FSC® Management Plan – Appendix 3

Annual Monitoring Report 2022

From the Land and Spirit of the Haida

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Introduction

This monitoring report is compiled on an annual basis in support of Forest Stewardship Council® (FSC®) certification and is based on the monitoring plan outlined in the FSC Management Plan. The past 5 years of monitoring results are provided in this report and previous years can be reviewed in earlier reports.

This Monitoring Report, including development of indicators, was completed by Taan Forest LP. Performance reporting for several key indicators was also generated utilizing the Forest and Range Evaluation Program (FREP) monitoring data provided by the Haida Gwaii Natural Resource District.

Indicators have been developed to address the FSC requirements for monitoring and progress on indicators has been used as benchmarks to assess trends. Targets have been developed to reflect internally established "goal posts" that, in some cases, are the same as the benchmark (e.g., indicators based on legal requirements) and, in other cases, may vary from the benchmark (e.g., indicators developed for improved performance or continual improvement). Targets are periodically reviewed and revised to drive continual improvement or to reflect current operational conditions, where applicable.

The reporting of indicators will occur annually based on the calendar year. Where specific indicators and targets are to be measured on alternate timeframes, it will be specified under the indicator descriptions.

A summary of this FSC monitoring report is available to the X̱aayda *Haida* Nation, stakeholders and to the public, as noted under the FSC engagement requirements in the FSC Management Plan.

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. Any proposed changes to the FSC Management Plan, Assessments, or Monitoring Plan are documented within the Management Review meeting minutes and/or the Taan Corporate Tracker.

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 as a result of management review recommendations, monitoring, audits, and feedback from X̱aayda *Haida* and stakeholders. Several of the updates were made to address the current National Forest Stewardship Standard of Canada and remain as guidance for those completing the annual report.

Indicator	Summary of Changes
Various	FSC Standard references updated where applicable, and the order some indicators appear in the report have been shuffled to better align with the new FSC Standard, in addition to updated groupings of indicators and their headings. Various indicators also had minor edits made to clarify types of information to be reported under the indicator, consistent with new standard requirements.
All indicators	Where appropriate, the monitoring report includes reporting for the last 5 years for each indicator. Additional data prior to 5 years can be viewed in earlier monitoring reports to reduce redundancy.
Indicator 1: Sustainable Harvest Rates	Target revised to reflect the requirements of the new FSC Standard (and is now based on harvesting consistent with the Allowable Annual Cut).
Indicator 3: Community Needs	The table under indicator 3 was updated to include additional forest products that were not reported in the past and to also include more information about the quantities of material provided. The Mushroom Habitat Table classifications were also adjusted to provide more clarity for readers, including noting the total mushroom habitat area, additional picking areas outside of the LUO mapped areas, and logging within the mushroom habitat area.
Indicator 10: Stand Level Biodiversity Effectiveness	New indicator and target added to report on any damage to residual/ retention trees resulting from harvesting operations, as measured by Post-Harvest Assessment that is completed for every cutblock by Taan Foresters. Linkages also to the Windthrow Effectiveness and Cultural Heritage Resource Effectiveness Indicators.
FSC Riparian Budgets Watershed & Stand Level	These indicators have been deleted, as they are no longer required under the new FSC Standard. Watersheds will be managed per the LUO Hydrological Recovery targets (refer to Indicator 13: Watershed Hydrological Recovery).
Indicator 13: Watershed Hydrological Recovery	Indicator renamed from Watershed Disturbance to Hydrological Recover to be consistent with the LUO. Thresholds related to the previous FSC Standard have been removed from the indicator and target as they no longer exist. Taan will continue to manage Hydrological Recovery to meet the requirements of the LUO.
Indicator 14: Riparian Management Effectiveness	Target updated from "Continually improve the percentage of properly functioning streams" to "Continually improve the percentage of properly functioning streams until all streams are deemed properly functioning". This ensures that Taan's performance will be recognized in situations where the previous years' streams were deemed properly functioning.
Indicator 17: Xaayda Haida and Public Engagement	Indicator title revised to add Xaayda Haida reference, and requirements to report on the implementation of FPIC agreement was added to the indicator.
Indicator 18: Special Sites	New indicator to report on protection of sites of special cultural, ecological, economic, religious, or spiritual significance to Xaayda Haida and local communities that are not included within the Land Use Order (LUO). LUO features are reported under the LUO/ FSP Annual Reporting Indicator.
Indicator 19: Payment of Fees and Wages	Indicator revised from Government Revenue to also include timely payments of wages to forest workers, which is a requirement for monitoring in the new standard.
Indicator 23: Safety Incidents	Indicator re-named from Accident Frequency Rate to Safety Incidents and added required criteria for reporting of incidents related to bullying/ Harassment, Sexual Harassment and gender discrimination and working conditions (recognizing that confidentiality must be protected in all cases). SAFE audit score was also added to the indicator reporting and a target of >90% was added to demonstrate effective implementation of the required elements of a Health and Safety Program, via the Taan Corporate Management System (CMS). It is important to note that Taan also completes our own internal monitoring through completion of inspections and audits.

	Also, the SAFE audit scores were broken down between Taan and Contractors to provide more clarity on performance.
Indicator 24: Environmental Incidents	Column added in the reporting table and description in the indicator rationale to describe the types of incidents to be included in the reporting, such as illegal or unauthorized activity, inappropriate storage or disposal of hazardous substances and wastes.
Indicator 26: Fertilizer	New indicator to report on use of fertilizer in the Management Unit.
Indicator 27: Economic Viability	Previous Forest Management Efficiencies indicator renamed to Economic Viability to align with terminology used in the new standard. Added a component to include completion of annual operating budgets.
Indicator 35: Cultural Heritage Resource Management Effectiveness	The reporting table above was improved to report on each feature type rather than an aggregate of all types. The actual number of features was also included in each category rather than just the overall percentage.

Summary of Results (2022)

In 2022, Taan achieved the established targets on 30 of 32 indicators assessed. Part marks were provided for two indicators as they have multiple targets. This resulted in an overall performance score of 94%. Its important to note that the Forest and Range Evaluation Program (FREP) data was not available form the Forest Service and Taan relies upon this data to monitor indicators 14, 15 and 35. If FREP data is provided in the future, this monitoring report will be updated accordingly. Taan is coordinating with the Forest Service to help support the collection of FREP monitoring data so there are no gaps in future monitoring.

Past performance history is as follows: 2021 (91%), 2020 (93%), 2019 (94%). 2018 (94%), 2017 (97%), 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 2: Forest Products

Target: Harvest Volumes within 5% of the profile over a 10-year period.

Target achieved: Partially

Taan assessed whether its harvest volumes were within 5% of its profile over the past 10-year period. In 2022, western red cedar and 'other' species were within 5% of the target, however spruce was 9.8% above and hemlock was 16.7% under. Taan has yet to update its harvest profile percentages to be consistent with the TSR for TFL 60 and the FNWL as identified as an action in 2021.

Indicator 28: Landscape Level Biodiversity – Overview

Target: 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.

Target achieved: Partially

Taan has not updated its data since 2019 and the 2022 results are consistent with the previous year. Results are noted below and show <30% old forest in the following landscape units (most are showing increases to old forest but decreases to mature forest; exception is the Skidegate LU which shows less old and mature forest):

- Lower Yakoun (19.3% old forest and 56.4% old + mature combined)
- Naikoon (24.7% old forest and 88.1% old + mature combined)
- Skidegate (18.6% old forest and 27.7% old + mature combined)

- Tlell (28.5% old forest and 54.8% old + mature combined)

Based on the above target, Taan cannot meet this indicator for the Landscape Units listed. Refer to the recommendations section for a proposed change to the target.

Action Items

The results of the annual report have generated some continual improvement 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. *Indicator 2:* Forest Products identifies a harvest profile target of 0% for yellow cedar. This should be assessed and be updated, if needed, to account for a percentage of yellow cedar in the profile. *In Process.*

2. *Indicator 4:* Waste and Residue classifies the avoidable waste into second growth and old growth; however, the forest service more accurately reports avoidable waste as immature and mature data classes. The classes should be updated in this monitoring report. *Updated, see Summary of Changes.*

3. *Indicator 14: Watershed Hydrological Recovery* sets the target as "# of watersheds exceeding the established thresholds improves over time until all watersheds are within the allowable thresholds". Does Taan have any influence towards achieving this target on the Brent Creek Watershed? Only 34.6 ha falls within the Management Unit (1% of the sensitive watershed) and Taan is not harvesting within this watershed. *This is not under Taan's control.*

4. *Indicator 15: Riparian Management Effectiveness* identifies the target as "Continually improve the percentage of properly functioning streams". This target should be revised as it will be ineffective when all streams are assessed as properly functioning. How can Taan continually improve if 100% of streams are properly functioning? Continuously work towards properly functioning streams (i.e., 85% of all streams w/in Taan tenures). *Updated, see Summary of Changes.*

5. *Indicator 34: LUO/ FSP Annual Reporting* notes several reporting tables over the past years. Update this section to include only one table (with past years noted) to reduce redundancy. *Updated, see Summary of Changes.*

6. *Indicator 32: Invasive Species* identifies the target as "Ensure monitoring and reporting of invasive plants is occurring". A review of this target and a recent meeting with the Northwest Invasive Plants Council identified that the target is currently ineffective and should be revised to be results focused. The eradication of invasives will never be achieved, only controlled. Focus should be on reporting and measures to control priority invasives on Taan tenures. Incorporate Taan's scotch broom treatments and annual contract with the NW plant committee to treat priority invasives. *Ongoing*

7. Revise Management Plan and monitoring report engagement process to be less time consuming and more streamlined for the Haida Nation and Taan. *Ongoing*

8. Revise this monitoring report format to reduce the overall length and time to complete based on the scale, intensity, and risk. *Ongoing*

9. Rerun the harvest profile percentages to be consistent with the TSR for TFL 60 and the FNWL. *In Process.*

10. *Indicator 24:* Environmental Incidents: During this review, Taan identified that this target could be revised to be more effective because many of the environmental incidences could result from natural causes or the general public. Taan should not be penalized for elements out of its control. *Not yet updated.*

11. *Indicator 35:* Cultural Heritage Resource Management Effectiveness: The reporting table above was improved to report on each feature type rather than an aggregate of all types. The actual number of features was also included in each category rather than just the overall percentage. As a result, Taan and the Solutions Table have developed alternate criteria for specific cultural features that have not yet been reflected upon in the FREP assessments. For example, Taan is now targeting 75% protection of Yew trees present in the Total Area Under Prescription, rather than 100%. Further, the FREP assessments have focused on blocks that are 3-4 years old, where the planning is generally completed an additional year prior, resulting in assessments of potentially 5 year-old practices. This indicator could benefit from the addition of more recent blocks and the training of Taan staff to complete additional FREP assessments. *Under Review*

Growth Rates, Regeneration & Condition of the Forest

Indicator 1: Sustainable Harvest Rates

Element	Objective	Indicator	Target
FSC 5.2.3, 8.2.2 (9)	Maintain sustainable harvest rates	Annual harvest volume is consistent with the Allowable Annual Cut (AAC)	Average level of harvest over a 5-year (cut control) period does not exceed the AAC

Rationale for Indicator & Target

Harvest rates are determined through the *Forest Act*, Allowable Annual Cut (AAC) requirements. In X̱aayda Gwaay.yaay *Haida Gwaii,* the AAC is established by the Haida Gwaii Management Council. The Chief Forester of BC is then responsible to allocate the AAC to the various tenure holders. Tenure holders are responsible to ensure that harvest levels are consistent with the AAC, measured in cut control periods of five years (legislated under the *Forest Act*).

Current Status/ Results

Year	Description	Tenure	Volume Harvested[1] (m³)	AAC (m³)	% of AAC	Target Met (Y/N)
2022	Taan	TFL 60	60,763	279,000	71%	Y
		FNWL N1G	143,504	137,129		
		FLA97524	90,428			
	BCTS	volume allocation	0	16,238		
		Total	294,695			
2021	Taan	TFL 60	190,318	279,000	43%	Y
		FLA97524	35,595	95,000		
		FNWL N1G	0	137,129		
	BCTS	volume allocation	0	16,238		
		Total	225,913	527,367		
2020	Taan	TFL 60 & Haida Tenure combined	99,836	340,000	46%	Y
		FLA87661	107,510	120,000		
		FLA97524	60,000	95,000		
		FNWL N1G	0	137,129		
	BCTS	volume allocation	0	14,210+16,238		
		Total	206,749			
	Taan	TFL 60	870,750	1,700,000	64%	Y

2015-2019	Taan	Haida Tenure	611,246	600,000		
	BCTS	volume allocation	0	14,210		
		Total	1,481,996	2,314,210		

Note 1: Harvest volumes are based on Ministry of Forests cut control statements.

Summary of Management Strategies

Taan actively monitors the harvest volumes in relation to the AAC through cut control monitoring and reporting process with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (Forest Service).

Database & Reporting Parameters

Harvest volumes are recorded and maintained by the Forest Service 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 Xaayda Gwaay.yaay *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).

In 2022, Taan continued to harvest below the long-term sustainable level and its AAC. Taan's current forest licences consist of Tree Farm License 60 and its new First Nations Woodland Licence N1G.

In 2021, Taan continued to harvest below the long-term sustainable level and its AAC. Taan's FLTC (A97524) will expire in September 2022 and Taan recently acquired a First Nations Woodland License (same defined area as the past FLTC A97254) with an AAC of 137,129 m3.

In 2020, Taan continued to harvest below the long-term sustainable level and the AAC. In September 2020, Taan's FLTC A87661 expired and in October 2020, the Chief Forester's new AAC determined was made for TFL 60. Taan was offered and accepted a 2-year FLTC A97524 for 190,000 m3 as a bridge to its future FN Woodland License, expected in early 2021.

In 2019, Taan continued to harvest below the long-term sustainable level and the AAC. A new TSR was completed in 2019 and a new AAC was recommended in April 2020 by the Haida Gwaii Management Council. The AAC will be determined by the Chief Forester later in 2020.

In 2018, Taan continued to harvest well below the long-term sustainable level although it was below the AAC. BCTS did not complete any harvesting in the Xaayda *Haida* Tenure during 2018.

BCTS did not complete any harvesting in the Xaayda *Haida* Tenure during 2017 (none since 2013 when significantly more than the LTHL was harvested by BCTS; they are holding off on any new harvest to account for the higher volume in 2013 until the levels have balanced with the LTHL). Taan continued to harvest at a rate that was well within the long-term sustainable level, although it was 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 TSR Analysis Package (January 2012) and resulting Allowable Annual Cut (AAC) determination for Xaayda Gwaay.yaay *Haida Gwaii*. For past reporting, interim harvest levels noted above reflect those indicated in the FSC Management Plan in lieu of the AAC determinations.

Indicator 2: Forest Products

Element	Objective	Indicator	Target
FSC 5.1.1, 5.1.2		Volume and species harvested is relatively consistent with the harvesting profile	Harvest Volumes within 5% of the profile over a 10-year period

A range of ecosystem services, non-timber and timber forest resources and products that can strengthen and diversify the local economy are identified	Amount of monumental cedar provided to the Cultural Wood Program	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 internal analysis completed by Taan to determine the harvesting profile of the timber harvesting land-base.

The Timber Supply Review completed by the Haida Gwaii Management Council indicates that the harvesting profile of X̲aayda Gwaay.yaay *Haida Gwaii* 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 was reduced by the establishment of 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.

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 Ts'uu *western red cedar* and a small amount of SG̲aahlaan *yellow cedar/ cypress* and K̲ayd *Sitka spruce*.

The following table represents Taan's harvest levels (including BCTS harvesting within Taan's tenures) and total lumber sales.

Current Status/ Results

Volume Harvested by Species

Year	Description	AAC m³	Total Volume Harvested¹ (m³)	Red Cedar	Yellow Cedar	Hemlock	Spruce	Other²	Taan Lumber Sales (fbm)	Target Met (Y/N)
2022	Taan	416,129	204,267	70,556	4,684	48,318	67,941	12,766	20,427,080	Met for Cw & Other but not for Yc, Hw, Ss
	BCTS	16,238	0	-	-	-	-	-		
	Total			34.5%	2.3%	23.7%	33.2%	6.2%		
2021	Taan	527,367	225,913	79,823	12,334	39,116	88,003	4,866	33,856,330	Met for Cw & Other but not for Yc, Hw, Ss
	BCTS	16,238	0	-	-	-	-	-		
	Total		225,913	35.3%	5.5%	17.3%	39.0%	2.2%		
2020	Taan	449,000	206,749	70,703	28,013	47,863	76,199	9,746	21,424,739	Met for Cw & Other but not for Yc, Hw, Ss
				34.2%	13.6%	23.2%	36.9%	4.7%		
	BCTS	14,200	0	-	-	-	-	-		
	Total		232,524	34.2%	13.6%	23.2%	36.9%	4.7%		
2019	Taan	460,000	242,949	89,102	12,424	59,988	77,906	3,529	22,756,430	To be reported 2021
				36.7%	5.1%	24.7%	32.1%	1.5%		
	BCTS	14,200	0	-	-	-	-	-		
	Total	-	242,949	36.7%	5.1%	24.7%	32.1%	1.5%		
2018	Taan	460,000	288,891	51,781	13,814	97,915	124,788	593	18,907,375	To be reported 2021
				17.9%	4.8%	33.9%	43.2%	0.02%		
	BCTS	14,200	0	-	-	-	-	-		
	Total	-	288,891	17.9%	4.8%	33.9%	43.2%	0.02%		
2017	Taan	460,000	266,526	82,026	23,116	65,276	95,576	532	16,661,000	To be reported 2021
				30.8%	8.7%	24.5%	35.9%	0.2%		
	BCTS	14,200	0	-	-	-	-	-		
	Total	-	266,526	30.8%	8.7%	24.5%	35.9%	0.2%		

Year	Description	AAC m³	Total Volume Harvested[1] (m³)	Volume Harvested by Species (m³)					Taan Lumber Sales (fbm)	Target Met (Y/N)
				Red Cedar	Yellow Cedar	Hemlock	Spruce	Other[2]		
2016	Taan	460,000	376,260	99,608	12,866	118,985	135,164	9,126	15,247,993	To be reported 2021
				26.5%	3.4%	31.6%	35.9%	2.4%		
	BCTS	14,200	0	-	-	-	-	-		
	Total	-	376,260	26.5%	3.4%	31.6%	35.9%	2.4%		
2015	Taan	460,000	370,234	73,492	15,175	123,373	157,981	209	7,079,580	N
				19.9%	4.1%	33.3%	42.7%	0.06%		
	BCTS	14,200	0	-	-	-	-	-		
	Total	-	370,234	19.9%	4.1%	33.3%	42.7%	0.06%		
2014	Taan	460,000	276,603	55,899	6,540	84,015	118,663	11,486	2,612,436	N
				20.2%	2.4%	30.4%	42.9%	4.2%		
	BCTS	14,200	0	-	-	-	-	-		
	Total	-	276,603	20.2%	2.4%	30.4%	42.9%	4.2%		
2013	Taan	460,000	269,462	83,035	14,643	83,165	79,975	8,644	4,710,105	Y
				30.8%	5.4%	30.9%	29.7%	3.2%		
	BCTS	14,200	54,696	0	0	15,824	38,601	271		
				0	0	28.9%	70.6%	0.5%		
	Total	-	324,158	25.6%	4.5%	30.5%	36.6%	2.8%		
	Harvest Profile			**27%**	**-**	**44%**	**28%**	**2.43**		
	10-year average harvest volumes (2013-2022)			**28.2%**	**5.4%**	**27.3%**	**37.8%**	**2.4%**		
	Rolling Average			28.2%	5.4%	27.3%	37.8%	%		
	Within 5% of profile?			**Y**	**N**	**N**	**N**	**Y**		

Note 1: Based on Taan's current tracking system (date of scale) - does not meet exact harvest billing data (date of billing) from Ministry of Forests

Note 2: Other species include minor species such as pine and deciduous species.

In 2022, the custom cut program produced 20,427,080 fbm of lumber. Taan further assessed whether its harvest volumes were within 5% of its profile over the past 10-year period. Similar to the previous year, western red cedar and 'other' species were within 5% of the target, however spruce was 9.8% above and hemlock was 16.7% under. Taan has yet to update its harvest profile percentages to be consistent with the TSR for TFL 60 and the FNWL as identified as an action in 2021. This will certainly bring the yellow cedar closer to its harvest profile target as the current target is identified as 0%. It is expected that the harvest profiles will be updated prior to the next 2023 annual monitoring report. Further, as Taan converts from an old growth to a second growth harvest profile, it is expected that the harvest volumes will balance out and fall within 5% of the profile over the next 10-year period.

In 2021, the custom cut program produced 33,856,330 fbm of lumber. Taan assessed whether its harvest volumes were within 5% of its profile over the past 10-year period. Similar to 2020, western red cedar and 'other' species were within 5% of the target, however yellow cedar was just outside of the limit (1.0% above) followed by spruce (7.1% above), and hemlock (16.1% under). As Taan converts from an old growth to a second growth harvest profile, it is expected that the harvest volumes will balance out and fall within 5% of the profile over the next 10-year period. The second growth hemlock stands are not quite meeting market size requirements, while spruce, a faster growing species, is meeting market size target. It is anticipated that the harvest volumes of hemlock will eventually be in excess and spruce volumes will be lower over the next decade. BCTS did not complete any harvesting within the X̲aayda *Haida* Tenure.

In 2020, the custom cut program produced 21,424,739 fbm of lumber. In 2020, Taan assessed whether its harvest volumes were within 5% of its profile over the past 10-year period. It was determined that western red cedar and 'other' species were within 5% of the target, however yellow cedar was just outside of the limit by 0.9% followed by spruce (6.9% above), and hemlock (15.9% under). As Taan converts from an old growth to a second growth harvest profile, it is expected that the harvest volumes will balance out and fall within 5% of the profile over the next 10-year period. The second growth hemlock stands are not quite meeting market size requirements, while spruce, a faster growing species, is meeting market size target. It is anticipated that the harvest volumes of hemlock will eventually be in excess and spruce volumes will be lower over the next decade. BCTS did not complete any harvesting within the X̲aayda *Haida* Tenure.

In 2019, the custom cut program produced 22,756,430 fbm of lumber. Taan continues to adhere to the cedar and cypress harvest limits. The target was adjusted to reflect harvesting consistent with the actual profile of the timber harvesting land base as opposed to the previous target which was based on the forecasted profile from the previous TSR. BCTS did not complete any harvesting within the X̲aayda *Haida* Tenure.

In 2018, Taan sold 18,907,375 fbm of lumber to various customers. The custom cut program has shown a significant increase over the last three years. A value-added project included custom cut K̲ayd *Sitka spruce* timbers to develop a profiled pattern for use in log home construction in Japan. Taan continues to adhere to the cedar and cypress harvest limits. BCTS did not complete any harvesting within the X̲aayda *Haida* Tenure.

Support for the Cultural Wood Program

Year	Monumental Cedar provided to the Cultural Wood Program		Target Met (Y/N)
	# of Pieces	m³	
2022	16	148.31	Y
2021	21	185.23	Y
2020	7	56.3	Y
2019	13	126.1	Y
2018	7	68.9	Y

In 2022, 16 monumental logs were released through the cultural wood program in 2022 for a total of 148.31 m3.

In 2021, 21 monumental trees were harvested and provided to the cultural wood program. As noted, the trees are gifted, the trees are tracked and under the control of the Council of Haida Nation.

In 2020, seven monumental trees were harvested and provided to the cultural wood program. Once the trees are gifted, the trees are tracked and under the control of the Council of Haida Nation.

In 2019, 13 monumental trees were harvested and provided to the cultural wood program. Three were ≥120cm (one of which were accidentally felled in Cultural Cedar Stand). Six were picked up and utilized, and seven remain in storage at Taan DLSs waiting for pick up from the Cultural Wood Program.

In 2018, seven monumental trees were harvested and provided to the cultural wood program. One was 120cm. Four were picked up (and utilized), and three remain in storage at the Dajing Giids *Skidegate* Dry Land Sort (DLS); none were put back into production.

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 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.

Database & Reporting Parameters

Annual harvest volumes are recorded and maintained by the Ministry of Forests, Lands and Natural Resource Operations (Forest Service) 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 X̲aayda Gwaay.yaay *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 harvest volume by species. Log scaling reports can be generated through the Netscale software and lumber sales reports can be generated through the accounting database. Volume provided to the cultural wood program is tracked by Taan personnel.

Indicator 3: Community Needs

Element	Objective	Indicator	Target
FSC 5.1.1, 5.1.2, 8.2.2 (9)	A range of ecosystem services, non-timber and timber forest resources and products that can strengthen and diversify the local economy are identified	Support local organizations/ groups requesting wood products and/or NTFPs	Record volume of products by type (cords, m³, kg, etc.) provided
		Hectares of Mushroom Habitat within Taan Tenures	Record and communicate Mushroom Habitat with local community

Rationale for Indicator & Target

This indicator is based on the objective 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 (i.e., there are no established maximum cut levels or fees charged to user groups for accessing NTFPs). The underlying assumption is that the local harvest of NTFPs is at a sustainable level for the ecosystems.

Current Status/ Results

Year	# provided	Forest Products Provided	Product	Volume (various units)	Target Met?
2022	4	Cooperation with local Haida for cedar bark collection	Cedar Bark	Not Available	Y
	0	Mushroom pickers	Mushrooms	Not Available	
	1	Firewood collectors	Firewood	12 cords	
	15	Firewood Delivered	Firewood	90 cords	
	3	Yew Wood	Misc. Tools	Not Available	
	3	Sitka Spruce	Tone Wood	25 m3	
	12	Cedar logs	Misc. Cultural Use	80 m3	
	6	Various logs	Misc. Community projects for custom cutting	605 m3	
	1	Cedar logs	Casket Wood	30 m3	
2021	12	Cooperation with local Haida for cedar bark collection Mushroom pickers Firewood collectors	Cedar Bark, Mushrooms, Firewood	Not available	Y
2020	1	Cooperation with local Haida for cedar bark collection Mushroom pickers Firewood collectors	Cedar Bark, Mushrooms, Firewood	Not available	Y
2019	1	Cooperation with local Haida for cedar bark collection	Cedar Bark	Not available	Y
2018	3	Cooperation with local Haida for cedar bark collection Contact and continued consultation with a group of local mushroom pickers Cooperation with local resident for cedar foliage for oil extraction.	Mushrooms Cedar Bark Cedar Boughs	Not available	Y

In 2022, Taan continued to support the local economy with various products such as logs for cultural use and local processing, firewood, and access to NTFPs such as mushrooms and cedar bark. The table above was revised this year to better account for the products provided to the public.

In 2021, Taan continued to provide maps and information to local Xaayda *Haida* for the collection of cedar bark for weaving, mushrooms, and firewood. One individual is responsible for coordinating the NTFP request to Taan on behalf of the CHN, and several local Xaayda *Haida* persons are involved in gathering NTFPs within Taan's Management Unit.

In 2020, Taan continued to provide maps and information to local Xaayda *Haida* for the collection of cedar bark for weaving, mushrooms, and firewood. One individual is responsible for coordinating the NTFP request to Taan on behalf of the CHN, and several local Xaayda *Haida* persons are involved in gathering NTFPs within Taan's Management Unit.

In 2019, Taan continued to provide maps and information for a local Haida to collect cedar bark for weaving.

In 2018, Taan continued to work with the Old Massett Men's Group providing maps and locations of upcoming harvest area that have potential bark stripping within them, while HaiCo facilitated the outing and transport. One Xaayda *Haida* of the Yahgulanaas Clan also continued to conduct bark stripping activities.

Mushroom Habitat

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 Kaagan daajing *Mushroom* habitat available in Taan tenures within the CWH wh1 01 ecosystem in the Dajing Giids *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+	
2022	Mushroom Habitat Area	**407.8**	**73**	**429.45**	**1,640.7**	**5,163**	**121.2**	**.84**	**7,836**
	Picked area outside the Polygon	135.2	0	.22	25	59.7	1.43	24.9	246.45
	Potential Mushroom Habitat	2,328.1	3,729.4	7,563.4	4,490.7	5,193.4	2,673.7	7,353.5	33,332.2
	Logging within the MHA	0	0	0	0	0	64.6	0	**64.6**
2021	Habitat Mapped	249.6	0	1.1	695.0	612.8	19.8	29.9	1,608.2
	Habitat GIS Analysis	278.3	65.7	533.6	2,876.7	2,650.6	102.5	0	6,507.4
	Not Mushroom Habitat	2,065.6	5,216.7	6,230.1	5,759	3,363.0	3,060.3	7,079.0	32,773.7
	Total Area	**2,544.6**	**5,282.4**	**6,764.8**	**9,330.7**	**6,675.3**	**3,182.7**	**7,109.0**	**40,889.4**
2020	Habitat Mapped	249.6	0	1.1	695.0	612.8	19.8	29.9	1,608.2
	Habitat GIS Analysis	278.3	65.7	533.6	2,876.7	2,650.6	102.5	0	6,507.4
	Not Mushroom Habitat	2,065.6	5,216.7	6,230.1	5,759	3,363.0	3,060.3	7,079.0	32,773.7
	Total Area	**2,544.6**	**5,282.4**	**6,764.8**	**9,330.7**	**6,675.3**	**3,182.7**	**7,109.0**	**40,889.4**
2019	Habitat Mapped	225.2	0	1.1	695.0	637.2	19.8	29.9	1,608.4
	Habitat GIS Analysis	253.9	65.7	533.6	2,876.7	2,675.0	102.5	0	6,507.4
	Not Mushroom Habitat	2,065.6	5,216.7	6,230.1	5,759	3,363.0	3,060.3	7,079.0	32,773.7
	Total Area	**2,544.6**	**5,282.4**	**6,764.8**	**9,330.7**	**6,675.3**	**3,182.7**	**7,109.0**	**40,889.4**
2018	Habitat Mapped	212.9	0	1.25	916.8	440.9	29.2	29.9	1,631
	Habitat GIS Analysis	126.74	82.10	564.89	3,671.7	1,924.3	103.7	0	6,473.4
	Not Mushroom Habitat	2,369.7	6,189.3	5,258.8	6,483.1	2,628.9	2,905.7	7,300.6	33,135.9
	Total Area	**2,709.3**	**6,271.4**	**5,824.9**	**11,071.6**	**4,994.1**	**3,038.6**	**7,330.5**	**41,240.4**

Classification:

- Mushroom Habitat includes LUO mapped areas plus additional picking areas identified by the local community.
- Picked area outside the polygon refers to known picked areas located outside of the mushroom habitat polygon and within the Skidegate LU.
- Potential Mushroom Habitat refers to CWH wh1 01 ecosystem areas that have not yet been verified as mushroom habitat.
- Logging within the mushroom management area may or may not have impacted established mushroom habitat.

In 2022, there was a reduction of mushroom habitat area of 64.6 ha due to harvesting two blocks (PAR001 & SKI015) in the Skidegate LU. Additionally, Taan set aside 48.7 ha into permanent mushroom habitat reserve. The above table classifications were adjusted to provide more clarity for readers, including noting the total mushroom habitat area, additional picking areas outside of the LUO mapped areas, and logging within the mushroom habitat area.

In 2021, there was no harvesting within the mushroom habitat area and no spatial updates required.

In 2020, the Mushroom Habitat analysis was updated to reflect a 24.4 ha age class adjustment from the 2019 results.

In 2019, analysis was re-run using updated VRI data which resulted in some significant changes from 2018. Overall, there is a reduction in the mapped habitat area total, and for stand ages 51-65 (221.8 ha) and 91-250 (9.4 ha). An increase in the stand age class 66-90 (196.27 ha) is representative of the shift of age class from the VRI. 2019 data also saw an increase in mapped habitat for 0-19 of 12.3 ha.

In 2018, analysis was re-run with new Vegetation Resource Inventory (VRI) inventory data. The reduced overall area at the end of 2018 relative to the 2017 analysis is the result of the elimination of non-productive (NP) attributes of "wetlands", "sparse", and "SI<=10" as well as "non-treed" from data included in analysis. These were incorrectly included in the 2017 analysis. 2018 results show slightly less area in the GIS mapped areas of mushroom production using BEC zone and site series classification, but a slight increase in the Kaagan daajing *Mushroom* habitat mapped using similar site series and stand structure as SKI012.

An age class map of the Kaagan daajing *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 the 2024 Monitoring Report.

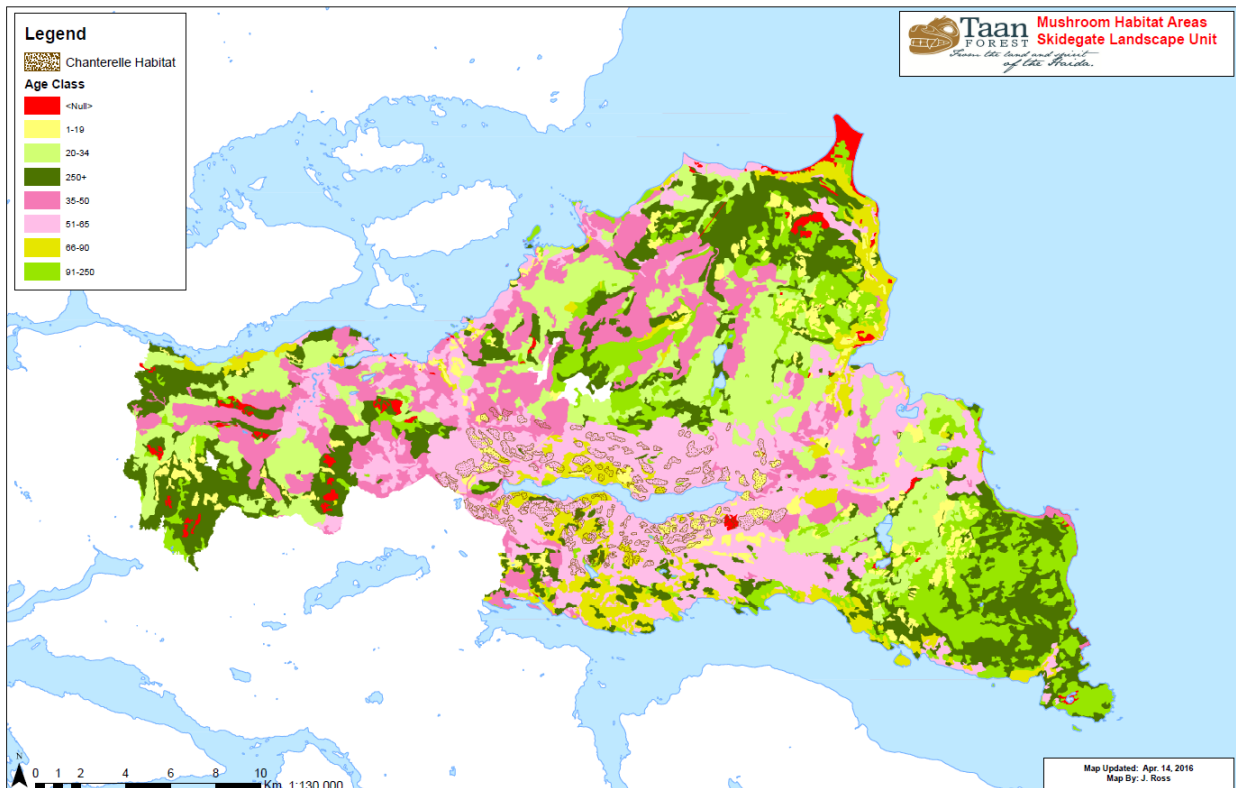**Figure 1: Age Class Distribution in Chanterelle Mushroom Habitat Areas (Skidegate Lake) – 2015**

Summary of Management Strategies

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

Kaagan daajing *Mushroom* picking occurs across X̱aayda Gwaay.yaay *Haida Gwaii* but harvests are not currently regulated. Key Kaagan daajing *Mushroom* habitat areas have been identified in various studies and are highlighted on overview maps provided in the HCV Assessment Report. A significant amount of Kaagan daajing *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 Kaagan daajing *Mushroom* habitat areas located in the harvestable area, Taan includes consideration of Kaagan daajing *Mushroom* picking during cutblock level planning by reviewing the ecosystem classification in relation to habitat suitability for Kaagan daajing *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 Kaagan daajing *Mushroom* habitat.

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 Kaagan daajing *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 they would pass on contact information to the local buyer and pickers if they are interested in contacting Taan. 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.

Indicator 4: Waste & Residue

Element	Objective	Indicator	Target
FSC 10.11.1	Harvesting practices optimize the use of merchantable timber, unless left on site to provide other objectives	Average billable waste results of as a function of harvest area (m³/ha)	Average avoidable waste is ≤ 100 m³/ha

Rationale for Indicator & Target

Taan must adhere to legislated requirements regarding both minimum levels of Coarse Woody Debris (Forest and Range Practices Act, Forest Planning & Practices Regulation) to provide for conservation of biodiversity, in addition to compliance with maximum levels of waste and residue under the Forest Act to ensure efficient utilization of the forest resource (the allowable thresholds generally differ between old growth and second growth harvesting and species harvested, e.g., old growth Ts'uu *cedar* and cypress blocks typically have more slash than second growth K̲'aang *hemlock* and Kayd *spruce* cutblocks).

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^3/ha for second growth and 35 m^3/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 because 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^3/ha (as the avoidable waste includes all lower grade logs that have minimum penalties applied to reflect the market conditions and challenges on X̲aayda Gwaay.yaay *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^3/ha)				Target Met (Y/N)
		Immature	Mature	Average	# of Samples	
2022	Taan	109.6	74.7	84.7	7 blocks	
	BCTS in Haida Tenure	0	0	0	-	Y
	Coast Region	37.5	87.6	57.9		
2021	Taan	77.3	77.5	77.4	4 blocks	
	BCTS in Haida Tenure	0	0	0	-	Y
	Coast Region	38.2	74.8	56.0		
2020	Taan	81.8	74.4	78.1	12 blocks	
	BCTS in Haida Tenure	0	0	0	-	Y
	Coast Region	43.4	84.9	67.7		
2019	Taan	0	55.2	55.2	5 blocks	
	BCTS in Haida Tenure	0	0	0	-	Y
	Coast Region	52.4	136.3	94.3	-	
2018	Taan	0	72.5	72.5	8 blocks	
	BCTS in Haida Tenure	0	0	0	-	
	Coast Region	63.7	129.2	96.4		Y
	BCTS in Haida Tenure	0	0	0	-	
	Coast Region	63.8	149.1	106.4		

[1] Historical waste and residue records for X̲aayda Gwaay.yaay Haida Gwaii and the Coast Region were obtained via email communication from Forest Service Coast Cruising and Waste Specialist (generated from the Forest Service WASTE System database) and includes data from 2004-2011. Discussion with the Forest Service Waste Specialist indicates that waste levels for the last few years have been higher than historical averages because of the poor markets for lower grade and pulp.

In 2022, waste and residue surveys were completed for 2 immature blocks in N1G, 3 mature blocks in N1G and 2 mature blocks in TFL60. Taan's average waste was 84.7 m3/ha. Taan continues to meet its target of less than 100 m3/ha. BCTS did not conduct any activities in Haida Tenures for 2022.

In 2021, waste and residue surveys were completed for FLTC A97524 (1 block) and TFL60 (3 blocks). Average waste for Taan was 77.4 m3/ha as compared to the average for the coast region. Taan continues to meet its target of less than 100 m^3/ha avoidable waste.

In 2020, waste and residue surveys were completed for the X̲aayda *Haida* Tenure (4 blocks) and TFL60 (8 blocks). Average waste for Taan was slightly higher than the average for the coast region. The coast region's avoidable average waste is less than previous years as a result of strong market conditions and higher demand for coastal logs. Taan continues to meet its target of less than 100 m^3/ha avoidable waste.

In 2018, waste and residue was completed for the X̲aayda *Haida* Tenure (4 blocks) and TFL60 (4 blocks). Average waste for Taan continues to be lower than the average for the coast region.

Summary of Management Strategies

Utilization and CWD is managed during the Planning stages (Planning SOP and Site Plan) as well as through the harvesting activities (Operations SOP).

The general management strategy is 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 salvage program and firewood cutting. A contract was signed with a local X̲aayda *Haida* member for salvage of waste wood for a bioenergy project, but the project has not been initiated by the proponent.

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 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 Forest Service for the Biogeoclimatic Ecosystem Classification (BEC) work that was done in X̲aayda Gwaay.yaay *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 m3/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 that 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 Forest Service 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^3/ha for immature (2nd growth) and mature (old growth). In addition, waste reports can also be generated out of the Forest Service 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.

Indicator 5: Dryland Sort Wood Waste

Element	Objective	Indicator	Target
FSC 10.11.1	Harvesting practices optimize the use of merchantable timber, unless left on site to provide other objectives	Volume of waste disposal (e.g., m^3, 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^3)	% of Volume Harvested	Method of Disposal	Target Met (Y/N)
2022	Dryland Sort (DLS) Wood Debris	1,157.1	0.6%	Landfill/ Burning/ Public	Y
2021	Dryland Sort (DLS) Wood Debris	3,031.0	1.3%	Landfill/ Burning/ Public	Y
2020	Dryland Sort (DLS) Wood Debris	3,416.0	1.4%	Landfill/ Burning/ Public	Y
2019	Dryland Sort (DLS) Wood Debris	2,411.2	1%	Landfill/ Burning/ Public	Y
2018	Dryland Sort (DLS) Wood Debris	1,183.0	0.4%	Landfill/ Burning/ Public	Y

In 2022, total waste at all the dryland sorts was 0.6% of the total harvested volume (204,267 m^3).

In 2021, total waste at all the dryland sorts was 1.3% of the harvested volume (225,913 m^3). During the year, Taan provided approximately 268 m^3 of firewood to the public.

In 2020, total waste at all the dryland sorts was 1.4% of the harvested volume (206,749 m^3). Taan continued to provide firewood to the public.

In 2019, total waste at all the dryland sorts was 1% of the harvested volume (242,949 m^3). Taan continued to provide firewood to the public.

In 2018, total waste at all the dryland sorts was 0.44% of the harvested volume (267,268 m^3). Taan continued to provide firewood from the DLS waste.

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 Masset Forestry Corp for use of waste wood in a bioenergy facility (chipped wood briquette fiber supply).

Database & Reporting Parameters

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

Indicator 6: Growth & Yield Plots

Element	Objective	Indicator	Target
N/A	Monitor growth rates	# of PSP/ G&Y plots identified during forest management planning; # harvested	No Forest Service PSP/ G&Y plots are harvested unless 'approval' is received from Forest Service

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 Forest Service to identify critical plot locations and ensure that they are protected from harvesting. There may be specific cases where Forest Service 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.).

Licensee established whitewood (i.e., Ḵayd *Sitka spruce*, Ḵ'aang *western hemlock*) plots are permitted to be harvested but Ts'uu *western red cedar* plots are not at this time.

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

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

Current Status/ Results

Year	Description	# of Plots[2]	# of Growth & Yield Plots Identified[1]		# of Growth & Yield Plots Harvested		Target Met (Y/N)
			Forest Service Established	Licensee Established	Forest Service Established	Licensee Established	
2022	Taan	199	22	177	Not permitted	0	Y
	BCTS in Haida Tenure						
2021	Taan	145	22	123	Not permitted	0	Y
	BCTS in Haida Tenure						
2020	Taan	145	22	123	Not permitted	0	Y
	BCTS in Haida Tenure						
2019	Taan	145	22	123	Not permitted	0	Y
	BCTS in Haida Tenure						
2018	Taan	145	22	123	Not permitted	0	Y
	BCTS in Haida Tenure						
	BCTS in Haida Tenure						

[1] Taan plot information is a combination of review of LRDW, Forest Service data and Taan GIS data.

In 2022, an additional 54 permanent sample plots were created by Taan for a total of 177. The 65 monitoring plots that were created in 2020 were assessed in 2022 and did not meet the required criteria. There were no PSP's harvested within the reporting year and all remain protected. Five PSPs were remeasured.

In 2021, no additional PSPs were created by Taan, and all existing PSPs remain protected. The 65 monitoring plots that were created in 2020 are being assessed to determine if they meet the PSP criteria. These PSPs will be added to the above table once approved.

In 2020, there were 60 monitoring plots established in TFL 60 and 5 monitoring plots established in the FN Woodlands License. These plots have been protected by Taan and are being assessed to determine if they meet the PSP criteria. The PSPs will be added to the above table once approved. No PSPs were harvested in 2020 and remain protected.

No growth and yield plots were harvested in 2019, 2018 or 2017.

Summary of Management Strategies

The BC Forest Branch (now Forest Service) 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.

Forest Service 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.

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

The total Forest Service plots identified above within the reporting data for Taan Forest, have been identified by Forest Service 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 Forest Service).

All proposed harvesting and road construction is submitted to the 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. The remaining plots that are owned by Taan within the MU are permitted to be harvested, at the discretion of Taan, however to date only three have been harvested.

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 Forest Service 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 7: Reforestation Monitoring

Element	Objective	Indicator	Target
FSC 6.7.5 (8.2.1)	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)		
2022	Taan	420.6	506.1	514.1	100%	Y
	BCTS in MU	0	0	0	N/A	
2021	Taan	1949	251.7	596.5	100%	Y
	BCTS in MU	-	-	24.7	100%	
2020	Taan	2211	830.3	446.6	100%	Y (96.6%)
	BCTS in MU	-	-	95.4	*28%	
2019	Taan	324.6	659.2	583.1	96.8%	Y
	BCTS in MU	27	-	118.3	Not Reported	
2018	Taan	525.6	783.3	77.4	100%	Y
	BCTS in MU	-	32.9	182	Not reported	

*21.8 ha of BCTS area was due for late free growing in 2020. 6.1 ha of this total area (28%) met its FG due date, however block JUN003 (15.7 ha) did not meet its late free growing date.

In 2022, 100% of the area that Taan surveyed met free growing. Walk throughs were conducted on 20 blocks, stocking surveys were conducted on 24 blocks, and free growing surveys were conducted on 26 blocks. BCTS did not conduct any activities in Haida Tenures for 2022.

In 2021, 100% of the area that Taan surveyed met free growing. The walk through assessments also included a plant review and all stand tending surveys (survival surveys and fertilization review). BCTS surveyed 2 blocks, both of which met free growing requirements.

In 2020, 100% of the area that Taan surveyed met free growing. BCTS surveyed five blocks and one block met free growing requirements. Additional time is needed for the other four blocks to reach minimum height or for the protectors to be removed on cedar trees. BCTS JUN003 is the only block to not meet its late free growing date and the silviculture prescription is being amended to extend the date by 3 additional years.

In 2019, 96.8% of the area with free growing met FG dates. Two blocks were surveyed and did not meet the early FG dates but are still within the FG dates window (Demon 413B and JUN002). IAN972 had sone small standard unit (1.1ha) that did not meet the FG dates and an SP amendment is being completed to extend the date to allow the trees more time to grow.

In 2018, all blocks with late free growing due were met.

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.

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 Forest Service RESULTS database (data is entered and maintained by Industry and Forest Service).

Indicator 8: Forest Health

Element	Objective	Indicator	Target
FSC 8.2.1, 8.2.3, 10.9	Monitor forest health	Report on the status of the forest health for Xaayda Gwaay.yaay *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 (Forest Service). Forest health, primarily insects and disease, can affect expected products from the forest. Generally, losses to forest health agents are relatively low on Xaayda Gwaay.yaay *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 Xaayda Gwaay.yaay *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 K'aang *Hemlock* looper or western black-headed budworm outbreaks cause mortality, then those can be harvested while the wood is still sound; planting of SGaahlaan *yellow cedar/ cypress* should focus on areas where the trees are doing relatively well and avoid where they area 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 updates. As well, new pest species should be reported if noticed; any outbreaks of new species should be acted on quickly.

Current Status/ Results

For Xaayda Gwaay.yaay *Haida Gwaii*:

Year	Category[3]	Summary of Impacts to Forest Health (ha)[1]										Target Met (Y/N)
		Lodge-pole Pine Sawfly	Conifer Sawflies	Large-spored Spruce-labrador tea rust [2]	Western Black headed Budworm	Yellow Cedar Decline	Spruce Beetle	Mt. Pine Beetle	Wind-fall	Land-slides	Flood	
2022	Trace	-	-	-	824.8	170.8	580.8	-	8.2		-	
	Light	-	72.9	-	6712.2	374.2	589.3	31.4	-	-	-	
	Moderate	-	368.1	-	10930.5	113.0	465.4	133.0	74.8	-	-	Y
	Severe	48.2	26.4	0.3	553.4	49.3	94.1	1.8	.3	4.1	-	
	V Severe	-	-	-	-	-	-	-	-	-	-	
2021	Trace	-	-	-	-	-	-	-	-	-	-	
	Light	-		-	197	-	921	-	-	-	-	
	Moderate	-		-	20	2,763	921	13	1239	892	381	Y
	Severe	-		-	-	-	921	-	-	-	-	
	V Severe	-		-	-	-	-	-	-	-	-	
2020	Trace	-		-	-	753.7	-	-	-	-	-	
	Light	-		-	-		-	-	-	-	-	
	Moderate	-		-	-	16.3	-	-	-	-	-	Y
	Severe	-		-	-	1.3	-	-	11.2	849.6	-	
	V Severe	-		-	-	-	-	-	-	-	-	
2019	Trace	-		-	-	1,873	45	-	-	-	-	
	Light	169		-	370.3	779.3	-	-	358.7	-	33.1	
	Moderate	15.31		-	-	1,094.8	-	50.9	563.1	37.7	-	Y
	Severe	-		-	-	878.9	-	-	344	462.9	47.3	
	V Severe	-		-	-	-	-	-	49	1,421.4	-	
2018	Trace	-		-	-	1,891.5	-	-	-	-	-	
	Light	71.2		-	-	758.2	-	-	-	-	-	
	Moderate	14.9		-	-	251.5	-	-	-	-	-	Y
	Severe	-		-	-	345.9	-	-	267.3	338.9	61.9	
	V Severe	-		-	-	-	-	-	195.2	401.6	49.4	

[1] Information is reported for all of Xaayda Gwaay.yaay *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 ha 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 4 ha of moderate drought and 182ha of moderate defoliator noted in 2015. In 2016 there was 19.81 ha of light foliage disease and 93.02 ha of trace and moderate drought.

[2] The column for the Green Spruce Aphid was removed and replaced with Large-Spored Spruce-Labrador Tea Rust for 2022 due to no indication for the aphid and reporting for the tea rust.

[3] Forest Service 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.

The 2022 Forest Health Aerial Overview Assessment for the province has not been finalized; however, the forest service has provided some preliminary data for Haida Gwaii as noted in the above table. The following forest health issues were identified:

- **Lodgepole Pine Sawfly:** Lodgepole pine sawfly defoliation was observed on 48.2 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA.

- **Conifer Sawflies:** Conifer sawfly defoliation was observed on 467.4 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA. There was 72.9 ha of light, 368.1 ha of moderate, and 26.4 ha of severe conifer sawfly damage identified on Haida Gwaii.

- **Large-Spored spruce-labrador tea rust:** Large-Spored spruce-labrador tea rust damage was observed on 0.3 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA.

- **Western Blackhead Budworm:** Western blackheaded budworm defoliation was observed on 19,021 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA. This includes 824.8 ha of trace, 6,712.2 ha of light, 10,930.5 ha of moderate, and 553.4 has of severe damage identified on Haida Gwaii. This represents a dramatic increase since the previous year.

- **Yellow Cedar Decline:** There was a total of 707.3 ha of yellow cedar decline observed in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA. This includes 170.8 ha of trace, 374.2 ha of light, 113.0 ha of moderate, and 49.3 ha of severe decline. This is a reduction in decline from the previous year and comparable to the 2020 levels.

- **Spruce Beetle:** Spruce beetle Infestations in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA accounted for 1,730 ha of damage, which is nearly the same level of infestation noted in the previous year.

- **Mountain Pine Beetle:** Mountain pine beetle damage covered 166 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA.

- **Windfall:** Windfall damage totalled 83.3 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA, which is a substantial reduction from 1,239 ha in the previous year.

- **Landslides**: Severe landslide damage occurred on 4.1 ha in the X̲aayda Gwaay.yaay *Haida Gwaii* TSA, while the previous year noted 892 ha of moderate damage.

Forest Health Concerns on Taan's Management Unit

In 2022, Taan still continues to identify windfall is a serious concern. This year has seen an uptake in attack from blackheaded budworm, conifer sawfly, lodgepole sawfly, and spruce beetle. Budworm infestation is monitored closely with the Forest Service (ground and helicopter assessments) to assess impact across the landscape.

Yellow cedar decline continues to be an issue with a reduction from the previous year. Taan continues to plant yellow cedar stock in higher densities to accommodate for losses due to various disturbances. Taan continues to coordinate with the University of British Columbia with respect to yellow cedar decline research to inform management practices, such as increased planting of yellow cedar in lower elevations. In general, Taan replants with cedar, where evidence indicates that the block had cedar historically, in efforts to restore the natural state. The company continues to manage for deer browsing and installed 188,880 protectors and planted higher densities to accommodate for losses due to disturbances.

In 2021, Taan identified that the primary forest health concerns within the management unit were windfall and slide damage due to high wind and rain events, very light defoliation due to blackheaded bud worm on hemlock, and yellow cedar decline. The company continues to manage for deer browsing and installed 80,710 protectors and planted higher densities to accommodate for losses due to disturbances.

In 2020, silviculture surveys completed by Taan continue to identify Conifer Seedling Weevil, Keithia Blight, Giant Conifer Aphid, Sirococcus Tip Blight, and k'aad *deer* browsing. Forest Service overview surveys were completed; however, the level of detail was limited due to COVID related restrictions, and a more detailed assessment is planned for 2021. The survey did indicate that there was Yellow-cedar decline damage of 771 ha in the Haida Gwaii TSA, south of Masset Inlet. The survey also identified that the West Coast Region continued to be most affected with slide damage (917 ha), and most of this damage (850 ha) occurred in small, dispersed polygons in the Haida Gwaii TSA.

Taan completed several company overflights in 2020 and no major forest health issues were identified. The company continues to manage for deer browsing and installed 133,700 protectors and planted higher densities to accommodate for losses due to disturbances.

In 2019, silviculture surveys identified the Conifer Seedling Weevil, Keithia Blight, Giant Conifer Aphid, Sirococcus Tip Blight, and k'aad *deer* browsing as the primary forest health concerns on seedlings. Forest Service overview surveys indicate that no green spruce aphid was noted; mountain pine beetle, spruce beetle, and pine sawfly damage saw an increase from 2018. Blackheaded budworm was reported for the first time since 2016, including in the MU. Windthrow and landslides increased from 2018 to the highest levels since 2015. Several storms occurred in winter 2018 and 2019, as well as a fairly significant earthquake in 2019. Floods decreased in amount and intensity from 2018. There was in increase in SGaahlaan *yellow cedar/ cypress* decline compared to 2017 but values are similar to previous survey years. Drought mortality values were also reported in the FHF data for 2019: Trace (110.6ha), Light (206.9ha), Moderate (64.8ha), Severe (83.6ha).
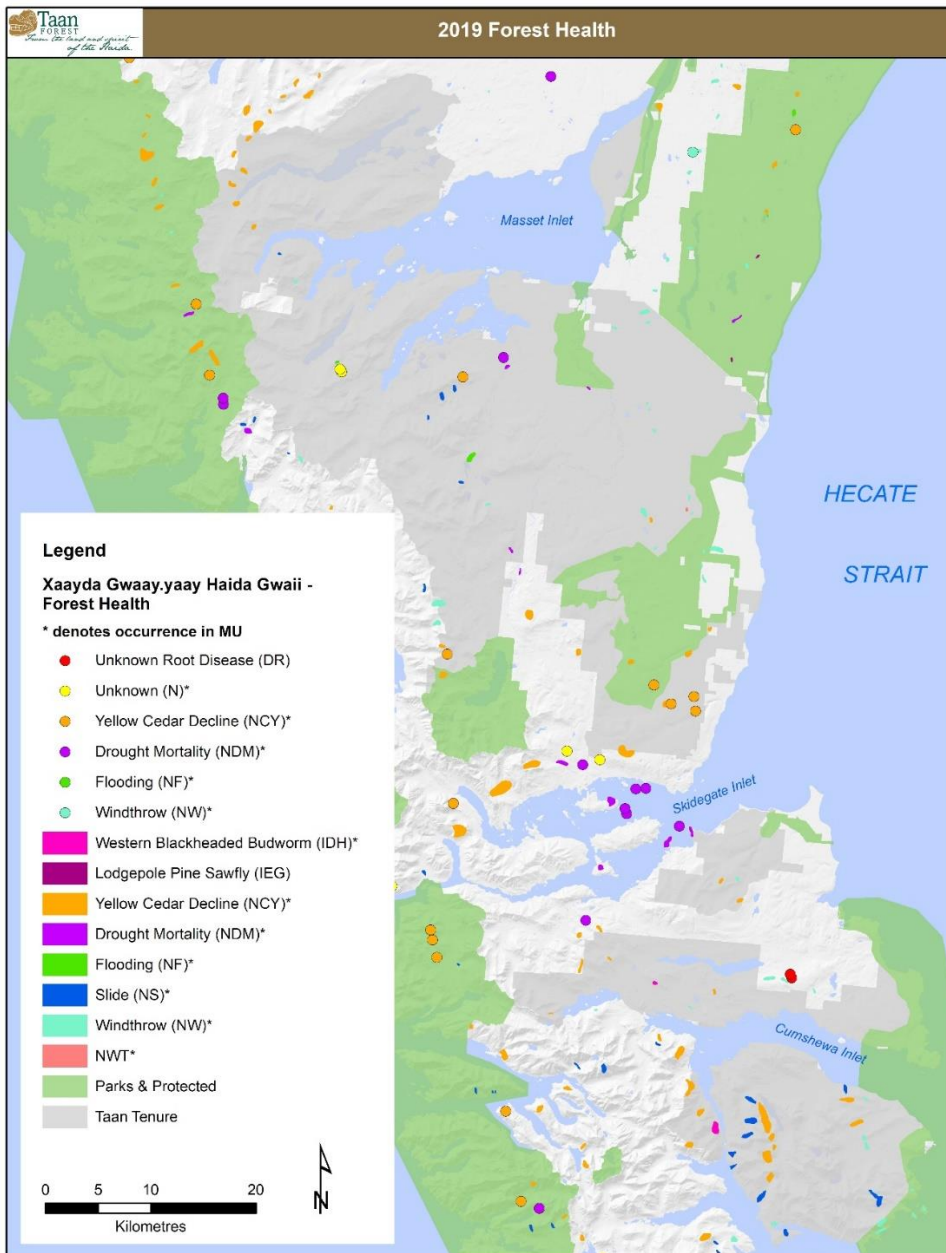
Figure 2: 2019 Forest Health Concerns in the Management Unit (MU)

2015-2019 Summary

The total area affected in X̱aayda Gwaay.yaay *Haida Gwaii* by all identified forest health concerns each year has remained under 10,000 ha, a significant decrease since the 25,989 ha reported in 2015.

2019 silviculture surveys within the Management Unit identified cases of Conifer Seedling Weevil, Keithia Blight, Giant Conifer Aphid, Sirococcus Tip Blight, and k'aad *deer* browse.

Forest Health concerns:

- SGaahlaan *yellow cedar/ cypress* decline - Continues to be a major issue for the coast and now for Xaayda Gwaay.yaay *Haida Gwaii*. 2017 saw significantly less decline (986.59ha), but reported areas have since increased, with approximately >3,000ha reported annually. An action item was created in 2015 to review the silviculture and planting strategies for SGaahlaan *yellow cedar/ cypress*. 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 (300-800ha), until 2019 saw a steep increase in area affected by windthrow and severity (1,314.73ha). Taan maintains a windthrow monitoring program (refer to Windthrow Management Effectiveness Indicator for details) which has identified some further work is needed to improve windthrow processes to protect LUO features, refer to the action items section of this report.

- Landslides – There was a significant decrease in the reported slides since 2015 (2015-5,142ha, 2014-1,209ha, 2017-915ha, 2018-463ha). 2019, while less than 2015, saw a significant increase in landslides over the intervening years (2019-1,922ha).

- Flooding – The flooding area was reduced significantly from 2015 (3,999ha), and 2019 shows 80ha. Some of the flooded areas were identified in the FLTC appear to be associated with natural waterbodies (e.g., rivers and lakes).

- Budworm – New damage was reported in 2019 for the first time since 2016; 370 ha was reported with 70 ha reported in the MU. Levels appear to be similar to those in 2015 and a continuation of the decline since the outbreak peaked in 2009.

- Spruce Beetle – There was a significant decrease in the reported spruce beetle from 2016-2018 compared to 2015, only 2.5 ha was identified. 2019 saw an increase in to 45 ha, reported outside of the MU, still much lower than the 1291 ha reported in 2015.

- Sawfly – Pine sawfly damage continues to be significantly less than 2015, remining under 250 ha since 2017.

Summary of Management Strategies

During the FSP development, Taan had discussions with Forest Service 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 Solutions Table to address windthrow concerns and ensuring that windthrow treatments are implemented in high-risk situations.

Taan will work in cooperation with the Forest Service 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 Forest Service 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 abiotic and biotic factors on Xaayda Gwaay.yaay *Haida Gwaii* are factored into the Timber Supply Reviews completed by the Haida Gwaii Management Council.

Adaptive Management Strategies

Forest Service is monitoring the new presence of SGaahlaan *yellow cedar/ cypress* decline in Xaayda Gwaay.yaay *Haida Gwaii*. Taan has also been supporting research projects for several years.

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 9: Soil Conservation Effectiveness

Element	Objective	Indicator	Target
FSC 8.2.1 (6, 7)	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 Taan reporting 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.

Current Status/ Results

Year	Description	Average Permanent Access[1] %	Soil Conservation		Target Met (Y/N)
			# Post- Harvest Surveys Identifying Soil Disturbance	# of Soil Rehabilitation Activities	
2022	Taan	6.4	9 blocks were assessed with no soil disturbance identified beyond the FREP threshold.	0	Y
	BCTS in Haida Tenure	N/A	N/A	N/A	
2021	Taan	5.5	14 blocks assessed with no soil disturbance identified.	0	Y
	BCTS in Haida Tenure	N/A	N/A	N/A	
2020	Taan	4.9	15 blocks assessed with no soil disturbance identified.	0	Y
	BCTS in Haida Tenure	N/A	N/A	N/A	
2019	Taan	3.2	0/14 cutblocks assessed	0	Y
	BCTS in Haida Tenure	N/A	N/A	N/A	
2018	Taan	4.9	0/25 cutblocks assessed	1	Y
	BCTS in Haida Tenure	N/A	N/A	N/A	

[1] The permanent access calculations were determined for all cutblocks harvested in the year.

In 2022, 9 blocks were assessed. Post-Harvest surveys did not identify any issues beyond the threshold.

In 2021, 14 blocks were assessed, and post-harvest surveys did not identify any issues or concerns with soil disturbance.

In 2020, harvest and post-harvest surveys did not identify any issues or concerns with soil disturbance.

In 2019, CMS inspections (Harvest and Post-Harvest) did not identify any issues or concerns with soil disturbance (some actions were prescribed for removal of machine trails).

In 2018, post-harvest inspections prescribed the removal of machine trails in a few blocks and noted that some issues in regard to respecting machine free zones along streams (DIN007). Road and Harvest Inspections did not identify any soil rehabilitation concerns of activities.

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.

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 X̱aayda Gwaay.yaay *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%.

To ensure that soil conservation thresholds are met, Taan's Corporate Management System includes appropriate field procedures relating to minimizing soil disturbance, use of puncheon 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. Road, Harvesting and Post-Harvest Inspections are completed on every cutblock, and include assessment of soil disturbance. If any issues are identified, corrective actions are generated and are tracked within the Operations Tracker for follow up/ completion.

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.

However, as Taan completes soil conservation monitoring on every cutblock (visual observations), soil conservation is assessed in the absence of the FREP monitoring data.

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 in the Corporate File System.

Indicator 10: Stand-level Biodiversity Effectiveness

Element	Objective	Indicator	Target
FSC 6.8.3, 6.8.4, 8.2.1 (8), 8.2.3 (2,3, 5), HCV effectiveness; linkages to Criterion 6,4, 6.6, 6.8	Monitor the condition of the forest and disturbances resulting from forest operations; maintain stand-level biodiversity; contribute to coarse filter maintenance of habitat and HCV	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
		Damage to residual/ retention trees caused by Forest Management activities	Forest Management activities do not damage residual/ retention trees

Rationale for Indicator & Target

This indicator is required under FSC Indicators 6.8.3 and 6.8.4, and the Environmental Values Assessment Report, including the Range of Natural Variation (RONV) of the X̲aayda Gwaay.yaay *Haida Gwaii* ecosystems and the objectives to maintain, restore or enhance the condition of the forest as appropriate to the regional context. The targets also consider the needs of species at risk that require large amounts of contiguous habitat (and also links to the landscape biodiversity indicators). FSC 8.2.1 (8) is also included in this indicator, as it relates to measuring damage to residual trees resulting from harvesting (refer also to Windthrow Effectiveness and Cultural Heritage Resource Effectiveness Indicators).

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 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. 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).

Current Status/ Results

Stand-level Biodiversity Effectiveness (Taan harvest area and stand level retention compared to FREP data):

Targets	23ha (coast wide avg.); use range of opening sizes	Average patch size is ≥ 2.0ha (permitting a range of patch sizes across blocks)			23% (coast wide average, but 31% in CWH vh2 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
2022	30.5	FREP SLBD Monitoring not completed in 2022			24.3	FREP SLBD Monitoring not completed in 2022				10
2021	35.3	FREP SLBD Monitoring not completed in 2021			44.3	FREP SLBD Monitoring not completed in 2021				11
2020	15.9	FREP SLBD Monitoring not completed in 2020			35.4	FREP SLBD Monitoring not completed in 2020				0
2019	23.2	FREP SLBD Monitoring not completed in 2019			63.2	FREP SLBD Monitoring not completed in 2019				0
2018	22.5	FREP SLBD Monitoring not completed in 2018			51.0	FREP SLBD Monitoring not completed in 2018				0
2017	19.2	N/A	N/A	N/A	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	
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	10 cutblocks (CWH wh)
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 vh, 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 vh2, CWHwh1 and CWH wh2.

In 2022, Taan's Total Area Under Prescription (TAUP) per block averaged 54.9 ha, with an average harvest area of 30.5 ha. This included 24.3% stand-level retention, averaged across all blocks. Post harvest surveys continue to include an initial windthrow and retention assessment and ongoing monitoring is completed, especially after storm events. As with past years, there was no stand-level biodiversity effectiveness monitoring completed by FREP.

In 2021, Taan's Total Area Under Prescription (TAUP) per block averaged 63.4ha, with an average harvest area of 35.3 ha. This included 44.3% stand-level retention, averaged across all blocks. Post harvest surveys continue to include an initial windthrow and retention assessment as well as ongoing monitoring, especially after storm events. Stand-level biodiversity effectiveness monitoring was not completed by the Forest Service in 2021. Taan has approached FREP for additional staff training to perform the FREP pre and post harvest assessments. This will allow Taan to capture more current data and to inform stand-level biodiversity planning practices.

In 2020, Taan's average cutblock size was 15.9 ha as compared to the coast average target of 23 ha. Post harvest survey completed by Taan includes an initial windthrow assessment for all retention and planned residuals and blocks are monitored over time especially after storm events. Taan reached out to the local FREP representative in efforts to support the collection of FREP data. While several indicators were assessed by FREP, stand level biodiversity effectiveness was not assessed in 2020.

In 2019, the average cutblock size was slightly higher (23.2ha) than the coast average target (23ha). Average Stand level retention far exceeded the coast average target. FREP did not complete any stand level biodiversity assessments within the MU. An action item has been generated for Taan to reach out to the local FREP representatives to determine monitoring plans and provide support.

In 2018, FREP did not conduct any stand level biodiversity assessments. Detailed reporting of Taan stand level retention is provided below.

Taan Stand-level Retention Data

Year	Total Area Under Prescription (TAUP ha)	Area Harvested (gross ha)	Stand-level Retention (TAUP ha – gross ha)	Average % Stand-level Retention[1]	Damage to Residual/ Retention Trees (Y/N)	Target Met (Y/N)	% Forest Influence (avg.)	% of Blocks with >50% Forest Influence
2022	549	304.8	242.5	43.4	N	Y	66.6	100 (9/9)
2021	697.6	388.3	309.3	44.3	N	Y	67.5	90.9 (10/11)
2020	433.8	238.2	195.0	35.4	Y	N	70	100 (9/9)
2019	609.8	312.7	297.2	63	New indicator added in 2020	Y	41	29 (4/14)
2018	684.2	370.6	313.5	51		Y	49	50 (7/14)

[1] 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.

In 2022,The average stand level retention was 43.4% which exceeds the retention target of 20%. The average forest influence was calculated at 66.6%.

In 2021, the average stand level retention was 44.3%, which exceeds the target of 20% retention. The average forest influence was calculated at 67.5%

In 2020, the average stand level retention is 35.4%, which exceeds the target of 20%. The reduction in retention, as compared to previous years (63%), is a result of a smaller number of features present in the layout due to increased logging in 2nd growth areas. The average forest influence is calculated at 70% and is assessed based on the same methodology as previous years.

A new target was established in 2020 that states "forest management activities do not damage residual/retention trees". Taan takes considerable efforts to increase stand level retention and to maintain more forest structure, however there was an incident in 2020 where a faller accidently fell a monumental tree, which resulted in an internal investigation. The tree was provided to the cultural wood access program and staff received additional training with respect to review of preworks and plans. Taan is currently reviewing this indicator to determine if it needs to be revised, as it is unrealistic to have no damage to residual/retention trees during harvesting operations. BCTS did not complete any harvesting within the Taan FLTC in 2020.

In 2019, the average stand-level retention is 63% (quite substantial). BCTS did not complete any harvesting within the Taan FLTC. Forest Influence is calculated at 41%. 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 continues to explore options for alternative harvesting that will focus on increasing stand level retention and maintaining more forest structure.

The average stand-level retention in 2018 is 52%. BCTS did not complete any harvesting within the Taan FLTC. Forest Influence is calculated at 56%. 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 continues to explore options for alternative harvesting that will focus on increasing stand level retention and maintaining more forest structure.

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 K̲'aasda Siiwaay _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:

Stand Level Retention in Skidegate LU

Year	Description	Average % Stand-level Retention (Skidegate LU)	Target Met (Y/N)
2022	Taan	53.1	Y
2021	Taan	No harvesting in Skidegate LU in 2021	NA
2020	Taan	29.7	Y
2019	Taan	69.0	Y
2018	Taan	111.0	Y

In 2022, Taan harvested 2 blocks in the Skidegate Landscape Unit, SKI015 and PAR001. Taan did not harvest in the Masset Landscape Unit.

In 2021, Taan did not harvest in the Skidegate Landscape Unit, however harvesting did occur in the Masset Landscape Unit.

In 2020, Taan harvested one block (SKI013) in the Skidegate LU with an average stand level retention of 30% which exceeds the target of 20%. Refer to the Landscape Level Biodiversity Ecosystem Representation indicator for reporting related to ecosystem representation.

In 2019, Taan has completed the transition away from the internally established landscape level eco-rep management zone mapping tool that was developed to assist with meeting the LUO ecosystem representation targets and is now using annual spatial analysis updates to report on and track the amount of area in old and mature forest in relation to the LUO targets for eco-rep tracking., therefore the references to the Eco-Rep Management Area in the above table have been removed. Taan is still tracking ecosystem representation, just using alternate methods. Refer to the Landscape Level Biodiversity Ecosystem Representation indicator for reporting related to ecosystem representation.

In 2018, Taan harvested AER002, ALL001 and HAA005 within the Skidegate LU. Taan is in transition from not using the eco-rep management area mapping and replacing it with updated spatial analysis and tracking of the eco-representation targets in the LUO. The new spatial ledger records the amount of old and mature forest present in each landscape unit in LUO reserves and in the harvestable land-base and is regularly updated with proposed harvesting areas to ensure that targets are met.

Road Construction in Skidegate & Masset LU

Year	Description	New Road Construction by LU (m)		Target Met (Y/N)
		Skidegate	Masset	
2022	Taan	1,455	0	Y
2021	Taan	2,563	0	Y
2020	Taan	5,902	1,574	Y
2019	Taan	5,292	3,758	Y
2018	Taan	5,664	1,845	Y

*BCTS has not completed any harvesting within the Taan Haida tenure since 2013.

In 2022, a total of 1,455 meters of new road was constructed in the Skidegate Landscape unit for block PAR001. SKI015 was built in 2020 and was captured within that reporting year. Taan limited the amount of road construction due to existing road networks and built 230 meters of new roads on past rail grades to reduce impact.

In 2021, a total of 2,563 meters of new road was constructed in the Skidegate Landscape Unit.

In 2020, Taan constructed SKI013 (1,922m) and SKI015 (3,980m) in the Skidegate LU, and SHN006 (1,374m), SHN008 (96m), and MAM005 (104m) in the Massett LU.   Average permanent access was calculated to be 4.9% for 2020, which is low in comparison to the 7% allowed under FRPA.

In 2019, Taan constructed road in HAA002, HAA003, HAA004, and SKI012 in the Skidegate LU, and MAM004, MAM005, SHN006, SHN008, and TOW007 in the Masset LU. Average permanent access was calculated to be 3.2% for 2019 (3.4% for the Skidegate Lake LU and 3.6% for the Masset LU), which is very low in comparison to the 7% allowed under FRPA.

In 2018, Taan constructed road in ALL001 and SKI012 in the Skidegate LU, and DIN007, MAM002, MAM003, MAM004, and MAM006 in the Masset LU.

Summary of Management Strategies

The management objectives for stand-level biodiversity are a combination of the legal requirements under the LUO (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.

Taan has also implemented a 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 Values and HCV). 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 X̲aayda Gwaay.yaay *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; Hl̲G̲iid *Yew* patches & individual Hl̲G̲iid *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; Taan *black bear* Dens; Forest Reserves; and any associated Reserves, Reserve Zones, Management Zones and Stand-level Retention. Refer to Indicator LUO Reporting for details.

Taan completes Post Harvest Assessments on all completed cutblocks, and reports on any damage observed to residual/ retention trees. Note that this indicator also links to the Windthrow Effectiveness and Cultural Heritage Resource Effectiveness Indicators and monitoring programs, which also include assessment of damage to residual trees.

Adaptive Management Strategies

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 X̲aayda Gwaay.yaay *Haida Gwaii* as well as from the recent Forest Service BEC zone work. From the BEC data, the average CWD levels was 186 m3/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. 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 X̲aayda Gwaay.yaay *Haida Gwaii*, which is consistent with the monitoring of forest health being done by the Forest Service. Taan has been actively improving the windthrow assessment process and has significantly increased the treatment program compared to the past.

Taan developed a windthrow monitoring program in 2015 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 the 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 Diinan *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 Forest Service 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.

During development area planning, all areas removed from the development area because 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., X̲aayda *Haida* Features, *bear* dens, red and blue listed ecosystems, riparian reserves and management zones, monumental cedars, Hl̲Giid *Yew*, K'ay *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).

Indicator 11: Species at Risk

Element	Objective	Indicator	Target
FSC 6.4.8, 8.2.3 (2, 3) & 9.4; linkages to Criterion 6.4	Monitor status of species at risk or species of high conservation concern known to occur in the Management Unit	Species at risk identified within Xaayda Gwaay.yaay *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 Xaayda Gwaay.yaay *Haida Gwaii*. We considered high priority species to include species of:

- global concern status G1, G2 or G3
- provincial status S1, S2, S3
- BC's red or blue listed species
- COSEWIC's endangered, threatened or special concern, or
- Identified under the Land Use Order.

Those categories yielded 117 high priority species (including) ecological communities on Xaayda Gwaay.yaay *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 117 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 HCV report.

Current Status/ Results

Species Group	Number of high priority species	Types of management	Target Met (Y/N)
Non-forested (group 6)	55	n/a	Y
Generalists (group 1)	12	None needed	
Seral Distribution (group 2)	17	Mostly provision of adequate old forest	
Habitat Structures and Riparian (group 3)	25	Protection of riparian habitats; supply of snags and down wood	
Localized habitats (group 4)	6	Protect when sites are known	
Forest Distribution (group 5)	2	Provision of habitat and monitoring of MAMU and NOGO	
Total high priority species	**117**		

In 2022, SAR training was completed for all Taan staff and contractor supervisors as part of the CMS Level 2 training, including a review of all related planning documents.

As well, a HCV Assessment review included an update to the following tables in the HCV report:

- Table 3: Critically Endangered, Endangered and Vulnerable Bird Species - HG
- Table 13. CDC G1 and G2, IUCN Endangered or Critically Endangered or CITES Appendix I, II or III Element Occurrences
- Table 14. CDC Red-Listed Species Occurrences
- Table 15. CDC Listing of S1 and S2 listed Species on Haida Gwaii

- Table 16. COSEWIC listed Endangered and Threatened species of Haida Gwaii
- Table 17. CDC Listing of Species Endemic to HG
- Table 19. CDC S1-S3, and G3 Occurrences – Globally and Regionally Significant Species

The HCV report was also updated to include management strategies for the red listed Haida Gwaii Slug.

Further, the Northern Goshawk Implementation Plan (2018) included a plan for establishment of 5 new breeding reserves on X̲aayda Gwaay.yaay *Haida Gwaii* and to develop provincial foraging habitat management recommendations expected by 2020. The NOGO breeding reserves have already been established, however the provincial foraging habitat recommendations have yet to be completed.

In 2021, SAR training was completed for all Taan staff as part of the CMS training including a review of all related planning documents. Field crews and contractors are trained in SAR identification and reporting requirements.

In 2020, SAR training was completed for all Taan staff as part of the CMS training including a review of all related planning documents. Field crews and contractors are trained in SAR identification and reporting requirements. As well, the 2020 HCV Assessment review included an update to the following related tables:

- Table 3: Critically Endangered, Endangered and Vulnerable Bird Species - HG
- Table 13. CDC G1 and G2, IUCN Endangered or Critically Endangered or CITES Appendix I, II or III Element Occurrences
- Table 14. CDC Red-Listed Species Occurrences
- Table 15. CDC Listing of S1 and S2 listed Species on Haida Gwaii
- Table 16. COSEWIC listed Endangered and Threatened species of Haida Gwaii
- Table 17. CDC Listing of Species Endemic to HG
- Table 19. CDC S1-S3, and G3 Occurrences – Globally and Regionally Significant Species

In 2019, there was a refinement of the previous rank calculator scores. In some cases, rankings were changed such that the species no longer meets any of the SAR criteria, these have also been noted in comments in the report. Some species have been regrouped or specific subspecies removed and generalized, or there was a scientific name change.

2019 updates and changes include the following:

- New species added:
    - Earthworm *Arctiostrotus perrieri* (S3, Blue)
- Birds:
    - Hairy Woodpecker, *picoideus* subspecies changed from S3 to S4, and from blue to yellow listed.
- Plants/ Moss:
    - Dalton's moss, Carey's bristle-moss, and drooping-leaved beard-moss added to COSEWIC list as Endangered status in May 2019.
- The following species are no longer listed as occurring in X̲aayda Gwaay.yaay *Haida Gwaii*, and have been removed:
    - Small spike-rush (group 6)
    - Alp lily (group 6)
    - small-flowered lousewort (group 1)
    - Whorled lousewort (group 1)
    - Hairy butterwort (group 1)
    - Spike-oat (group 2)
    - *Pleuroziopsis ruthenica* moss (group 3)
    - Water bur-reed (group 3)
    - Enander's sedge (group 3)
    - Small-fruited willowherb (group 3)

- *Myotis keenii* scientific name change to *Myotis evotis* and English name changed to Long-eared Myotis with Keen's Myotis as a synonym. Rank change from G2G3, S3, Blue to G5, S5, Yellow.
- *Andreaea rupestris var. papillosa* moss and Northern butterweed are no longer listed in the BCSEE database.

Coarse filter assessment on Tree Farm License 48

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	**N**on-**V**egetated upland: less than 5% vegetation cover; includes roadsides, oil and gas developments (excludes lakes, rivers, and ponds)
	NT	**N**on-**T**reed upland or wetland: less than 10% tree cover; includes tundra, wetland, and other sparsely treed sites such as non-commercial brush (NCBR)
	RD	**R**ecent **D**isturbance: 0 to 20 yrs. old; intended to represent the period of shrub abundance post disturbance
	H	**H**ardwoods: landclass 127, 128, 129
	C1	**C**onifer and mixed: 21-60 yrs. and landclass >129
	C2	**C**onifer and mixed: age 61-140 yrs. and landclass >129
	C3	**C**onifer and mixed: age >140 yrs. and landclass >129
	open	**O**pen areas of low vegetation, may only be a single tree present
	R	**R**iparian forest - streams, lakes and rivers; not wetlands
	all	uses **A**ll 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 Xaayda Gwaay.yaay *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 Xaayda Gwaay.yaay *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.

In relation to classification of high priority species on X̲aayda Gwaay.yaay *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.

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. 55 (almost half) of the 117 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
Trematodon montanus	Non-vascular plant	G1G3	S1?		Red			CWH					6
Andreaea mutabilis	moss	G5	S1S2		Red			CWH	N	4	6	2	6
Andreaea sinuosa	moss	G2	S1S2		Red			CMA;CWHvm;CWHwh;MHmm;	N	1	6	2	6
Asplenium adulterinum	corrupt spleenwort	G3?	S3		Blue			CMA;CWHvm;CWHwh;MHmm	N	2	6	3	6
Calystegia soldanella	beach bindweed	G5	S3		Blue			CWHvh;CWHwh;CWHxm	N	6	2	3	6
Campylopus schimperi	moss	G3G4	S1S2		Red			CWH;MH	N	2	6	3	6
Cerastium fischerianum	Fischer's chickweed	G4	S3		Blue			BAFA;CMA;CWHvh;CWHwh;MHwh	N	6	6	6	6
Claopodium pellucinerve	moss	G3G5	S1S2		Red			CWH	N	2	6	2	6
Crumia latifolia	moss	G3	S3		Blue			CDF	N	3	6	2	6
Dermochelys coriacea	Leatherback	G2	S1N	E (May 2012)	Red		1-E (Jun 2003)	CWH	N	4	6	2	6
Dicranodontium asperulum	moss	G4G5	S3		Blue			CWH;MH	N	3	4	4	6
Didymodon giganteus	moss	G5?	S2		Red			CWH;MH	N	4	6	3	6
Didymodon subandreaeoides	moss	G4G5	S1S3		Red			CWH;ESSF	N	Not Assessed	6	3	6
Discelium nudum	moss	G3G4	S1		Red			CDF;CWH	N	4	6	1	6
Douglasia laevigata	smooth douglasia	G3	S3S4		Yellow			BAFA;CMA;ESSFmw;IMA;MHmm;MHwh	N				6
Draba chamissonis	Cape Thompson draba	G3Q	S4		Yellow			CMAun					6
Epilobium hornemannii ssp. behringianum	Hornemann's willowherb	G5T4	SH		Red			CWHwh;ICHmm;ICHvc;SWBmk;SWBun	N	5	6	3	6
Eschrichtius robustus	Grey Whale	G4	S3	SC (May 2004)	Blue		1-SC (Jul 2005)		N	5	6	4	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
Eumetopias jubatus	Steller Sea Lion	G3	S3B, S4N	SC (Nov 2003)	Blue		1-SC (Jul 2005)	CDF;CWH;MH	N	2	6	3	6
Geum schofieldii	Queen Charlotte avens	G3	S3		Blue			CMA;CWHvh;MHwh;MHwhp	Y	1	6	3	6
Glehnia littoralis ssp. *leiocarpa*	American glehnia	G5T5	S3		Blue			CWHvh;CWHwh;CWHxm	N	5	2	3	6
Gollania turgens	moss	G2	S1	C (Jul 2011)	Red			CWH;MH	N	1	6	2	6
Hageniella micans	moss	G3G5	S2S3		Blue			CWH	N	2	6	3	6
Haliotis kamtschatkana	Northern Abalone	G3G4	S2	E (Apr 2009)	Red		1-T (Jun 2003)	CDF;CWH	N	3	6	2	6
Lathyrus littoralis	silky beach pea	G3G4	S2	T (Apr 2013)	Red			CDFmm;CWHvh;CWHwh;CWHxm	N	4	6	2	6
Lescuraea saxicola		G4G5	S3		Blue			BAFA;CWH;ESSF;SWB	N	3	6	2	6
Limnodromus griseus	Short-billed Dowitcher	G5	S2S3B		Blue			BG;BWBS;CDF;CWH;ICH;IDF;PP;SWB	N	6	6	3	6
Mertensia maritima var. *asiatica*	sea bluebells	G5T3T4	S3		Blue			CWHvh;CWHwh	N	6	6	2	6
Micranthes nelsoniana var. *carlottae*	dotted saxifrage	G5T3	S3S4		Yellow			BAFA;BWBSdk;CMA;CWHds;CWHvh;CWHwh;IMA;MHwh;SWBdk;SWBmk;SWBun	N	2	4	4	6
Ostrea lurida	Olympia Oyster	GNR	S3	SC (May 2011)	Blue		1-SC (Jun 2003)		N	5	4	4	6
Phalacrocorax pelagicus	Pelagic Cormorant	G5	S4		Yellow			CDF;CWH	N	6	6	2	6
Ptychoramphus aleuticus	Cassin's Auklet	G4	S2B, S3N	SC (Jul 2014)	Red	Y (Jun 2006)		CDF;CWH	N	3	6	2	6
Ardenna creatopus	Pink-footed Shearwater	G3	S3N	E (Nov 2016)	Blue		1-T (Jul 2005)		N	3	2	3	6
Ardenna bulleri	Buller's Shearwater	G3	S3?N		Blue				N	4	4	4	6
Rhodobryum roseum	moss	G5	S2S3		Blue			CWHvh;ICHwk;SBSwk	N	4	6	2	6
Salix reticulata	net-veined willow	G5	S5		Yellow			CMA;CWHvh;CWHwh;MHwh	N	1	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
Sanguisorba menziesii	Menzies' burnet	G3G4	S3S4		Yellow			CWHvh;CWHvm;CWHwh;CWHxm;MHmm	N	3	6	3	6
Schistidium trichodon	moss	G2G4	S3		Blue			BAFA;BWBS;CMA;CWH;SWB	N	3	4	4	6
Seligeria careyana	moss	G2	S2	E (May 2019)	Red			CWH	N	1	6	2	6
Seligeria tristichoides	moss	G4	S3		Blue			CMA;CWH;ICH;SWB	N	3	6	2	6
Senecio pseudoarnica	beach groundsel	G5	S2S3		Blue			CWHvh;CWHwh	N	4	6	2	6
Tetrodontium brownianum	moss	GNRT3T4	S3		Blue			CWH	N	2	6	3	6
Thaleichthys pacificus	Eulachon	G5	S2S3	E/T (May 2011)	Blue			CWH	N	5	6	2	6
Trichostomum recurvifolium	moss	G3?	S3	E (May 2019)	Blue			CWH;MH	N	1	6	3	6
Uria aalge	Common Murre	G5	S2B, S3S4N		Red			CDF;CWH	N	6	6	2	6
Zygodon gracilis	moss	G2	S1S2	E (Nov 2019)	Red			CWH	N	1	6	2	6
Fratercula cirrhata	Tufted Puffin	G5	S2S3B, S4N		Blue			CDF;CWH	N	5	2	3	6(cl,sh)
Fratercula corniculata	Horned Puffin	G5	S2B		Red			CDF;CWH	N	6	6	2	6(cl,sh)
Hirundo rustica	Barn Swallow	G5	S3S4B	T (May 2011)	Blue			BAFA;BG;BWBS;CDF;CWH;ESSF;ICH;IDF;IMA;MH;MS;PP;SBPS;SBS;SWB	N	6	2	3	6(mm)
Oedipodium griffithianum	moss	G5	S1		Red			CWH;MH	N	4	6	2	6; 3(dw)
Entodon concinnus	cylinder moss	G4G5	S3		Blue			CWH;SWB	N	3	6	2	6;2(H)
Wijkia carlottae	moss	G3?	S3?		Blue			CMA;CWH;MH	N	1	6	3	6;3(t)
Potentilla furcata	forked cinquefoil	G4TNR	SH		Red				N				6
Festuca pseudovivipara	pseudoviviparous fescue	G2G3	S2S3		Blue				N				6
Castilleja parviflora var. albida	white small-flowered paintbrush	G5T3T4	S3S4		Yellow				N				6

Group 1: generalists

Overall, 12 species are **habitat generalists (Group 1),** that are highly unlikely to be affected by forest practices. Some Group 1 species benefit from forest harvest. One generalist also use riparian habitats and hence could be affected by riparian practices (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
Bryum gemmiparum	moss	G3G5	S3		Blue			CWH;ESSF;IDF	N	2	6	2	1
Diphyscium foliosum	moss	G5	S2S3		Blue			CWH	N	4	6	3	1
Epipterygium tozeri	moss	G4?	S3S4		Yellow			CDF;CWH	N	3	6	2	1
Hymenostylium recurvirostre var. *insigne*	moss	G5T3	S2S3		Blue			CWH	N	2	6	3	1
Pohlia columbica	moss	G3G5	S3		Blue			CWH	N	2	6	2	1
Pohlia elongata	moss	G4G5	S3		Blue			BAFA;CWH;ESSF;ICH;IMA	N	5	6	3	1
Pohlia lescuriana	moss	G4G5	S2		Red			ESSF	N	3	6	2	1
Pohlia pacifica	moss	GU	S1S2		Red			CWHvh;CWHwh	N	Not Assessed	6	2	1
Polystichum setigerum	Alaska holly fern	G3	S3		Blue			CMA;CWHvm;CWHwh;CWHws	N	3	6	3	1
Trematodon montanus	moss	G1G3	S1?		Red			CWH	N	1	6	2	1
Mustela erminea haidarum	Ermine, *haidarum* subspecies	G5T2	S2	T (May 2015)	Red		1-T (Jun 2003)	CWH;MH	Y	2	6	3	1;3(w,r)?
Martes caurina	Pacific Marten	G4G5	S5?		Yellow			BAFA, BG, CDF, CMA, CWH, ESSF, ICH, IDF, IMA, MH, MS, PP, SBPS, SBS, SWB	N				1

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
Nebria louiseae, and Nebria charlottae	Ground Beetles	G1G3	S1S3		No Status								4
Sphagnum junghuhnianum var. pseudomolle	Non-vascular plant	GNRTNR	S1		Red			CWH vh					4
Sphagnum wilfii		G2G3	SU (unrankable)		U			CWH	N	2	6	2	4
Synthliboramphus antiquus	Ancient Murrelet	G4	S2S3B, S4N	SC (Nov 2014)	Blue	Y (May 2004)	1-SC (Aug 2006)	CDF;CWH	N	2	6	1	4
Falco peregrinus	Peregrine Falcon	G4	S3	SC (Apr 2007)	No Status			BG;BWBS;CDF; CWH;ESSF;ICH; IDF;MS;PP;SBS; SWB	N	5	2	3	4/6(cl)
Falco peregrinus pealei	Peregrine Falcon, *pealei* subspecies	G4T3	S3S4	SC (Dec 2017)	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 HlGuu *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 Xil K'anhlGahl *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
Arctiostrotus perrieri	earthworm	GNR	S3?		Blue								2(all)
Ursus americanus	American Black Bear	G5	S5	NAR (May 1999)	Yellow				N	6	6	6	2(all)
Viola biflora var. *carlottae*	Queen Charlotte twinflower violet	G5T3	S3S4		Yellow			BAFA;CMA;CWHvh;CWHwh;IMA;MHwh	Y	2	4	4	2(all)
Cirriphyllum piliferum	moss	G5	S2S3		Blue			SWB	N	6	6	2	2(all); 1
Oxalis oregana	redwood sorrel	G5	S3		Blue			CWHvh;CWHvm	N	4	6	3	2(C)
Sphagnum quinquefarium		G5	S3		Blue			CWH	N	6	6	3	2 (all)
Oxypolis occidentalis	western cowbane	G4?	S3		Blue			CWHwh	N	3	6	2	2(C)
Ranunculus occidentalis var. *hexasepalus*	Haida buttercup	G3G4	S3S4		Yellow			CWHwh, CHWvh	Y		Not Assessed		2(C,H)
Pinicola enucleator carlottae	Pine Grosbeak, *carlottae* subspecies	G5T3	S3		Blue			CWH;MH	P	2	2	3	2(C)
Staala gwaii	Haida Gwaii Slug	G2?	S2?	SC (Apr 2013)	Red			CWH	Y	Not Assessed	4	4	2(C)
Malaxis diphyllos	Aleutian adder's-mouth orchid	G5T3?	S1S2		Red			CWHwh	N	4	6	3	2(C);3(r)
Daltonia splachnoides	moss	G1G2	S1	E (May 2019)	Red			CWH	N	1	6	2	2(C,H)

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
Cyanocitta stelleri carlottae	Steller's Jay, *carlottae* subspecies	G5T3	S3		Blue			CWH;MH	Y	2	4	4	2(C1)
Dendragapus fuliginosus	Sooty Grouse	G5	S4		Yellow			CDF;CMA;CWH;MH	N	5	2	3	2(C1)
Certhia americana	Brown Creeper	G5	S5		Yellow			BWBS;CDF;CWH;ESSF;ICH;IDF;MH;MS;PP;SBPS;SBS;SWB	N	6	1	3	2(C2)
Pseudocyphellaria rainierensis	Old growth specklebelly	G4	S2S3	SC (Apr 2010)	Blue		3 (Mar 2005)	CWHms;CWHvh;CWHvm;CWHwh;MHmm	N	2	6	2	2(C2,H2)
Ardea herodias fannini	Great Blue Heron, *fannini* subspecies	G5T4	S2S3B,S4N	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 – Stads K'un *northern goshawk* and Ts'allang.nga *Marbled Murrelet*. We consider Ts'allang.nga *Marbled Murrelet* as a group 5 species because of its sensitivity (nesting success) to predation at edges. Most Stads k'un *goshawk* nest sites are known on X̱aayda Gwaay.yaay *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. Ts'allang.nga *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
Accipiter gentilis laingi	Northern Goshawk, *laingi* subspecies	G5T2	S2	T (Apr 2013)	Red	Y (May 2004)	1-T (Jun 2003)	CDF;CWH;MH	N	1	6	1	5; 2(C)
Brachyramphus marmoratus	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 25 high priority species. Most 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
Dryobates villosus picoideus	Hairy Woodpecker, *picoideus* subspecies	G5T3	S4		Yellow	Y (Jun 2006)		CWH;MH	Y	1	1	2	3(c)/2(C1, C3)
Ulota drummondii	moss	G3G5	S3		Blue			CWH	N	2	6	3	3(d,t);2(H)
Histrionicus	Harlequin Duck	G4	S4B,S3N		Yellow			BWBS;CDF;CWH;ESSF;ICH;IDF;MH;MS;PP;SBPS;SBS;SWB	N	4	1	3	3(r)
Myriophyllum quitense	waterwort water-milfoil	G4?	S3S4		Yellow			CDFmm;CWHvh;CWHwh;CWHxm	N	5	6	3	3(r)
Oncorhynchus clarkii	Cutthroat Trout, *clarkii* subspecies	G5T4	S3S4		Blue			BWBS;CDF;CWH;ICH;SBS	N	4	2	3	3(r)
Cardamine angulata	angled bittercress	G5	S3		Blue			CWHdm;CWHvh;CWHwh	N	5	6	2	3(r);2(alll)
Eleocharis kamtschatica	Kamchatka spike-rush	G4	S3S4		Yellow			CWHvh;CWHvm;CWHwh;CWHwm	N	3	6	2	3(r,w)
Gasterosteus aculeatus pop. 1	Charlotte Unarmoured Stickleback	G5T2	S1S2	SC (Nov 2013)	Red		3 (Mar 2005)	CWH	Y	1	6	2	3(r,w)
Gasterosteus sp. 1	Giant Black Stickleback	G1	S1S2	SC (Nov 2013)	Red		3	CWH	Y	1	6	1	3(r,w)
Callitriche heterophylla var. heterophylla	two-edged water-starwort	G5T5	S2S3		Blue			BAFAunp;CDFmm;CWHvm;CWHwh;CWHxm	N	6	6	3	3(w)
Campylopus sinensis	moss	GNR	S1		Red			CWHwh	N				3(w)
Carex glareosa ssp. glareosa	lesser saltmarsh sedge	G5T5	S3S4		Yellow			CWHds;CWHms;CWHvh;CWHwh	N	4	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
Carex gmelinii	Gmelin's sedge	G4G5	S3S4		Yellow			CWHvh;CWHwh;CWHwm	N	5	6	2	3(w)
Glyceria leptostachya	slender-spiked mannagrass	G3	S4		Blue			CDFmm;CWHdm;CWHwh;CWHxm	N	3	6	2	3(w)
Malaxis paludosa	bog adder's-mouth orchid	G3G4	S3S4		Yellow			CWHvh;CWHvm;CWHwh;SBSdw;SBSwk	N	5	6	3	3(w)
Rana aurora	Northern Red-legged Frog	G4	S3	SC (May 2015)	Blue	Y (May 2004)	1-SC (Jan 2005)	CDF;CWH;MH	N	3	1	2	3(w)
Sphagnum subsecundum var. andrusii		GNR	S1S3		Red			CWH	N	3	6	2	3(w)
Triglochin concinna var. concinna	graceful arrow-grass	G5	S3S4		Yellow			CDFmm;CWHvh;CWHwh	N	6	6	3	3(w)
Malaxis brachypoda	white adder's-mouth orchid	G4T4T5	S3S4		Yellow			BWBSdk;BWBSmw;CDFmm;CWHdm;CWHvm;CWHwh;CWHws;CWHxm;SBSvk	N	4	6	3	3(w);2(all)
Aegolius acadicus brooksi	Northern Saw-whet Owl, *brooksi* subspecies	G5T2T3	S2S3	T (Dec 2017)	Blue	Y (May 2005)	1-T (Dec 2007)	CWH;MH	Y	1	6	2	3c/2(C2)
Myotis evotis	Long-eared myotis	G5	S5?		Yellow			CDF, CWH, MS, IDF,ICH,ESSF,PP,SBS, BWBS	N				3c,2(C2), 4 (caves)
Myotis lucifugus	Little brown myotis	G3	S4	E (Nov 2013)	Yellow			all	N	6	6	5	3c; 4 (caves; buildings)
Anaxyrus boreas	Western Toad	G4	S4	SC (Nov 2012)	Yellow		1-SC (Jan 2005)	BG;BWBS;CDF;CWH;ESSF;ICH;IDF;PP;SBS;SWB	N	3	2	4	3w
Antigone canadensis	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)
Sphagnum balticum		G5	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. Most 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 (67 of the 117 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% – Stads K'un *northern goshawk* (NOGO)and Ts'allang.nga *Marbled Murrelet (MAMU)*. 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.

Eight of the 25 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 LUO'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 Xaayda *Haida* Nation and Xaayda Gwaay.yaay *Haida Gwaii*: Ts'allang.nga *Marbled Murrelet*, Stads K'un *northern goshawk* , St'aw.was *northern saw-whet owl*, Great HlGuu *great blue heron* and Taan *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 Stads K'un *northern goshawk* areas (through the identification of individual nest trees).

Forest Service recently published Implementation Plans for both NOGO and MAMU.

The 2019 TSR has included modelling and consideration of both the provincial and the federal plans.

<u>NOGO Management Strategy – X</u>aayda Gwaay.yaay *Haida Gwaii*

The Haida Nation recently announced the Stads k'un (Goshawk) as the national bird of <u>X</u>aayda Gwaay.yaay *Haida Gwaii*. At th*e* 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.

The Taan Advisory Group (TAG) comprised of Taan, CHN, Skidegate Band Council and Old Massett Village Council has drafted a Goshawk Terms of Reference for TAG review 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 Stads k'un *Goshawk* management.

In the absence of the CHN <u>X</u>aayda Gwaay.yaay *Haida Gwaii* specific Management Plan. Taan will continue to work with the <u>X</u>aayda *Haida* to monitor foraging habitat around existing known nests and explore the potential for proposed operations in areas that show sufficient forage areas.

<u>NOGO Implementation Plan (Feb 2018) – Provincial</u>

An Implementation Plan (Forest Service) 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 Stads K'un *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 <u>X</u>aayda Gwaay.yaay *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 <u>X</u>aayda Gwaay.yaay *Haida Gwaii* (already implemented under the LUO) and to develop provincial foraging habitat management recommendations expected by 2020. Engagement events were held in early 2016 (Jan 29, 2016 in <u>X</u>aayda Gwaay.yaay *Haida Gwaii*) and Taan participated and provided collaborative feedback (through the Coast Forest Products Association).

The long-term objective for <u>X</u>aayda Gwaay.yaay *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 <u>X</u>aayda Gwaay.yaay *Haida Gwaii*. The implementation objectives identified a minimum 5 breeding areas on <u>X</u>aayda Gwaay.yaay *Haida Gwaii* for protection by 2020 (along with the plans to conduct further research on forage area requirements).

NOGO SAR Recovery Strategy (December 2018) - Federal

The federal Recovery Strategy for the Stads K'un *northern goshawk laingi* subspecies was published in December 2018. However, the Order to make it a legal requirement has not yet been released. It includes the same 18 critical habitat areas for Xaayda Gwaay.yaay *Haida Gwaii* as the 2014 draft. Critical forage habitat targets include maintaining 65.5% suitable habitat within a breeding home range spacing of 10.4 km. The amount of suitable habitat required for critical habitat for foraging for Xaayda Gwaay.yaay *Haida Gwaii* is 65.5% and 5,564 ha.

The strategy identifies critical breeding habitat areas as well as critical foraging habitat. The strategy notes that work will continue on researching critical habitat knowledge gaps.

Action Plans are expected to be developed consistent with the Recovery Strategy. The Strategy notes that urgent action is needed to discover or manage habitat for additional home ranges and develop approaches to human induced mortality (e.g., landowners protecting chickens causing Goshawk mortality).

The Province of BC (and Biologists) are currently reviewing the federal recovery strategy specifically in relation to Xaayda Gwaay.yaay *Haida Gwaii*.

MAMU Implementation Plan (Feb 2018) - Provincial

An Implementation Plan (Forest Service) 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 Ts'allang.nga *Marbled Murrelet*s 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 Xaayda Gwaay.yaay *Haida Gwaii* incudes 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 Ts'allang.nga *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 Xaayda Gwaay.yaay *Haida Gwaii*, as well as to develop monitoring plans across all regions.

The habitat protection targets for Xaayda Gwaay.yaay *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 - Federal

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 X̲aayda Gwaay.yaay *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	-

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 Xaayda Gwaay.yaay *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 (HCV) Assessment contains a full list of the species identified within the Management Unit. These lists are updated though 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 HCV 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.

Indicator 12: Sensitive Species Habitat

Element	Objective	Indicator	Target
FSC 6.4.8, 8.2.3 (2, 3) & 9.4; linkages to Criterion 6.4	Monitor the habitat for sensitive species and observed changes over time	MAMU Class 1 and 2 habitat area Northern Goshawk reserve area Northern Saw-whet Owl reserve area Great Blue Heron reserve area 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 Xaayda *Haida* Nation and Xaayda Gwaay.yaay *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[2] (ha)	Habitat in NCLB (ha)	Total Habitat outside of THLB (ha)		
MAMU Class 1 & 2 habitat	57,753.3	19,756	13,967.2	1,320.9 (2,930.2 partially contributing)	15,288.1	Targets by LU set in the LUO	Y: Targets are met in Site Plans for each development area. Refer to the MAMU Summary Spreadsheet.
Northern Goshawk high forage habitat	57,315.3	45,623.0	17,778.1	5,029.5 (11,346.9 partially contributing)	22,807.6	HG Strategy is under development by the Haida Nation	Y: Targets are met in Site Plans for each development area.
Northern Goshawk high nesting habitat	50,109.3	18,016.1	8,275.7	1,680.2 ha (3,926.7 partially contributing)	9,955.9		
Northern Goshawk Reserve	-	-	1,663.2 in reserve	N/A	N/A	Respect reserve boundaries	Y: Targets are met in Site Plans for each development area.
Northern Saw-whet Owl Reserve	-	-	572.3 in -reserve	N/A	N/A	Respect reserve boundaries	Y: Taan sets aside min 10ha in development areas as per requirements of the LU Order.
Great Blue Heron Reserve	-	-	405 in reserve; 366 management zone – 17 nests (overlap between nests netted out)	N/A	N/A	Respect reserve boundaries	Y: Targets are met in Site Plans for each development area.
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: Each development area has set asides for den recruitment. A 200-meter timing restriction zone around bear dens is required.
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 retained monumental cedars have appropriate reserves.

[1] Data is per the TSR 2019 data set/ forest inventory.

[2] 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.

In 2022, there were no changes to the species at risk/ sensitive species management areas in the Management Unit. MAMU was not updated but was tracked for the next update planned for 2023. On Haida Gwaii, there was one additional *northern goshawk* nests identified but not within Taan's Management Unit.

In 2021, species at risk/ sensitive species management areas in the Management Unit were updated. Taan continues to follow the Marbled Murrelet targets set in the Land Use Order, which are addressed in the site plans for each development area. Taan maintains a surplus of area in the Skidegate and Louise LUs to choose from if existing MAMU habitat is required. A summary of MAMU habitat is detailed in Taan's MAMU Summary Spreadsheet. There were no additional Stads K'un *northern goshawk* nests identified in 2021 within Taan's Management Unit.

In 2020, species at risk/ sensitive species management areas in the Management Unit were updated. Taan continues to follow the Marbled Murrelet targets set in the Land Use Order, which are addressed in the site plans for each development area. The province found an additional 4 nest sites on X̲aayda Gwaay.yaay *Haida Gwaii* in 2020 for the Stads K'un *northern goshawk,* which are now protected, and one nest is located within Taan's Management Unit.

In 2019, species at risk/ sensitive species management areas in the Management Unit were updated. Stads K'un *northern goshawk* high forage and nesting habitat areas saw significant increases within the LUO Constrained area from 902.1 ha to 1,778.1 ha and 397.78 ha to 8,275.7 ha, respectively. One new Goshawk nest site was identified in the Canoe area.

In 2018, several monumental cedars and 2 new bear dens were identified (see LUO reporting indicator). Two new goshawk nests added, one in Feather and one in Hancock River.

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 X̲aayda Gwaay.yaay *Haida Gwaii*, including the X̲aayda *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 Ts'allang.nga *Marbled Murrelet*, Stads K'un *northern goshawk*, St'aw.was *northern saw-whet owl*, HlG̲uu *great blue heron* and the Taan *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. In addition, the TSR also considered the recovery strategies and plans and included several scenarios for Stads K'un *northern goshawk*.

Reserve boundaries will be carefully respected. All known Goshawk nests on X̲aayda Gwaay.yaay *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 under the FSP 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.

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

Work is underway to develop a X̲aayda Gwaay.yaay *Haida Gwaii* specific strategy for the Goshawk, and Taan is participating through the Taan Advisory Group. Taan will continue to work with the X̲aayda *Haida* to monitor foraging habitat around existing known nests and explore the potential for proposed operations in areas that show sufficient forage areas (>65%).

Taan also continues to support the Goshawk breeding monitoring program.

Forecast

Several scenarios were completed as part of the 2019 TSR, that included some forecasting to analyze effects of different strategies on the AAC.

Database & Reporting Parameters

The LUO incorporated MAMU habitat suitability mapping and reserve areas for Stads K'un *northern goshawk* and St'aw.was *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 X̲aayda *Haida* Nation and the Province of BC (refer to the LUO Reporting indicator for details).

Environmental Impacts

Indicator 13: Watershed Hydrological Recovery

Element	Objective	Indicator	Target
FSC 6.7.5, 8.2.3 (4)	Best management practices are in place that identify measures to control changes in flow in watersheds with significant downstream values resulting from management activities.	# of Upland Stream Areas with Hydrological Recovery <70%; # of sensitive watersheds with Hydrological Recovery <80%	# 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 best management practices to manage watersheds and employ analytical approaches to identify and avoid hydrological impacts as well as legal requirements under the Land Use Order for Upland Stream Areas and 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 X̲aayda Gwaay.yaay *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	# of Watersheds	# of Upland Stream Areas HR < 70%	Area for Watersheds Upland Stream Areas HR < 70% (ha)	# of Sensitive Watersheds HR < 80%	Area of Sensitive Watersheds HR < 80%	Target Met (Y/N)
2022	158	-	-	1	Not defined	Y
2021	158	-	-	1	Not defined	Y
2020	158	-	-	1	Not defined	Y
2019	158	-	-	1	Not defined	See below

*Brent Creek watershed is considered sensitive with a Hydrological Recovery < 80%. 34.6 ha falls within the Management Unit (1% of the sensitive watershed) and no Taan harvesting occurs within this watershed. Brent Creek 2021 watershed analysis was completed, and it was determined that HR was 78.6%.

Past Reporting based on Previous Indicator

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%	
2019	Taan	158	2	5,729 (46ha in MU)0	1	3,451 (36ha in MU)	Y
2018	Taan	158	6	3,102	2	1,337	Y
2017	Taan	158	6	3,102	2	1,337	Y

In 2022, Taan did not conduct any operations in the Brent Creek Watershed.

In 2021, there was only one sensitive watershed (Brent Creek Watershed) with Hydrological Recovery less than 80%. 34.6 ha of this watershed falls within Taan's Management Unit, which accounts to 1% of the total watershed area. Taan did not conduct any operations in this area during 2021.

In 2020, there was only one sensitive watershed (Brent Creek Watershed) with Hydrological Recovery less than 80%. 34.6 ha of this watershed falls within Taan's Management Unit, which accounts to 1% of the total watershed area. Taan has not conducted any operations in this area.

In 2019, there are no watersheds within the Management unit (MU) that exceed the FSC threshold of ECA >25% and there are no Sensitive Watersheds that exceed the LUO threshold of ECA >20%. Bill Creek (minor overlap in the MU of 11ha) and Brent Creek (35ha overlap in the MU) are over 25% ECA, and Brent Creek exceeds the LUO threshold of 20% (35ha overlap in the MU). Taan has not conducted any operations on these two minor overlap areas with the MU. This demonstrates watershed recovery over time through the application of the LUO.

In order to maintain a consistent comparison for the indicator over the years, the list of watersheds overlapping Taan tenures was reset to the original 158 for all years; data from previous years that had omitted some watersheds were reviewed and values recalculated. In 2018 there were six watersheds with ECA >25%, Bill Creek, Brian Creek2, Brent Creek, Log Creek3, Heather Lake, and Dinan Bay Residual2. The recalculated 2017 results are consistent with the 2018 results. There were 2 sensitive watersheds >20% in 2018, consistent with the 2017 recalculated data, Brent Creek and Mamin River4.

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.

Summary of Management Strategies

Watershed Hydrological Recovery is managed through the legal requirements under the Land Use Order and the Forest Stewardship Plan, which establishes Hydrological Recovery (HR) minimum of 80% for Sensitive Watersheds, and 70% HR for Upland Stream Areas. Analysis and tracking of watershed condition in relation to harvest planning is a requirement of the FSP.

In the event that watersheds exceed allowable Hydrological Recovery (HR) 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 HR thresholds.

Database & Reporting Parameters

Watershed status is maintained within GIS. Under the X̲aayda Gwaay.yaay *Haida Gwaii* FSP, analysis is required to confirm current status of each watershed unit in relation to the allowable thresholds to harvest planning.

Indicator 14: 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 until all streams are deemed properly functioning.

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 improve 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		Properly Functioning Adj.	Properly Functioning In block	Properly Functioning but at risk Adj.	Properly Functioning but at risk In block	Properly Functioning with high risk Adj.	Properly Functioning with high risk In block	Not Properly Functioning Adj.	Not Properly Functioning In block	# of samples	Target Met (Y/N)
2022	Upland Stream		-	-	-	-	-	-	-	-	0	-
	Type I		-	-	-	-	-	-	-	-	0	
	Type II		-	-	-	-	-	-	-	-	0	
2021	Upland Stream	S6	-	-	-	1	-	-	-	-	1	N
	Type II	S4	-	1	-	-	-	-	-	-	1	
	Type II	S4	-	1	-	-	-	-	-	-	1	
2020	Type II	S4	-	1	-	-	-	-	-	-	1	Y
2019	Type I	S3	-	-	-	2	-	-	-	-	2	-
	Type II	S4	-	1	-	1	-	-	-	-	2	
	Upland Stream	S6	-	-	-	1	-	-	-	1	2	
2018*	Type I	S1	1	-	-	-	1	-	-	-	2	-
	Type I	S2	2	-	1	-	-	-	-	-	3	
	Type I	S3	-	-	2	-	-	-	-	-	2	
	Upland Stream	S5	-	-	-	-	-	-	-	1	2	
	Upland Stream	S6	-	2	-	1	-	-	-	2	4	

Note: 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.

In 2022, FREP data was not provided by the Forest Service. As a result, this indicator cannot be properly assessed. If information is brough forward from the Ministry, Taan will update this section accordingly. In accordance with Taan's post harvest inspections, all stream prescription inspections were followed including proper buffers on type 1 and 2 streams and machine free zones on upland streams.

In 2021, FREP assessed IAN032 and GLD005 in TFL 60 and HON001 in FLA87661. IAN032 was assessed as functioning but at risk due to current logging (falling and yarding and low retention) and animal disturbance (ungulates). GLD005 was deemed properly functioning with some impacts from old logging (falling and yarding), natural impacts (floods), and animal disturbances (ungulates). HON001 was deemed properly functioning with some impacts from old roads and trails, old logging, natural impacts (mass wasting), and animal disturbance (ungulates). Taan also completed post harvest surveys on 100% of its cutblocks and no issues were identified with respect to riparian effectiveness.

The past 2020 FREP sample included only one stream which was identified as properly functioning, making it unattainable in 2021 to meet the target of "continually improving the percentage of properly functioning streams". The above target was updated to acknowledge good practices, where streams are properly functioning on an annual basis.

I was also identified that this indicator does not incorporate Taan's internal pre and post harvest assessments. Taan recently met with FREP and proposed to have staff trained to complete pre and post harvest assessments using the FREP assessment tool. This would help incorporate Taan's internal assessments, increase sample size, and provide a better picture of current practices.

In 2020, FREP assessed steam STR2DR2 in cutblock TOW001 and identified that the stream was properly functioning, however historic logging practices have disturbed stream bank and channel. Also, deer browse, and lack of retention has impacted stand structure adjacent to stream. A field inspection by Taan confirmed that it was not responsible for the past disturbance and that the steam continues to function properly.

Taan also completed post harvest surveys on 100% of its cutblocks and no issues were identified with respect to riparian effectiveness. Follow-up field inspections conducted by Taan on BUC001 and BUC003 resulted in zero mitigation actions. It appears these streams are not properly functioning in accordance with FREP because of the lack of vegetative cover along the streams. Retention of non-merch and understory vegetation was prescribed and followed however there was minimal non-merch and understory vegetation to retain. In some streams, coarse woody debris seemed a bit high although the stream was staying in channel and flowing with no evidence of any downstream impact. Taan determined that no further action is required on BUC001 and BUC003.

In 2019, blocks THR002, BUC001, BUC003, AER006 and AER032 were assessed by FREP. THR002 was identified as not properly functioning as a result of low retention and logging debris collecting in streams. BUC001, BUC003, and AER032 were identified as functioning but at risk from animal disturbance, current logging, and old logging. Road design upstream of the break at AER006 was found to be successfully mitigating sedimentation into the stream. Taan completed field assessments of THR002, AER006 and AER032 (report is on file including any mitigative actions already completed or planned). The BUC blocks are second growth blocks. Initial logging was completed by steam donkey and the logs were cable yarded from hill side to shore. Streams are quite incised closer to the ocean and graveling is still occurring because of past logging practices and wildlife travel up and down these banks. There is no remedial action to conduct. A field inspection by Taan on block IAN004 did not identify any evidence of sedimentation or water quality issues. However, it is likely that heavy rains will cause some erosion of streams banks resulting in siltation and decreasing water quality.

In 2018, the blocks assessed included GRA002, AER004, THR004, IAN001, GEI001, THR003, BUC002, PHT001, IAN005, PHT004, IAN004, AWN009, and AWN010. The block identified as functioning but at high risk included AER004, and the blocks with stream identified as not properly functioning included IAN005, AWN009 and AWN010. An action item was generated in the 2018 Monitoring Report to obtain the site-specific details, and these have now since been provided allowing for a new action to be generated for Taan staff to complete field visits to assess the remaining areas for remedial action. Taan has completed field assessments of AER004, THR004 and THR003 (report is on file including any mitigative actions already completed or planned).

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

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

In 2013, we 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. Where FREP monitoring indicates there are issues, Taan generates action items to follow up with field inspections to determine if mitigative action can be completed to address the issues.

- 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 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 Forest Service 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).

Indicator 15: 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 X̲aayda Gwaay.yaay *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			
2022	Taan	-	-	-	-	-	-	-	
	W. Coast Region	-	-	-	-	-	-	-	
2021	Taan	4	11	3	-	-	18	2	N
	W. Coast Region	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
2020	Taan	8	2	-	-	-	10	4	Y
	W. Coast Region	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
2019	Taan	29	64	7	-	-	42	6	Y
	W. Coast Region	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
2017-2018	To be reported in 2019. FREP did not complete Water Quality Assessments in 2018.								

In 2022, FREP data was not provided by the Forest Service. As a result, this indicator cannot be properly assessed. If information is brough forward from the Ministry, Taan will update this section accordingly. In accordance with Taan's post harvest inspections, all stream prescription inspections were followed including proper buffers on type 1 and 2 streams and machine free zones on upland streams.

In 2021, two blocks were sampled with a total of 18 sampling sites. 83% of samples (15/18 sites) showed very low to low potential for sediment entering a stream, while 17% (3/18 sites) showed moderate potential for sediment entering a stream. One of the sites with moderate potential noted sediment visible in the stream at the crossing and another moderate potential site noted a disturbed areas beside the stream. Taan has engaged with FREP to have its staff trained in the FREP water quality effectiveness evaluation protocol to help incorporate Taan's internal assessments, increase sample size, and provide a better picture of current practices.

In 2020, four blocks were sampled with a total of 10 sampling sites. 100% of samples showed very low to low potential for sediment to enter a stream. One site noted that windthrow was down side from the water crossing and the ground quickly revegetated. At this site, there was water running across the crossing to a deactivated culvert that was hydrologically connected to the stream. A bridge site noted that the bank was well armoured, but sediment was traveling over the bridge into the stream onto well vegetated ground. Another site identified that there was a perched culvert and most water was running under the culvert otherwise in excellent condition. The assessor noted that the road construction was not causing sediment issues, rather old windthrow and logging was the cause.

In 2019, six blocks were sampled with a total of 42 sampling sites. 93% of samples showed very low to low potential for sediment to enter a stream. Sites identified as moderate potential for sediment entering a stream were the result of ponding, ruts, and depressed road approach at crossings causing run-off, windthrow in retention above stream resulting in patches of exposed soil hydrologically connected to the stream above a crossing, and cutbanks hydrologically connected to a crossing.

There were no FREP assessments of water quality completed for the Management Unit in 2017 or 2018.

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* 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	Very High
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 sedimentation 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 road or harvesting. Poor location and (or) water management	Very Low

* ≤ 1 mm in diameter.

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 armouring, road maintenance/ deactivation etc.). Availability of rock material for armouring can be a challenge in some areas of Xaayda Gwaay.yaay *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).

Database & Reporting Parameters

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

Indicator 16: Research & Monitoring Projects

Element	Objective	Indicator	Target
FSC 5.1.4 & 8.2.7: Environmental and social impacts of harvesting and other operations	Provide multiple benefits/ mitigate environmental & social cost	# of Xaayda Gwaay.yaay *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)
2022	15	• Mother Tree Network Society - Soil Carbon Haida Gwaii project. UBC (academic)	Y

Year	# of Haida Gwaii Research & Monitoring Projects Supported*	Target Met (Y/N)
	• Biomass Results. Develop a biomass ratio comparing the amount of roadside waster to the harvested volume. UBC (academic) • Taan Forest Biomass Feasibility Study. Assess biomass volumes of Taan Forest and feasibility of procuring this volume for a bio-energy plant in Port Clements, BC. (consultants) • Understory Biodiversity Plantings with Canopy Gaps in the King Creek Watershed of Haida Gwaii – Fin Smith, University of Victoria (academic) • Assessing arbuscular mycorrhizal inoculum as a tool to increase western red cedar regeneration in the presence of invasive deer. (academic) • Assessing deer repellent as a tool to increase western red cedar regeneration in the presence of invasive deer. (academic) • Evaluating the effects of nitrogen urea fertilization on western redcedar growth, soil carbon stocks, and greenhouse gas emissions on Haida Gwaii, B.C. (academic) • Is climate causing yellow-cedar decline on Haida Gwaii? Dr Lori Daniels, UBC (academic). Dec 2016. • Yellow cedar genetic research. Dr. Jim Mattsson. SFU (academic). 2017 • Low Value Fibre Removal. Increase fibre utilization by removing fibre that would otherwise be left on site. (government) • Forest Enhancement on Haida Gwaii – Carbon Storage & Old Growth Restoration (government) • Haida Gwaii Enhanced Silviculture Carbon Feasibility Study. Treat 1000 hectares annually on HG. • Forest Restoration on Haida Gwaii: Implications for Goshawk Habitat • Stad's Kun Management Strategy (local Goshawk research) • Implementation Plan for the Recovery of Northern Goshawk laingi Subspecies (Accipiter gentilis laingi) in British Columbia. (government)	
2021	9 • Support for UBC carbon sequestration studies with fertilization research on HG cedar stands including greenhouse gas release studies. • Continued in-house Riparian Restoration studies of enhanced silviculture practices in riparian stands. • PSP establishments. • FREP monitoring with the Haida Gwaii Forest Service District Office. • Support Simon Fraser graduate student with a Goshawk research study. • Support Simon Fraser graduate student with an ecological restoration study to provide financial assistance for native plant sowing and site selection. • Black bear den restoration and monitoring with Helen Davies, RPBio. • Additional black bear den construction and monitoring was established. • CHN monitoring of cultural wood identification.	Y
2020	7 • Support for UBC carbon sequestration studies with fertilization research on HG cedar stands including greenhouse gas release studies. • Continued in-house Riparian Restoration studies of enhanced silviculture practices in riparian stands. • FREP monitoring with the Haida Gwaii Forest Service District Office • Support Simon Fraser graduate student with a Goshawk research study • Support Simon Fraser graduate student with an ecological restoration study • Black bear den restoration and monitoring with Helen Davies, RPBio • CHN monitoring of cultural wood identification	Y
2019	2 • Support for UBC carbon sequestration studies with fertilization research on HG cedar stands including greenhouse gas release studies. • Continued in-house Riparian Restoration studies of enhanced silviculture practices in riparian stands.	Y
2018	11 • Support for the funding application for Forest Enhancement Society of BC for habitat enhancement in second growth stands. • Continued support for UBC yellow cedar die back project • Support for the UBC red cedar arbuscular mycorrhizal research project • Continued support for the Forest Service FREP Monitoring program • Continued Collaborative data sharing initiative (CHN & BC Government) • Support for the NoGo monitoring by Province of BC	Y

Year	# of Haida Gwaii Research & Monitoring Projects Supported*	Target Met (Y/N)
	• Work with CHN & Forest Service part of NoGo Recovery Strategy Development for Haida Gwaii. • Support for Simon Fraser University project related to genomic approach to yellow cedar decline in BC. • UBC and Harvard U of Graduate Design. Thesis support - Knowledge Grounds, A Landscape-Based Art School on Haida Gwaii – Mapping& lidar support.	

*Note: Donations and sponsorships are now issued by the Haida Enterprise Corporation (HaiCo) rather than through Taan (which is a subsidiary of HaiCo).

In 2022, Taan continued to support several projects related to research and monitoring, including a new project with the Mother Tree Network to understanding impacts on carbon in the soil related to riparian and habitat restoration projects. Taan is also engaged in two biomass related projects, one to compare the amount of roadside waste to the harvested volume with UBC and another to assess biomass volumes and feasibility for a bio-energy plant in Port Clements. Several other research projects are ongoing related to mycorrhizal inoculum, planting high-value understory species to increase biodiversity, deer repellent as a tool to increase western red cedar regeneration, effects of nitrogen urea fertilization on western redcedar growth, climate change impacts related to yellow-cedar decline, carbon storage and old growth restoration, and recovery of northern goshawk.

In 2021, Taan continued to support several projects related to research and monitoring, such as the UBC carbon sequestration study with fertilization research on cedar stands, in-house riparian restoration studies of enhanced silviculture practices, Permanent Sample Plot establishment, FREP monitoring with the Haida Gwaii Forest District, Simon Fraser Goshawk and ecological restoration studies, black bear den restoration and monitoring, and CHN monitoring of cultural wood identification.

In 2020, Taan supported several projects related to research and monitoring, such as the UBC carbon sequestration, fertilization research on cedar stands including greenhouse gas release studies, in-house riparian restoration studies of enhanced silviculture practices, FREP monitoring with the Haida Gwaii Forest District, Simon Fraser Goshawk and ecological restoration studies, black bear den restoration and monitoring, and CHN monitoring of cultural wood identification.

In 2019, Taan supported studies at UBC examining carbon sequestration and fertilization research on X̱aayda Gwaay.yaay *Haida Gwaii* cedar stands including greenhouse gas release studies. In-house ongoing Riparian Restoration studies for enhanced silviculture practices utilized in riparian stands was continued. No further Yc die back studies are currently underway, and support for further research is may continue but funding sources limited.

In 2018, Taan continued to support or work collaboratively with a number of groups and organisations to support research and monitoring projects on X̱aayda Gwaay.yaay *Haida Gwaii*.

Summary of Management Strategies

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

Database & Reporting Parameters

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

Social & Economic Impacts

Indicator 17: Xaayda Haida & Public Engagement

Element	Objective	Indicator	Target
FSC 8.2.2 (2), (7); linkages to Criterion 1.6, 2.6, 3.3, and 7.6	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.) or FPIC agreements	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 the Xaayda *Haida* and local residents regarding forest management activities. It incorporates general complains and issues as well as a general summary of the outcome of public engagement (as required under certification) and whether any formal disputes have been submitted as well as their resolution. The target is intended to support corporate objectives and FSC requirements to obtain general "free and informed consent" (FPIC) from the Xaayda *Haida,* local residents and rights holders. This includes reporting of any dissatisfaction regarding the full implementation of the terms of any binding FPIC agreements.

Current Status/ Results

Year	Public Engagement (FSC related)– Comments Received	"Complaints" Received	"Disputes"	Target Met (Y/N)
2022	• Taan Forest joined Linkedin March 2022 https://ca.linkedin.com/company/taan-forest • Facebook continues to be utilized https://www.facebook.com/taanforest/ • Gwaii Trader updates: https://haidagwaiitrader.com/ • Council of the Haida Nation Webiste: https://www.haidanation.ca/sdm_categories/haida-laas/ • Taan Annual Strategic Advisory Group • Operational Advisory Group (HNRD staff)–every 6 weeks • HaiCo House of Assembly annually • Direct relationship/communication with bands, value added users, and log purchasers • Mailbox to mailbox – e-distribution, houses, business in Skidegate/Old Masset	0	0	Y
2021	• Created Taan Facebook July 6, 2021 • Taan Annual Strategic Advisory Group (postposed) • Operational Advisory Group (HNRD staff)–every 6 weeks • HaiCo House of Assembly annually • 2 in-person dinners with HaiCo • Bi-annual newsletters • Annual BBQ/Open House in Old Masset and Skidegate • Direct relationship/communication with bands, value added users, and log purchasers • Mailbox to mailbox – e-distribution, houses, business in Skidegate/Old Masset	0	0	Y

Year	Public Engagement (FSC related)– Comments Received	"Complaints" Received	"Disputes"	Target Met (Y/N)
2020	• Typically, Taan would hold an open house and an BBQ, but this was not possible due to COVID restrictions. Instead, Taan completed virtual town meetings with Queen Charlotte City, Massett, Village of Port Clements, Old Massett Village, and Skidegate with unfortunately little uptake. No complaints were received. • Taan Annual Strategic Advisory Group (CHN President, VP, Band Council Chief Councillors, CHN Stewardship Director, HNRD Manager, Solutions Table Representative)	0	0	Y
2019	• The Village of Port Clements requested a presentation on FSC to be made. • A complaint was observed on Facebook about potential oil in Skidegate Lake. Taan Staff visited the site and confirmed no oil presence in the lake. • Concerns raised by the Old Massett Village Council during a HaiCo Community Dinner about the Taan Fertilization Projects. A response was provided.	2	0	Y
2018	• Closure of USW Dispute. • Closure of grievance with a group of local residents related to proposed harvesting in SKI012. • Local resident concerned over the possibility of a bear den in SK012, site investigated by CFI surveyor and no bear den or activity was discovered. • Local resident concerned about tree protector at AIN12, Taan responded that it is on the list of blocks requiring protector removal. • Concerns from a local resident/business operator regarding DLS bark debris, leaky machinery, old growth fire breaks, plastic log tags, boom sticks, harvest age, and nutrient availability were. Response addressing all topics was sent, no further inquiries were made. • Local resident inquired into access to obtain cedar foliage for oil extraction. Access granted provided conditions required to work within a block (FSC and CMS requirements) met, requirements were listed.	0	0	Y

In 2022, no complaints or disputes were received in regard to forest management operations. Taan joined another social media platform, Linkedin, to continue to communicate information and provide another avenue for feedback from the public. Taan continues to hold the annual strategic advisory group, operational advisory group meetings along with the annual HaiCo house of assembly meetings.

In 2021, no complaints were received and there was increased engagement as compared to 2020 including the creation of a Taan Facebook account. Taan continued to hold Operational Advisory Group Meetings, engage in the HaiCo House of Assembly, produce bi-annual newsletters, host open houses in Old Masset and Skidegate, maintain general communication with bands, value added producers, and communicate through mailbox to mailbox distribution to houses and business throughout Skidegate/Old Massett.

In 2020, no complaints were received and there was limited engagement in the virtual town meetings. The lack of involvement was related to the COVID pandemic and Taan hopes to have a greater turnout during next year's public engagement sessions.

In 2019, no disputes were received, however one complaint was observed on Facebook and one complaint was raised at a HaiCo Community Dinner.

In 2018, consultation was completed for the closure of grievance, without compensation for a grievance filed in 2017 by a group of local residents related to proposed harvesting in SKI012 and potential for losses to livelihood related to Kaagan daajing *mushroom* picking.

The Haida Enterprise Corporate (HaiCo) has also hired a X̱aayda *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.

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).

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.

Indicator 18: Special Sites

Element	Objective	Indicator	Target
FSC 8.2.2 (8); linkages to criteria 3.5 and 4.7	Protection of sites of special cultural, ecological, economic, religious or spiritual significance to Xaayda Haida and local communities that are not included within the Land Use Order (LUO).	Protection of Special Sites	Appropriate management strategies are applied to protect identified special sites

Rationale for Indicator & Target

This indicator is intended to report on protection of sites of special cultural, ecological, economic, religious or spiritual significance to Xaayda Haida and local communities that are not included within the Land Use Order (LUO). LUO features are reported under the LUO/ FSP Annual Reporting Indicator.

Special sites are identified through engagement processes with the Xaayda *Haida* and local communities and include:

- Mosquito Lake & the Mount Moresby Adventure Camp area)
- Karst features/ caves
- Unique ecosystems: Sitka Spruce Riparian Forest (CWHwh1 07/08), Sitka Spruce Sea Spray/ Fog Forest (CWHvh2 08/09), identified in the HCV Assessment Report.
- Yakoun and Mamin Rivers and riparian areas
- Marie and Pam Lakes and riparian areas
- Estuaries of rivers and streams
- Masset Inlet recreation values

- Red and blue listed ecosystems not included within the LUO: Western red cedar-Sitka spruce/ skunk cabbage (blue); Yellow cedar-Mt. Hemlock/ Twisted Stalk (blue); Dune wildrye-beach pea (red); skitka willow-pacific willow/ skunk cabbage (red), identified in the HCV Assessment Report.
- Unique features and sites are considered where encountered: ancient forest patches, vernal pools, small wetlands, dens, nests for birds of prey, ungulate calving sites, spawning areas, super canopy trees, wallows, mineral licks.
- Mushroom picking areas (particularly Skidegate Lake area)
- Cumshewa Inlet site (added 2019)

The above special sites remain protected and are considered culturally significant by the Haida.

Summary of Management Strategies

Taan's Planning SOP guides the block and road development process and ensures that special sites are appropriately identified and managed. Sites and features may also be identified through the Public Engagement process or other engagement such as the Solutions Table or the Taan Advisory Group.

Special sites are included as considerations on the Taan Site Plan Template, which is a document that gets completed during the planning process, to ensure that all required elements are addressed prior to harvesting.

Database & Reporting Parameters

Taan Site Plans will be reviewed for all blocks harvested within the year, to verify that identified special sites are managed to ensure their protection.

Indicator 19: Payments of Fees and Wages

Element	Objective	Indicator	Target
FSC 1.3.2, 8.2.2 (5); linkages to Criterion 2.4	Provide multiple benefits/ mitigate social cost	Wages are paid to workers in a timely manner	100% of required payments are completed in a timely manner (within 30 days)
		$ paid to government (stumpage, export fees, tenure rent, prepaid rent and lease, CPP& EI)	100% of required payments are completed in a timely manner (within 30 days)

Rationale for Indicator & Target

This indicator was revised to include a component of reporting of timely payment of wages Taan is responsible for, or that is within our sphere of influence.

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	# of Outstanding payments (>30 days) of wages Taan is responsible for	Paid to Government ($)	Outstanding Payments ($)	Target Met (Y/N)
2022	0	9,053,171	0	Y
2021	0	2,740,900	0	Y
2020	0	616,180	0	Y
2019	New Indicator in 2020	2,274,547	0	Y
2018		615,084	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 or to forest workers other than to ensure that all payments are made within allowable timeframes (per legal requirements, corporate objectives and FSC requirements).

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 Canada Pension Plan (CPP), Employment Insurance (EI), Taxes, Stumpage and License Payments. The accounting department will also provide a report of the number of any outstanding payments to staff or contractors that are more than 30 days overdue (none are anticipated).

The Forest Service, Forest Revenue Branch no longer publishes the statement of accounts for forestry revenues. Taan receives regular statements regarding any outstanding payments.

Indicator 20: Local Support & Agreements

Element	Objective	Indicator	Target
FSC 5.1.1, 5.1.2	Provide multiple benefits/ mitigate social cost	Donations made to X̲aayda Gwaay.yaay *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, and the Haida Enterprise Corporation (HaiCo) – Taan Forest, Haida Tourism, and Haida Wild. 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.

It is important to note that Donations and sponsorships are now issued by the Haida Enterprise Corporation (HaiCo) rather than through Taan (which is a subsidiary of HaiCo). As such the donations and support by Taan have decreased.

Current Status/ Results

Year	$/ In-Kind Support for Local Groups	# of Agreements/ Joint Ventures with Local Businesses	Target Met (Y/N)
2022	Direct donations to the following; • Old Massett Community (firewood) • Skidegate Community (firewood) • Gidgalang Kuuyas Naay Secondary School (Firewood Program) • Grading of local forestry roads specifically for community access • Maintenance of the local fish hatchery road system The following donations were made on behalf of HaiCo's Group of Companies • OMVC Christmas Hampers • SBC Christmas Hampers • Skidegate Days • Haida Heritage Center • Shaylanna walk • Gudangaay Tlaats'gaa Naay Secondary School Entrepreneurs • Agate Man Triathlon	• Local wildfire support to Haida Gwaii with Province. • Equipment with the local fire department for rural response. • Local Coast Guard and spill response teams for deploying remote caches of spill gear.	Y

Year	$/ In-Kind Support for Local Groups	# of Agreements/ Joint Ventures with Local Businesses	Target Met (Y/N)
	• **Approximate Total = $55,000**		
2021	• Old Massett Community (firewood) • Skidegate Community (firewood) • Highschool Firewood Program • Highschool Christmas Trees • Donation to the local food banks • Grading of local roads specifically for community use • Maintenance of the local fish hatchery road system **Approximate Total = $45,000**	• Local Sawmill Agreements - Bee Hive program. • Local Sawmill Agreement -Trial Custom Cutting. • Local wildfire support to Haida Gwaii with Province. • Equipment with the local fire department for rural response. • Local Coast Guard and spill response teams for deploying remote caches of spill gear. • Total Agreements: 5+	Y
2020	• Old Massett Community (firewood) • Skidegate Community (firewood) • Highschool Firewood Program • Highschool Christmas Trees • Donation to the local food banks • Grading of local roads specifically for community use • Maintenance of the local fish hatchery road system **Approximate Total = $35,000**	• Waste Wood Agreement with Old Massett Forestry Corp. • Local Sawmill Agreement for bridge timbers. • Local wildfire support to Haida Gwaii. • Equipment with the local fire department for a rural industrial park. • Local Coast Guard and spill response teams for deploying remote caches of spill gear. • Maintenance of the local fish hatchery road system. • Total Agreements: 6+	Y
2019	• Old Massett Community (firewood) • Skidegate Day Care • Sk'aadgaa Naay Elementary School • Chief Mathews School • Annual Kaiya Nungkoyas Williams: Remembering Lost Loved Ones event	• Waste Wood Agreement - Old Masset Forestry Corp • Local Sawmill Agreement - for bridge timbers	Y
2018	• Haida Watchmen • Haida Gwaii Museum Society • Secretariat of the Haida Nation • Old Massett Village Council • Old Massett Intermediate Raiders • Skidegate Health Center • Skidegate Band Council • Skidegate Haida Immersion Program • GidGalang Kuuyas Naay • Gudangaay Tlaatsgaa Naay • Port Clements Historical Society • Sandspit Loggers Sports Day • Pacific Salmon Foundation • Getbold	• Waste Wood Agreement - Old Massett Forestry Corp	Y

Year	$/ In-Kind Support for Local Groups	# of Agreements/ Joint Ventures with Local Businesses	Target Met (Y/N)
	• Haida Gwaii Individuals • DVR Trucking Ltd. (transportation of donated wood) • Highlander Marine Services Ltd. • Public (firewood) **Approximate Total = $ 126,342**		

In 2022, Taan continued to provide firewood to locals by encouraging logging contractors to bring as much firewood to roadside as feasible, having loader operators at the sort yards place firewood outside the gate, providing firewood to the communities of Old Massett and Skidegate and donating logging truck loads of firewood to the high school graduates. In addition, Taan continues to maintain the access roads to the fish hatchery for community use.

In 2021, Taan maintained its support to several local groups, including providing firewood to Old Masset and Skidegate communities, firewood and Christmas trees to the local high school, donations to the local food banks, grading of local roads for community use, and maintenance of the fish hatchery road system.

In 2020, Taan supported several local groups, including providing firewood to Old Masset and Skidegate communities, firewood and Christmas trees to the local high school, donations to the local food banks, grading of local roads for community use, and maintenance of the fish hatchery road system.

In 2019, Taan Forest gave roughly 850 Ts'uu (western redcedar) seedlings to communities. 150 seedlings were handed out to community members at the Annual Kaiya Nungkoyas Williams: Remembering Lost Loved Ones event held in Queen Charlotte. Children from Skidegate Daycare and students of Sk'aadgaa Naay Elementary School each received seedlings to take home. The students at Chief Matthews School went out and planted over 400 trees in the school yard and throughout the community of Old Massett. An agreement was also signed with a local sawmill to provide bridge timbers for bridge maintenance and construction projects.

In 2018, Taan continued to support several local organizations, sporting, and cultural events through donations. Taan continued to provide free firewood from the dry land sort waste, several logging truck loads of firewood to Old Masset.

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.

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.

Indicator 21: Local Supplies & Services

Element	Objective	Indicator	Target
FSC 5.1.1, 5.1.2	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 Xaayda Gwaay.yaay *Haida Gwaii* and considers that some supplies and services may not be locally available and significant variations in price may exist between Xaayda Gwaay.yaay *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)
2022	94	35%	Y
2021	116	35%	Y
2020	97	33%	Y
2019	89	40%	Y
2018	81	44%	Y

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.

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 22: Local Employment

Element	Objective	Indicator	Target
FSC 4.3.1	Opportunities for employment are communicated and provided to the Xaayda *Haida* and local communities	% of employees from X̱aayda Gwaay.yaay *Haida Gwaii*; % of contractors from X̱aayda Gwaay.yaay *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

	Description	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Target Met (Y/N)
Taan	% Local Employees[1]	73	93	80	71	75	65	63	63	75	76	65	
	Local Employee Hours	New Indicator in 2022										27,602	
	% Employees Haida Nation	64	64	53	57	56	53	56	56	50	48	50	
	Haida Employee Hours	New Indicator in 2022										21,233	Y
Contractors	% Local Contactors	89	91	80	91	94	95	83	95	96	98	77	
	Local Contractor Hours	New Indicator in 2022										99,145.5	
	% Contractors Haida Nation	46	39	32	23	23	21	26	22	26	26	33	

Haida Contractor Hours	New Indicator in 2022		32,816.25	

Note 1: Local employees includes both Xaayda Haida and others living on Xaayda Gwaay.yaay Haida Gwaii.

In 2022, Taan had an average of 20 employees for the year. Out of these 20 employees 13 live on Xaayda Gwaay.yaay and 10 are Xaayda Haida.

Taan utilized 39 direct contractors throughout the year to conduct business activities. Out of these 39 contractors, 30 are local to the Islands, within those 30 local contractors, 13 are Xaayda owned. These contractors collectively employ an average of 250 workers.

Please note that the above table does not fully represent the hours generated within our contractors work activities. Taan has increased the reporting criteria, such as all hours generated during work activities to better capture the amount of labour required to conduct the operations. Reporting person hours is an ongoing progressive request that will be better captured in future reporting years.

In 2021, 21 of 28 employees at Taan Forest live on Xaayda Gwaay.yaay *Haida Gwaii* and 13 are Xaayda *Haida.* There are over 13 local contracting companies that work directly for Taan Forest, also creating 29 full time equivalent local jobs.

In 2020, Taan had 20 employees (15 local and 10 Xaayda *Haida).*

In 2019, Taan had 16 employees (10 local and 9 Xaayda *Haida*).

In 2018, Taan had 16 employees (10 local and 9 Xaayda *Haida*).

Summary of Management Strategies

Taan is committed to supporting local employment and ensuring that employment opportunities include preference to Xaayda Gwaay.yaay *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 Xaayda Laas *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 23: Safety Incidents

Element	Objective	Indicator	Target
FSC 8.2.2 (3, 4, 6); linkages to Criterion 2.2, 2.3, 2.5, and Indicator 10.7.7)	Provide multiple benefits/ mitigate environmental & social cost	Safety incidents	# of Safety Incident Reports received by category; Medical Incident Rate (MIR) ≤ 8.00
	Implement a Health and Safety Program (Taan Corporate Management System)	Maintain BC Forest Safety Council SAFE certification	Annual Audit score is >90%

Rationale for Indicator & Target

This indicator has been expanded to include a specific target related to incident reporting categories, which were generally reporting within the comments in the past. Safety Incident types include close calls, first aid treatments, medical treatments, lost time, and other incident types such as bullying/ harassment, violence in the workplace, sexual harassment, gender discrimination, and unsatisfactory work conditions. The specific details regarding other incident types will not be reported, to protect the privacy of all those involved and ensure confidentiality is maintained. Reportable safety incidents would also include any health concerns related to fertilizer exposure, as required under WorkSafe BC reporting.

The indicator is based on FSC requirements and Taan 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.

Medical Incident Rate (MIR) is calculated based on the number of reportable incidents (Medical Treatment, Restricted Work and Lost Time Incidents) times 200,000 divided by the employee hours worked for the year. 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.

Taan maintains a Corporate Management System (CMS) that includes health and safety program requirements and environmental/ FSC certification commitments within an integrated set of procedures. The CMS includes provisions for monitoring to ensure the system is effectively monitored though inspections and audits. Taan also maintains BC Forest Safety Council SAFE certification which includes an annual audit that verifies that the CMS meets all of the legal requirements and is effectively implemented. As a result, the SAFE audit score was determined to be an effective target to report to demonstrate implementation of the CMS.

Current Status/ Results

Year	SAFE Audit Score	# of Safety Incident Reports received (by Category)	Medical Incident Rate (MIR) for employees and contractors	Targets Met (Y/N)
2022	100% (Taan)	**Taan** Close Call: 1 First Aid:0 Medical Treatment: 0 Restricted Work: 0 Lost Time: 1 Oher: 2 (vehicle damage, asset damage, harassment, etc.) **Contractors** Close Call: 0 First Aid:0 Medical Treatment: 3 Restricted Work: 0 Lost Time: 0 Oher: 1 (vehicle damage, asset damage, harassment, etc.)	4.09 annual MIR (Taan)	Y (Audit score <90%) (MIR ≤ 8.00)
2021	85%	Close Call:0 First Aid: 1 Medical Treatment: 1 Restricted Work:0 Lost Time:0 Other:11 (vehicle damage, asset damage, harassment, etc.)	1.7 annual 3.6 (rolling)	Partially (Audit score <90%)
2020	92%	Close Call: First Aid: Medical Treatment: Restricted Work: 1 Lost Time:	3.7	Y

2019	New Target added in 2020	Other:		
		New Target added in 2020	5.4	Y
2018			4.6	Y
2017			6.2	Y

In 2022, Taan had one close call. A deer was struck by a vehicle, and one worker sustained an injury where 2 days were missed from work. Taan received 100% on the BC Forest Safety audit. For the contractors that were utilized throughout the year, there was one mechanical failure that resulted in an engine fire which was quickly extinguished, and 3 medical aids reported. 2 medical aids were the result of logging trucks flopping on their sides and 1 was due to a laceration to the hand from a chain saw injury.

Taan continues to guide and assist all contractors to be SAFE certified as a goal to leading to an incident free worksite.

2021, there was one safety incident requiring medical attention where a contractors worker (truck driver) was transported by helicopter to a hospital due to a heart condition. There was also one minor incident requiring first aid and several incidences classified as 'other' involving vehicle damage, asset damage and harassment (1 incident). The MIR was calculated to be 1.7 for the year, with a rolling average of 3.6 (calculated over the last 8 years). Also, Taan achieved a SAFE audit score of 85% in 2021.

In 2020, there was one safety incident recorded under the restricted work category, which involved an employee suffering a rolled ankle while completing field work, which was treated and the employee was restricted to office work. The MIR is reported as a rolling average calculation (over the last 7 years) due to less than total 200,000 exposure hours.

In 2019, there were four recordable incidents, all lost time (disc rupture in the back from a slip/ fall, faller struck by a snag/ branch, broken bones in hand from slip/ fall, and a scratched eye). The MIR for 2019 is reported as a rolling average calculation due to less than total 200,000 exposure hours.

In 2018 there were four recordable accidents (one restricted work and three lost time). Accidents included a sprained shoulder, twisted ankle from misplaced footing, a cut/puncture from metal shard, and a muscle strain resulting from a truck that rolled on its side.

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 X̱aayda Gwaay.yaay *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 contactor accident statistics (File C10-02).

Indicator 24: Environmental Incidents

Element	Objective	Indicator	Target
FSC 8.2.1 (9), 8.2.2 (1); linkages to Criterion 10.12 and 1.4	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	Minimize the number and size of environmental incidents; ≤ 5 events

Rationale for Indicator & Target

The indicator is based on commitments under the Corporate Management System to record and monitor environmental incidents such as reportable spills of hazardous substances, fires, landslides, avalanche, and other incident types (e.g., illegal or unauthorized activity and inappropriate storage or disposal of chemical/ inorganic waste materials). The current target is based on a review of the benchmark status, and past performance.

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	Other	Target Met (Y/N)
2022	1	0	0	0	0	Y
2021	1	2	1	0	0	Y
2020	2	0	3	0	0	Y
2019	0	0	14 (ha TBD)	0	New indicator in 2020	Y
2018	0	0	0	0		Y
2017	0	0	5	0		Y

In 2022, There was one spill reported from an off highway lowbed that spilled approximately 50 liters of engine oil onto the mainline. Spill pads were used and operator called for additional assistance. Boom was placed in ditch to prevent any contamination from spreading into ditch. Spill was cleaned and contained.

In 2021, there was a possible spill reported due to a sheen observed on the water at Dinan Dryland Sort. As a result, Taan shutdown operations and investigated the incident. The substance was not identified, however there was a tug boat in the area, and it is suspected that cause was oily rags or ropes on the deck. Another possible explanation is that potential hydrocarbons were leaching into the water from the Dryland Sort due to heavy rainfall. The spill dissipated quickly and was not visible during the investigation. There was also 2 small fires that were investigated by the Conservation Officer and Compliance and Enforcement that were deemed to be caused by the public.

During this review, Taan identified that this target could be revised to be more effective because many of the environmental incidences could result from natural causes or the general public (i.e., spills or fires). Taan should not be penalized for elements out of its control.

In 2020, there was a spill of 2500L of diesel spill on April 22nd into the ocean at Dinan Bay from the FOSS 153 accommodation barge. A spill action plan was put into place which involved notifying Taan Management and setting up containment booms. Taan Management notified the Emergency Management BC and the Coast Guard. Taan staff were deployed with additional gear and the Coast Guard took control and set up an incident command which consisted of unified command, planning section, environmental section, operations, and media. There was also nine small spills of hydraulic fluid and diesel reported (seven on land and two on water).

In 2019, five small spills of hydraulic fluid and diesel were reported to land, and all were well below the legal reporting threshold (100L). 14 slides occurred in the MU, as noted in the Forest Health Indicator, five located in the northern section of the MU and nine located on Louise Island. An action item has been generated for Taan to follow up and complete slide reports, determine areas impacted and any remediation plans needed. 2018 and 2019 included some severe winter storms with high winds and rainfall, as well as a significant earthquake in 2019. No other environmental incidents were reported within the MU.

In 2018 14 spills were reported, none of which were legally reportable spills (Taan requires reporting of all spills as part of our Corporate Management System). 10 Landslides were reported, 8 of which were on Moresby Island and 2 on Graham Island. All slides occurred October 24, 2018 with more than 300mm of rainfall over a 48-hour period; none required additional investigation.

Summary of Management Strategies

Taan maintains a Corporate Management System that includes evaluation of risk to the environment (and 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.

Taan also maintains standard operating procedures that address proper management and handling of hazardous substances and inorganics wastes related to management activities, such as fuels, lubes, batteries, fuel filters, etc.

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.

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.

Indicator 25: Seedling Protectors

Element	Objective	Indicator	Target
FSC 8.2.1 (9), FSC Engagement Process	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 (ha)	Removed (#)	New Installations (ha)	New Installations (#)	Re-used (#)	Target Met (Y/N)
2022	Taan	0	38.5	131.8	67,740	367.6	188,880	188,880	Y
	BCTS in MU		0	0	0	0	0	0	
2021	Taan	0	9.5	481.3	178,379	154.8	80,710	80,710	Y
	BCTS in MU								
2020	Taan	0	177.3	177.3	55,573	313.1	133,700	20,000	Y
	BCTS in MU	-	-	-	-	-	-	-	
2019	Taan	0	317.9	317.9	121,383	393.2	43,915	102,445	Y
	BCTS in MU	-	-	29	15,135	-	-	-	
2018	Taan	0	-	358	90,241	403.4	116,815	55,000	Y
	BCTS in MU	-	-	43.24	8600	-	-	Not available	

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.

Note: BCTS does not record the number of protectors that are recycled or disposed of. The estimated number of protectors removed is largely based on what was originally installed and without field verification the number is not accurate. BCTS does not keep a record of the number of new/recycled or re-used protectors are installed.

In 2022, Taan completed maintenance, removal and new installation of cones. All new cone installations were re-used. 9 blocks had the cones removed. BCTS had no activities in 2022.

In 2021, Taan completed removal and new installations of cones. Taan continues to re use as many cones as possible to fulfill its planting requirements. Taan purchased 57,800 cones from a local provider and 100% of cones were used. 9.5ha of maintenance occurred in 2021.

In 2020, Taan completed maintenance, removal and new installations of cones. Taan continues to re use as many cones as possible (removal contracts include maintenance on any cones that need to remain). Maintenance was completed 177.3ha, including the removal of 55,573 cones.

In 2019, Taan completed maintenance, removal and new installations of cones. Taan continues to re use as many cones as possible (removal contracts include maintenance on any cones that need to remain). Those that cannot be re-used are send off island to be recycled. Maintenance was completed on 121,383 cones (and 317.9ha).

Summary of Management Strategies

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

Due to the significant k'aad *deer* population on X̱aayda Gwaay.yaay *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 X̱aayda Gwaay.yaay *Haida Gwaii* Youth Stewardship Program for cone removal projects. Discussion with Forest Service 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 k'aad *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 k'aad *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.

Database & Reporting Parameters

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

Indicator 26: Fertilizer

Element	Objective	Indicator	Target
FSC 8.2.1 (3, 4, 5), linkages to Criterion 6, 7,8l FSC Engagement Process	Monitoring is completed to identify significant environmental impacts of management activities relating to the use of Fertilizers	Fertilizer applications on the Management Unit	Report on the area, type of treatment and type of fertilizer applications

Rationale for Indicator & Target

This indicator is intended to report on the use of fertilizers on the Management Unit. The FSC standard has some specific requirements that must be met when using fertilizers (refer to the Management Strategies below for details). Local residents have also raised concerns with the use of fertilizer on the management unit and protection of the adjacent streams.

Taan does not utilize any pesticides or biological control agents on the Management Unit (and these are not supported by the Haida).

Current Status/ Results

Year	Fertilizer Treatments Completed (ha)	Type of Treatment	Fertilizer Used	Target Met (Y/N)
2022	0	N/A	N/A	Y
2021	293.2	Hand dispersed	NPK(21-7-10)	Y
	2.5	Hand dispersed	Urea (46-0-0)	Y
2020	90.9	Hand dispersed	(46-0-0)	Y

In 2022, no fertilizers were applied to any seedlings.

In 2021, fertilization was applied to 295.7 ha to improve productivity of 104,614 stems (Western Red Cedar and Cypress) on known low productive areas in conjunction with removing seedling protectors.

In 2020, urea fertilizer was applied to 90.9 ha to improve productivity of 36,429 stems (Western Red Cedar and Cypress) on known low productive areas in conjunction with removing seedling protectors.

Summary of Management Strategies

The use of fertilizers is minimized or avoided. When fertilizers are used:

- Measures are employed to avoid contamination of surface and ground waters, protect non-timber forest values and maintain long-term soil health (e.g., maintenance of soil organic matter, pH balance).

- Buffer zones are also used to protect rare plant communities, riparian zones, watercourses and water bodies.

- Records are maintained to document fertilizer types, application rates, treatment areas and frequencies. A record of the composition of any fertilizers planned for use must be reviewed (and filed) to verify conformance with FSC Principles.

- In the event that damage is environmental values results from fertilizer use, the damage is mitigated or repaired.

Database & Reporting Parameters

Taan maintains records of all fertilizer treatments completed within the Corporate File System and the Silviculture tracking database.

Indicator 27: Economic Viability

Element	Objective	Indicator	Target
FSC 5.5.1, 8.2.2 (10)	Ensure Sufficient expenditures and investments are made to implement the management plan and to ensure economic viability of Taan over the long-term.	Annual Operating Budget is completed	Annual Operating Budget is completed and approved by HaiCo
		# of completed pro-formas	Pro-formas are completed and evaluated for every development area

Rationale for Indicator & Target

Annual operating budgets are prepared by Taan that outline the expenditures and investments needed to implement the management plans and ensure the economic viability of the company over the long term. Budgets are reviewed by the CFO and CEO and approved by the HaiCo Board of Directors.

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 mean to demonstrate that costs are evaluated, as it does not contain confidential information of actual costs for forest management.

Current Status/ Results

Year	Annual Operating Budget completed and approved	# Pro-Formas	Target Met (Y/N)
2022	Yes	40	Y
2021	Yes	40	Y
2020	Yes	20	Y
2019	New indicator added 2020	40	Y
2018		55	Y

Evaluation of costs versus profit margins continues to be regularly assessed during harvest planning and is used to evaluate harvest scheduling. This routine expense is approved under Taan's annual operating budget.

Summary of Management Strategies

Taan records and monitor costs, productivity and efficiency of forest management activities on a regular basis as part of the corporate business structures and annual operating 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.

Database & Reporting Parameters

Annual Operating Budgets and Taan Pro-Forma worksheets filed in the Corporate File System.

High Conservation Values

It is important to note that several previous indicators all contribute to monitoring of High Conservation Values (HCVs) for 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.

Several of these HCVs are monitored by Landscape Unit, as identified within the Land Use Order. A map of the LUs is below.

It should also be noted that the updated analysis was completed using the new VRI mapping/ inventory that was also used in the new TSR that was recently completed. The new VRI is showing a significant shift in the amount of area previously identified as old seral stage, that is now identified as mature seral. This has a substantial impact on the analysis results. As a result, Taan has also considered harvesting data over the last five years to supplement the reporting to decipher between changes to information that resulted in harvesting, vs changes resulting from the new VRI data.

Schedule 1
Landscape Units Covered by this Order

Landscape Units

1 : 1,150,000

0   20   40 km

Albers Equal Area Conic Projection, NAD 83

Haida Gwaii
Management Council

July 13, 2017

N

Note:
The boundaries depicted on this schedule map are a
representation of a spatial dataset and may not portray
the full visual detail of the original dataset. The source
dataset is available in:

http://www.haidagwaiimanagementcouncil.ca/land_use_orders.html
ftp://ftp.geobc.gov.bc.ca/publish/Regional/Nanaimo/HaidaGwaii/Objectives/data/

Indicator 28: Landscape Level Biodiversity – Overview

Element	Objective	Indicator	Target
FSC 6.8.3, 6.8.4, 8.2.3 (2,3, 5), 9.4 HCV effectiveness; linkages to Criterion 6,4, 6.6, 6.8	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

This indicator links to FSC Indicators 6.8.3 and 6.8.4, and the Environmental Values Assessment Report, including the Range of Natural Variation (RONV) of the X̲aayda Gwaay.yaay *Haida Gwaii* ecosystems and the objectives to maintain, restore or enhance the condition of the forest as appropriate to the regional context. The targets also consider the needs of species at risk that require large amounts of contiguous habitat.

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 (anticipated to be approved in 2020). 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

The land use order is based off the LMH (Land Management Handbook) 28 Vancouver Forest Region BEC Classification created in 1994. Within the next five years, the land use order will be switched to meet the new LMH 68, created in 2014, specific to BEC classifications on Haida Gwaii. This will change the current rare and common ecosystems of the land use order on Haida Gwaii.

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. Reporting periods are 2011-2015, 2016-2019 (completed one year sooner than scheduled to incorporate the new forest cover inventory and to accommodate Taan FSC certificate re-registration cycle to the new standard). The next period will be 2020-2025, with update occurring in 2025.

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.

The results were initially reported in 2012; the method of analysis was updated for 2016 and used again for 2019.

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. For 2019, a 200m buffer for the calculation of forest interior was added to the analysis.

The 2019 results are depicted below and show <30% old forest (indicator of vulnerable landscape units for biodiversity health) in the following landscape units (most are showing increases to old forest but decreases to mature forest; exception is the Skidegate LU which shows less old and mature forest):

- Lower Yakoun (19.3% old forest and 56.4% old + mature combined)
- Naikoon (24.7% old forest and 88.1% old + mature combined)
- Skidegate (18.6% old forest and 27.7% old + mature combined)
- Tlell (28.5% old forest and 54.8% old + mature combined)

Over the last five years, Taan has harvested 420ha on average annually. This includes a total of 534ha of mid seral, 713ha of mature and 804ha of old forest over the five-year period. Overall, this represents a very low impact to the overall amount of old and mature forest spread out over several LUs.

Since the Skidegate LU now has <30% old forest, we summarized the Taan harvesting within the LU. In the Skidegate LU, Taan harvested a total of 425ha over the last five years, 198ha of mid seral, 75.3ha of mature and 150ha of old forest. This corresponds to a 1.5% reduction in the amount of old forest reported in 2016, as attributed to harvesting. There are no planned blocks within the Skidegate LU in 2020 and 2021.

For areas outside of the Taan MU, harvesting by other tenure holders included an annual average of 502ha, and a total over the five years of 162ha of mid seral, 985ha of mature and 1,349ha of old forest.

The new Timber Supply Review was completed using updated forest cover inventory, which included a significant shift in the amount of old forest previously identified in the forest inventory, now identified as mature rather than old.

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).
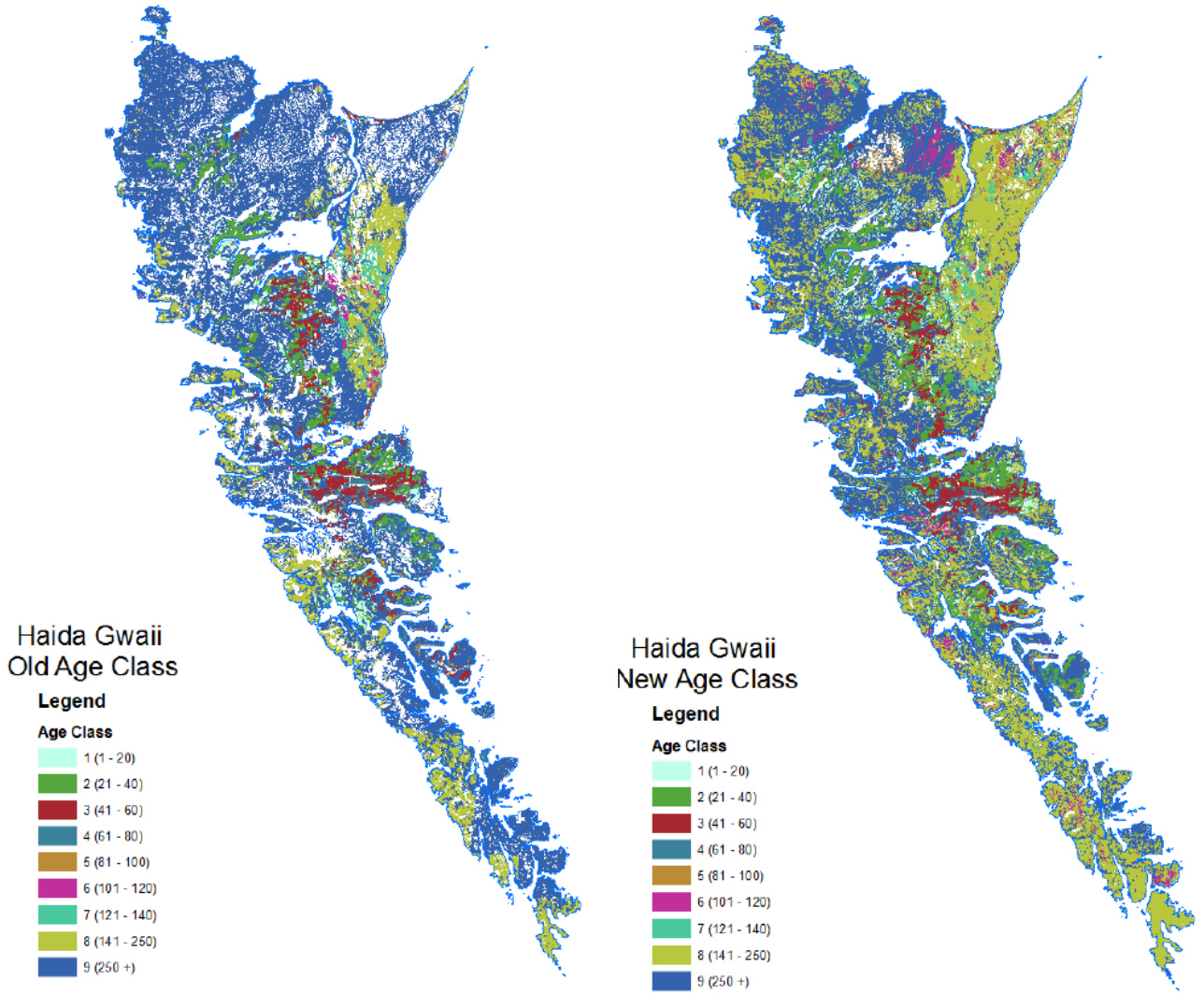
Figure: XX Updated Age Class Distribution on Haida Gwaii (2019)

Landscape Unit	Total LU Landbase (ha)	Category	Total Area (ha) - including no age polygons	Total Area %	Non Productive Ha	OLD Ha	OLD %	MATURE Ha	MATURE %	OLD + MATURE Ha	OLD + MATURE %	MID Ha	MID %	EARLY Ha	EARLY %	Stand Level Retention (ha)	Stand Level Retention %	Kms Road Built	% Old Forest	>30% Old Forest (Y/N)	Old Forest (ha)
Honna	29,403.2	Park	6.4	0.0	2.7	2.2	0.0	1.4	0.0	3.7	0.0		0.0		0.0		0.0				
		LUO Constrained	8,480.0	28.8	832.9	5,592.0	24.1	467.8	2.0	6,059.8	26.1	1,055.7	4.6	519.8	2.2	114.2	0.4				
		NCLB	10,773.9	36.6	4,340.6	2,938.4	12.7	825.3	3.6	3,763.7	16.2	1,976.7	8.5	679.3	2.9	31.4	0.1				
		Partial	5,682.3	19.3	856.4	1,906.0	8.2	450.0	1.9	2,356.0	10.2	1,228.0	5.3	1,208.1	5.2	62.1	0.2				
		Cont THLB	4,460.7	15.2	187.9	664.4	2.9	485.5	2.1	1,149.9	5.0	1,550.9	6.7	1,529.1	6.6	42.4	0.1				
		Total LU	**29,403.2**	**100.0**	**6,220.6**	**11,103.1**	**47.9**	**2,230.0**	**9.6**	**13,333.1**	**57.5**	**5,811.2**	**25.1**	**3,936.4**	**17.0**	**250.2**	**0.9**	413.0	47.9	Y	11,103.1
Ian	32,333.8	Park	2.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0		0.0				
		LUO Constrained	11,299.3	34.9	2,150.0	6,831.8	30.9	1,193.5	5.4	8,025.3	36.4	118.8	0.5	1,005.2	4.6	347.7	1.1				
		NCLB	8,627.9	26.7	5,975.8	1,966.1	8.9	323.0	1.5	2,289.1	10.4	40.2	0.2	314.4	1.4	168.5	0.5				
		Partial	6,885.0	21.3	1,500.8	3,018.7	13.7	472.5	2.1	3,491.2	15.8	186.3	0.8	1,703.2	7.7	355.2	1.1				
		Cont THLB	5,519.3	17.1	627.2	1,032.6	4.7	684.4	3.1	1,717.0	7.8	379.4	1.7	2,795.4	12.7	246.3	0.8				
		Total LU	**32,333.8**	**100.0**	**10,256.2**	**12,849.3**	**58.2**	**2,673.4**	**12.1**	**15,522.6**	**70.3**	**724.7**	**3.3**	**5,818.2**	**26.4**	**1,117.8**	**3.5**	452.5	58.2	Y	12,849.3
Louise Island	27,626.4	Park	1,922.1	7.0	85.4	494.7	2.1	658.6	2.8	1,153.4	5.0	393.1	1.7	290.3	1.3	2.6	0.0				
		LUO Constrained	8,780.0	31.8	538.8	4,951.1	21.4	1,125.6	4.9	6,076.7	26.3	1,522.3	6.6	642.1	2.8	182.8	0.7				
		NCLB	4,938.9	17.9	1,625.4	1,044.7	4.5	610.7	2.6	1,655.4	7.2	760.5	3.3	897.2	3.9	54.5	0.2				
		Partial	7,228.8	26.2	1,717.4	1,925.3	8.3	1,253.2	5.4	3,178.5	13.7	1,072.0	4.6	1,260.9	5.4	59.0	0.2				
		Cont THLB	4,756.7	17.2	520.5	543.2	2.3	865.2	3.7	1,408.5	6.1	1,056.5	4.6	1,771.2	7.7	21.4	0.1				
		Total LU	**27,626.4**	**100.0**	**4,488.0**	**8,959.1**	**38.7**	**4,513.4**	**19.5**	**13,472.5**	**58.2**	**4,804.3**	**20.8**	**4,861.7**	**21.0**	**320.5**	**1.2**	346.2	38.7	Y	8,959.1
Lower Yakoun	30,534.0	Park	2,526.5	8.3	267.3	780.3	2.8	659.5	2.4	1,439.8	5.2	375.3	1.3	430.1	1.5	72.0	0.2				
		LUO Constrained	11,212.2	36.7	755.7	3,555.3	12.7	3,799.9	13.6	7,355.3	26.3	1,641.5	5.9	1,428.6	5.1	593.8	1.9				
		NCLB	2,347.6	7.7	979.2	267.9	1.0	456.8	1.6	724.7	2.6	280.9	1.0	353.3	1.3	53.4	0.2				
		Partial	3,695.5	12.1	371.9	476.3	1.7	1,010.9	3.6	1,487.2	5.3	622.3	2.2	1,197.7	4.3	225.2	0.7				
		Cont THLB	10,752.2	35.2	204.9	294.0	1.1	4,393.5	15.7	4,687.6	16.8	2,010.3	7.2	3,795.9	13.6	767.1	2.5				
		Total LU	**30,534.0**	**100.0**	**2,579.1**	**5,373.9**	**19.2**	**10,320.7**	**36.9**	**15,694.6**	**56.1**	**4,930.2**	**17.6**	**7,205.6**	**25.8**	**1,711.5**	**5.6**	617.5	19.2	N	5,373.9
Masset Inlet	53,761.8	Park	6.9	0.0	4.7	1.2	0.0	1.0	0.0	2.2	0.0		0.0		0.0		0.0				
		LUO Constrained	15,445.2	28.7	1,571.7	7,964.4	18.0	1,434.3	3.2	9,398.7	21.2	2,312.1	5.2	2,118.1	4.8	814.9	1.5				
		NCLB	8,936.6	16.6	4,143.8	1,972.1	4.5	544.4	1.2	2,516.5	5.7	854.8	1.9	1,395.2	3.2	299.6	0.6				
		Partial	13,952.4	26.0	2,658.8	3,708.2	8.4	1,084.8	2.4	4,793.0	10.8	2,002.7	4.5	4,451.7	10.1	569.1	1.1				
		Cont THLB	15,420.7	28.7	1,095.8	1,674.2	3.8	1,662.5	3.8	3,336.7	7.5	3,840.2	8.7	7,111.2	16.1	457.3	0.9				
		Total LU	**53,761.8**	**100.0**	**9,474.7**	**15,320.1**	**34.6**	**4,727.0**	**10.7**	**20,047.1**	**45.3**	**9,009.9**	**20.3**	**15,076.2**	**34.0**	**2,140.9**	**4.0**	1,180.9	34.6	Y	15,320.1
Naikoon	112,227.4	Park	69,460.1	61.9	43,462.8	7,600.5	17.8	17,919.7	41.9	25,520.3	59.6	343.2	0.8	133.8	0.3	0.3	0.0				
		LUO Constrained	7,618.2	6.8	4,332.0	935.3	2.2	1,948.7	4.6	2,884.0	6.7	152.6	0.4	249.5	0.6	159.1	0.1				
		NCLB	24,113.9	21.5	19,282.4	944.6	2.2	1,919.7	4.5	2,864.3	6.7	981.0	2.3	949.5	2.2	72.7	0.1				
		Partial	4,863.1	4.3	1,844.7	642.6	1.5	1,643.1	3.8	2,285.7	5.3	177.1	0.4	555.0	1.3	131.9	0.1				
		Cont THLB	6,172.1	5.5	491.3	448.6	1.0	3,691.9	8.6	4,140.5	9.7	146.4	0.3	1,392.8	3.3	355.6	0.3				
		Total LU	**112,227.4**	**100.0**	**69,413.2**	**10,571.6**	**24.7**	**27,123.1**	**63.4**	**37,694.8**	**88.0**	**1,800.3**	**4.2**	**3,280.7**	**7.7**	**719.6**	**0.6**	381.8	24.7	N	10,571.6
Sewell	47,296.5	Park	9,552.5	20.2	5,308.5	2,669.3	8.1	1,364.6	4.1	4,033.9	12.2	206.7	0.6	3.4	0.0		0.0				
		LUO Constrained	8,143.7	17.2	578.5	3,503.0	10.6	1,151.2	3.5	4,654.1	14.1	2,595.2	7.8	311.6	0.9	129.7	0.3				
		NCLB	11,480.0	24.3	5,742.0	3,361.7	10.2	839.7	2.5	4,201.4	12.7	1,283.4	3.9	242.8	0.7	60.8	0.1				
		Partial	11,921.0	25.2	2,179.5	3,343.1	10.1	1,380.4	4.2	4,723.5	14.3	4,150.1	12.5	866.1	2.6	70.1	0.1				
		Cont THLB	6,199.3	13.1	376.8	761.5	2.3	713.0	2.2	1,474.5	4.5	3,449.5	10.4	896.4	2.7	34.0	0.1				
		Total LU	**47,296.5**	**100.0**	**14,185.2**	**13,638.6**	**41.2**	**5,448.8**	**16.5**	**19,087.4**	**57.6**	**11,684.9**	**35.3**	**2,320.4**	**7.0**	**294.5**	**0.6**	370.9	41.2	Y	13,638.6
Skidegate Lake	54,423.8	Park	5,042.1	9.3	1,125.5	1,516.9	3.1	633.0	1.3	2,149.9	4.4	708.4	1.5	1,058.3	2.2	12.7	0.0				
		LUO Constrained	11,949.4	22.0	723.6	3,507.0	7.2	1,012.7	2.1	4,519.6	9.3	4,992.2	10.3	1,667.9	3.4	545.9	1.0				
		NCLB	7,912.7	14.5	2,995.9	1,359.6	2.8	742.7	1.5	2,102.3	4.3	1,743.7	3.6	1,055.9	2.2	124.6	0.2				
		Partial	11,852.0	21.8	765.5	1,824.4	3.8	755.8	1.6	2,580.1	5.3	4,141.8	8.5	4,332.2	8.9	278.0	0.5				
		Cont THLB	17,667.7	32.5	328.4	764.2	1.6	1,262.7	2.6	2,026.9	4.2	9,361.5	19.3	5,924.6	12.2	202.5	0.4				
		Total LU	**54,423.8**	**100.0**	**5,939.0**	**8,972.0**	**18.5**	**4,406.8**	**9.1**	**13,378.8**	**27.6**	**20,947.6**	**43.2**	**14,038.9**	**29.0**	**1,163.6**	**2.1**	1,338.4	18.5	N	8,972.0
Tlell	41,422.6	Park	17,415.3	42.0	1,822.5	6,173.5	16.7	9,349.6	25.3	15,523.1	42.0	31.6	0.1	38.1	0.1	8.2	0.0				
		LUO Constrained	4,390.1	10.6	429.0	1,650.3	4.5	1,551.6	4.2	3,201.9	8.7	135.4	0.4	623.8	1.7	255.8	0.6				
		NCLB	5,299.6	12.8	1,319.7	724.6	2.0	1,504.2	4.1	2,228.8	6.0	795.0	2.2	947.9	2.6	82.9	0.2				
		Partial	3,774.1	9.1	558.6	1,031.0	2.8	1,468.7	4.0	2,499.7	6.8	165.8	0.4	548.8	1.5	166.0	0.4				
		Cont THLB	10,543.5	25.5	375.5	930.4	2.5	6,639.8	18.0	7,570.2	20.5	306.5	0.8	2,288.5	6.2	275.9	0.7				
		Total LU	**41,422.6**	**100.0**	**4,505.2**	**10,509.8**	**28.5**	**20,513.9**	**55.6**	**31,023.7**	**84.0**	**1,434.4**	**3.9**	**4,447.2**	**12.0**	**788.7**	**1.9**	309.2	28.5	N	10,509.8
Yakoun Lake	26,897.5	Park	7,963.9	29.6	3,386.8	3,635.9	16.3	875.3	3.9	4,511.2	20.2	23.2	0.1	42.6	0.2		0.0				
		LUO Constrained	5,222.4	19.4	213.0	2,367.6	10.6	729.6	3.3	3,097.2	13.9	985.0	4.4	888.0	4.0	278.8	1.0				
		NCLB	6,913.7	25.7	506.1	1,390.0	6.2	835.8	3.7	2,225.8	10.0	2,447.4	11.0	1,659.7	7.4	31.8	0.1				
		Partial	2,967.1	11.0	319.7	991.5	4.4	337.8	1.5	1,329.3	6.0	437.8	2.0	878.8	3.9	86.1	0.3				
		Cont THLB	3,830.4	14.2	157.0	540.9	2.4	461.6	2.1	1,002.5	4.5	989.3	4.4	1,680.6	7.5	62.6	0.2				
		Total LU	**26,897.5**	**100.0**	**4,582.5**	**8,925.9**	**40.0**	**3,240.1**	**14.5**	**12,166.1**	**54.5**	**4,882.7**	**21.9**	**5,149.7**	**23.1**	**459.3**	**1.7**	467.0	40.0	Y	8,925.9

Note: 2019 reporting was updated with the new forest cover inventory data used in the TSR, which had some fairly significant changes to the mature and old forest cover data. Therefore, not all of the changes above are a result of forest harvesting.

Forest Interior 2019:

Landscape Unit	Total LU Area (ha)	LU Area less NP (ha)	Interior Forest - 50m buffer (ha)	% of Interior Forest per LU Area less NP (50m buffer)	Interior Forest (50m) Ha (Old and Mature)	Interior Forest (50m) % (Old and Mature)	Interior Forest - 200m buffer (ha)	% of Interior Forest per LU Area less nP (200m buffer)	Interior Forest (200m) Ha (Old and Mature)	Interior Forest (200m) % (Old and Mature)
Honna	29,403.2	23,182.7	17,020.9	73	12,585.7	54	12,589.8	54	10,322.0	45
Ian	32,333.8	22,077.6	13,531.4	61	13,089.9	59	8,720.5	39	8,631.8	39
Louise Island	27,626.4	23,138.5	16,148.4	70	12,379.5	54	11,350.4	49	9,308.5	40
Lower Yakoun	30,534.0	27,955.0	16,236.3	58	13,011.1	47	8,611.1	31	7,929.5	28
Masset Inlet	53,761.8	44,287.1	22,824.9	52	17,025.0	38	11,603.9	26	10,422.7	24
Naikoon	112,227.4	42,814.1	37,277.0	87	35,961.4	84	33,856.9	79	33,031.5	77
Sewell	47,296.5	33,111.3	27,352.5	83	18,257.0	55	20,463.5	62	16,048.7	48
Skidegate Lake	54,423.8	48,484.8	26,190.6	54	11,392.6	23	12,190.7	25	6,983.8	14
Tlell	41,422.6	36,914.4	29,810.8	81	28,930.4	78	24,887.5	67	24,730.3	67
Yakoun Lake	26,897.5	22,315.0	14,079.2	63	11,134.6	50	8,964.6	40	8,672.3	39

Forest Interior 2019 using the 50m buffer and removing Non-Productive areas from the calculations, are quite similar to the results reported in 2016 (see below).

The analysis was adjusted in 2019 to also measure forest interior using a 200m buffer. All results include reporting of interior forest both with NP included and NP removed to allow for easier comparison to the 2016 results and to explore other parameters for analysis.

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.

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 as calculated using 50m and 200m buffers.

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).

Landscape Level Biodiversity Overview – Vulnerability Rating (2019)

Landscape Unit	Overall Vulnerability Rating	Comments	Recommended Action				
			Increase Old Forest	Increase Forest Interior	Improve Connectivity	Increase Stand Level Retention	Use existing Roads
Honna	Medium	29% constrained; 37% NCLB; THLB 35% 24% of old in LU is in constrained; 13% in NCLB = low. Slight increase in the amount of old forest since 2016, med-high percentage of old and mature forest (58%) 73% interior (50m) and 54% (200m).no significant change Med roads (relative to other HG LUs): 413 km Slightly low reserved area (<30% constrained) and medium old forest (47.9%). Roads are moderate and forest interior is med-high.	-	-	Y	Y	-
Ian	Medium	35% constrained; 27% NCLB; THLB 38.4% 31% of old in LU is in constrained (9% in NCLB). Slight increase in the amount of old forest since 2016, high percentage of old and mature forest (71%) 61% interior (50m) and 39% (200m), 9% decrease since 2016 Med roads (relative to other HG LUs): 453km 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; 18% NCLB; THLB 43% 2% of old in LU is in protected; 21% in constrained; 4.5% in NCLB = medium (less than 30%) Slight decrease (5%) in the amount of old forest and mature from 2016, but the level of mature plus old remains high (58%) 70% interior (50m) and 49% (200m) no significant change Med roads (relative to other HG LUs): 346 km The low vulnerability score results from the relatively low old amount of old forest in the reserves	-	-	-	Y	-
Lower Yakoun	Low	8% protected; 37% constrained; 7% NCLB; 47% THLB 2.8% of old in LU is in protected; 12.7% in constrained; 1% in NCLB = low (old plus mature is 34% in protected, constrained and NCLB) Slight increase in the amount of old forest from 2016 (17% to 19%), and is less than 30%, mature plus old has decreased sightly but remains high (56%) 58% interior (50m) and 31% (200m), no significant change Med roads (relative to other HG LUs): 617 km 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; 17% NCLB; THLB 55% 18% of old in LU is in constrained (4.5% in NCLB) Decrease in the amount of old forest since 2016 (37.6% to 34.6%), significant decrease in the amount of old plus mature forest (45.3%) 39% interior (50m) and 24% (200m); decrease High roads (relative to other HG LUs): 1,181 km 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
Naikoon	Low	69% protected or constrained; only 10% THLB About 20% of LU old is in protected or constrained areas Significant increase in the amount of old forest from 2016 (from 11% to 24.7%), no change to mature (63%). Total old plus mature increased (66% to 88%) Low roads (relative to other HG LUs): 382 km 84% (50m) and 77% (200m) forest interior. Although there is currently a low amount of old in the reserved area, that should increase over time. Low THLB	-	-	-	-	-
Sewell	Low	20% protected; 17% constrained; 24% NCLB; THLB 38% 8% of old in LU is in protected; 11% in constrained; 10% in NCLB= medium (almost 30%) Small increase in the amount of old forest from 2016 (36% to 41%); old plus mature decreased but remains high (58%) 55% (50m) and 48% (200m) interior (significant decrease) Med roads (relative to other HG LUs): 371 km The LU has low THLB, and reasonable levels of reserves and interior. Amounts of old forest in reserve are currently low but should increase over time.	-	-	Y	-	Y
Skidegate Lake	**Very High**	9% protected; 22% constrained; 15% NCLB; THLB 54% 9% of old in LU is in protected; 22% in constrained; 14.5% in NCLB = more than 40% of the 18% old is protected Amount of old forest decreased slightly (from 19.2% to 18.5%). Old plus mature decreased slightly from 28% to 27.6%. 54% (50m) and 25% (200m) forest interior; a decrease and very low forest interior using 200 m edge distance High roads (relative to other HG LUs): 1,338 km Low amount of reserve area (<31% protected and constrained), low amount of old forest (<3% of reserved forest), low amount of interior, low stand-level retention and relatively high THLB This LU remains to be the most concerning in terms of landscape level biodiversity health related to low old forest.	Y	Y	-	Y	Y
Tlell	Low	42% protected; 11% constrained; 13% NCLB 17% of old in LU is in protected; 4.5% in constrained;2% in NCLB = low Slight increase in the amount of old forest from 2016, and is less than 30% (from 24.5% to 28.5%), but mature plus old remains high (84%) 81% (50m) and 67% (200m) forest interior, slight decrease. Low roads (relative to other HG LUs): 309 km. Good amount of reserve area, old forest, and interior.	-	-	-	-	-
Yakoun Lake	Low	30% protected; 19% constrained; 26% NCLB; THLB 25% 16% of old in LU is in protected;11% in constrained; 6% in NCLB=low Slight increase in the amount of old forest from 2016 (38.5% to 40%), old plus mature decreased but remains high (55%) 63% (50m) and 40% (200m) interior = slight increase Med roads (relative to other HG LUs): 467 km. Good amount of reserve area and low THLB. However, there is a low amount of old forest, moderate interior and low amount of stand-level retention so far.	-	-	-	Y	Y

2019 analysis was completed using the new TSR forest cover inventory. Road information appears to have been adjusted from the 2012 reporting.

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%				
Tlell	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%				

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 to also calculate forest interior with a 200m buffer to allow for improved analysis in the future.

Landscape Level Biodiversity Overview – Vulnerability Rating (2016)

Landscape Unit	Overall Vulnerability Rating	Comments	Recommended Action				
			Increase Old Forest	Increase Forest	Improve Connectivity	Increase Stand Level Retention	Use existing Roads
Honna	Medium	30% constrained; 26% NCLB; THLB 31% 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%) 75% interior Med roads (relative to other HG LUs): 556.3 km 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% 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%) 69% interior Med roads (relative to other HG LUs): 785.8km 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% 1.4% of old in LU is in protected; 17% in constrained; 3.6% in NCLB = considerable (plus additional 20% protected, constrained and NCLB) Slight decrease in the amount of old forest from 2012, but the level of mature plus old remains high (63%) 71% interior Med roads (relative to other HG LUs): 522.8 km 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 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) 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%) 59% interior Med roads (relative to other HG LUs): 835.7 km 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% 17% of old in LU is in constrained (6% in NCLB) Slight increase in the amount of old forest since 2012, slight decrease in the amount of old plus mature forest (55%) 56% interior High roads (relative to other HG LUs): 1845 km 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**
Naikoon	Low	70% protected or constrained; only 11% THLB About 9% of LU old is in protected or constrained areas 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%) Low roads (relative to other HG LUs): 473.5 km 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% 9% of old in LU is in protected; 8% in constrained; 14% in NCLB= low Slight decrease in the amount of old forest from 2012, but old plus mature remains high (69%) 84% interior Med roads (relative to other HG LUs): 441.3 km The LU has low THLB, and reasonable levels of reserves and interior. 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% 3.4% of old in LU is in protected; 7% in constrained; 3% in NCLB = low Slight increase in the amount of old forest (18.6-19.2%). Old plus mature increased from 22% to 34%. 57% interior High roads (relative to other HG LUs): 1860 km 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 This LU remains to be the most concerning in terms of landscape level biodiversity health related to low old forest.	**Y**	**Y**	**-**	**Y**	**Y**
Tlell	Low	42% protected; 11% constrained; 16% NCLB 14% of old in LU is in protected; 4% in constrained;1% in NCLB = low Slight decrease in the amount of old forest from 2012, and is less than 30%, but mature plus old remains high (87%) 83% interior Low roads (relative to other HG LUs): 414.7 km Good amount of reserve area, old forest, and interior.	-	-	-	-	-

Landscape Level Biodiversity Overview – Vulnerability Rating (2016)

Landscape Unit	Overall Vulnerability Rating	Comments	Recommended Action				
			Increase Old Forest	Increase Forest	Improve Connectivity	Increase Stand Level Retention	Use existing Roads
Yakoun Lake	Low	27% protected; 24% constrained; 25% NCLB; THLB 19% 19% of old in LU is in protected;10% in constrained; 5% in NCLB=low Slight decrease in the amount of old forest from 2012, but old plus mature remains high (62%) 68% interior = low Med roads (relative to other HG LUs): 564 km 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, X̲aana K̲aahlii *Skidegate Lake* and G̲aauu K̲aahlii *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., X̲aana K̲aahlii *Skidegate Lake* and G̲aauu K̲aahlii *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%.

Forecast

Work has 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 FSC Canada Standard). In general, the results of the analysis demonstrate an impressive increase (60%) in old forest and a minor increase (6%) in mature forest within the harvestable land-base 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

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 regard 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.

Database & Reporting Parameters

Some preliminary data for X̲aayda Gwaay.yaay *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.

Indicator 29: Landscape Level Biodiversity – Connectivity

Element	Objective	Indicator	Target
FSC 6.8.3, 6.8.4, 8.2.3 (2,3, 5), 9.4 HCV effectiveness; linkages to Criterion 6,4, 6.6, 6.8	Maintain HCV 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

This indicator links to FSC Indicators 6.8.3 and 6.8.4, and the Environmental Values Assessment Report, including the Range of Natural Variation (RONV) of the X̲aayda Gwaay.yaay *Haida Gwaii* ecosystems and the objectives to maintain, restore or enhance the condition of the forest as appropriate to the regional context. The targets also consider the needs of species at risk that require large amounts of contiguous habitat.

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. Reporting periods are 2011-2015, 2016-2019 (completed one year sooner than scheduled to incorporate the new forest cover inventory and to accommodate Taan FSC certificate re-registration cycle to the new standard). The next period will be 2020-2025, with update occurring in 2025.

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 X̲aayda Gwaay.yaay *Haida Gwaii* as a whole, and for each Landscape Unit and considers forest cover, road networks and riparian crossings associated with road networks such as streams and wetlands.

There is planned activity within the Sewell LU and further connectivity analysis will be completed prior to harvest.

Landscape Connectivity – by Landscape Unit (2019)

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. There has been no significant change since 2016 because the areas harvested have generally been close to other harvest areas, thus not affecting connectivity or patch sizes to any significant degree. The recommendations in 2019 thus remain the same as in 2016.

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 (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
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	Good	Good	Improve connections to south and west. Many isolated patches in south and west corners of the LU and on the island.	N (Minor overlap with MU)
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)	N (Only two small portions o the MU are located within this LU)
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 – 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 (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
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	Good	Good	Improve connections to south and west. Many isolated patches in south and west corners of the LU and on the island.	N (Minor overlap with MU)
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)	N (Only two small portions o the MU are located within this LU)
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 2016 & 2019

When Xaayda Gwaay.yaay *Haida Gwaii* is considered as a whole, Figure 3 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 K'uuna Gwaay.yaay *Louise Island*, areas on the large peninsula south of K'il Llnagaay *Sandspit*; and areas on the peninsula south of Gaw Tlagee *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 4 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 5). 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 to 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), provided those efforts are underway to ensure internal retention in large blocks to help provide those connections. For additional stand-level retention indicators, targets and results refer to the Stand-level Biodiversity Indicator (page 23).
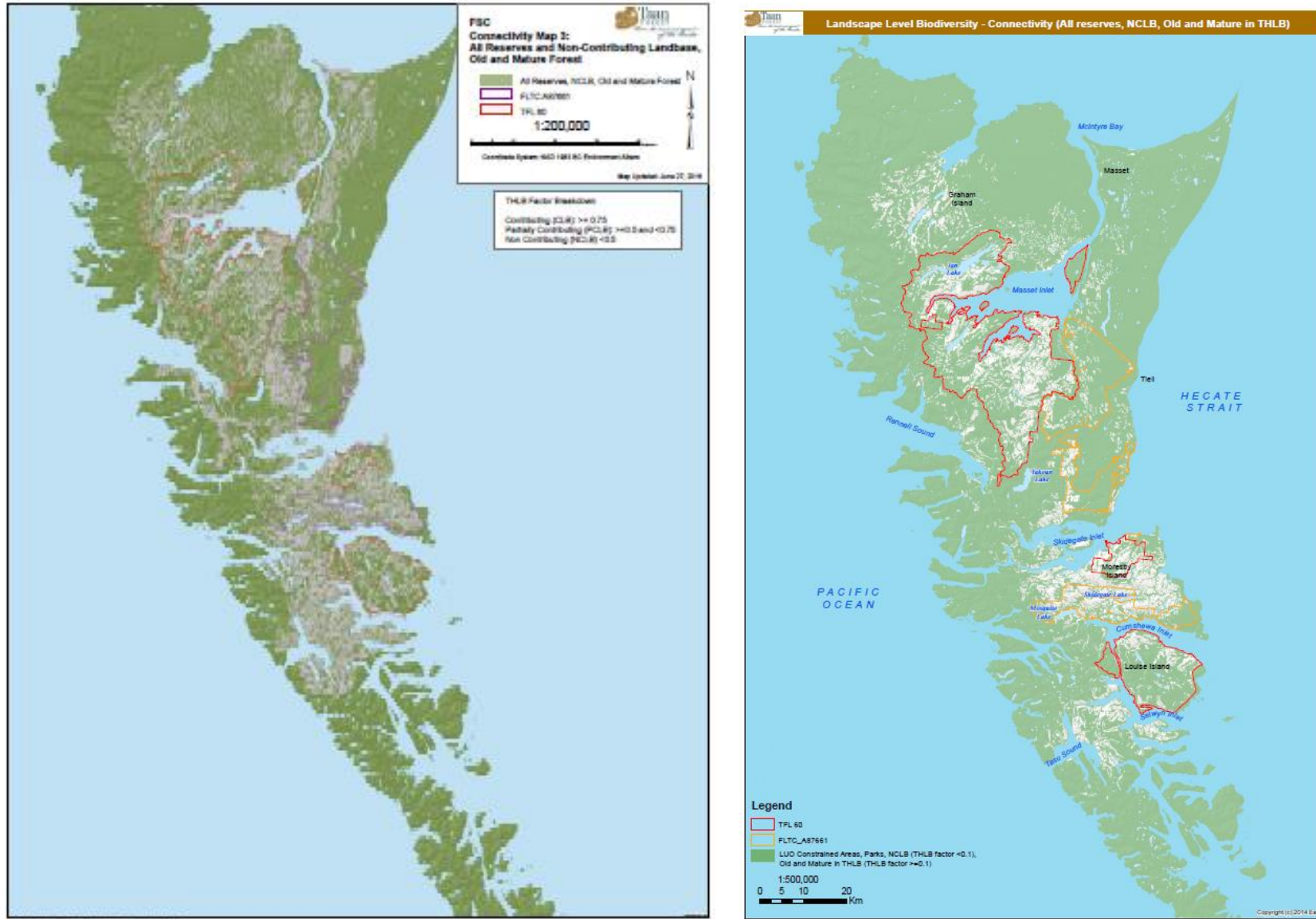
Figure 3: 2016 & 2019 Landscape Connectivity – reserves, non-timber harvesting land-base and mature/ old within the THLB
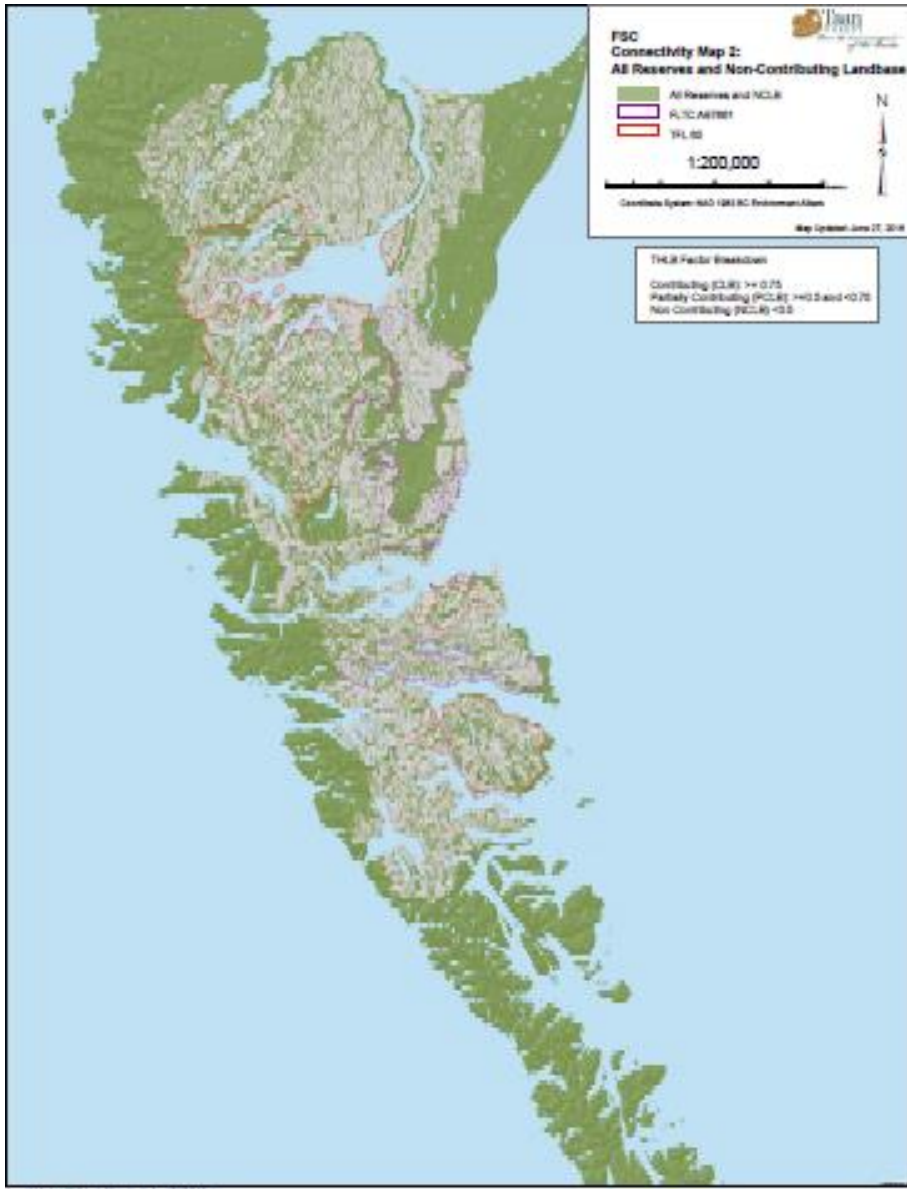
Figure 4: 2016 & 2019 Likely Future Landscape Connectivity – all reserves and non-contributing land-base
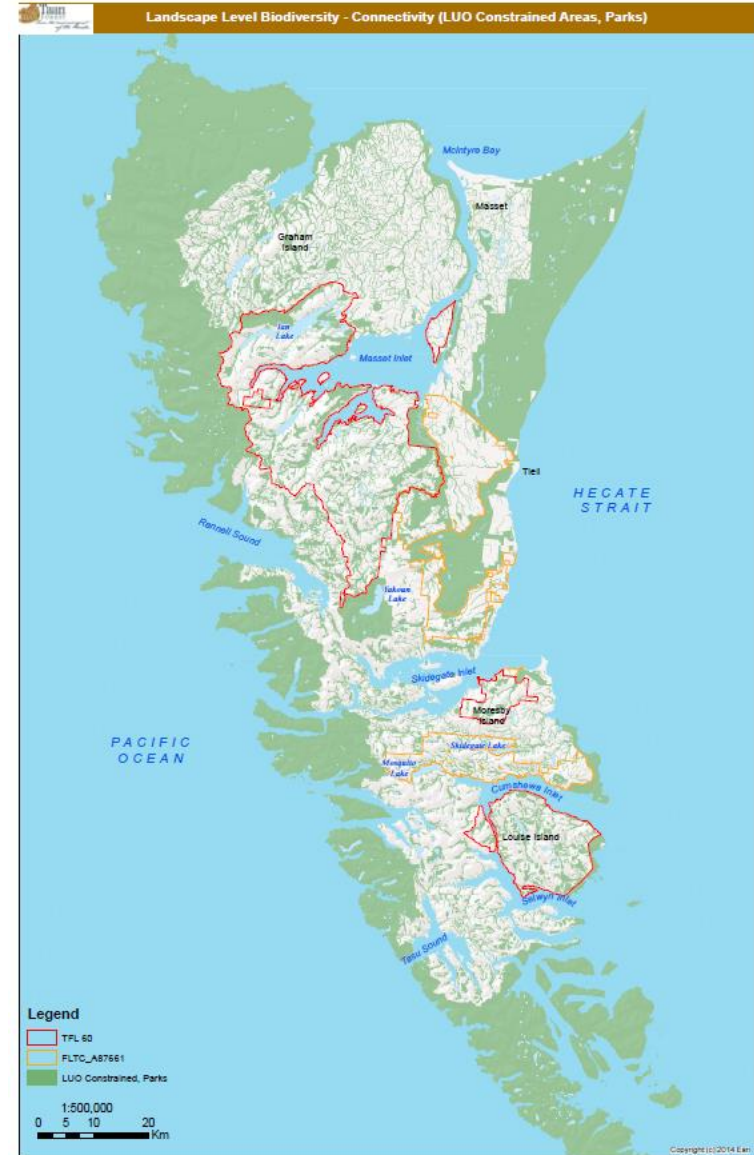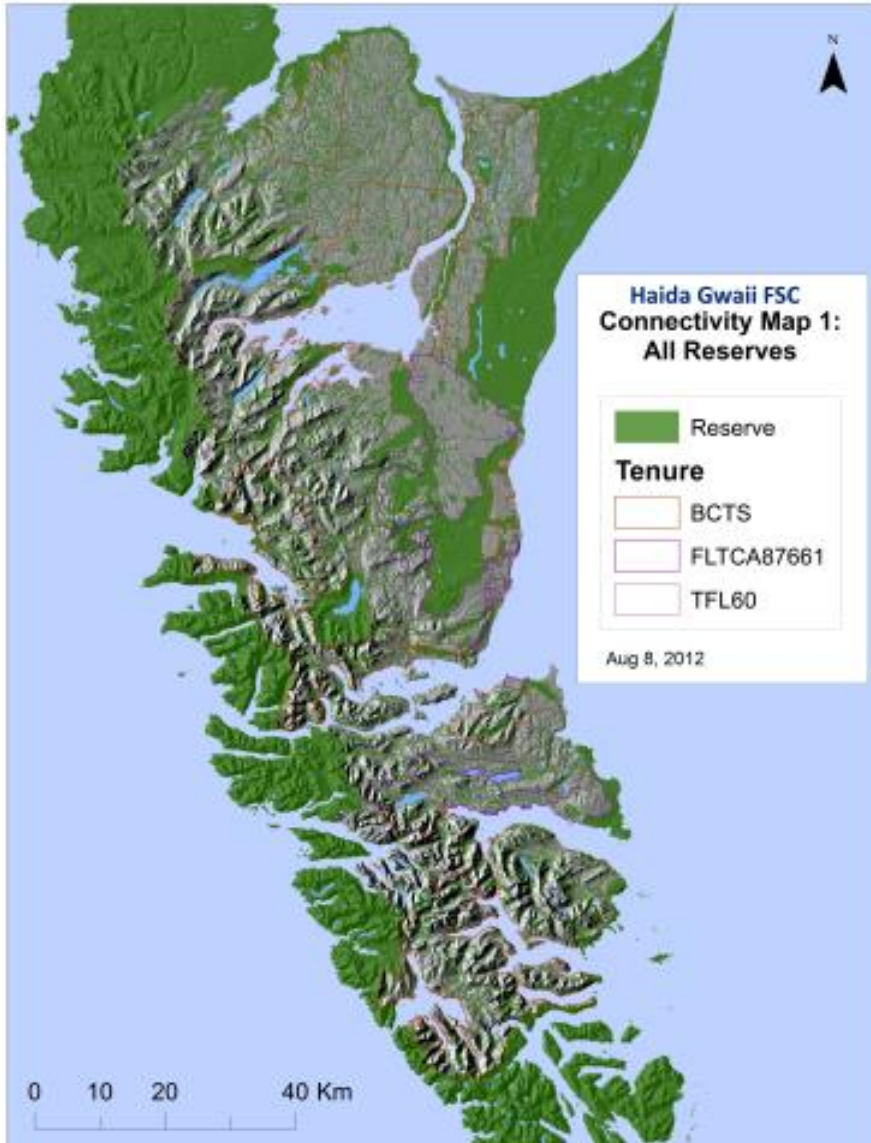
Figure 5: 2016 & 2019 Likely Future Landscape Connectivity – all reserve

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 the area and is monitoring the Sewell LU.

The Sewell LU was identified as benefitting from increased connectivity in 2012, however the majority of the Landscape Unit is not within Taan's tenures. 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	
2022	N/A - No harvesting	Y
2021	N/A - No harvesting	Y
2020	N/A - No harvesting	Y
2019	N/A - No harvesting	Y
2018	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 X̲aayda Gwaay.yaay *Haida Gwaii* for which connectivity of old forest is a key habitat factor. It has been suggested that K'uuxuu *marten* may require connectivity, however given the high population on X̲aayda Gwaay.yaay *Haida Gwaii*, connectivity appears adequate at present. Nonetheless, if K'uuxuu *marten* populations are healthy, that likely indicates populations of other old and mature forest species are also healthy, so monitoring K'uuxuu *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 tables above). Future planning in these areas will consider connectivity during cutblock and road design.

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.

Indicator 30: Landscape Level Biodiversity - Ecosystem Representation

Element	Objective	Indicator	Target
FSC 6.8.3. 6.8.4, 8.2.3 (2,3, 5), 9.4 HCV effectiveness; linkages to Criterion 6,4, 6.6, 6.8	Maintain HCV 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

This indicator is linked to FSC Indicators 6.8.3 and 6.8.4, and the Environmental Values Assessment Report, including the Range of Natural Variation (RONV) of the Xaayda Gwaay.yaay *Haida Gwaii* ecosystems and the objectives to maintain, restore or enhance the condition of the forest as appropriate to the regional context. The targets also consider the needs of species at risk that require large amounts of contiguous habitat.

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 for monitoring by Taan (as it is a legal requirement). 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 so, 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, with a priority for old forest, then mature, followed by recruitment of young stands if there is insufficient old and mature forest to meet the targets. 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.

This indicator was revised in 2020, to focus on the application of the LUO Ecosystem Representation Targets in relation to the harvesting completed within the FSC Annual Reporting period for this Monitoring Report rather than on a display of the complex analysis that is used to determine ecosystem representation current status. The annual harvest monitoring previously located within the Stand Level Biodiversity Indicator has therefore been moved to this section. A detailed analysis is available for viewing if desired.

Current Status/ Results

All licence holders are required as part of the LUO and their FSPs monitor harvest planning in relation to the current status to ensure that targets are met.

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	
2022	n/a	n/a	-	-	-	-	Y
2021	n/a	n/a	-	-	-	-	Y
2020	n/a	n/a	-	-	-	-	Y
2019	n/a	n/a	-	-	-	-	Y
2018	n/a	n/a	-	-	-	-	Y

*The target is considered to be met in 2016 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 2022, no harvesting was completed within any site series identified as having a deficit of old forest retention under the LUO targets. Taan is still waiting for the Land Use Order to be updated to the new Land Management Handbook 68.

In 2021, no harvesting was completed within any site series identified as having a deficit of old forest retention under the LUO targets. Further to the discussion in 2020, the land use order is based off the LMH (Land Management Handbook) 28 Vancouver Forest Region BEC Classification created in 1994. Within the next five years, the land use order will be switched to meet the new LMH 68, created in 2014, specific to BEC classifications on Haida Gwaii. This will change the current rare and common ecosystems on X̱aayda Gwaay.yaay *Haida Gwaii*, and this ecosystem representation analysis will need to be updated.

In 2020, no harvesting was completed within any site series identified as having a deficit of old forest retention under the LUO targets. Upon review, Taan determined that there are some issues with calculations of current ecosystem representation for planning blocks moving forward, as the LUO targets are based on the previous TEM mapping, but the new VRI mapping that was used in the new TSR shows a significant shift in the amount of identified old forest into mature forest seral. However, Taan has checked a few areas that are currently showing in the VRI as mature forest that were previously identified as old forest and verified by timber cruisers to be old forest seral. Taan will need to engage with the Forest Service and CHN to determine next steps and action item has been generated. Currently, Taan has decided to use the older VRI age classes to maintain accuracy and working on ways to improve current VRI.

In 2019, no harvesting was completed within any site series identified as having a deficit of old forest retention under the LUO targets.

In 2018, no harvesting was completed within any site series identified as having a deficit of old forest retention under the LUO targets.

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 maintains a "live" update spatial analysis of the current representation of old and mature forest in relation to the LUO targets, which is regularly updated with planned and completed forest operations to adjust the current status and ensure LUO targets are met.

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 the Taan Spatial Analysis tracking for ecosystem representation and is updated annually.

Indicator 31: HCVF Large Landscape Level Forests (LLLF)

Element		Objective	Indicator	Target
FSC 6.8.3, 6.8.4, 8.2.3 (2,3, 5), 9.4 HCV effectiveness; linkages to Criterion 6,4, 6.6, 6.8		Maintain HCV 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

This indicator is linked to FSC Indicators 6.8.3 and 6.8.4, and the Environmental Values Assessment Report, including the Range of Natural Variation (RONV) of the Xaayda Gwaay.yaay *Haida Gwaii* ecosystems and the objectives to maintain, restore or enhance the condition of the forest as appropriate to the regional context. The targets also consider the needs of species at risk that require large amounts of contiguous habitat.

The indicator is based on the FSC requirements to identify large landscape level forests within the Management Unit as part of the HCV Assessment and then establish management strategies consistent with the precautionary approach to ensure maintenance of the values. 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 two 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	115,119	113,077	98.2	1,342	1.2	268.4	20	0.8	0
3	69,420	55,687	80.0	0	0			13,733	20

LLLF #1 is not a significant concern for forest management as 98% of the area is located within protected areas and only 1% is located within the Management Unit. Of the area located within the MU, 20% is available for forest management activities, or 268.4ha (thereby preserving the 80% core area established under Motion 65).

LLLF #3 are located outside of the Management Unit and are outside of Taan's management control or sphere of influence. Since 80% of this LLF is located within protected areas/ conservancies and LUO Constrained areas, there is sufficient area protected to ensure this LLF remains LLF in the long term (i.e., >50,000ha).

- LLLF 2 (48,894ha) previously identified within the FSC Management Plan and HCV Assessment no longer meets the criteria for intact forest landscapes due to harvesting activity in the Timber Supply Area north of G̱aauu K̲aahlii *Masset Inlet* (outside of the management unit). At this time, Taan has determined that we do not have any sphere of influence over the other licenses regarding any recommendations to limit harvesting within this LLLF, as a significant portion of the area lies within the timber harvesting land-base and within forest tenures.

Taan currently has not completed harvesting, nor has any plans for harvesting, within the small narrow section of intact forest located in the northwest section of TFL 60 (in LLLF polygon 1).

Summary of Management Strategies

The overall management objective for large landscape level forests under the FSC High Conservation Value 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 HCV 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 and harvesting remains within the allowable disturbance threshold of 20% of the portion within the MU.

Database & Reporting Parameters

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

Indicator 32: Invasive Species

Element	Objective	Indicator	Target
FSC 8.2.1 (2) and linkages to Criterion 10.3, 9.4	Maintain HCVs and attributes	# of high priority invasive plant new 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 Assessment 2016 to monitor new introductions, eradications and spread of existing invasive species. This is also a legal requirement under FRPA, and the FSP must contain results or strategies to address invasive plants.

A symposium was held in 2002 to discuss introduced species to X̲aayda Gwaay.yaay *Haida Gwaii* and in particular, focussed on the k'aad *deer* in relation to ecosystem impacts. Recent studies by the Research Group on Introduced Species (RGIS) also indicate that k'aad *deer* browse have significantly impacted song bird populations on X̲aayda Gwaay.yaay *Haida Gwaii*. The Land Use Order Background Report (2003) describes introduced species of key relevance to the Land Use Planning process and includes Ts'ing *Canadian Beaver*, kaagan 'yudala *rats*, gwiiguu *racoon*, k'aad *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 of high priority species.

The current high priority species identified by the Northwest Invasive Plants Council for the North region are common tansy, Bohemian knotweed, dalmation toadflax, gorse, Himalayan blackberry, Himalayan knotweed, Japanese knotweed, Scotch broom, spotted hawkweed, tansy ragwort, yellow archangel, yellow flag iris and giant knotweed.

Current Status/ Results

Xaayda Gwaay.yaay Haida Gwaii – priority species

Year	Invasive Plant ID	# of Sites added	Treated sites*	Total # of active sites
2022	Common Tansy	1	9	35
	Tansy Ragwort	1	1	16
	Bull Thistle	0	7	43
	Canada Thistle	0	5	26
	Scotch Broom	0	4	85
	March Plume	0	1	3
	Japanese Knotweed	0	2	26
	Yellow Iris	0	1	11
	Groundsel	0	1	9
	Burdock Sp. (Canada and Bull Thistle)	0	1	23
	Yellow Arch Angle	0	0	13
	Bohemian Knotweed	0	0	7
	Total	**0**	**32**	**297**
2021	Common Tansy	9	6	35
	Tansy Ragwort	7	6	16
	Bull Thistle	5	4	43
	Canada Thistle	2	2	26
	Scotch Broom	14	15	85
	March Plume	1	0	3
	Japanese Knotweed	3	0	26
	Yellow Iris	1	0	11
	Groundsel	2	0	9
	Burdock Sp. (Canada and Bull Thistle)	3	2	23
	Yellow Arch Angle	1	0	13
	Bohemian Knotweed	1	0	7
	Total	**49**	**35**	**287**
2020	Common Tansy	1	5	
	Sowthistle	0	1	116
	Tansy Ragwort	0	1	
	Gorse	0	1	
	Bull Thistle	0	2	426
	Canada Thistle	0	2	211
	Scotch Broom	0	5	124
	March Plume	0	1	
	Total		**18**	**877**
2019	Bull Thistle	0	5	426
	Burdock Spp	1	2	79
	Canada Thistle	0	3	211
	Scotch Broom	1	7	124
	Sowthistle	0	4	116
	Total	**2**	**21**	**956**
2018	Bull Thistle	3	1	431
	Burdock Spp	2	1	80
	Canada Thistle	2	1	214
	Scotch Broom	2	14	130

Year	Invasive Plant ID	# of Sites added	Treated sites*	Total # of active sites
	Sowthistle	1	0	120
	Total	**10**	**17**	**975**

* 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 2022, there were no herbicide treatments across Haida Gwaii by the NW Invasive Plants Committee, however 8 sites were mechanically treated with the focus on Common Tansy, Scotch Broom, and Burdock spp. Taan maintained its contract with the Northwest Invasive Plants Council to determine the most effective treatment for eradicating invasive species on its management unit. Taan has 40 active sites on its Management Unit.

In 2021, there were no herbicide treatments across Haida Gwaii by the NW Invasive Plants Committee, however several sites were mechanically treated. Taan maintains its annual contract with the plant committee to treat high priority invasives. Tansy Ragwort and Scotch Broom continue to increase in size and the invasive plant committee is working with the CHN on treatment alternatives. Taan is engaged with the Northwest Invasive Plants Council to determine the most effective treatment for eradicating invasive species on its management unit.

In 2020, there was 1 new site (Common Tansy) added on Xaayda Gwaay.yaay Haida Gwaii, which was identified by a Taan staff member. There were 18 sites of species treated including Common Tansy, Sowthistle, Tansy Ragwort, Gorse, Bull Thistle, Canada Thistle, Scotch Broom, and March Plume. Overall, the number of sites is decreasing slightly, as more sites are eradicated than new sites added. Taan is in direct contact with the Northwest Invasive Plants Council to determine the most effective treatment for eradicating invasive species on its management unit.

In 2019, 4 new invasive plant sites were added to the Xaayda Gwaay.yaay *Haida Gwaii* data, one each for burdock species, Japanese knotweed, scotch broom, and tansy ragwort (note that the table above only includes the top five species recorded by area occupied, so some of these new sites are not listed in the above table). There were 21 sites of the five key species eradicated, and an additional 21 sites eradicated including common tansy, cypress spurge, Himalayan knotweed, Japanese knotweed, marsh plume thistle, march thistle, orange hawkweed, Himalayan balsam, St. John's wort, tansy ragwort, and yellow archangel. Overall, the number of sites is decreasing slightly, as slightly more sites are eradicated than new sites added. Knotweed, although not one of the top five in area, is an important species to focus eradication efforts on, before it spreads.

2018 data were not modified but reviewed for missed eradicated sites during analysis. In addition to the two scotch broom sites identified and eradicated in 2018, 15 additional sites were eradicated from previous years: 12 scotch broom, 1 Canada thistle, 1 burdock, and 1 bull thistle.

In 2018, 14 new invasive plant sites with the following species were added to the Xaayda Gwaay.yaay *Haida Gwaii* data: bull thistle, burdock, Canada thistle, scotch broom, and sow thistle. Two scotch broom sites were eradicated.

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 Xaayda Gwaay.yaay *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 of High Priority Species Reported	# of Taan Assessments Completed on New Occurrence Sites for High Priority Species	Target Met (Y/N)
2022	0	0	0	Y
2021	10	1 – Marsh Plume	1	Y

Year	# of Invasive Plant New Occurrences on the MU	# of Invasive Plant New Occurrences of High Priority Species Reported	# of Taan Assessments Completed on New Occurrence Sites for High Priority Species	Target Met (Y/N)
2020	1	N/A	N/A	Y
2019	16	N/A	N/A	Y
2018	9	N/A	N/A	Y

In 2022, mitigation measures continued for Tansy Ragwort (on blocks GRA006 and GRA001) including keeping disturbance as limited as possible, smothering dense sites with a foot of clean material during construction, keeping the road 'right of way' width to an absolute minimum, limiting ditch disturbance during reactivation work, side casting material to be seeded with the approved HG seed mixture (including seed certificates to ensure no invasive plants), keeping the gate closed to prevent public access, and washing all vehicles leaving the work site. Block reactivation maps can be provided for me details.

In 2021, Taan identified the spreading of Common Tansy and Scotch Broom within the Management Unit and identified a new occurrence of a high priority Marsh Plume. Taan continues to work closely with the Invasive Species Council of BC on education and training of Taan staff as well as for treatments to eradicate high priority species. Through the collaboration, the NW Invasive Plants Committee completed invasive plant assessments, reporting and treatment of 10 sites on the Taan Tenures in 2021. Taan continues to treat scotch broom sites and restricts access to high priority invasive plants areas.

In 2020, Taan identified only site of Common Tansy within the Management Unit. Taan continues to work closely with the Invasive Species Council of BC on education and training of Taan staff as well as for treatments to eradicate high priority species. Through the collaboration, the NW Invasive Plants Committee completed invasive plant assessments, reporting and treatment of 18 sites on the Taan Tenures.

In 2019 Taan identified Horsetail, Foxglove and Canadian Thistle during surveys within the Management Unit. Taan has been working closely with the Invasive Plants Council on education and training of Taan staff as well as for treatments to eradicate high priority species. Through the collaboration, the ISC completed invasive plant assessments, reporting and treatment of 21 sites on the Taan Tenures (and do so annually). A field card was developed by Taan as part of the education and training initiative.

In 2018 Taan identified Common Tansy, Fox Glove, and Canadian Thistle during surveys. Foxglove occurrences are not required to be reported anymore since it is so widespread. An action item has been generated to ensure that the locations of the new sightings of invasive plants are reported to the invasive plants council.

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 over the phone under the Invasive Alien Plant Program and through the Report a Weed phone Application.

The Invasive Plants Council maintains a list of high priority species for the coast region that is updated periodically.

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 Xaayda Gwaay.yaay *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 Forest Service 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.

Database & Reporting Parameters

The Forest Service 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 high priority 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 Xaayda Gwaay.yaay *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 33: LUO/ FSP Annual Reporting

Element	Objective	Indicator	Target
FSC 8.2.2 (8), 8.2.3 (4) & 9.4	Maintain HCV values/ attributes, protection of special sites	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.

Protection of sites of special cultural, ecological, economic, religious, or spiritual significance to the Xaayda *Haida* and local communities are included within the LUO and reported under this indicator. Special sites may also be identified through planning activities and engagement with the Solutions Table that are not included within the LUO, refer to the Special Sites Indicator for details.

Current Status/ Results

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

In 2022, Total area harvested was 288.52 ha. Total reserve was 111.75 ha or 38.7% of harvest area. Total LUO features recorded were 1546. Note* for the 2022 report hellebore features were used vs individual hellebore stem count that was used in the previous reporting years.

Year	Feature Description[2]	# of Features	'Reserve' Area[1] (ha)	Target Met (Y/N)
2022	Bear Den	2	2.4	Y
	Cultural Cedar Stands	6	13.88	
	CMT Reserve (Stems + polygons)	125	6.5	
	Monumental Cedar Reserve		6.24	
	MT's >120cm	11	-	
	MT's <120cm	15	-	
	Heritage Features			
	Forest Features			
	Stink Current	3	-	
	Cloudberry	-	-	
	Devil's Club	21	9.43	
	Indian Hellebore	65	-	
	Pacific Crab Apple (group)	139	-	
	Pacific Crab Apple (single)	287	-	
	Fairy Slipper	-	-	

Year	Feature Description[2]	# of Features	'Reserve' Area[1] (ha)	Target Met (Y/N)
	Labrador Tea			
	Licorice Fern			
	Northern maiden-hair			
	Running Club Moss			
	Yellow Pond Lily	9	-	
	Riparian			
	Type I Streams	16	42.42	
	Type II Streams	27	20.69	
	Active Fluvial Units[3]	3	10.19	
	Yew Retention			
	Group	22	-	
	Single	748	-	
	Total LUO Reserves	**1546**	**111.75**	

1 Reserve Area includes LUO reserve zones and management zones found within LUO_Reserve_Mgmt_Zone_Final feature class which is within the TAUP.

2 Note that many GIS forest feature points include multiple remunerations of features, and these are recorded in the database. The # of features include everything surveyed for all blocks submitted regardless of in/out of TAUP.

3 Active Fluvial Units includes Active Flood Plains/Flood Plains for both feature count and reserve area.

In 2021, LUO Reporting included 26 cutblocks (22 regular cutblocks, 3 riparian treatment blocks, and 1 spacing block). The 26 blocks reported in 2021 totalled 679.7ha harvest area. LUO Management Zones and Reserves totalled 637.7ha, or 94% of the harvest area.

Year	Feature Description		# of Features	'Reserve' Area[1] (ha)	Target Met (Y/N)
2021	Bear Den		2	2.2	Y
	Cedar Retention Patch		-		
	Cultural Cedar Stands		7	36.0	
	CMT Reserve (polygons)		-	15.0	
	CMT Reserve (stems on ground)		144	-	
	Monumental Cedar Reserve		-	84.8	
		>120cm	113		
		<120cm	57		
	Heritage Feature		-		
	Forest Feature		-	132.2	
		Stink Current	3		
		Cloudberry	-		
		Devil's Club	134		
		Indian Hellebore	1886		
		Pacific Crab Apple (group)	270		
		Pacific Crab Apple (single)	646		
		Fairy Slipper	36		
		Labrador Tea	-		
		Licorice Fern	-		
		Northern maiden-hair	-		
		Running Club Moss	-		
		Yellow Pond Lily	29		
	Riparian				
		Type I Streams	44	225.7	
		Type II Streams	102	100.8	
		Active Fluvial Units	5	41.0	
	Yew Retention				
		Group	59		
		Single	1877		
	Total LUO Reserves		**5445**	**637.7**	

1 Reserve Area includes LUO reserve zones and management zones found within LUO_Reserve_Mgmt_Zone_Final feature class which is within the TAUP.

2 Note that many GIS forest feature points include multiple remunerations of features, and these are recorded in the database. The # of features include everything surveyed for all blocks submitted regardless of in/out of TAUP.

3 Active Fluvial Units includes Active Flood Plains/Flood Plains for both feature count and reserve area.

In 2020, LUO Reporting included 25 cutblocks (14 regular cutblocks and 11 Salvage blocks). The 25 blocks reported in 2020 totalled 356.6 ha harvest area. LUO Management Zones and Reserves totalled 186.9ha, or 52% of the harvest area.

Year	Feature Description	# of Features	'Reserve' Area[1] (ha)	Target Met (Y/N)
2020	Bear Den	5	2.8	Y
	Cedar Retention Patch			
	Cultural Cedar Stands	9	16.8	
	CMT Reserve (polygons)		18.5	
	CMT Reserve (stems on ground)	51		
	Monumental Cedar Reserve		17.8	
	>120cm	43		
	<120cm	44		
	Heritage Feature			
	Forest Feature		20.4	
	Stink Current	18		
	Cloudberry			
	Devil's Club	31		
	Indian Hellebore	358		
	Pacific Crab Apple (group)	109		
	Pacific Crab Apple (single)	157		
	Fairy Slipper			
	Labrador Tea	3		
	Licorice Fern	1		
	Northern maiden-hair			
	Running Club Moss			
	Yellow Pond Lily			
	Riparian			
	Type I Streams	53	60.9	
	Type II Streams	84	35.4	
	Active Fluvial Units	7	14.3	
	Yew Retention			
	Group	94		
	Single	2,314		
	Total LUO Reserves	**3,400**	**186.9**	

1 Reserve Area includes LUO reserve zones and management zones found within LUO_Reserve_Mgmt_Zone_Final feature class which is within the TAUP.

2 Note that many GIS forest feature points include multiple remunerations of features, and these are recorded in the database. The # of features include everything surveyed for all blocks submitted regardless of in/out of TAUP.

3 Active Fluvial Units includes Floodplains for both feature count and reserve area.

In 2019, LUO Reporting included 14 cutblocks (no salvage blocks) with a total of 312.7 ha harvested in 2019. LUO Management Zones and Reserves totalled 220.3 ha, or 71% of the harvested area.

Year	Feature Description		# of Features	'Reserve' Area[1] (ha)	Target Met (Y/N)
2019	Bear Den		-		Y
	Cedar Retention Patch		-		
	Cultural Cedar Stands		-	42.7	
	CMT Reserve (polygons)			8.5	
	CMT Reserve (stems on ground)		20		
	Monumental Cedar Reserve			1.8	
		>120cm	1		
		<120cm	3		
	Heritage Feature				
	Forest Feature			24.6	
		Stink Current	1		
		Cloudberry	-		
		Devil's Club	19		
		Indian Hellebore	386		
		Pacific Crab Apple (group)	97		
		Pacific Crab Apple (single)	149		
		Fairy Slipper	-		
		Labrador Tea	3		
		Licorice Fern	-		
		Northern maiden-hair	-		
		Running Club Moss	1		
		Yellow Pond Lily	4		
	Riparian				
		Type I Streams	17	63	
		Type II Streams	71	66	
		Active Fluvial Units	2	13.7	
	Yew Retention				
		Group	60	0.9	
		Single	821		
	Total LUO Reserves		**1,655**	**220.3**	

[1] Reserve Area includes LUO reserve zones and management zones
[2] Note that many GIS forest feature points include multiple remunerations of features, and these are recorded in the database.

In 2018, LUO Reporting included 16 cutblocks (Including 2 salvage blocks) with a total of 370.6 ha harvested. LUO Management Zones and Reserves totalled 218.9 ha, or 59% of the harvested area. Data corrections completed in 2019.

Year	Feature Description		# of Features	'Reserve' Area[1] (ha)	Target Met (Y/N)
2018	Bear Den		2	2.66	Y
	Cedar Retention Patch				
	Cultural Cedar Stands		2	4.88	
	CMT Reserve (polygons)		18	7.04	
	CMT Reserve (stems on ground)		-	-	
	Monumental Cedar Reserve			29.79	
		>120cm	36		
		<120cm	11		
	Heritage Feature			21.21	
	Forest Feature			37.79	
		Stink Current	3		
		Cloudberry	-		
		Devil's Club	92		
		Indian Hellebore	636		
		Pacific Crab Apple (group)	22		
		Pacific Crab Apple (single)	26		
		Fairy Slipper	29		
		Labrador Tea	-		
		Licorice Fern	-		
		Northern maiden-hair	-		
		Running Club Moss	1		
		Yellow Pond Lily	5		
	Riparian				
		Type I Streams	9	66.79	
		Type II Streams	16	48.79	
		Active Fluvial Units	1	0.59	
	Yew Retention				
		Group	45		
		Single	2173		
	Total LUO Reserves		**3,714**	**218.9**	

[1] Reserve Area includes LUO reserve zones and management zones
[2] Note that many GIS forest feature points include multiple remunerations of features and these are recorded in the database.

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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 (Ts'uu *western red cedar* and SGaahlaan *yellow cedar*)
- HlGiid *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
- Taan *black bear* Dens
- Forest Reserves

Under the LUO, reporting is also required concurrent with the identification of any potential nests of Stads K'un *northern goshawk*, HlGuu *great blue heron* and St'aw.was *northern saw-whet owl*.

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.

Indicator 34: Windthrow Management Effectiveness

Element	Objective	Indicator	Target
FSC 8.2.1 (8) & 9.4	Maintain HCVF values/ attributes	Areas with expected windthrow have Tree Crown Modification (TCM) treatments completed	100% of prescribed TCM is completed; 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 HCVs 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)
2022	9 (84 segments)	0	0	0	0	Y
2021	9 (25 segments)	1 (1 segments)	0	0	0	Y
2020	10 (55 segments)	0	2 (4 segments)	0	1	N

2019	37 (202 segments)	19 (27 segments)	12 (18 segments)	6 (7 segments)	7	N
2018	32 (129 segments)	12 (23 segments)	7 (10 segments)	3 (7 segments)	4	N
2017	24 (129 segments)	16 (36 segments)	9 (15 segments)	8 (8 segments)	4	N
2016	34 (200 segments)	25 (50 segments)	12 (22 segments)	4 (8 segments)	6	N
2015	12 (73 segments)	7 (15 segments)	3 (6 segments)	0	2	N

In 2022, 100% of the prescribed Tree Crown Modification was completed for 9 blocks. The road along the north side of Louise Island was repaired and a follow up assessment was completed for MAT012 and there was no impact to the adjacent LOU feature from the 2020 blowdown.

In 2021, 100% of the prescribed Tree Crown Modification was completed for 9 blocks. A follow up assessment for MAT012 has not yet occurred due to a November 2021 landslide blocking the mainline into the block. Taan plans to repair the road in 2022 and be on-site to complete the post-harvest assessments.

In 2020, 100% of the prescribed TCM was completed for 10 blocks. A follow-up assessment of MAT012 identified 3 segments which have been partially impacted by blowdown after the TCM was completed. One of these segments, along FC32 to FC33, has adjacent LUO features which requires a follow-up to determine an impact to the feature(s). No additional blocks were identified as having significant blowdown during post-harvest assessments. Field staff will need to follow-up on sites to track any windthrow progression and evaluate any impacts of LUO features. More time is needed to determine if the treatments were effective.

Taan is currently reviewing this indicator and target to determine if it needs to be revised. The target could better worded and not in the form of a question. The intent of the target is to ensure that all prescribed TCM is effective. There is an inherent challenge with assessing the effectiveness of this indicator over only a one-year timeframe as further windthrown data needs to be captured in the assessments. There is also a risk that this target will never be achieved with blow down occurring. As well, Taan has implemented a pilot project to trial the feathering of boundary edges adjacent to LUO reserves. The results of this pilot will be reported in 2021. Staff training and a refresh of post harvest assessments is scheduled for 2022.

In 2019, TCM was prescribed and completed for 15 blocks. Of these, TCM was completed for one block pre-harvest and 7 blocks post-harvest (treatment is generally planned to be completed prior to or concurrent with harvesting to ensure the edges are windfirm once they are opened up, but Heli-treatment require the boundary to be felled). Another 7 had windthrow assessments completed at the time of post-harvest assessment and TCM was not yet completed. Follow-up of these blocks confirmed completion of TCM has since occurred. During the internal review, it was noted that the forestry crew needs to ensure that sufficient level of detail is included within the comments particularly where LUO features are present).

There were 7 blocks where LUO reserves/management zones and/ or some features were potentially impacted by windthrow.

- AER005 potential impact to adjacent devil's club (edge of reserve area is 25-50m away from the block boundary (TCM Completed in block, but not prescribed on this edge segment)

- MCL006 riparian reserve boundary edge (small section had TCM prescribed and TCM completed, portion of the impacted edge did not have TCM prescribed)

- THR001 1 short segment of boundary edges with yew and helibore adjacent impacted (TCM not prescribed, TCM completed in rest of the block where prescribed)

- THR004 boundary edge next to Monumental (TCM Completed). *Boundary segment noted in assessment does not match any segments in the block; assumed it was referring to FC12-15, rather than A12-A15.

- THR006 one CMT retention patch (in excess of required reserve) and one CMT reserve edge impacted, both edges had TCM prescribed and were treated. Additional retention patch of crabapple and yew was impacted, TCM not prescribed.

- TOW001 was also reported by FREP. CMTs, Windthrow impacted 3 out of 5 CMT reserve zones, with two CMTs struck by windthrown trees. (TCM prescribed and completed)
- TOW002 riparian reserve (TCM prescribed and completed)

Windthrow monitoring was also completed on the following block that had previously been identified with potential impacts to LUO features or reserves/ management zones, and the assessments did not report any additional windthrow than what was reported in the initial assessment:

- MCL001 CMT reserve (TCM was completed, but a section of the reserve not treated experienced windthrow).
- MCL004 CMT reserves (TCM was completed, but a section of the reserve not treated experienced windthrow).

Taan completed a detailed internal review to review the monitoring results and it is important to note that all of these blocks had the planning/ layout completed prior to the updated Windthrow Prescription procedures that were implemented in October 2018 in response to the early learnings from the windthrow monitoring. Preliminary follow up investigation also indicates that windthrow assessments completed by one Taan staff member were over-estimating the percentages of windthrow, thus follow up training is being scheduled. Taan is also implementing a pilot project to trial edge feathering on some boundary edges adjacent to Forest Reserve areas to determine if feathering is more effective (KNG003).

In 2018, TCM was prescribed and completed for 21 blocks. 10 blocks did not have any TCM prescribed (included several salvage areas). TCM was prescribed but not completed for AER004, which did experience some windthrow.

There were 4 blocks where LUO reserves/management zones and/ or some features were impacted by windthrow.

- AER004 CMT patch (internal), CMT feature not impacted. TCM not completed as prescribed.
- MCL004 block boundary next to CMT reserve external to the block (CMT feature not impacted). Also reported in 2017
- THR003 boundary edge next to Monumental Cedar management zone (FC #9), also reported in 2017. No additional impacts in 2018. Features not impacted.
- YAK001 Monumental Cedar management zone is impacted, buffer almost gone (monumental cedar features not impacted)

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 X̲aayda Gwaay.yaay *Haida Gwaii*. A summary and proposed actions is included within the 2017 Report Summary of Results section.

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. Some changes to management strategies have occurred over the years as we learn from the windthrow monitoring results, such as changes in October 2018 to require windthrow treatments to be prescribed for all edges that have adjacent LUO Features and increases to the percentage of crowns to be treated.

An action item has been generated as part if this report (2019) to further review the windthrow monitoring results and effectiveness and determine if additional preventative actions/ management strategies are required. The review has been completed and several initiatives are underway (such as training, feathered edges).

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 35: Cultural Heritage Resource Management Effectiveness

Element	Objective	Indicator	Target
FSC 8.2.1 (8) & 9.4	Monitor Cultural Heritage Resource Stewardship and High Conservation Values	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 Program (FREP) 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 Xaayda *Haida* (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 | Total # Assessed | FREP Cultural Heritage Resource Indicators | | | | | Target Met (Y/N) |
| | | | Extend practices maintained CHR Values (%) | | | | | |
			Very Poor	Poor	Moderate	Well	Very Well	
2022	*FREP data was not provided by the Forest Service for 2022*							
2021	Individual Yew Stems	859	397 (46%)		4 (0.5%)	458 (53%)		N
	Yew Patches	10		2 (20%)			8 (80%)	N
	Hellebore	2008				2008 (100%)		Y
2020	Yew Trees*	149		36%			42%	N
	Hellebore	270					100%	
	Monumental Cedars	10		100%				
	Devil's Club	4	100%					
	Fairy Slipper	1					100%	
	Cultural Cedar	1					100%	
2019	Yew Trees	13	-	85%	-	15%	-	N
	Hellebore	420	-	-	100%	-	-	
	Monumental Cedars	2	-	-	-	100%	-	
	CMTs	3	-	100%	-	-	-	
	Devil's Club	4	-	-	-	25%	75%	
	Stink Currant	1	-	-	-	-	100%	
2018	FREP Assessments not completed for this Indicator in 2018							N/A
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%	-	-	

*Note: In 2020, 22% of the yew trees were ranked 'unknown' under FREP, and this is not reflected in the above table.

In 2022, FREP data was not available at the time of compiling this monitoring report and results will be added to the report if data is provided. Taan continues to protect a significant number of cultural features in the blocks, as approved by the Council of Haida Nation. Walk through assessments are completed on every block by Taan after harvesting to ensure that the prescription was followed. Taan and the Council are in discussions with respect to revising how cultural heritage features are monitored to ensure that accurate data is available, and the collection of monitoring data is routine and manageable.

In 2021, the reporting table above was improved to report on each feature type rather than an aggregate of all types. The actual number of features was also included in each category rather than just the overall percentage. Block IAN 032 in TFL 60 was assessed by FREP during 2021 and the results are as follows:

- The management of Hellebore achieved the target to maintain 100% of practices categorized as "well".
- The management of individual Yew trees was assessed as very poor (46%), moderate (0.5%), and well (53%). The FREP auditor noted that "block design included 46% of yew within harvest area. FSP states: *where practicable, also include individual western yew in stand level retention*. It is difficult to ascertain which stems were or were not practicable to include in stand level retention."
- The management of Yew patches was assessed as poor (20%) and very well (80%).

Taan continues to protect a significant number of cultural features in the blocks, however there are operational challenges when encountering a large number of features. As a result, Taan and the Solutions Table have developed alternate criteria for specific cultural features that have not yet been reflected upon in the FREP assessments. For example, Taan is now targeting 75% protection of Yew trees present in the Total Area Under Prescription, rather than 100%.

Further, the FREP assessments have focused on blocks that are 3-4 years old, where the planning is generally completed an additional year prior, resulting in assessments of potentially 5 year old practices. This indicator could benefit from the addition of more recent blocks and the training of Taan staff to complete additional FREP assessments.

In 2020, FREP completed CHR assessments on 2 blocks (THR003 and THR002).

- In THR003, monumental cedar, yew, hellebore and devil's club features were assessed. Taan's practices to maintain monumental cedars was rated as 'poor' because 8 of 9 trees had blown over in the CCS. Taan had completed a windthrow hazard assessment and tree crown modification to protect the features; however, the cedar were still subject to blowdown. The monumental cedars were subsequently salvage logged for use under the Cultural Wood Access Program. The practices related to maintaining yew trees were rated both 'poor' and 'very well'. The 'poor' rating was due to 31 out of 54 yew trees identified as felled or damaged during harvesting. Another site was rated as 'very well' because 95% of 54 yew trees were retained with no damage. Practices to protect for hellebore was ranked very well as 89% of stems were excluded from the harvest area and other stems within the harvest area were regenerating. The protection of devil's club was rated 'very poor' as it was not identified in the Cultural Feature Identification Survey and therefore no reserve or management zone was established to protect the feature. It was noted that the plant appears to be regenerating well.

- In THR002, monumental cedar, yew, fairly slipper, cultural cedar and hellebore features were assessed. Taan's practices to maintain monumental cedar was rated 'poor' even though TCM was implemented along the harvest boundary near MT20. The block design and reduction of the management zone (MZ) width on the SW boundary resulted in windthrow which narrowly missed damaging MT20. The assessment noted that the monumental cedar would have been better protected by not reducing the MZ width. On one site the assessor could not locate 90% of the 33 preidentified yew trees and rated the performance as 'unknown' without knowing if it was practical or not to have retained the yew. Another site was rated as 'very well' because individual yew trees and 8 larger patches were not damaged from harvest operations. One fairly slipper site was ranked 'very well' as there was no damage to the feature or respective reserve zone and management zone. Another cultural cedar site was rated as 'very well' due to no damage to the cultural cedar stand. A final hellebore site was rated as 'very well' as the target of 50% retention was met in the harvest area and the feature was thriving.

In 2019, assessments were completed on 4 blocks (LOG018, AWN010, IAN004, and TOW001):

- LOG018 yew and crabapple were assessed to be managed well.

- AWN010, ts'iihlinjaaw devil's club and monumental cedar were well retained with established reserve and management zones, but six of the HlGiid Yew in the harvest area (80% of the yew) were assessed as irreversibly damaged by harvesting. This is an older cutblock and the issue was previously identified by Taan as part of our internal inspection process and was previously self-reported to the CHN and the Forest Service. The FREP assessment does make note that "it is recognized that Taan's internal monitoring process had identified this issue prior to the FREP CHR assessment, and they have taken multiple remedial stems to more successfully retain yew". Taan had adjusted management strategies for yew following the incident and was acknowledged by the FREP team. No further action is required.

- IAN004, ts'iihlinjaaw devil's club, Gwaay k'yah hellebore were assessed as well managed. Five HlGiid Yew were assessed as poorly managed and were damaged during harvesting activities. This block is an older block, harvested in 2016 and Taan has since adjusted management strategies for yew as noted above. No further action is required.

- TOW001, FREP monitoring indicated that windthrow impacted 3 out of 5 CMT reserve zones in TOW001, two CMTs were struck by windthrown trees, related to the harvest of TOW001 and therefore the management of cultural and heritage resources in TOW001 was determined to be poor. Refer to the Windthrow indicator above and the indicator reporting summary for windthrow discussion and corrective actions generated. TOW001 was harvested in 2016. Taan has since adjusted the windthrow prescriptions to increase treatment on LUO feature and reserve/ management zone areas.

- There were no cultural heritage resource FREP assessment completed in 2018 or 2017.

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.

Taan adjusted management strategies for yew trees back in 2018/2019 to address the internally identified issues with protection during harvesting, including but not limited to meetings with contractors and developing of identification and mapping strategies of marking special management zones on the map where multiple yew stems are identified, and creation of internal retention patches in some cases where multiple yew trees exist.

Database & Reporting Parameters

FREP Cultural Heritage Resource Value Resource Stewardship Monitoring Forms (forms received from Forest Service FREP contacts).

Score

Indicator 1: Y
Indicator 2: Y (2/5) N (3/5)
Indicator 3: Y
Indicator 4: Y
Indicator 5: Y
Indicator 6: Y
Indicator 7: Y
Indicator 8: Y
Indicator 9: Y
Indicator 10: Y
Indicator 11: Y
Indicator 12: Y
Indicator 13: Y
Indicator 14: FREP Data Not Available
Indicator 15: FREP Data Not Available
Indicator 16: Y
Indicator 17: Y
Indicator 18: Y
Indicator 19: Y
Indicator 20: Y
Indicator 21: Y
Indicator 22: Y
Indicator 23: Y
Indicator 24: Y
Indicator 25: Y
Indicator 26: Y
Indicator 27: Y
Indicator 28: Partially met – maintain 30% of LUs in old seral, minimize roads and maintain forest interior
6/10 Y 4/10 N
Indicator 29: Y
Indicator 30: Y
Indicator 31: Y
Indicator 32: Y
Indicator 33: Y
Indicator 34: Y
Indicator 35: FREP Data Not Available

 30 + 0.4 + 0.6 = 31/33=94% for the indicators measured.
Note: 3 indicators were not measured for 2022 due to lack of information from the FREP Program.