HIGH CONSERVATION VALUE FOREST
in the
HEARST FOREST

Version 2.3
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Executive Summary

This High Conservation Value Forest report for the Hearst Forest has been completed in accordance with Principle 9 of the National Boreal Standard of Forest Stewardship Council. Through this evaluation a number of HCVs were identified on the Hearst Forest.

The identification of High Conservation Values (HCVs) is an ongoing process that will change over time as new information becomes available. Notably, MNRF recently designated more species that could be on the Forest as Species at Risk. This is an update to January 2019.

Summary of High Conservation Values on the Hearst Forest

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1.0 Purpose and Scope

This report was produced by Hearst Forest Management Inc (HFMI) to fulfill the requirement of Forest Stewardship Council (FSC) certification to identify High Conservation Value Forest (HCVF) on the Hearst Forest, as required by Principle #9 of the National Boreal Standard of the FSC certification process. This report includes sections on the HCVF identification (Principle 9.1) through a public process (9.2) and HCVF management (9.3) and monitoring (9.4).

HFMI manages the Crown land of the Hearst Forest under the authority of a Sustainable Forest Licence (SFL) granted by the Government of Ontario. SFL managers are required to fulfill an rigorous planning process that includes the identification and maintenance of a wide range of values, as well as monitoring and reporting, subject to guidelines developed from best available science. FSC audits focus on ensuring that the outcomes of this system meet FSC's global standards.

By the FSC definition, ‘management activities in high conservation value forests shall maintain or enhance the attributes that define such forests’. As outlined in FSC Principle 9, Criterion 9.1, an assessment is required, at an intensity and scale appropriate to the forest management activities being undertaken on the forest, to determine the presence of attributes consistent with High Conservation Value Forests. FSC defines HCV Forests as forests that possess one or more of the following attributes in 6 categories:

HCV Category 1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values:
- Species at risk
- Endemics
- Wildlife concentration areas
- Critical habitat for regionally significant species
- Outlier or range edge species
- Protected areas and candidates

HCV Category 2: Forest areas containing globally, regionally or nationally significant large landscape level forests:
- Large landscape level forests

HCV Category 3: Forest areas that are in or contain rare, threatened or endangered ecosystems:
- Nationally rare ecosystem types
- Declining ecosystem types
- Remaining intact forests (where large landscape level forests are rare or absent)
- Unique and/or diverse ecosystem types

HCV Category 4: Forest areas that provide basic services of nature in critical situations:
- Drinking water quality
- Erosion
- Flooding
- Fire barrier
- Ameliorating microclimate for agriculture and fisheries

HCV Category 5: Forest areas fundamental to meeting basic needs of local communities:
- Forest areas fundamental to meeting basic needs of local communities
The concept of HCV Forests is intended to identify areas of forest that are considered important and may (or may not) be considered as candidates for conservation based on the values that the forest possesses, while removing it from the debate created over definitions of a particular forest type (e.g. old growth forest).

For the forest manager, the presence of high conservation value forests incurs increased obligations which require a higher level of care for those areas than other portions of the landscape, and a management strategy that maintains those high conservation values as well as institution of a monitoring program to ensure those values are maintained.

FSC standards recognize that forest managers may make decisions with incomplete knowledge or information on how those management decisions may impact other processes on the forest, and offers the use of adaptive management and the precautionary principle as partial solutions. Monitoring protocols are intended to determine the effectiveness of various management prescriptions, and to ensure mitigation measures are undertaken at the earliest possible time.

Hearst Forest Management Inc and the local public consider that all of the forest has value, for its ecosystem services to air and water, as a home for all manner of fish and wildlife, and as a source of recreation, livelihood, cultural identity, and home for humans. The challenge of HCVF identification is to decide when certain FSC-defined thresholds have been met.

Under the regulatory framework in Ontario, the Forest Management Planning process includes the mapping of values and the solicitation of values information from the public. Forest Management Plans (FMP) are the legal document that spatially locates natural resources values and prescribes measures to manage for them, and is the standard against which the government conducts monitoring and enforcement. The current FMP for the Hearst Forest is the 2017-19 Contingency Plan, and the 2019-29 FMP is nearing completion. This HCVF Report and its prescriptions are consistent with the 2017-19 Contingency Plan and 2019-29 Draft FMP. Prescriptions in this HCVF report can be more stringent than that in the FMP if required to meet FSC requirements.

2.0 Methodology

The identification of HCV and HCV Forests was done as per the FSC Boreal Forest Standard (August 2004) Appendix 5: High Conservation Value Forest National Framework. Given the multitude of factors to consider when judging an element HCV(F) or not, additional advice was obtained from the WWF-Canada High Conservation Value Forest Support Document (November 2005); and from other Forests’ HCVF Reports and commentary by Tom Clark were examined.

FSC recommends that community members be involved in the designation of HCVs. This need has been satisfied not through a single formal meeting but rather through decades of personal involvement in the community, LCC meetings and informal discussions, FMP consultations, trapper meetings, and countless individual drop-ins which HFMI’s ‘open door’ culture encourages. In these encounters, individuals related their experiences and observations, and what interested or concerned them, be it a special place, a phenomenon, a type of plant or species of wildlife.

The 2010 HCVF report was reviewed by Gaetan Baillargeon on behalf of Constance Lake First Nation, and Desneiges Larose on behalf of the community of Hearst. Both have education and experience in forest ecology and management, and both grew up within the Hearst Forest. Their reviews are available. This
2014 version has no significant change in HCVs (some upgraded and added, some downgraded but still addressed) so a new review was not required. The Monitoring/Management Strategy was reviewed by MNR biologist Anne Genier-Gardiner.

This report shall be updated as needed after March 31 of each year. Updates may be needed due to various reasons, such as new sightings of an existing HCV, changed Species at Risk status of an element, or identification of a new element by a member of the public.

"During assessment, values are designated as HCV, not HCV, or potential HCV. The potential HCV designation should be used in cases where occurrence is not confirmed, further information about distribution and abundance are needed, and/or further consultation is required." (WWF-Canada HCVF Support Document). The additional advice documents showed other factors to consider.

Two values were rated "Potential HCV" because their populations are at concerningly low levels, but they are migratory and their summer habitat is abundant/increasing.

It should be noted the an element designated as HCV does not necessarily need a new prescription. "Where the existing regulatory requirements have been proven to be effective in maintaining the attributes of which the HCV has been defined, there may not be a need to modify the prescriptions." (WWF-Canada. Ibid)

3.0 Description of the Hearst Forest

The Hearst Forest falls almost entirely within EcoRegion 3E, in EcoDistricts 3E-1 and 3E-2 of Northeastern Ontario. The topography and surficial geology of the Forest is the result of several glaciations. Most of the Hearst Forest is in the Northern Claybelt (3E-1), which is is flat with very little topographical relief, having been overridden and depressed by glacial ice and then buried beneath lacustrine deposits of glacial lake Barlow-Ojibway. Soils generally consist of clays through silt clays to clay loams deposited as glacial-lacustrine sediments.

In the south and southwest portions of the Forest (3E-2) and along the northeast boundary, a mixture of glacial till and lacustrine deposits and pre-Cambrian bedrock exposure causes topography to vary from gently rolling to very hilly. Soils vary from clays to loams to sands resulting from a wide range of types of glacial deposition.

Beyond the Forest's northern boundary are expanses of poorly drained, deep organic soils that are the James Bay Lowlands, EcoRegion 2E.
Interspersed throughout the regions described above are areas of organic soils and poor drainages. The extents of these areas varies ranging from insignificant to expanses large enough to influence operational planning of forest management and also fire occurrence, spread and behavior.

The variety of soils and landform conditions had a powerful influence over the periodicity that fire would have occurred on any given piece of land. This, along with fire suppression in recent years, has resulted in an abundance of mature and over mature forest on the Hearst Forest.

Black spruce dominates most of the forest, occurring in varying degrees as pure and mixed stands on much of the forest. Black spruce-dominated stands cover approximately two-thirds of the Forest from poorly drained lowlands to rolling uplands. The south and southwest as well as the northeast areas of the Forest have higher proportions of hardwood, and also significant jack pine.

There is very low population density and human footprint on the Forest; the combined population is about 7,000 people and there is over a million hectares of Crown land, almost all still forested after almost a hundred years of use. There are large tracts of privately owned townships.

The forests of Northern Ontario, being not that long removed from glaciation and being adapted to extensive fires and extremes of temperature, and having no barriers to movement over vast areas, tend to house 'generalist' species that are very resilient, rather than sensitive 'niche' or 'specialist' species.
The Guidance box below is from the HCV Checklist of FSC's Boreal Standard which was developed at an FSC Canada Workshop on Principle 9 in 2003, and was based on a tool kit developed by WWF-Canada and Tembec Inc., and an international working group convened by ProForest UK.

**HIGH CONSERVATION VALUE CATEGORY 1, QUESTION 1: Species at Risk**

*Category 1) Forest areas containing globally, nationally or regionally significant concentrations of biodiversity values.*

**Q.1) Does the forest contain species at risk or potential habitat of species at risk as listed by international, national or territorial/provincial authorities?**

<table>
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<th>Guidance</th>
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<td>- Are any of the rare, threatened or endangered species in the forest a species representative of habitat types naturally occurring in the management unit? (DEFINITIVE)</td>
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<td>- Are any of the rare, threatened or endangered species in the forest a focal species? (GUIDANCE)</td>
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<td>- Are there any ecological/taxonomic groups of rare species that together constitute a HCV? (GUIDANCE)</td>
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<td>- Do any of the identified rare, threatened or endangered species have a demonstrated sensitivity to forest operations? (GUIDANCE)</td>
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<td>- Does the forest contain critical habitat for any individual species or concentration of species identified in the above questions? (GUIDANCE)</td>
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**Sources:**

- **MNRF** - during FMP preparation, provides a list of species to be considered SAR on each Forest
- **MOECP Species at Risk website**
  - The Committee on the Status of Species at Risk in Ontario (COSSARO) list of Species at Risk
  - COSEWIC (Committee on the Status of Endangered Wildlife in Canada)
  - local observations
  - Breeding Bird Survey (BBS) and Breeding Bird Atlas (BBA)

As of January 2019, 17 species of mammals, fish, reptiles, plants, insects and lichens designated provincially (COSSARO) or nationally (COSEWIC) as being Species at Risk are, or could be, in the Hearst Forest.

- Lake Sturgeon - S. Hudson Bay/James Bay Population (special concern)
- Short-eared Owl (special concern)
- Common Nighthawk (**special concern**)
- Whip-poor-will (threatened)
- Olive-sided Flycatcher (**special concern**)
- Black Tern (special concern / not at risk)
- Yellow Rail (special concern)
- Monarch Butterfly (special concern)
- Wolverine (threatened/special concern)
- Bald Eagle (special concern / not at risk)
- Canada Warbler (special concern / threatened)
- **Evening Grosbeak** (special concern)
- Eastern Cougar (endangered / not designated)
- **Boreal** Caribou (threatened)
- Barn Swallow (threatened)
- Bank Swallow (threatened / under consideration)
- Little Brown Bat and Northern Long-Eared Bat (endangered)
Lake Sturgeon (Southern Hudson Bay/James Bay Population)

Three distinct populations of Lake Sturgeon are identified in Ontario: the Northwestern Ontario population, the Great Lakes population and the Southern Hudson Bay/James Bay population. Only the Southern Hudson Bay/James Bay population is present in the Hearst Forest. This population is designated as Special Concern (unlike the two other populations which are Threatened).

Lake Sturgeon use large rivers. They are known to be in two of the three large rivers on the Forest: in the Kabinakagami (Kabi) River where they have been observed spawning, and also in the Nagagami River (which is a park). They have not been observed in the section of the Missinaibi River on the Hearst Forest (which is a park), and not on any other river.

A direct impact by forestry operations is extremely unlikely, as two of the three large rivers are parks, the rivers where the sturgeon occurs are too large to be bridged by a forest access road, and no-harvest riparian buffers are wide enough to prevent sedimentation.

It is possible that forestry operations could have an indirect impact if a new forest access road allowed more people to access a stretch of river where sturgeon live, and then if the people removed the sturgeon. However, many such access points already exist.

Lake Sturgeon is a High Conservation Value.
Short-eared Owl

The Short-eared Owl is designated as Special Concern both Provincially and Nationally. It is rated a Priority Species (Breeding) by the Ontario Landbird Conservation Plan (2008) for BCR8, which has set an objective to increase the continental population of Short-Eared Owl. Any increase in the local population would contribute to the continental population objectives.

Short-eared Owl use wet meadows, grassland, idle pasture, bogs, and marshes for nesting sites and hunting in open fields for small mammals, especially voles. The intensification of agricultural practices has made some of these nesting sites unsuitable. The current threat to the Short-eared Owl habitat is the loss of marshes. However, wetlands and marshes are not drained anywhere on the Hearst Forest.

A great deal of forest around Hearst was cleared for agriculture in the early 1900's. Very little is still actively farmed, and most is in various stages of a slow revegetation to shrubs and trees.

Hearst's most experienced birder, Marc Johnson, had seen a nesting pair (but not the nest itself) in the field near his house and had seen many owls then, but found one hit dead by a vehicle on the concession road and since then hasn't seen any (M. Johnson, pers.comm., 2014).

Forest operations are not conducted on the above-mentioned habitat. However, it is possible that a meadow-like harvested area could attract a Short-eared Owl. In the extremely unlikely event of a nest being found, every effort will be made to protect it.

Short-eared Owl is a High Conservation Value.
The following commentary (minus references) from the Ontario Landbird Conservation Plan applies to Nighthawk, Whip-poor-will, Bank Swallow and Barn Swallow:

The abundance and distribution of most aerial foraging insectivorous landbirds breeding in BCR 8 and the Ontario portion of the BCR have undergone a severe decline in the past few decades. A general decline in aerial foragers in Ontario has only recently become apparent, and the causal factors are as yet unknown. COSEWIC is currently reviewing the status of Common Nighthawk and has identified two other aerial-foraging insectivores (Barn Swallow and Whip-poor-will) as high-priority candidates for species assessments. None of the seven aerial-foraging insectivorous landbirds that occur regularly in ON BCR8 are identified individually as priority species, but the entire aerial-foraging guild is considered a priority guild. Five of these species were widely distributed in ON BCR8 during the first BBA (1981–85) but were much less widespread during the second atlas (2001–05). The other two species, Whip-poor-will and Chimney Swift, reach the northern limit of their breeding range in this region and are only locally distributed.

**Common Nighthawk**

The Common Nighthawk is designated Special Concern provincially and nationally.

One birder reported having only seen a few through the years. Nighthawks nest on the ground in harvested and burned areas, openings in the forest and gravel lakeshores. (One nighthawk nested in a gravelled parking lot in Hearst; many have been seen flying at night in town.) The effects of fire suppression and reduced harvest levels and land use changes in the boreal forest may have contributed to a reduction in suitable nesting sites.

Common Nighthawk populations have decreased between the first and second Breeding Bird Surveys (BBS) in the area covered by Bird Conservation Region 8. The OLCP - BCR8 states that this is possibly due to a reduction in insect populations, which could be due to climate change, the degradation of aquatic habitats, or an increase in ultraviolet radiation affecting the aquatic phase of some insects such as dragonflies.

Forest harvesting generally does not occur in nighthawk's open habitat. Open site conditions created by harvesting, though, can be used as habitat and nesting sites, and nighthawk have been observed in cutovers. Forestry operations other than summer regeneration work should not negatively affect this species (Landriault and Mills 2009 p19). Nighthawk's tendency to aggressively defend their nest means if a nest is present, the adults will likely attack, reducing the chance of stepping on the camouflaged eggs. Should they be found during tree-plant (or during any forestry operation), the MNR biologist will be notified and their instruction followed.

Common Nighthawk is a High Conservation Value on the Hearst Forest.
Eastern Whip-poor-will

Whip-poor-will are designated as Threatened provincially and nationally.

They range from the United States north as far as Lake Superior. Although MNR's range maps do not show them in the Hearst Forest and there are no observations documented in the Breeding Bird Atlas or by MNR, and the most experienced birder has never seen or heard one and says there is no mistaking their song (M. Johnson pers. comm. 2014), it is possible they could come this far north, as one was seen north of Cochrane during the Breeding Bird Atlas fieldwork. The Bird Studies Canada website says that "The Ontario Whip-poor-will Project was launched by Bird Studies Canada... to investigate where in Ontario whip-poor-wills still occur, and to identify hotspots... A summary report on this project will be available in fall 2014."

The Whip-poor-will is usually found in a mix of open and forested areas, such as savannahs, open woodlands or openings in more mature, deciduous, coniferous and mixed forests. It forages in these open areas and uses forested areas for roosting and nesting. It lays its eggs directly on the forest floor, protected from visual predators by their camouflage coloring.

Although there is some uncertainty surrounding the decline of Whip-poor-will, the main threat to the species is likely habitat loss and degradation. The habitat loss is a result of natural changes when, in the north, open fields and thickets become closed forest, and in the south, agriculture is intensified.

Forest harvesting does not occur in their open habitat, but it might create the open conditions favorable for habitat and nesting sites. According to MNRF, an encounter during forest operations is extremely unlikely, and will be dealt with on a case-by-case basis.

Because they are most likely not on the Hearst Forest, Whip-poor-will is not a High Conservation Value. If one is reported or is detected by sound recordings, it will be an HCV.
Barn Swallow

Barn Swallows are designated as Threatened provincially and federally.

Barn Swallows range throughout Ontario north to Hudson’s Bay. Although they are present in the Hearst Forest, as of yet, MNRF does not know of any nest sites associated with forestry.

Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in large culverts. The species is attracted to open structures that include ledges where they can build nests, which are often re-used from year to year. (MNRF website).

Forest access roads involve the installation and removal of bridges and culverts, albeit in remote locations far from the human barns and buildings which attract swallows. According to the MNRF, an encounter during forest operations is extremely unlikely, and they will be dealt with on a case-by-case basis. In 2014, MNRF Hearst District began a Barn Swallow Bridge Surveying program and checked over 35 bridges and large culverts; no nests were found. HFMI added a nest check to its standard procedure for bridge removal and will ask MNRF to participate (not temporary bridges). Barn Swallow are a High Conservation Value.

Bank Swallow

Bank Swallows were designated Threatened federally in May 2013. They are not a designated species at risk in Ontario, but are on the list to be assessed (MNRF biologist A Genier, MNRF website).

Bank Swallows live in steep (>70°) exposed sand riverbanks and active aggregate pits. In 2014, MNRF examined local aggregate pits and identified some bank swallow colonies (below). As of yet, no colonies associated with forestry or near harvesting areas have been identified.

Swallows do not use mature timber stands as habitat. There is potential that an aggregate pit face occupied by swallows could be desired to be worked again for forest road construction or maintenance. The Ontario Stone, Sand, & Gravel Association has a Fact Sheet for mitigating the impact of operations on bank swallows; MNRF distributes the Fact Sheet as guidance and it is in the Annual Work Schedule.

Barn Swallow are a High Conservation Value.
Olive-sided Flycatcher

The Olive-sided Flycatcher is designated as Special Concern provincially and nationally. It is rated a Priority Species (Breeding) by the Ontario Landbird Conservation Plan (2008) for BCR8, whose population objective is to bring the population back to the levels seen in the 1970’s and the distribution to the 1980’s levels; the Partners in Flight objective is a 100% increase in continental population.

The Olive-sided Flycatcher preferred nesting sites are coniferous or mixed forest close to rivers and other wetland openings such as bogs, burns, beaver meadows, and cutovers. It typically nests in conifer tree species such as white and black spruce, jack pine and balsam fir. The Olive-sided Flycatcher uses openings in the forest to forage for flying insects, especially if there are snags and residual standing tall trees in which they can perch.

This habitat type is common on the Hearst Forest. Flycatchers have been observed on the Forest (M. Johnson pers. comm. 2014)

The reason for the decline in Olive-sided Flycatcher populations is unclear, but it could be habitat loss in both breeding and wintering grounds as well as a decline in insect populations.

Forest harvesting could occur in Flycatcher habitat. MNRF’s Stand and Site Guidelines requires the retention of mature trees in harvested areas for use by many bird and wildlife species including the Flycatcher. Normal practices tend to leave many more residual trees than the Guideline minimum. The Forest Management Plan prescription for harvest along rivers is to retain an uncut reserve at least 15m wide. These forest practices retain habitat features used by flycatchers. As well, flying insects are abundant in season.

The Olive-sided Flycatcher is a High Conservation Value.
Black Tern

The Black Tern is designated as Special Concern provincially and Not at Risk nationally. It ranges throughout Ontario.

The Black Tern builds floating nests in marshes and wetlands. The main threat to the Black Tern is loss of nesting habitat due to loss and alteration of wetlands, water pollution and human interference with the nest (boat traffic swamping floating nests). Wetlands are common on the Hearst Forest and are not altered or developed, as there is not the population pressure to do so.

Forest operations are not conducted on the above-mentioned habitat. Forest operations are required to maintain buffers around water bodies, and are restricted in working around wetlands and therefore forestry operations are not likely to impact this species (Landriault and Mills, 2009 page 19).

Black Tern is a High Conservation Value.

Yellow Rail

The Yellow Rail is designated as Special Concern both provincially and nationally. It is not addressed in the Ontario Landbird Conservation Plan. It ranges throughout Ontario.

Yellow Rail are seldom seen, and breeds and spends most of its time deep in the reeds surrounding marshes and shallow wetlands.

Threats to the Yellow Rail are the draining of wetlands in southern Ontario. In the Hudson Bay lowlands they are experiencing habitat decline due to the expansion of Snow Goose populations which may be destroying Yellow Rail nesting habitat.

Wetlands are common on the Hearst Forest and are not altered or developed, as there is not the population pressure to do so.

Forest operations are not conducted on the above-mentioned habitat. Forest operations are required to maintain buffers around water bodies, and are restricted in working around wetlands, and therefore forestry operations are not likely to impact this species.

Yellow Rail is a High Conservation Value.
Monarch Butterfly

The Monarch Butterfly is designated as Special Concern both provincially and nationally.

The Monarch Butterfly population is thought to be declining due to logging activities in the Monarch’s over-wintering grounds in Mexico and the use of herbicide and pesticide applications in the farmlands of Southern Ontario.

While range maps show range extending into the Hearst Forest, they have not been seen here except in a rare year, and the milkweed with which they are associated is not known to exist here. (http://www.hww.ca/en/species/insects/monarch-butterfly.html)

Because they are evidently not present, Monarch Butterfly is not a High Conservation Value.
Wolverine

Wolverine is designated as Threatened provincially and Special Concern nationally. There is a Recovery Strategy for the wolverine in Ontario (O.W.R.T 2013) which states "As of June 30, 2013, Wolverine receive general habitat protection under the ESA. Ontario’s Wolverine population is considered part of the national Western Population, which was assessed by COSEWIC as special concern; as such, designation of Critical Habitat is not required under the federal SARA (Statutes of Canada 2003)."

The Recovery Strategy maps (below) show that Wolverine is found in Northwestern Ontario with limited observations in the Northeast. There is one recent sighting in the Hearst Forest: one accidentally trapped near the Forest’s northwest corner near Pagwa. Another one was accidentally trapped not far north of the Forest.

The Recovery Strategy thoroughly details the current knowledge about Wolverine. Wolverine population densities are naturally low relative to other similar-sized carnivores (p10). Their scavenging lifestyle requires them to cover home ranges much larger than similar-sized carnivores (p2). In Ontario they are known to occupy both tundra and boreal forest. Contributing factors to there being few Wolverines is their low reproductive rate and relatively large home range that lead to intrinsically low population densities as well as low population resilience. Because Wolverine can travel great distances and are attracted to bait by virtue of their scavenging habits, they are more susceptible to trapping than many other furbearing species (p20). Although it is not legal for non-First Nations people to trap Wolverine, they are accidentally caught by trappers focused on other species (as was the case on the Hearst Forest). This incidental trapping is a threat to the population given the species' inherently low numbers. Access roads can facilitate trapping. Wolverine are also depend on snow cover during their spring denning period, with one study finding a need for "one metre of snow, either evenly distributed or drifted and present by February and persisting until May" (p 14), which is longer than snow persists on the Hearst Forest. With climate change, this requirement is expected to become more constraining.

The Recovery Strategy (p18) states that "While the exact impacts of forest management on Wolverine are not completely understood, evidence suggests that there is a threshold of human access (road density) and habitat removal or degradation at which Wolverine will cease to use or occupy an area which overcomes any benefits brought about by logging-induced increases in prey levels."

Habitat classification schemes and habitat models do not currently exist for Wolverine. The Draft Forest Management Guide for Boreal Landscapes (OMNR 2014) is intended to address the general habitat requirements for area-demanding species such as Wolverine by applying the coarse filter in forest management.

Wolverine is a High Conservation Value.
Bald Eagle

Bald Eagle is designated as Special Concern provincially and Not at Risk nationally. Bald eagle is listed as a priority species in the BCR 8 Landbird Conservation Plan.

In the Boreal Forest Bald Eagles typically make their nests which are huge stick platforms high in large trees, often in the forks of Trembling Aspen close to water.

Bald Eagle numbers began declining significantly in the 1960’s and 70’s when the use of pesticides such as DDT resulted in reproductive failures through thinning egg shells that would break during the incubating period of the eggs. With the restriction on the use of these types of pesticides, Bald Eagle populations have begun to rebound. Bald Eagle are still susceptible to illegal shooting, accidental trapping, poisoning and electrocution.

Bald Eagles are commonly seen on the Forest and many nest sites have been mapped.

Under the current forest management guidelines, Bald Eagle nest sites are protected from forestry operations by 200 or 400 metre no harvest reserves depending on vegetation, topography and line of sight from the nest site. The standards and guidelines for operations in riparian areas recommend leaving super-canopy Poplar trees as wildlife trees where bald eagles tend to establish nest sites.

Bald Eagle are a High Conservation Value.
The Canada Warbler is designated Special Concern provincially and Threatened nationally. Canada Warbler breed only in North America and 80% of its breeding habitat is in Canada. The Canada Warbler’s range covers almost the entire province of Ontario. While the species has shown some level of decline in adjacent Bird Conservation Regions, and populations in BCR8 declined over the last 20 years, there is some evidence of increase in the Ontario BCR8. The BCR 8 Ontario Landbird Conservation Plan (OLCP) lists Canada Warbler as a Priority species for regional stewardship. The OLCP’s population objective for the Canada Warbler is to halt the current decline and maintain the population abundance and distribution level above current levels.

The Canada Warbler nests either on or near the ground. Preferred forest cover is lowland deciduous areas with dense shrub and understory vegetation (e.g. alder) to provide cover for their nest sites. Habitat is also described as immature and older intolerant hardwood and lowland conifer that is located on slopes near water with dense understory growth.

Threats to Canada Warbler are largely believed to be fragmentation of their summer habitat as well as deforestation of their winter habitat in South America. Another possible cause for the population decline is the decline in spruce budworm (choristoneura fumiferana Clemens), to which Canada Warbler shows a strong linkage (Sleep et. al. 2009).

The OLCP approach and MNRF’s regulatory approach to maintaining such species is to maintain and regenerate sufficient quantities of the habitat type over time. These are called ‘coarse filter’ approaches because they are implemented across the forest without having to see an individual bird or nest. Lowland sites on the Hearst Forest are harvested in the winter when the frozen ground can support machinery. Warblers are not in the Hearst Forest at that time. Semi-lowland sites may included in summer harvesting so there could be an impact to warblers. Harvesting tends to stimulate shrub expansion, which would benefit them. The Forest Management Plan prescription for harvest along rivers and lakes is to retain an uncut reserve at least 15m wide.

Canada Warbler is a High Conservation Value.
Evening Grosbeak

Evening Grosbeak was declared a Special Concern in Ontario by COSSARO on August 1, 2018.

The summary from COSSARO report Jan 2018 "Ontario Species at Risk Evaluation Report for Evening Grosbeak" states:

"The Evening Grosbeak (Coccothraustes vespertinus) is a colourful yellow and black songbird with a heavy conical bill.... It nests in conifer-dominated forests across northern Ontario, as far south as southern Georgian Bay, and is a common winter bird at feeders. Its abundance varies substantially in direct response to Spruce Budworm cycles. ... It is distributed right across southern Canada as far east as Newfoundland.

Potential threats include window strikes, habitat loss from forestry, climate change impacts on habitat, road salt, collisions with vehicles, and budworm control measures.

Breeding Bird Survey data indicate a significant population decrease in Canada of -5.2% a year from 1970-2012, representing a 90% population decline over 42 years, and a significant decline of -5% per year, or 42% cumulatively, for the 10-year period from 2004-2014. Breeding Bird Atlas, Christmas Bird Count and Project FeederWatch data all support the conclusion that the Ontario population has declined significantly in recent decades.

Based upon indices showing a significant population decline over the past 10 years, the Evening Grosbeak meets quantitative criteria for Threatened designation under Criterion A1; however, it is classified as Special Concern in Ontario due to potential for rescue and the species’ close relationship between population levels and Spruce Budworm cycles which must be taken into account when evaluating population trends."

MNRF's website describes its breeding season habitat as

"open, mature mixed-wood forests dominated by fir species, White Spruce and/or Trembling Aspen. Its abundance is strongly linked to the cycle of its primary prey, the Spruce Budworm. Outside the breeding season, the species depends mostly on seed crops from tree species in the boreal forest such as firs and spruces. It is also attracted to ornamental trees that have seeds or fruit, and may visit bird feeders."

Little Brown Bat (Myotis) and Northern Long-Nosed Bat (Myotis)

The following is based on the Stand and Site Guide Background Information & Rationale, and by a report of bat monitoring just south of Timmins, Ontario, Mills et al 2013. The monitoring was done because white-nose syndrome (WNS) has decimated bat populations in North America, and conservation efforts are hampered by the limited data about the northern range extent for the various bat species in Ontario.

In 2012, in response to the reports of bats mortality due to WNS, COSEWIC concluded that Little Brown Bat and Northern Long-Nosed Bat are endangered.

Bats, being aerial insectivores, forage in forest openings and open areas such as waterways, beaver ponds, grassy areas and recently harvested areas. Little Brown Bat is one of the most common bats, a habitat generalist with an extensive range and ubiquitous presence in Ontario. Northern Long-Nosed Bat is a highly maneuverable forest specialist which typically forages in dense habitats (although it prefers edges of openings to dense interiors). It lives in forests as far north as Lake Nipigon and Moosonee.

Bats of unknown species have been found in cottages around Cochrane and Kapuskasing (A. Genier pers. comm. 2014) and Hearst.

Both bat species roosts in tree cavities or behind exfoliating bark. The tree and patch retention required of all forest harvesting provides cavity nesting opportunities (where the original stand has suitable trees).

Bats hibernate in caves and mines, sometimes long distances from their summer habitat. The Hearst Forest's flat clayey terrain does not feature caves; it may be that bats hibernate in more suitable terrain outside the Forest.

This monitoring by Mills et al. found much activity by Little Brown Bats and some activity by Northern Long-Nosed Bat. The monitored bats used the edges between mature timber and harvested areas more than they used the centres of harvested areas (the interior of mature timber was not monitored), which agrees with existing knowledge about bats.

The study could not confirm the presence of Tricolored bats (the other endangered bat species), although this may have been because the study site did not have the open water preferred by that species, nor the bat's preferred species of roosting tree (oak).

In 2014, MNRF District staff conducted a driving survey using the wildlife recorder SM Bat 3 on four routes either 30 km or 45 km long (Fushimi Rd, Railway Rd, South end of Caithness Rd and Larry’s Rd). The objective was to identify bat species presence. Recorded data has not yet been analyzed.
Eastern Cougar

The Eastern Cougar is designated as Endangered provincially, but not designated nationally, due to lack of data.

Eastern Cougar is the name used to describe the cougars inhabiting northeastern North America. Cougars in Northern Ontario are of unknown origin; they may have moved into Northern Ontario from western provinces or they may be remnants of the original population, or may be released pets.

Cougar have very large ranges and are often found in forest settings where there are deer but will also prey on a variety of smaller animals. They would likely use a wide variety of habitats.

While MNRF does not list cougar as a species at risk in the Hearst Forest, there have been more than a dozen cougar sightings over the years on the Hearst Forest. There have not been photos nor physical evidence (i.e. scat or hair samples) recovered which would allow DNA testing.

Eastern Cougar is a Potential High Conservation Value. If physical evidence was recovered and MNRF declared it present, then it would become a High Conservation Value.
**Boreal Caribou**

The boreal population of caribou is designated as Threatened both provincially and nationally. **Boreal Caribou** - and their habitat - is a High Conservation Value.

With regards to range, the MNRF has designated an Area of Application of its Caribou Conservation Plan (CCP), shown below hatched. This does not imply caribou occupancy; the only caribou on the Hearst Forest are west of Hwy 631, south of Hwy 11, north of Hornepayne, as well as some sightings of caribou crossing the forest's northernmost 'Finger' extension.

In general, **Boreal** Caribou live in small groups or singly and move over a large area throughout the year. Caribou require two main types of habitat throughout the year. Winter habitat is generally comprised of mature, tight canopy spruce and jack pine with little or no understory and has patches of ground lichen (*cladina stellaris*) and/or arboreal lichen on which the caribou subsist over the winter months. The other type of habitat that caribou rely on is refuge habitat which is generally very poor swamps which other ungulates are not likely to use and therefore may be predator free.

**Boreal** Caribou are very sensitive to predation from wolves, bear and other predators and for this reason exist in very low densities on the landscape. Because they are very susceptible to predation, it is assumed that **Boreal** Caribou is sensitive to the creation of linear features such as roads, pipelines and hydro corridors that, like rivers in winter, can be used as travel corridors by predators to increase the efficiency of their hunting.

Because moose and deer occur on the landscape at higher densities, predators such as wolf and black bear can be attracted to areas with moose and deer (and beaver) where hunting is likely to be more productive. For this reason **Boreal** Caribou choose to seek out habitat conditions that are not desirable to moose and deer. Moose and deer browse on low woody shrubs and other plants that are associated with either newer disturbances or stands that are breaking up and infilling with brush.

Forestry operations, i.e. harvesting, will temporarily make areas unsuitable for caribou habitat for the first 40 years or so as the regenerating forest is still supporting browse species suitable for moose and deer. Once the new stand has achieved crown closure, it will no longer support high moose (and therefore wolf)
populations making the area suitable again for caribou. Spruce lowlands with little hardwood brush may be suitable immediately after a harvest that leaves dense residuals that resemble a treed muskeg. Lowland conifer forests and treed muskegs that are undisturbed tend to remain suitable for caribou as sphagnum facilitates continual regeneration. Over-mature upland forests, if left unharvested and unregenerated, begin to break up, allowing more light to reach the forest floor, resulting in the growth of balsam fir and hardwood browse species. A forest in this stage of its succession will again attract moose and along with them the predator populations that caribou are susceptible to.

With ongoing monitoring, more and more is known about the use of the Hearst Forest by Boreal Caribou. There had been sightings over the years of caribou around the Nagagami Lake area north of Homepayne and west of Hwy 631, including Nagagamisis Provincial Park.

At the outset of planning for the 2007-2017 Forest Management Plan (FMP), the planning teams for the Hearst, Nagagami and Big Pic Forests struck an agreement that this area would be managed to minimize negative impacts of harvesting on caribou habitat.

Research was needed to better understand their movements and habitat use by this group of caribou. so the Hearst and Wawa district MNRF led, and HFMI supported, collaring and fieldwork which began in 2009. It is now known that there is a group 5 to 8 animals, the "Nagagami caribou", using habitat west of Hwy 631 and south of Hwy 11 and east of Nagagami Lake, especially between the West Elgie Road and Larry’s Road areas (map below).

Two cows were satellite collared in the March 2009 and their tracks were monitored for two years until the collar expired. Satellite collaring indicated where the two cows went to have their calves. One of the cows and her calf was killed by a predator in the summer of 2009. The second cow had a calf in 2009 and returned to roughly the same location in 2010 to have her calf. Indications were that she had her calf and stayed around the same area.

Collars were installed on 2 caribou again in February 2011. One collar ceased to transmit GPS signals within a year, but the other is still operating; both will automatically drop in February 2014. The caribou are living in roughly the same area that the first two were. In February 2014 the non-transmitting collar was found with indication the caribou had died. The collars indicate where they were during calving season; a couple areas have been repeatedly occupied, and a new area was used in 2012. The knowledge gained has been used in designing the Dynamic Caribou Habitat Schedule (DCHS, or mosaic).

In the 2007-17 FMP, no particular caribou AOC was designated because the preferred areas were deferred from harvest under the DCHS, and also, calving sites are swampy sites that have little merchantable timber and could only be operated during the winter (not calving season). For the 2017-19 Contingency Plan and 2019 FMP, an AOC was designated for areas classed as ‘General Habitat Description 1’, i.e. occupied.

MNRF attempted to collar caribou in northern Ontario in 2010-2012 (preciser dates). None could be found on the Hearst Forest except in the Nagagami area; caribou were found, and some collared, in the James Bay Lowland ecozone north of the Hearst Forest. Two of these collared caribou were recorded as having traveled across the 'Finger' of the Hearst Forest (see map below).
Area (orange) of recent Nagagami caribou collars and sightings
CONCENTRATIONS OF ENDEMIC SPECIES
HIGH CONSERVATION VALUE 1, QUESTION 2

*Does the forest contain a globally, nationally or regionally significant concentration of endemic species?*

Regional and district Ministry of Natural Resources & Forestry staff indicated that there are no species that are specifically endemic to the Hearst Forest (i.e. exist only on the Hearst Forest). The forests of Northern Ontario, being not that long removed from glaciation (i.e. relatively young) and being adapted to extensive fires and extremes of temperature, and having no barriers to movement over vast areas, tend to house 'generalist' species that are very resilient, rather than sensitive 'niche' or 'specialist' species.

Caribou in general but even more specifically the concentration of caribou known as the Nagagami Caribou are, as described above, a High Conservation Value.
SEASONAL CONCENTRATIONS OF SPECIES
HIGH CONSERVATION VALUE 1, QUESTION 3

Does the forest include critical habitat containing globally, nationally or regionally significant seasonal concentration of species (one or several species, e.g., concentrations of wildlife in breeding sites, wintering sites, migration sites, migration routes or corridors-latitudinal as well as altitudinal)?

<table>
<thead>
<tr>
<th>Guidance</th>
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<tbody>
<tr>
<td>- Is there an IBA (Important Bird Area) in the forest? (DEFINITIVE)</td>
</tr>
<tr>
<td>- What proportion of the global, national, or regional population uses the wildlife concentration area? (GUIDANCE)</td>
</tr>
<tr>
<td>- How protected are similar wildlife concentration areas in the region? (GUIDANCE)</td>
</tr>
<tr>
<td>- Is it a wildlife concentration area for more than one species? (GUIDANCE)</td>
</tr>
<tr>
<td>- (Where species data is limited) are there landscape or habitat features correlated with wildlife concentration? (GUIDANCE)</td>
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The Hearst Forest is within the Ontario portion of Bird Conservation Region 8 (ON-BCR8) which has been described as North America’s ‘Bird nursery” due to its role in sustaining North America’s avifauna. Bird Studies Canada identifies Important Bird Areas (IBAs), which are sites providing essential habitat for one or more species of breeding or non-breeding birds. The BSC website indicates no IBAs on the Hearst Forest; the only IBAs in Ontario are along the coasts of Hudson Bay, James Bay and the Great Lakes and in Southern Ontario.

Great Blue Heron

Great Blue Heron are a migratory bird species that return to the forest in each spring. According to MNRF, Herons are not At Risk and not a conservation concern. The Ontario Landbird Conservation Plan for BCR8 noted that there appears to have been a population decline recently, but the MNRF Stand and Site Guide Background indicates that the decline is not significant given high overall numbers.

There are a number of known heron rookeries on the Hearst Forest. During FMP planning, MNRF and the SFL fly over the proposed 5-year allocations to search for sticknests. Whenever forest operations are planned near a rookery, they are protected with buffer zones as per the Stand and Site Guide. With regards to vulnerability to forest operations, the MNRF Stand and Site Guide says:

In the most comprehensive study to date, Naylor (2009) studied the effects of forest management operations on 150 heronries in central and northeastern Ontario. No significant difference in colony size, occupancy, or productivity was found among colonies that had experienced cutting that followed Ontario’s guidelines, had been cut in a way that was not consistent with the guidelines, or had not experienced any cutting (although colonies cut without the guidelines tended to have a lower rate of occupancy and chick production). However, Naylor (2009) did find that colony size, occupancy, and productivity were all influenced by the amount of timber harvest within 250 to 500 m of colonies. Overall, cutting appeared to have little effect when beyond 100 to 200 m of colonies.

Because they are not at risk, and because their nests are easily detected and avoided, Great Blue Heron are not a High Conservation Value.

Moose early winter concentration area

An area in Newlands Township called Newlands Hill in the southwest of the Forest has been determined to have a high proportion of early winter moose habitat. For this reason, hunting pressure in this area is
2018 High Conservation Value Forest Report for the Hearst Forest

Restricted by signing it as a ‘red zone’ (no hunting). Although it is managed differently, Newlands Hill is not a High Conservation Value because moose and early winter moose habitat are very common.
REGIONALLY SIGNIFICANT SPECIES
HIGH CONSERVATION VALUE 1, QUESTION 4

Does the forest contain critical habitat for regionally significant species (e.g., species representative of habitat type naturally occurring in the management unit, focal species, species declining regionally)?

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<tr>
<td>- Is the regionally significant species in significant decline as a result of forest management? (DEFINITIVE)</td>
</tr>
<tr>
<td>- Is the population of regionally significant species locally at risk i.e. declining? (GUIDANCE)</td>
</tr>
<tr>
<td>- Does the forest contain limiting habitat for regionally significant species? (GUIDANCE)</td>
</tr>
<tr>
<td>- Is there a group of species that together form a regionally significant concentration? (GUIDANCE)</td>
</tr>
</tbody>
</table>

Species designated as Species at Risk have already been dealt with in Question 1. **Boreal Caribou** are a High Conservation Value- see above

MNRF does not manage for 'featured species' anymore except for Species at Risk; that approach has given way to the 'emulate nature' coarse-filter approach of the Landscape Guide and Stand & Site Guide. However, the Marten Guide (OMNR 1996) was in force for the Hearst Forest 2002 and 2007 FMP, and was only superseded by the Landscape Guide in 2014. It used marten as a proxy for all species that require large blocks of old conifer forest. Also, for birds, the Ontario Landbird Conservation Plan does designate Priority Species by Bird Conservation Region. Those are described below.

**Marten**
The Marten Guide was not brought into effect as a remedy to dwindling population levels but as a proxy mechanism to maintain an appropriate amount of forest with mature and old growth habitat characteristics on the landscape. Marten were used as an indicator species.

Marten populations are cyclical along with predator/prey relationships and are largely unknown. Trappers are aware of population trends in their area. The MNRF keeps abreast of population trends by monitoring trapper returns and talking with trappers. Trappers describe marten as a species that will travel great distances and which can migrate through an area in population pulses.

According to the Marten Guide, Marten generally require well stocked, conifer-dominated mature forest. HFMI maps and monitors changes in forest types and associated MNRF-defined habitat as part of forest management planning and reporting. The Marten Guide required FMPs to leave at least 10% of the suitable and capable marten habitat that is on the Forest in Marten Core deferral areas 3,000-5,000 hectares in size. These deferrals are intended to stay on the landscape for 60 years to ensure marten and other species that require the forest with the same habitat characteristics in the short to medium term. In addition to these spatial (mappable locations) requirements, the quantity of non-spatial (anywhere) habitat will continue to be monitored as part of the wood supply modeling done for forest management planning, i.e. every 5 or 10 years. If the proportion of suitable habitat is low, then more has to be maintained through time in an old age, and there is a reduction to wood supply.

Because they are common, and their population is strong, marten are not a High Conservation Value.
Birds

The main source of data on birds is MNRF, the Ontario Landbird Conservation Plan (OLCP) for Bird Conservation Region 8 (BCR8) (Ont. Partner in Flight 2006), and The Breeding Bird Atlas. The best available evaluation of species' population health is the OLCP-BCR8 which designates Priority Species in the Ontario portion of BCR8. Those are described below.

Species which have been designated At Risk have been previously discussed and evaluated for HCV under Question 1.

Of the 138 bird species that breed or winter in the ON-BCR8, 37 have been identified as priority species in the Ontario Landbird Conservation Plan (OLCP), and are listed below. Most of these priority species are common boreal forest landbirds; and most are in the Hearst Forest.

The OLCP notes (p v.) that most of the priority birds species are migratory, and therefore conservation actions may be needed elsewhere.

Objectives for most forest priority landbirds coincide with the current forest management requirement to maintain, over time, a quantity of the various forest types and ages similar to the 'natural' quantity of the forest types and ages (as determined by forest modeling). That the Hearst Forest is still over 90% forested is a benefit to these birds.

Another forest management requirement that coincides with many bird species’ needs is the requirement to leave residual trees as individual stems, clumps and patches during harvesting. These ‘coarse filter’ across-the-board requirements are sufficient for most species. For some species, though, specific ‘fine filter’ strategies are required in forest management, such as species-specific reserve prescriptions around the nests of eagles, ospreys, hawks, and owls.

Notes re the list below:
Species at Risk are noted and have already been dealt with.
Species that are not known to be present on the Forest are noted as (absent).
There are 3 which the PIF report singled out (on p. iv) as being "of high conservation concern due to a combination of population declines, high vulnerability and high regional responsibility."
Species that have specific prescriptions in the FMP (other than the 'coarse filter’ approach) are noted.
The remaining species are not HCV because they are not SAR and because they will be maintained by the standard forest management approach of maintaining the natural proportions of forest types and ages as well as maintaining residual trees and patches in harvested areas.

Coniferous forest (OLCP Table 6 p28)
- bay-breasted warbler - High Conservation Concern
- Blackburnian warbler (absent)
- Cape May warbler
- Connecticut warbler
- black-throated green warbler
- yellow-bellied flycatcher
- evening grosbeak (previously discussed; a HCV)
  - purple finch
  - black-backed woodpecker
  - ruby crowned kinglet
  - winter wren
  - great gray owl *specific FMP prescription
  - sharp-shinned hawk *specific FMP prescription
  - boreal owl *specific FMP prescription

Deciduous Forest (OLCP Table 12 p39)
- Canada warbler - High Conservation Concern (previously discussed; a Potential HCV)
- black-and-white warbler
- ovenbird
- yellow-bellied sapsucker
- ruffed grouse (hunted)
- northern flicker

Successional Forests (OLCP Table 18 p46)
- mourning warbler
- Nashville warbler
- chestnut-sided warbler
- white-throated sparrow
- Philadelphia vireo (absent)
- Magnolia warbler (absent)
- Tennessee warbler (absent)

Wetland & Riparian (OLCP Table 22 p53)
- alder flycatcher
- rusty blackbird - High Conservation Concern (absent)
- swamp sparrow
- belted kingfisher
- bald eagle (previously discussed; a HCV) *specific FMP prescription
- short-eared owl (previously discussed; a HCV) *specific FMP prescription
- olive-sided flycatcher - High Conservation Concern (previously discussed; a HCV)

Non-forested uplands (OLCP Table 26 p60)
- Peregrine Falcon (absent)
- Golden Eagle (absent)
The OLCP also cites the guild of aerial-foraging insectivores (swallows, swifts, nighthawks; OLCP Table 29 p62) as a priority guild though no individual species are priority. These were previously discussed; some are HCV.

The bay-breasted warbler is the one priority species of High Conservation Concern that has not already been evaluated here for HCV status. The OLCP states (p29) "Populations of this spruce budworm specialist undergo dramatic fluctuations in response to insect outbreaks," and that the population peaked in the 1980's with the spruce budworm outbreak in Northern Ontario. The Canada warbler is similarly linked to spruce budworm. Spruce budworm is cyclic, and northern Ontario is over-due for another epidemic. Balsam fir, a favored food of spruce budworm, has been increasing on the Hearst Forest (and elsewhere) due to its ability to thrive both in old upland forests and in harvested sites in the absence of fire.

The OLCP recommends, and MNRF requires, using a coarse filter for this species by maintaining the preferred habitat types which are immature and older forest composed of intolerant hardwood and spruce-fir-cedar forest types. These types are stable or increasing on the Forest.

The High Conservation Concern warblers are species that, due to their small size and low chance of detection, can only be cared for through 'coarse filter' approaches of maintaining sufficient habitat for them, which forest management does on the Hearst Forest.

Bay-breasted warbler is a Potential High Conservation Value rather than HCV because although its population is a concern, it is being affected by factors outside of the Hearst Forest summer habitat, a habitat type that is abundant and increasing.
RANGE EDGE AND OUTLIER POPULATIONS
HIGH CONSERVATION VALUE 1, QUESTION 5

Does the forest support concentrations of species at the edge of their natural ranges or outlier populations?

Guidance

- Are there naturally occurring outliers of commercial tree species? (DEFINITIVE)
- Are any of the range edge or outlier species a species representative of habitat types naturally occurring in the management unit? (DEFINITIVE)
- Are any of the range edge or outlier species a focal species? (GUIDANCE)
- Is there a group of range edge species that together form a regionally significant concentration? (GUIDANCE)
- Are the species potentially negatively impacted by forest management? (GUIDANCE)

Most species which call the Hearst Forest home are 'generalist' species with continental-scale ranges, so there aren't many range boundaries on the Forest - at least not east-west. The Forest's northern boundary is roughly where the Canadian Shield transitions into the James Bay Lowlands, which is inhospitable to many species (and preferable to some), so there are some species whose northern range edge (or southern range edge) is on the Forest.

Notably, the Nagagami caribou population is an important outlier from more northerly Lowland populations. There are birds, deer, and fish species that are moving into the Claybelt from the south (especially with the warming climate). Being at the edge of its range does not automatically make a species a High Conservation Value. The species which are not secure, i.e. At Risk, have already been dealt with in this document.

There are a number of tree species at the northern limit of their range on the Hearst Forest. The occurrence of some of these species are often associated with the big rivers that flow northward from the forest while others may be retreating due to some longer term climate change event. This refers to trees in the Crown forest, not trees planted as ornamentals on private land.

Red pine is found in small patches or individuals on the Hearst Forest in the vicinity of the Homepayne Highway, Highway 631, on the coarse-soiled Arnott Moraine. Mature red pine is found on the shores of Red Pine Lake, Corine Lake, Big Skunk Lake, and Arnott Lake, generally on top of steep south-facing shorelines. There are also some reported along an esker lake near Rogers Road. Scattered individual red pine also seeded into some planted areas and are now about 20 years old. Currently there is no active regeneration of red pine on the Hearst Forest, although there is a low level of natural seeding of red pine under the current overstorey (see Management & Monitoring report).

There are 7 mature white pine super-canopy trees near the junction of the Calstock Bypass and Rogers Roads. Unlike the red pine, the white pine has been successful at seeding in underneath the canopy and there is currently regenerating white pine in the area.
There were white pine at the south end of the Forest on the Boomerang Loop, Marjorie Twp. There is no known natural regeneration of white pine there, although a thousand white pine seedlings were planted (along with other species) where the pine had been. This population is more in the vicinity of the continuous white pine population in the Champlain Township area of the Gordon Cosens Forest.

The manner and location in which the red and white pine occur on the forest would lead one to believe that at some point in the past that these two species were more evenly distributed across the Hearst Forest. Due to changes in climatic conditions, the range of these tree species has decreased over time to the degree where only these small populations continue to exist.

**Red and White Pine are a High Conservation Value.**

There are a few occurrences of White Elm on the Hearst Forest. These are associated with the large rivers that flow north from the height of land. It is likely that this is the result of the transportation of the seed northward on the river, possibly during high water events that saw seed being deposited. Growth of these southern species may have been facilitated by the climate moderating effects of the big rivers. Elm can exist beyond the rivers, though; white elm were planted in Kapuskasing around the time the town was established, and are now mature trees.

**White Elm is a High Conservation Value.**

![Map of Elm Stands, Hearst Forest](image)

Natural Heritage Information Centre (NHIC) data indicates that the Goldwin Township Islands on the Missinaibi River supports an Ash/Elm community in conjunction with other species that are considered to be rare on the Claybelt including wild ginger, red baneberry, and hairy Solomon’s seal. These species can exist on these islands because of warmer than normal ecoclimates due to good air drainage along the river. Poison ivy was reported (G. Graham pers. comm., 2009) along the Missinaibi River near Thunderhouse Falls. This species likely arrived there by floating down the river.
CONSERVATION RESERVES
HIGH CONSERVATION VALUE 1, QUESTION 6

**Does the forest lie within, adjacent to, or contain a conservation area: a) designated by an international authority, b) legally designated or proposed by relevant federal/provincial/territorial legislative body, or c) identified in regional land use plans or conservation plans?**

**Guidance**

- Are the values for which the conservation area has been identified consistent with the assessment of HCVs in the framework? (DEFINITIVE)
- Do permitted uses in the conservation area include industrial activities? (GUIDANCE)
- Are there forest areas important to connect, or buffer, conservation areas in order to maintain the values for which the conservation areas were identified? (GUIDANCE)

The Hearst District Land Use Guidelines, the Canadian Conservation and UNESCO databases were examined to determine if there were any areas of the Hearst Forest that had previously been identified as potential protected or conservation areas. There have been no areas of potential protection identified.

There are 4 provincial parks on the Hearst Forest (see map below). Fushimi Provincial Park, northwest of Hearst, is a Recreation park. To the west is Nagagamisis Provincial Park, which is part recreation park and part nature reserve and includes the Nagagami River waterway park running north. Missinaibi Provincial Park, a waterway park, is on the east side of the forest and includes the large Coal River Node. In the south end of the Forest is the Pichogen River Mixed Forest Provincial Park which is a nature reserve. There are two Conservation Reserves: the Dube Creek Iceberg Keel Marks southwest of Hearst, and the very small Ste Therese Ground Moraine just north of Hearst along the Chain of Lakes.

The values for which Nagagamisis, Missinaibi and Fushimi Parks were identified was both recreation and nature protection. The question of what the Park value is and what external buffer or prescription is required has been a topic of debate during FMP preparation. It has been concluded, with the Park manager, that the issue is access roads that enable unauthorized access, so FMPs have prescribed distance requirements for logging roads from park boundaries, but harvest can go right up to the boundary.

The values for which Pichogen, Dube Creek and Lac Ste Therese were identified during Lands for Life/OLL was their Landform-Vegetation types as per a gap analysis (and for Dube, a particular landform feature). The boundaries were designed to enclose all the value being protected, and no external buffer or connector have been required in FMPs.

These parks and conservation areas are not designated High Conservation Values, and buffers and connectors are not required, because they exist in a landscape that is almost entirely forested (in contrast to some parks in southern Ontario which are the only large forests in an area almost entirely developed).

FSC direction is that parks and conservation reserves which are effective for biodiversity protection (as these are) need not be automatically designated HCV Forests. The area in them is to be evaluated for HCV just as non-park area is. The evaluation for Species at Risk earlier in this document included Nagagamisis Provincial Park as important area for the Nagagami group of Boreal Caribou. The evaluation for large landscape forests will include the Missinaibi Park's Coal River Node and Nagagamisis Park as being large unroaded areas.
LARGE AND REMNANT LANDSCAPE LEVEL FORESTS
HIGH CONSERVATION VALUES 2 & 3, QUESTIONS 7 & 10

**Does the forest constitute or form part of a globally, nationally or regionally significant forest landscape that includes populations of most native species and sufficient habitat such that there is a high likelihood of long-term species persistence?**

**Guidance**
- Are there forest landscapes unfragmented by permanent infrastructure and of a size to maintain viable populations of most species? (DEFINITIVE)
- Do the unfragmented landscapes include suitable habitat for native species or more natural forests in terms of structure and function? (GUIDANCE)
  - an appropriate proportion of climax species; >30% in a late seral stage
  - structurally complex with woody debris and standing dead trees
- Is the level of dissection and perforation below levels that will permit the persistence of most native species? (GUIDANCE)

**Are large landscape level forests (i.e. large unfragmented forests) rare or absent in the forest or ecoregion?**

**Guidance**
- Are large remnant patches (thousands of hectares) the best examples of intact forest for their community and landform types (GUIDANCE)
- Do the largest remnant forest patches include a significant proportion of climax species, late seral stands, and structural complexity? (GUIDANCE)

The Hearst Forest is part of the boreal forest that spans Canada, a forest that some consider to be globally significant. On the Hearst Forest, according to the latest FMP, only 4% of the 1,188,000 ha of Crown land and 10% of the 276,000 ha of private & federal land has been cleared for agriculture, infrastructure, and communities, clustered along Hwy 11. The remainder is a vast forest, with bush roads, but the domain of wildlife and natural processes (except fire, discussed later). This low level of development limited to clusters along the highway and surrounded by vast expanses of forest is fairly typical across the region especially from Cochrane to Nipigon.

Industrial harvesting of the forest began on the Hearst Forest in the late 1930’s and early 1940’s in earnest and has been ramping up since the late 1960’s and 1970’s with the advent of mechanical harvesting. The Hearst Forest's most recent Forest Resource Inventory (FRI) imagery and data (2007) shows that although this land has been harvested, it has regenerated to the full diversity of tree species and now provides a forest landscape which serves as habitat for wildlife that require early to mid successional forest conditions, along with patches of old forest.

There are also areas of significant size that have not had access created in them and have never undergone harvesting operations. Some of this area abuts the north boundary of the Hearst Forest and the never-harvested Far North.

The age class and species structure of the Hearst Forest is a mix of the legacy of the pattern of wildfires that burned freely before the advent of effective forest fire protection, and the forest harvesting patterns. It is this pattern that is sustaining the native wildlife species on the forest that have adapted to these conditions.

In the Caribou Conservation Policy zone, MNRF requires the maintenance of old coniferous forest in large "DCHS" blocks over time. As calculated in the latest Forest Management Plan, there is well more than 30% late seral stage forest now, and will be into the future.

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The various native species require different types of forest over the course of their life cycles to allow them to persist on the landscape. This means that not only do we need large and small areas of old growth forest today, but also areas of mid age and young forest to progress and age into old forest in the future. The management of the mix of forest types and ages is governed by forest management planning which involves the community.

Beyond the cleared areas and communities and cottaging clustered along Hwy 11, there is little evidence of humans in the forest. MNRF has permitted only trapper cabins and the occasional small recreational cabins away from water, and a small number of outfitter cabins. In some places there are bush roads, more often, roads that are now only trails. This is a landscape that maintains viable populations of the native species.

With respect to ecological function: all the natural forces of growth, death, decay, and disturbance are functioning naturally in the forest - except one. Humans have influenced part of the land by harvesting and regenerating it; they have influenced all of it, including the large parks, by successfully excluding fire from it over the past several decades. There was prescribed burning in cutovers until 1995 (and in 2012), but very little wildfire. Fire exclusion in a boreal ecosystem affects not just age but also vegetation species. The new eFRI forest inventory shows that the forest has increased in proportion of climax species. There is an abundance of structure and deadfalls especially in upland forests.

The entire Hearst Forest therefore has high conservation value. All of it is valuable. It is managed with care and closely scrutinized by both auditors and public. However, the whole Forest will not be listed as an HCV, whose purpose is more to focus on specific areas and values for particular care.

The definition of 'intact' forest we used is: at least one kilometre from a road and not impacted by industry in the past 70 years (i.e. ever) and at least 10km across.

The areas of intact forest that remain on the Hearst Forest today regenerated following wildfires that occurred in the early 20\textsuperscript{th} century, specifically the fires of 1901, 1910 and 1923 (see map below). The resulting forests were not of merchantable age to harvest until recently.

The westernmost intact forest area regenerated from a wildfire that burned in 1910, and contiguous Park south of it. This forest, now 104 years old, has been split by Highway 11 and Larry’s Road into four areas between 2,460 and 40,680 hectares in size. These areas do not qualify as regionally significant areas of intact forest. However, it is home to the Nagagami Caribou, who are an HCV. It contains FSC Gap
Analysis Candidate areas, both lowland-muskegs and also the Eureka Lake 1972 Fire site, which was a reburn of the 1910 fire.

There is an area of much older forest just to the north that has been deferred from harvest for the past two planning terms to meet targets for large old forest areas. This area is 10,800 ha and does not qualify as regionally significant intact forest area. It is a FSC Gap Analysis candidate protected area.

There are two areas that are the result of the 1923 fire in the south end of Hearst Forest. (The 1923 fire was an extensive fire, mostly south of the Hearst Forest). Part of this fire area forms the Pichogan Conservation Reserve. This area is 7,294 ha and does not qualify as a regionally significant intact forest.

A very large forest fire in 1901 raged over 60 km east-west (beyond the eastern Forest boundary) and was reported by an eyewitness for over 150km along the Missinaibi/Moose River. It has been inaccessible except by river and snowmobile.

Due to the forest age, it was not until recently that access and harvest began in the easterly "Waxatike" section. It was for the same reason that harvest only recently began up the Thunder Road, which now extends northwards and is under construction westward. With the Caribou DCHS done for forest.
management planning in 2011 and then again for the 2017-19 and 2019 FMP, harvesting may occur in the A, A/E and A/F blocks. Harvesting is deferred in the B, C and D blocks. The roads planned in the B may not be constructed until the last 2 years of the A.

Area that currently meets the above-mentioned standard for 'Intact' is the P, B (except buffered Friday Creek Road), southern D, and Candidate 7 X, which amounts to 99,000 ha. In 2017, if the B is roaded and harvested as planned, only the area of the lower D, P, and X "P", or 51,000 ha will meet the 'Intact' criteria. This area is also contiguous with the undeveloped area north of the Hearst Forest i.e. the Far North, which in the draft Canadian Standard may contribute to a Regionally Significant Intact Forest. **Given the location of this area of intact forest with extensive intact forest to the north, this is a High Conservation Value.**

Note that with each new FMP and subject to changes in MNRF policy and new FRI, all strategies such as the DCHS are re-determined.

The management of this High Conservation Value is complicated by the fact that the qualities of "late seral stage" and "structural complexity with deadfalls" and "climax species" - referred to as qualities of an intact forest - are qualities that are increasing and gradually rendering this landscape less desirable as habitat for the one animal which is used to promote requirements for intactness in the first place - the caribou.

Curiously, this vast intact area is not and has apparently not been used by caribou - according to the local First Nations trapper who has travelled the Missinaibi River frequently for 70 years, other trappers, caribou surveys by air, collar data, and absent any other sightings. This non-use by caribou is important to the understanding of what caribou need and to the management of this HCV. The entire Waxatike area to the east, before harvesting, was 80,000 intact ha (aside from a remote lodge), with rocky outcrops and muskegs, but a significant deciduous component, with no sightings or evidence of caribou. There are lowland spruce and muskeg stands, and west of the proposed road is a massive muskeg that is an FSC Gap Analysis candidate site. The Park area is home to a rich soils and a moderate proportion of deciduous trees, which are thought to not be good for caribou (being good for moose). MNRF’s caribou biologists do not have any other reason why caribou have not used it in its intact condition. This matters because caribou are, as far as we know, the only species who is endangered and significantly affected by roads and harvesting followed by regeneration. The MNRF caribou strategy requires a mosaic approach which means that much of this area will be deferred from harvested for 20, 40, or 60 years (at which time there may not be enough timber on the uplands to be worth harvesting.) MNRF does support ‘letting fires burn’ in principle where the SFL is agreeable, but has yet to have it happen in practice. This means that the pristine, fire-origin quality of this area is not likely to persist much longer on the uplands. (The lowlands do not change much).

The question then is, what is the value of this High Conservation Value. Although the category is 'Intact Forest', its intactness per se is irrelevant to the ecology and its value to wildlife, i.e a landscape with the exact same forest stands in it, yet a single road running through it, would be the same (except for any human or animal use of that road). The qualities of the forest stands and the natural processes at play are indeed relevant to the ecology and use by wildlife, so that is what will be discussed, managed and monitored.
RARE, THREATENED OR ENDANGERED ECOSYSTEMS
HIGH CONSERVATION VALUE 3, QUESTIONS 8, 9 & 11

Does the forest contain naturally rare ecosystem types?
Are there ecosystem types within the forest or ecoregion that have significantly declined?
Are there nationally/regionally significant diverse or unique forest ecosystems?

Guidance
- Are there ecosystems that have been classified as rare, threatened or endangered? (DEFINITIVE)
- Is there a significant proportion of a declining ecosystem type within the management unit compared to the broader ecoregion? (GUIDANCE)
- How well is each ecosystem secured by the protected area network and legislation? (GUIDANCE)
- Are there important and/or unique geological features or microclimatic conditions that strongly influence vegetation cover? (GUIDANCE)
- Do these ecosystems possess any exceptional species characteristics? (GUIDANCE)

The boreal forest does not tend to house rare or 'special' ecosystems. Sites which we might think of as special are, looking over the whole Forest and the region, not really rare. The rare species previously noted are linked to uncommon site types. The HCV red pine / white pine are on sandy uplands, but that is not a very rare ecosystem. Black ash stands, which occur along creeks and rivers, are uncommon but not really rare. There is a large classic 'string bog' (fen) in Mercer Twp which is the furthest south we know of for such a well-formed string bog (and is used by caribou); it is proposed as a Gap Analysis Candidate area, but this is more 'interesting' than a special ecosystem.

One ecosystem that is rare, in only two locations on the Hearst Forest, is the black ash/white elm forest ecosystems. (See map under Q.5) While black ash is not rare, the white elm, as previously noted, is rare, a range outlier, and an HCV. These areas are along the large rivers and are subject to periodic flooding during spring high water season. Neither of these species appear to regenerating under the existing canopy (pers. obs. 2007) and the trees in the overstorey are succumbing to the effects of old age and weather. These sites are not likely to be maintained without some sort of disturbance and effort to regenerate them to the existing species. Given the island/riparian location of these areas, it is not likely that they will be sustained through any kind of human caused activity.

A site condition, not really an ecosystem, that is in decline is the fire origin condition. It is well established that a recently post-fire site is different in soil and vegetation from a site longer since fire, and especially different from a site whose trees originated from later succession. As a former MNRF Area biologist declared, the rarest site type on the Hearst Forest is the recently burned type. Indeed on the 3E-1 ecodistrict on the Hearst Forest, only 28,300 ha has burned in large (>200ha) wildfires since 1920. Of this, all has been altered by humans (salvage cut, roaded, planted, or farmed) or is private land - except the 1974 Eureka Lake burn and the 1945 Sweet Twp burn (contiguous with the 1901 burn mentioned previously). The Sweet burn area includes 4700 ha on the Hearst Forest (the rest on the Gordon Cosens) and much of that is muskeg. Thus the 1974 Eureka burn - which is actually a partial re-burn of the larger McCoig 1910 fire - is the best of only 2 sites with this condition on 3E-1 on the Forest. Therefore the 1974 Eureka Lake burn is proposed as a candidate site in the Gap Analysis. It is not, though, being declared an HCV as it doesn't meet the criteria of being an 'ecosystem'.
SOURCES OF DRINKING WATER
HIGH CONSERVATION VALUE 4, QUESTION 12

Does the forest provide a significant source of drinking water?

Guidance
- Is there a sole and accessible source of drinking water? (DEFINITIVE)
- Are there watershed studies that identify significant recharge areas that affect drinking water supplies? (GUIDANCE)

The communities that are on the Forest that obtain their drinking water from municipal water supplies are Hearst, Mattice, and Constance Lake.

Residents of other communities on the forest such as Hallebourg, Val Cote, Jogues and Lac Ste Therese, as well as the rural residents living outside of these communities, obtain their drinking water from wells usually on their own property. At this time there has been nothing identified that would impact these wells.

The town of Hearst is the most populous town on the Hearst Forest with a population of 5,090 (2011 Census). The town of Hearst draws its water from the Mattawishkwa River which flows through the town. The Mattawishwia River watershed upstream of Hearst is 1,140 km² in size and consists of both Crown and private land.

Mattice-Val Cote is the next largest community on the Hearst Forest with a joint population of 868 (2011 Census). Mattice draws its water from the Missinaibi River. The Missinaibi River watershed upstream of Mattice is 8,940 km². The Missinaibi covers over 100 km of straight line distance from its headwaters in Missinaibi Lake before reaching Mattice.

Constance Lake First Nation has the third largest population with an on-Reserve population of 820 (CLFN website). Due to the small size of the watershed (26 km²) and past problems with lake water, and drawing water from the lake, Constance Lake was a High Conservation Value in the original HCV Report.

In 2011-2012 the community's water system was upgraded and now draws from groundwater, rather than the Lake. (CLFN website). With the upgraded water system not drawing from the lake, Constance Lake is now considered a Potential High Conservation Value.
FLOOD CONTROL AND DROUGHT ALLEVIATION
HIGH CONSERVATION VALUE 4, QUESTION 13

Are there forests that provide a significant ecological service in mediating flooding and/or drought, controlling stream flow regulation, and water quality?

Guidance
- Are there high risk areas for flooding and drought? (DEFINITIVE)
- Are there particular forest areas that affect a significant portion of the water flow, including flows for hydro-electric dams? (GUIDANCE)

The Hearst Forest is largely a contiguous natural forest - about 95% - despite having evidence of a level of anthropogenic disturbance, and as a natural forest, provides the ecological services of moderating water flows. The vegetation on the land regulates the speed at which the water flows from the land following rain events by absorbing and diverting water flows. Extensive wetlands and muskegs buffer the fluctuation in runoff and water levels. The flatness of the land results in slower water flows than in mountainous terrain. All these factors explain why communities on the Forest do not get flooded.

Having said this, there have been years in which low water levels in rivers and the ground-water table have led to water shortages both in towns and for people on less productive wells. To combat this, the town of Hearst installed two weirs in the Mattawishkwia River to ensure the town and the Columbia Forest Products mill do not run out of water.

Because the Hearst Forest being predominantly forested, no specific areas are identified as being of particularly high conservation value to mediate the risk of flooding and or drought.

Forest harvesting occurs on less than 1% of the landbase per year and usually is scattered amongst the various watersheds rather than being concentrated on one. (Data from a sample 10-year period below). Together with the factors of flat topography, extensive wetlands, high forested landbase, and harvest retention practices, there is no issue with forest management and water levels. There is no HCV associated with this Question.

Watersheds
The following data on the proportion of the Hearst Forest part of the various watersheds which were harvested for the 10-year plan period of 1997-2007 is given for context.

The Hearst Forest has a number of large rivers running through it, and is part of two second-order watersheds, divided up the middle of the forest roughly along Fushimi Road: The Kenogami watershed on the west and the Missinaibi-Mattagami watershed on the east.

The Pagwa, Nagagami, and Kabinakagami (Kabi) on the west side of the forest are large rivers- 100 m wide at points - which drain the land west of Fushimi Road. The Pagwa joins the Kenogami which then joins the others at the historic Mamamattawa at the northern boundary of the forest.

The land east of the Fushimi Road is drained by a number of smaller rivers that ultimately drain into the Missinaibi River and thence to James Bay. One of these smaller rivers is the Pivabiska River. The Pivabiska River starts at the end of a series of 5 lakes, the Chain of Lakes, that are large for this area of the province. These lakes serve as a fairly large reservoir that can absorb a large amount of water after rain events, which moderates water level fluctuation.
The Kenogami watershed

The Kenogami 2nd-order watershed on the Hearst Forest divides into four 3rd-order watersheds:

- The Upper Kabinakagami is in the lower centre of the Hearst Forest and includes Kabinakagami (Kabi) Lake and lower Kabi River.
- The Lower Kabinakagami watershed is in the north centre of the forest and includes water bodies such as the Fox River and Carey Lake draining into the Kabinakagami (Kabi) River. Four run-of-river hydro dams are proposed on the Kabi River.
- The Nagagami watershed is on the west side of the forest and includes the Pitopiko and Shekak Rivers which flow into the Nagagami River. The Shekak River is the only waterbody on the forest that has an existing hydro dam on it.
- The Upper Kenogami watershed is mainly west and north of the forest. This watershed includes the Pagwa River before it flows into the Kenogami River.

The Upper Kabinakagami is made of two 4th order watersheds on the Forest.
- The 4JA-01 watershed is 135,246 ha; of this 5% of the area on the Hearst Forest was harvested from 1997 to 2007.
• The 4JA-02 watershed is 16,698 ha and none of the area on the Hearst Forest was harvested from 1997 to 2007.

The Lower Kabinakagami is made up of two 4th order watersheds on the Forest.
• The 4JB-01 is 48,330 hectares of which 6% was harvested from 1997 to 2007, and
• The 4JB-03 is 38,717 hectares of which 15% of 4JB-03 was harvested from 1997 to 2007.

The Nagagami watershed on the Hearst Forest is made up of nine 4th order watersheds.
• The 4JC-01 is 94,484 ha of which 4% has been cut.
• The 4JC-02 watershed is 87,771 hectares with 10% harvested from 1997-2007.
• The 4JC-03 watershed is 56,609 ha with 5% of its area harvested from 1997-2007.
• The 4JC-04 watershed is 41,199 ha entirely within the Hearst Forest, with 6% harvested from 1997-2007.
• The 4JC-05 watershed is 15,482 ha and has had 12% of the area harvested in 1997-2007.
• The 4JC-06 watershed is 70,069 ha and has had harvesting on 3% of the area between 1997-2007.
• The 4JC-07 watershed is 15,477 ha and has not had any harvesting between 1997-2007.
• The 4JC-12 watershed is 48,291 ha of which 12% has been harvested between 1997 and 2007. The 4JC-13 watershed has 1,385 ha on the Hearst Forest, of which 4% has been harvested between 1997-2007.
• For the 4JD-06 watershed, only 31,701 ha of the 271,756 ha is on the Hearst Forest. Of this, 42% has been harvested from 1997 - 2007. This is largely due to its age class structure and its being was largely inaccessible to the forest industry prior to the early 1990’s.

The Missinaibi-Mattagami watershed
The Missinaibi-Mattagami 2nd-order watershed on the Hearst Forest divides into four 3rd-order watersheds:
• The Upper Missinaibi which just catches the bottom corner of the forest with a small portion of Legge Township.
• The Central Missinaibi-Mattawichewan watershed which encompasses the lower centre part of the forest and extend northward beyond the community of Mattice to Goldwin Township where the Mattiwishkwia River flows into the Missinaibi.
• The Central Missinaibi-Mattawishkwia watershed extends from the Fushimi Road and the Hearst Chain of Lakes and includes the Town of Hearst.
• The Opasatika watershed includes the eastern sections of the forest and extends northward to include the Waxatiike area of the Hearst Forest.

The Upper Missinaibi watershed only includes one 4th order watershed on the Hearst Forest.
• The 4LH-06 watershed is only 19,650 ha on the Hearst Forest and none of it has seen harvesting operations between 1997 and 2007.

The Central Missinaibi-Mattawishkwia watershed on the Hearst Forest is made up four 4th order watersheds.
• The 4LJ-01 watershed is 33,121 hectares which has not been harvested from 1997 - 2007.
• The 4LJ-03 watershed which is almost entirely within the bounds of the Hearst Forest is 26,912 ha and has not been harvested from 1997-2007.
• The 4LJ-04 watershed is 168,706 ha of which 1% has been harvested from 1997 - 2007.
• The 4 LJ-05 watershed is 22,084 ha and has not been harvested from 1997 - 2007.

The Central Missinaibi-Mattawishkwia watershed on the Hearst Forest consists of four 4th order watersheds.
• The 4LK-01 watershed is 58,569 ha of which 1% was harvested from 1997 - 2007.
• The 4LK-06 watershed is 102,872 ha of which 4% was harvested from 1997 -2007.
• The 4LK-07 watershed is 34,704 ha and entirely within the bounds of the Hearst Forest. This watershed has not had any forest operations take place within it from 1997-2007.
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- The 4LK-08 watershed is also entirely within the bounds of the Hearst Forest. This watershed is 194,524 ha of which 2% was harvested from 1997-2007.

The Opasatika 3rd-order watershed that is within the bounds of the Hearst Forest consists of five 4th order watersheds. The Opasatika watershed saw a high proportion of harvest in the Waxatike area from 1997-2007. This is the result of the age class of the area which is almost all the result of a very large fire that occurred in 1905.
- The 4LL-01 watershed is 12,289 ha of which 25% was harvested between 1997 and 2007.
- The 4LL-03 has only 43 ha of the 44,525 ha total watershed located on the Hearst Forest. None of this area has been harvested between 1997 and 2007.
- The 4LL-04 watershed has had 16% of its 14,813 ha harvested in the previous two planning periods.
- The 4LL-05 watershed is 42,101 hectares of which 14% has been harvested in 1997-2007.
- The 4LL-06 watershed is 32,272 ha of which 15% of the area that is on the Hearst Forest has been harvested between 1997 and 2007.

EROSION CONTROL
HIGH CONSERVATION VALUE 4, QUESTION 14

Are there forests critical to erosion control?

The relatively flat terrain of the Hearst Forest makes the land less prone to erosion than in mountainous regions.

On the clay soils of the claybelt though, on this flat terrain, rivers alternately erode and deposit on their banks, and over the millennia, have formed banks that in some places are higher than the surrounding terrain. There have been cases on the large rivers, i.e. Nagagami and Kabinakagami, where the high river banks slumped into the river temporarily blocking the water flow. This is a natural phenomenon that occurs a number of times over the lifespan of the river as the river meanders and attempts to find the most direct route to James Bay. However these impacts are natural and cannot be mitigated through forest management activities.

Where harvesting operations are carried out in adjacent to these large rivers, buffer zones of an appropriate width will be left to ensure adequate shoreline vegetation is retained to bind soils together with the root mat of the vegetation and maintain stable shorelines. Buffer zones adjacent to waterways are of varying widths depending on the slope of the ground i.e. greater slopes receive wider buffer zones.

One activity where the potential for erosion occurs is at the installation of water crossings, both at the installation phase and then ongoing as long as the water crossing remains in place. Best management practices for the installation and monitoring and maintenance of water crossings has been developed with the industry operators to eliminate or mitigate the effects of erosion on water bodies that are crossed. Hearst Forest Management Inc, in partnership with the forest industry, has developed a manual describing different methods of minimizing site damage while carrying out forest operations (A Guide for Minimizing Site Damage and Site Disturbance on the Hearst Forest, undated). This manual has been distributed to the harvesting operators and supervisors who work on the Forest. By following the practices described in the manual, site damage and subsequent erosion is minimized or mitigated. There is no HCV associated with this Question.
FIRE BARRIER
HIGH CONSERVATION VALUE 4, QUESTION 15

Are there forest that provide a critical barrier to destructive fire (in areas where fire is not a common natural agent of disturbance)?

The boreal forest does not exclude fire; it actually requires periodic fire to maintain its health. Periodic destructive fire serves not only to renew the forest but also to occasionally remove the build-up of the seed bank of tree and shrub species that impede regeneration of the forest. While there are areas where fire is less likely to occur, i.e. very wet spruce and cedar lowlands, it has been seen that occasionally even these areas get dry enough that they will burn.

There are no areas of extreme topography where fire would not be expected to travel on the Hearst Forest. There is no HCV associated with this Question.

Active fire suppression and especially in the most recent times has helped to keep fire off the landscape of the Hearst Forest by suppressing small fires before they have a chance to become larger landscape-changing fires. The effect of this active fire suppression has resulted in an age class structure and species composition that may not be a reflection of the natural forest. For example by eliminating fire from the Hearst Forest, some tree species that are very susceptible to fire, i.e. balsam fir and cedar, now persist on the forest in larger numbers than on the natural forest.

AGRICULTURE AND FISHERIES IMPACTS
HIGH CONSERVATION VALUE 4, QUESTION 16

Are there forest landscapes (or regional landscapes) that have a critical impact on agriculture or fisheries?

Riparian forest areas provide protection for waterbodies by providing bank stability, sediment control, moderating nutrient inputs and by moderating temperature fluctuations by providing shading to the waterbody.

Although values information showing areas of critical fisheries habitat i.e. spawning beds, nursery sites etc, this level of detail is limited on the Hearst Forest. Where these values are known, buffers as well as restrictions on water crossing types and locations are put into place so as to not negatively impact fisheries values.

Large scale agricultural activity in and around the Hearst Forest is limited to livestock and haying to provide winter forage. Forest operations on the Hearst Forest do not affect these activities. There is no HCV associated with this Question.
MEETING BASIC NEEDS OF LOCAL COMMUNITIES

HIGH CONSERVATION VALUE 5, QUESTION 17

Are there local communities (includes people living inside the forest area and those living adjacent to it) as well as any group that regularly visits the forest making use of the forest for basic needs/livelihoods (e.g. food, medicine, fodder, fuel, building and craft materials, water, income)?

The local communities on and surrounding the Hearst Forest rely on the Forest for many aspects of daily life. The recreation opportunities afforded by the forest contribute greatly to the quality of life in Northern Ontario, while many others rely on the forest for cultural identity, subsistence, medicinal plants and as a source of income. As mentioned before, the entire Hearst Forest is highly valued by the community, although it is not appropriate to call a whole forest an HCV.

The communities' relationship with the Forest is underscored by the communities' and SFL holder's efforts to increase local influence over MNRF policy, forest management, and wood flows. The Board of the SFL holder HFMI added representatives of Constance Lake First Nation, Hearst and Mattice-Val Cote as ex-officio members. The SFL makes efforts to expose the public to the forest, forest management and forest operations (such as field trips, presentations, and participation in public sessions) to get more public input.

First Nations

Although there is only one First Nations community located on the Hearst Forest, Constance Lake First Nation, there are a number of other First Nations that use portions of the Hearst Forest as part of their traditional territory. The Hornepayne Community and Moose Cree First Nation both have members who have registered traplines on the Forest as well as using the forest for other traditional activities such as hunting, berry picking and harvesting of medicinal plants.

For every FMP, each First Nations Community that may have members that could be possibly affected by forestry operations are contacted to determine whether or how they want to be involved in the preparation of the FMP. The communities have the option of being involved in the general process of public consultation, or have a public consultation process that deals exclusively with the First Nations community. This option has been available for the past 2 FMPs and the communities of Constance Lake and Hornepayne Cree have chosen to have a process that worked separately with the First Nation. Constance Lake has also had members of the community sitting on the planning team for the past two plans in an effort to more completely consult with the First Nation over forest management planning issues.

As part of the effort to locate First Nations values prior to planning and beginning operations, the Aboriginal Background Information Report was completed for Constance Lake in preparation of the 1997 FMP and the Hornepayne Cree for the 2002 FMP. These reports, while not complete, are a good start on getting a product that can be beneficial to First Nations values protection in the forest management planning process.

The winter of 1997 saw an unfortunate incident where the mill entrance to Lecours Lumber Co Ltd was blockaded by members of Constance Lake First Nation as a result of the frustration the community felt regarding not having equal opportunities to earn a livelihood from the forest and the forest industry. The event was actually the culmination of a series of events where forest companies were conducting harvesting operations on First Nations traplines with no prior consultation with the trapper working in the area. The outcome from this event was that a ‘co-existence agreement’ was struck. The committee that struck this agreement was composed of local forest industry, First Nations members, the Province of Ontario represented by members of the Ministry of Natural Resources (MNRF) and the Government of Canada represented by staff of the Indian and Northern Affairs Canada (INAC). The agreement that was reached outlined the manner of how and when First Nations trappers would be advised and consulted prior to harvesting operations taking place on their traplines. The agreement also made arrangements for the existing forest companies to encourage and support the development of a First Nations logging company. The
agreement also addressed topics such as community compensation for logging operations through the delivery of firewood to the community and the development of a scholarship fund for First Nations members interested in pursuing education in natural resources management. While this agreement has never been signed, it has been lived up to by all of the parties.

Recreation

The Hearst Forest is extremely important to the people of the Hearst area and surrounding communities as well as people of Ontario for the many recreational activities that can be enjoyed in the forest.

Residents and non residents regularly use the area of the Hearst Forest for camping, cottaging, hunting, and fishing as well as activities involving photographing and watching birds and other wild life.

Many residents of both Hearst and Constance Lake pursue trapping activities in the fall and winter. While much of Northern Ontario was opened up through trapping and the fur trade, trapping at times is less of an economic benefit to the trappers themselves. With reports of yields for the furs not amounting to enough to cover the cost of gas, many of these individuals choose to continue trapping as a seasonal way of life for traditional and spiritual reasons.

The large rivers in the area are enjoyed by both residents and non-residents for recreation and as travel corridors while pursuing other activities such as hunting and fishing. Some of these rivers have been declared waterway parks and are enjoyed by canoeists from all over the world. One river in particular, the Shekak, has been used by a company for guided whitewater rafting tours.

Through the Lands for Life/ Living Legacy exercise which established new protected areas throughout the province, an Enhanced Management Area (EMA) was established on the Hearst Forest straddling Highway 631 for the purposes of providing recreational activities to the people of Ontario.
Fuelwood
A number of local residents use the roads developed for logging operations to access past and present harvest areas to collect personal fuelwood. Access to the forest for this activity is considered part of the traditional way of life and contributes to the quality of life for many residents of the Hearst Forest. From April 1, 2013 to February 25, 2014 the local MNRF District office issued 127 firewood permits.

Forest Industry

There are a number of local and not-so-local forest industries that rely on inputs from the Hearst Forest to maintain their mills and operations. Table 1 lists the wood supply commitments outlined in Appendix E of the SFL document for the Hearst Forest.

Table 1

<table>
<thead>
<tr>
<th>Company</th>
<th>Species</th>
<th>Volume (m³)</th>
<th>Special Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecours Lumber Company Ltd.</td>
<td>Conifer</td>
<td>311,417</td>
<td>Sawlogs</td>
</tr>
<tr>
<td>Tembec Industries Inc.</td>
<td>Conifer</td>
<td>256,691</td>
<td>Sawlogs</td>
</tr>
<tr>
<td>Levesque Plywood Limited (Columbia)</td>
<td>Aspen</td>
<td>56,602</td>
<td>Veneer quality Aspen</td>
</tr>
<tr>
<td></td>
<td>Birch</td>
<td>1,000</td>
<td>Veneer quality Birch</td>
</tr>
<tr>
<td>Marcel Lacroix</td>
<td>Conifer</td>
<td>6,515</td>
<td>To be sold to Tembec or Lecours</td>
</tr>
<tr>
<td>Constance Lake First Nation</td>
<td>Conifer</td>
<td>13,030</td>
<td>To be sold to Tembec or Lecours</td>
</tr>
</tbody>
</table>

Aside from the commitments laid out in the SFL document, a variety of wood residues are byproducts of the sawmilling or plywood making processes. These may be used in-house or shipped to another facility as per SFL document requirements or business to business agreements. The table below lists the average volumes and types of wood products and residues that would be generated from the committed volumes.

Table 2

<table>
<thead>
<tr>
<th>Company</th>
<th>Committed Roundwood Volume</th>
<th>Volume of Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia</td>
<td>56,602 Aspen</td>
<td>28,301 m³ plywood</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15,283 m³ wood chips</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,222 m³ hog fuel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,396 m³ landscaping timbers</td>
</tr>
<tr>
<td>Lecours Lumber Co. Ltd</td>
<td>311,000 conifer</td>
<td>58,716,800 board feet lumber</td>
</tr>
<tr>
<td></td>
<td></td>
<td>61,578 odmt*wood chips</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41,985 gmt** bark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16,172 odmt sawdust</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,019 odmt shavings</td>
</tr>
<tr>
<td>Tembec Industries Inc.</td>
<td>256,000 conifer</td>
<td>56,888,889 board feet lumber</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50,688 odmt wood chips</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34,560 gmt bark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13,312 odmt sawdust</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7,424 odmt shavings</td>
</tr>
</tbody>
</table>

*odmt oven dry metric tons
Resource-Based Tourism
There are 17 resource-based tourism establishments that use various areas of the Hearst Forest in support of their businesses, as listed in Table 3 (list provided by the Ministry of Tourism, March 2014, for use in preparation of the 2017 FMP). The resource-based tourism designation covers a range of activities from remote destinations to road-based tourism including moose hunting, bear hunting, fishing, canoe trip outfitting, and camping.

Table 3  Resource-Based Tourism Outfitters

<table>
<thead>
<tr>
<th>Business Name</th>
<th>Crown Resource Used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bear</td>
</tr>
<tr>
<td></td>
<td>Fish</td>
</tr>
<tr>
<td></td>
<td>Moose</td>
</tr>
<tr>
<td>Brunswick Lake Lodge</td>
<td>✓</td>
</tr>
<tr>
<td>Crow Creek Camp</td>
<td>✓</td>
</tr>
<tr>
<td>Fushimi Cabin Rentals</td>
<td>✓</td>
</tr>
<tr>
<td>Happy Camp Ontario</td>
<td>✓</td>
</tr>
<tr>
<td>Hawk Air/ Kel-Mar Air</td>
<td>✓</td>
</tr>
<tr>
<td>Hearst Air Service</td>
<td>✓</td>
</tr>
<tr>
<td>Hearst Big Game Outfitters</td>
<td>✓</td>
</tr>
<tr>
<td>Kap Outfitters</td>
<td>✓</td>
</tr>
<tr>
<td>Kap'l Lodge</td>
<td>✓</td>
</tr>
<tr>
<td>Rufus Lake Outfitters</td>
<td>✓</td>
</tr>
<tr>
<td>Missinaibi Outfitters</td>
<td>✓</td>
</tr>
<tr>
<td>Nagagami Outfitters</td>
<td>✓</td>
</tr>
<tr>
<td>Pro North Outfitters</td>
<td>✓</td>
</tr>
<tr>
<td>Timberdoodle Lodge</td>
<td>✓</td>
</tr>
<tr>
<td>Waltons Kay Vee Lodge</td>
<td>✓</td>
</tr>
<tr>
<td>Wilderness Lodges</td>
<td>✓</td>
</tr>
<tr>
<td>Wolf Creek Guides</td>
<td>✓</td>
</tr>
</tbody>
</table>
TRADITIONAL CULTURAL IDENTITY OF LOCAL COMMUNITY
HIGH CONSERVATION VALUE 6, QUESTION 18

Is the traditional cultural identity of the local community particularly tied to a specific forest area?

For this question, local community is interpreted as a First Nations or other Community that is wholly contained within the Hearst Forest, or members of a community outside the bounds of the Hearst Forest who regularly spend time on areas of the Hearst Forest.

The communities directly located on the Hearst Forest are: Hearst, Constance Lake First Nation, Mattice, Val Cote, Hallebourg, Lac Ste Therese, Jogues and Coppell.

Other communities with residents that may also use parts of the Hearst Forest on a regular basis include: Hornepayne, the Hornepayne Cree First Nation Community, Opasatika, Val Rita, Kapuskasing, Longlac, Moosonee and Moose Cree First Nation.

Members of the above communities regularly use areas of the Hearst Forest on an almost traditional basis. Moose hunters regularly hunt with the same group of hunters annually and hunt and camp in the same area year after year as they learn the surrounding terrain.

Groups of campers traditionally return with the same group to the same site on the same lake year after year imparting almost a family cottage nature to the area.

First Nations and non aboriginal trappers have exclusive trapping rights on their traplines and as a result maintain trails and trap cabins year after year as a part of what they consider their traditional identity.

The present location of Constance Lake First Nation is not the traditional location for a large proportion of the members of the community. This site was only occupied in the late 1940’s when the community that had been located at Pagwa River (where the railroad crosses) was moved to Constance Lake in an effort to provide employees to sawmills that had just been started in the area. Following this move, a number of the community members continued to maintain residences and camps in the vicinity of Pagwa River and this site continues to be a focus area for this portion of the Constance Lake population.
OVERLAPPING VALUES
INTERSECTION OF HIGH CONSERVATION VALUES, QUESTION 19

Is there a significant overlap of values (ecological and/or cultural) that individually did not meet the HCV thresholds, but collectively constitute HCVs?

There is not a location that is the kind of overlap referred to in the question, i.e. overlaps where several near-HCVs overlap and would all be benefitted.

There is, however, a place where HCVs conflict. The Large Landscape Forest HCV along the Missinaibi River along the Forest's northern boundary contains both Park and non-park land. The non-park area is now scheduled to be managed under the Dynamic Caribou Habitat Schedule (DCHS) of rotating long-term deferrals as required by the Caribou Conservation Plan; caribou are also an HCV, although they apparently do not use this area.

The availability of this area for harvesting is also vitally important to the socio-economic wellbeing of the community of Hearst and surrounding communities including Constance Lake First Nation. However, the DCHS will allow uplands timber to deteriorate beyond its usefulness to the communities dependent on it.
Evaluation of FSC Indicator 6.3.12, Contiguous Cores of Mature Forest

The FSC Canadian Boreal Standard, Indicator 6.3.1, states:

6.3.12 Large areas (thousands of hectares) of contiguous core forest habitat, representative of the habitat types of the landbase, exist and are maintained in the management unit. The proportion of the management unit in large areas of core is guided by the outcome of the pre-industrial forest condition analysis and by a target of maintaining at least 20% of the forest management unit. Large cores consist primarily of mature and old forest, but may also contain inclusions of up to 5% recently disturbed forest. To the greatest extent possible within the current forest condition, large cores do not contain roads and other linear disturbances.

This indicator was assessed by mapping the ageclass of the FRI for the 2017 FMP, and then selecting contiguous areas over >1000 ha in size that were almost entirely over 60 years of age. As per the standard, the presence of a road did not disqualify a core.

The assessment is shown in the map and table below. Note that there is one core, C6, that contains a 1974 fire which is unroaded and a Candidate Protected area, though it is less than 60 years old.

The tables distinguishes between areas which are Parks or FSC Candidates for protection ('Committed') from the other cores.

The Boreal Standard text above calls for a target of at least 20% of the Hearst Forest. Currently, 31% of the land of the Hearst Forest is within one of these cores.
# 2018 High Conservation Value Forest Report for the Hearst Forest

<table>
<thead>
<tr>
<th>Committed Cores (Parks and Candidates for Protection)</th>
<th>Land Area (ha)</th>
<th>Average Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>C15</td>
<td>15,083</td>
<td>136</td>
</tr>
<tr>
<td>C99</td>
<td>1,105</td>
<td>107</td>
</tr>
<tr>
<td>D8</td>
<td>21,453</td>
<td>120</td>
</tr>
<tr>
<td>P2 - Nagag</td>
<td>16,772</td>
<td>118</td>
</tr>
<tr>
<td>P21 - Missin</td>
<td>29,113</td>
<td>100</td>
</tr>
<tr>
<td>X7</td>
<td>502</td>
<td>137</td>
</tr>
<tr>
<td>X9</td>
<td>1,202</td>
<td>104</td>
</tr>
<tr>
<td>X13</td>
<td>4,105</td>
<td>116</td>
</tr>
<tr>
<td>X22</td>
<td>13,566</td>
<td>113</td>
</tr>
<tr>
<td>X27</td>
<td>7,538</td>
<td>93</td>
</tr>
<tr>
<td>P-Pichogen</td>
<td>2,921</td>
<td>114</td>
</tr>
<tr>
<td>P-Nagag</td>
<td>5,597</td>
<td>112</td>
</tr>
<tr>
<td>P-Fush</td>
<td>3,857</td>
<td>88</td>
</tr>
<tr>
<td>P-Dube</td>
<td>1,122</td>
<td>136</td>
</tr>
<tr>
<td>Ebbs</td>
<td>18,728</td>
<td>91</td>
</tr>
<tr>
<td>total</td>
<td>142,663</td>
<td>110</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Cores</th>
<th>Land Area (ha)</th>
<th>Average Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>A31</td>
<td>11,702</td>
<td>115</td>
</tr>
<tr>
<td>A34</td>
<td>7,294</td>
<td>106</td>
</tr>
<tr>
<td>A/F4</td>
<td>5,488</td>
<td>130</td>
</tr>
<tr>
<td>A/F25</td>
<td>14,713</td>
<td>110</td>
</tr>
<tr>
<td>A/F29</td>
<td>6,626</td>
<td>88</td>
</tr>
<tr>
<td>B12</td>
<td>17,294</td>
<td>103</td>
</tr>
<tr>
<td>B17</td>
<td>11,050</td>
<td>103</td>
</tr>
<tr>
<td>B24</td>
<td>3,525</td>
<td>133</td>
</tr>
<tr>
<td>B26</td>
<td>26,178</td>
<td>105</td>
</tr>
<tr>
<td>B33</td>
<td>22,367</td>
<td>101</td>
</tr>
<tr>
<td>C6</td>
<td>27,235</td>
<td>116</td>
</tr>
<tr>
<td>C10</td>
<td>10,117</td>
<td>106</td>
</tr>
<tr>
<td>D30</td>
<td>19,448</td>
<td>94</td>
</tr>
<tr>
<td>F16</td>
<td>1,175</td>
<td>127</td>
</tr>
<tr>
<td>Cochalgo</td>
<td>2,977</td>
<td>151</td>
</tr>
<tr>
<td>Dishnish</td>
<td>1,906</td>
<td>108</td>
</tr>
<tr>
<td>Franz</td>
<td>10,379</td>
<td>101</td>
</tr>
<tr>
<td>Goat</td>
<td>2,971</td>
<td>97</td>
</tr>
<tr>
<td>Irish</td>
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<td>142</td>
</tr>
<tr>
<td>Marjorie</td>
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<td>94</td>
</tr>
<tr>
<td>Pelletier</td>
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<td>100</td>
</tr>
<tr>
<td>Verdun</td>
<td>1,298</td>
<td>140</td>
</tr>
<tr>
<td>Walls</td>
<td>4,191</td>
<td>109</td>
</tr>
<tr>
<td>total</td>
<td>221,865</td>
<td>107</td>
</tr>
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</table>

**Grand Total** 364,528

**Hearst Forest Land** 1,193,201
Literature Cited


Personal Communication

Anne Genier-Gardiner, MNR Biologist, Hearst District

Marc Johnson, birder, Hearst