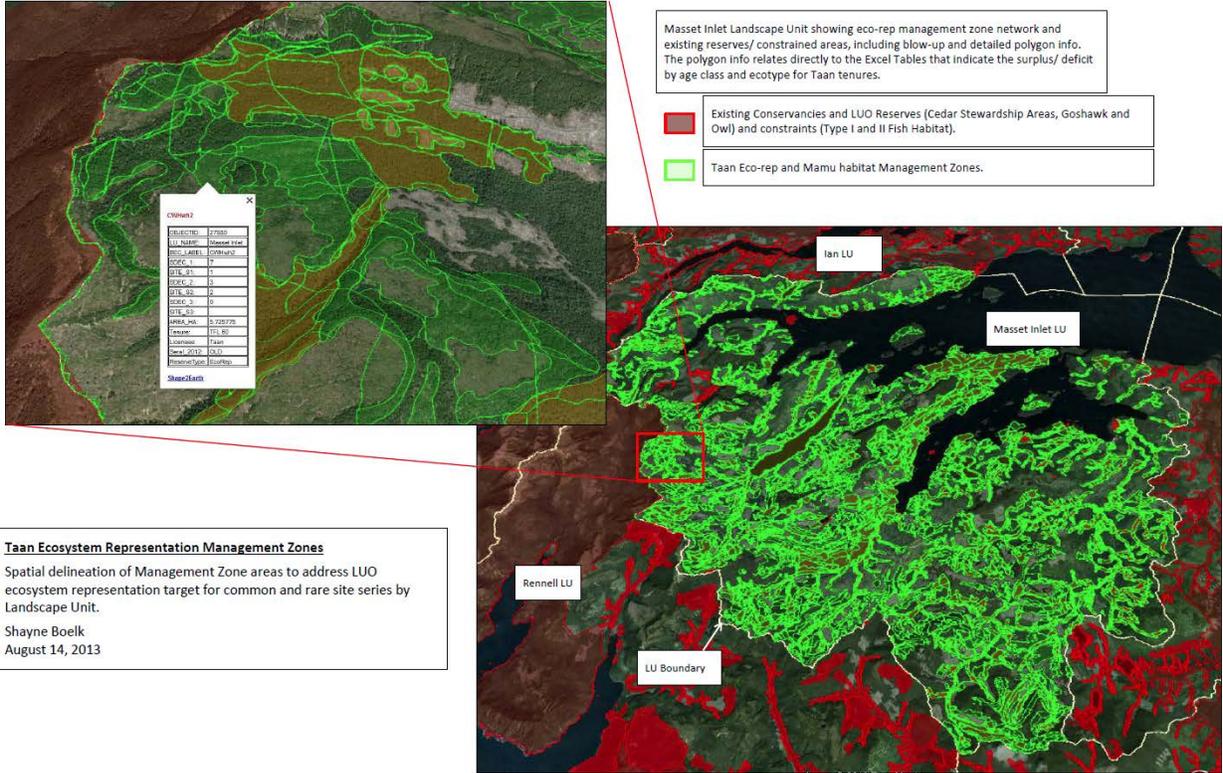
In particular, the Land Use Order (and related FSP) contains provisions for ecosystem representation targets for each Landscape Unit, relative to whether the ecosystem is considered common (30% representation targets) or rare (70% representation targets).

Licensees are required to complete analysis and tracking mechanisms in relation to ensuring these targets are met for each Landscape Unit. At a minimum, Site plans must include a review of the ecosystem representation targets and current status and ensure that harvesting is not occurring within any ecosystem that has identified deficits. Options to address deficits include non-spatial tracking or identification of internally established reserves to spatially identify the additional areas needed to eliminate deficits.

### Adaptive Management Strategies

Taan has completed a strategic planning exercise to spatially identify Ecosystem Representation Management Areas to identify areas of old and mature forest required to address the identified ecosystem representation deficits within our tenures (a total of 9,300ha of the operable land-base has been identified as Eco-Rep. Management Areas, ensuring that all eco-rep deficits are addressed and managed for in Taan tenures at both the landscape and site levels). Therefore, for Taan tenures, the Eco-Rep. Management Areas result in no eco-rep deficits for Taan at the landscape level. The management areas are considered during development activities and addressed within the Site Plans to ensure site level implementation of the landscape level management areas and maintenance of ecosystem targets.

This indicator ties into the Landscape Level Biodiversity Overview Indicator, as the management areas considered old forest, forest interior conditions and connectivity to existing reserves during the exercise. Planning procedures have been updated to set the parameters for implementation (Planning SOP). An overview sample of the results is as follows:



**Potential Future Considerations:** In addition to the legally required analysis by each site series, future monitoring may want to consider also assessing ecosystem representation by site series groups in place of site series, as this may provide a broader portrayal of ecosystem representation in larger “like” or related units. At this point in time though, this level of analysis is not really relevant, as we are legally required to assess ecosystem representation for each site series within each Landscape Unit.

**Database & Reporting Parameters**

This indicator is analyzed using GIS information and builds on existing analysis work done for the LUO and the FSP related to the Ecosystem Representation targets under the LUO as well as previous work completed for the Environmental Risk Assessment. In addition, a spreadsheet and mapping layer exists for the Taan Eco-Rep Management Area work that has been done. It is anticipated that this indicator will be assessed every five years, but may be more frequently in the event that there are significant changes to any of the factors impacting the indicator.

## Indicator: HCVF Large Landscape Level Forests (LLLF)

| Element   | Objective   | Indicator  | Target  |
|---|---|--|---|
| FSC 9.4.1, 8.2.3 & 8.2.4: High Conservation Value Forests (HCVF) and attributes | Maintain HCVF values of large landscape level intact forests; ensure viable populations of most or all naturally occurring species exist in natural patterns of disturbance and abundance | % disturbance within LLLF Forest Polygon (measured in relation to the proportion of the intact forest located within the MU) | ≤ 20% disturbance, including harvesting and road development activities |

### Rationale for Indicator & Target

The indicator is based on the FSC requirements to identify large landscape level forests within the Management Unit as part of the HCVF Assessment and then establish management strategies consistent with the precautionary approach to ensure maintenance of the values, and consistent with Motion 65 (passed by FSC International to establish maximum disturbance thresholds). The target is based on the Motion 65 and the resulting 20% threshold set under the management strategies of the FSC Management Plan. It is anticipated that this indicator and target will change over time as results of monitoring and adaptive management are reviewed (continual improvement and adaptive management loop).

The FSC Management Plan describes the three large landscape level forests (LLLF) in more detail, but a summary is provided as follows:

| LLL Forest Patches on the Haida Gwaii |         | LLL Forest within Protected Areas & Conservancies |    | LLL Forest within the MU (ha) |   | Allowable Disturbance (Motion 65) |    | LLL Forest within other tenures |    |
|---------------------------------------|---------|---|----|-------------------------------|---|-----------------------------------|----|---------------------------------|----|
| ID                                    | (ha)    | (ha)  | %  | (ha)                          | % | (ha)                              | %  | (ha)                            | %  |
| 1                                     | 114,440 | 112,367   | 99 | 1,054                         | 1 | 210.8                             | 20 | -                               | 0  |
| 2                                     | 62,381  | 1,988   | 3  | 0                             | 0 |                                   |    | 64,369                          | 97 |
| 3                                     | 71,083  | 53,638  | 75 | 0                             | 0 |                                   |    | 17,445                          | 25 |

LLLF #1 is not a significant concern for forest management as 99% of the area is located within protected areas and only 1% is located within the Management Unit. Of the 1,054ha located within the MU, 20% is available for forest management activities, or 210.8ha (thereby preserving the 80% core area established under Motion 65). LLLF #2 and #3 are located outside of the Management Unit and are outside of Taan's management control.

A detailed breakdown of the Large Landscape Level Forests in relation to the Management Unit is as follows:

| Detailed Breakdown                                      | LLLF Polygon |
|---|--------------|
|   | 1            |
| Total Area (ha)   | 114,439.83   |
| Parks & Conservancies (ha)                              | 112,381.83   |
| Parks & Conservancies (%)                               | 98%          |
| Total Area within MU (ha)                               | 1,053.87     |
| Total Area within MU (%)                                | 1%           |
| LUO Constrained in MU (ha)                              | 60.46        |
| Remaining in MU-not constrained (ha)                    | 993.40       |
| Non-Contributing in MU (ha)                             | 71.02        |
| Remaining in MU ha)                                     | 922.38       |
| Partially Contributing in MU (ha)                       | 82.28        |
| Remaining in MU ha) – within timber Harvesting Landbase | 840.10       |
| <b>Maximum permitted harvest under Motion 65 (ha)</b>   | <b>210.8</b> |

The THLB factors used to generate this data are non-contributing <0.5, partially contributing 0.5 to <0.75 and timber harvesting land-base 0.75-1.0.

### **Current Status/ Results**

#### Harvesting

| Year | Harvest Area & Road Area within LLF Polygon #1 | Target Met (Y/N) |
|------|--|------------------|
|      | Maximum threshold = 210.8ha                    |                  |
| 2017 | 0.0  | Y                |
| 2016 | 0.0  | Y                |
| 2015 | 0.0  | Y                |
| 2014 | 0.0  | Y                |
| 2013 | 0.0  | Y                |
| 2012 | 0.0  | Y                |
| 2011 | 0.0  | Y                |

Taan currently has not completed, not has any plans for harvesting planned within the small narrow section of intact forest located in the north-west section of TFL 60 (in LLF polygon 1).

### **Summary of Management Strategies**

The overall management objective for large landscape level forests under the FSC High Conservation Value Forests assessment criteria is “Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance and there is a high likelihood of long-term species persistence”.

The management objectives for intact forest polygons are a combination of the legal requirements under the Land Use Order (and related Forest Stewardship Plan-FSP), the *Forest and Range Practices Act* (FRPA), and the FSC Management Plan. The HCVF Assessment determined that special measures are required beyond the legal requirements in order to adhere to the FSC requirements and ensure a precautionary management approach is implemented for large landscape level intact forests.

The FSC Management Plan includes a description of the analysis, methods and research on various disturbance thresholds for ensuring intactness is maintained.



### ***Adaptive Management Strategies***

The disturbance threshold target has been revised to include [the requirements of FSC International Motion 65](#). [Past revisions included, consideration of](#) disturbance in relation to roads and the management strategies in the FSC Management Plan have been revised to include considerations such as minimizing the amount of roads, widths, etc. and deactivation/ rehabilitation of roads no longer required for use.

Some additional items to consider regarding adaptation of the management strategies for the large landscape level forests is exploring the potential to utilize helicopter logging to reduce impacts from roads in the intact forest areas (may be uneconomical due to poorer timber types or may not be feasible due to other constraints such as equipment, fuel, etc.). An alternative is to consider developing forest influence targets for the LLLF area.

### **Database & Reporting Parameters**

GIS analysis combined with annual harvest reporting as communicated by Planning.

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## Indicator: Invasive Species

| Element  | Objective                        | Indicator  | Target  |
|--|----------------------------------|--|---|
| FSC 8.2.6 & 9.4: High Conservation Value Forests (HCVF) and attributes | Maintain HCVF values/ attributes | # of invasive plant occurrences reported; # of assessments completed on new occurrence areas | Ensure monitoring and reporting of invasive plants is occurring |

### Rationale for Indicator & Target

The indicator was developed based on recommendations made from the peer review of the High Conservation Value Forest Assessment to monitor new introductions, eradications and spread of existing invasive species.

A symposium was held in 2002 to discuss introduced species to Haida Gwaii and in particular, focussed on the Sitka mule deer in relation to ecosystem impacts. Recent studies by the Research Group on Introduced Species (RGIS) also indicate that deer browse have significantly impacted song bird populations on Haida Gwaii. The Land Use Order Background Report (2003) describes introduced species of key relevance to the Land Use Planning process and includes beaver, rats, racoon, Sitka deer, Japanese knotweed, scotch broom, gorse, Canada thistle, marsh thistle, wall lettuce and English ivy.

Invasive plants are only part of invasive species concerns, but are the most directly related to, and can be impacted by, forest management activities. Therefore, this indicator has been developed to focus on invasive plants. The target does not contain a specific threshold, but is designed to encourage active monitoring and reporting of new sightings.

### Current Status/ Results

#### Haida Gwaii – Top Five

| Year      | Invasive Plant ID | # of Sites added | Eradicated sites* | Total # of active sites |
|-----------|-------------------|------------------|-------------------|-------------------------|
| 2017      | Bull Thistle      | 0                | 1                 | 429                     |
|           | Burdock Spp       | 0                | 0                 | 79                      |
|           | Canada Thistle    | 0                | 0                 | 213                     |
|           | Scotch Broom      | 5                | 5                 | 142                     |
|           | Sowthistle        | 0                | 0                 | 119                     |
| 2016      | Bull Thistle      | 2                | 1                 | 430                     |
|           | Burdock Spp       | 0                | 1                 | 79                      |
|           | Canada Thistle    | 0                | 0                 | 213                     |
|           | Scotch Broom      | 8                | 9                 | 142                     |
|           | Sowthistle        | 1                | 0                 | 119                     |
| 2015      | Bull Thistle      | 5                | 49                | 429                     |
|           | Burdock Spp       | 1                | 44                | 80                      |
|           | Canada Thistle    | 5                | 42                | 213                     |
|           | Scotch Broom      | 8                | 63                | 143                     |
|           | Sowthistle        | 0                | 45                | 118                     |
| 2014      | Bull Thistle      | 20               | 3                 | 424                     |
|           | Burdock Spp       | 0                | 1                 | 79                      |
|           | Canada Thistle    | 10               | 1                 | 208                     |
|           | Scotch Broom      | 2                | 4                 | 135                     |
|           | Sowthistle        | 3                | 0                 | 118                     |
| 2013      | Bull Thistle      | 108              | 25                | 404                     |
|           | Burdock Spp       | 7                | 2                 | 79                      |
|           | Canada Thistle    | 37               | 12                | 198                     |
|           | Scotch Broom      | 0                | 12                | 133                     |
|           | Sowthistle        | 8                | 1                 | 115                     |
| 1997-2012 | Bull Thistle      | 296              | 52                | Benchmark               |
|           | Burdock Spp       | 72               | 13                | Benchmark               |

|  |                |     |    |           |
|--|----------------|-----|----|-----------|
|  | Canada Thistle | 161 | 19 | Benchmark |
|  | Scotch Broom   | 133 | 53 | Benchmark |
|  | Sowthistle     | 107 | 16 | Benchmark |

\* The values for 1997-2015 include all the initial and follow-up surveys for the eradicated sites (e.g., may be multiple per site to confirm species removal).

In 2016, there were 23 new sites added on Haida Gwaii which included the following species: annual sow thistle, bohemian knotweed, bull thistle, butterfly bush, common comfrey, common tansy, himalayan blackberry, himalayan knotweed, mountain bluet, Himalayan balsam, scotch broom, spotted knapweed, St. John's wort, tansy ragwort, wormwood and yellow archangel. There were 22 sites eradicated which include the following species: bull thistle, burdock species, common tansy, gorse, marsh plume thistle, orange hawkweed, scotch broom, tansy ragwort, yellow hawkweed. There was an overall net increase of 1 site.

There were no significant changes in the number of sites for the top 5 species (net increase by 1 site).

The reporting criteria was updated in 2015 to better represent the efforts to control invasive plants on Haida Gwaii. Previously, the total number of locations and the net change in area occupied by the invasive plant was reported. The net change in area does not give an accurate representation of the reported occurrences as the annual surveys do not include all the identified sites (and one site may be surveyed multiple times year). Furthermore, the data for the number of locations is linked to the number of records in the IAPP database which includes multiple survey records and eradicated sites.

Over the past 3 years there has been an increase in the occurrences of the 5 key species with a fairly significant increase in bull thistle and Canada thistle. There have also been new occurrences of tansy ragwort, yellow iris and oxeye daisy (high priority species). This is likely a function of the increase in surveyed area and awareness (and reporting) over past years. The results will continue to be monitored for trends.

Across Haida Gwaii, the key species that are currently occupying the most area are Bull Thistle, Burdock species, Canada thistle, Scotch Broom and Sowthistle species.

### Management Unit

| Year | # of Invasive Plant New Occurrences on the MU | # of Invasive Plant New Occurrences Reported To MFLNRO | # of Taan Assessments Completed on New Occurrence Sites | Target Met (Y/N) |
|------|---|--|---|------------------|
| 2017 | 1   | 1  | 1   | Y                |
| 2016 | 1   | 1  | 1   | Y                |
| 2015 | 53  | 0  | 0   | N                |
| 2014 | 0   | 0  | 0   | Y                |
| 2013 | 0   | 0  | 0   | Y                |
| 2012 | 0   | 0  | 0   | Y*               |
| 2011 | 0   | 0  | 0   | Y                |

In 2017, the MFLNRO notified Taan that they had identified a knotweed location adjacent to Farm Mainline in 2016 and that the site had been loaded into the IAPP database. This site was reviewed and confirmed to be private land and not within Taan's tenures. However, an additional location was identified by Taan within a special use permit area held by a third party, a portion of which overlaps with the Haida Tenure and this area was treated in 2017. Some treatments were completed by MFLRNO in Haida Gwaii for Bull Thistle using a biological control (Gall Fly), but not within Taan tenures.

In 2016, Taan identified and surveyed several occurrences of foxglove in the Skidegate Lake area. The site was reported to the IAPP database, however they replied that they already had the site identified. The site was assessed and treatment options were reviewed, however treatment was not pursued in 2016. There were no new invasive plant sightings noted during the survey program.

There was also a request from MFLNRO to undertake a bull thistle biocontrol agent (gall fly) release on the Taan tenure (MAM001). Taan reviewed the request and decided not to approve the request at this time as it involves the use of a non-native species being introduced to Haida Gwaii.

In 2015, there were several noted minor occurrences of bull and Canada thistle, scotch broom, horsetail, Himalayan blackberry, hawkweed and foxglove in cutblocks during the survey program. Taan did not report any occurrences to MFLNRO (Report a Weed). Taan also collaborated with the MFLNRO and the Northwest Invasive Plant Council to ensure that recent Taan activity near a known tansy ragwort occurrence (Spur 20D, Copper Mainline) would not create further invasions. FREP surveys in the Management Unit in 2015 did not indicate any invasive plants observed.

In 2014, Taan did not report any new occurrences of invasive species during silviculture surveys or Site Plan development for proposed harvest areas. FREP surveys in the Management Unit in 2014 also did not indicate any invasive plants observed.

In 2013, there were no specific activities carried out by Taan regarding invasive plants in the management unit and no new occurrences observed. Information on a new Haida Gwaii grass seed mix "Northern Coastal Mix" containing no invasive species was provided by MFLNRO in 2013 and is being considered for future grass seed orders. FREP surveys in the Management Unit in 2013 also did not indicate any invasive plants in the reports.

### **Summary of Management Strategies**

In 2012, Taan developed an internal training package for invasive plants that includes information on identification, general habitat, reproduction and mechanism of spread, management considerations and additional sources of information. The package also contains information on reporting invasive plants through phone, the Invasive Alien Plant Program or the Report a Weed phone Application.

The following invasive plants have been identified as high priority species: knapweeds (diffuse and spotted), bull thistle, Canada thistle, common burdock, common tansy, Cypress spurge, Dalmatian toadflax, knapweeds (diffuse and spotted), English ivy, gorse, Hawkweeds (yellow, spotted, orange), Himalayan blackberry, Japanese knotweed, Himalayan knotweed, marsh plume thistle, mountain bluet, oxeye daisy, perennial sow thistle, scotch boom, St. Johns-wort, tansy ragwort, yellow iris, and yellow archangel.

Forest managers in BC are required under the *Forest and Range Practices Act* (FRPA) to include measures to prevent the introduction and spread of invasive plants through their Forest Stewardship Plans (FSP). The Haida Gwaii FSP (approved November 2011) includes measures for a list of identified high priority invasive species, and includes training in identification, monitoring and reporting to the provincial database (IAPP), grass seeding and roadside brushing as well as considerations for recommending for sanitation and disposal activities (e.g., machine washing).

The presence of invasive plants is first assessed at the development/ planning stage of the cutblock through the Site Plan process (field work and documentation to address all FSP requirements, including invasive plants). New sightings are reported to MFLNRO via the IAPP database/ Report a Weed process. If any special instructions are required to work crews regarding prevention of spread, etc. they are reviewed during the pre-work meetings. Routine inspections and survey such as regeneration surveys, planting inspections, road maintenance, etc. are all potential avenues to identify and report new sightings.

### **Adaptive Management Strategies**

None at this time. Results from this indicator will continue to be monitored for future considerations.

### **Database & Reporting Parameters**

The Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) Invasive Alien Plants Program and Invasive plants database (IAPP Application) has the capability to generate exports of data. Taan can obtain access to the database or can request reports periodically from the IAPP contacts (listed on the website.). New sightings, including species details and reporting 'agency'/ licensee are available. Reported of treated areas are also available (web link is provided below).

Under the FSP, Taan is required to report new sightings of invasive plants to the IAPP Application, 'Report A Weed' process: <http://www.for.gov.bc.ca/hra/plants/index.htm>.

[The Research Group on Introduced Species \(RGIS\)](#) was founded in 1996 to conduct research and publicize information on the effects of introduced species on natural ecosystems within Haida Gwaii. It works in collaboration with several other groups such as federal and provincial governments and environmental groups. Several reports and publications are available on their website.

## Indicator: LUO/ FSP Annual Reporting

| Element  | Objective                        | Indicator                            | Target  |
|--|----------------------------------|--------------------------------------|---|
| FSC 8.2.6 & 9.4: High Conservation Value Forests (HCVF) and attributes | Maintain HCVF values/ attributes | Land Use Order/ FSP annual reporting | Provide a summary of the results of the LUO/ FSP annual reporting |

### Rationale for Indicator & Target

The indicator is intended to provide a summary of annual report data under the LUO/ FSP in order to demonstrate stand-level implementation of the LUO that are for the most part, absent from the initial landscape level data analysis for the FSC Assessments and FSC Management Plan. The intent is that the data will build onto the landscape level mapping over time to allow for more complete and accurate data analysis. The target is a general target to gather information/ data at this time. Future work may involve establishing performance targets based on some numerical targets, if applicable.

### Current Status/ Results

The following table includes the features that are identified within the development areas (roads and blocks) that are identified, mapped and reported annually to the MFLRNO and the CHN.

| Year                      | Feature Description           | # of Features | 'Reserve' Area <sup>1</sup> (ha) | Target Met (Y/N) |
|---------------------------|-------------------------------|---------------|----------------------------------|------------------|
| 2017                      | Bear Den                      | 2             | 1.3                              | Y                |
|                           | Cedar Retention Patch         |               |                                  |                  |
|                           | Cultural Cedar Stands         |               |                                  |                  |
|                           | CMT Reserve (polygons)        | 25            | 13.4                             |                  |
|                           | CMT Reserve (stems on ground) | -             | -                                |                  |
|                           | Monumental Cedar Reserve      |               | 6.7                              |                  |
|                           | >120cm                        | 9             |                                  |                  |
|                           | <120cm                        | 14            |                                  |                  |
|                           | Heritage Feature              |               |                                  |                  |
|                           | Forest Feature                |               | 16.7                             |                  |
|                           | Stink Current                 | 10            |                                  |                  |
|                           | Cloudberry                    | -             |                                  |                  |
|                           | Devil's Club                  | 22            |                                  |                  |
|                           | Indian Hellebore              | 439           |                                  |                  |
|                           | Pacific Crab Apple            | 4             |                                  |                  |
|                           | Pacific Crab Apple (group)    | 103           |                                  |                  |
|                           | Pacific Crab Apple (single)   | 149           |                                  |                  |
|                           | Fairy Slipper                 | -             |                                  |                  |
|                           | Labrador Tea                  | -             |                                  |                  |
|                           | Licorice Fern                 | 1             |                                  |                  |
|                           | Northern maiden-hair          | 1             |                                  |                  |
|                           | Running Club Moss             | 1             |                                  |                  |
|                           | Riparian                      |               |                                  |                  |
|                           | Type I Streams                |               | 144.2                            |                  |
|                           | Type II Streams               |               | 89.7                             |                  |
|                           | Active Fluvial Units          | 2             | 12.0                             |                  |
|                           | Yew Retention                 |               |                                  |                  |
| Group                     | 67                            |               |                                  |                  |
| Single                    | 1872                          |               |                                  |                  |
| <b>Total LUO Reserves</b> | <b>2,720</b>                  | <b>289.3</b>  |                                  |                  |

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| Year                      | Feature Description           | # of Features    | 'Reserve' Area <sup>1</sup> (ha) | Target Met (Y/N) |
|---------------------------|-------------------------------|------------------|----------------------------------|------------------|
| 2016                      | Bear Den                      | 6                | 2.4                              | Y                |
|                           | Cedar Retention Patch         | -                | -                                |                  |
|                           | Cultural Cedar Stands         | 8                | 14.4                             |                  |
|                           | CMT Reserve (polygons)        | 64               | 30.5                             |                  |
|                           | CMT Reserve (stems on ground) | 12               | -                                |                  |
|                           | Monumental Cedar Reserve      |                  |                                  |                  |
|                           | >120cm                        | 46               | 47.0                             |                  |
|                           | <120cm                        | 51               |                                  |                  |
|                           | Heritage Feature              | 1                | 3.1                              |                  |
|                           | Forest Feature                |                  |                                  |                  |
|                           | Stink Current                 | 11               | 53.1                             |                  |
|                           | Cloudberry                    | 0                |                                  |                  |
|                           | Devil's Club                  | 42               |                                  |                  |
|                           | Indian Hellebore              | 475              |                                  |                  |
|                           | Pacific Crab Apple            | 178              |                                  |                  |
|                           | Fairy Slipper                 | 34               |                                  |                  |
|                           | Labrador Tea                  | 1                |                                  |                  |
|                           | Running Club Moss             | 1                |                                  |                  |
|                           | Riparian                      |                  |                                  |                  |
|                           | Type I Streams                | 17               | 132.7                            |                  |
| Type II Streams           | 40                            | 126.2            |                                  |                  |
| Active Fluvial Units      | 2                             | 4.3              |                                  |                  |
| Yew Retention             |                               |                  |                                  |                  |
| Group                     | 76                            |                  |                                  |                  |
| Single                    | 2678                          |                  |                                  |                  |
| <b>Total LUO Reserves</b> |                               | <b>3,743</b>     | <b>413.7</b>                     |                  |
| Year                      | Feature Description           | # of Features    | 'Reserve' Area <sup>1</sup> (ha) | Target Met (Y/N) |
| 2015                      | Bear Den                      | 4                | 4.5                              | Y                |
|                           | Cedar Retention Patch         |                  |                                  |                  |
|                           | Cultural Cedar Stands         |                  | 62.1                             |                  |
|                           | CMT Reserve                   | 28 & 5 on ground | 20.9                             |                  |
|                           | Monumental Cedar Reserve      |                  |                                  |                  |
|                           | >120cm                        | 48               | 108.1                            |                  |
|                           | <120cm                        | 61               |                                  |                  |
|                           | Heritage Feature              | 1                | 4.7                              |                  |
|                           | Forest Feature                |                  |                                  |                  |
|                           | Stink Current                 | 1                | 16.8                             |                  |
|                           | Cloudberry                    | 1                |                                  |                  |
|                           | Devil's Club                  | 19               |                                  |                  |
|                           | Indian Hellebore              | 92               |                                  |                  |
|                           | Pacific Crab Apple            | 310 & 22 groups  |                                  |                  |
|                           | Riparian                      |                  |                                  |                  |
|                           | Type I Streams                | 16               | 36.5                             |                  |
|                           | Type II Streams               | 26               | 105.3                            |                  |
|                           | Active Fluvial Units          | 7                | 27.7                             |                  |
|                           | Yew Retention                 |                  |                                  |                  |
|                           | Group                         | 25               |                                  |                  |
| Single                    | 676                           |                  |                                  |                  |
| <b>Total LUO Reserves</b> |                               | <b>1,292</b>     | <b>395.5</b>                     |                  |

| Year                      | Feature Description      | # of Features        | 'Reserve' Area <sup>1</sup> (ha) | Target Met (Y/N) |
|---------------------------|--------------------------|----------------------|----------------------------------|------------------|
| 2014                      | Bear Den                 | 4                    | 1.1                              | Y                |
|                           | Cedar Retention Patch    | -                    | -                                |                  |
|                           | Cultural Cedar Stands    | -                    | 18.1                             |                  |
|                           | CMT Reserve              | 33                   | 3.1                              |                  |
|                           | Monumental Cedar Reserve | 54                   | 10.5                             |                  |
|                           | >120cm                   | 45                   | -                                |                  |
|                           | <120cm                   | 9                    | -                                |                  |
|                           | Forest Feature           | 185                  | -                                |                  |
|                           | Devil's Club             | 2                    | -                                |                  |
|                           | Indian Hellebore         | 167                  | -                                |                  |
|                           | Pacific Crab Apple       | 16                   | -                                |                  |
|                           | Riparian                 | 16                   | 75.5                             |                  |
|                           | Type I Streams           | 3                    | 33.8                             |                  |
|                           | Type II Streams          | 12                   | 40.2                             |                  |
|                           | Active Fluvial Units     | 1                    | 1.5                              |                  |
|                           | Yew Retention            | 183                  | -                                |                  |
|                           | Group                    | 7                    | -                                |                  |
| Single                    | 176                      | -                    |                                  |                  |
| <b>Total LUO Reserves</b> |                          |                      | <b>108.3</b>                     |                  |
| Year                      | Feature Description      | # of Features        | 'Reserve' Area <sup>1</sup> (ha) | Target Met (Y/N) |
| 2013                      | Cedar Retention Patch    | -                    | -                                | Y                |
|                           | Cultural Cedar Stands    | 2                    | 1.8                              |                  |
|                           | CMT Reserve              | 14 CMT<br>(2 stands) | 2.7                              |                  |
|                           | Monumental Cedar Reserve | 60                   | 20.5                             |                  |
|                           | >120cm                   | 29                   | -                                |                  |
|                           | <120cm                   | 31                   | -                                |                  |
|                           | Forest Feature           | 558                  | -                                |                  |
|                           | Devil's Club             | 1                    | -                                |                  |
|                           | Indian Hellebore         | 220                  | -                                |                  |
|                           | Pacific Crab Apple       | 337                  | -                                |                  |
|                           | Riparian                 | 17                   | 108.4                            |                  |
|                           | Type I Streams           | 7                    | 67.4                             |                  |
|                           | Type II Streams          | 8                    | 32.2                             |                  |
|                           | Active Fluvial Units     | 2                    | 8.8                              |                  |
|                           | Yew Retention            | 321                  | -                                |                  |
|                           | Group                    | 4                    | -                                |                  |
|                           | Single                   | 317                  | -                                |                  |
| <b>Total LUO Reserves</b> |                          |                      | <b>133.4</b>                     |                  |

| Year                      | Feature Description         | # of Features | 'Reserve' Area <sup>1</sup> (ha) | Target Met (Y/N) |      |
|---------------------------|-----------------------------|---------------|----------------------------------|------------------|------|
| 2012                      | Cedar Retention Patch       | -             | 3.4                              | Yes              |      |
|                           | CMT Reserve                 | 40            | 4.2                              |                  |      |
|                           | Cultural Cedar Stands       | -             | 1.3                              |                  |      |
|                           | Forest Feature <sup>2</sup> | 280           | 5.5                              |                  |      |
|                           | Devil's Club                | 3             |                                  |                  |      |
|                           | Indian Hellebore            | 3             |                                  |                  |      |
|                           | Labrador Tea                | 3             |                                  |                  |      |
|                           | Licorice Fern               | 37            |                                  |                  |      |
|                           | Lingonberry                 | 2             |                                  |                  |      |
|                           | Old Man's Beard             | 1             |                                  |                  |      |
|                           | Oval Leaved Blueberry       | 4             |                                  |                  |      |
|                           | Pacific Crab Apple          | 256           |                                  |                  |      |
|                           | Running Club Moss           | 1             |                                  |                  |      |
|                           | Monumental Cedar Reserve    | 124           |                                  |                  | 17.6 |
|                           | >120cm                      | 58            |                                  |                  |      |
|                           | <120cm                      | 66            |                                  |                  |      |
|                           | Type I Streams              | N/A           | 119.6                            |                  |      |
|                           | Type II Streams             | N/A           | 33.9                             |                  |      |
|                           | Yew Retention               | 115           | Incorporated into other reserves |                  |      |
|                           | Single                      | 88            |                                  |                  |      |
| Group                     | 27                          |               |                                  |                  |      |
| <b>Total LUO Reserves</b> |                             |               | <b>185.7</b>                     |                  |      |

<sup>1</sup> Reserve Area includes LUO reserve zones and management zones

<sup>2</sup> Note that many GIS forest feature points include multiple remunerations of features and these are recorded in the database.

In 2017, LUO reporting included 22 cutblocks (including four salvage blocks) with a total of 423.3ha harvested. LUO Management Zones and Reserves totalled 185.7ha, or 44% of the harvested area.

Taan 2016, LUO Reporting included 25 cutblocks (including one salvage block) with a total of 719.4ha harvested. Two of the harvested blocks (LOG018 and LYK017) and the salvage block did not contain any LUO reserves. LUO Reserves (413.4ha) represent 57.5% of the harvested area. There was also a midden identified with a 3.1ha reserve in MCL006. There was a 45ha habitat zone put around the blue heron nest in AER004.

Taan 2015 LUO Reporting included 19 cutblocks (no salvage blocks) with a total of 504.1 hectares harvested. LUO Reserves (298.8) represent 59% of the harvested area. There was also a Haida midden identified with a 0.2 ha reserve.

Taan 2014 LUO Reporting included 10 cutblocks and 16 salvage blocks with a total of 325 hectares harvested. LUO Reserves (108.3 ha) represent 33% of the harvested area.

Taan 2013 LUO Reporting included 14 cutblocks and 8 salvage blocks with a total of 380.2 hectares harvested. LUO Reserves (133.4 ha) represent 35% of the harvested area.

Taan 2012 LUO Reporting was completed December 31, 2012 and included 11 cutblocks and 2 salvage blocks. To put the LUO reserves total of 185.7 ha in context, the total harvest area for the 2012 reporting period is 339.7 ha (55%).

In 2012, Taan created a blank geodatabase for LUO reporting purposes and provided it to the CHN for use by other licensees in completing their LUO reporting.



### **Summary of Management Strategies**

Under the Land Use Order (LUO) and related Forest Stewardship Plan (FSP), Taan is required to annually report to the Council of the Haida Nation and the Province of BC the following items (information related to the feature as well as established no harvest zones and management zones):

- Haida Traditional Heritage Features and Forest Features
- Cedar Retention
- Western Yew Retention
- Cultural Cedar Stands, CMTs and Monumental Cedar
- Type I and II Fish Habitat
- Active Fluvial Units
- Forested Swamps
- Ecological Representation
- Red & Blue Listed Plant Communities
- Black Bear Dens
- Forest Reserves

Under the LUO, reporting is also required concurrent with the identification of any potential nests of Northern Goshawk, Great Blue Heron and Northern Saw-whet Owl.

### ***Adaptive Management Strategies***

Not applicable at this time (this indicator is based on a legal requirement).

### **Database & Reporting Parameters**

Data is maintained within GIS database systems and reporting is compiled and submitted annually by Taan as required (reporting period is generally November 1-November 1 each year, submitted by December 31 of each year). Summaries are provided to the Taan Certification Manager for inclusion in the FSC Monitoring Report. Presumably, the Council of the Haida Nation and the Provincial Government will be compiling the annual data within a database. It is not known whether this database will be made available to the licensees.

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## Indicator: Windthrow Management Effectiveness

| Element  | Objective                        | Indicator   | Target                              |
|--|----------------------------------|---|-------------------------------------|
| FSC 8.2.6 & 9.4: High Conservation Value Forests (HCVF) and attributes | Maintain HCVF values/ attributes | Areas with expected windthrow have Tree Crown Modification (TCM) treatments completed | 100%; did the TCM work as expected? |

### Rationale for Indicator & Target

The 2014 External Audit resulted in a recommendation for development of a windthrow management effectiveness monitoring program since there are so many Land Use Order features and HCVFs that are managed through the establishment of reserves and management zones that have the potential to be impacted by windthrow. Taan developed a monitoring program to assess whether the current management regime and treatment prescriptions are maintaining wind-firm edges.

### Current Status/ Results

| Year | # of Blocks Assessed | # of Blocks w/ Windthrow >20% | # of Blocks w/ Windthrow >50% | # of Blocks w/ Windthrow >70% | # of Blocks with LUO Features Impacted | Target Met (Y/N) |
|------|----------------------|-------------------------------|-------------------------------|-------------------------------|--|------------------|
| 2017 | 24<br>(129 segments) | 16<br>(36 segments)           | 9<br>(15 segments)            | 8<br>(8 segments)             | 4                                      | N                |
| 2016 | 34<br>(200 segments) | 25<br>(50 segments)           | 12<br>(22 segments)           | 4<br>(8 segments)             | 6                                      | N                |
| 2015 | 12<br>(73 segments)  | 7<br>(15 segments)            | 3<br>(6 segments)             | 0                             | 2                                      | N                |

In 2017, 5 blocks had TCM prescribed but not completed at the time of the assessment (BUC001, BUC002, GRA003, GST005, GST009). TCM has since been confirmed to have been completed in all blocks.

An additional 2 blocks had TCM completed but the assessment noted they did not appear to have been completed the full 20m depth as prescribed (CAN001, THR002A).

There were four blocks with LUO reserves/management zones and/ or some features that were impacted by windthrow:

- MCL001 CMT reserves impacted by windthrow (CMT feature not impacted)
- MCL004 CMT reserves impacted by windthrow (CMT features not impacted)
- SHN005 portions of cultural cedar stand heavily impacted by windthrow (CMT, Monumental (MTs) impacted)
- THR003 3 monumental have blown over
- IAN005 also had windthrow in a devil's club reserve, but the feature was not impacted.

An internal investigation was completed to assess the immediate and root causes and develop corrective/preventative actions to address the continued challenges with windthrow management on Haida Gwaii. A summary and proposed actions is included within the Summary of Results section.

During 2016, nine assessments were completed at the post harvest stage, 14 at the survival walkthrough assessment stage (or survival plot stage) and 11 at the stocking survey stage. On nine of the forms the stages were not indicated or were marked incorrectly. An action item has been generated to consider modifying the form to change the stages to match the Taan terminology used in the silviculture database as well as the survey timing. The results of the assessments indicated the following:

- There were four blocks (AER001, SKI010, DAT009 and THR 004) where the windthrow treatments were not completed before the winter storm season occurred (prescriptions specified treatments were to occur prior to, or during harvesting). SKI010 and DAT009 had LUO features within riparian areas that were impacted as a result of windthrow that occurred. AER001, SKI010, and THR004 all had boundary segments with significant windthrow noted (>50% windthrow).
- MCL003 and DAT003 were both treated before the winter storms, but had 1-2 segments with >70% windthrow.
- As a preventative measure, the pre-work form was revised in 2016 following the 2015 Monitoring Report and review of this indicator to include an item for TCM to help ensure that treatments get completed prior to the winter storm season.
- Of the six blocks with LUO feature impacted, the windthrow occurred within a year after harvest on four of the blocks (AWN 005, DAT 007, DAT 009, SKI010) and two blocks (DAT 007 and FLO003) were identified at the stocking survey stage. Features impacted include three streams (DAT 003, DAT 009, SKI010), a yew patch (DAT 003), a monumental tree reserve (AWN 005) and two LUO management zones/ reserves with no features impacted (FLO 003 and DAT 007). AWN005 had TCM completed but the cedar stems were not modified and the monumental reserve was impacted. DAT 009 and SKI010 did not have TCM completed as per the prescription (i.e., complete before falling or soon after).

The 2015 monitoring results include some assessments completed in the spring of 2016.

### **Summary of Management Strategies**

Taan maintains windthrow management procedures within the Planning SOP that are consistent with the best management practices for coastal forests. This includes standard forms for data collection and completion of windthrow assessments for each development area as well as guidelines for treatment prescriptions based on stand type and level of protection required for adjacent features.

### **Adaptive Management Strategies**

Taan has developed a Windthrow Effectiveness Monitoring Program within the Corporate Management System (Planning SOP) that utilizes a CMS Monitoring Form that collects information for each cutblock at the following stages: Post Harvest Assessment (within 3-6 months of harvest), Survival Walkthrough (typically 1-2 yrs post-harvest) and Stocking Survey (typically 3-6 yrs post-harvest).

Results will be compiled and assessed for overall effectiveness evaluation during the compilation of the annual FSC Monitoring Report. It may take a few years of implementation to generate meaningful analysis.

### **Database & Reporting Parameters**

Windthrow monitoring forms are saved within each cutblock file on the Taan server (and a copy is also filed in the Corporate-Monitoring folder for easy access). They are compiled and reviewed as part of the annual FSC Monitoring Report and results presented above.

## Indicator: Cultural Heritage Resource Management Effectiveness

| Element  | Objective                                      | Indicator                                  | Target  |
|--|--|--|---|
| FSC 8.2.6 & 9.4: High Conservation Value Forests (HCVF) and attributes | Monitor Cultural Heritage Resource Stewardship | Maintain Cultural Heritage Resource values | 100% of practices to maintain features categorized as well to very well |

### Rationale for Indicator & Target

The indicator and target is developed to evaluate the effectiveness of the implementation of the Land Use Order and site specific management strategies for cultural resources and features and utilizes data from the Forest and Range Evaluation Programs (FREP) Resource Stewardship Monitoring (RSM) protocol for Cultural Heritage Resource (CHR) stewardship. The protocol monitors the impacts of forest resource management practices on known site-specific CHR sites and features (at the post-harvest stage). The RSM indicators are intended to assess:

- How are known CHRs actively managed and what strategies are used?
- How has conversation or protection maintained the site integrity and (or) value?
- Are results on the ground consistent with the Haida's (First Nations') expectations?
- Do professional site planning documents contain information about CHR management?
- Are results on the ground consistent with site planning and site alteration permit commitments or requirements?
- Is/was site damage due to unavoidable operational factors?
- What management practices are resulting in adequately protecting, managing and/or conserving CHR values?
- What management options may have improved CHR management on the site?
- In what format, and how readily available, is CHR information?

The target is focussed on improved management of CHRs. This indicator will be reported annually, but assessed against the target on a five-year reporting period to better assess trends (larger sample size).

### Current Status/ Results

| Year | Feature Type  | FREP Cultural Heritage Resource Indicators |  |        |            |      | Target Met (Y/N) |     |
|------|---|--|--|--------|------------|------|------------------|-----|
|      |   | Total # Assessed                           | Extend practices maintained CHR Values (%) |        |            |      |                  |     |
|      |   |  | Very poorly                                | Poorly | Moderately | Well | Very Well        |     |
| 2017 | FREP Assessments not completed for this Indicator in 2017 |  |  |        |            |      |                  | N/A |
| 2016 | Hellebore   | 1  | -  | -      | -          | 100% | -                | N   |
|      | Monumental Cedars   | 21   | -  | -      | -          | -    | 100%             |     |
|      | CMTs  | 9  | -  | -      | 33%        | 17%  | 50%              |     |
|      | Devil's Club  | 4  | -  | 50%    | -          | -    | 50%              |     |
| 2015 | Yew Trees   | 17   | -  | -      | -          | 35%  | 65%              | N   |
|      | Crabapple Trees   | 243  | -  | -      | -          | 46%  | 54%              |     |
|      | Monumental Cedars   | 17   | -  | -      | -          | 12%  | 88%              |     |
|      | Devil's Club  | 1  | -  | -      | 100%       | -    | -                |     |

There were no cultural heritage resource FREP assessment completed in 2017.

In 2016, assessments were completed in 4 blocks (COW004, DEM002, MCL004 and PHT002). Two Monumental Reserves in MCL004 were impacted by windthrow. TCM was completed, however the edges with the windthrow were not treated. Windthrow also impacted a devils club feature in DEM002. In PHT002, a devil's club stem was not identified during the CFI Surveys or other forest development phases (there was a stem identified 100m upstream on the Operations Map). A Council of the Haida Nation (CHN) Post Harvest Incident assessment and tracking form was completed.



In 2015, Post Harvest Assessments were completed in 3 cutblocks (SHN003, FLO003 and DAT006). The DAT006 assessment was completed after a devil's club stem was found in close proximity to the harvest boundary during a stream survey (i.e., was not a full assessment of the cutblock).

### **Summary of Management Strategies**

Cultural resource management is legislated under the Land Use Order and through the overlap requirements under the *Forest and Range Practices Act* and *Heritage Conservation Act* which are implemented through the Forest Stewardship Plan and site level planning. In addition, Taan maintains standard operating procedures/ field procedures to guide operations in harvesting and road building related to culture feature identification, assessments, retention, etc.

Implementation of the Corporate Management System (CMS) procedures and FSC requirements in the FSC Management Plan address several of the recommended best practices above and should contribute to reducing the impacts: SOPs require that a Cultural Features Identification survey be completed by direction of a person certified by the CHN before layout to ensure the appropriate management strategy (i.e., reserve and/ or management zone) is implemented and the features are marked in the field accordingly. There are also stop work instructions in the SOP's in the event a feature which is not identified on the map is encountered.

Specific procedures for FREP evaluations, including descriptions of the features and block evaluations (e.g., 'well', 'very well', etc.) are described within the FREP Protocol for Cultural Heritage Resource Stewardship Monitoring and can be accessed on the [FREP website](#).

### **Adaptive Management Strategies**

Internal review of the FREP monitoring recommendations with the Planning Manager or during the Management Review Meetings (generate action items, as required).

The CHN also completes field reviews (often with FREP team) and discusses the results with Taan.

### **Database & Reporting Parameters**

FREP Cultural Heritage Resource Value Resource Stewardship Monitoring Forms (forms received from MFLNRO FREP contacts).

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