A Coarse-Level, Rapid Biodiversity Assessment of the Large Islands in Lake Temagami, Ontario

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EXECUTIVE SUMMARY

1. Continued logging of ancient forests and increasing recreational activity has raised concern over the conservation of the many large and relatively pristine islands on Lake Temagami, which is the largest lake in the Temagami region of central Ontario. The goal of this study was to identify, assess, and document the significant and valuable biodiversity features of all the large islands (>20 ha) in Lake Temagami, which also involved assessing large islands throughout the other portions of the Temagami Management Unit (TMU). These features included primarily old-growth forests, pristine landscapes, rare plants, and rare forest communities.

2. In total there are 39 large islands in the TMU and 20 are located in Lake Temagami. Even at a coarse scale, island biogeographical phenomena were evident in the results of this study. Island "isolation" was defined as the greatest distance of open water between any two islands in a chain of islands that is located between an island and the mainland, whereas "distance to shore" is simply the shortest straight-line distance between the island and the mainland. No significant relationships were found between island biology and distance to shore, however, we did find that as island isolation increased, mean stand age, white cedar abundance, and white pine abundance decreased, and balsam fir and poplar abundance increased. These relationships in combination with the lack of relationship between island biology and distance to shore suggest that the stepping-stone effect is operative even in a mid-sized freshwater lake. In other words, it appears that the age and species of trees on an island are affected more by the biology of nearby islands that act as sources of colonization than by the biology of the closest portion of mainland. In addition, we found that mean stand age, abundance of white pine, and island area all increase as island perimeter increases. Although island area was not directly related to any of the biological variables, through its association with perimeter it may also be positively associated with mean stand age and white pine abundance. In general, larger islands have greater species richness.

3. Using criteria developed by the Ontario Ministry of Natural Resources (OMNR) combined with Forest Resource Inventory (FRI) map data it was determined that (a) 11 of the Lake Temagami islands (67% by area) are classified as >95% old growth, (b) three of the islands (8% by area) have no old growth at all, and (c) six islands (27% by area) have a partial component of old growth.

4. Of the 17 islands with FRI old-growth forest, six are dominated by old-growth white pine forest, five are dominated by old-growth white birch forest, three are dominated by old-growth red pine forest, two are dominated by old-growth white cedar forest, and one is dominated by old-growth poplar forest.

5. There are a total of 30 white pine-dominated stands (33.9% of all island area) and ten red pine-dominated stands (13.1% of total island area) that are classified as old growth based on the OMNR criteria and data. Old-growth red and white pine forests are among the world's most endangered ecosystems. Together, old-growth red and white pine dominated stands make up 47.0% of the FRI old-growth forest compared with 27.7% for all other FRI old-growth forest types combined.

6. Those island stands that were not classified as FRI old growth were aged using field data and all were found to qualify as old-growth forest according to OMNR criteria. Stand classification changed to old growth when ages from tree cores were used because FRI maps tend to underestimate ages of the island stands.

7. Our plot-based, quantitative results support the hypothesis that the coarse woody debris (CWD, includes both snags and logs) component of old-growth forests on the islands increases in volume with increasing stand age. Many studies have documented the importance of CWD as habitat for both rare and common species of wildlife. These islands have some of the oldest trees in the province with many over 200 years old - the oldest found being a 394-year old white pine. Our results show that as the forest

stands on the islands get older, there is also an increase in the amount of white pine snags, red pine snags, all conifer snags combined, all snags combined, red pine logs, white cedar logs, all conifer logs combined, all logs combined, and all coarse woody debris combined. A portion of the forest stands on these islands have some of the highest CWD volumes found in any old-growth forests in the Temagami region as well as in the Province of Ontario.

8. A total of 13 different forest community types occur on the large islands in Lake Temagami. Of these, ten are rare (<5% cover in the TMU) and make up a total of 1,145 ha or 57% of the total study area (2001 ha). Five community types on these islands occur in very high concentrations including white cedar-lowland hardwood, white pine-red pine-white spruce-white birch-trembling aspen, white pine-largetooth aspen-red oak, red pine, and white pine-red pine. Most of these five community types include at least some endangered old-growth red and white pine forest.

9. Without even considering natural heritage values other than forest community rarity, this high concentration of five rare community types as a group is an excellent candidate for protection. By including these community type occurrences together in the same reserve, representation would be maximized by including numerous community types and integrity would also be maximized by creating one larger connected reserve rather than several smaller separate reserves. Additional legal protection of these endangered old-growth red and white pine ecosystems has been called for by the OMNR.

10. Relative to stands on the large islands throughout the remainder of the TMU, stands on large islands in Lake Temagami are 34% older, have 114% more white pine, have 408% more red pine, have 10% higher tree species richness per stand, and have 307% less balsam fir. The largest water gap in the chain of islands that connects each large island to the mainland is 67% less than those in lakes throughout the remainder of the TMU. This difference in isolation suggests that the Lake Temagami islands are biogeographically different from large islands elsewhere in the TMU. This is likely due to the occurrence of many smaller islands in Lake Temagami which act as stepping-stones or connections to the mainland.

11. Nine rare plant species were found on a subset of the large islands in Lake Temagami.

12. The extent of non-industrial cutting varied on these islands from rare stumps to intensive cutting, although all islands appear to be mostly pristine. The results of one survey of an area of intensive cutting on Cattle Island showed that the mean basal area of the area cut is 83% of the basal area of the remaining trees. This intensity of cutting is comparable to a 45% industrial shelterwood cut.

13. Old cedars were found on rocky shoreline sites where they are protected from fire and where their roots are confined, creating a bonsai effect. The oldest white cedar had 498 growth rings, however, due to heart rot it was impossible to determine how much older it actually was when it died. With its many islands and cliffs, Temagami may be comparable to the Niagara Escarpment in its potential for supporting extremely old cedars. It is highly likely that additional searching in Temagami will uncover cedars with more than 498 growth rings. Further research is needed to determine the extent of ancient cedars and to characterize their habitat.

14. We found evidence of a large population of deer on Papoose Island and we observed that moose are using some islands and not others. Signs of pileated woodpecker, beaver, pine marten, and black bear were also observed and sightings of broad-winged hawk, merlin, and other bird species were recorded. Two loon nests located in small sheltered bays were found on two of the large islands.

15. This study focused on less than 2% of the 1,000+ islands in Lake Temagami and for those islands that were studied, only a coarse-level rapid survey approach was used. Although this approach is typically the first step in developing a conservation strategy, these results provide only a partial

understanding of the biodiversity and ecological processes on these islands. If long-term conservation of the islands in Lake Temagami is desired, a complete ecological inventory (geology, soils, plants, insects, birds, mammals, wetlands, streams, lakes, cliffs, etc.) of the islands should be the ultimate goal. Because of the enormity of this task, however, it will be necessary to develop an inventory-based research plan that can be implemented in stages over the course of many years. Central to this plan would be (1) identification and ranking of all threats to the ecological integrity of the islands, (2) development of a data collection system that facilitates and integrates involvement by the local community, professional conservation scientists, and academic experts including student projects, and (3) creation and maintenance of an information database so that knowledge will not be lost, can be passed on from one database manager to the next, and can be made accessible to interested parties.

16. The abundant and dense red pine forests on the large islands in Lake Temagami provide an excellent opportunity to conduct forest fire studies. The uninhabited islands are ideal sites for fire history studies, prescribed burn research, and for experimenting with other types of understory and ground litter removal techniques. Results of these studies could be used to improve red pine regeneration in stands that are managed for fiber production as well as those that are managed for their old-growth characteristics.

17. With its myriad of islands, Lake Temagami is an ideal natural laboratory for the study of island biogeography. Of particular interest are studies that relate size and isolation of islands to their wildlife populations. These studies could provide insight into forest fragmentation theory and would be applicable to forest conservation issues throughout the TMU and beyond where fragmentation has occurred due to industrial forestry. These studies need not be limited to any one species or group of species.

18. Almost 100% of the large islands in Lake Temagami are composed of pristine old-growth forests. Roughly half of these forests are endangered red and white pine ecosystems, more than half of them are rare throughout the TMU, and numerous rare plants are found in them. Given the high volumes of CWD in many of these island forests and the unique biogeography of island ecosystems, it is highly likely that an animal community distinct from mainland communities exits on these islands. Their natural heritage value is equivalent to any of the protected areas in the TMU.

INTRODUCTION

Relative to the study of oceanic islands that have been studied for more than a century (Darwin 1859, Wallace 1902, MacArthur and Wilson 1967, Carlquist 1974, Williamson 1981, Whittaker 1998), and continental habitat islands that have been studied for more than a half century (Curtis 1956, Harris 1984), the study of freshwater islands has been significantly neglected. For example, in *Island Biology*, Carlquist (1974) speaks only of freshwater lakes as a type of "aquatic" island, and in the most recent text addressing the biology and geography of islands, Whittaker (1998) does not explicitly include freshwater islands in his island classification scheme. Despite a lack of focus on freshwater islands by the research community, continued logging of ancient forests and increasing recreational activity has raised concern over the conservation of the many large and relatively pristine islands on Lake Temagami - the largest lake in the Temagami region of central Ontario (Figs. 1 and 2).

To date, only two of these islands have been protected for their biodiversity (natural heritage) value – Narrows Island and Temagami Island North (OMNR 2002a, 2002b). However, neither of the *Statements of Conservation Interest* (OMNR 2002a, 2002b) prepared for these two islands includes information derived from field surveys (e.g., rare plants, actual vs. estimated tree ages, etc.) nor was their selection as reserves based on a comprehensive comparative analysis of all the large islands in Lake Temagami. Thus, the values of these two island reserves relative to the other large islands in the lake are currently unknown. The goal of this study was to identify, assess, and document the significant and valuable biodiversity features of all the large islands (>20 ha) in Lake Temagami. These features included primarily old-growth forests, pristine landscapes, rare plants, and rare forest communities. The value of these features for recreation, education, and scientific research are also briefly addressed.

METHODS

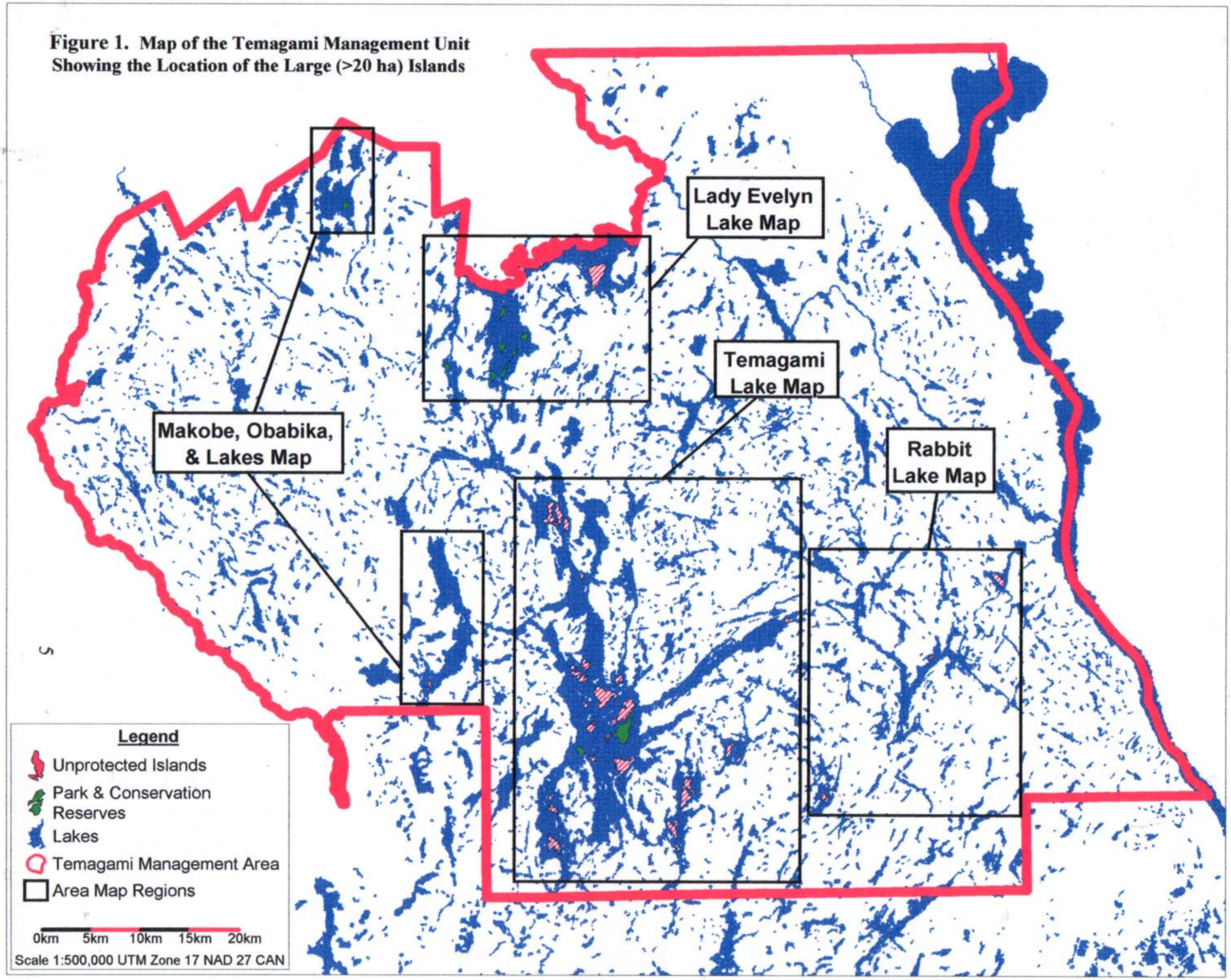
Island Definition

All islands greater than 20 ha in Lake Temagami were assessed for ecological and geographic features, and all islands larger than 20 ha outside of Lake Temagami but within the Temagami Management Unit (TMU) were also assessed for many of the same features in order to make basic comparisons with the Lake Temagami islands. In total, 20 islands in Lake Temagami (Appendices 1-12; a large-scale map of Bear Island was not included because it does not have any crown land) and 19 islands outside of Lake Temagami were included in this study (Figs. 2-5). Islands in Lake Temagami were differentiated from mainland whenever water separated the two according to the *Lake Temagami Shoal Map* (Temagami Lakes Association 2001). For islands that were very close to the mainland, field checks were made to confirm island status. The Lake Temagami island identification numbers shown on the Shoal Map were used throughout this study. To distinguish the islands outside of Lake Temagami, the 1:20,000 topographic maps were used.

Biogeography

Some fundamental biogeographical attributes of all 39 islands were assessed and analyzed. Area and perimeter were calculated using geographic information system software (MapInfo). Shape was also calculated for each island and is defined as island perimeter divided by area. Distance from shore was measured as the shortest straight-line distance from each island to the mainland. Two measures were used to account for the effect of other islands which may act as pathways of colonization for an island, know as the stepping stone effect (MacArthur and Wilson 1967). Isolation was defined as the greatest distance of open water between any two islands in a chain of islands that occurs between an island and the

Figure 1. Map of the Temagami Management Unit Showing the Location of the Large (>20 ha) Islands



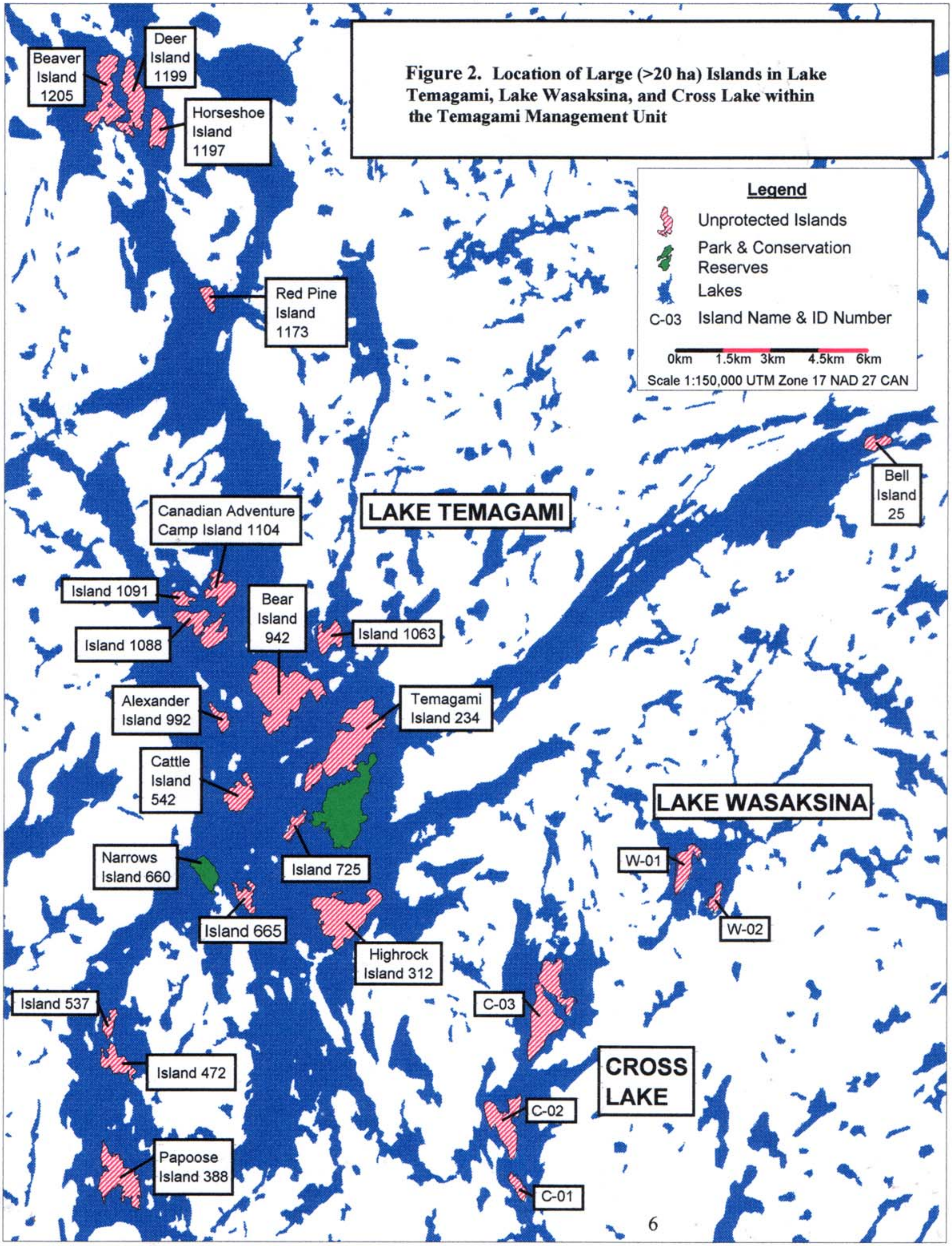


Figure 2. Location of Large (>20 ha) Islands in Lake Temagami, Lake Wasaksina, and Cross Lake within the Temagami Management Unit

mainland. This measure, however, does not account for the number of water gaps that must be crossed by an organism in a particular island chain to travel from the mainland to the destination island. Thus, the number of steps was defined as the total number of island water gaps between the mainland and the destination island. These geographic island variables were related to the mean age of island forests and the abundance of all tree species on the islands as assessed from Forest Resource Inventory (FRI) Maps (Ontario Ministry of Natural Resources 1991)

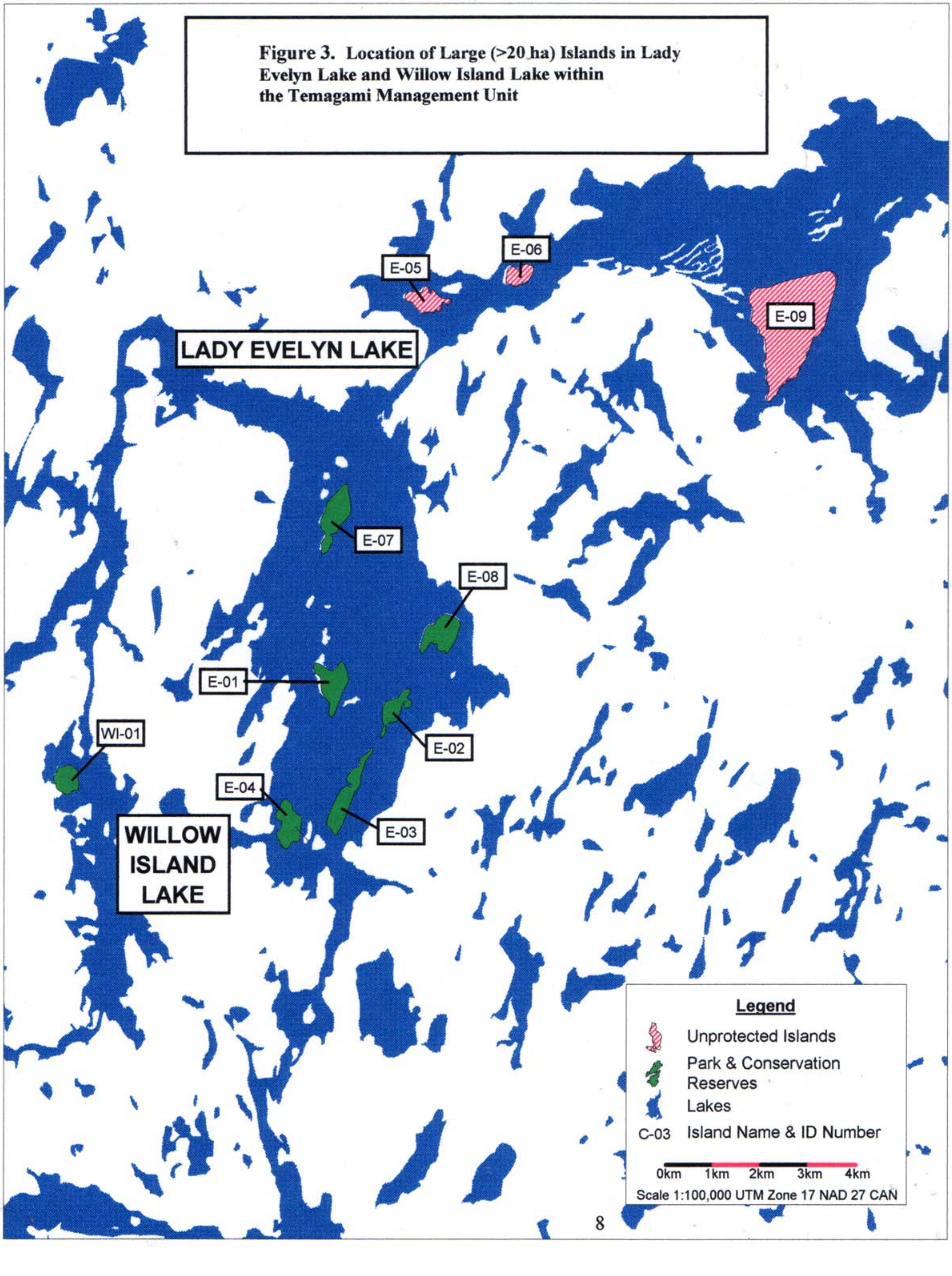
Identifying Stands of Old-Growth Forest from Maps

Since the landscape of the TMU is dominated by forest ecosystems, the FRI Maps for the area were used to assess some basic forest stand attributes, including tree composition and age. Using the FRI age data in combination with the OMNR publication, *Old Growth Forest Definitions for Ontario* (Uhlig et al. 2001), it was possible to characterize stands on the Lake Temagami islands as either "FRI old growth", or "FRI non-old growth". Because these definitions are categorized by ecosite in this OMNR publication, we classified each of the FRI stands on the Lake Temagami islands by ecosite using the *Detailed Ecosites for the Temagami Management Unit Area Map* (Ontario Ministry of Natural Resources 2002). The minimum old growth age for each ecosite type is listed in Table 3 of the OMNR's Old Growth Definitions report (Uhlig et al. 2001) (see Appendix 1). Using the "species-specific old growth onset ages" available from this table, the dominant tree species in the FRI stand, and the age of each FRI stand (in 2002), we were then able to determine which stands qualify as old growth and which do not. For example, an FRI stand dominated by white pine that is classified within Ecosites 11-14, would have a species-specific old growth onset age of 150 years. Because aerial photography for the FRI maps was taken in 1989, stand ages on these maps were adjusted to 2002 ages by adding 13 years. All stands on the Lake Temagami islands which did not meet OMNR's minimum age requirement for old growth were surveyed using a qualitative approach. A sub-set of those stands that did meet OMNR's minimum age requirement for old growth were sampled using a quantitative approach.

Qualitative Surveys of FRI Non-Old Growth Stands

Transects were placed through each forest stand at an intensity of 40 linear meters of transect per hectare of stand, and were located to sample the topographic (or habitat) variation of the stand. For each 150 meters of transect (equal to 3.75 hectares of stand area), the largest tree in line of sight was aged using an increment borer, and a species list was compiled of all vascular plant species encountered along the transect. Plant species nomenclature is based on Chambers et al. (1996). When selecting trees to age, we generally avoided species known to be very fast growing and therefore probably not very old for their size, and trees that appeared likely to have heart rot. In cases where trees with heart rot were unavoidable, some additional years were added to the ring count to compensate for the missing years. The estimate for these additional years was based on the assumptions that trees grow faster in their younger years (near the center) and that the increment borer causes some compression of the core so that the length of the extracted core that includes the pith will never be the exact radius of the tree. Thus, the following formula was used to estimate the additional years: [(radius of tree - length of core - 5cm) x (the number of rings/cm counted) x (½)]. It should be noted that ages estimated using this formula were very similar to the complete ring count ages of nearby trees of the same species and similar diameter, however, most trees cored for age estimates did not have heart rot. In addition, anecdotal observations were recorded along transects including the presence of trails, evidence of historical logging or mining, evidence of wildlife activity, etc. Private lands and Bear Island were not visited for any part of the study.

Figure 3. Location of Large (>20 ha) Islands in Lady Evelyn Lake and Willow Island Lake within the Temagami Management Unit



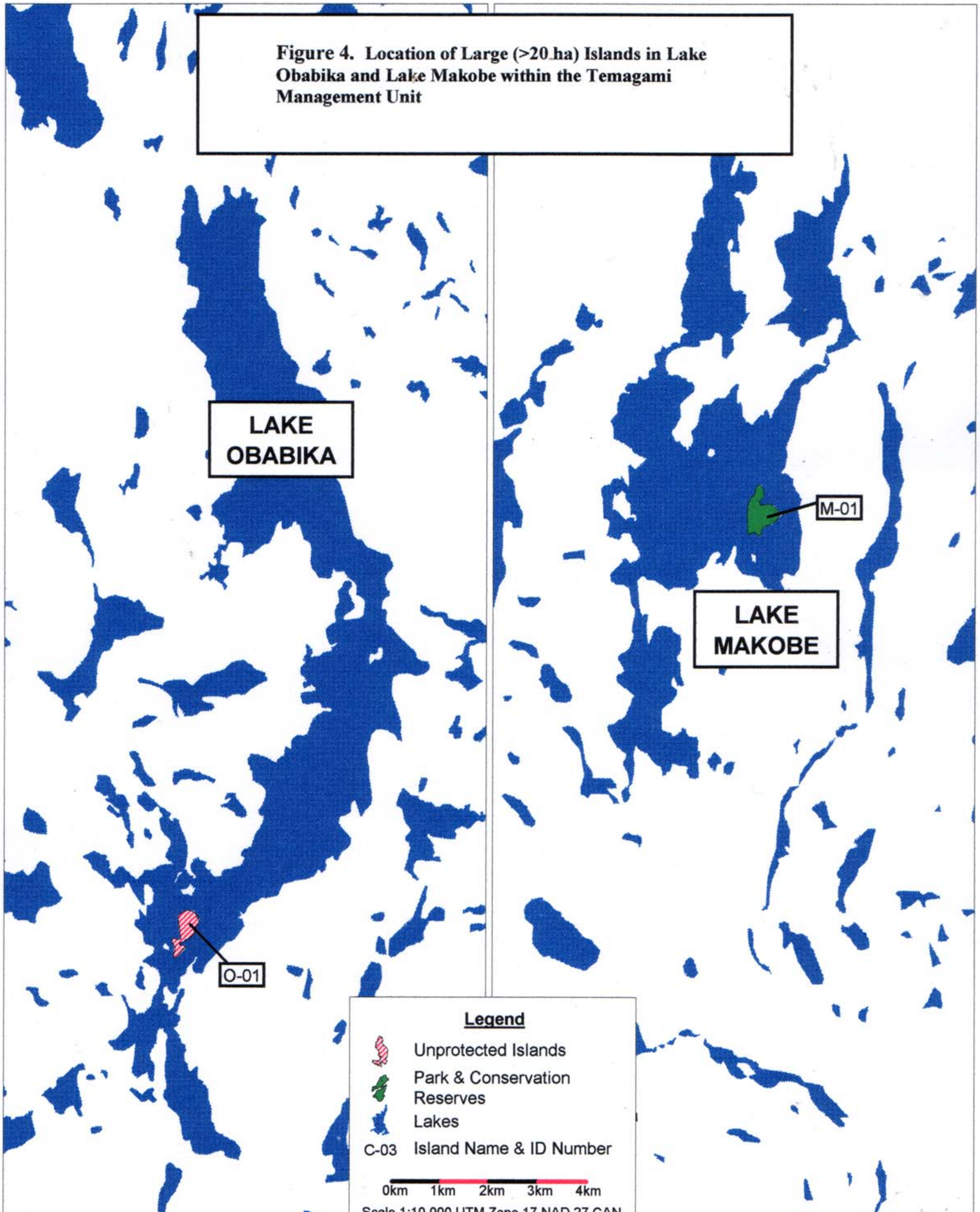


Figure 4. Location of Large (>20 ha) Islands in Lake Obabika and Lake Makobe within the Temagami Management Unit
LAKE OBABIKA
LAKE MAKOBE
M-01
O-01
Legend
Unprotected Islands
Park & Conservation Reserves
Lakes
C-03 Island Name & ID Number
0km 1km 2km 3km 4km
Scale 1:10,000 UTM Zone 17 NAD 27 CAN

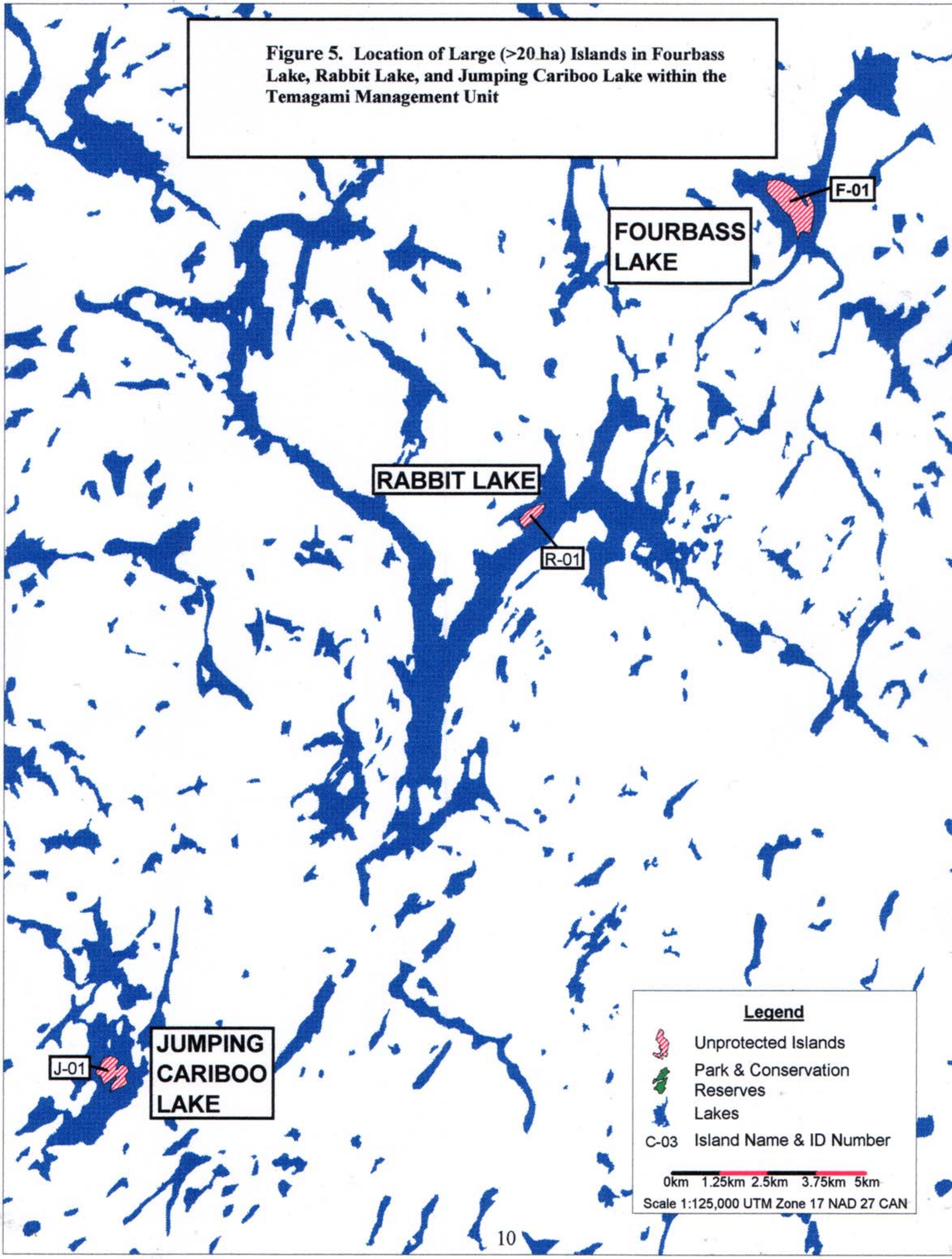


Figure 5. Location of Large (>20 ha) Islands in Fourbass Lake, Rabbit Lake, and Jumping Cariboo Lake within the Temagami Management Unit

Quantitative Surveys of FRI Old-Growth Stands

Relative to other parts of the central Ontario region, some of the oldest forest stands are found on the large islands in Lake Temagami (Isles 1990, Quinby et al. 1996). And, relative to young forests, older forests (or old-growth forests) generally have higher quantities of coarse woody debris (snags and logs), which are directly beneficial as habitat for many species of wildlife and essential for some species (Hunter 1990, Davis 1996). Given that greater quantities of coarse woody debris generally provides greater amounts of valuable wildlife habitat, we theorize that the oldest of the old-growth forests will have the greatest quantity of coarse woody debris and therefore will provide the greatest amount of high quality wildlife habitat. The purpose of this component of the study, therefore, was to test the hypothesis that the oldest of the old-growth forests on the Lake Temagami islands have the greatest quantity of coarse woody debris.

To test this hypothesis, a subset of stands which met the OMNR's old growth criteria was sampled for stand age, trees, snags, and logs in the field. To ensure that our sample was representative of the variety of forest community types, these stands were classified by ecosite types, at least one stand in each ecosite was sampled, and a minimum of three plots were sampled in each stand. For those ecosites with more than three plots, samples were apportioned among ecosite types relative to the area occupied by each ecosite type for those stands identified as FRI old growth. The exception to this was the most common type, ecosite 21, which was under-represented in the sample due to time constraints. Because age was the key independent variable in this study, stands representing a wide range of ages were chosen for sampling. When a diversity of stand composition existed within one ecosite type, stands were selected which were more uniform in composition rather than more variable so that the effect of age could me more easily isolated. Where possible, stands within an ecosite were selected from different islands, however logistics were also a factor.

Within each sampled stand, transects were located in order to sample the topographic variation of the stand. A list of all vascular plant species encountered along the transect was compiled. Every 150 meters along the transect a 40 m x 10 m plot was established. Within each plot we recorded the diameter at breast height (dbh) and species of all trees and snags, and the length and diameter at each end of all logs. Two trees occurring within a 50-meter radius of each plot were aged using an increment borer. Anecdotal observations were also recorded.

Rare Forest Community Types and Representation

The *Detailed Ecosites for the Temagami Management Unit Area Map* (Ontario Ministry of Natural Resources 2002) was used to determine the ecosite composition of each island over 20 ha in Lake Temagami. Knowing the abundance of each ecosite throughout the entire TMU it was possible to identify the rare ecosites in the TMU, which were defined as those with an aerial extent of 5% or less. Using these rare ecosite data, it was then possible to determine which of the rare ecosites in the TMU occur on the Lake Temagami islands greater than 20 ha and the extent of each.

Using both geographic variables and biological variables obtained from FRI maps, the Lake Temagami islands were compared with the rest of the large islands in the TMU. These variables included island size, island perimeter, island shape, distance to shore, isolation, number of steps, the abundance of all tree species assessed on FRI maps, the number of tree species present in each stand, and the number of stands on each island. The results of these variable comparisons were used to characterize differences in island features that are represented by each group of islands.

Rare Plants

The list of vascular plant species that was compiled from both the qualitative and quantitative surveys was compared with a list of rare plants for the TMU (White 1990, Quinby 1996) to produce an initial list of rare plant species that are found on the 20 largest islands in Lake Temagami. This list is based on only a very small sample of each island and therefore, represents only a portion of all rare plants that occur on these islands.

Integrity

Evidence of historical logging was recorded whenever it was encountered during the surveys that were conducted to assess other island features. A detailed inventory of a logged area was conducted on Cattle Island as an example of severe human disturbance. This inventory consisted of two 10 x 40 m plots in which all living trees, standing dead snags, and cut stumps were inventoried. Stumps were recorded by measuring the diameter across the top.

Old White Cedar

Old, dead white cedars were located along the shoreline of islands where field work was done or on other islands in the vicinity of sampled islands. Two of the islands where old cedars were aged were less than 20 ha in size and therefore were not included in other aspects of this study. Trees were cut and aged by counting growth rings on cross sections.

Wildlife

The presence of wildlife species and the signs of wildlife were observed and recorded.

Statistical Analysis

The software program Minitab was used to perform statistical analysis. Pearson product-moment correlations were used to examine relationships between and among variables and the t-test was used to identify mean differences with statistical significance.

RESULTS AND DISCUSSION

Biogeography

An ecological study of islands would not be complete without considering their biogeography. The biogeographical analysis revealed (1) that island isolation is negatively correlated with mean stand age (-.4674), white cedar (-.3726), and white pine (-.4455), and positively correlated with balsam fir (.4252) and poplar (.4123) and (2) that island perimeter is positively correlated with mean stand age (.3947) and white pine (.4015) (Table 1, also see Appendices 14 and 15). The correlation of isolation with mean stand age and four tree species versus the lack of correlation between distance to shore and these same variables suggests that the stepping stone effect, which has been addressed in the context of oceanic islands, is operative even in a mid-sized freshwater lake. MacArthur and Wilson (1967) theorized that for the average plant or animal, “dispersal across gaps of more than a few kilometers is by stepping stones wherever habitable stepping stones of even the smallest size exist”. Our results indicate that the same principles may operate even on a scale of hundreds of meters. Correlations between isolation and tree species abundance are likely due to the size and shape of the seeds, the mechanism of dispersal (e.g., wind, birds), and the timing of seed release for each of the various species. In a reservoir in Georgia, Kadmon-Ronen and Pulliam (1995) found that logged islands had significantly fewer species of woody plants than unlogged islands with similar distances from the mainland. They also found that the mechanism of seed dispersal explained the greatest amount of variation in species' ability to recolonize the logged islands. Milne and Forman (1986) found that species richness decreased on peninsulas in Maine with increasing distance from the mainland.

Table 1. Significant Correlations between Geographic and Biological Variables for the Large Islands in the Temagami Management Unit (total of 39 islands; p<.05; ns = not statistically significant)

Geographic Variables	Biological Variables				
	Mean Stand Age	Balsam Fir	Poplar	White Cedar	White Pine
Isolation	-.4674	.4252	.4123	-.3726	-.4455
Perimeter	.3947	ns	ns	ns	.4015

Island perimeter was positively correlated with both mean stand age (.3947) and the abundance of white pine (.4015). Although island area was not directly correlated with any of the biological variables, through its association with perimeter (r=.95, p<.000) it also may be positively associated with mean stand age and white pine abundance. In contrast to perimeter effects on island biota, area effects have been documented much more extensively. In general, larger islands have greater species richness on both oceanic islands (e.g., Whittaker 1998) and on freshwater islands (Dean and Bond 1990, Tangney et al. 1990).

These results involving island area may reflect, at least in part, the differences between the 20 large islands found on Lake Temagami, which has its own unique forest composition and history, and the 19 islands found elsewhere in the TMU. For example, isolation is significantly lower for islands in Lake Temagami (mean = 57 m) versus those throughout the remainder of the TMU (mean = 95 m). Additional differences between the Lake Temagami Islands and the other TMU islands are addressed in the section on representation.

Identifying Stands of Old-Growth Forest from Maps

Based on OMNR criteria, (1) 11 of the Lake Temagami islands (67% by area) are classified as >95% old-growth, (2) three of the islands (8% by area) had no old-growth at all, and (3) six islands (27% by area) have a partial component of old-growth (Table 2; see also Appendix 3 for additional FRI information). Of the 17 islands with FRI old growth forest, six are dominated by old-growth white pine forest, five islands are dominated by old-growth white birch forest, three islands are dominated by old-growth red pine forest, two islands are dominated by old growth white cedar forest, and one island is dominated by old growth poplar forest. There are a total of 30 white pine-dominated stands (33.9% of all island area) that are designated old growth based on the OMNR data and 10 red pine-dominated stands (13.1% of total island area) (Table 3). Together, old-growth red and white pine dominated stands make up 47.0% of the FRI old-growth forest compared with 27.7% for all other old growth forest types combined.

Table 2. Old-Growth Forest Stands on Large Islands on Lake Temagami as Determined from Data and Criteria Provided by the Ontario Ministry of Natural Resources

Island No.	Island Name	Island Area (ha)	Community Dominance Type	No. of Stands	Total Stand Area (ha)	% of Island	% of Old Growth
25	Bell	29	none	0	0	0.0	0.0
234	Temagami	522	White Pine	11	288	55.2	57.9
			Sugar Maple	3	89	17.0	17.9
			Poplar	4	54	10.3	10.9
			Yellow Birch	2	34	6.5	6.8
			White Cedar	1	19	3.6	3.8
			Red Pine	1	13	2.5	2.6
			Total	22	497	95.2	100.0
312	High rock	204	White Birch	1	46	22.5	57.5
			Red Pine	1	34	16.7	42.5
			Total	6	80	39.2	100.0
388	Papoose	133	White Pine	3	92	69.2	69.2
			Yellow Birch	1	21	15.8	15.8
			White Cedar	1	20	15.0	15.0
			Total	5	133	100.0	100.0
472		57	White Cedar	5	35	61.4	61.4
			White Pine	2	22	38.6	38.6
			Total	7	57	100.0	100.0
537		25	White Cedar	1	25	100.0	100.0
660	Narrows	53	Red Pine	3	53	100.0	100.0
665		37	Poplar	4	37	100.0	100.0
725		29	White Birch	2	29	100.0	100.0
849	Cattle	68	White Birch	3	25	36.8	100.0
964	Bear	247	White Pine	4	106	42.9	70.7
			White Birch	1	22	8.9	14.7
			Red Pine	1	12	4.9	8.0
			White Cedar	1	10	4.0	6.7
			Total		150	60.7	100.0
992	Alexander	27	White Birch	4	27	100.0	100.0
1063		58	White Pine	2	29	50.0	100.0

Table 2. Old-Growth Forest Stands on Large Islands on Lake Temagami as Determined from Data and Criteria Provided by the Ontario Ministry of Natural Resources (continued)							
Island No.	**Island Name**	**Island Area (ha)**	**Community Dominance Type**	**No. of Stands**	**Total Stand Area (ha)**	**% of Island**	**% of Old Growth**
1088		101	none	0	0	0.0	0.0
1091		23	none	0	0	0.0	0.0
1104		66	Red Pine	1	66	100.0	100.0
1173	Red Pine	26	White Pine	3	26	100.0	100.0
1197	Horseshoe	58	Red Pine	2	46	79.3	100.0
1199	Deer	131	White Pine	1	90	68.7	68.7
			Red Pine	1	41	31.3	31.3
			Total	2	131	100.0	100.0
1205	Beaver	132	White Birch	2	38	28.8	36.9
			White Pine	4	34	25.8	33.0
			Poplar	1	31	23.5	30.1
			Total	7	103	78.0	100.0

Table 3. Summary of FRI Old-Growth Stand Composition and Abundance for all Islands on Lake Temagami					
Community Dominance Type	**Number of Stands**	**Stand Relative Abundance (%)**	**Total Stand Area (ha)**	**Total Stand Area as % of Old Growth**	**Total Stand Area as % of Island**
White Pine	30	39	687	45.4	33.9
Red Pine	10	13	265	17.5	13.1
White Birch	13	17	187	12.4	9.2
Poplar	9	12	122	8.1	6.0
White Cedar	9	12	109	7.2	5.4
Sugar Maple	3	4	89	5.9	4.4
Yellow Birch	3	4	55	3.6	2.7

Qualitative Surveys of FRI Non-Old Growth Stands

Those island stands that were not classified as FRI old growth were aged using increment borers and all were found to qualify as old growth forest according to OMNR criteria (Table 4). Areas not visited included all private land that was FRI non-old growth, which made up only 1.7% of the study area, and Bear Island (see also Appendix 16). Each FRI non-old growth stand sampled in the field converted to the old growth classification once the cores were aged simply because FRI maps tend to underestimate the true ages of these FRI non-old growth stands. In contrast, the core ages from FRI old growth stands

(Table 5) are relatively close to the FRI ages of those stands. Core ages were on average 12% higher than FRI ages in these stands, whereas core ages of the FRI non-old growth stands were on average 75% higher than the FRI stand ages. Thus, FRI stand ages for our FRI old growth stands were slightly underestimated compared with severe underestimation of FRI stand age for the FRI non-old growth stands. We advise extreme caution when using ages provided on FRI maps, particularly in cases where ages are critical to the management outcome – as with identifying old growth forest stands for example. Ages derived from tree cores taken in the field should be obtained whenever possible when tree or stand age is a variable of interest.

Table 4. Summary of Qualitative Surveys of FRI Non-Old Growth Crown Land Stands (sorted by Island Number)

Isle No.	FRI Data			Ecosite Data			Tree Core Data				
	FRI Stand No.	WKGP	FRI Age (2002)	Ecosite	SOG Age	EOG Age	No. Trees Cored	Min. Age	Max. Age	Mean Age	Old Growth Presence
25	9714 & 14	Ce	113	ES 21	120	120	3	127	195	161	Yes
312	2362	Pw	123	ES 20	150	140	13	116	254	186	Yes
312	2556	Pw	123	ES 20	150	140	2	166	265	215	Yes
312	3366	Pw	68	ES 11	150	130	16	108	236	154	Yes
849	9203	Pw	103	ES 21	150	120	10	114	249	169	Yes
1063	2149	Bw	83	ES 21	90	120	7	89	251	153	Yes
1063	2655	Ce	128	ES 33	150	130	2	143	163	153	Yes
1088	7759	Pw	103	ES 20	150	140	5	130	205	186	Yes
1088	8653	Pw	103	ES 20	150	140	18	114	252	192	Yes
1091	7565	Pr	103	ES 16	140	110	5	113	216	165	Yes
1197	6910	Bw	53	ES 21	90	120	2	132	242	187	Yes
1205	5118	Bw	73	ES 17	90	90	7	114	162	131	Yes

Definitions:
FRI – Forest Resource Inventory
SOG – species-specific old growth onset age
EOG – Ecosite-specific old growth onset age
WKGP – FRI Working Group (dominant tree species)

NOTE: island 964 (Bear Island) and private land are not included in this table because no field sampling occurred on in these areas.

Ab – Black Ash
B – Balsam Fir
Bw – White Birch
By – Yellow Birch
Ce – Cedar
Or – Red Oak
Mh – hard maple (sugar maple)
Ms – Soft Maple (red maple)
Pj – Jack Pine
Po – Poplar
Pr – Red Pine
Pw – White Pine
Sb – Black Spruce
Sw – White Spruce

Some might argue that core sampling in the field was not adequate to accurately estimate the age of the FRI non-old growth stands. However, multiple core samples in each stand were randomly placed along transects that followed the topographic gradients of each stand. In all cases, the average ages of these cores exceeded both the species-specific, and the ecosite specific minimum ages for the stand (Table 4). Our observations of these stands confirmed that there was generally a significant component of old trees. In several cases a super-canopy of old growth red pine was mixed throughout a stand of somewhat younger trees (Photo 16, Appendix 20). See Appendices 18 and 19 for a list of plant species encountered during the field surveys.

Quantitative Surveys of FRI Old-Growth Stands

Old growth is a broad term which encompasses a huge range of forest ages and community types. A forest which barely meets the old growth criteria will not have the same characteristics as a 250-year old forest, for example (Hunter 1990, Davis 1996, Lofroth 1998). For this part of the study, it was hypothesized that the coarse woody debris (CWD) component (snags and logs) of old-growth forests on the islands increases in volume with increasing stand age. Given the importance of CWD as habitat to many species of wildlife (Quinby 1996b, MacKinnon 1998, McComb and Lindenmayer 1999) and given the relatively old forests of the Lake Temagami islands, it is likely that these islands provide unique and valuable habitat for wildlife. In fact, our results support this hypothesis.

The large islands in Lake Temagami have some of the oldest trees in the province with many over 200 years old (Photos 9, 13 and 14, Appendix 20) - the oldest found being a 394 year old white pine on island 1063 (excluding the shoreline cedar; Table 5). In the Temagami region, only the White Bear Forest is known to have older interior forest trees.

Table 5. A Comparison of Ages of FRI Old-Growth Stands Based on Forest Resource Inventory Map Data and Tree Cores (ranked by maximum age)

Isle No.	FRI Stand No.	Ecosite	No. of Plots	FRI Age	Ages from Core Samples			
					Min Age	Max Age	Mean Age	No. Cores
1063	2355	21	3	163	163	394	272	6
1199	5829	21	2	234	123	272	195	4
1197	6814	20	3	213	175	269	235	6
234	3306	33	3	190	85	259	144	6
234	2790	29	3	139	152	249	196	6
388	5279	34	3	173	113	240	185	6
312	3268	11	3	153	115	239	184	6
1199	6117	21	3	213	121	236	181	6
1173	8459	20	2	163	204	234	230	4
1205	4715	14	3	148	123	229	188	6
537	5231	21	3	133	178	217	206	6
660	8379	12	3	178	152	213	183	6
388	6179	21	3	193	161	196	182	6
388	5288	22	3	163	66	194	158	6
234	2598	17	2	113	119	191	150	4
312	2168	20	3	123	73	161	123	6
992	8827	27	3	103	105	131	117	6
1205	5233	17	2	93	99	124	113	4

Both maximum and mean core age were significantly correlated with ten CWD variables including white pine snags, red pine snags, all conifer snags combined, all snags combined, red pine logs, white cedar logs, white birch logs, all conifer logs combined, all logs combined, and all coarse woody debris combined (Table 6; Appendix 17; Photo 10, Appendix 20). In all cases except for white birch, the quantities of these variables increased with increasing stand age.

It was also found that FRI stand age was not correlated with any of the CWD variables analyzed by plot or by stand (all plots for a single stand combined). Without this relationship it is not possible to make landscape- and regional-level spatial predictions using FRI age as an indicator of CWD volume. However, with additional samples more broadly distributed it may be possible to find a relationship between FRI stand age and CWD.

Table 6. Correlations between Tree Core Age and Coarse Woody Debris (all correlations significant at p<.05)										
Tree Age	Snags				Logs					Coarse Woody Debris
	Pw	Pr	All Conifer	All Snags	Pr	Ce	Bw	All conifer	All Logs	
Maximum	.352	.278	.435	.350	.448	.429	-.328	.452	.431	.439
Mean	.366	.319	.477	.424	.382	.330	-.322	.389	.356	.372

Pw-white pine, Pr-red pine, Ce-white cedar, Bw-white birch

Due primarily to logging, the amount and diversity of CWD has been severely reduced throughout much of eastern North America (McComb and Lindenmayer 1999) including much of the TMU. However, some of the forest stands on the large islands in Lake Temagami have CWD abundances similar to findings from Quinby's 1989 survey in Temagami which included the 30 oldest and largest old-growth red and white pine stands in the region (Quinby 1991). In some cases, CWD values on the islands were found to be higher than those found by Quinby in 1989. For example, the highest log volume found on the islands (410 m^3/ha in one plot in FRI stand #2355 on island 1063) is 56% greater than the highest log volume found in Quinby's 1989 old-growth survey (263 m^3/ha). These results indicate that, in addition to their pristine character, many of these island stands are also very productive and structurally diverse. Based on (1) their old age, (2) our finding of a positive relationship between stand age and CWD, and (3) their pristine condition, we suspect that the large islands in Lake Temagami have some of the highest volumes of CWD in the Province of Ontario.

Rare Forest Community Types and Representation

Analysis of forest community types (ecosites) in the TMU, based only on species composition, shows that a number of these community types are relatively rare (Table 7). Any forest community type covering 5% or less of the TMU forested area is considered for this report as sufficiently rare to merit special consideration. This level of 5% is based partially on the following definitions developed by Noss et al. (1995): "critically endangered" as <2% remaining, "endangered" as <15% and >2% remaining, and "threatened" as <30% and >16% remaining. Additional study is required to address the ecological and biological aspects of rarity as it applies to conserving forest ecosystems at the regional scale.

A total of 13 different forest community types occur on the Lake Temagami islands. Of these, ten are rare and cover a total of 1,145 ha or 57% of the total Lake Temagami islands study area. Five community types on the Lake Temagami islands occur in amounts significantly greater compared to the expected random distribution throughout the entire TMU (Table 7, last column). These five forest community types include white cedar-lowland hardwood (7.4x more abundant than expected), white pine-red pine-white spruce-white birch-trembling aspen (6.0x more abundant than expected), white pine-largetooth aspen-red oak (5.1x more abundant than expected), red pine (3.3x more abundant than expected), and white pine-red pine (2.0x more abundant than expected). Most of these community types include old-growth red and white pine forest, which is one of Ontario's most endangered ecosystems (Quinby 1993, Quinby 1996a).

Without even considering natural heritage values other than community rarity, this high concentration of five rare community types as a group is an excellent candidate for protection. By including these community type occurrences together in the same reserve, representation would be maximized by including numerous community types and integrity would also be maximized by creating one larger connected reserve rather than several smaller separate reserves. Further legal protection of these endangered ecosystems has been called for by Uhlig et al. (2001, pg. 26): "Identifying significant examples of primary remnant old growth stands for all ecosites, including white and red pine on the Canadian Shield, would be of value for natural heritage representation".

Table 7. Ecosite Area in the Temagami Management Unit and on the Large Islands on Lake Temagami (from OMNR 2002)

Ecosite	Area of TMU (ha)	Island Area (ha)	Area of TMU (%)	Island Area (%)	Variation From Expected
23 Red Oak-Hardwood	6		0.001		
30 Hemlock-Yellow Birch	35		0.007		
24 Sugar Maple-Red Oak-Basswood	43		0.009		
25 Sugar Maple-Beech-Red Oak	92		0.019		
14 White Pine-Largetooth Aspen-Red Oak	2,058	44	0.435	2.199	5.1 x
34 White Cedar-Lowland Hardwood	2,495	78	0.527	3.898	7.4 x
32 White Cedar- Black Spruce-Tamarack	2,525		0.534		
35 Lowland Hardwood	2,772		0.586		
31 Black Spruce-Tamarack	3,861		0.816		
12 Red Pine	4,958	69	1.048	3.433	3.3 x
27 Sugar Maple- White Birch- Poplar- White Pine	9,844	27	2.080	1.349	-1.5 x
13 Jack Pine- White Pine- Red Pine	13,437	13	2.840	0.650	-4.4 x
11 White Pine- Red Pine	15,129	129	3.197	6.447	2.0 x
29 Sugar Maple- Yellow Birch	17,035	89	3.600	4.448	1.2 x
33 White Cedar- Other Conifer	17,248	67	3.645	3.348	-1.1 x
20 White Pine- Red Pine- White Spruce- White Birch- Trembling Aspen	21,856	553	4.619	27.653	6.0 x
19 Poplar- Jack Pine- White Spruce- Black Spruce	24,964		5.276		
22 White Cedar- Other Conifer	25,301	76	5.347	3.798	-1.4 x
15 Jack Pine	39,042		8.251		
17 Poplar- White Birch	50,938	178	10.765	8.916	-1.2 x
18 Poplar- White Birch- White Spruce- Balsam Fir	54,681		11.556		
21 White Cedar- White Pine- White Birch- White Spruce	71,043	655	15.014	32.710	2.2 x
16 Black Spruce- Pine	93,809	23	19.826	1.149	-17.2 x
Total	473,170	2001	100	100.000	

Comparing islands in Lake Temagami with islands occurring elsewhere in the TMU shows several significant differences (Table 8). Relative to island stands throughout the remainder of the TMU, stands on islands in Lake Temagami are 34% older, have 114% more white pine, have 408% more red pine, and have 10% higher tree species richness per stand. At minimum, the Lake Temagami islands best represent these features of large islands in the TMU. There is 307% less balsam fir in the stands of the Lake Temagami islands relative to the other islands and the islands in Lake Temagami are 67% less isolated than those in lakes throughout the remainder of the TMU. The differences in isolation suggest that the Lake Temagami islands are biogeographically different from islands elsewhere in the TMU. This is likely due to the occurrence of many smaller islands in Lake Temagami which act as stepping stones to the mainland. Lake Temagami, with more than half of the large islands on less than 10% of the entire TMU area, appears to have unique and ecologically important island forest communities.

Table 8. Representation Comparison of the Large Islands on Lake Temagami with other Large Islands in the Temagami Management Unit (all significant at p<.05;)

Feature	Means		
	L. Temagami Islands	Other TMU Islands	Difference
Stand Age (yrs)	**142**	106	34%
Isolation (m)	57	**95**	67%
White Pine (%)	**24.8**	11.6	114%
Red Pine (%)	**12.7**	2.5	408%
Balsam Fir (%)	2.7	**11.0**	307%
No. Tree Species per FRI Stand	**5.5**	5.0	10%

Rare Plants

Based on White (1990), nine plant species that were either locally or regionally rare were found on the Lake Temagami islands (Table 9). Partridgeberry, staghorn sumac, round-leaved dogwood, and

Table 9. Rare Plant Species on Some of the Large Islands in Lake Temagami (ranked by rarity)

Plant Species	Island Number															
	312	1088	1205	660	1091	992	849	1063	234	1197	388	537	1199	1173	25	No. of Isl.
Regionally Rare																
Common Juniper	x			x												2
Partridgeberry	x				x		x									3
Staghorn Sumac		x	x	x	x	x										5
Marginal Wood Fern	x	x	x			x			x		x					6
Striped Maple	x	x	x	x	x	x	x	x	x	x	x	x		x		13
Locally Rare																
Three-Toothed Cinquefoil	x															1
Red Baneberry	x	x													x	3
Round Leaved Dogwood		x	x	x												3
Rattlesnake Plantain	x	x						x		x		x	x			6
Total Species	7	6	4	4	3	3	2	2	2	2	2	2	1	1	1	

NOTE: 25-Bell Island, 234-Temagami Island, 312-High rock Island, 388-Papoose Island, 660-Narrows Island, 849-Cattle Island, 992-Alexander Island, 1173-Red Pine Island, 1197-Horseshoe Island, 1199-Deer Island, 1025-Beaver Island three-toothed cinquefoil are very rarely seen in Temagami. Others such as striped maple and marginal wood fern don't seem to be quite as rare, although striped maple in particular appears to be far more abundant on the Lake Temagami islands than elsewhere in Temagami. In most cases, these are species that are at the northern limits of their ranges, being more common further south. Thus, they are more susceptible to disturbance than many other plants that are found in association with them. Our plant surveys were by no means exhaustive - many more rare plant species likely occur on the islands. For example, although survey transects followed topographic gradients, large expanses of wetland on the islands were not surveyed.

Integrity

Evidence of historical logging was recorded whenever it was encountered during the island field surveys. The extent of pristine landscape varies from one island to another and more intensive surveys are required for a more accurate assessment, however, every island surveyed showed at least some signs of shoreline logging and all appear to be mostly pristine (none less than 90%). The extent of the logging varied, from rare stumps on Papoose and Deer Island, to some areas of intensive cutting on Cattle Island, island 1063, and Temagami Island. On Cattle Island, stumps cut roughly 30 to 50 years ago were surveyed (in two plots) in a particularly disturbed upland area. Results show that their mean basal area (20 m^2/ha) is 83% of the basal area of the remaining trees (24 m^2/ha) (Table 10). This intensity of cutting is comparable to a 45% industrial shelterwood cut. Much of this cutting probably supplied logs for dock cribs, cabins, etc. (Photos 7 & 8, Appendix 8).

Table 10. Historical Cutting on Cattle Island

Plots	Living Trees (m^2/ha)	Cut Stumps (m^2/ha)
1	28.1	12.6
2	19.8	27.4
mean	24.0	20.0

Old White Cedar

Four white cedars that appeared to be old were aged during the course of this study. The oldest cedar, which was found on island 972 (diameter of ~30 cm, height of 3-4 m), had 498 annual growth rings that could be counted (Table 11, see Photo 1 in Appendix 8). Some rings had been lost due to heart rot, making the age of this cedar somewhere over 500 years. These old cedars were found on rocky shoreline sites where they are protected from fire and where their roots are confined, creating a bonsai effect (Larson and Kelly 1990).

Table 11. Old Cedar Survey

Island Number/ Name	Diameter (cm)	Age (yrs)
972	30	498
234 Temagami	12	307
992 Alexander	8.5	123
830	3.8	109

Most of the research on these ancient rock-dwelling cedars has come from the cliff ecology group at the University of Guelph where studies have been primarily located on the Niagara Escarpment. During the first season of research on the Escarpment, the oldest tree was aged at 511 years (Larson and Kelly 1990). Subsequently, a tree with an estimated age of 1653 years was discovered there (Larson 2001). With its many islands and cliffs, Temagami may be comparable to the Niagara Escarpment in its potential for supporting extremely old cedars. In addition, white cedars as old as 802 years have been found on islands and cliffs in nearby northern Quebec (Archambault and Bergeron 1992). It is highly likely that additional searching in Temagami will uncover cedars with more than 498 growth rings.

Wildlife

Wildlife activity on the large islands in Lake Temagami was not assessed directly, however, observations of scat, browse, and other evidence of wildlife were noted. Moose scat was recorded in varying amounts on Beaver, Deer, Papoose and High Rock Islands. While inconclusive, on some islands there were as many as ten or more moose pellet groups observed, while on other islands with similar levels of sampling, no moose pellet groups were observed. Stephens and Peterson (1984) found that islands adjacent to Isle Royale are inhabited preferentially by moose with calves to avoid predators. Our anecdotal evidence suggests that moose may be using some of the islands in Lake Temagami for the same purpose. Evidence of deer was encountered only on Papoose Island. In this case, 17 deer pellet groups were recorded in a fairly small area. Signs of pileated woodpeckers (Photo 15, Appendix 20) and black bear (Photo 11, Appendix 20) were also observed.

Beaver stumps were often observed on the islands. In one case on Papoose Island, beavers had chewed trees at a variety of points along a 130 m transect from the shoreline to the ridgetop. Perhaps island isolation and corresponding lower predator populations may allow beavers to forage further inland than they might on mainland shores.

Loons prefer to nest on the sheltered sides of islands and in small bays and inlets that are protected from windy conditions and boat waves that may flood the low-lying nests (McIntyre and Barr 1997). It is only during nesting season that loons come ashore where they become more vulnerable to human disturbance. In some cases this results in abandoned nests and eggs. Heimberger et al. (1983) found that loon nest success rate declined as the number of cottages within 150 meters of the nest increased. During our field work, two loon nests were encountered while traveling to and from sampling areas. These were found in small sheltered bays on Papoose Island and Beaver Island (Photo 12, Appendix 20).

VALUE FOR RECREATION AND EDUCATION

The unique value of the Lake Temagami islands for current and future recreation and education derives from four characteristics of the islands. First, they are surprisingly pristine, considering the intensity of use on the lake. Second, they are dominated by old-growth forests. Third, they are easily accessible. And fourth, they are ecologically unique within the TMU, and possibly within the world. The educational and recreational value of the islands is obvious with the many children's camps and cottages on the lake, and the number of established canoe tripping routes. This value will only increase as recognition of old-growth forests grows and as the forest communities that they represent continue to decrease in area under current management throughout the TMU and the rest of central Ontario. Red Pine Island has a dense old-growth stand which may be one of the most beautiful unknown old-growth areas in Temagami. In particular, it would be worth preserving as an outstanding example of old growth - without trails, since most of the finest old growth in Temagami is now trail-accessible. This would ensure its value for low-impact research, education, and recreation.

FUTURE WORK

Islands Conservation Strategy

This study focused on less than 2% of the 1,000+ islands in Lake Temagami and for those islands that were studied, only a coarse-level rapid survey approach was used. Although this approach is typically the first step in developing a conservation strategy, these results provide only a partial understanding of the biodiversity and ecological processes on these islands. If long-term conservation of the islands in Lake Temagami is desired, a complete ecological inventory (geology, soils, plants, insects, birds, mammals, wetlands, streams, lakes, cliffs, etc.) of the islands should be the ultimate goal. Because of the enormity of this task, however, it will be necessary to develop an inventory-based research plan that can be implemented in stages over the course of many years. Central to this plan would be (1) identification and ranking of all threats to the ecological integrity of the islands, (2) development of a data collection system that facilitates and integrates involvement by the local community, professional conservation scientists, and academic experts including student projects, and (3) creation and maintenance of an information database so that knowledge will not be lost, can be passed on from one database manager to the next, and can be made accessible to interested parties.

Wetlands and Lakes

One of the unique features of the large islands in Lake Temagami is that they provide enough area to support small lakes and wetlands. Three wetlands greater than 1 ha, many smaller wetlands (unmarked on maps), and two lakes are found on the large islands in Lake Temagami. By comparison, only one sizeable wetland and no lakes are found on the 19 other large islands throughout the TMU, however, these observations are based only on map analysis. No field work was conducted in Lake Temagami's island wetlands and lakes during the course of this study, however, because it is likely that rare plant species, significant wildlife habitat, and other unique ecological features exist there, inventories of these features need to be conducted.

Red Pine Fire Ecology

Red pine is 408% more abundant on the large islands in Lake Temagami than on other large islands in the TMU, and the red pine forest community type (ecosite 11, an endangered ecosystem) is three times more abundant on the Lake Temagami islands than throughout the TMU landscape as a whole. Being fire-dependent, red pine forest requires frequent surface fires for regeneration, and given their prevalence on these islands, it is also safe to assume that fire has been a frequent event on these islands. Red pine trees provide an excellent opportunity to reconstruct forest fire history given that forest fires often damage only the bark on one side of a tree without killing it. The fire scar that remains on the burned side of the tree can be used to precisely date the occurrence of the fire using tree-ring analysis.

During the course of our field work, red pine trees or snags with fire scars were often observed, and in several cases multiple fire scars were noted, up to a maximum of five fire scars (from five different fires) on a single snag. Some of these stands had uneven age structures (multiple ages from young to old), which is a condition of red pine forest that is not well understood. The Lake Temagami islands could be a natural laboratory to study red pine fire ecology, and eventually uninhabited islands could be ideal sites for prescribed burn research and for experimenting with other types of understory and ground litter removal techniques. Results of these studies could be used to improve red pine regeneration in stands that are managed for fiber production as well as those that are managed (and protected) for their old-growth characteristics. For example, much of the shoreline reserve on Lake Temagami is composed of old-growth red pine forest, which according to our past observations, is not successfully regenerating back to red pine.

Wildlife Populations

A few unusual trends related to wildlife were observed on the islands. For example, we found evidence of a large population of deer on Papoose Island and we observed that moose are using some islands and not others. Signs of pine marten and black bear were also observed and sightings of broad-winged hawk, merlin, and other bird species were recorded. A detailed study of wildlife on the islands would be particularly useful if it focused on biogeography, relating size and isolation of islands to their wildlife populations. One focal species could be pine marten, an old growth forest-dependent, mid-size carnivore with a home range suitable for the larger islands on Lake Temagami. Results of this kind of research would provide insight into forest fragmentation theory and would be applicable to forest conservation issues throughout the TMU and beyond where industrial forestry has fragmented or continues to fragment the natural landscape. Lake Temagami with its myriad of islands is an ideal natural laboratory for the study of island biogeography theory and these studies need not be limited to just to one or few species, but in fact could address any species or group of species that are found on these islands.

Old White Cedar

Our results so far suggest that Temagami, with its many islands and cliffs, may be comparable to the Niagara Escarpment in its potential for supporting very old cedar trees. Further research is needed to determine the extent of ancient cedars and to characterize their habitat. This information, combined with existing literature, will help to predict the occurrence of these cedars on a landscape scale across central and northern Ontario. Over centuries, the undisturbed environments that favor ancient bonsai cedars facilitate the establishment of a unique ecosystem of invertebrates, ferns and other plants, algae, and bacteria, which is not found elsewhere on the landscape (Larson et al. 1999). This community is relatively unstudied in central Ontario.

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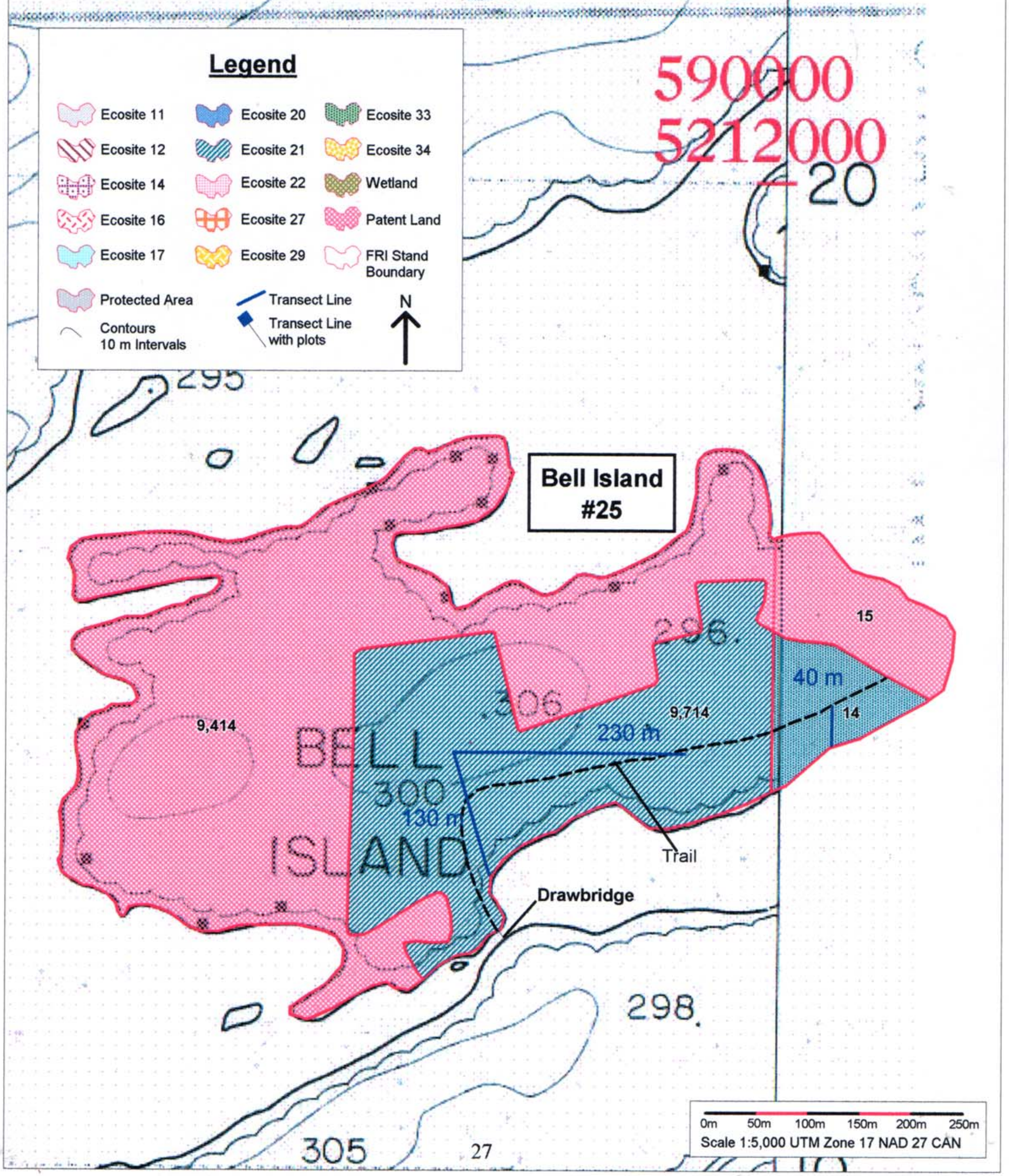
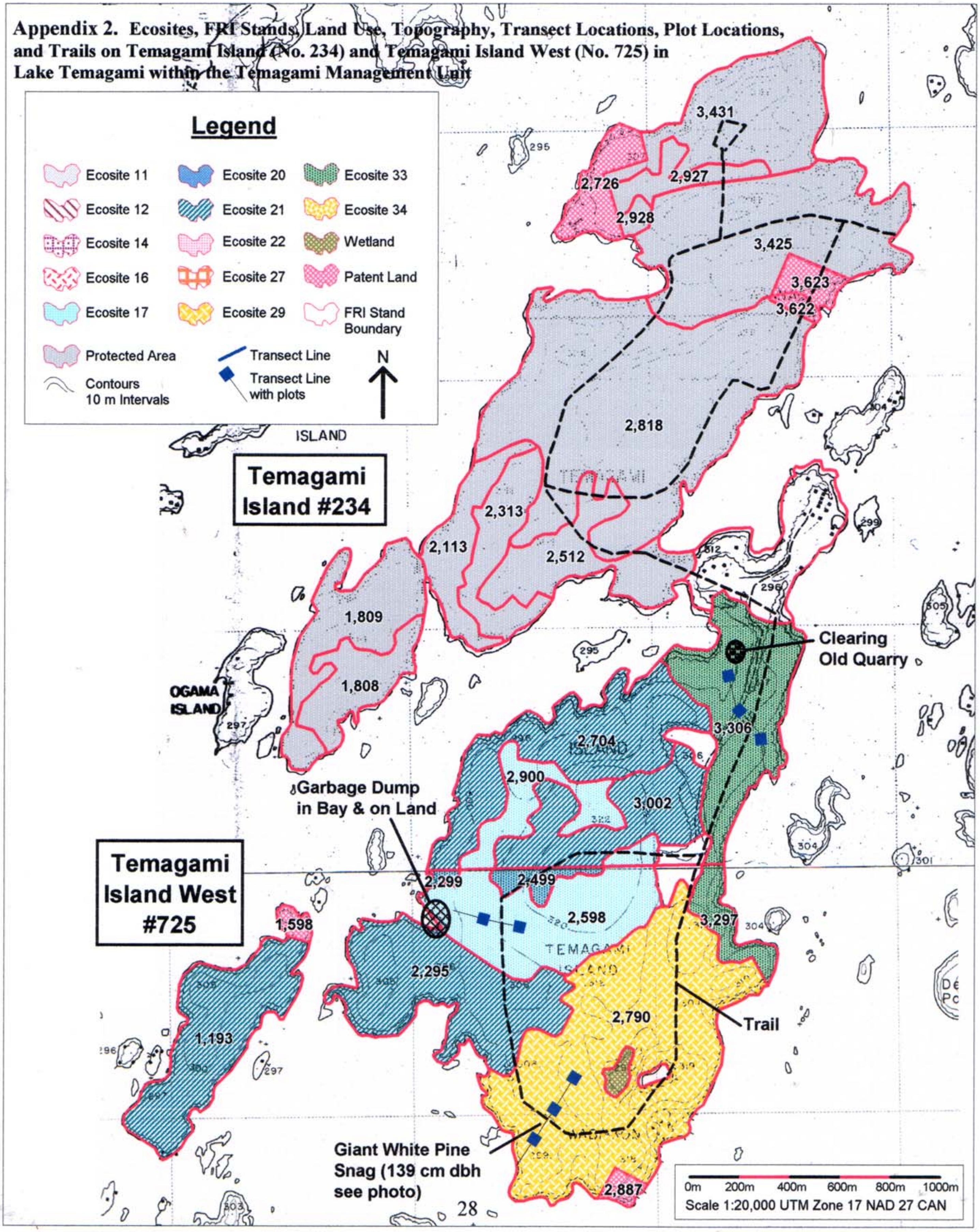
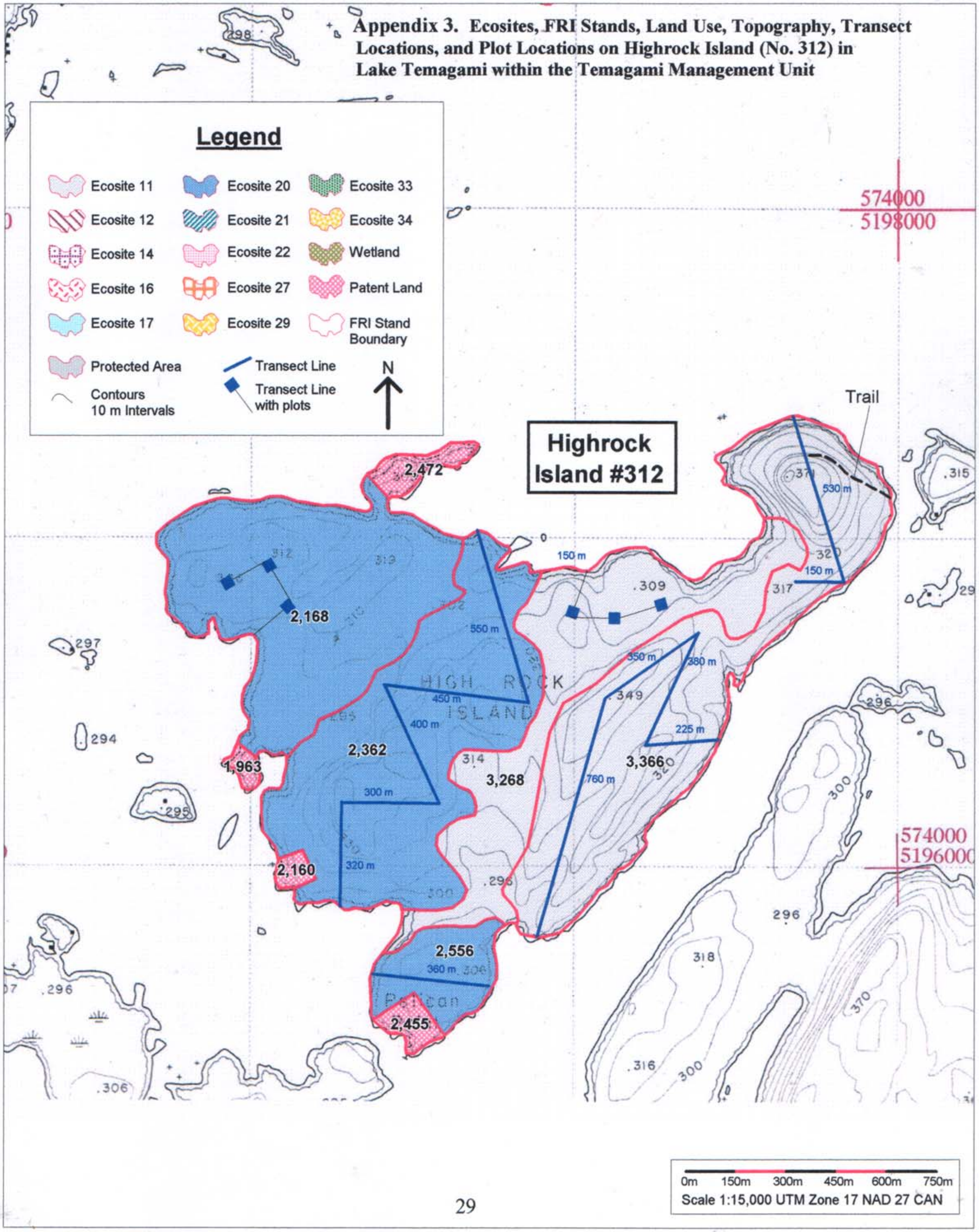
Appendix 1. Ecosites, FRI Stands, Land Use, Topography, and Transect Locations on Bell Island (No. 25) in Lake Temagami within the Temagami Management Unit



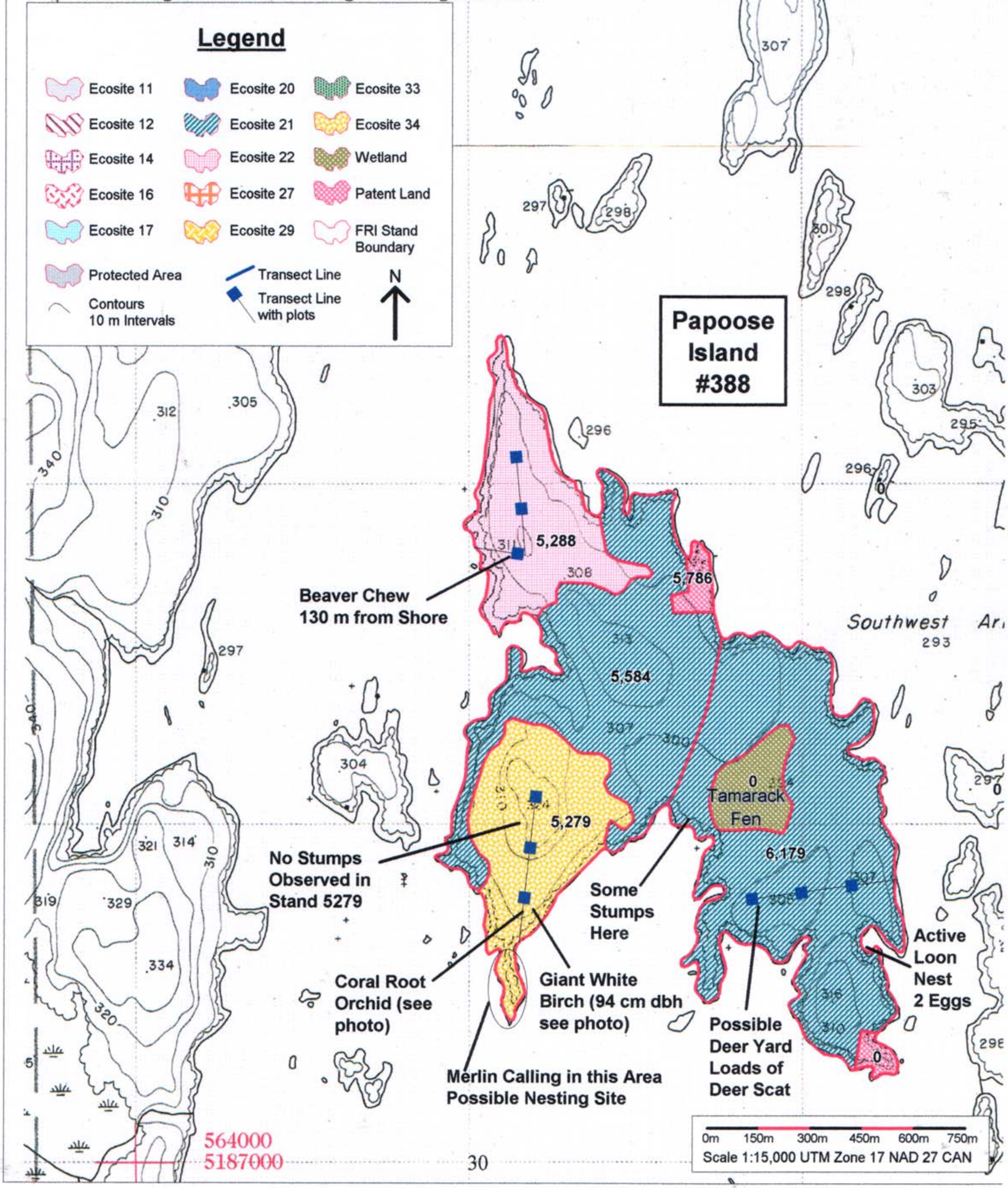
Appendix 2. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, Plot Locations, and Trails on Temagami Island (No. 234) and Temagami Island West (No. 725) in Lake Temagami within the Temagami Management Unit

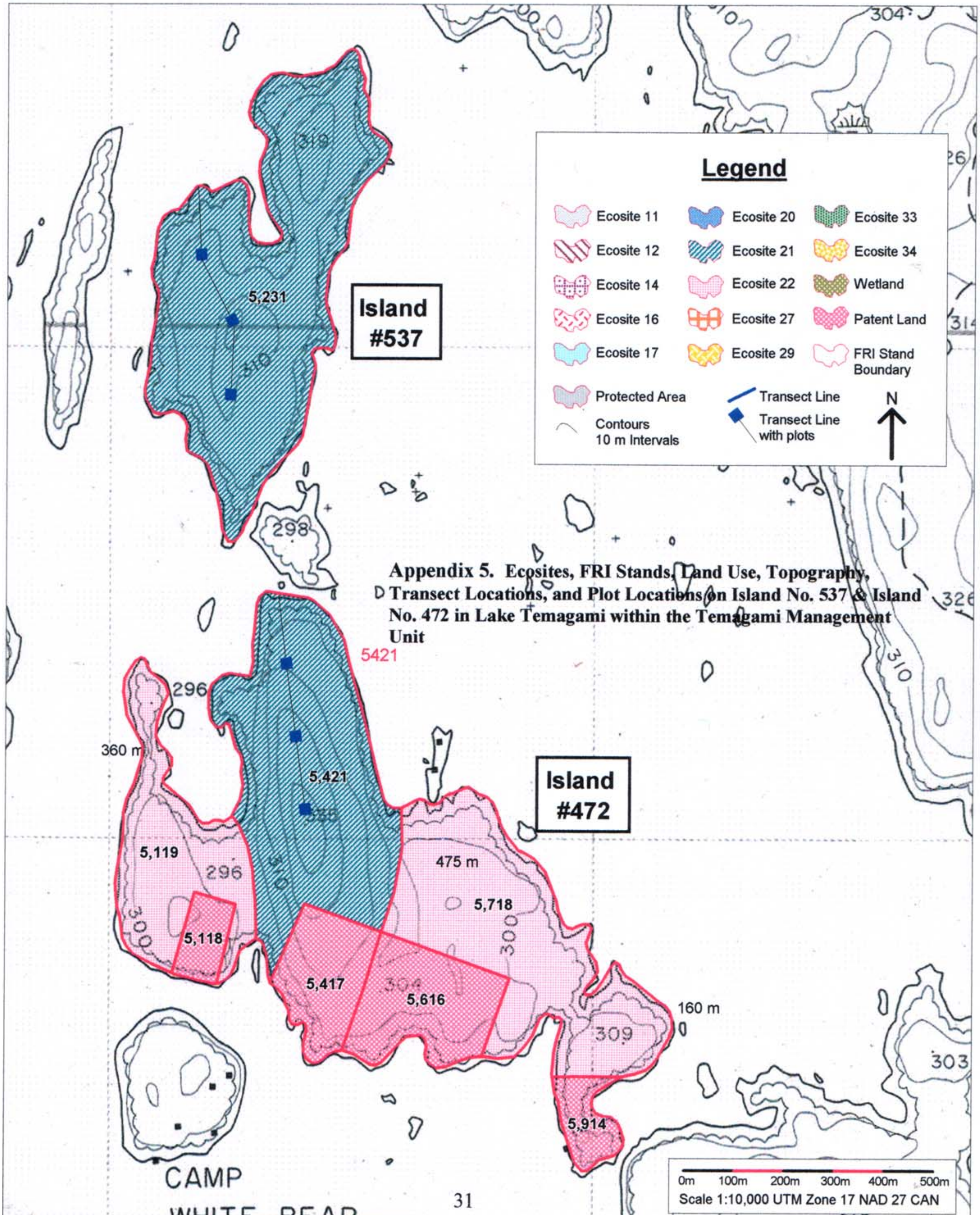


Appendix 3. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, and Plot Locations on Highrock Island (No. 312) in Lake Temagami within the Temagami Management Unit

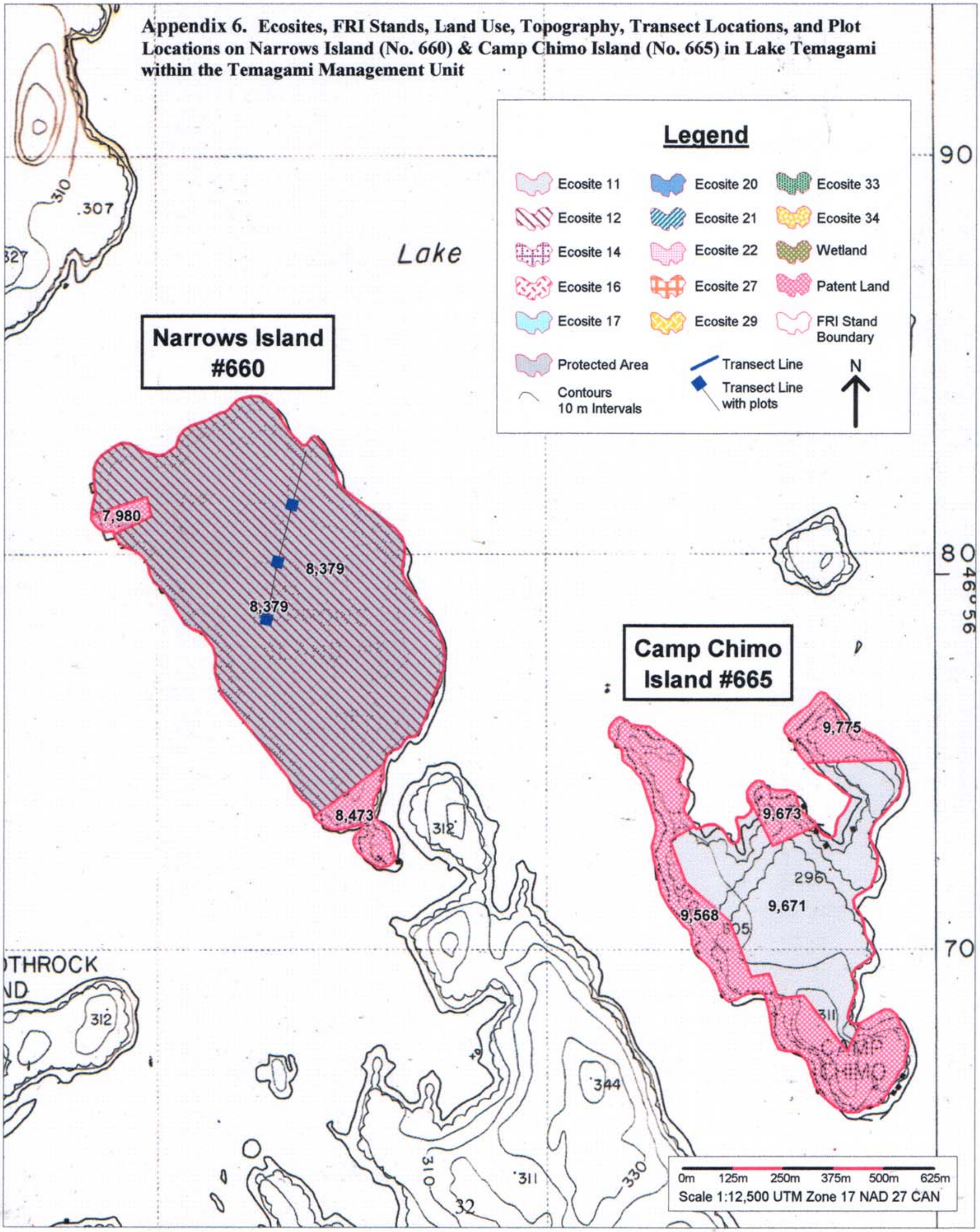


Appendix 4. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, Plot Locations, and Other Features on Papoose Island (No. 388) in Lake Temagami within the Temagami Management Unit

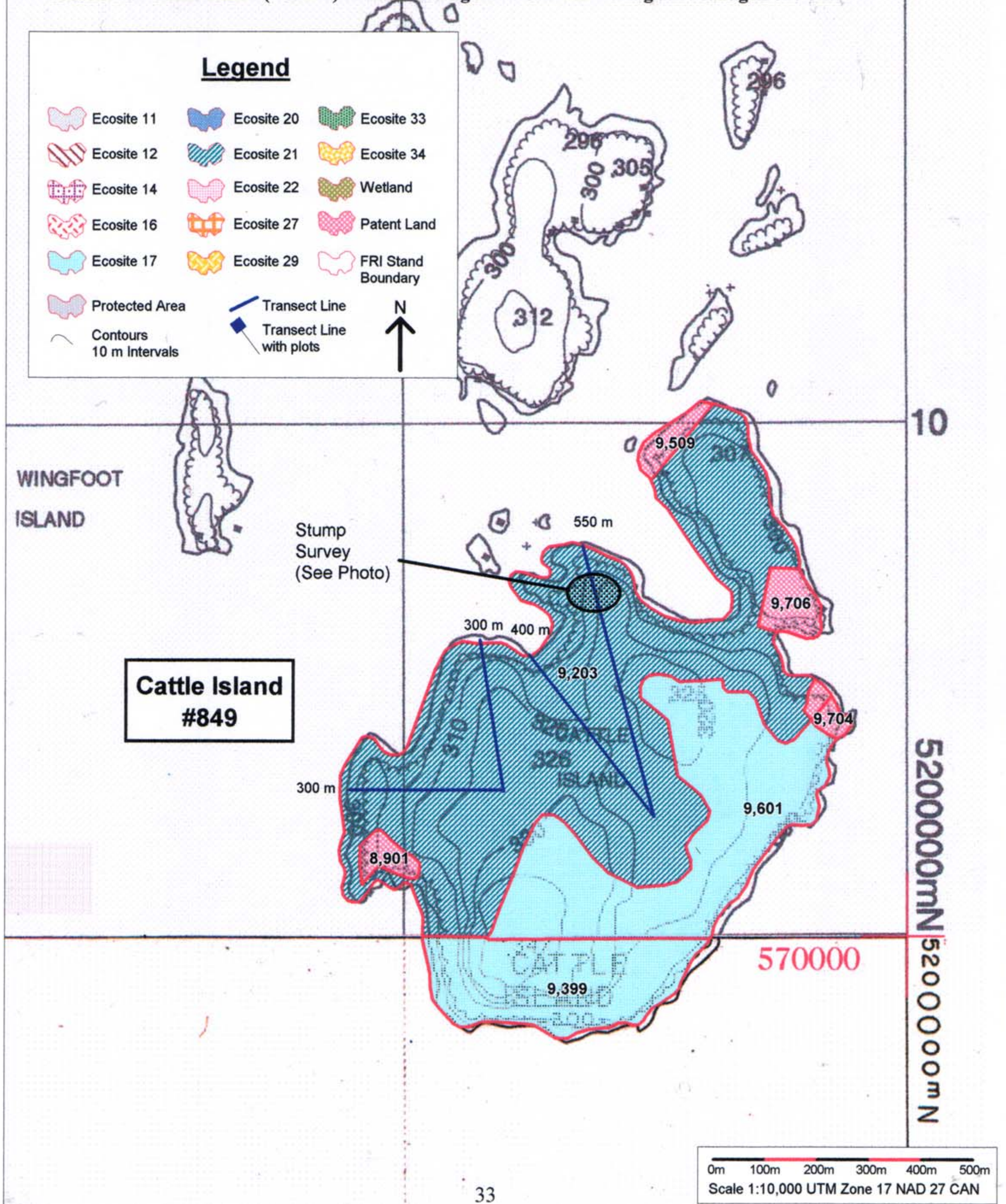




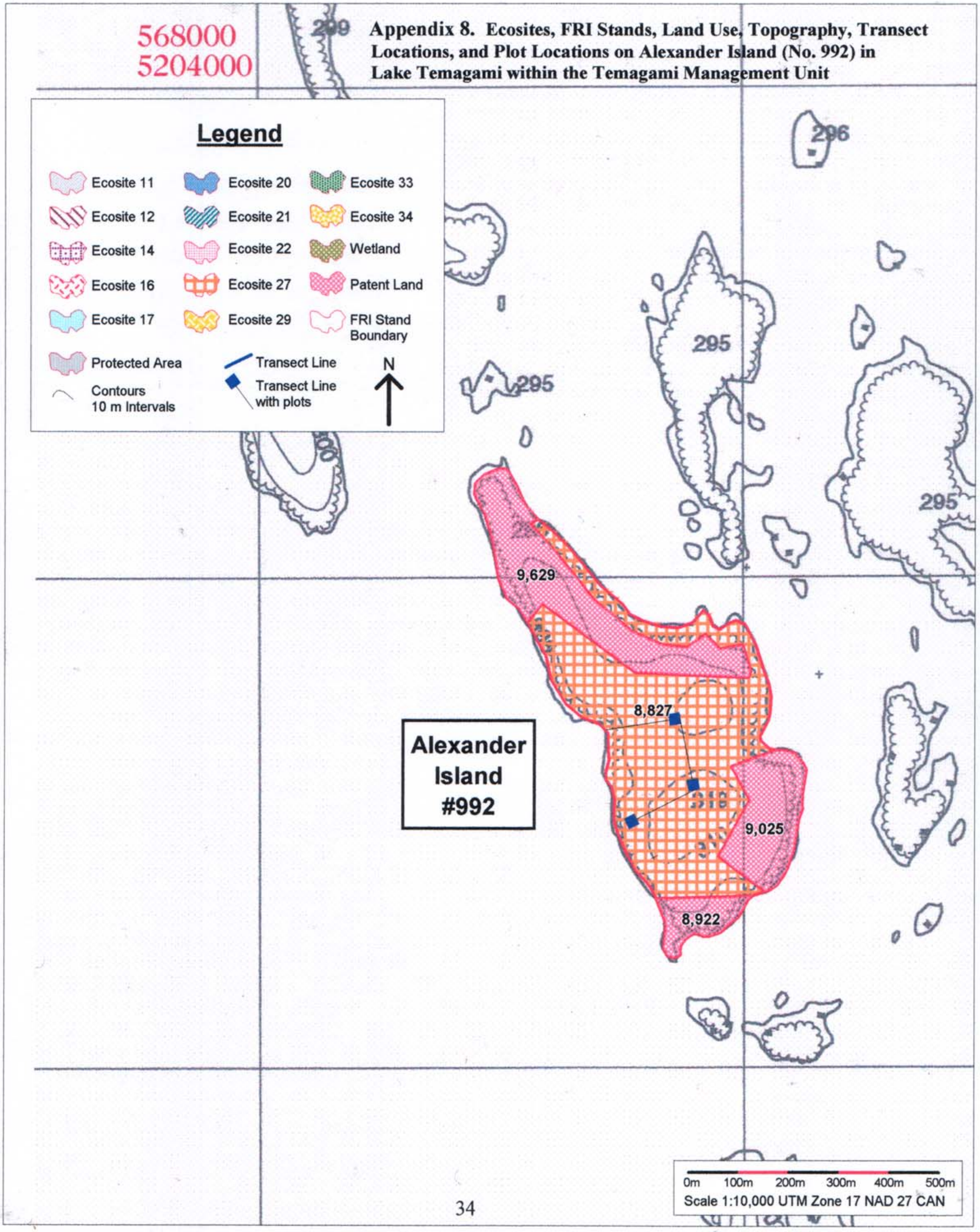
Appendix 5. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, and Plot Locations on Island No. 537 & Island No. 472 in Lake Temagami within the Temagami Management Unit

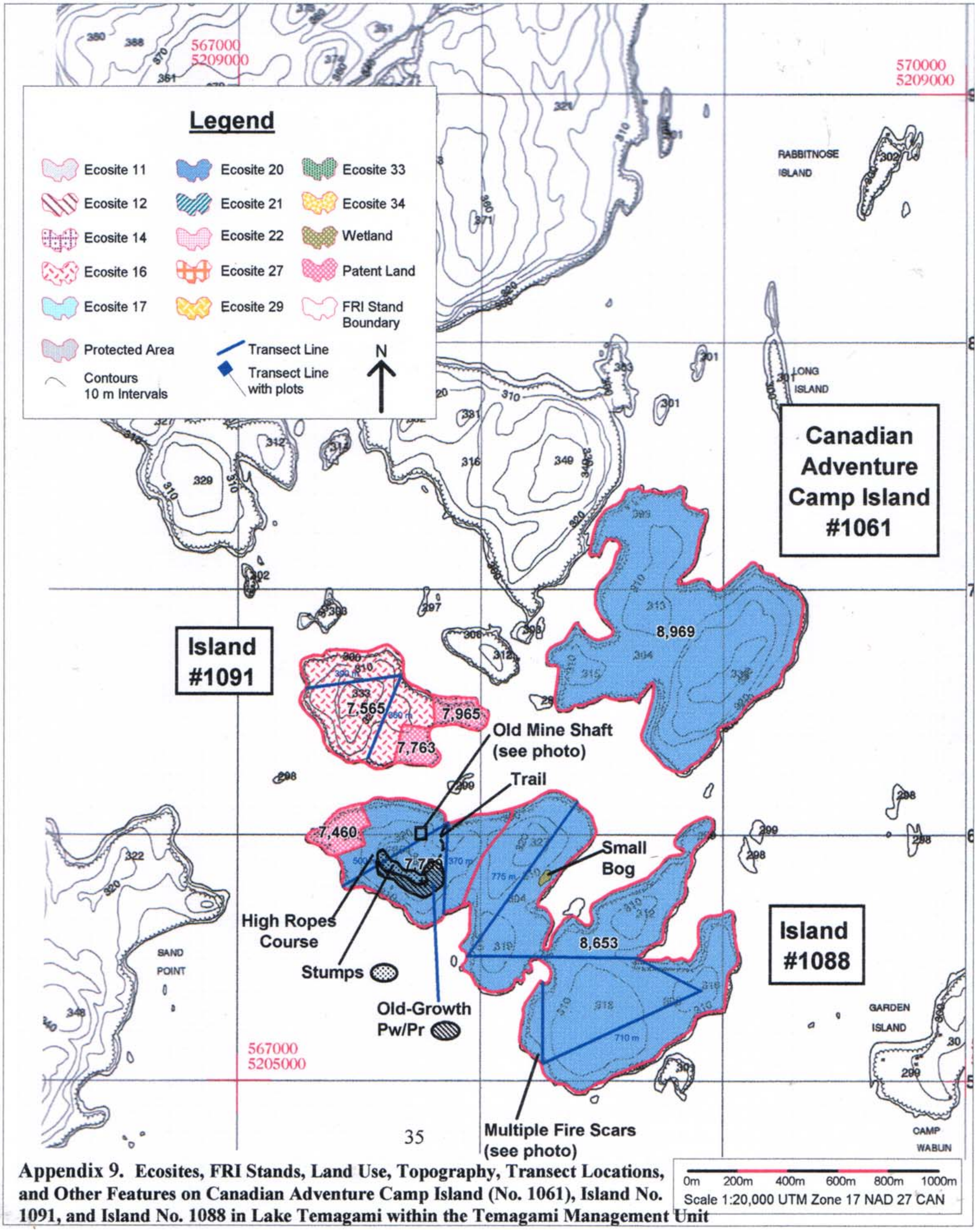

Appendix 6. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, and Plot Locations on Narrows Island (No. 660) & Camp Chimo Island (No. 665) in Lake Temagami within the Temagami Management Unit
Legend
Ecosite 11
Ecosite 12
Ecosite 14
Ecosite 16
Ecosite 17
Ecosite 20
Ecosite 21
Ecosite 22
Ecosite 27
Ecosite 29
Ecosite 33
Ecosite 34
Wetland
Patent Land
FRI Stand Boundary
Protected Area
Contours 10 m Intervals
Transect Line
Transect Line with plots
N
Lake
Narrows Island #660
7,980
8,379
8,379
8,473
Camp Chimo Island #665
9,775
9,673
9,671
9,568
296
305
311
CAMP CHIMO
312
312
344
310
311
330
307
310
90
80
70
46° 56
0m 125m 250m 375m 500m 625m
Scale 1:12,500 UTM Zone 17 NAD 27 CAN
32

Appendix 7. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, and Stump Survey Location on Cattle Island (No. 849) in Lake Temagami within the Temagami Management Unit



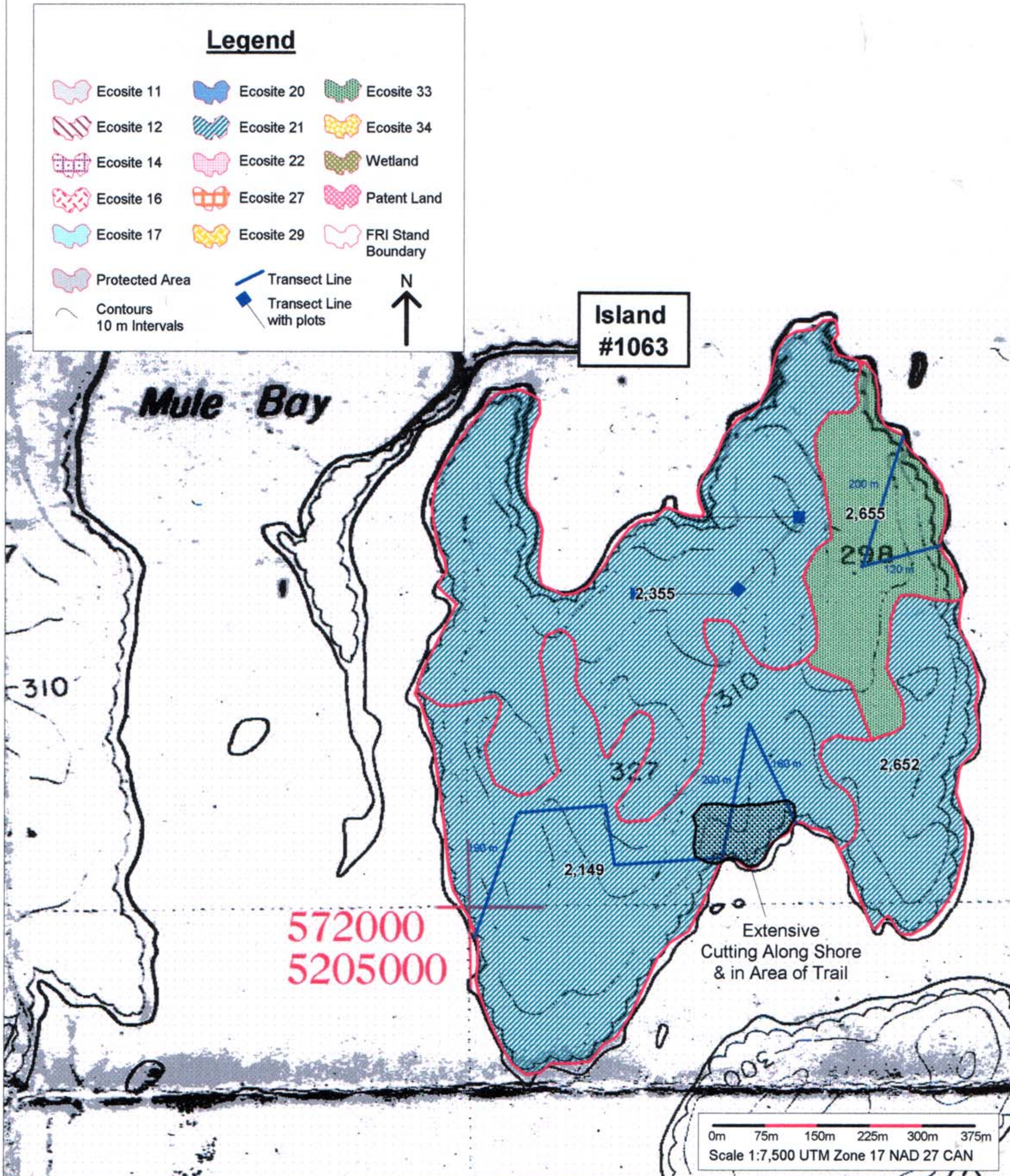
Appendix 8. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, and Plot Locations on Alexander Island (No. 992) in Lake Temagami within the Temagami Management Unit



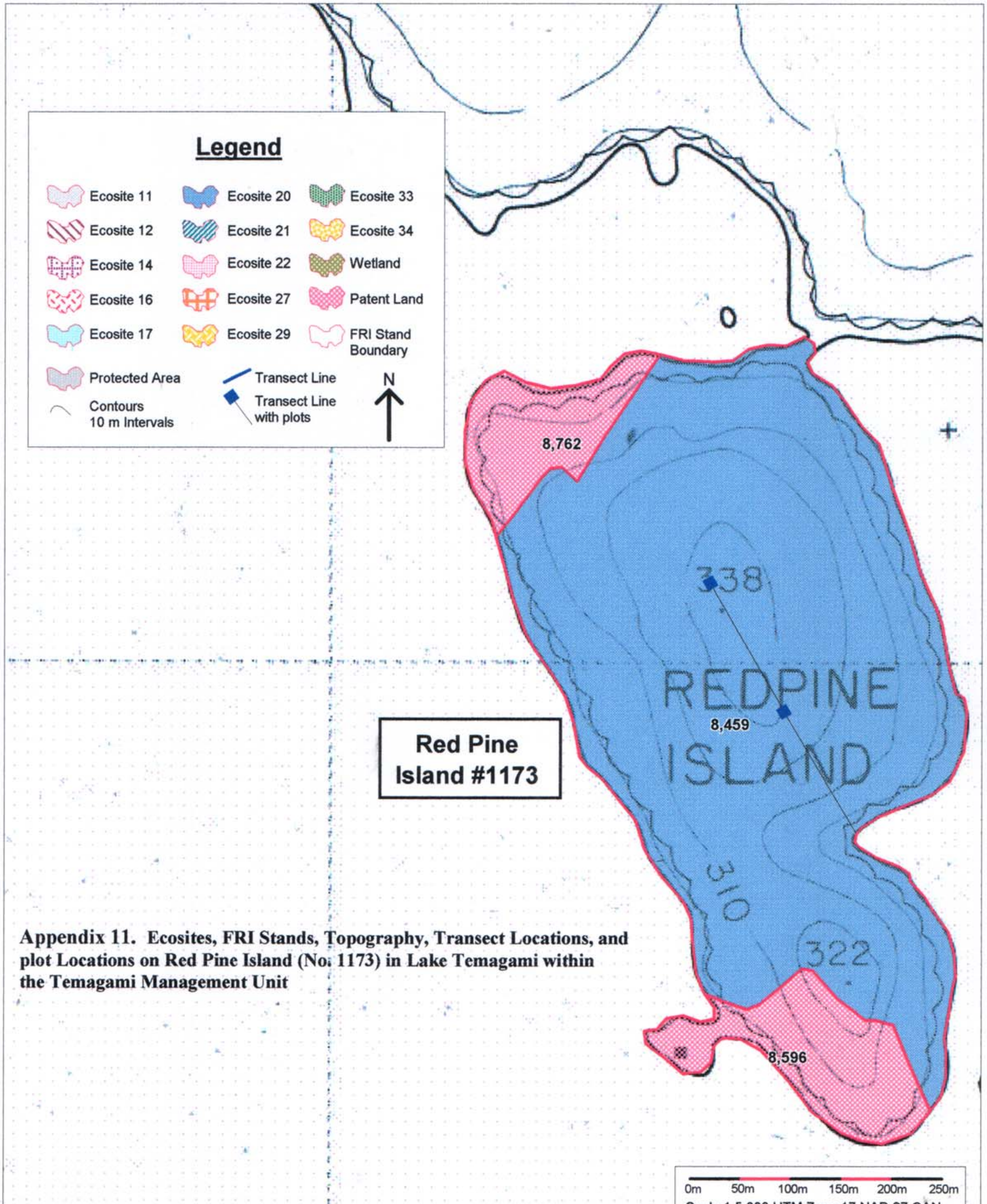


Appendix 9. Ecosites, FRI Stands, Land Use, Topography, Transect Locations, and Other Features on Canadian Adventure Camp Island (No. 1061), Island No. 1091, and Island No. 1088 in Lake Temagami within the Temagami Management Unit

Appendix 10. Ecosites, FRI Stands, Topography, Transect Locations, and Other Features on Island No. 1063 in Lake Temagami within the Temagami Management Unit

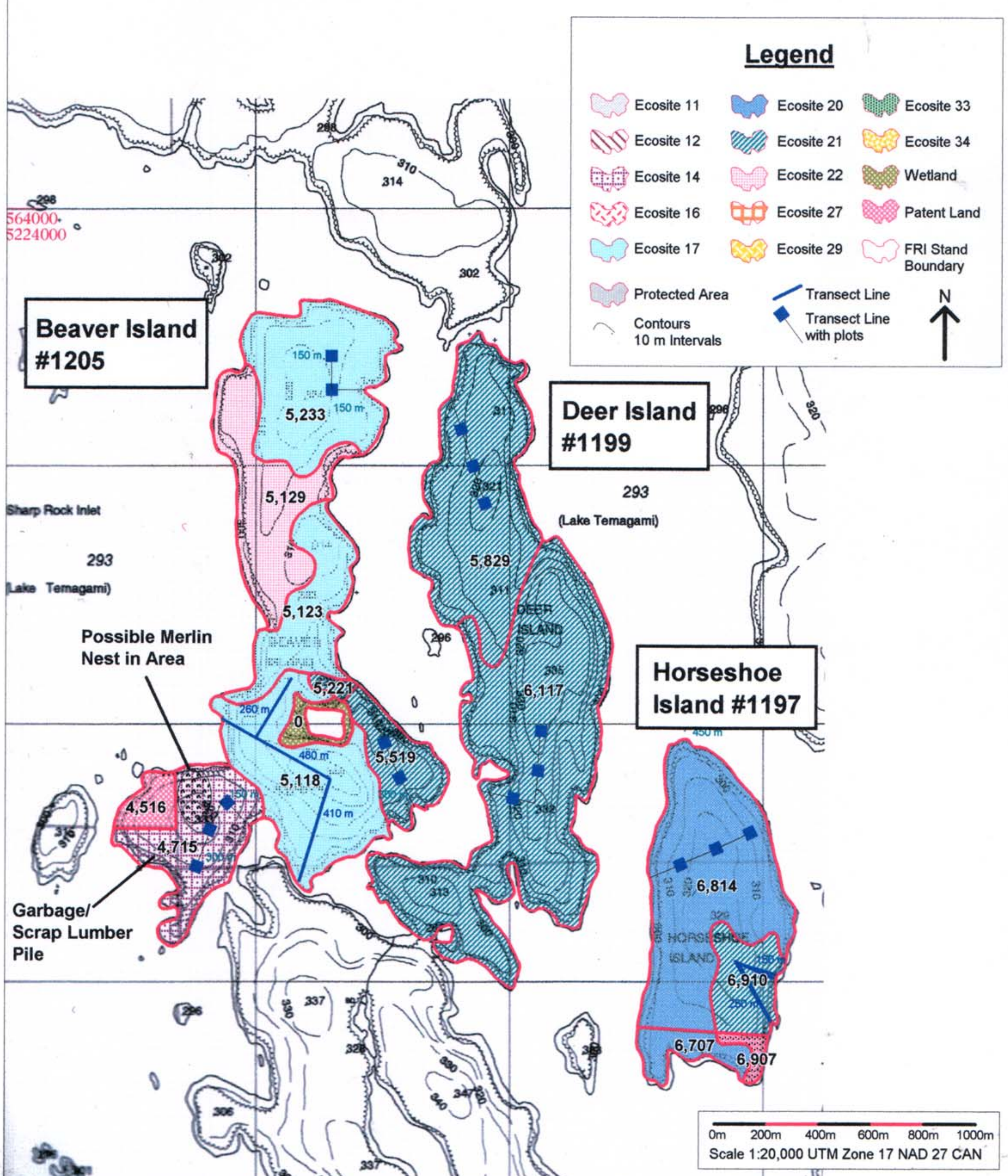


36



Appendix 11. Ecosites, FRI Stands, Topography, Transect Locations, and plot Locations on Red Pine Island (No. 1173) in Lake Temagami within the Temagami Management Unit

Appendix 12. Ecosites, FRI Stands, Topography, Land Use, Transect Locations, Plot Locations, and Other Features on Beaver Island (No. 1205), Deer Island (No. 1199), and Horseshoe Island (No. 1197) in Lake Temagami within the Temagami Management Unit



Appendix 13.

An Ecological Context for Old Growth Definition in Ontario

TABLE 3: OLD GROWTH AGE OF ONSET AND DURATION FOR FOREST Ecosites in Ecoregions 4E and 5E (Great Lakes-St. Lawrence Forest)

Overstory Species	Ecosites	Common Soil and Site Description	Associated Vegetation and Stand Structure Characteristics	Species-specific Old Growth Onset Age (yrs)	Species-specific Old Growth Duration (yrs)	Ecosite-specific Old Growth Onset Age (yrs)	Ecosite-specific Old Growth Duration (yrs)
White Pine, Red Pine, Poplar, Jack Pine, Red Oak	ES 11 -14	Dry to fresh, very shallow to deep, sandy to coarse loamy soils	Conifer dominated. White spruce and balsam fir can be minor components of overstory. Shrubs include beaked hazel, blueberry spp., bush honeysuckle, fly honeysuckle, serviceberry spp., twinflower, and wintergreen. Low to moderate number of herbs. Ground cover of feathermosses.	Pw – 150 Pr – 140 Or – 110 Po – 100 Pj – 90	Pw – 80 to 160 Pr – 50 to 100 Or – 70 to 140 Po – 40 to 80 Pj – 30 to 50	ES11– 130 ES12– 140 ES13– 120 ES14– 120	ES11–60 to 120 ES12–60 to 110 ES13–50 to 100 ES14– 60 to 120
Black Spruce, Jack Pine, White Pine, Red Pine	ES 15 & 16	Dry to fresh, very shallow to deep, sandy to coarse loamy soils	Conifer dominated. Poplar and white birch can be minor components of overstory. Shrubs include blueberry spp., bush honeysuckle, creeping snowberry, labrador tea, sheep laurel, trailing arbutus, and twinflower. Herb poor. Ground cover of feathermosses and lichens.	Pw – 150 Pr – 140 Pj – 100 Sb – 100	Pw – 80 to 160 Pr – 50 to 100 Pj – 30 to 50 Sb – 30 to 50	ES15– 100 ES16– 110	ES15 – 30 to 50 ES16 – 40 to 70
Poplar, White Birch, White Spruce, Balsam Fir, Jack Pine, Black Spruce, Soft Maple	ES 17-19	Dry to moist, deep, sandy to coarse loamy soils	Hardwood-dominated mixedwoods. Shrubs include beaked hazel, blueberry spp., bush honeysuckle, fly honeysuckle, mountain maple, twinflower, and wild raisin. Moderate number of herbs. Ground cover of feathermosses and lichens.	Sw – 110 Sb – 100 Bw – 90 Po – 90 Pj – 80 Bf – 70 Ms – 70	Sw – 60 to 130 Sb – 30 to 50 Bw – 40 to 80 Po – 30 to 50 Pj – 30 to 50 Bf – 40 to 80 Ms – insuf. data	ES17 – 90 ES18–100 ES19 – 90	ES17 – 40 to 70 ES18 – 40 to 70 ES19 – 40 to 70
White Pine, White Cedar, White Birch, White Spruce, Balsam Fir, Red Pine, Poplar	ES 20 -22	Dry to moist, very shallow to deep, sandy to coarse loamy soils	Conifer-dominated mixedwoods. Shrubs include beaked hazel, blueberry spp., bush honeysuckle, creeping snowberry, mountain maple, fly honeysuckle, showy mountain-ash, and twinflower. Moderate number of herbs. Ground cover of feathermosses, Sphagnum, and lichens.	Pw – 150 Pr – 140 Ce – 120 Sw – 110 Bw – 90 Po – 90 Bf – 70	Pw – 80 to 160 Pr – 50 to 100 Ce – 70 to 140 Sw – 60 to 130 Bw – 40 to 80 Po – 30 to 50 Bf – 40 to 80	ES20– 140 ES21–120 ES22–110	ES20 – 60 to 120 ES21 – 60 to 120 ES22 – 50 to 110
Hard Maple, White Birch, Poplar, Red Oak, White Pine, Basswood, American Beech	ES 23 -27	Dry to fresh, deep, sandy to coarse loamy soils, often calcareous	Tolerant and mid-tolerant hardwood dominated. Black ash, black cherry, ironwood, soft maple, yellow birch, and white ash minor components of the overstory. Shrubs include alternate-leaved dogwood, beaked hazel, fly honeysuckle, leatherwood, maple-leaved viburmum, mountain maple, striped maple, and partridgeberry. Low to moderate number of herbs (but rich in spring ephemerals). Ground cover of ragged and hypnum mosses and lichens.	Pw – 150 Be – 150 Mh – 140 Bd – 120 Or – 120 Bw – 100 Po – 90	Pw – 80 to 160 Be – > 500+ Mh – > 500+ Bd – 40 to 80 Or – 50 to 110 Bw – 40 to 80 Po – 30 to 50	ES23–110 ES24–120 ES25–130 ES26–130 ES27–120	ES23 > 300 ES24 > 400 ES25 > 500 ES26 > 500 ES27 > 300
Eastern Hemlock, Hard Maple, Yellow Birch, White Cedar, Soft Maple	ES 28– 30	Dry to moist, shallow to deep, sandy to medium loamy soils	Tolerant hardwoods and mixedwoods. Beech, poplar, white spruce minor components of the overstory. Shrubs include beaked hazel, fly honeysuckle, hobblebush, mountain maple, and striped maple. Low to moderate number of herbs. Ground cover of polytrichum and hypnum mosses, liverworts, and lichens.	He – 180 By – 160 Mh – 140 Ce – 120 Ms – 100	He – > 500+ By – > 500+ Mh – > 500+ Ce – 70 to 140 Ms – 40 to 80	ES28–150 ES29–140 ES30–160	ES28 > 500 ES29 > 500 ES30 > 500
Black Spruce, White Cedar, Larch, Balsam Fir	ES 31-33	Very moist to wet, deep, mineral and organic soils	Conifer dominated. Shrubs include blueberry spp., creeping snowberry, labrador tea, mountain holly, mountain maple, sheep laurel, showy mountain - ash, speckled alder, twinflower, and wild raisin. Low to moderate number of herbs. Ground cover dominated by Sphagnum and feathermosses.	Ce – 150 Sb – 110 La – 90 Bf – 70	Ce – Insuf. data Sb – Insuf. data La – Insuf. data Bf – 40 to 80	ES31– 110 ES32– 120 ES33–130	ES31– Insuf. data ES32 – Insuf. data ES33 – Insuf. data
Poplar, White Cedar, Black Ash, Soft Maple, Yellow Birch, Hard Maple	ES 34&35	Very moist, deep, coarse loamy to organic soils	Hardwood dominated. Shrubs include alternate-leaved dogwood, beaked hazel, choke cherry, dwarf raspberry, fly honeysuckle, mountain maple, red currant, and wild red raspberry. Herb rich.	Ce – 150 By – 150 Mh – 130 Ab – 120 Ms – 90 Po – 80	Ce – Insuf. data By – > 500+ Mh – > 500+ Ab – 50 to 100 Ms – 40 to 80 Po – Insuf. data	ES34–120 ES35–120	ES34–Insuf. data ES35–Insuf. data

Appendix 14. Summary of Features for Large Islands (>20 ha) on Lake Temagami

General			Geographic Variables					Forest Community Variables						
Isle No.	Island Name	Private Land	Area (ha)	Perimeter (m)	Shape (P/A)	Isolation	Distance to Shore (m)	No of Steps	Old Growth Based on FRI age-%	Old Growth (based on core ages +FRI ages)	Rare Ecosites	Common Ecosites	Mean Age	Tree Species Composition from Forest Resource Inventory Maps
25	Bell	Y	29	2606	88.3	10	10	1	0.0%	100%		21	113	60% Ce, 20 % Pw, 10% Bw, 10% Sw
234	Temagami	Y	522	23645	44.5	110	300	3	95.2%	100%	29, 33	17, 21	188	35% Pw, 12% Mh, 9% By, 8% Ce, 7% B, 7% Pr, 7% Po, 6% Bw, 4% Sw, 2% Ms, 2% Or, 1% Sb
312	High Rock	Y	204	9581	46.9	60	60	2	39.2%	100%	11, 20		112	40% Pw, 28% Pr, 19% Bw, 8% Sb, 3% Po, 2% Sw
388	Papoose	Y	133	10180	73.4	70	520	10	100.0%	100%	22, 34	21	185	37% Pw, 18% Ce, 11% Ms, 8% Bw, 8% Sb, 8% B, 5% Po, 5% By
472		Y	57	5404	94.3	20	30	1	100.0%	100%	22	21	156	32% Ce, 24% Pw, 16% Bw, 10% Sb, 10% B, 4% Ms, 4% Sw
537		Y	25	2897	114.5	20	150	3	100.0%	100%		21	133	40% Ce, 30% Pw, 10% Bw, 10% Pr, 10% Sb
660	Narrows	Y	53	3492	64.4	10	10	1	100.0%	100%	12		178	50% Pr, 30% Pw, 10% Bw, 10% Po
665		Y	37	4363	117.3	130	260	1	100.0%	100%	11		133	30% Po, 20% Pr, 10% Pw, 10% Bw, 10% Ce, 10% Sw, 10% B
725		Y	29	3224	115.1	110	2600	4	100.0%	100%		21	133	30% Bw, 20% Bw, 20% Ce, 10% Ms, 10% Po, 10% Sw
849	Cattle	Y	68	4716	69.2	100	830	3	36.8%	100%		17, 21	103	24% Bw, 23% Pw, 14% Ms, 13% Pr, 10% Ce, 7% Po, 6% Sw, 2% Mh, 1% Ab
964	Bear	Y	247	10860	38.9	100	500	3	60.7%	NA	13, 33, 34	17, 21	1221	18% Bw, 17% Pw, 10% Ms, 10% Ce, 10% Po, 10% Sw, 9% Pr, 4% Sb, 4% B, 3% Pj, 3% By, 2% Ab
992	Alexander	Y	27	2762	101.5	120	1510	6	100.0%	100%	27		103	30% Bw, 20% Mh, 10% Pw, 10% Po, 10% By, 10% Sb, 10% Sb
1063		N	58	4066	73.4	20	60	1	50.0%	100%	33	21	129	32% Ce, 18% Pw, 17% Bw, 9% By, 9% Sb, 7% Ms, 5% Pr, 3% B
1088		Y	101	7882	78.8	60	400	3	0.0%	100%	20		103	38% Pw,8 20% Pr, 18% Sw, 10% Pw, 10% Po, 2% Ms, 2% By
1091		Y	23	2289	97.8	60	300	2	0.0%	100%		16	103	20% Pw, 20% Bw, 20% Pr, 20% Sb, 10% Ms, 10% Ce
1104		Y	66	4741	73.3	40	10	1	100.0%	100%	20		173	30% Pr, 20% Pw, 10% Bw, 10% Ms, 10% Ce, 10% Po, 10% Sw
1173	Red Pine	Y	26	2271	89.8	10	20	1	100.0%	100%	20		163	40% Pw, 20% Bw, 10% Pr, 10% Po, 10% Sw, 10% Sb
1197	Horseshoe	Y	58	3605	62.2	60	160	1	79.3%	100%	20	21	180	34% Pr, 32% Bw, 27% Ce, 18% Pw, 16% Sw
1199	Deer	N	131	8386	73.6	10	10	1	100.0%	100%		21	220	30% Pw, 23% Pr, 20% Bw, 10% Ce, 10% B, 7% Sb
1205	Beaver	N	132	8453	62.8	10	20	1	78.0%	100%	14, 22	17, 21	109	34% Bw, 16% Pw, 16% Ms, 15% Po, 9% Sw, 3% Ce, 3% Sb, 1% B, 2% Or, 1% Or

Appendix 15. Summary of Features for Large Islands (>20 ha) on Lakes other than Lake Temagami in the Temagami Management Unit

General			Geographic Variables						Forest Community Variables	
Isle No.	Island Location	Private Land	Area (ha)	Perimeter (m)	Shape (P/A)	Isolation	Distance to Shore (m)	No of Steps	Mean FRI Age	Tree Species Composition from Forest Resource Inventory Maps
M-01	Makobe Lake	N	39	3037	77.872	130	340	2	76	40% Sb, 30% Bw, 20% Sw, 10% Ce
O-01	Lake Obabika	N	28	2844	101.57	70	290	3	123	30% Bw, 20% Sw, 10% Pw, 10% Ms, 10% Ce, 10% Po, 10% B
E-04	Lady Evelyn L.	N	37	2757	74.514	40	80	1	98	40% Bw, 20% Po, 20% Sb, 10% Pw, 10% Sw
E-01	Lady Evelyn L.	N	50	3297	65.94	250	520	4	73	40% B, 30% Bw, 10% Pw, 10% Po, 10% Sb
E-02	Lady Evelyn L.	N	28	3132	111.86	130	70	2	88	30% Po, 20% Sb, 10% Pw, 10% Bw, 10% Ms, 10% Ce, 10% Pr
E-03	Lady Evelyn L.	N	47	4582	97.489	130	260	4	98	40% Sb, 20% Pw, 20% Po, 10% Bw, 10% Sw
E-05	Lady Evelyn L.	N	29	2853	98.379	80	270	2	78	50% Bw, 20% B, 10% Ce, 10% Po, 10% Sw
E-06	Lady Evelyn L.	N	23	1814	78.87	70	190	2	83	40% Ce, 30% Bw, 10% Sw, 10% SB, 10% B
E-07	Lady Evelyn L.	N	49	3591	73.286	260	830	9	83	40% Bw, 20% Po, 20% Sw, 20% B
E-08	Lady Evelyn L.	N	44	3027	68.795	140	260	1	82	40% Bw, 20% Sb, 10% Ce, 10% Po, 10% Sw, 10% B
C-01	Cross Lake	N	24	2473	103.04	80	150	1	173	30% Pw, 20% Bw, 20% Ce, 10% Pr, 10% Sw, 10% Mh
C-03	Cross Lake	N	216.5	11844	54.707	30	20	1	148	20% Pw, 20% Bw, 20% Ce, 10% Ms, 10% Pr, 10% Po, 10% B
C-02	Cross Lake	N	114	6914	60.649	40	80	1	153	30% Pw, 20% Bw, 20% Ce, 10% Pr, 10% B
E-09	Lady E. Lake	N	278.4	7630	27.407	50	90	1	80	40% Bw, 20% B, 10% Ce, 10% Po, 10% Sw, 10% Sb
W-01	Wasaksina Lake	N	66	4661	70.621	100	130	1	117	50% Ce, 10% Pw, 10% By, 10% B, 10% Mh, 10% Sb
W-02	Wasaksina Lake	N	25	2707	108.28	30	70	1	113	60% Ce, 20% B, 10% Pw, 10% By
J-01	Jumping Cariboo L.	N	46	3849	83.674	80	140	2	120	30% Ce, 20% Bw, 20% Ms, 20% Sw, 10% B
R-01	Rabbit L.	Y	22.4	2025	90.402	40	50	1	103	50% Ce, 30% Pw, 10% Bw, 10% Sw
F-01	Fourbass L.	N	92	5135	55.815	50	80	1	135	30% Bw, 20% Ce, 20% B, 10% Pw, 10% Ms, 10% Sb

Definitions

Ab – Black Ash
B – Balsam Fir
Bw – White Birch
By – Yellow Birch
Ce – Cedar
Or – Red Oak
Mh – hard maple (sugar maple)
Ms – Soft Maple (red maple)
Pj – Jack Pine
Po – Poplar
Pr – Red Pine
Pw – White Pine
Sb – Black Spruce
Sw – White Spruce

Appendix 16. Summary of Features for Forest Resource Inventory Stands on Large Islands (>20 ha) in the Temagami Management Unit

Map	Isle	Ctg	Lake	Wet	Priv	Location	FRI Stand	WKGP	Age	FRI Old Growth	Area (ha)	Pw	Bw	Ms	Ce	Pr	Po	By	Sw	Sb	B	Mh	Ab	Or	Pj
59-521	25	Y			N	Lake Temagami	14	Ce	113	N	1	20	10	0	60	0	0	0	10	0	0	0	0	0	0
59-521	25				Y		15	Ce	113	N	2	20	10	0	60	0	0	0	10	0	0	0	0	0	0
58-521	25				Y		9414	Ce	113	N	17	20	10	0	60	0	0	0	10	0	0	0	0	0	0
58-521	25				N		9714	Ce	113	N	9	20	10	0	60	0	0	0	10	0	0	0	0	0	0
57-520	234	Y	1	2	Y	Lake Temagami	UCL				25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57-520	234				N		1808	Po	113	Y	12	0	20	20	0	0	40	0	0	10	10	0	0	0	0
57-520	234				N		1809	Pw	228	Y	21	50	0	0	0	20	0	0	0	10	10	10	0	0	0
57-520	234				N		2113	Pr	227	Y	13	30	0	0	0	50	0	0	0	10	10	0	0	0	0
57-519	234				N		2295	Pw	213	Y	35	40	0	0	20	0	10	20	0	0	10	0	0	0	0
57-519	234				N		2299	Pw	213	Y	0.9	40	10	0	20	0	0	0	10	0	20	0	0	0	0
57-520	234				N		2313	Mh	227	Y	13	0	10	10	0	0	0	0	0	0	0	70	0	10	0
57-520	234				N		2402	Po	113	Y	11	10	10	10	20	0	30	0	10	0	10	0	0	0	0
57-519	234				N		2499	Pw	213	Y	3	30	0	10	10	0	20	0	10	10	10	0	0	0	0
57-520	234				N		2512	Ce	133	Y	19	20	0	0	30	0	0	20	10	0	20	0	0	0	0
57-519	234				N		2598	Po	113	Y	29	10	10	10	20	0	30	0	10	0	10	0	0	0	0
57-520	234				N		2704	Pw	213	Y	34	40	10	0	20	0	0	0	10	0	20	0	0	0	0
57-520	234				Y		2726	Pw	233	Y	9	50	0	0	0	10	0	10	10	0	0	20	0	0	0
57-519	234				N		2790	Mh	139	Y	75	10	10	0	0	0	10	20	0	0	0	40	0	10	0
57-520	234				N		2818	Pw	243	Y	86	70	0	0	0	20	0	0	0	0	0	10	0	0	0
57-519	234				Y		2887	Mh	139	Y	1	10	10	0	0	0	10	20	0	0	0	40	0	10	0
57-520	234				N		2900	Po	113	Y	2	10	10	10	20	0	30	0	10	0	10	0	0	0	0
57-520	234				N		3002	Pw	213	Y	21	30	0	10	10	0	20	0	10	10	10	0	0	0	0
57-519	234				N		3297	By	190	Y	6	0	10	0	30	0	0	40	0	0	20	0	0	0	0
57-520	234				N		3306	By	190	Y	28	0	10	0	30	0	0	40	0	0	20	0	0	0	0
57-520	234				N		3425	Pw	233	Y	47	60	10	0	0	10	0	0	10	0	10	0	0	0	0
57-520	234				N		3431	Pw	233	Y	28	50	0	0	0	10	0	10	10	0	0	20	0	0	0
57-520	234				Y		3623	Pw	233	Y	3	60	10	0	0	10	0	0	10	0	10	0	0	0	0
57-519	312	Y			Y	Lake Temagami	1963	Pr	129	N	1	40	0	0	0	50	0	0	0	0	10	0	0	0	0
57-519	312				Y		2160	Pw	123	N	1	40	10	0	0	20	20	0	10	0	0	0	0	0	0
57-519	312				N		2168	Bw	123	Y	46	20	30	0	20	10	10	0	10	0	0	0	0	0	0
57-519	312				N		2362	Pw	123	N	51	40	10	0	0	20	20	0	10	0	0	0	0	0	0
57-519	312				Y		2455	Pw	123	N	2	40	10	0	0	20	20	0	10	0	0	0	0	0	0
57-519	312				Y		2472	Bw	123	Y	2	20	30	0	20	10	10	0	10	0	0	0	0	0	0
57-519	312				N		2556	Pw	123	N	9	40	10	0	0	20	20	0	10	0	0	0	0	0	0
57-519	312				N		3268	Pr	153	Y	34	20	10	0	30	30	10	0	0	0	0	0	0	0	0
57-519	312				N		3366	Pw	68	N	58	40	20	0	0	30	0	0	0	10	0	0	0	0	0
56-518	388	Y		7	N	Lake Temagami	5279	By	173	Y	21	0	0	20	20	0	10	30	0	0	20	0	0	0	0
56-518	388				N		5288	Ce	163	Y	20	10	10	10	30	0	20	0	10	0	10	0	0	0	0
56-518	388				N		5584	Pw	193	Y	39	40	10	10	20	0	0	0	10	0	10	0	0	0	0
56-518	388				Y		5786	Pw	193	Y	2	40	10	10	20	0	0	0	10	0	10	0	0	0	0
56-518	388				N		6179	Pw	193	Y	51	60	10	10	10	0	0	0	10	0	0	0	0	0	0
56-519	472	Y			Y	Lake Temagami	5118	Ce	133	Y	2	20	20	0	40	0	0	0	0	10	10	0	0	0	0
56-519	472				N		5119	Ce	133	Y	9	20	20	0	40	0	0	0	0	10	10	0	0	0	0

Definitions

CTG – Cottage(s) present on island
Lake – Lake on island (approximate area of lake in ha)
Wet – Wetland on island (approximate area of wetland in ha)
WKGP – FRI Working Group (dominant tree species)
Priv – Private Land (FRI stand)

Ab – Black Ash
B – Balsam Fir
Bw – White Birch
By – Yellow Birch
Ce – Cedar
Or – Red Oak
Mh – hard maple (sugar maple)

Ms – Soft Maple (red maple)
Pj – Jack Pine
Po – Poplar
Pr – Red Pine
Pw – White Pine
Sb – Black Spruce
Sw – White Spruce

Appendix 16. Summary of Features for Forest Resource Inventory Stands on Large Islands (>20 ha) in the Temagami Management Unit (continued)

Map	Isle	Ctg	Lake	Wet	Priv	Location	FRI Stand	WKGP	Age	FRI Old Growth	Area (ha)	Pw	Bw	Ms	Ce	Pr	Po	By	Sw	Sb	B	Mh	Ab	Or	Pj
56-519	472				Y		5417	Pw	193	Y	4	30	20	10	20	0	0	0	10	0	10	0	0	0	0
56-519	472				N		5421	Pw	193	Y	18	30	20	10	20	0	0	0	10	0	10	0	0	0	0
56-519	472				Y		5616	Ce	133	Y	6	20	10	0	40	0	0	0	0	20	10	0	0	0	0
56-519	472				N		5718	Ce	133	Y	16	20	10	0	40	0	0	0	0	20	10	0	0	0	0
56-519	472				Y		5914	Ce	133	Y	2	20	10	0	40	0	0	0	0	20	10	0	0	0	0
56-519	537	N			N	Lake Temagami	5231	Ce	133	Y	25	30	10	0	40	10	0	0	0	10	0	0	0	0	0
56-519	660	Y			Y	Lake Temagami	7980	Pr	178	Y	0.7	30	10	0	0	50	10	0	0	0	0	0	0	0	0
56-519	660				N		8379	Pr	178	Y	50	30	10	0	0	50	10	0	0	0	0	0	0	0	0
56-519	660				Y		8473	Pr	178	Y	2	30	10	0	0	50	10	0	0	0	0	0	0	0	0
56-519	665	Y			Y	Lake Temagami	9568	Po	133	Y	13	10	10	0	10	20	30	0	10	0	10	0	0	0	0
56-519	665				N		9671	Po	133	Y	20	10	10	0	10	20	30	0	10	0	10	0	0	0	0
56-519	665				Y		9673	Po	133	Y	1	10	10	0	10	20	30	0	10	0	10	0	0	0	0
56-519	665				Y		9775	Po	133	Y	3	10	10	0	10	20	30	0	10	0	10	0	0	0	0
57-519	725	Y			N	Lake Temagami	1193	Bw	133	Y	27	20	30	10	20	0	10	0	10	0	0	0	0	0	0
57-519	725				Y		1598	Bw	133	Y	2	20	30	10	20	0	10	0	10	0	0	0	0	0	0
56-520	849	Y			Y	Lake Temagami	8901	Pw	103	N	0.7	30	20	10	10	20	0	0	10	0	0	0	0	0	0
56-520	849				N		9203	Pw	103	N	40	30	20	10	10	20	0	0	10	0	0	0	0	0	0
56-519	849				N		9399	Bw	103	Y	9	10	30	20	10	0	20	0	0	0	0	0	10	0	0
56-520	849				Y		9509	Pw	103	N	0.7	30	20	10	10	20	0	0	10	0	0	0	0	0	0
56-520	849				N		9601	Bw	103	Y	16	10	30	20	10	0	20	0	0	0	0	10	0	0	0
56-520	849				Y		9704	Bw	103	Y	0.4	10	30	20	10	0	20	0	0	0	0	10	0	0	0
56-520	849				Y		9706	Pw	103	N	1	30	20	10	10	20	0	0	10	0	0	0	0	0	0
56-520	849				Y		9804	Pw	103	N	0.2	30	20	10	10	20	0	0	10	0	0	0	0	0	0
57-520	964	Y				Lake Temagami	539	Pw	163	Y	85	30	10	10	0	20	10	0	10	0	10	0	0	0	0
57-520	964						735	Ce	133	N	25	0	0	10	30	0	10	20	10	20	0	0	0	0	0
57-520	964						828	Bw	123	Y	22	0	40	20	0	0	10	10	20	0	0	0	0	0	0
57-520	964						832	Bw	48	N	38	10	30	10	10	0	20	0	0	10	0	0	10	0	0
57-520	964						1240	Pw	163	Y	19	40	20	10	0	10	10	0	10	0	0	0	0	0	0
57-520	964						1434	Ce	53	N	21	10	20	0	40	0	0	0	20	0	0	0	0	0	10
57-520	964						1937	Pj	48	N	13	10	20	10	0	0	0	0	0	10	0	0	0	0	50
57-520	964						2034	Ce	133	Y	10	20	20	0	40	0	0	0	10	0	10	0	0	0	0
56-520	964						9838	Pr	163	Y	12	0	20	10	10	30	10	0	10	0	10	0	0	0	0
56-520	964						9940	Pw	163	Y	0.3	30	10	10	0	20	10	0	10	0	10	0	0	0	0
56-520	964						9943	Pw	163	Y	2	30	10	10	0	20	10	0	10	0	10	0	0	0	0
56-520	992	Y			Y	Lake Temagami	8629	Bw	103	Y	6	10	30	0	0	0	10	10	10	10	0	20	0	0	0
56-520	992				N		8827	Bw	103	Y	17	10	30	0	0	0	10	10	10	10	0	20	0	0	0
56-520	992				Y		8922	Bw	103	Y	1	10	30	0	0	0	10	10	10	10	0	20	0	0	0
56-520	992				Y		9025	Bw	103	Y	3	10	30	0	0	0	10	10	10	10	0	20	0	0	0
57-520	1063	N			N	Lake Temagami	2149	Bw	83	N	21	10	30	20	20	0	0	10	0	10	0	0	0	0	0
57-520	1063				N		2355	Pw	163	Y	21	30	10	0	30	10	0	10	0	10	0	0	0	0	0
57-520	1063				N		2652	Pw	163	Y	8	30	10	0	30	10	0	10	0	10	0	0	0	0	0

Definitions			
	CTG – Cottage(s) present on island Lake – Lake on island (approximate area of lake in ha) Wet – Wetland on island (approximate area of wetland in ha) WKGP – FRI Working Group (dominant tree species) Priv – Private Land (FRI stand)	Ab – Black Ash B – Balsam Fir Bw – White Birch By – Yellow Birch Ce – Cedar Or – Red Oak Mh – hard maple (sugar maple)	Ms – Soft Maple (red maple) Pj – Jack Pine Po – Poplar Pr – Red Pine Pw – White Pine Sb – Black Spruce Sw – White Spruce

Appendix 16. Summary of Features for Forest Resource Inventory Stands on Large Islands (>20 ha) in the Temagami Management Unit (continued)

Map	Isle	Ctg	Lake	Wet	Priv	Location	FRI Stand	WKGP	Age	FRI Old Growth	Area (ha)	Pw	Bw	Ms	Ce	Pr	Po	By	Sw	Sb	B	Mh	Ab	Or	Pj
57-520	1063				N		2655	Ce	128	N	8	0	10	0	70	0	0	0	0	0	20	0	0	0	0
56-520	1088	Y			Y	Lake Temagami	7460	Pw	103	N	3	30	10	10	0	20	10	10	10	0	0	0	0	0	0
56-520	1088				N		7759	Pw	103	N	22	30	10	10	0	20	10	10	10	0	0	0	0	0	0
56-520	1088				N		8653	Pw	103	N	76	40	10	0	0	20	10	0	20	0	0	0	0	0	0
56-520	1091	Y			N	Lake Temagami	7565	Pr	103	N	19	20	20	10	10	20	0	0	0	20	0	0	0	0	0
56-520	1091				Y		7763	Pr	103	N	2	20	20	10	10	20	0	0	0	20	0	0	0	0	0
56-520	1091				Y		7965	Pr	103	N	2	20	20	10	10	20	0	0	0	20	0	0	0	0	0
56-520	1104	Y			N	Lake Temagami	8969	Pr	173	Y	66	20	10	10	10	30	10	0	10	0	0	0	0	0	0
56-521	1173	Y			Y	Lake Temagami	8262	Pw	163	Y	2	40	20	0	0	10	10	0	10	10	0	0	0	0	0
56-521	1173				N		8459	Pw	163	Y	22	40	20	0	0	10	10	0	10	10	0	0	0	0	0
56-521	1173				Y		8556	Pw	163	Y	2	40	20	0	0	10	10	0	10	10	0	0	0	0	0
56-522	1197	Y			Y	Lake Temagami	6707	Pr	213	Y	7	20	20	0	0	40	0	0	20	0	0	0	0	0	0
56-522	1197				N		6814	Pr	213	Y	39	20	20	0	0	40	0	0	20	0	0	0	0	0	0
56-522	1197				Y		6907	Bw	53	N	2	10	80	0	0	10	0	0	0	0	0	0	0	0	0
56-522	1197				N		6910	Bw	53	N	10	10	80	0	0	10	0	0	0	0	0	0	0	0	0
56-522	1199	N			N	Lake Temagami	5829	Pr	234	Y	41	30	20	0	10	30	0	0	0	0	10	0	0	0	0
56-522	1199				N		6117	Pw	213	Y	90	30	20	0	10	20	0	0	0	10	10	0	0	0	0
56-522	1205	N			N	Lake Temagami	4516	Pw	148	Y	4	30	30	0	10	0	10	0	10	0	0	0	0	10	0
56-522	1205				N		4715	Pw	148	Y	19	30	30	0	10	0	10	0	10	0	0	0	0	10	0
56-522	1205				N		5118	Bw	73	N	29	10	40	20	0	0	10	0	20	0	0	0	0	0	0
56-522	1205				N		5123	Bw	93	Y	17	0	50	20	0	0	20	0	10	0	0	0	0	0	0
56-522	1205				N		5129	Bw	93	Y	21	0	30	20	10	0	10	0	0	20	10	0	0	0	0
56-522	1205				N		5221	Pw	223	Y	1	40	20	10	0	10	0	0	20	0	0	0	0	0	0
56-522	1205		1	1	N		5233	Po	93	Y	31	20	30	20	0	0	30	0	0	0	0	0	0	0	0
56-522	1205				N		5519	Pw	223	Y	10	40	20	10	0	10	0	0	20	0	0	0	0	0	0
54-525	M-01			1	N	Makobe Lake	4043	Bw	73	NA	18	10	50	0	0	20	0	0	20	0	0	0	0	0	0
54-525	M-01				N		4341	Sb	78	NA	21	0	10	0	0	0	0	0	10	80	0	0	0	0	0
55-520	O-01				N	Lake Obabika	2642	Bw	123	NA	22	10	30	10	10	0	10	0	20	0	10	0	0	0	0
55-520	O-01				N		2847	Bw	123	NA	5	10	30	10	10	0	10	0	20	0	10	0	0	0	0
55-523	E-04				N	Lady Evelyn L.	9366	Bw	98	NA	37	10	40	0	0	0	20	0	10	20	0	0	0	0	0
56-523	E-01				N	Lady Evelyn L.	292	Bw	73	NA	20	10	40	10	0	0	20	0	0	0	20	0	0	0	0
56-523	E-01				N		396	B	68	NA	24	10	20	0	0	0	0	0	0	10	60	0	0	0	0
55-523	E-01				N		9996	Bw	73	NA	4	0	40	0	0	0	20	0	0	0	0	0	0	0	0
55-523	E-01				N		9998	B	68	NA	2	0	20	0	0	0	0	0	0	0	60	0	0	0	0
56-523	E-02				N	Lady Evelyn L.	1589	Po	88	NA	28	10	10	10	10	10	30	0	0	20	0	0	0	0	0
56-523	E-03				N	Lady Evelyn L.	469	Sb	98	NA	47	20	10	0	0	0	20	0	10	40	0	0	0	0	0
56-524	E-05				N	Lady Evelyn L.	2176	Bw	78	NA	29	0	50	0	10	0	10	0	10	0	20	0	0	0	0
56-524	E-06				N	Lady Evelyn L.	4281	Ce	83	NA	23	0	30	0	40	0	0	0	10	10	10	0	0	0	0
56-524	E-07				N	Lady Evelyn L.	331	Bw	83	NA	49	0	40	0	0	0	20	0	20	0	20	0	0	0	0
56-524	E-08				N	Lady Evelyn L.	2505	Bw	53	NA	16	0	70	0	10	0	0	0	0	10	10	0	0	0	0
56-524	E-08				N		2708	Sb	98	NA	28	0	30	0	10	0	10	0	20	20	10	0	0	0	0

Definitions

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Appendix 16. Summary of Features for Forest Resource Inventory Stands on Large Islands (>20 ha) in the Temagami Management Unit (continued)

Map	Isle	Ctg	Lake	Wet	Priv	Location	FRI Stand	WKGP	Age	FRI Old Growth	Area (ha)	Pw	Bw	Ms	Ce	Pr	Po	By	Sw	Sb	B	Mh	Ab	Or	Pj
57-524	E-09				N	Lady Evelyn L.	61	Bw	93	NA	0.4	0	50	0	10	0	10	0	10	0	20	0	0	0	0
57-524	E-09				N		72	B	78	NA	2	0	10	0	0	0	0	0	10	20	60	0	0	0	0
57-524	E-09				N		165	Bw	88	NA	25	10	50	0	0	0	0	0	10	10	20	0	0	0	0
57-524	E-09				N		170	B	78	NA	4	0	10	0	0	0	0	0	10	20	60	0	0	0	0
57-524	E-09				N		280	B	83	NA	8	0	20	0	20	0	10	0	10	10	30	0	0	0	0
57-524	E-09				N		377	Bw	63	NA	39	0	80	0	0	0	0	0	0	10	10	0	0	0	0
57-524	E-09				N		571	Bw	73	NA	46	0	40	0	10	0	10	0	0	20	20	0	0	0	0
56-524	E-09				N		9464	Sw	83	NA	21	0	20	0	0	0	10	0	30	10	10	0	0	0	20
56-524	E-09				N		9475	B	83	NA	66	0	20	0	20	0	10	0	10	10	30	0	0	0	0
56-524	E-09				N		9860	Bw	93	NA	31	0	50	0	10	0	10	0	10	0	20	0	0	0	0
56-524	E-09				N		9865	OH	88	NA	15	10	0	0	0	0	0	0	10	10	20	0	0	0	0
56-524	E-09				N		9871	B	78	NA	15	0	10	0	0	0	0	0	10	20	60	0	0	0	0
56-524	E-09				N		9970	Bw	63	NA	1	0	80	0	0	0	0	0	0	10	10	0	0	0	0
56-524	E-09				N		9973	Bw	63	NA	5	0	80	0	0	0	0	0	0	10	10	0	0	0	0
57-518	C-01				N	Cross Lake	8280	Pw	173	NA	24	30	20	0	20	10	0	0	10	0	0	10	0	0	0
58-519	C-03				N	Cross Lake	38	Pw	173	NA	0.5	30	10	10	20	10	20	0	0	0	0	0	0	0	0
57-519	C-03				N		8823	Pw	173	NA	43	30	20	0	20	10	10	0	0	0	10	0	0	0	0
57-519	C-03				N		8830	Ce	143	NA	40	20	20	10	30	0	0	0	0	10	10	0	0	0	0
57-519	C-03				N		9136	Ce	143	NA	33	20	10	0	40	0	10	0	0	0	10	10	0	0	0
57-519	C-03				N		9247	Mr	63	NA	29	10	20	40	10	0	0	0	0	0	20	0	0	0	0
57-519	C-03				N		9342	Pw	173	NA	71	30	10	10	20	10	20	0	0	0	0	0	0	0	0
57-519	C-02				N	Cross Lake	7503	Pw	163	NA	61	30	20	0	20	10	0	0	0	0	10	10	0	0	0
57-518	C-02				N		7894	Pw	163	NA	34	30	20	0	20	10	0	0	0	0	10	10	0	0	0
57-518	C-02				N		7996	Bw	103	NA	19	10	40	0	10	0	0	10	10	0	0	20	0	0	0
58-519	W-01				N	Wasaksina Lake	3577	Ce	113	NA	20	0	0	0	70	0	0	20	0	0	10	0	0	0	0
58-519	W-01				N		3581	Mh	123	NA	19	10	0	0	20	0	0	10	10	0	10	40	0	0	0
58-519	W-01				N		3785	Ce	113	NA	27	20	0	0	50	0	0	10	0	10	10	0	0	0	0
58-519	W-02				N	Wasaksina Lake	4671	Ce	113	NA	25	10	0	0	60	0	0	10	0	0	20	0	0	0	0
59-519	J-01				N	Jump Cariboo L.	3232	Ce	143	NA	27	10	20	20	30	0	0	0	20	0	0	0	0	0	0
59-519	J-01				N		3528	B	88	NA	19	20	10	10	20	10	0	0	10	0	20	0	0	0	0
60-520	R-01	Y			Y	Rabbit L.	4173	Ce	103	NA	0.4	30	10	0	50	0	0	0	10	0	0	0	0	0	0
60-520	R-01				N		4376	Ce	103	NA	22	30	10	0	50	0	0	0	10	0	0	0	0	0	0
61-521	F-01				N	Fourbass L.	956	Bw	135	NA	15	10	30	10	20	0	0	0	0	10	20	0	0	0	0
61-521	F-01				N		961	Bw	135	NA	9	10	30	10	20	0	0	0	0	10	20	0	0	0	0
61-521	F-01				N		1156	Bw	135	NA	68	10	30	10	20	0	0	0	0	10	20	0	0	0	0

Definitions			
	CTG – Cottage(s) present on island Lake – Lake on island (approximate area of lake in ha) Wet – Wetland on island (approximate area of wetland in ha) WKGP – FRI Working Group (dominant tree species) Priv – Private Land (FRI stand)	Ab – Black Ash B – Balsam Fir Bw – White Birch By – Yellow Birch Ce – Cedar Or – Red Oak Mh – hard maple (sugar maple)	Ms – Soft Maple (red maple) Pj – Jack Pine Po – Poplar Pr – Red Pine Pw – White Pine Sb – Black Spruce Sw – White Spruce

Appendix 17. Coarse Woody Debris for Quantitative Field Plots

Plot Information			Tree Core Ages		Basal Area of Snags (m^2/ha)				Volume of Logs (m^3/ha)					Coarse Woody Debris
Isle No.	FRI No.	Plot No.	Maximum	Mean	White Pine	Red Pine	All Conifer	All Snags	White Birch	Red Pine	White Cedar	All Conifer	All Logs	
234	2598	1	191	155	0.00	0.00	0.00	0.71	0.00	0.00	0.00	12.07	62.49	63.20
234	2598	2	147	145	3.98	0.00	4.70	5.18	17.96	0.00	0.00	43.42	66.77	71.95
234	2790	1	236	199	0.00	0.00	3.25	3.25	0.00	0.00	57.41	87.32	119.03	122.28
234	2790	2	181	188	0.00	0.00	0.28	2.33	0.00	0.00	0.00	27.89	52.19	54.52
234	2790	3	249	201	0.00	0.00	0.00	1.43	5.50	0.00	0.00	23.17	85.41	86.84
234	3306	1	259	195	0.00	0.00	0.00	0.00	4.42	0.00	17.85	157.49	162.85	162.85
234	3306	2	109	97	0.00	0.00	4.91	4.91	12.38	0.00	8.95	31.64	56.12	61.03
234	3306	3	175	140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	166.99	171.40	171.40
312	2168	1	161	154	0.00	0.00	3.92	4.71	0.00	0.00	0.00	23.61	23.61	28.31
312	2168	2	88	81	0.00	0.00	0.38	0.38	14.51	0.00	0.00	11.78	29.51	29.90
312	2168	3	153	136	0.87	0.00	1.15	2.38	0.00	0.00	0.00	2.61	19.73	22.11
312	3268	1	159	137	0.00	0.00	0.00	1.01	0.00	13.21	0.00	15.90	36.54	37.55
312	3268	2	239	195	0.64	0.00	1.40	3.08	0.00	0.00	0.00	3.77	33.77	36.86
312	3268	3	228	219	6.95	0.00	8.66	9.37	5.00	0.00	0.00	47.00	52.00	61.37
388	5279	1	240	235	18.10	0.00	18.60	25.97	0.00	0.00	0.00	15.90	98.00	123.97
388	5279	2	134	125	0.00	0.00	0.00	4.66	0.00	0.00	0.00	0.00	46.79	51.46
388	5279	3	201	195	0.00	0.00	0.00	1.77	0.00	0.00	14.00	16.07	21.04	22.81
388	5288	1	162	114	0.00	0.00	0.00	3.22	5.65	0.00	0.00	94.04	111.09	114.30
388	5288	2	194	177	7.09	0.00	7.09	7.09	6.24	0.00	0.00	23.64	34.48	41.57
388	5288	3	191	183	7.30	0.00	7.96	9.81	11.49	0.00	0.00	28.60	40.08	49.89
388	6179	1	180	173	2.07	0.00	2.07	2.07	0.00	0.00	0.00	13.93	17.91	19.99
388	6179	2	184	183	4.34	0.00	4.34	7.92	0.00	0.00	0.00	18.40	18.40	26.32
388	6179	3	196	189	2.84	0.00	4.26	6.67	0.00	28.76	0.00	240.36	242.63	249.30
537	5231	1	212	195	16.20	0.00	17.45	17.45	0.00	7.22	0.00	131.00	133.13	150.58
537	5231	2	211	211	5.35	9.01	14.93	14.93	0.00	9.65	0.00	33.07	33.07	48.00
537	5231	3	217	211	0.38	0.00	2.48	2.48	0.00	18.90	0.00	181.02	182.25	184.74
660	8379	1	154	153	0.00	0.00	0.53	12.98	11.63	0.00	0.00	7.77	82.26	95.24
660	8379	2	213	201	0.00	4.75	6.38	6.38	0.00	0.00	0.00	3.92	5.53	11.91
660	8379	3	207	196	0.00	3.19	6.76	6.76	0.00	0.00	0.00	32.67	32.67	39.43
992	8827	1	131	123	0.00	0.00	1.12	2.44	0.00	0.00	0.00	82.90	88.76	91.20
992	8827	2	110	108	3.98	0.00	3.98	6.15	1.92	0.00	0.00	236.36	271.35	277.50
992	8827	3	126	120	0.57	0.57	1.13	1.13	0.00	67.59	0.00	70.58	91.79	92.92
1063	2355	1	332	272	0.00	0.00	0.33	0.33	0.00	20.11	2.68	98.24	107.96	108.29
1063	2355	2	308	266	3.21	21.83	25.99	25.99	0.00	173.18	25.04	368.36	406.08	432.07
1063	2355	3	394	279	17.72	0.00	19.69	19.69	0.00	106.33	54.39	363.30	410.21	429.90
1173	8459	1	234	219	0.00	0.00	1.54	2.43	0.00	0.00	0.00	164.92	164.92	167.35
1173	8459	2	261	241	0.00	0.00	0.00	0.00	9.86	0.00	0.00	82.37	99.33	99.33
1197	6814	1	269	259	0.00	0.00	0.24	2.46	1.78	0.00	0.00	40.03	41.80	44.26
1197	6814	2	267	240	0.00	0.00	0.00	0.00	4.91	0.00	0.00	23.58	28.49	28.49
1197	6814	3	235	205	5.11	0.00	5.55	9.12	21.89	0.00	0.00	40.06	64.51	73.62
1199	5829	1	272	259	2.27	4.91	7.18	9.96	2.08	58.92	0.00	174.56	203.92	213.89
1199	5829	2	138	131	0.00	0.00	1.65	2.36	12.73	0.00	0.00	10.46	28.07	30.43
1199	6117	1	236	179	0.50	0.00	0.89	0.89	0.00	0.00	0.00	17.26	17.26	18.15
1199	6117	2	231	224	12.57	0.00	17.33	17.57	6.72	0.00	53.60	239.12	247.35	264.92
1199	6117	3	140	140	0.00	0.00	0.00	0.00	2.83	0.00	0.00	27.04	29.87	29.87
1205	4715	1	170	170	0.00	0.00	0.00	8.72	7.59	0.00	0.72	134.46	150.35	159.07
1205	4715	2	229	176	0.60	0.00	1.83	3.72	0.00	0.00	0.00	11.22	14.42	18.14
1205	4715	3	222	217	1.77	0.00	6.10	10.84	1.33	0.00	2.59	11.30	15.37	26.21
1205	5233	1	124	119	0.00	0.00	0.00	5.59	17.37	0.00	0.00	2.76	70.03	75.62
1205	5233	2	115	107	0.57	0.00	0.57	1.42	15.80	0.00	0.00	8.85	53.29	54.71

Appendix 18. Plant Species Inventory

Species	Island Number/FRI Stand Number																												
	660	234	234	234	537	1063	1063	1063	849	312	312	312	312	312	388	388	388	25	1088	1088	1091	1173	1205	1205	1205	1199	1199	1197	1197	992
	8379	3306	2790	2598	5421	2149	2355	2655	9203	2168	2362	2556	3268	3366	5279	5288	6179	9714	8653	7759	7565	8459	5233	4715	5118	6117	5829	6814	6910	8827
American Mountain Ash				X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X			X		X	X	X		X
Balsam Fir	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Balsam Poplar		X																X												
Baneberry (Red)										X								X		X										
Bear Berry	X																		X		X									X
Black Ash	X		X										X					X					X							
Black Chokeberry	X			X					X				X				X							X	X					X
Black Spruce	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X		X	X	X	X	X
Blue Flag Iris				X			X	X					X	X				X	X			X								
Blue-bead Lily	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Bog Cranberry									X																					
Bog Laurel									X																					
Bog Rosemary									X																					
Bracken Fern	X			X	X			X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Bristley Sarsaparilla					X																	X		X	X	X				
Bunchberry	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Canada Fly Honeysuckle	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X		X	X	X		X
Canada Mayflower	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X		X
Canada Yew		X	X	X	X	X	X		X	X					X		X	X		X	X	X						X		X
Choke Cherry		X														X														
Cinnamon Fern									X		X		X												X		X			
Cow Wheat	X													X										X	X	X			X	
Creeping Snowberry	X			X	X	X	X	X			X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X
Daisy				X														X												
Dandelion		X						X										X												
Downy Serviceberry					X			X	X				X	X						X			X	X	X	X				X
Dwarf Enchanter's Nightshade		X							X								X													
Dwarf Scouring Rush			X								X																			
Dwarf Trailing Raspberry	X		X	X			X											X	X				X					X		
False Climbing Buckwheat				X							X				X	X		X				X		X	X	X				

Appendix 18. Plant Species Inventory (continued)

	Island Number/FRI Stand Number																													
	660	234	234	234	537	1063	1063	1063	849	312	312	312	312	312	388	388	388	25	1088	1088	1091	1173	1205	1205	1205	1199	1199	1197	1197	992
	8379	3306	2790	2598	5421	2149	2355	2655	9203	2168	2362	2556	3268	3366	5279	5288	6179	9714	8653	7759	7565	8459	5233	4715	5118	6117	5829	6814	6910	8827
Species																														
False Solomon Seal		X	X							X					X	X			X	X	X		X		X					
Fancy Wood Fern	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Fire Weed																		X												
Fragrant Bedstraw			X						X	X					X	X		X		X			X							
Geranium																		X												
Goldthread	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Goldenrod																		X												
Grass spp.																				X										
Green Alder	X				X	X	X	X	X			X	X			X	X		X		X			X	X	X	X	X		X
Green-Flowered Pyrola																										X				
Ground Cedar																	X		X											
Ground Pine	X	X	X		X	X			X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
Hairy Honeysuckle				X														X												
Hawkweed (yellow)																		X												
Hazlenut	X	X	X	X			X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Heal All																		X												
Indian Pipe									X								X													
Interrupted Fern	X		X			X	X		X	X	X							X	X				X				X	X		
Jack Pine	X										X		X								X			X		X	X			
Jewel Weed																		X												
Juniper	X											X	X	X																
Kidney-Leaved Violet	X		X			X	X		X	X					X	X	X		X					X						
Labrador Tea									X		X		X			X	X						X		X		X		X	
Lady Fern	X		X				X		X	X								X					X							
Lady Slipper	X		X		X	X	X	X	X		X	X	X	X		X	X				X	X		X	X	X			X	X
Large Pointed-Leaved Violet	X																													
Large-leaved Aster			X								X	X			X	X		X	X	X	X		X	X						
Large-tooth Aspen	X		X	X					X		X	X	X		X	X	X		X	X				X		X	X			X
Late-Low Blueberry			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X	X	X
Lycopodium lucidulum	X	X	X		X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X		X		X		X		X
Marginal Wood Fern		X									X			X	X				X	X				X	X					X
Mountain Holly	X		X	X	X	X			X		X		X	X	X	X	X		X	X		X	X			X	X	X		X
Mountain Maple	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X

Appendix 18. Plant Species Inventory (continued)

	Island Number/FRI Stand Number																													
	660	234	234	234	537	1063	1063	1063	849	312	312	312	312	312	388	388	388	25	1088	1088	1091	1173	1205	1205	1205	1199	1199	1197	1197	992
	8379	3306	2790	2598	5421	2149	2355	2655	9203	2168	2362	2556	3268	3366	5279	5288	6179	9714	8653	7759	7565	8459	5233	4715	5118	6117	5829	6814	6910	8827
Species																														
Northern Beech Fern	X			X		X	X		X	X								X												
Northern Bush Honeysuckle	X		X	X	X			X	X	X	X	X			X	X		X	X	X	X	X	X	X		X	X	X		X
Oak Fern	X	X	X		X	X	X		X	X	X				X		X	X	X	X	X		X	X						
One-Sided Pyrola		X	X	X	X	X		X	X		X	X		X			X	X	X			X					X	X		
Pin Cherry	X					X			X	X	X			X	X	X			X			X		X	X	X		X		
Princes Pine								X	X					X					X	X	X	X				X				X
Rattlesnake Plantain					X	X	X				X		X						X							X	X		X	
Red Maple	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Red Oak	X		X	X					X	X	X	X	X	X					X	X	X	X		X	X					X
Red Pine	X			X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X		X	X	X	X	X
Red Raspberry				X		X				X	X				X	X		X						X	X	X				
Rock Cap Fern	X		X		X	X		X	X		X	X	X	X	X	X	X		X	X		X		X	X	X		X	X	X
Round-Leaved Dogwood	X																		X	X					X					
Sensitive Fern			X															X												
Sheep Laurel			X			X			X			X	X	X			X		X		X		X	X	X	X	X	X		
Shining Club Moss	X			X		X	X		X		X		X	X	X		X	X			X		X	X			X	X		X
Showy Mountain Ash		X	X	X	X	X	X		X	X	X		X		X	X	X		X	X		X					X		X	X
Skunk Current	X		X	X		X	X			X	X			X	X	X		X	X	X	X	X	X	X	X	X				X
Smooth Serviceberry	X		X	X	X	X		X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X
Speckled Alder	X	X	X	X		X	X	X	X	X	X	X	X			X	X	X	X	X			X		X	X	X	X		
Spreading Dogbane	X																								X	X				
Star Flower		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X	X	X
Striped Maple	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X		X	X	X	X			X			X		X
Sugar Maple		X	X												X					X	X									X
Sweet Fern	X																							X	X	X				
Three-Leaved Solomon Seal											X		X																	
Toothed Wood Fern	X		X	X		X	X		X	X		X			X	X	X	X			X	X	X	X				X		X
Trailing Arbutus	X			X		X	X	X	X		X	X	X	X			X		X		X		X	X	X	X	X	X	X	
Trembling Aspen	X		X	X					X	X	X				X				X	X	X			X		X				X
Twinflower	X			X	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X		X	X	X	X	X

Appendix 18. Plant Species Inventory (continued)

	Island Number/FRI Stand Number																													
	660	234	234	234	537	1063	1063	1063	849	312	312	312	312	312	388	388	388	25	1088	1088	1091	1173	1205	1205	1205	1199	1199	1197	1197	992
	8379	3306	2790	2598	5421	2149	2355	2655	9203	2168	2362	2556	3268	3366	5279	5288	6179	9714	8653	7759	7565	8459	5233	4715	5118	6117	5829	6814	6910	8827
Species																														
Twisted Stalk	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Velvet-Leaf Blueberry				X	X			X	X		X		X		X	X	X					X		X		X	X	X	X	X
White Birch	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X	X	X
White Cedar		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X		X	X		X	X
White Pine	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
White Spruce	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X		X
Wild Raisin					X				X		X		X		X	X	X		X								X			X
Wild Sarsaparilla	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Wintergreen	X				X	X	X	X	X		X	X	X			X	X		X	X	X	X		X		X	X	X	X	
Wolf's Claw Clubmoss	X		X		X				X	X	X	X		X	X	X	X	X			X	X			X			X		X
Yellow Birch	X	X	X		X	X	X	X	X	X	X		X		X	X	X		X	X		X	X	X				X		X

Appendix 19. Common and Scientific Plant Names

Common Name	Scientific Name
3-leaved Solomon seal	*Maianthemum trifolium*
alternate-leaved dogwood	*Cornus alterniflora*
American mountain ash	*Sorbus americana*
ash	*Fraxinus spp.*
balsam fir	*Abies balsamea*
baneberry, red	*Actaea rubra*
beaked hazelnut	*Corylus cornuta*
beech fern	*Phegopteris connectilis*
birch	*Betula spp.*
black ash	*Fraxinus nigra*
black spruce	*Picea mariana*
blue bead lily	*Clintonia borealis*
blunt leaf orchid	*Platanthera obtusata*
bracken fern	*Pteridium aquilinum*
bugleweed	*Lycopus uniflorus*
bunchberry	*Cornus canadensis*
Canada fly honeysuckle	*Lonicera canadensis*
Canada mayflower	*Maianthemum canadense*
Canada yew/ground hemlock	*Taxus canadensis*
cedar, white	*Thuja occidentalis*
cinnamon fern	*Osmunda cinnamomea*
common polypody (rock fern)	*Polypodium virginianum*
cow wheat	*Melampyrum lineare*
creeping snowberry	*Gaultheria hispidula*
dew drop	*Dalibarda repens*
dogwood	*Cornus spp.*
dwarf enchanter's night shade	*Circeaea alpina*
dwarf trailing raspberry	*Rubus pubescens*
black fringed bindweed	*Polygonum cilinode*
false Solomon seal	*Maianthemum racemosum*
fancy wood fern	*Dryopteris Fancy*
fragrant bedstraw	*Galium asprellum*
fringed bindweed	*Polygonum cilinode*
goldthread	*Coptis trifolia*
grape fern (rattlesnake)	*Botrychium virginianum*
grass	
ground cedar	*Diphasiastrum digitatum*
ground pine	*Lycopodium obscurum*
horsetail	*Equisetum spp.*
Indian cucumber root	*Medeola virginiana*
Indian pipe	*Monotropa uniflora*
interrupted club-moss	*Lycopodium annotinum*
interrupted fern	*Osmunda claytoniana*
ironwood	*Ostrya virginiana*
jack pine	*Pinus banksiana*

Appendix 19. Common and Scientific Plant Names (con't.)

Common Name	Scientific Name
jewelweed	*Impatiens capensis*
Labrador tea	*Ledum groenlandicum*
lady fern	*Athyrium angustum*
large-leaved aster	*Aster macrophyllus*
large-toothed aspen (poplar)	*Populus grandidentata*
late-low blueberry	*Vaccinium angustifolium*
lichens	
maple	*Acer spp.*
maple leaved viburnum	*Viburnum acerifolium*
marginal wood fern	*Dryopteris marginalis*
mint	*Mentha arvensis*
mosses & liverworts	
mountain alder	*Alnus Crispa*
mountain holly	*Nemopanthus mucronatus*
mountain maple	*Acer spicatum*
aster	*Aster spp.*
naked mitrewort	*Mitella nuda*
needle litter	
northern bush honeysuckle	*Diervilla lonicera*
oak fern	*Gymnocarpium dryopteris*
one flowered wintergreen	*Moneses uniflora*
one sided pyrola	*Orthilia secunda*
pale corydalis	*Corydalis sempervirens*
partridgeberry	*Mitchella repens*
pin cherry	*Prunus pensylvanica*
pine	*Pinus spp.*
pink lady slipper	*Cypripedium acaule*
poplar (aspen)	*Populus spp.*
poplar balsam	*Populus balsamifera*
prince's pine	*Chimaphila umbellata*
pyrola	*Pyrola spp.*
raspberry	*Rubus spp.*
rattlesnake plantain	*Goodyera repens*
red currant	*Ribes triste*
red maple	*Acer rubrum*
red oak	*Quercus rubra*
red pine	*Pinus resinosa*
round-leaved dogwood	*Cornus rugosa*
sedges	*Carex spp.*
sensitive fern	*Onoclea sensibilis*
serviceberry	*Amelanchier spp,*
sheep's laurel	*Kalmia angustifolia*
shining club-moss	*Huperzia lucidula*
showy mountain ash	*Sorbus decora*
skunk currant	*Ribes glandulosum*
Solomon seal	*Polygonatum pubescens*
speckled alder	*Alnus rugosa*
spikenard	*Aralia racemosa*

Appendix 19. Common and Scientific Plant Names (con't.)

Common Name	Scientific Name
spotted Joe-pye weed	*Eupatorium maculatum*
spreading dogbane	*Apocynum androsaemifolium*
spruce	*Picea spp.*
star flower	*Trientalis borealis*
stripped maple	*Acer pensylvanicum*
sugar maple	*Acer saccharum*
swamp black currant	*Ribes lacustre*
sweet fern	*Comptonia peregrina*
toothed wood fern	*Dryopteris Carthusiana*
trailing arbutus	*Epigaea repens*
trembling aspen (poplar)	*Populus tremuloides*
trillium	*Trillium spp.*
twinflower	*Linnaea borealis*
twisted stalk	*Streptopus roseus*
velvet leaf blueberry	*Vaccinium myrtilloides*
violet	*Viola spp.*
water horehound	*Lycopus americanus*
white birch	*Betula papyrifera*
white pine	*Pinus strobus*
white spruce	*Picea glauca*
wild prickley rose	*Rosa acicularis ssp. sayi*
wild raisin	*Viburnum cassinoidies*
wild sarsaparilla	*Aralia nudicaulis*
willow	*Salix spp.*
wintergreen	*Gaultheria procumbens*
wolf's claw club-moss	*Lycopodium clavatum*
wood fern	*Dryopteris carthusiana*
wood sorrel	*Oxalis acetosella*
yellow birch	*Betula alleghaniensis*

Appendix 20. Photographs

1. 498 year-old Eastern White Cedar

2. Old Mining Pit, Island 1088

3. 139 cm white pine snag, Temagami Island

4. View from High Rock Island lookout

5. Four Fire Scars on a Snag, Island 1088

6. Five Fire Scars on a Snag, High Rock Island

7. Stump Survey, Cattle Island

8. Cribs Near Site of Stump Survey

9. Old Growth on Red Pine Island

10. Coarse Woody Debris, Red Pine Island

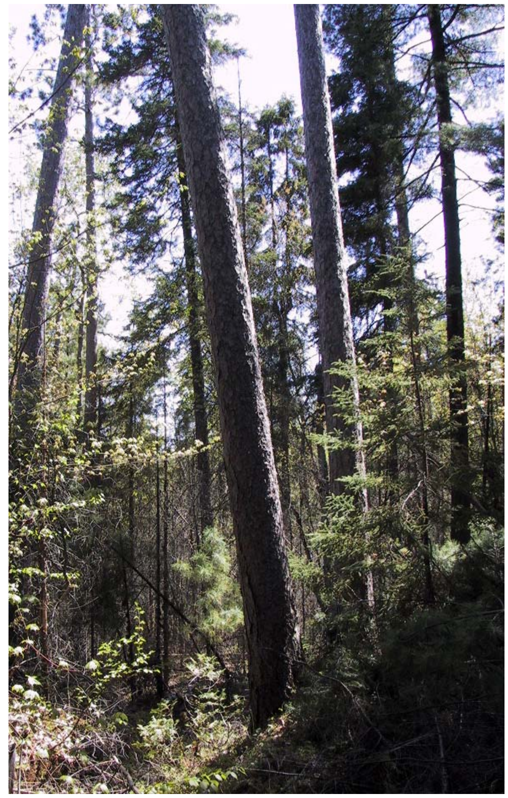

11. Bear Claw Marks, Island 388


12. Loon Nesting Habitat, Beaver Island


13. White Birch, 94 cm DBH


14. Coring a Tree on Temagami Island


15. Pileated Woodpecker Holes in White Pine


16. Supercanopy of Red Pine, Island 1088