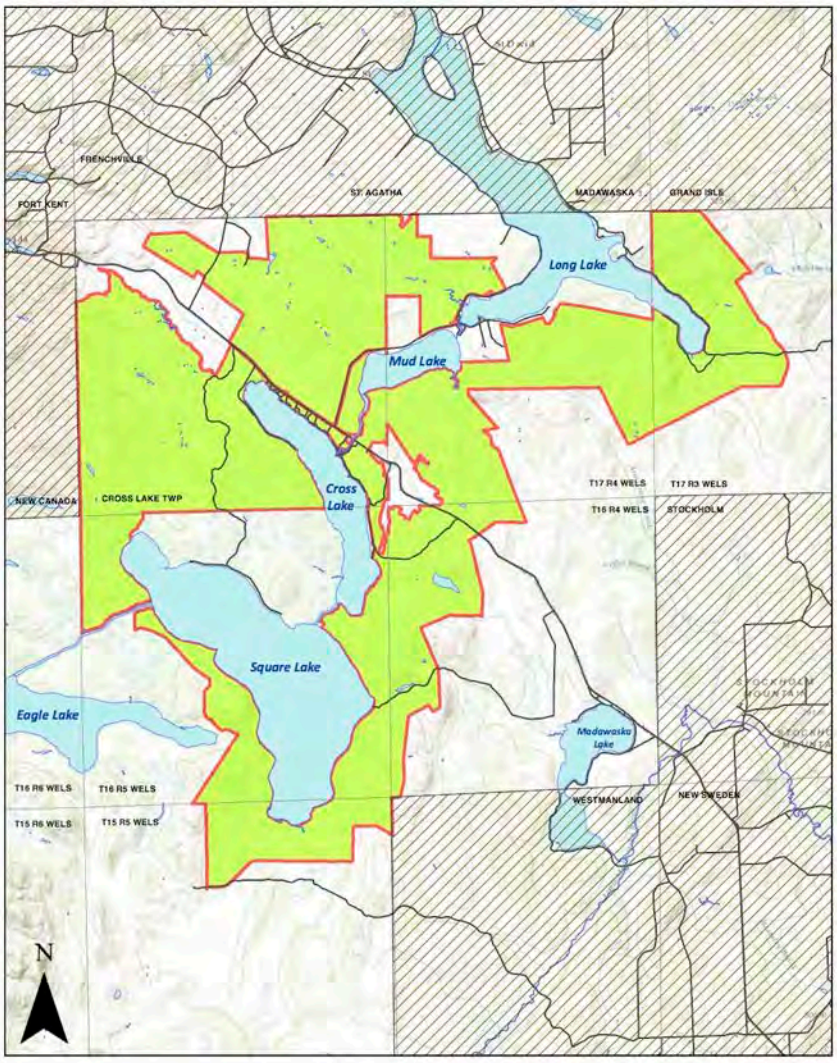
APPENDIX A - EXISTING CONDITIONS IN THE PLAN AREA

1. THE PLAN AREA/OWNERSHIP

The area included within the Concept Plan (Plan area) is approximately 51,015 acres in northern Aroostook County. The Plan area includes land within 6 unorganized townships: T17 R3, T17 R4, Cross Lake (T17 R5), T16 R4, T16 R5, and T15 R5. The closest organized towns are to the north of the Plan area: St. Agatha, Madawaska, and Frenchville. Grand Isle and Van Buren are to the east of the Plan area. New Sweden and Westmanland are to the south of the Plan area. Eagle Lake and New Canada are to the west of the Plan area.

The Plan area includes substantial frontage on Long Lake, Mud Lake, Cross Lake, and Square Lake, as well as frontage along the thoroughfares that connect the lakes. The Plan area also encompasses Carry Pond, Dickey Pond, and Little California Pond, as well as several named and unnamed streams. The Plan area is traversed by two State roads (Route 161 and Route 162) and a network of forest management roads.



Concept Plan area

The land within the Plan area is managed by Irving Woodlands LLC (Irving Woodlands), acting as agent for the owners of the property: Aroostook Timberlands LP, Allagash Timberlands LLC, and Maine Woodlands Realty Company (collectively referred to as Irving). Irving Woodlands presently manages approximately 1.3 million acres of forestland in northern Maine.

Irving began expanding its ownership into the Plan area in the 1980s when it acquired approximately 250,000 acres from International Paper Co. in the northern and eastern parts of Aroostook County. This area included townships from New Canada east to T16 R4, with some additional land in St. Francis and Allagash. In 1985 Irving purchased additional lands from Great Northern Paper in the northeastern part of Maine. This area included Townships T17 R3, T17 R4, and T17 R5 along with acreage in Cyr Plantation, Grand Isle, and Hamlin.

When Irving acquired the woodland assets from International Paper and Great Northern, it also acquired approximately 425 existing camp lots in the Plan area: 150 on Long Lake, 19 on the Mud/Cross thoroughfare, 237 on Cross Lake, and 19 on Square Lake. Most of these camp lots pre-dated the creation of the Land Use Regulation Commission (LURC) and are typically less than one acre in size with approximately 150 feet of lake frontage. Irving Woodlands has continued International Paper's and Great Northern's policy of licensing or leasing these lots to individuals, some of whom have held such licenses and leases for decades.

2. FOREST RESOURCES AND USES

The forestland managed by Irving in northern Maine is approximately 1.3 million acres, making it the largest land manager in the State of Maine. The property extends from the western border with Quebec to the eastern border with New Brunswick, with the majority of the land being in Aroostook County. Approximately 95% of Irving's Maine land base is productive forestland. The remaining lands include non-forest areas such as roads, water, licensed/leased lots, wetlands, and a small amount of agricultural and industrial land.

Irving is a leader in innovative forest management practices and is guided by sustainable forest management principles, which include the Outcome Based Forestry (OBF) approach of the Maine Forest Service. For more information on Irving's sustainable forestry management practices in Maine and the OBF approach, see the response to Question 20 and Appendix D.

3. SOILS AND TOPOGRAPHY

SOILS

The lower areas in the Plan area adjacent to the lakes are generally moderately well to poorly drained glacial till soils with inclusions of water-worked and glacio-lacustrine material. The upper slopes are dominated by well-drained deep to moderately deep glacial till soils over bedrock-controlled landforms. Soil textures are generally loams and silt loams.

The Natural Resources Conservation Service soil survey identified the soils in the Plan area as dominated by the "Plaisted-Howland-Monarda-Burnham" soil catena. A soil catena consists of soils with similar soil parent materials that occur over a repeatable pattern on the landscape. The soil map units are differentiated by slope, soil texture, stoniness, depth to bedrock, and a seasonally high water table. Field review by soils scientists indicates the presence of soil series and soil types other than what was mapped. For more information on the soils conditions within the Plan area, see Tab 8.

TOPOGRAPHY

The topography throughout the Plan area ranges from gently sloping areas and rolling topography to areas of significant slopes. Elevations range from a high of approximately 1,180 feet on the south side of Long Lake to a low point of about 580 feet at the southern end of Square Lake. Slopes were a major factor in siting designated development areas.

4. WATER RESOURCES/WATER QUALITY

LAKES, RIVERS, AND STREAMS

LONG LAKE

Existing Development. Long Lake is the third largest lake in Aroostook County (the largest is Grand Lake and the second largest is Square Lake). The shores of this approximately 6,000-acre lake are highly developed with seasonal camps, year-round residences, motor home parks, restaurants and motels, commercial and institutional buildings, and other related uses. There are approximately 775 structures on the water side of the roads that ring its roughly 33 miles of shoreline (including the large island at the north end of the lake). Irving owns approximately 4 miles of shore frontage at the southeastern end of the lake. Irving's shore frontage consists of:

Aerial view of west side of Long Lake

- Developed shoreline: Irving has 150 licensed/leased camp lots, each with a seasonal or year-round residence directly on the water. The majority of the licensed/leased camp lots (112) are on East Van Buren Cove Road. The remaining 38 sites are located at the base of a hill on West Van Buren Cove Road.
- Long Lake Beach: A roughly quarter-mile long sand beach extends from East Van Buren Cove Road to the confluence of Mud Brook.
- Undeveloped shoreline: There is about 0.3 mile of undeveloped shoreline between the northern end of West Van Buren Cove Road and the Irving property line.

Water Quality. At 163 feet deep at its deepest point, Long Lake is the deepest of the Fish River chain of lakes. The lake has average summer water temperatures of 65°F at the surface and 54°F at 150 feet. Long Lake has recently experienced some water quality degradation. Because of the recreational significance of the lake and sport fishery resource, this situation is being addressed through cooperative agreements with the Maine Department of Environmental Protection (DEP) and private groups. Water quality enhancement projects are being implemented throughout the entire drainage to help control and correct the degradation.

LUPC Management Classification. Long Lake is approaching Management Class 5, Heavily Developed Status. "Heavily Developed" means the lake has fewer than 10 surface acres or fewer than 400 feet of lake frontage per dwelling unit. Under current LUPC zoning, the regulatory emphasis is on retaining the natural qualities of the remaining undeveloped land bordering the lake; any further shoreline development must be clustered.

The Wildlands Lakes Assessment notes that Long Lake is accessible and developed and is assigned to Resource Class 1B (lakes of statewide significance with one outstanding resource value). The lake

received a resource rating of "outstanding" for its botanical resources, and "significant" for its fisheries and cultural resources.

MUD LAKE

Existing Development. With a surface area of approximately 972 acres, Mud Lake is both the smallest and shallowest of the four lakes within the Plan area. Irving owns approximately 3.58 miles of shore frontage, all of which is undeveloped. There are over two dozen seasonal camps and permanent homes on the north shore of the lake that are accessed off Route 162 (Sinclair Road). The most prominent use of the surrounding area is a private campground with 56 campsites, 6 cabins, and a variety of outbuildings on 5.6 acres of land located on the north shore of the lake.

Aerial view of Mud Lake

The State is the second largest landowner with frontage on the lake, with a 304-acre Public Reserve Lot on the north side of the lake, known as the T17 R4 (Sinclair) Public Lot. This land is part of a series of small State holdings in northern Aroostook County that are managed primarily for timber production and dispersed recreation, such as hunting, fishing, camping, boating, snowmobiling, and ATV riding. The majority of the Sinclair Public Lot is on the north side of Route 162. In 1994, the State sold a 200-acre portion of the original lot to the Sinclair Sanitary District that provided the location for the wastewater treatment plant designed to address water quality issues in the Village of Sinclair. The 2,218 linear feet of frontage on Mud Lake is designated as a Wildlife Riparian Area under the Regional Management Plan.

Water Quality. The lake has a mean depth of 11 feet and maximum depth of 20 feet. Wind mixing causes water temperatures to remain about equal at all depths throughout the summer (64°F at the surface and 63°F at 18 feet). The Maine Department of Inland Fisheries and Wildlife (IF&W) considers Mud Lake to have marginal habitat supporting cold-water sport fish seasonally. Because of these habitat conditions, hornpout, suckers, and yellow perch have become abundant and limit sport fish production.

LUPC Management Classification. Mud Lake is assigned to Management Class 7, the "all others" classification with emphasis on a combination of resource conservation, recreation, timber production, and limited development that does not unduly compromise the lake's resource values.

The Wildlands Lakes Assessment notes that Mud Lake is accessible and developed and is assigned to

Resource Class 2 (lakes of regional significance with no outstanding resource values, but at least one significant resource value). The lake received a resource rating of "significant" for its fisheries and cultural resources.

CROSS LAKE

Existing Development. Cross Lake, the eighth largest lake in Aroostook County, has a surface area of 2,515 acres and over 13 miles of shoreline. The northern half of the lake is highly developed with over 300 total seasonal and year-round residences. Irving owns approximately 9 miles of shoreline on the lake. The shore frontage consists of:

- Developed shoreline owned by Irving: 237 licensed/leased sites on the lake (including 2 on a stream at the north end of the lake), each with a seasonal or year-round residence directly on the water. In addition, Irving has 19 licensed/leased sites on the Mud/Cross Lake thoroughfare.
- Developed shoreline owned by others (Mifs Lane): approximately 1.4 miles.
- Boat launch / picnic area / beach at the end of Landing Road, currently leased to a sportsmen's club.
- Undeveloped shoreline owned by Irving: approximately 4.0 miles.

Aerial view of Cross Lake at Mud/Cross Lake thoroughfare

Water Quality. The lake has a maximum depth of 46 feet, with summer water temperatures averaging 68°F at the surface and 54°F at 45 feet. Cross Lake is relatively shallow and has recently experienced some water quality degradation. Because of the recreational significance of the lake and sport fishery resource, this situation is being addressed through cooperative agreements with DEP and private group

efforts. Water quality enhancement projects are being implemented throughout the entire drainage to help correct and control the degradation.

LUPC Management Classification. Cross Lake is assigned to Management Class 5, Heavily Developed Status. Unlike Long Lake, which is considered "approaching" heavily developed status, LUPC found that Cross Lake has reached it. Under current LUPC zoning, the regulatory emphasis is on retaining the natural qualities of the remaining undeveloped land bordering the lake; any further shoreline development must be clustered.

The Wildlands Lakes Assessment notes that Cross Lake is accessible and developed and is assigned to Resource Class 1B (lakes of statewide significance with one outstanding resource value). The lake received a resource rating of "outstanding" for its botanical resources and "significant" for its fisheries and cultural resources. It also received a "+" under shore character resources (meaning that the rating needs further field checking due to public comment).

SQUARE LAKE

Existing Development. Square Lake, at 8,150 acres in size, is the largest of the Fish River chain of lakes and the second largest lake in Aroostook County. The lake remains largely undeveloped, with the exception of a group of 19 Irving licensed/leased camp lots on the western shore, about 36 seasonal and year-round homes on the northern shoreline near the Moscovic Boat Landing (outside of Irving land), and one residence (Fraser Camp) at the point where the thoroughfare enters Square Lake.

Aerial view of west side of Square Lake

The State owns two parcels of land on the northern end of the lake: a 252-acre public lot on the northeast shore at Rocky Point that includes about ¾mile of shore frontage, and an 83-acre Parker Bog parcel that is part of the Cross Lake Fen. Both of these parcels are part of the 24,083-acre Eagle Lake Unit, which is the largest land area managed by the Bureau of Parks and Lands in northern Aroostook County.

Irving owns approximately 13.9 miles of the roughly 19.4-mile shoreline of Square Lake. Irving's shore frontage consists of:

- Developed shoreline: Irving has 19 licensed/leased sites on approximately 1.0 mile of shoreline south of Limestone Point. Each licensed/leased site is occupied by a seasonal residence on the

water. This group of camps is not serviced by electric or telephone utilities; and license/lease holders provide their own power through solar collectors, gas generators, and other means.
- Yerxas Camps (also known over the years at Gorfinkle and Square Lake Camps): formerly a traditional Maine sporting camp dating back to the early 1900s. Irving purchased this 17-acre parcel in 2013, recognizing its significance in achieving several recreational and land-use goals of the Concept Plan. The Camps occupy approximately 0.15 mile of shoreline, which includes an extensive sandy beach.
- Undeveloped shoreline: approximately 12.8 miles. This includes several campsites on the southern end of the lake.

Water Quality. The lake has a maximum depth of 122 feet, with summer water temperatures of 64°F at the surface and 61°F at 90 feet. The IF&W survey notes that Square Lake has recently experienced some water quality degradation. Because of the recreational significance of the lake and sport fishery resource this situation is being addressed through cooperative agreements with DEP and private groups. Water quality enhancement projects are being implemented throughout the entire drainage to help control and correct the degradation.

LUPC Management Classification. Square Lake is currently in Management Class 7, but is potentially a Management Class 3, which would mean "potentially suitable for development" – the classification that provides the most leeway for lake-oriented development. Appendix C of the Comprehensive Land Use Plan, at page C-17, specifically provides: "Square Lake may be placed on this list [of Management Class 3 Lakes] when and if the Maine Department of Environmental Protection is able to show that increased shoreland development around Square Lake would not significantly contribute to the stresses already being placed on it from lakes upstream." This refers to the high nutrient (phosphorus) loadings in Long Lake and especially Cross Lake, which drain to Square Lake.

The Wildlands Lakes Assessment notes that Square Lake is accessible and developed and is assigned to Resource Class 1B (lakes of statewide significance with one outstanding resource value). The lake received a resource rating of "outstanding" for its fisheries resources, and "significant" for its cultural and physical resources. It also received a "+" under shore character resources (meaning that the rating needs further field checking due to public comment).

CARRY POND

Carry Pond is a 65-acre waterbody approximately one mile east of Cross Lake. The pond has a maximum depth of 9 feet, with summer water temperatures of 66°F at the surface and 64°F at the bottom. There is currently no development on the pond.

Carry Pond provides a wild brook trout fishery of modest quality. Additional fish species found in the pond include minnows (golden shiner, redbelly dace, and creek chub), white sucker, brook stickleback, threespine stickleback, and pumpkin sunfish.

Aerial view of Carry Pond with Cross Lake in background

Tributaries and spring seepages provide cool refuges for brook trout during critical summer periods. Chemical reclamation was carried out in 1957 and 1961 to reduce competing species of fish and allow intensive brook trout management. Due to extensive boggy areas, complete kills were not achieved. Barrier dam washouts allowed further reinfestation of competing species. The outlet is presently free-flowing through the remains of an old barrier dam.

RIVERS

The Fish River chain of lakes thoroughfare is the common natural thread that links each of the four lakes in the Plan area (Long Lake, Mud Lake, Cross Lake, and Square Lake). Eagle Lake, to the west of the Plan area, is also connected by the thoroughfares.

The thoroughfares are rated as a "B" river by the Maine Rivers Study, which means that they have composite natural and recreation resource values of outstanding statewide significance. The thoroughfare starts at Long Lake and extends for 60 miles to Eagle Lake. The Maine Rivers Study found that the thoroughfares have unique/significant river resource values in the undeveloped category, as well as inland fisheries and canoe touring. It further notes that the fisheries resources are some of the State's most significant.

The **Long/Mud Lake thoroughfare** (approximately 0.5 miles in length) is highly developed with seasonal camps and year-round homes lining its bank. It is also close to a number of local roads (Route 162, Thoroughfare Road, Martin Road, Shore Road) and the Village of Sinclair. Irving does not own any land abutting the thoroughfare in this area.

The **Mud/Cross Lake thoroughfare** (approximately 1.9 miles in length) consists of two significantly different segments. From Mud Lake to the transmission line corridor that parallels Route 161, the thoroughfare is characterized by limited development and a wooded shoreline. From the transmission line corridor to Cross Lake, the thoroughfare is developed with a general store, seasonal cottages, and year-round homes along the shoreline. Irving owns the majority of the land on either side of the thoroughfare, except for the general store.

Mud/Cross Lake thoroughfare from the Route 161 bridge

During the summer months low water exposes a considerable amount of ledge above Route 161, making passage difficult or impossible for motorized boat traffic.

The **Cross/Square Lake thoroughfare** (approximately 0.8 miles in length) is largely undeveloped, with the exception of a residential development at the site of the former Fraser Camps at the outlet into Square Lake. Irving owns most of the land on the southeastern shore (with the exception of the Fraser

Camps). According to the tax records, the land on the opposite (northwestern) shore has been subdivided, but apparently no lots have been sold or built upon. During the summer months low water exposes a considerable number of large rocks near its junction with Square Lake, making it virtually impossible for larger boats to gain access from the Cross Lake boat launch into Square Lake.

STREAMS

Long Lake. There are several streams that feed into Van Buren Cove and the immediate surroundings: Mud Brook, Paulette Brook, Chapel Brook, and Auclair Brook. Mud Brook flows into Long Lake at the southern end of Van Buren Cove, at the west side of the Long Lake Beach. IF&W considers it to be the most important "smelt engine" feeding into Long Lake.

Mud Brook

The North Fork McLean Brook, which drains into the western leg of Long Lake just north of Sinclair, is rated on the Maine Rivers Study as a C River, which means that it has composite natural and recreation resource values of statewide significance. From its headwaters at the northern end of the Plan area, the brook extends for 12 miles to its confluence with Long Lake. The Maine Rivers Study found that the brook has unique/ significant river resource values in the undeveloped and critical/ecologic categories. The area on either side of the stream contains wetlands, deer wintering areas (DWAs), and inland waterfowl/wading bird habitat.

Cross Lake. IF&W noted that there is a small stream at the southern end of the lake (Black Brook) that is recognized for the trout that spawn there. The stream drains the eastern portion of the Cross Lake Fen, and enters the lake on land that is outside of Irving owner-ship. Dickey Brook, at the northeastern end of the lake, could be an important smelt producer, but is impacted by various land uses (nearby residential development, an electrical transmission corridor, and State Route 161).

Square Lake. There are several streams that feed into Square Lake that are important for smelt production: Butler Brook on the southeastern end of the lake; Barstow Brook at the southwestern end of the lake; California Pond Brook at the northwestern end of the lake; and Dimmock Brook at the northern end of the lake. Goddard Brook and Little Goddard Brook at the southern end may also have value for smelt spawning. All of these streams enter Square Lake on Irving property. A short segment of Dimmock Brook forms the boundary between Irving and the large adjacent parcel of non-Irving land.

FLOOD PLAINS

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) depict the following portions of the Plan area as Unmapped Areas (assumed to be considered Zone C: areas outside the 500-year flood):

- The eastern end of Long Lake (in the vicinity of Van Buren Cove);
- The block of land surrounding Carry Pond and either side of Route 161 east of the Cross Lake thoroughfare;
- The southern half of Cross Lake; and
- All of Square Lake.

The western portion of Long Lake and most of Mud Lake are shown on FEMA Map 230454A. The northern half of Cross Lake is shown on FEMA Map 230453A. Detailed maps indicate that the extent of Zone A: 100-year flood; base flood elevations and flood hazard factors are not determined. See Maps 38 and 39 in Volume 3 for a description of the FEMA flood zones that have been mapped for the Plan area.

Any shorefront development proposed in the future would have to evaluate the 100-year flood and make suitable provisions to avoid areas that may be affected by flood events.

WETLANDS/VERNAL POOLS

Wetlands. A preliminary wetlands analysis was undertaken by Irving scientists, using multiple resources such as depth to water table mapping, LiDAR contour mapping, LUPC zoning, and hydric soils as a base line. A limited field reconnaissance covering most of the proposed development areas was conducted to broadly identify any wet areas and verify areas of major concern.

There are extensive wetland systems in the Plan area. Some of the higher value wetland areas are located at the south end of Van Buren Cove on Long Lake, associated with Mud Brook; a small cove at the southeastern end of Mud Lake; the land mass between Cross Lake and Square Lake, which includes the Cross Lake Fen; and wetlands associated with Goddard and Little Goddard Brooks at the southern end of Square Lake.

Vernal Pools. Irving scientists conducted a preliminary vernal pool survey for specified development areas on each of the four lakes in April and May, 2012: the west side of Square Lake (Square Lake W), the east side of Cross Lake (Cross Lake C), the east side of Long Lake (Long Lake A), and the south side of Mud Lake. A combination of infrared aerial photography, topographic mapping, and depth to water table mapping was used to establish a systematic survey route for each site. Active vernal pools with wood frog egg masses were found at many of the sites investigated; salamander eggs were also found in one vernal pool on the east side of Cross Lake. The majority of the vernal pools were in or adjacent to old logging roads or borrow pits.

Vernal Pool

5. FISHERIES RESOURCES

LONG LAKE

The principal fisheries in Long Lake include landlocked salmon, brook trout, and rainbow smelt. Other fish species found in the lake include yellow perch, minnows (lake chub, golden shiner, common shiner, redbelly dace, blacknose dace, creek chub, and fallfish (chub)), longnose sucker, white sucker, hornpout (bullhead), burbot (cusk), threespine stickleback, ninespine stickleback, and slimy sculpin.

Long Lake is surrounded by agricultural land, residential development, and forestland. Despite the heavy level of development within its watershed, Long Lake supports a sport fishery of statewide significance for brook trout and landlocked salmon. Long Lake is considered by many to be the best salmon fishing in Maine. IF&W considers it to be the top lake in the 27 lakes that are rated for size quality. According to IF&W, sizes have dropped recently and there has been a downward trend in catches.

Of local significance, a popular hook-and-line smelt fishery exists at Long Lake both in winter and summer. Smelts also provide an extremely important forage species for salmon and, to a lesser extent, trout.

The lake's outlet, the Long Lake/Mud Lake thoroughfare, provides limited spawning and nursery area for salmon. In addition, some salmon travel through Mud Lake and spawn at the Cross Lake thoroughfare. Paulette Brook and Mud Brook contain some spawning and nursery areas suitable for salmon. In spite of the presence of productive spawning habitat, the salmon population is supplemented with annual stockings (4,000/year). The wild brook trout population spawns in several of the smaller inlet tributaries.

Smelt Dipping. In 2006, a law was passed that allowed recreational smelt dipping on a part of Long Lake, with a bag limit of two quarts. Upwards of 200 people have been reported at the Long Lake beach participating in smelt dipping in Mud Brook. In tracking the size of salmon taken on Long Lake, IF&W has coincidentally noted a steady decline in the size of 3-year old salmon, which they partly attribute to the taking of smelt from Mud Brook. In their April 2015 Monthly Report, IF&W reports “The remedy for returning Long Lake to its full potential as a size-quality salmon water will be a complicated fisheries management problem. The immediate need is to reduce those factors that are negatively in influencing smelt abundance, only a few of which are within our immediate control.”

MUD LAKE

The principal fisheries in Mud Lake are landlocked salmon and brook trout. Additional fish species include rainbow smelt, yellow perch, minnows (lake chub, creek chub, and fallfish (chub)), longnose sucker, white sucker, hornpout (bullhead), three-spine stickleback, and nine-spine stickleback. IF&W considers Mud Lake to be an important resource for salmon, since they seem to use it for overwintering.

The 2002 IF&W survey recommends that Mud Lake should be managed for salmon and trout in conjunction with the adjacent Cross and Long Lakes, which have much better habitat and support sport fisheries. Movement of young and adult salmon and trout is common among the lakes by use of the connecting thoroughfares. These waterways contain excellent spawning and juvenile habitat and are

critical in maintaining the wild stock of brook trout and the natural component of the salmon population. The lake is currently not stocked, partially due to lack of public access to the lake.

CROSS LAKE

The principal fisheries in Cross Lake include landlocked salmon, brook trout, and rainbow smelt. Additional fish species found in the lake include yellow perch, minnows (lake chub, common shiner, redbelly dace, blacknose dace, creek chub, fallfish (chub)), longnose sucker, white sucker, hornpout (bullhead), burbot (cusk), threespine stickleback, ninespine stickleback, and slimy sculpin.

Cross Lake supports a sport fishery of statewide significance for brook trout and landlocked salmon. Smelts provide the main forage for salmon and also support a hook-and-line sport fishery that is variable in quality. The major inlet from the Mud Lake/Cross Lake thoroughfare provides excellent salmon spawning and nursery area. Dickey Brook and Daigle Brook also provide suitable salmon spawning area. In spite of these significant spawning and nursery areas, it remains necessary to supplement the salmon population with annual stockings. The various tributaries to the lake are utilized to sustain the wild brook trout population.

Cross Lake continues to be stocked and the fishing pressure seems to be steady, according to IF&W survey records. There is greater potential for trout in the future (IF&W only stocks salmon at the moment). None of the lakes are stocked for trout, although they were in the past. Salmon have a relatively slow growth rate, due primarily to water quality (oxygen and temperature).

SQUARE LAKE

The principal fisheries of Square Lake include landlocked salmon, brook trout, and rainbow smelt. Additional fish species found in the lake include lake trout (togue), round whitefish, yellow perch, minnows (lake chub, common shiner, redbelly dace, blacknose dace, creek chub, fallfish (chub)), longnose sucker, white sucker, hornpout (bullhead), burbot (cusk), banded killifish, threespine stickleback, ninespine stickleback, and slimy sculpin.

Square Lake supports a sport fishery of statewide significance for brook trout and landlocked salmon. In addition to the salmon and brook trout fisheries, a popular hook-and-line smelt fishery exists at Square Lake in both winter and summer.

Although the salmon population is now supplemented with annual stockings, the Square Lake/Eagle Lake thoroughfare provides excellent salmon spawning and nursery areas. The Cross Lake/Square Lake

thoroughfare and Goddard Brook also provide limited salmon spawning and nursery areas. Brook trout spawning area exists in many of the smaller inlets.

IF&W considers Square Lake to be underutilized from a fisheries perspective and would like to see more people fishing on it (and harvesting more fish). While the lake is large, access is restricted to a relatively shallow boat launch on private land at the north end of the lake. There is currently no deepwater access.

6. WILDLIFE RESOURCES

DEER

Irving operates under cooperative agreements with IF&W for the management of areas that extend beyond regulated DWAs.[1] Within the 1.3 million acres of land owned and managed by Irving in Maine, 122,770 acres (approximately 9.8% of Irving's total managed lands) are covered by the agreement. Within the Plan area there are approximately 500 acres of regulated DWAs. There are approximately 2,692 additional acres of DWAs that Irving manages voluntarily as part of its cooperative agreement with IF&W. The general management guidelines included within the cooperative agreement address a number of issues related to the management of DWAs, including: construction activities and standards; silviculture practices; treatments of travel corridors; recreation use; and special considerations.

The following chart summarizes DWAs in four townships within the proposed Plan area:

Township	Yard Type	Acres (approximate)
T16 R5 Square Lake Vicinity	Cooperative DWA	765
	Zoned P-FW	158
T17 R4 McLean Brook	Cooperative DWA	217
	Zoned P-FW	174
T17 R5 North end of Cross Lake. Both sides of Dickey Brook at the northern end of Cross Lake, extending to the northeast across Route 161	Cooperative DWA	342
T15 R5 South of Square Lake	Cooperative DWA	1368
	Zoned P-FW	169

[1] New cooperative agreement with IF&W is being finalized.

MOOSE

The Plan area is located in IF&W Wildlife Management District (WMD) 3, which includes portions or all of 31 towns/townships in northeastern Aroostook County. Within WMD 3, the management objective is to balance public concern about moose/vehicle collisions with the public's desire to hunt moose.

The forests in the Plan area are ideal for moose due to the diversity of habitat ranging from mature to regenerating stands. Regionally, moose are a popular species for both hunters and nature photographers. According to state wildlife biologists, Maine's moose population was estimated at 76,000 in 2012. There were 234 moose taken during the 2015 moose hunt in WMD 3. This represents a success rate of 78% for the 300 permits that were issued for that year, and is the third highest number of moose taken in the State.

IF&W manages the moose population in the State using one of three guiding objectives:

- Recreational management, where moose are managed for hunting and viewing;
- Road safety, where moose are managed to reduce the number of moose/vehicle collisions; and
- Compromise, where moose are managed to balance the two.

BLACK BEAR

According to IF&W, the number of black bears in Maine has been increasing over the past 5 years. Current estimates indicate that the population at around 36,000 bears throughout the State. The forestland in the Plan area provides ideal habitat for black bears, i.e., regenerating forest stands, ample food supply, and adequate range.

Black bear hunting is an important aspect of the regional economy. In 2015, 172 of the 3,016 bears taken statewide were from WMD 3; of this number, 23 bears were taken in the six townships where the Concept Plan is located.

CANADA LYNX

Canada lynx have been reported in the less populated portions of the Plan area. The most important factor determining habitat quality for Canada lynx is the abundance of snowshoe hare. Therefore,

habitat that is ideal for snowshoe hare is also important to Canada lynx. Throughout their range, snowshoe hares are highly associated with dense forest understories and appear to select this type of habitat for cover, food, and protection from predators, precipitation, and temperature extremes. Winter is the period of greatest stress for hares, thus dense cover takes on a greater importance during this time of year. In Maine, the forest stands that provide dense cover and are preferred by both snowshoe hare and Canada lynx are regenerating sapling (15-35 years old) spruce-fir forest. Regenerating conifer clearcuts provide ideal foraging habitat for Canada lynx in Maine.

The U.S. Fish & Wildlife Service (USFWS) listed the Canada lynx as threatened under the Endangered Species Act in 2000 and designated critical habitat for the species in 2006 (revised in 2009 and 2014). In Maine, the habitat designation includes most of the northern part of Maine (most of Somerset, Piscataquis, and Aroostook Counties). Route 161 in the Plan area is one of the northern boundaries for the designation.

FURBEARERS

Furbearers include all mammals harvested primarily for their pelts. In Maine, these include coyote, red and gray fox, bobcat, fisher, marten, raccoon, skunk, short and long-tailed weasels, mink, otter, beaver, muskrat, and opossum. The pelts of all furbearers, except weasel, raccoon, muskrat, skunk, and opossum, are tagged for tracking the furbearer harvest. Pelt tagging is one of the primary population indices used in the IF&W furbearer management systems. Furbearers are primarily trapped, but some species (e.g., fox, coyote, bobcat, raccoon, and skunk) are also hunted. Furbearers are common throughout the Plan area.

UPLAND BIRDS - RUFFED GROUSE AND WOODCOCK

Approximately half of all licensed hunters in Maine hunt for ruffed grouse (partridge) and woodcock, so upland birds constitute a significant draw for hunters. The ruffed grouse population is primarily a function of the availability of habitat. The birds live in young forests, so forestry practices that favor sapling and pole stands of hardwoods, as well as mixed stands, improve or sustain ruffed grouse habitat. These upland birds are common throughout the Plan area.

Woodcock numbers are in decline across their range. USFWS instituted a shortened hunting season and plans to continue these management strategies. Despite these restrictions, however, the population remains low compared to levels in the 1960s. Maine biologists attribute this to loss of habitat due to

urban and industrial development and forest maturation. Forestry is generally thought to be positive for woodcock habitat.

BALD EAGLES

State and federal law first recognized the bald eagle as an Endangered Species in Maine and 42 other states in 1978. Subsequent recovery of eagle populations led to reclassification as a Threatened Species in 1995. Further improvements prompted the federal government to remove bald eagles from its list of Endangered and Threatened species in 2007. In January 2009, IF&W similarly removed the bald eagle from Maine's list of Endangered and Threatened Species. Bald eagles still receive substantial protections, however, under the Federal Bald Eagle and Golden Eagle Protection Act. IF&W and partners have not ceased bald eagle monitoring, research, and management since delisting.

IF&W management goals and objectives for bald eagles include the following:

*Population Goal***.** Increase the population and expand the range of breeding bald eagles in Maine.

- Population Objective: By 2019, increase the bald eagle population to at least 600 nesting pairs, and allow the population to naturally expand statewide.
- Productivity Objective: Maintain a statewide minimum productivity of 9 fledged eaglets per 10 occupied breeding areas through 2019.

Habitat Goal. Identify, maintain, and enhance bald eagle breeding, foraging, and wintering habitat to allow for future expansion of the bald eagle population in Maine.

- Habitat Objective 1: By 2019, ensure long-term protection of viable bald eagle nesting habitat through fee ownership, easements, and land-owner agreements for a minimum of 300 nest sites, proportionately distributed throughout occupied range.
- Habitat Objective 2: By 2019, promote private stewardship of 300 additional viable bald eagle nest sites through landowner agreements, outreach, tax credits, or other means.
- Habitat Objective 3: By 2008, determine the amount and distribution of shoreline habitat that is currently protected for feeding, wintering, and future nesting sites for bald eagles, and determine the amount of additional shoreline that needs to be protected to ensure the viability of 600 nesting pairs of eagles in Maine.

The Irving Unique Areas Program has identified several bald eagle nests within the Plan area and on adjacent properties outside of Irving ownership. The greatest concentration of nesting sites is at the southern end of Square Lake. Bald eagle sightings are relatively common in the Plan area, especially on Cross Lake and Square Lake. None of the nest sites are within proposed development areas.

GREAT BLUE HERONS

A possible great blue heron nesting site east of Van Buren Cove is included on Irving's inventory of Unique Areas. This area was noted during the site evaluation process and is outside the development areas.

RUSTY BLACKBIRDS

Once-common breeders in boreal wetlands across New York, Vermont, New Hampshire, and Maine, rusty blackbirds have experienced chronic long-term and severe short-term population declines in recent years. Some estimates suggest that rusty blackbird populations have declined by 85-99% over the past 40 years. In a recent study of boreal forest-breeding birds, rusty blackbirds experienced the steepest declines, leading scientists to state that the rusty blackbird is "one of the most precipitously declining species in North America" (Niven et al., 2004). Until 1999, these alarming losses went unrecognized; only for the last decade have scientists sought to understand the roots of this decline.

Rusty blackbirds breed in boreal forest wetlands from northern New England throughout Canada to Alaska. While the eastern portion of the breeding range may have once contained the highest densities of breeding birds (Erskine, 1977), this region may have experienced the steepest population declines (IRBTG, 2009). Surveys of wetlands throughout Maine between 2001 and 2007 documented a range contraction of 160 square kilometers since 1983 (Powell, 2008). In Maine, the rusty blackbird is listed as a Species of Special Concern, and the International Union for Conservation of Nature Red List denotes this species as globally vulnerable.

In 2012, Irving contracted with Dr. Judith Scarl, Vermont Center for Ecostudies, to conduct rusty blackbird surveys within the Plan area. There were 10 survey sites near the proposed development areas. The observers detected rusty blackbirds at only one of the ten survey sites. This was at a highly forested site just north of Square Lake E with no visible evidence of beaver activity.[2] See Appendix F for Dr. Scarl's report.

INLAND WATERFOWL/WADING BIRD HABITAT

Significant Wildlife Habitats are regulated under Maine's Natural Resources Protection Act, which is administered by the DEP. Inland Waterfowl/Wading Bird Habitats, one type of Significant Wildlife Habitat, are freshwater breeding, migration/staging, and wintering habitats for inland waterfowl, or breeding, feeding, loafing, migration, or roosting habitats for inland wading birds. These are typically wetland complexes and a 250-foot-wide upland zone surrounding them. The quality of a wetland complex is determined by the dominant wetland type, the diversity of wetland types in the complex, the size of the wetland(s), the interspersion of the different types, and the relative amount of open water.

There are several inland waterfowl/wading bird habitats found within the Plan area, including:

[2] 2012 Rusty Blackbird Detections on J.D. Irving, Ltd. Lands, Square Lake and Long Lake Regions. Dr. Judith Scarl, Vermont Center for Ecostudies. Norwich, VT. July 24, 2012.

- Wetlands associated with the unnamed stream at the eastern end of Mud Lake;
- A portion of the Mud Lake/Cross Lake thoroughfare;
- The Cross Lake Bog and the Cross Lake Fen;
- A beaver flowage along Black Brook east of the Yerxas Camp; and
- Wetlands associated with Goddard and Little Goddard Brook at the southern end of Square Lake.

Beaver flowage along Black Brook east of the Yerxas camp

None of these habitats are within a proposed development area.

7. PLANT RESOURCES/UNIQUE NATURAL AREAS

UNIQUE AREAS PROGRAM

Irving has adopted a company-wide program, known as the Unique Areas Program, which catalogues unique features on the landscape and provides woodlands operations personnel with recommendations on how to maintain that feature within the concept of a working forest. See Appendix E for more detail on the Program. This information was a critical factor in determining the locations of areas proposed for conservation and the development areas.

The following are the broad-based objectives of the Unique Areas Program:

- Use of “indicator” species from which we may monitor for changes in the environment caused by man or nature;
- Preservation of rare and uncommon species or significant landscape features;
- Establishment of a database that will aid regional scientists and policy makers in determining the abundance and distribution of species or natural features; and
- Use of the information within the newly established database to formulate better management plans for Unique Areas, educate the public on how Irving manages its resources and invite its support in identifying significant sites.

There are a number of criteria that are used to define Unique Areas. At least one is required for a site to be designated and become a part of the program. Places such as DWAs, streams, and rivers – while of significant habitat value – are generally not included since they already receive special management considerations to ensure their viability. Criteria include:

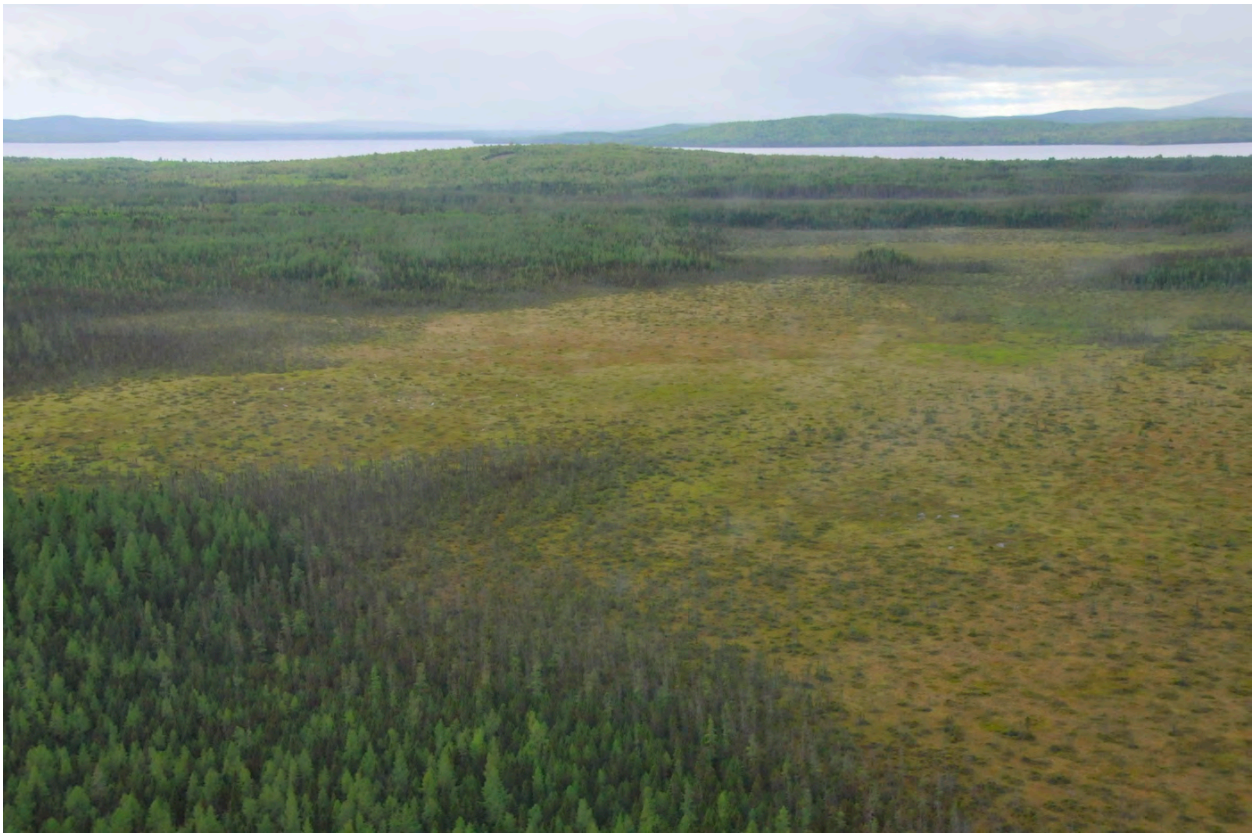
- Presence of rare and uncommon species (such as the inlet on Mud Lake where the pigmy waterlily has been identified);
- Critical habitats;
- Outstanding, rare, or uncommon state types (such as the Cross Lake Fen between Square and Cross Lake);
- Unique geologic features (such as Limestone Point on the west shoreline of Square Lake);
- Historical and archaeological features; and
- Sites with high aesthetic appeal (such as the steep slopes above both sides of Van Buren Cove on Long Lake).

Potential sites are often proposed through dialogue with biologists, foresters, concerned citizens and environmental groups, or through scientific or historical literature. Once this information is obtained, the site undergoes an ecological survey and inventory of the plant and animal species. If accepted, a boundary is delineated and a management recommendation is created to ensure the conservation of the feature(s).

The number of Unique Areas within Irving lands can fluctuate on a yearly basis. Harvesting operations in these areas are governed by site-specific management instructions (prescriptions). In many cases, the prescriptions forbid harvesting within a given site. In Unique Areas where limited harvesting is permitted a management plan is formulated with the intent of preserving the elements that give these sites their significance. As public awareness of this program increases it is expected more sites will be proposed and will likely be accepted as unique areas. Likewise, it is also likely that some sites may be removed from the database, e.g., if known heron or eagle nesting sites are permanently abandoned or destroyed due to wind damage. Current sites in the Program are identified on Map 19 in Volume 3.

BEGINNING WITH HABITAT FOCUS AREAS / CROSS LAKE FEN

Beginning with Habitat (BwH) Focus Areas are natural areas of statewide ecological significance that contain unusually rich concentrations of at-risk species and habitats. These areas, identified by biologists from the Maine Natural Areas Program (MNAP), IF&W, Maine Department of Marine Resources (DMR), USFWS, The Nature Conservancy, Maine Audubon, and Maine Coast Heritage Trust, support rare plants, animals, and natural communities, high quality common natural communities, significant wildlife habitats, and their intersections with large blocks of undeveloped habitat. BwH Focus Area boundaries are drawn based on the species and natural communities that occur within them and the supporting landscape conditions that contribute to the long-term viability of the species, habitats, and community types.



Cross Lake Fen

One or more of the following must be present before an area is considered a Candidate Focus Area (in most cases, two or more are present):

- Globally rare plant or animal;
- Three or more healthy populations of a rare plant species;
- Any healthy population of a rare animal species;
- Rare natural community;
- Excellent example of a common natural community;
- Good example of a common natural community and one or more high value wildlife habitats; or
- Large undeveloped block and at least one of the following: a good example of a common natural community, or high value wildlife habitat, or two or more healthy populations of a rare plant.

Within the Plan area, the Cross Lake Fen, above the western shore of Cross Lake, is listed as a BwH Focus Area. The Fen as a whole contains more than 1,500 acres of inland waterfowl/wading bird habitat, of which approximately 40% are on Irving land. The Fen contains several rare and exemplary natural communities, as well as two rare plant species.[3]

The State owns an 83-acre tract called the Parker Bog parcel that is part of the Cross Lake Fen complex. This area, which is a Maine Public Reserve Land, abuts Irving's portion of the Fen. The Parker Bog

[3] http://beginningwithhabitat.org/about_bwh/focusareas.html

property is underlain by swamp, marsh, and bog deposits, with more than 50 acres in open wetland. Most of the parcel provides inland waterfowl/wading bird habitat. There are several exemplary features on the Parker Bog property including an extensive Patterned Fen Ecosystem, most of which lies outside the property. The "patterning" arises from low, parallel peat ridges alternating with wet hollows or shallow pools creating a ribbed appearance on the surface of the peatland. Fens tend to have higher pH levels than other wetland types. The pH range on this parcel is 4.5 to 4.9. Exemplary natural communities within the ecosystem include Low Sedge-Buckbean Fen Lawn and Sedge – Leatherleaf Fen Lawn. Moor rush (*Juncus stygius*), a rare plant (S2), is found in the open Low Sedge – Buckbean Fen Lawn portion. Wiegand's sedge (*Carex wiegandii*) grows in the transition zone between the open fen and spruce swamp.[4]

BOTANICAL RESOURCES

Preliminary Field Investigations. Irving scientists performed a rare plant habitat pre-screening survey in July and August 2012 for the following residential areas: Long Lake A and B; Cross Lake A, C, and E; and Square Lake E and W. Despite identifying a small number of rare plant indicator species (as outlined in J.D. Irving, Limited's Rare Plant Habitat Pre-Screening Program for Maine), no state or federally listed (nor S1-S3, G1-G3) plant species (rare plants) were observed during the surveys at any of the development areas visited. No rare plants were located within the development areas, nor the 1,000 foot buffers on those areas. Irving contacts the MNAP annually for a listing of new flora on their properties.

Known Botanical Resources. The following species have been identified through the MNAP and the Unique Areas Program. In all cases, these sites are outside the areas proposed for development.

- A pigmy waterlily (*Nymphaea leibergii*) (S1) site was identified at the confluence of a small stream at the eastern end of Mud Lake;
- Cross Lake Bog, on the north side of Route 161. This is an inland waterfowl/wading bird habitat that runs from Dickey Brook on the west to the Cross Lake thoroughfare on the east;
- Cross Lake Fen (see description above); and
- Several small stands of old growth hemlock and red oak.

8. SCENIC RESOURCES

STATE ASSESSMENT

The Fish River chain of lakes is a noteworthy scenic feature, offering recreational users and residents a combination of woods and water views. There is significant variety in the visual landscape that includes large lakes with moderately configured shorelines, small ponds, steep hills overlooking the waters, open beaches, and wildlife viewing opportunities. The scenic resources are undoubtedly one of the attractions that led to the dense development along some of the shorelines.

[4] Northern Aroostook Regional Management Plan. Maine Department of Conservation Bureau of Parks and Lands. Augusta, Maine. June, 2007.

In 1987, LURC published the Wildlands Lakes Assessment, which evaluated each of the lakes within the Unorganized Territory for its resource values. While each of the lakes was noted for a variety of resource values, none of them were recognized for their scenic resources under the Assessment.

Prior to the publication of the Assessment, the State Planning Office issued the Scenic Lakes Character Evaluation in Maine's Unorganized Towns, which evaluated the scenic characteristics of all 1,509 lakes and ponds (with a surface area greater than 10 acres) in the area under LURC jurisdiction. The Evaluation was based on six criteria: relief, physical features, shoreline configuration, vegetation diversity, special features, and inharmonious development. A point system was developed to assign a rating to each of the criteria, depending upon their presence in the landscape. Based upon a review of the methodology, it appears that the Fish River chain of lakes was not listed due to the relative lack of physical relief near the shoreline.

Southern end of Long Lake at Van Buren Cove

Despite these assessments by the State, Irving has designated sites within the Plan area as Unique Areas due to their high aesthetic appeal. The steep slopes on both the east and west side of Long Lake have been established as protection areas under the Unique Areas Program to preserve the steep topography above the shoreline communities on either side of Van Buren Cove.
Irving's forest management practice considers and incorporates aesthetics when planning management activities in areas where visual impacts may be of concern. As part of the development of a Forest Management Plan, planners identify, though a public process, areas that may have scenic or aesthetic value in places that are targeted for forestry activity. Within these areas, harvest operations use methods that minimize the visual impacts.

This approach parallels the Department of Conservation's management strategy for the adjacent Eagle Lake lands, where the background views as seen from Eagle Lake and Square Lake and the thoroughfare are designated as Visual Class II areas. Under this designation, State lands are managed to avoid any

obvious alterations to the landscape. Openings will be of a size and orientation as to not draw undue attention.

For more information on Irving's sustainable forestry management practices in Maine and the OBF approach, see the response to Question 20, Appendix D, and Volume 2 at Tab 2(E), Chapter 10 Addendum § 10.32.

9. HISTORICAL, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

The Maine Historic Preservation Commission (MHPC) has identified the general locations of four prehistoric archeological sites in the Plan area. One is located on Cross Lake near the thoroughfare from Mud Lake. Two are located on Cross Lake near the thoroughfare to Square Lake. One is located on Square Lake at the thoroughfare to Eagle Lake. MHPC has concluded that the Plan area possibly contains one or more prehistoric archaeological sites based on its predictive model of archaeological site location. Each of these identified areas includes a significant amount of land that is outside of the Plan area (e.g., the frontage along the Eagle Lake thoroughfare is owned by the State), and thus it is not clear at this time that there would be any impact from development.

A Phase I archaeological survey prior to any ground disturbance would be necessary for future development if it occurs in the vicinity of these known sites. The survey should include a search for logging camps and possible driving dams.

Regarding architectural resources, there may be potentially eligible historic properties within the Plan area. Once individual projects have been identified, photos should be taken of any existing buildings or structures that are 50 years or older so that they can be evaluated by MHPC for eligibility on the National Register of Historic Places.

10. RECREATIONAL RESOURCES

IF&W has done stratified random design surveys to determine recent and 15-year recreational use patterns within the Plan area. Counts were done both in the air and on the ground. In IF&W's opinion, the winter seasons are getting shorter (lakes freeze later and ice goes out sooner), resulting in more pressure in some locations and less in others.

IF&W would like to see an "equitable access" policy established whereby everyone has the ability to gain access to each lake within the Plan area. Long Lake has no deep water access; Mud Lake has no access; Cross Lake has good access at a designated boat launch, but it is leased to a private club and not required to be accessible to the public; and Square Lake has no deep water access.

BOATING

Long Lake. Three public boat landings are available around the lake, in Sinclair, St. Agatha, and Van Buren Cove in T17 R3. The St. Agatha boat landing, which also includes a picnic area, has been upgraded to accommodate additional boaters. There is no deep-water access into Long Lake within the Plan area. Even if Van Buren Cove were improved, it could not provide access for larger boats.

Mud Lake. There is currently no public access available on Mud Lake. Boating access is possible from an informal put-in on private property at the western end of Long Lake in Sinclair, which provides access to the 1.9-mile long Mud Lake/Cross Lake thoroughfare. The Northern Aroostook Regional Management Plan recognized the need for boat access to Mud Lake; however, an inspection of the Bureau-owned property indicates that the frontage is not suitable for development for boating access.[5] Mud Lake is listed by the State as the #1 priority lake for access in the Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000.[6]

Cross Lake. A boat landing, picnic area, and beach is located on the southeast corner of Cross Lake on Irving property and is currently leased to a local sportsmen's club. Vehicle access to this site is from Route 161 over an improved gravel road. The boat launch is also one of the main access points into Square Lake. Bigger boats are used in the spring when water levels are high, and go from Cross Lake into Square Lake. However, during the summer and fall months, the water in the thoroughfare drops, exposing large boulders and sandbars that effectively cut off into Square Lake for most motorized boats.

Boat launch, picnic area, and beach on Cross Lake

Square Lake. Primary access to Square Lake is via boat through either the Cross Lake/Square Lake or the Square Lake/Eagle Lake thoroughfares. The Moscovic Landing at the northern end of the lake provides a privately-owned access into the lake. Shoreline gradients at this end of the lake are relatively shallow, which limits the size of the boats that can be launched. Vehicle access to the landing is over 7½ miles of unimproved, privately-owned gravel road from Route 161. Local residents consider Square Lake to be highly unpredictable, with large whitecaps being frequent at various times of the year. The Northern Aroostook Regional Management Plan recognized the need for boat access to Square Lake, since the Moscovic Landing is on private property. Square Lake is listed by the State as the #2 priority lake for access in the Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000.[7]

Thoroughfares. One of the unique qualities of the Fish River chain of lakes is the presence of the thoroughfares, which provide a natural water route from Long Lake to Indian Lake, a distance of over 60

[5] Northern Aroostook Regional Management Plan. Maine Department of Conservation Bureau of Parks and Lands. Augusta, Maine. June, 2007.

[6] Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000. Boating Facilities Program of the Maine Dept. of Agriculture, Conservation, & Forestry, Maine Department of Inland Fisheries and Wildlife.

[7] Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000. Boating Facilities Program of the Maine Dept. of Agriculture, Conservation, & Forestry, Maine Department of Inland Fisheries and Wildlife.

miles. The Maine Rivers Study found that the thoroughfares have unique/significant river resource values for canoe touring.

SWIMMING

The primary swimming beach in the Plan area is at Van Buren Cove on Long Lake, where a quarter-mile sand beach separates dense development on the east and west sides of the lake. There are no formal facilities at the beach. Wide shoulders along East Side Road provide room for parking. While this is not a permitted boat launch, people use it to gain boat access to this end of the lake.

For several years, Irving licensed the beach to the Town of Van Buren for its summer recreation program. However, with the decline in population, Van Buren no longer has a formal relationship with Irving. The Town still considers the beach and Long Lake in general to be a significant recreational resource for the community.

HIKING

While there are no designated hiking trails within the Plan area, there is ample opportunity for hiking along Irving logging roads. The Bureau of Public Land's (BPL) Northern Aroostook Region Management Plan notes that hiking trails are of limited demand on the Unit (which includes the adjacent land around Eagle Lake).

CAMPING

There are a limited number of designated campsites within the Plan area. The U.S. Geological Survey (USGS) map for the region indicates three such sites at the southern end of Square Lake; however, local residents only know of one that is currently in use. According to local residents there has been a campsite on the Cross Lake/Square Lake thoroughfare, but no evidence was found during field investigations. The BPL's Northern Aroostook Region Management Plan indicates that there is the potential for a water-access campsite on Rocky Point, at the northern end of Square Lake, where there was formerly a Maine Forest Service campsite.

CROSS COUNTRY SKIING / SNOWSHOEING

While there are no designated cross-country ski trails within the Plan area, there is ample opportunity for skiing along Irving's logging roads. The Northern Aroostook Region Management Plan notes an interest in developing cross-country ski and dog sled trails on the Unit (including the adjacent Eagle Lake land).

SNOWMOBILING

With a yearly snowfall average of 115 inches, the Plan area is very popular with snowmobile enthusiasts. Registered club members are welcome to use Irving's dedicated trail network, provided they follow recreational use guidelines based on Irving's land management policies. See Volume 3 Map 32 for the location of major snowmobile routes in and around the Project area.

ATV RIDING

ATV riding is very popular within the Plan area, with a series of marked trails maintained by local clubs. Irving allows managed ATV access to designated trails within their holdings, as long as the vehicle owner is a member of the local ATV club and abides by the rules regarding the use of their land. See Volume 3 Map 32 for the location of major ATV trails in and around the Project area.

ATV trail on the east side of Long Lake near Van Buren Cove

11. EXISTING LUPC ZONING

The existing zoning districts in the Plan area are typical of many developed lakes in the jurisdiction. Residential and commercial uses are currently permitted throughout the Plan area. Within 250 feet of the shoreline two subdistricts predominate: the P-GP (Great Pond, Protection) Zone and the D-RS (Residential, Development) Zone. Beyond 250 feet, most of the land is in the M-GN (General, Management) Zone. Smaller areas are zoned as P-SL2, P-WL1 & 2, and D-GN, etc., within this general zoning pattern. See Maps 4-10 in Volume 3 for more information in existing LUPC zoning in the Plan area.

12. EXISTING DEVELOPMENT

Most of the shoreline of Long Lake and much of the shoreline of Cross Lake that is owned by Irving is extensively developed with seasonal and year-round homes. Although none of Irving's frontage on Mud Lake is developed, there are over two-dozen homes and a camping area on the north shoreline outside of Irving's holdings. Square Lake has 19 licensed/leased camp lots on land owned by Irving. There are roughly 36 privately owned camps lots on the north shore in the vicinity of the Moscovic Boat Landing.

In addition to the lakes, development also occurs on the thoroughfares connecting each of the lakes. The Long /Mud Lake thoroughfare has about three dozen privately-owned homes on it, primarily near the Village of Sinclair. The Mud/Cross Lake thoroughfare has 20 camp lots that are licensed by Irving, plus a general store at the intersection with Route 161. Irving owns the land on the southern half of the Cross/Square Lake thoroughfare, with the exception of the Fraser Camp (now a private residence) on the eastern shore of Square Lake. The land along the Square/Eagle Lake thoroughfare is owned by the State as part of the Maine Public Reserve Land.

Over 400 camp lots are located within the Plan area

Much of the development in and around the Plan area occurred in the early to mid-1900s, prior to the establishment of LURC. The type of development that is typically found on the lakes – 1/2 acre lots, minimal setbacks from the water, extensive lawn areas with minimal tree cover – would not be allowed under current LUPC standards designed to protect the integrity of the lakes.

The 2010 U.S. Census recorded a total of 1,089 housing units in the portion of the Unorganized Territory that includes all of Square, Cross, and Mud lakes and the southern portion of Long Lake, plus the heavily developed northern basin of Madawaska Lake. Since the northern basin of Madawaska Lake accounts for an estimated 150 to 200 units of this total, and since there is virtually no residential development in the interior of this part of the Unorganized Territory, it can be estimated that Long, Cross, Square, and Madawaska Lakes have on the order of 850 to 950 housing units around them. Of these, Irving owns and licenses/leases an estimated 425 camp lots on Long, Cross, and Square Lakes and the Cross Lake thoroughfare. The majority of these camp lots have seasonal or year-round homes on them; some may be vacant or used for a garage or other accessory building.

Other development on the lakes includes churches and other institutional uses, commercial establishments (restaurants, stores, commercial campgrounds), and recreational facilities (marina/seaplane base, boat ramps, golf course). The northern end of Long Lake is heavily agricultural. A network of ATV and snowmobile trails is maintained in the area, including on Irving lands.

There are no longer active traditional sporting camps on any of the four lakes in the Plan area. Well known ones from the past included the Fraser Camp at the mouth of the Cross-Square Lake thoroughfare and Yerxas on Square Lake (now labeled “Gorfinkle Camp” on USGS maps). Eagle Lake Sporting Camps, with seven year-round and six seasonal cabins and a dining room, continues to operate at the point where the Square Lake/Eagle Lake thoroughfare enters Eagle Lake, outside of the Plan area. It is surrounded by Maine Public Reserve Land and is accessible by four-wheel drive vehicles, boats, and snowmobiles.

The only commercial center in the immediate four-lake area is in the Village of Sinclair on the Long Lake/Mud Lake thoroughfare. Most goods and services are obtained in the surrounding towns, including Van Buren, Fort Kent, and Madawaska.

13. EXISTING MUNICIPAL SERVICES AND CAPACITY TO SERVE

WATER SERVICE

There is no municipal water service within the Plan area.

SEWER SERVICE

The Village of Sinclair is served by a sanitary treatment facility that was constructed and put into operation in 1994. The need for the plant was driven by a concern for water quality in the Long Lake/Mud Lake thoroughfare, caused by outdated and/or failing septic systems. The goal was to remove nutrients that contributed to water quality issues. The plant consists of three lagoons and four spray irrigation fields designed by Wright-Pierce, an engineering firm in Topsham, Maine. Since the treatment plant was constructed, the license was modified to include a one-mile sewer extension on Barnbrook Road on the south side of Long Lake and the installation of a 2-inch force main line.

According to Raymond Thibodeau, the retired superintendent of the Sanitary District, the design capacity is 45,000 gal/day, while the average actual use is 15,000-20,000 gal/day (as of 2011). According to the proposed license renewal, the spray capacity is 54,300 gal/ac/week. The average actual discharge is 32,000 to 39,000 gal/ac/wk over the last 5 years. Thus, there appears to be a reasonable amount of available capacity for additional users. The DEP would require historical records of flows into the plant to determine the capacity to handle additional customers. Wright-Pierce felt that the type of community/economic development that would be of interest to the Town would be unlikely to have a high water and treatment demand.

ELECTRICAL POWER

Electricity is supplied to most parts of the Plan area by Maine Public Service (MPS) and Bangor Hydro. MPS and Bangor Hydro are regulated electric transmission and distribution utilities that are wholly owned by Emera, a full-service energy company based in Nova Scotia. Existing residential developments on Long Lake and Cross Lake are served by MPS. The Irving licensed/leased camp lots on the west side of Square Lake do not have electrical service and rely upon other means, such as solar collectors and gas generators, for their power requirements.

TELEPHONE / CATV SERVICE

FairPoint Communications is one of a number of entities that provides internet, telephone, and television service for northern Aroostook County. As noted above, wire utilities are not available on the western side of Square Lake.

AMBULANCE SERVICE

Ambulance Services, Inc. (ASI), headquartered in Fort Kent, provides ambulance services for Cross Lake Township, Sinclair, and Square Lake. ASI maintains satellite offices in St. Agatha and Cross Lake.

SOLID WASTE

Solid waste is disposed of at the Tri-Community Landfill in Fort Fairfield for Sinclair, Cross Lake, and Square Lake. Aroostook County pays Tri-Community on a tonnage basis for solid waste disposal. There is a transfer station in Sinclair for bulky waste. There are three companies that currently provide pick-up services for individuals in the area. Individual haulers handle recycling; there are igloos in both Sinclair and Cross Lake for recyclables.

FIRE PROTECTION

Fire protection for Sinclair, Cross Lake Township, and Square Lake is provided by North Lakes Fire & Rescue (NLFR), which has three substations covering four unorganized territories in Aroostook County. The substations serve the northern part of Aroostook County, covering Cross Lake, Mud Lake, Long Lake, Madawaska Lake, and Square Lake. NLFR has written mutual aid agreements with the Towns of Stockholm, St. Agatha, and Fort Kent, and the Caribou Fire & Ambulance Department. In addition to fire protection, they also provide the following services:

- Fire prevention and home inspections
- Jaws of life
- Basic haz-mat response
- Removal of debris from camp roads after major storms
- First response for assisting local ambulances.

LAW ENFORCEMENT

The Maine State Police and the County Sheriff handle law enforcement in the Plan area on a rotating basis. Aroostook County is subdivided into five zones for law enforcement, and the responsibility changes weekly. Calls to 911 from landlines go to Penobscot County; the Houlton Police handles those from cell phones. All calls are then transferred to the County for dispatch. There are 68 jurisdictions within Aroostook County; the Unorganized Territory constitutes one jurisdiction.

14. ROAD NETWORK

PUBLIC ROADS

There are two public roads that serve the Plan area:

- **Route 161** is a state road that runs northwest/southeast through the center of the Plan area between Mud Lake and Cross Lake. It serves as the major north-south connector between Fort Kent to the north and Caribou to the south. Route 161 is in good condition and there are no problems with its traffic capacity or sight distances. Within the Plan area it is lightly developed, with occasional residences and businesses. The St. Peter's Country Store in Cross Lake Township

(north of the Mud/Cross Lake thoroughfare) is the focal point for commercial activity within the Plan area. There are no current Maine Department of Transportation (MDOT) projects on this section of the highway.

- **Route 162** is also a state road that connects Frenchville to the north with Cross Lake Township (formerly known as Guerette) in the middle of the Plan area. Unlike Route 161, Route 162 is moderately to heavily developed along much of its length within the Plan area. The most intense development is in the Village of Sinclair, at the western end of Long Lake and adjacent to the Long/Mud Lake thoroughfare. Route 162 is in good condition. MDOT has no current plans for any improvements within the Plan area.

IRVING ROADS

The Irving roads within the Plan area fall into four general categories:

- **Primary Roads.** Primary roads are year-round named roads designed for daily use for forest management activities. Members of the public also use the primary roads to travel through the Plan area and to access recreational areas and leased/licensed camp lots. These roads generally have a travel surface 24-30 feet in width and shoulders giving a total width of about 40 feet. They are often built up on shaley fill with drainage ditches leading to turnouts. The Sullivan Road is a good example of a primary road.

- **Secondary Roads.** Secondary roads are often named roads used for forest management activities and may provide direct access to residential areas and recreational resources. The typical travel surface of secondary roads is 12-18 feet in width and gravel shoulders for a total width of about 24 feet. The Disy Road leading to Cross Lake is a good example of a secondary road.

- **Camp Roads**. Camp roads are a subset within the secondary road system and are primarily used for access and frontage for the leased/ licensed camp lots throughout the Plan area. Many of these roads have little value from a forest management perspective. These roads are typically maintained by Irving for use by license/lease holders and recreational users, and are often managed by a lease/license holder association. Examples include the East Van Buren Cove Road on Long Lake and the Cyr Road on the east side of Cross Lake.

Access road to camps on west side of Square Lake

- **Logging Roads.** The typical logging road is a one-lane travel way developed on shaley fill with a width of about 12-15 feet. These are actively used during forest management operations, and are often discontinued once harvesting has occurred. Many of the logging roads have sags that tend to collect water, with few turnouts.

For more information on the road network, please see Maps 35-37 in Volume 3.

APPENDIX B - PUBLIC OUTREACH ACTIVITIES

As part of the process for developing the Concept Plan, Irving met with local stakeholders, current license holders, individuals, state and federal agencies, local and county officials, and Non-Governmental Organizations. The following table lists these meetings, all of which provided the planning team with valuable insights into the Plan area and surroundings and helped to shape the proposed Concept Plan petition. Numerous newspaper articles published in the Bangor Daily News, St. John Valley Times, and the Star Herald, as well as interviews by WAGM TV-8, provided citizens of Aroostook County and Western New Brunswick with up-to-date information on the status of the Concept Plan, as well. In addition, Irving retained the services of Hollie Umphrey, a long-time Aroostook County resident and former town manager of Portage Lake, to be available to answer questions and provide on-the-ground information for local residents and license holders.

DATE	LOCATION	AUDIENCE	TOPICS
June 3, 2013	Lakeview St. Agatha	Fish River Lakes License Holders Association - Board of Directors	Provided overview of the Concept Plan. Discussed how it could potentially benefit license holders.
June 4, 2013	NMDC Caribou	Community Guided Planning and Zoning Committee; NMDC staff	Provided overview of the Concept Plan to the CGPZ Steering Committee. Explored possible synergies.
June 4, 2013	NMDC Caribou	NMDC staff and consultants	Provided overview of the Concept Plan.
June 12, 2013	Houlton	Land Use Planning Commissioners	Provided overview of the Concept Plan.
June 12, 2013	Lakeview St. Agatha	Public Meeting: over 200, mostly license holders, in attendance	Provided overview of the Concept Plan. Q&A session with attendees.
July 7, 2013	Long Lake	Public Meeting with Van Buren Cove Association (Club 17): over 70+ members	Provided overview of the Concept Plan. Q&A session with attendees re: how the plan will impact license holders, opportunity for land purchase; road maintenance; new boat launch. A result of these public outreach meetings was the creation of a database to ensure all lake association members have access to current information on the development of the Plan.

DATE	LOCATION	AUDIENCE	TOPICS
July 23, 2013	Brewer	Maine Audubon Society (MAS)	Provided overview of the Concept Plan. Established line of communication. Discussed MAS mission, involvement with other concept plans, lessons learned, habitat in Concept Plan Area, role of MAS in process.
July 23, 2013	Brewer	The Nature Conservancy (TNC)	Provided overview of the Concept Plan. Established line of communication. Discussed TNC mission, involvement with other concept plans, conservation options, role of TNC in process.
July 23, 2013	Brewer	Forest Society of Maine (FSM)	Provided overview of the Concept Plan. Established line of communication. Discussed FSM mission, involvement with other concept plans, conservation easements, potential role of FSM in process.
July 30, 2013	Augusta	Bureau of Parks & Lands (BPL)	Provided overview of Concept Plan. Discussed BPL Eagle Lake Management Plan, role of BPL in development of Concept Plan, possible boat launches.
August 21, 2013	Ashland: LUPC	Resource Agencies: LUPC, Maine IF&W, Maine Forest Service, Maine DOT, Maine DEP, BPL, St. John Valley Soil and Water Conservation District	Provided overview of Concept Plan. Established lines of communication. Discussed agencies' roles, data needs, and areas of interest.
August 21, 2013	Caribou	Aroostook County Commissioners	Provided overview of Concept Plan and Commissioners' role. Q&A session with attendees.

DATE	LOCATION	AUDIENCE	TOPICS
August 21, 2013	Cross Lake	Fish River Lakes License Holders Assoc. Board of Directors; Club 17 Directors	Provided update on the development of the Concept Plan. Discussed specific recommendations for development areas.
August 22, 2013	St. Agatha	Eagle Lake and St. Agatha Town Managers	Provided overview of Concept Plan. Discussed the role of individual communities in the planning process. Q&A session with attendees.
September 18, 2013	Ashland	Maine IF&W	Reviewed fisheries and wildlife records for each of the lakes; discussed fisheries and wildlife management issues and trends; responded to specific data requests.
September 18, 2013	Cross Lake	Property owners	Discussed Cross Lake-specific topics; boat tour of lake.
September 19, 2013	Van Buren	Town Manager and Economic Development Director	Provided overview of Concept Plan. Discussed historic and potential future use of beach at Van Buren Cove, county road maintenance.
September 19, 2013	Caribou	NMDC staff	Provided update on Concept Plan. Transferred GIS data, discussed Aroostook Partnership for Progress, discussed Yerxas, discussed NMDC involvement in Plan.
October 9, 2013	Presque Isle	LUPC: Commissioners and staff	Provided update on Concept Plan. Provided overview of field trip the following day.
October 9, 2013	Caribou	Aroostook County Administrator and Road Commissioner	Provided update on status of Concept Plan. Discussion of providing services to residents, road maintenance and acceptance policy.

DATE	LOCATION	AUDIENCE	TOPICS
October 10, 2013	Fish River Lakes	LUPC Commissioners, staff, members of lake associations. 30+ in attendance	Guided tour of Concept Plan Area: Long Lake, Sinclair, Mud Lake, Cross Lake, Square Lake.
October 16, 2013	Square Lake	Local resident	Discussed Square Lake-specific topics.
October 17, 2013	Fort Fairfield	Aroostook County Town Manager's Association	Provided overview of the Concept Plan. Q&A session with managers. Discussed trails planning.
October 28, 2013	Brewer	FSM staff	Provided details of conservation plan and FSM's potential role in Concept Plan.
November 18, 2013	Augusta	LUPC staff, Maine Natural Areas Program; US Fish & Wildlife Service	Discussed wildlife issues, involvement of Natural Areas Program, preservation of significant natural resources, conservation objectives.
November 18, 2013	Augusta	Natural Resources Council of Maine (NRCM)	Provided overview of Concept Plan. Discussed specific recommendations and proposals for development and conservation, review of field visit, discussed areas of concern.
December 5, 2013	Bangor	FSM Board of Directors	Provided overview of Concept Plan. Discussed potential conservation areas.
March 21, 2014	Lakeview St. Agatha	St. John Valley Soil & Water Conservation District	Provided overview of Concept Plan. Q&A session with attendees.
February 6, 2015	Augusta	Natural Resources Council of Maine Maine Audubon Society	Provided update of Concept Plan. Discussed specific recommendations and proposals for development and conservation.
June 17, 2015	Presque Isle	Forest Society of Maine	Presentation to FSM Board of Directors. Tour Plan area with FSM Board

DATE	LOCATION	AUDIENCE	TOPICS
October 29, 2015	Presque Isle	Staff of IF&W and LUPC	Update to Concept Plan. Discuss wildlife and related issues.
December 17, 2016	Portland	Forest Society of Maine	Discussion of terms of conservation easement

APPENDIX C - EVALUATION OF IMPACTS TO RECREATION

INTRODUCTION

The implementation of the Concept Plan will likely add some level of boating, fishing, and other recreational pressures on each of the lakes in the Concept Plan area (Plan area), by virtue of additional home sites, increases in the number and quality of water access points, and improved opportunities for tourism. This analysis reviews existing conditions and possible changes on each of the four lakes (Long, Mud, Cross, and Square Lakes) if the Concept Plan were fully implemented, as well as the thoroughfares that link them together in a unified whole.

For each lake there is an overview of existing conditions, a list of actions proposed under the Concept Plan, a discussion of future conditions, with both anticipated favorable and unfavorable impacts, a projection of the changes in recreational use to the lake (primarily boating), and a conclusion regarding the effect on the lake as a whole.

The analysis is based upon the Recreation Opportunity Spectrum (ROS), which provides a way to describe the continuum of recreational settings found within the Plan area, and to evaluate the potential changes that may result from its implementation over the next 30 years.

ROS is a recreation inventory and management tool that was developed by the U.S. Department of Agriculture's Forest Service in the late 1970s for use on public lands in the western United States. It is based upon the notion that recreational users expect certain types of social experiences on the lands they visit, and that it is possible to provide recreational opportunities across a broad spectrum of land use classes.

In 2004 a similar program – the Water Recreation Opportunity Spectrum (WROS) – was adopted by the USDA Forest Service for water-based recreation planning. WROS later became known as the Water and Land Recreation Opportunity Spectrum (WALROS). While these tools have become widely used and accepted by federal agencies, they were primarily designed for federal landscapes in the western portion of this country. In 2003, researchers in Vermont[1] developed a revised guide (ROS Northeast Guide, known as the "Guide") that is specifically aimed at the smaller land holdings and the greater frequency of roads typically found in the Northeast (i.e., the types of landscape represented by the Concept Plan). For purposes of this analysis, both WALROS and the Guide will be used to evaluate impacts to the recreation experience on the lakes in the Plan area.

RECREATION OPPORTUNITY SPECTRUM: NORTHEAST GUIDE

The Guide recognizes a spectrum of six different ROS classes: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Semi-Developed Natural, Developed Natural, and Highly Developed. "Highly developed" is primarily found in urban situations and is not included in this assessment. An ROS evaluation is based upon inventories of physical setting, the social setting (amount and type of contact with others), and the managerial setting (amount and kind of restrictions the landowner places on user activities).

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[1] More, Thomas A, Susan Buler, Linda Henzel, Anne E. Mates. Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide. USDA Forest Service. Newtown Square, PA. August 2003.

Since the lands in the Plan area are not primarily managed for recreation – which is the case in state and national recreation areas – a complete ROS analysis is not possible. However, it is possible to identify several of the criteria used to determine ROS classes and social setting.

Southern end of Square Lake

The Setting Characterizations for each of the ROS classes in the Guide[2] are:

- **Primitive**. The area appears to be an essentially unmodified natural environment of relatively large size. It may contain evidence of past human activities and historical-cultural sites, but these are subordinate to its natural state. Interaction between users is very low, and evidence of other users is minimal. The area is essentially free from evidence of management restrictions and controls. Motorized or mechanized use is not permitted.

  Timber harvesting and vegetation management are not compatible with this class. There are no Primitive class lands within the Plan area.

- **Semi-Primitive Non-Motorized.** The area appears to be a predominantly natural or natural appearing environment of relatively medium-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed so that minimum on-site controls and restrictions, if needed, are subtle. Non-mechanized uses predominate. Mechanized uses may be permitted. Motorized use is not permitted.

[2] More, Thomas A, Susan Buler, Linda Henzel, Anne E. Mates. Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide. Table 1, p. 12.

Timber harvesting and vegetation management may occur on a short-term basis if effects are minimized or mitigated to maintain class consistency (seasonality, scheduling harvest, aesthetics, road placement). Sights and sounds associated with skidder and chain saw use generally are not consistent with this class.

Portions of the southern end of Square Lake, which appear to be a predominantly natural appearing environment, have characteristics of Semi-Primitive Non-Motorized.

- **Semi-Primitive Motorized**. The area appears to be a predominantly medium-to-large size natural or natural appearing environment. Interaction between users is low, but there is often evidence of other users. The area is managed so that minimum on-site controls and restrictions, if needed, are subtle. Mechanized uses may be permitted.

  Timber harvesting and vegetation management are compatible with this class. Cross Lake south of the boat launch, which is a medium size natural appearing environment, is an example of Semi-Primitive Motorized.

- **Semi-Developed Natural.** The area is a natural appearing environment. Evidence of the sights and sounds of people are moderate and usually harmonize with the natural environment. Interaction between users may be low to moderate, but evidence of other users is prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Construction standards and facility design accommodate conventional motorized and mechanized uses.

  Many timber harvesting and vegetation management practices are compatible with this class. The Petitioner's land surrounding Mud Lake is an example of Semi-Developed Natural.

- **Developed Natural**. The area is a substantially modified natural environment. Resource modification and utilization practices enhance specific recreation activities and maintain vegetative cover and soil. Sights and sounds of people are readily evident. Interaction between users often is moderate to high. Many facilities are designed for use by a large number of people. Density levels decline with increasing distance from developed sites. Facilities often are provided for special activities. Facilities for intensified motorized and mechanized uses and parking are available.

  Many timber harvesting and vegetation management practices are compatible. Long Lake and Cross Lake north of the boat launch are two examples of Developed Natural.

The Physical Setting is evaluated in terms of remoteness, size, and evidence of human activity[3]:

- **Primitive**. The area is at least 2-3 miles from all maintained roads, railroads, or trails with designated motorized or mechanized use, and has a minimum of 3,000 acres.

[3] Derived from More, Thomas A, Susan Buler, Linda Henzel, Anne E. Mates. Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide. Tables 3, 4, 5.

The setting appears to be an essentially unmodified natural environment. Evidence of recent human activities would be unnoticed by an observer wandering through the area. Evidence of past human activities may be compatible. Trails may be acceptable but must be designed to a primitive standard. Structures are extremely rare.

- **Semi-Primitive Non-Motorized.** The area is at least 0.5 mile (but not farther than 2-3 miles) from all maintained roads, railroads, or trails with designated motorized or mechanized use. These areas can include unimproved roads and trails if usually closed to motorized use. These areas have a minimum of 1,000 to 2,500 acres.

  The natural appearing setting may have subtle modifications that could be noticed, but would not draw the attention of an observer wandering through the area. There is little or no evidence of unimproved roads and motorized use of trails (e.g., snowmobile trail in winter with no evidence of its presence in summer). Structures are rare and isolated.

- **Semi-Primitive Motorized**. The area may contain unimproved roads or secondary trails, but is at least 0.5 mile from any improved, maintained roads, railroads, or primary motorized or mechanized trails. The area has a minimum of 1,000 to 2,500 acres.

  The natural appearing setting may have moderately dominant alterations, but would not draw the attention of motorized observers on trails and primitive roads within the area. Unimproved roads and trails with motorized use are present. Structures are rare and isolated.

- **Semi-Developed Natural.** The area is within 0.5 mile from improved, maintained roads, railroads, or trails. There is no size criterion.

  The natural appearing setting may have obvious modifications, ranging from easily noticed to strongly dominant. However, these alterations remain unnoticed or subordinate from visually scenic and heavily traveled routes and use areas. Designed roads and/or highways are present. Structures generally are scattered, remaining subordinate or unnoticed by observers on visually scenic or heavily traveled routes. Structures may include power lines, microwave installations, etc.

- **Developed Natural**. This class has no distance or size criteria.

  The natural appearing setting has been culturally modified so that the modifications are dominant. Pedestrian or other slow moving observers are constantly within view of culturally changed landscape. This area may include pastoral, agricultural, intensively managed wildland resource landscapes, or utility corridors. Designed roads and/or highways are present. Structures are readily apparent and may range from scattered to small clusters that could dominate the landscape. Structures may include power lines, microwave installations, local ski areas, minor resorts, and recreation sites.

ROS experience characterization is described in terms of the probability of encounters with other people, the type of equipment used, and the quality of the experience[4].

- **Primitive.** Extremely high probability of experiencing isolation from human development, use, and impact.
- **Semi-Primitive Non-Motorized**. Moderately high probability of experiencing isolation from human development, use, and impact.
- **Semi-Primitive Motorized**. Moderate probability of experiencing isolation from human development, use, and impact.
- **Semi-Developed Natural**. About equal probability of encountering other user groups and isolation from sights and sounds of people.
- **Developed Natural**. Encounters with other individuals and groups are common. The physical setting is not as important as the activity opportunity.

Existing boat launch, picnic area, and beach on Cross Lake

[4] From More, Thomas A, Susan Buler, Linda Henzel, Anne E. Mates. Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide. Table 2.

WATER AND LAND RECREATION OPPORTUNITY SPECTRUM (WALROS)

Even though the WALROS system was designed for federal lands in the western part of the United States, it is instructive to review the defining characteristics of each of the five classes, especially in reviewing the characteristics of the four major waterbodies in the Fish River chain of lakes. The summary includes a reference to the comparable ROS classes in the Guide, where applicable.

Primitive Setting[5]: A primitive WALROS area is a large expanse of natural resources far from development and settlement. Sights, sounds, or smells of human activity are rare and seldom sensed. The water resources and shorelines appear natural, showing little evidence of past human use. A sense of remoteness, wildness, solitude, and self-reliance is dominant among visitors. Visitor comforts, conveniences, and concentrations are not appropriate to a primitive setting. Examples of primitive settings are large expanses of federal lands and waters that are miles from development and settlement. The settings are commonly designated as Wild and Scenic Rivers, Wilderness Areas, backcountry lakes, headwaters, marine reserves, roadless areas, or other types of federal or international protected areas.

Primitive Recreation Experience: The area provides many opportunities to see, hear, or smell the natural resources (e.g., forests, wildlife, and aesthetics) since development, human activity and natural resource modifications are rare. The opportunity to experience natural ecosystems with very little and no apparent human imprint is paramount. The natural views, sounds, and smells dominate the area. A sense of solitude, peacefulness, tranquility, challenge, adventure, risk, and self-reliance is highly important, as is the lack of sight, sound, and smells of other humans. A sense of freedom, tranquility, humility, relaxation, appreciation of nature, and stewardship is central and dominant. The primitive recreation experience provides opportunities for human-powered activities such as canoeing, kayaking, fly-fishing, hunting, floating, and backpacking. The high-speed noise of motorized conveyances is typically inappropriate for this area. Visitation often requires considerable trip planning and preparation, travel distance, physical exertion, and duration. Overnight visitors use tents in settings with no conveniences or facilities. Adventure travelers and ecotourists from distant locations are often attracted to the undisturbed wildland setting.

Semi-Primitive Setting: A semi-primitive WALROS area is a large expanse of natural resources that is far from any city or metropolitan area and a considerable distance from small communities, subdivisions, or developments. Natural resources dominate the landscape. Development is minor, and the sights and sounds of human activity in a semi-primitive setting may include evidence of human activity such as distant farming operations, powerlines, livestock, small buildings, old roadways, historic structures, and historic logging or mining. These water resources are often within large expanses of public lands and waters. Visitors desire a sense of tranquility and an escape from their daily routine. Facilities are rustic and blend well into the setting. Resource protection is highly important. The opportunity for visitors to see, hear, and smell nature is widespread. Visitors sense solitude and remoteness. Examples of semi-primitive settings are large expanses of state and federal lands and waters that are commonly designated as Wild and Scenic Rivers, Wilderness Areas, backcountry lakes, headwaters, marine reserves, roadless areas, or other types of protected areas.

[5] Aukerman, Haas, and Associates, LLC. Water and Land Recreation Opportunity Spectrum (WALROS). User's Handbook, Second Edition. U.S. Department of the Interior. Denver. 2009.

Semi-Primitive Recreation Experience: The area provides widespread and prevalent opportunities to see, hear, or smell the natural resources (e.g., forests, wildlife, and aesthetics) since development, human activity, and natural resource modifications are seldom encountered. The opportunity to experience a natural ecosystem with little human imprint, a sense of challenge, an adventure, a risk, a sense of self-reliance, and a feeling of solitude are all important characteristics. However, management is important on the water and at destination sites even though the recreation experiences tend to be more resource based. A sense of independence, freedom, tranquility, relaxation, appreciation of nature, testing skills, and stewardship is typical. The opportunity often requires more trip planning, preparation, travel distance of one or more days, physical effort, and duration. The semi-primitive area provides opportunities for the more adventure-based enthusiasts (e.g., fly and float fishing, hunting, backcountry camping, canoeing, rafting, and nature viewing). Overnight visits typically involve tents in settings with few conveniences and facilities, although extended stays may be accommodated. Adventure recreationists and ecotourists are attracted to this setting. However, inexperienced recreationists or visitors new to the area may be uncomfortable with the remoteness and the necessary requirement of self-reliance.

Rural Natural Setting (Northeast Guide: Semi-Primitive Motorized): A rural natural WALROS area is a considerable distance from metropolitan areas and communities. Natural features are predominant on the landscape, and the presence of development is occasional or infrequent. Agriculture, tourism, and outdoor recreation are often primary industries. Many rural natural areas are large enclaves of public lands and waters. Natural resources dominate the landscape. The sights, sounds, and smells of development are infrequent. Natural-looking settings border the water resources. Water controls or other structures are occasional along the shoreline. Visitors desire a sense of tranquility and escape from their daily routine. Opportunity for visitors to see, hear, and smell nature is prevalent and common, as are occasions to enjoy periods of solitude. Recreation use, diversity, socialization, concentration, sense of security, and conveniences are periodic and occasional. Examples of rural natural areas include unincorporated rural areas with secondary and unpaved roads, small cabins, single residences, farms and ranches, rustic campgrounds, rural county and state parks, powerline rights-of-way, small stores and fuel service stations, and areas bordering or surrounded by large expanses of public lands and waters.

Rural Natural Recreation Experience: The area provides frequent opportunities to see, hear, or smell the natural resources (e.g., forests, wildlife, and aesthetics), as development, human activity, and natural resource modifications are only occasional and infrequent. It is noticeably more natural, less developed, and more tranquil than an urban setting. Socialization with others outside one's group is not very important, although the presence of others is expected and tolerated. The opportunity to relieve stress and get away from an infrastructure environment is important; a high sense of safety, security, comfort, and convenience is not important or expected. Moreover, a sense of independence, freedom, moments of solitude, tranquility, and the appreciation of nature are also important. Various experiences tend to be more resource-dependent, diverse, and may include relaxation and contemplation. Such activities include camping, sunbathing, canoeing, sailing, and boat fishing. Other activities involve socialization and physical exertion (e.g., competitive tournament fishing, kayaking, waterskiing, hunting, and float boat fishing). The rural natural area is typically attractive to extended weekend and long-term visitors who desire to experience the outdoors and get away from large numbers of other people. The rural natural area is popular with overnight visitors using recreation vehicles, tents, and rustic cabins.

Rural Developed Setting (Northeast Guide: Semi-Developed Natural): A rural developed WALROS area is beyond a metropolitan area and the suburban ring of development. Rural developed areas may serve as "bedroom" communities for urban areas and may contain working farms, ranches, and towns. In this setting, primary road networks are common. Although development will be prevalent and common, the setting has a pastoral sense because of an interspersing of forests, water resources, hills, valleys, canyons, wetlands, open spaces, and agricultural lands. Naturally appearing shoreline edges are common, although various water controls or other structures are also common. Recreation use, diversity, socialization, concentration, sense of security, and conveniences are less common than in a developed suburban or urban setting. The sights, sounds, and smells of recreation and non-recreation use are common, yet interspersed with locations and times when the urbanized visitor may experience a sense of tranquility and escape from everyday challenges. Examples of rural developed areas include areas with country estates, second homes and cabins, dams, power stations, primary and secondary roads, communication lines, resorts, marinas, small communities, full service campgrounds, county and state parks, farms, ranches, and small commercial and industrial establishments.

Rural Developed Recreation Experience: The area provides occasional or periodic opportunities to see, hear, or smell the natural resources (e.g., forests, wildlife, aesthetics), but development, human activity, and natural resource modifications are common and frequently encountered. The area is less developed and more tranquil than a suburban setting. The opportunity to experience brief periods of solitude is important but changes from day to day. In a rural-developed area, everyday sights and sounds are also important. Socialization within and outside one's group is typical, and the presence of other visitors is expected. The opportunity to relieve stress, alter everyday routines, and achieve a moderate level of comfort and convenience along with a sense of safety and security is important. The array of recreation activities may be diverse, ranging from relaxation and contemplation (e.g., sunbathing, sailing, shoreline fishing) to physical exertion and challenge (e.g., competing in shoreline and water sports, tournament fishing, ice fishing, water skiing, snowmobiling, motocross racing, and kayaking). The rural developed area is typically attractive for day use by weekend visitors from local metropolitan areas, nearby communities, short-term campers, recreational vehicle users, large groups, and adventure tourists within a day's drive.

Suburban Setting (Northeast Guide: Developed Natural): A suburban WALROS area is on the fringe of the urban area. The sights, sounds, and smells of development and built structures are widespread. The built environment tends to be commercial and residential. The sights, sounds, and smells of commerce and everyday living are very obvious and prevalent.

Suburban Recreation Experience: The area provides little opportunity to see, hear, or smell the natural resources (e.g., forests, wildlife, aesthetics) because of the widespread and prevalent level of development, human activity, and natural resource modification. Moreover, watching and meeting other visitors is expected and desired. The area provides an opportunity to briefly relieve stress and alter everyday routines. Socializing with family and friends is also important since large groups and families are common. A high sense of safety, security, comfort, and convenience is central and dominant. The mix of recreation activities may be diverse, ranging from relaxation and contemplation (e.g., sunbathing, reading, and nature walking) to physical exertion, thrills, excitement, and challenge (e.g., parasailing, jet boating, and water skiing). Learning about natural or cultural history, ecology, and reservoir and river operations is important to some people. Thus, the suburban area is a popular attraction to many local residents.

Table 1 summarizes various social setting and managerial setting attributes of WALROS classes. Information is derived from Tables 2.3 and 2.4 in WALROS.

TABLE 1
LAND AND WATER ATTRIBUTES: WALROS

Attributes	Primitive	Semi-Primitive	Rural Natural	Rural Developed	Suburban
Degree of visitor concentration	Very minor 0–3%	Minor 3–10%	Occasional 10–20%	Common 20–50%	Very prevalent 50–80%
Degree of recreation diversity	Very minor 0–3%	Minor 3–10%	Occasional 10–20%	Common 20–50%	Very prevalent 50–80%
Boats seen /heard/day	< 3	< 10	N/A	N/A	N/A
Water acres per boat	480 – 3,200	110 – 480	50 – 110	20 – 50	10 – 20
Sea planes	N/A	N/A	Occasional	Very prevalent	Very prevalent
Picnic and day use areas	N/A	N/A	Occasional	Common	Very prevalent
Designated beach areas	N/A	N/A	Occasional	Common	Very prevalent
Boat ramps	N/A	N/A	Occasional	Common	Very prevalent
Unimproved trails	Very few	Seldom	Occasional	Common	Very prevalent
Water trails	Seldom	Seldom	Occasional	Common	Very prevalent
Fuel services	N/A	N/A	Occasional	Common	Very prevalent
Community boat docks	N/A	N/A	Occasional	Common	Very prevalent

FISH RIVER CHAIN OF LAKES

The Fish River Chain of Lakes offers a wide spectrum of physical settings and recreational experiences to its lease/license holders and visitors. In general, the density of development decreases as the visitor starts at Long Lake and heads downstream (west) toward Square Lake. Table 2 summarizes both the Northeast Guide ROS and WALROS classes identified for each major waterbody in the Plan area.

TABLE 2
ROS/WALROS CLASSES OF MAJOR WATERBODIES

WATERBODY	NORTHEAST GUIDE CLASS	WALROS CLASS
Long Lake	Developed Natural	Suburban
Long/Mud Thoroughfare	Developed Natural	Suburban
Mud Lake	Semi-Developed Natural	Rural Developed
Mud/Cross Thoroughfare (Mud Lake to Route 161)	Semi-Primitive Motorized	Rural Natural
Mud/Cross Thoroughfare (Route 161 to Cross Lake)	Developed Natural	Suburban
Cross Lake (north of boat launch)	Developed Natural	Suburban
Cross Lake (south of boat launch)	Semi-Primitive Motorized	Rural Natural
Cross/Square Thoroughfare	Semi-Primitive Motorized	Rural Natural
Square Lake (north half)	Semi-Developed Natural (Semi-Primitive Motorized)	Rural Developed (Rural Natural)
Square Lake (south half)	Semi-Primitive Motorized (Semi-Primitive Non-Motorized)	Rural Natural (Semi Primitive)

LONG LAKE

Existing Conditions. In its present condition, the portion of Long Lake in the Plan area may be considered Developed Natural (Suburban in WALROS). Starting at Van Buren Cove on Long Lake, the lakefront is highly developed, with virtually every camp lot occupied by seasonal cottages and year-round homes that dominate the view of the shoreline. Petitioners have 150 leased/ licensed lots on both sides of the cove. There are approximately 775 residences and other structures along the shoreline of Long Lake, the vast majority of which are not on Petitioners' lands. Natural resources are still very prominent, with steep wooded
hillsides defining the cove on the east and west. The array of recreation activities and opportunities are diverse, and include swimming, boating, water skiing, fishing, ice fishing, fishing derbies, smelt dipping, ATV riding, and snowmobiling. The focal point is a quarter-mile sand beach that provides access to the water for recreational users (e.g., Van Buren).

Proposed Actions. The Concept Plan is proposing to zone areas for residential development that could affect the existing recreational experience on Long Lake:

Long Lake from the beach at Van Buren Cove

Long Lake A. This is a residential development zone on a 129-acre tract of land on the east side of Van Buren Cove. None of the residential lots would have water frontage. Common areas may provide access to the waterfront. The existing beach at Van Buren Cove would provide access to the waterfront.

Long Lake B. This is a residential development zone on a 56-acre tract of land on the west side of Van Buren Cove. Common areas may provide access to the waterfront. The existing beach at Van Buren Cove would also provide access to the waterfront.

Long Lake C. This is a residential development zone on a 120-acre tract of land above Barn Brook Road east of the Village of Sinclair overlooking Long Lake. None of these lots would have water frontage.

Future Conditions: Anticipated Favorable Impacts. The Concept Plan is expected to result in a number of favorable impacts to the recreational resources associated with the lake and surrounding lands, including:

- Assured access to the beach at Van Buren Cove;
- Preservation of scenic resources at Long Lake; and
- Maintaining existing ATV/snowmobile trails.

Future Conditions: Anticipated Unfavorable Impacts. Future development associated with the Concept Plan has the potential to cause some unfavorable impacts on the visual and recreational resources associated with the lake and surrounding lands:

- There will likely be some visual impact from new development. The measures to control these impacts are the adoption of Chapter 10 regulations in the Chapter 10 Addendum that will address issues such as setbacks, screening, clearing, and road and driveway construction. The limited amount of land designated for future development will provide the opportunity to preserve woodlands for privacy, screening, and trail corridors.
- Additional development opportunities may bring more people and waterfront activity to this part of the lake. Water access will be limited to possible common facilities and/or use of the beach. The hillside development at Long Lake C, east of the Village of Sinclair, will not have direct water access in the Plan area.

Conclusion. Given the heavy existing development in this area, the development permitted by the Concept Plan should not have an appreciable effect on the setting or the recreational experience found in Van Buren Cove and the surrounding lands. The ROS class for this portion of Long Lake should remain as Developed Natural (Suburban).

LONG/MUD LAKE THOROUGHFARE

There are no development areas along the thoroughfare between Long Lake and Mud Lake. Development authorized by the Concept Plan will not have a direct impact on the thoroughfare between Long Lake and Mud Lake. The thoroughfare is considered Developed Natural (Suburban), due to the number of camps/homes that line its bank and the proximity to major roads (Route 162), local roads (Thoroughfare Road, Martin Road, Shore Road), and the Village of Sinclair. The ROS class should remain the same.

Long Lake / Mud Lake thoroughfare

MUD LAKE

Existing Conditions. The majority of the northern shoreline of Mud Lake is developed with seasonal camps, a campground, and year-round residences, with the exception the Maine Public Reserve Land owned by the State. Route 162 is located within 0.5 miles of the lake on both the north and west side. The primary access to the lake is via the Long Lake thoroughfare. The Village of Sinclair is within 0.5 miles of the lake. For these reasons Mud Lake may be considered Semi-Developed Natural (Rural Developed).

Proposed Actions. The Concept Plan includes two actions that could affect the quality of the existing recreational experience on Mud Lake:

Mud Lake Boat Access. There is currently no public access available on Mud Lake. Boating access is possible from an informal put-in at the western end of Long Lake in Sinclair through the thoroughfare, a 1.9-mile journey. The Northern Aroostook Regional Management Plan recognized the need for boat access to Mud Lake and it is listed as the #1 priority lake for access in the Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000.[6] The Concept plan provides the opportunity for a hand-carry boat access facility, along with associated parking, to be added to the northwestern shore of the lake, thus addressing the need for water access to Mud Lake. Petitioners are committing to seek permits to construct the facility within 24 months of the effective date of the Concept Plan, and to start construction within 12 months of the approval of all applicable permits. See Conceptual Sketch for water access facility on Map 35 in Volume 3.

Outpost. The Concept Plan has identified a location along the Mud/Cross Lake thoroughfare for a potential remote campsite or a remote rental cabin (see Map 33 in Volume 3). This could be either a single campsite with minimal clearing, a path to the shore, and a fire ring/picnic table, or it could be a small primitive shelter set back from the edge of the water.

Two development areas on the north side of Route 162, CD-1 and CD-2, are designated for potential community and economic development. These locations are separated from the lake by the highway and existing development along the shoreline. The development anticipated for these areas would not be visible from the lake. By adherence to Chapter 10 regulations in the Chapter 10 Addendum for site development, there should be no impact on the recreation experience or water quality of Mud Lake.

Mud Lake

[6] Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000. Boating Facilities Program of the Maine Dept. of Agriculture, Conservation, & Forestry, Maine Department of Inland Fisheries and Wildlife.

Future Conditions: Anticipated Favorable Impacts. The Concept Plan is expected to result in a number of favorable impacts to the recreational resources associated with Mud Lake and surrounding lands:

- Formal access to the lake to meet a regional need that has been identified by the State. The Maine Department of Inland Fisheries and Wildlife (IF&W) has indicated that it may stock Mud Lake if access were available, which would improve fishing opportunity.
- Preservation of scenic resources. The Concept Plan includes permanent conservation of approximately 1.7 miles of Mud Lake shoreline and approximately 2.0 miles of shoreline along the thoroughfare into Cross Lake.

Future Conditions: Anticipated Unfavorable Impacts. The Concept Plan may result in some unfavorable impacts to the recreational resources associated with Mud Lake:

- Change in character to Mud Lake. A boat access could provide the opportunity for additional boating traffic and fishing on Mud Lake. Any water access site would have to comply with the applicable sections of the Chapter 10 Addendum.

Table 3, from WALROS, presents a range of "reasonable boating capacity coefficients." A boating capacity coefficient is defined as the number of water surface acres adequate for each recreational boat in a particular WALROS class. For lakes in the Rural Developed class, coefficients range from 20 acres per boat to 50 acres per boat.[7] Since Mud Lake is approximately 1,000 acres in size, a reasonable capacity of the lake would be 20 to 50 boats.

TABLE 3
RANGE OF BOATING COEFFICIENTS

WALROS CLASS	Range of Boating Coefficients	
	Low End (more boats)	High End (fewer boats)
Primitive	480 acres/boat	3,200 acres/boat (5 sq. miles)
Semi-Primitive	110 acres/boat	480 acres/boat
Rural Natural	50 acres/boat	110 acres/boat
Rural Developed	20 acres/boat	50 acres/boat
Suburban	10 acres/boat	20 acres/boat

WALROS provides a boating capacity range decision tool (Table 2.6) that is useful in determining the capacity range for water bodies similar to Mud Lake (as presented in Table 2.5). This will provide useful input in arriving at decisions regarding the size of boats to be accommodated, typical boating speed, and the size of the parking lot to be constructed.

[7] At a density of 20 acres/boat, boats distributed evenly across the surface of the lake would be 933' apart. At a density of 50 acres/boat, the distance between boats would increase to 1,475' apart (slightly more than 1/4 mile).

Table 2.6 in WALROS suggests that various factors be considered in selecting the low or the high end of the range, as well as the size and speed of the boats. The lower end, with greater number of boats, is aimed at lakes that have the following characteristics:

- simple shoreline configuration (degree of complexity);
- infrequent islands/shallows/hazards;
- limited diversity of boating types;
- simple boater visitation pattern;
- high compatibility with adjacent recreation/non-recreation land use; or
- low number of sensitive resources / potential for impact.

According to this analysis, Mud Lake has the capacity for up to 50 boats, typically less than 15 feet in length, with less than 10 mi/hr for a top speed. This is well in excess of the anticipated numbers that were used in the development of the Concept Sketch provided on Map 35, which shows a parking area that would accommodate up 4 – 6 vehicles. The following is an estimate of the maximum number of boats that may be anticipated on Mud Lake, with the development of the hand carry facility:

15% of 24 existing camps on lake	4 boats
boats from new access facility	5 boats
15% of the 30 lots on the thoroughfare	5 boats
Total anticipated boats on lake	14 boats

This is well within the 20–50 range recommended by WALROS for a lake of this size and class; it is also within the 9–20 range if the lake were to be considered Rural Natural.[8] This analysis indicates that the lake has the capacity to accept additional boats and still maintain the experience that recreational users expect when visiting Mud Lake.

Conclusion. The development of the hand carry water access site should not have an appreciable effect on the setting or the recreational experience found on Mud Lake. The ROS class for Mud Lake should remain as Semi-Developed Natural (Rural Developed), which should maintain the quality of the recreational experience.

MUD/CROSS LAKE THOROUGHFARE

Development authorized under the Concept Plan should have minimal impact on the thoroughfare. The thoroughfare is considered Semi-Primitive Motorized (Rural Natural) from Mud Lake to Route 161, due to its general lack of development, and Developed Natural (Suburban) from Route 161 to its confluence with Cross Lake, due to the number of seasonal cottages and year-round homes along its shoreline. The undeveloped portion of the thoroughfare will be preserved

Mud Lake / Cross Lake thoroughfare

[8] The rural natural area is typically attractive to extended weekend and long-term visitors who desire to experience the outdoors and get away from large numbers of other people. WALROS.

under a permanent conservation easement. The only visible change that would affect the recreation experience is
the potential outpost (campsite or cabin), as described above for Mud Lake. The ROS classes should remain the same for the thoroughfare.

CROSS LAKE

Existing Conditions. Starting at the boat launch on the southeastern shore, approximately 6.2 miles of shoreline are developed with over 300 seasonal camps and year-round residences (Irving has 237 licensed lots on Cross Lake and a small stream at the north end of the lake, and 19 on the Mud Lake/Cross Lake thoroughfare). The only exception to this pattern is a 0.8-mile section of the shoreline at the northern end, where wetlands and two major streams prohibit development. The developed portion of the lake is easily accessed: Route 161 is located within 0.5 miles of the lake on the east side; the Cyr Road, Landing Road, Mifs Lane, Disy Road, West Side Road, and a dozen smaller roads provide access and frontage to existing lots along the waterfront. The majority of the boating occurs at the northern end of the lake, generally in view of the lakeside camps. For these reasons the majority of Cross Lake may be considered Developed Natural (Suburban), similar to Van Buren Cove on Long Lake.

Cross Lake boat launch, beach & picnic area

The character of the lake changes markedly south of the boat launch, where there is little obvious sign of development for almost 6 miles of continuous shoreline (approximately 2.5 miles of this length is non-Irving land). The topography on the eastern side of the lake is much more pronounced than the northern section of the lake. Local residents occasionally use a small beach at the southern end of the lake. There have been recent harvest operations on both sides of the lake within 0.5 mile of the

shoreline. Land access is limited to unimproved woods roads. The southern end of the lake may be described as Semi-Primitive Motorized (Rural Natural).

Proposed Actions. The Concept Plan is proposing areas be zoned for several residential developments that could affect the existing recreational experience on Cross Lake:

Cross Lake A. This is a residential development zone on a 110-acre tract of land at the northeastern end of the lake off the West Side Road. None of the lots would have water frontage or would be visible from the lake. A common area may provide a point of access to the waterfront.

Cross Lake B. This is primarily an infill residential development zone on 91 acres of land at the northeastern end of the lake area between Route 161 and the waterfront. Most of the shore frontage is already occupied with camp lots. A few areas of shorefront that have not been licensed offer the potential for common water access to serve the new upland lots.

Cross Lake C. This is a residential development zone on a 57-acre tract of land just south of the Mud/Cross Lake thoroughfare, off the heavily-developed Cyr Road. None of these lots would have water frontage or would be visible from the lake. A common area may provide a point of access to the waterfront.

Cross Lake D. This is a residential development zone on a 187-acre tract of land in the vicinity of the boat launch on the east side of the lake. Access would be off Mifs Lane, Disy Road, and Landing Road. There is an opportunity for several lots to have water frontage; the majority of the lots would have filtered views of the lake. The existing boat launch and picnic area may become the focal point for this new residential development.

Cross Lake E. This is a residential development zone on a 163-acre tract of land south of the boat launch. Road access would be off Disy Road and Disy Crossover Road. Many of the lots would be near the water or have filtered views of the lake. A common area could provide a point of access to the waterfront.

Future Conditions: Anticipated Favorable Impacts. The Concept Plan is expected to result in a number of favorable impacts to the recreational resources associated with Cross Lake and surrounding lands:

- Within 14 months of the Effective Date, Petitioners will amend the lease for the Cross Lake boat launch, picnic area, and beach, to ensure that the public can use these facilities, and
- Preservation of approximately 2.0 miles of Cross Lake shoreline (the southern end of the lake and the western shoreline south of Matrimony Point).

Future Conditions: Anticipated Unfavorable Impacts. Future development associated with the Concept Plan has the potential to cause some unfavorable impacts on the visual and recreational resources associated with the lake and surrounding lands:

- Visual impacts from new development, primarily Cross Lake D and Cross Lake E. Adoption of the Chapter 10 standards in the Chapter 10 Addendum, specifically for setbacks, screening, clearing, and road and driveway construction, should minimize visual impacts and preserve the existing character of the lake. The amount of land designated for future development will provide the

opportunity to preserve woodland for privacy, screening, and trail corridors.
- Additional development opportunities will bring more people and waterfront activity to the lake. The 125 additional housing units on Cross Lake that are included in the Concept Plan would represent a 41% increase in the number of existing residences on or near the shoreline. The majority of water access will occur at common facilities and/or the existing boat launch.
- Additional development may affect the quality of the recreational experience, especially in the area south of the existing boat launch.

Cross Lake has a surface area of approximately 2,515 acres. Reports from residents and personal observation indicate that the majority of the lake use occurs in the middle and northern section of the lake, near the developed shoreline. For purposes of this analysis, the northern 80% of the lake (approximately 2,000 acres north of the boat launch) is considered Developed Natural (Suburban). Table 3 indicates that for lakes in this class, coefficients range from 10 acres per boat to 20 acres per boat, or 100 to 200 boats. WALROS (Table 2.6, A boating capacity range decision tool) suggests that the midrange number might be suitable for Cross Lake.

The following is an estimate of the number of boats that may be anticipated north of the boat launch at peak times, if all five Development Areas were fully built out:[9]

15% of 275 existing residences on lake	41 boats
15% of the 125 new units	19 boats
Total anticipated boats on lake	60 boats

This is well below the 100–200 boat range indicated by WALROS for a lake of this size and class. It is also well within the 40–100 range if the lake were to be considered Rural Developed. This calculation does not account for the lower 20% of the lake, which is discussed below.

Approximately 20% of the lake (465 acres) south of the boat launch is considered Semi-Primitive Motorized (Rural Natural). Local residents report that there are typically between 1 and 5 boats in this part of the lake during the boating season. If residential development were to occur at the southern end of the lake (Cross Lake E), it is likely that this area would see an increase in the number of boaters.

Table 3 indicates that for a Rural Natural lake (or portion thereof), coefficients range from 50 to 110 acres per boat, or 4 to 9 boats in the area south of the boat launch. If the primary source of boating activity were the development at Cross Lake E, approximately 9 additional boats would be expected at peak times (based upon 15% of an assumed 60 units at Cross Lake E using a boat at any one time). With 1 to 5 existing boats, this area would expect to see a total of 10 to 14 boats at peak times if Cross Lake E were fully developed and boating traffic were to stay south of the boat launch.

While the boating analysis indicates that this section of the lake may retain many of the characteristics of a Rural Natural area, the presence of development on the hillside above the lake may cause the classification to move toward Rural Developed (see description of Rural Developed experience above).

[9] The estimates of maximum use are very conservative. Year-round residents report that on a busy July 4th, there may be as many as 30 motorized boats (including jet skis) on the lake, plus another 5 canoes/kayaks. On a "typical" day during the summer, there may be as many as a dozen motorized boats on the lake. Cheryl St. Peter, Cross Lake Resident. Personal Communication.

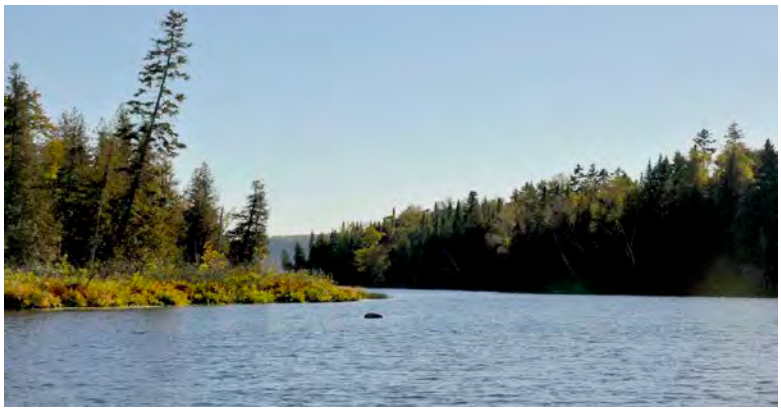
The main group of people who would be affected by this shift are those who use the beach at the southern end of the lake and those who enjoy boating in a more natural appearing landscape.

Conclusion. With appropriate land use controls (i.e., the Chapter 10 standards in the Addendum), any development authorized under the Concept Plan should not have an appreciable effect on the setting or the recreational experience found over the majority of Cross Lake. The ROS class for the northern 80% of the lake should remain as Developed Natural (Suburban). Development and additional boat traffic at the southern 20% of the lake may cause that area to shift from a Rural Natural to a Rural Developed class. Some current residents may find this shift undesirable; likewise, others may find the anticipated development and the opportunities that accompany it very desirable. The application of the Chapter 10 Addendum standards for hillside development, home siting, water access facilities, and other forms of infrastructure will be important to preserve the character of the southern end of the lake in order to minimize impacts to its recreation and visual character.

CROSS LAKE/SQUARE LAKE THOROUGHFARE

No Development Areas are proposed for the thoroughfare between Cross Lake and Square Lake. Development authorized by the Concept Plan should have minimal impact. The thoroughfare is considered Semi-Primitive Motorized (Rural Natural) due to its general lack of development. It is important to note that Irving does not own the land on the northwestern shore, and has no control over its future. According to the tax maps, the shoreline has already been subdivided, but apparently no lots have been sold or built upon.

The undeveloped portion of the thoroughfare owned by Irving will be preserved under a permanent conservation easement. The only visible change resulting from the Concept Plan that would affect the recreation experience is the potential for a remote campsite on the east side of the thoroughfare, near an area that was used for camping in the past. The ROS classes should remain the same for the thoroughfare.



Cross Lake / Square Lake thoroughfare

SQUARE LAKE

Existing Conditions. Petitioners owns approximately 13.9 miles of the roughly 19.4-mile shoreline of the 8,150-acre Square Lake. Of this, approximately 12.8 miles of their land are undeveloped. Irving has 19 licensed sites on approximately 1.0 mile of shoreline south of Limestone Point on the west side of the lake. On the eastern shoreline, the only visible evidence of previous development is the former Yerxas Sporting Camp, now owned by the petitioners (approximately 0.15 miles of shoreline) and a private residence at the site of the former Fraser Camps at the point where the thoroughfare meets Square Lake. At the northern end of the lake (not owned by Irving), approximately 36 private seasonal and

year-round homes and a private boat launch occupy about 3/4 mile of lake frontage. Access is provided over forest management roads that are generally not maintained during winter months. The northern half of Square Lake is considered Semi-Developed Natural (Rural Developed).

The southern half of the lake is almost completely undeveloped, although there are several woods roads within 0.5 mile and three informal campsites on the shoreline. There has been considerable forest management activity within this area. This section of the lake is described as Semi-Primitive Motorized (Rural Natural).

The beach at the Yerxas Camps on Square Lake

Proposed Actions. The Concept Plan is proposing areas zoned for residential and recreational developments that could affect the quality of the existing recreational experience on Square Lake:

Square Lake Yerxas. This is a recreational lodging and residential development zone on approximately 51 acres of land in the vicinity of the former Yerxas Camps. The concept for this area (in conjunction with Square Lake E) is to allow for a well-planned development that mixes a recreational lodging core with residential development. The core would be sited around the former camp property, which is a remnant of a traditional Maine sporting camp. Residential development and a variety of recreational activities could be sited within easy walking distance of the core facility.

Several of the remaining structures at the Yerxas Camps on Square Lake

Square Lake E. This is a residential development zone of approximately 278 acres on land surrounding Square Lake Yerxas.

Square Lake W. This is a residential development zone of approximately 121 acres on the west side of the lake in the vicinity of the existing licensed lots south of Limestone Point. While some of the development area has water frontage, the majority of the new units would likely be located on the hillside overlooking the lake. A common area may provide access to the waterfront.

Square Lake Boat Launch. The opportunity for a deep-water boat launch/put-in facility has been identified on the north side of Square Lake E. At the present time the only way to gain access to Square Lake is at the Muscovic Landing at the north end of the lake, or to put in at the Cross Lake boat launch when water conditions allow passage through the thoroughfare into Square Lake. The Northern Aroostook Regional Management Plan recognized the need for deep water boat access to Square Lake, since the Muscovic Landing is on private property and is relatively shallow, which limits the size of boats that can be launched. Square Lake is listed as the #2 priority lake for access in the Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000.[10] The Concept Plan will zone Square Lake Yerxas and Square Lake E to allow development of up to three water access sites between them. Only one of these may be a trailered ramp. Further, to promote development of a public or commercial trailered ramp (which would be open to the public), any recreational lodging facility developed in Square Lake Yerxas would have to include a trailered ramp, unless such a ramp has already been permitted in the adjacent Square Lake E development area. At this point there are no commitments on the part of the State or any other body or organization to raise the necessary funds to plan for and construct such a facility

[10] Strategic Plan for Providing Public Access to Maine Waters for Boating and Fishing, 1995 and 2000. Boating Facilities Program of the Maine Dept. of Agriculture, Conservation, & Forestry, Maine Department of Inland Fisheries and Wildlife.

Future Conditions: Anticipated Favorable Impacts. The Concept Plan is expected to result in a number of favorable impacts to the recreational and scenic resources associated with Square Lake and surrounding lands:

- Preservation of scenic resources of Square Lake. Over 10.6 miles of Irving's shorefront would be put into permanent conservation;
- Forest management operations within the viewshed of the lake would follow sustainable forestry principles to minimize visual impacts;
- Development of remote campsites to be used on transient basis by persons primarily in pursuit of recreation opportunities within the Plan area;
- Removal any of the buildings at the Yerxas Camps site that cannot be reasonably restored or preserved to improve the scenic character of the east side of the lake;
- Restoration of a historic Maine sporting camp; and
- Hiking, ATV, snowmobile, and cross-country ski trails would be allowed within the permanent conservation easement.

Future Conditions: Anticipated Unfavorable Impacts. Future development associated with the Concept Plan has the potential to cause some unfavorable impacts on the visual and recreational resources associated with the lake and surrounding lands:

- Visual impact from new development, primarily Square Lake E. The adoption of the Chapter 10 Addendum standards for setbacks, screening, clearing, road and driveway construction should minimize visual impacts of future development activities. The amount of land designated for future development will provide the opportunity to preserve woodland for privacy, screening, and trail corridors.
- Additional development opportunities will bring more people and waterfront activity to the lake. The 130 additional housing units that could be built on Square Lake represent a substantial increase in the number of existing residences on the lake. Water access will be limited to common facilities and/or use of a future boat launch. Any water access facility or future development adjacent to the lake would have to comply with the applicable sections of the Chapter 10 Addendum.
- Additional development and boating traffic may affect the quality of the recreational experience, especially in the southern half of the lake where there is currently no development.

For purpose of this assessment, Square Lake is divided into the northern and southern half, due to their different ROS characteristics. The northern portion is considered Semi-Developed Natural (Rural Developed). Table 3 indicates that for lakes in this class, coefficients range from 20 to 50 acres per boat, which translates into a capacity of 80 to 200 boats for north half of the lake. The southern half of the lake is classified as Semi-Primitive Motorized (Rural Natural). Table 3 indicates that for lakes in this class coefficients range from 50 to 110 acres per boat, or 36–80 boats for the 4,000 acres at the south half of the lake. Combined totals for the whole lake are 116 to 280 boats.

Both halves of the lake also have characteristics of less intense ROS classes, i.e., portions of the northern half could be considered Semi-Primitive Motorized (Rural Natural), while portions of the southern half could be considered Semi-Primitive Non-Motorized (Semi-Primitive). The coefficients for these classes range from 36 to 80 boats for the northern half, and 8 to 36 for the southern half. Combined totals under this scenario range from 44 to 116 boats.

At the present time, the lake receives relatively light use for many reasons that include: lack of convenient public access; lack of deep water access; limited number of residents; distance from the Cross Lake boat launch; obstructions in the Cross Lake thoroughfare; wind and wave conditions on the lake; and lack of service facilities. At peak times the anticipated number of boats on the lake may include:

15% of 56 existing camps on lake[11]	8 boats
Boats from Cross Lake boat launch[12]	10 boats
Total	18 boats

The following is an estimate of the number of boats that may be anticipated on the lake at peak times, if the additional housing was developed over the ensuing 30 years.

15% of 56 existing camps on lake	8 boats
Boats from Cross Lake boat launch	10 boats
15% of 130 new units	19 boats
Boats for lease (estimate)	15 boats
Total anticipated boats on lake	52 boats

While this represents a significant increase over existing boating numbers, it is well within the more conservative 44–116 boat range provided by WALROS for a lake of this size with these classes. This also indicates that a boat launch similar in size to the existing facility on Cross Lake would not have an unreasonable effect on the recreational experience on Square Lake. It is likely that many of the boaters that now use the Cross Lake boat launch would simply move their access location, especially at times of lower water conditions in the thoroughfare.

The presence of development at the Yerxas Camp would likely cause the classification in the vicinity of the camps to move from Semi-Primitive Non-Motorized (Semi-Primitive) to Semi-Primitive Motorized (Rural Natural) or even to Semi-Developed Natural (Rural Developed). The people who would be affected by this shift are a) existing Irving license holders on the west side of the lake, who might be aware of new development at distances of 2.5 to 3.5 miles; b) several of the camps at the north end of the lake, where they might see signs of the development at about 3 miles, c) recreational boaters, fishermen, and ice fishermen on the lake who are accustomed to seeing a largely abandoned sporting camp, and d) the owners of the former Fraser Camp at the point where the Cross Lake thoroughfare discharges into Square Lake. The Chapter 10 Addendum regulations and design guidelines for development on Square Lake will be important components in maintaining the existing visual character of the lake.

[11] Based on information from Cross Lake.
[12] As reported by residents on Cross Lake. Cheryl St. Peter, Personal Communications.

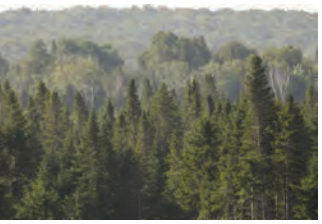
CONCLUSION

Future development authorized by the Concept Plan should not have a significant appreciable effect on the setting or the recreational experience found on Square Lake as a whole. Some current residents may find this shift undesirable; likewise, others may find the anticipated development of the former Yerxas Camps and a boat access facility very desirable. If the State or a responsible NGO wish to develop a boat launch on the lake north of the Yerxas Camps, it should determine the existing use pattern at the time and size the boating facility accordingly to stay within the capacity of the lake while maintaining the quality of the recreational experience. The application of the Chapter 10 Addendum standards for hillside development, home siting, water access facilities, lighting, and other forms of infrastructure will be important to preserve the character of the lake in order to minimize impacts to its recreation and visual character.

Aerial view of the thoroughfare between Cross Lake and Square Lake

IRVING WOODLANDS IN MAINE

IRVING WOODLANDS, LLC

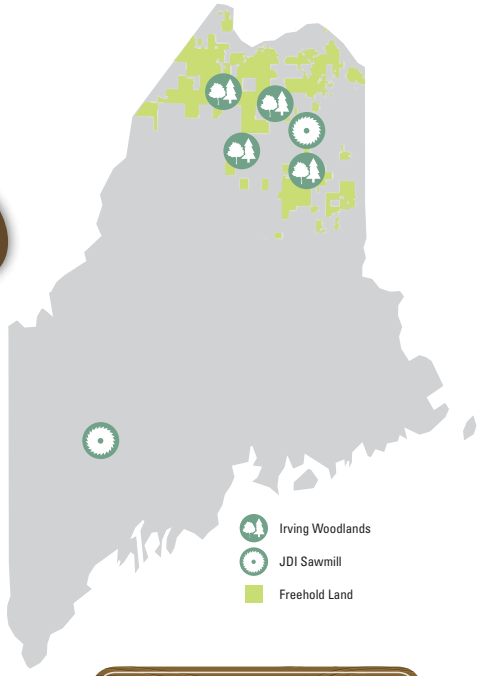




VITAL STATISTICS

- Over 60 years of operations in Maine
- 1.255 million acres in Maine (7% of the forested land in Maine)
- A team of 30 forestry professionals working on the ground in Maine
- Voluntary Conservation Program – 228 sites and growing
- Voluntary investments in forest science with UMaine, Manomet, Inland Fisheries & Wildlife and other partners
- Irving Woodlands LLC plants 70% of the planted trees in Maine – over 60 Million seedlings in the last 35 years
- Jobs: Over 2,100 (direct, contractor and indirect)
- Annual employment Income: $92 million (direct, contractor & indirect)
- NEW Sawmill up and running in Ashland, 63 NEW full-time jobs, $33 million investment
- Providing a sustainable wood supply to over 20 separate businesses in Maine

Sustainable Forestry in Maine means **LESS THAN 3%** of the land base is harvested every year



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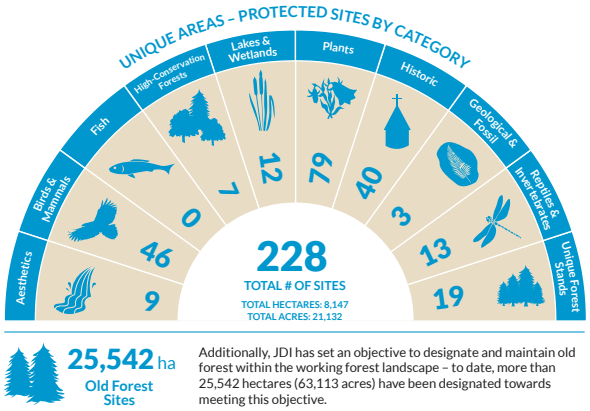
IRVING WOODLANDS, LLC

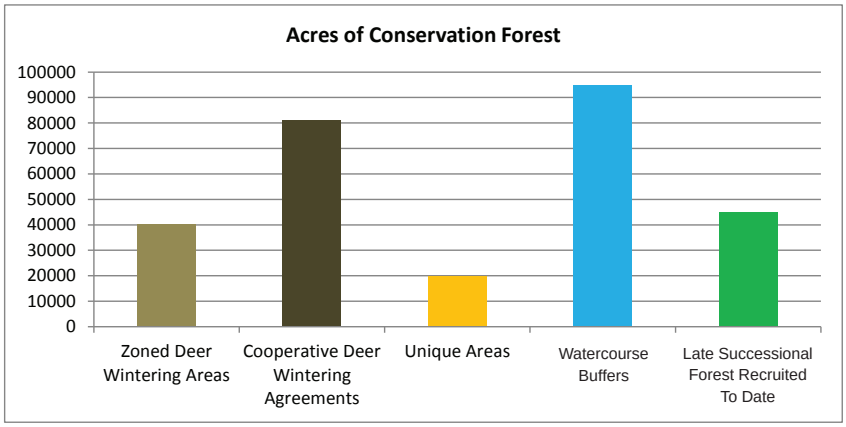




VOLUNTARY CONSERVATION EFFORTS IN THE NORTH MAINE WOODS



122,000 Acres of Deer Wintering Habitat



94,000 Acres of Watercourse Buffers

RESEARCH PARTNERS

Our (voluntary) Forest Research Advisory Committee includes two UMaine scientists: Dr. R. Wagner and Dr. A. Weiskittel as well as Mr. A. Whitman from Manomet.

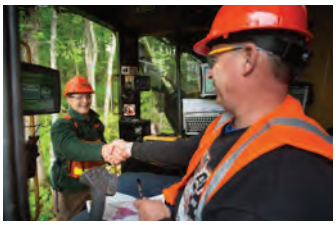
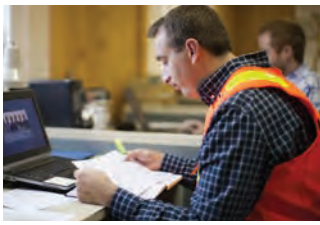
Dr. A. Weiskittel is the Irving Chair in Forest Ecosystem Management at UMaine.

Irving Woodlands, LLC has been a long term and active member of the Cooperative Forestry Research Unit.

OUTCOME-BASED FORESTRY OVERVIEW

IRVING WOODLANDS, LLC



In 2013 we finalized a new management plan for the 1,255,000 acres that we own in Northern Maine.

This forest management plan aligns with the criteria and objectives outlined within the Maine Forest Service's (MFS) Outcome Based Forestry (OBF) law. We are confident that our new plan can be implemented to meet the desired outcomes of the OBF agreement that we entered into with the MFS. This agreement requires that our operations be implemented in a manner that is ecologically sustainable, economically viable and socially responsible.

Outcome Based Forestry requires economic, social and environmental assessment.

http://www.maine.gov/dacf/mfs/policy_management/outcome_based_forestry.html

Our OBF agreement obligates us to maintain independent third party certifications for our woodlands and relieves us from certain provisions of the Maine Forest Practices Act (FPA). Today, our woodland's are certified to meet the standards of the Forest Stewardship Council® (FSC® C041515) and the Sustainable Forestry Initiative (SFI) forest certification systems. Under this agreement the FSC US Forest Management standards have been aligned (with additional indicators) with all federal and state laws.

Final OBF assessment is determined by a governor appointed panel of technical experts who report to the director of the MFS. The accompanying table provides a quick reference comparison between OBF and the Maine FPA and the benefits that have been achieved thus far. A summary of our forest management plan and our SFI and FSC certification reports are both publicly posted on our website.

Comparison Between OBF agreement and FPA

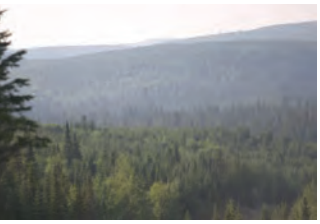
	OBF	FPA
State of Maine, Based Technical Experts Review	Yes ✓	No X
Independent 3rd Party Certification Required	Yes ✓	No X
Provisions to Improve Timber Supply and Quality	Yes ✓	No X
Provisions to Protect Forest Health	Yes ✓	No X
Provisions to Conserve Biological Diversity	Yes ✓	No X
Provisions to Consider Economic and Social Obligations	Yes ✓	No X
Reduced Administrative Work for Landowner and MFS Staff	Yes ✓	No X
Increased Reporting Transparency	Yes ✓	No X
Science Based Harvest Prescriptions	Required for all harvests	Only required for clearcuts
Regeneration of Clearcuts	Required	
Maximum Clearcut Size Allowable	250 acres	
Clearcut Separation Zone Requirements	Landowner can manage with scientifically based silviculture prescriptions	May only be harvested according to prescriptive standards in rule
	Buffering between clearcuts can utilize natural landscape features	Minimum 250 foot separation zones with short term 1:1 acreage requirement
**Required Compliance to All Local, State & Federal Regulations to Protect Water and Wildlife and Protected Resources (i.e. DEP, LUPC, MFS, AWW, Local Ordinances etc.)	Yes	

**The State of Maine has established laws that protect the wildlife, waters and unique natural resources in our State that are above and beyond the FPA. All of the laws protecting our natural resources remain intact and are still subject to compliance under OBF.

http://www.jdirving.com/environment.aspx?id=5334&ekmensel=8_submenu_168_btnlink

BENEFITS OF OUTCOME BASED FORESTRY

IRVING WOODLANDS, LLC





- ✓ Less road building (40% reduction)
- ✓ Operate on less of the landbase – less fragmentation of the forest
- ✓ Science-based harvest prescriptions = better management
- ✓ Salvaging mortality due to wind damage and disease, improving forest health and reducing forest loss due to mortality
- ✓ Lower operating costs
- ✓ Improved earnings and productivity for 90+ contractors due to reduced equipment moves and related downtime
- ✓ A competitive wood supply for our Maine mills and over 20 others in in the state
- ✓ Growing jobs and investment – $33M in Ashland Sawmill, 63 new jobs, opened in Summer 2014
- ✓ No increase in percentage of clear cutting

Science Based
Harvest Prescriptions

"Under outcome based forestry my machines spend less time on a low-bed and this has helped me improve my bottom line."

Jeremy Fournier - Ironwood Logging
Eagle Lake, ME (7 employees)

"KPel Industrial Services, Inc., is based in Fort Fairfield, ME. We employ 26 people. In an area that has been challenged by out-migration and limited job creation, Irving's decision to create 63 jobs by investing $33 million in the Ashland Sawmill was good news for the County and for our business in a particular. This investment and the benefits we have received as a local business and employer are in large part because outcome based forestry ensures a sustainable, cost-efficient delivery of wood to the Ashland Sawmill."

Scott Colton
Co-owner
Fort Fairfield, ME

"To be successful in the State of Maine, we need to do more than to preserve the status quo. Simply stated, we need to grow and develop opportunities for work, reverse the outmigration of our young people and cultivate a climate conductive to future capital investment.

Maine's outcome based forestry law has created an opportunity to do just that for one of our suppliers, Irving Woodlands LLC. Under Outcome Based Forestry, Irving has increased its levels of silviculture investments to grow more wood for mills in the State of Maine. As you would expect, an improved and stable fiber supply is critical for employment and good for Maine mills. As well as building a new mill, Irving has worked hard to develop more contractors and increased investments in training operators for the labor pool in the region. These efforts all demonstrate long term commitment to the State, the forest and the people. Outcome based forestry has played a major role for helping Irving do its part."

Bert Martin, Director
Woodlands Pulp LLC

ACCOUNTABILITY

IRVING WOODLANDS, LLC





Independent 3rd party verification of our forest management is important for public credibility and confidence. Under our OBF agreement with the MFS, we are required to maintain independent 3rd party certification (aligned with all state and federal laws) for all of our Maine Lands with oversight and endorsement of auditing results by a governor appointed panel of experts.

In 2015, our operations were audited to the standards of the Sustainable Forestry Initiative (SFI) and ISO 14001 as well as the principles and criteria of the Forest Stewardship Council (FSC) – US Forest Management Standards. Auditors found our sustainable forest management system to be in conformance to the SFI program and that the ISO 14001 Environmental Management System (EMS) was being effectively implemented and that overall conformance to the applicable FSC standards was achieved. No corrective action requests and four observations were issued by auditors for FSC indicators under the US Forest Management Standards and will be reviewed in 2016 to evaluate compliance.

Our FSC and SFI certifications require us to minimize and strive to reduce our use of chemical pesticides.

Expert panel findings for 2015 can be found on the Maine Forest Service's website for Outcome Based Forestry. The following graphs depict focal areas for auditors in 2015.


KPMG

Forest Certification REPORT

J.D. Irving, Limited Woodlands Operations – 2013 SFI Surveillance Audit

SUSTAINABLE FORESTRY INITIATIVE

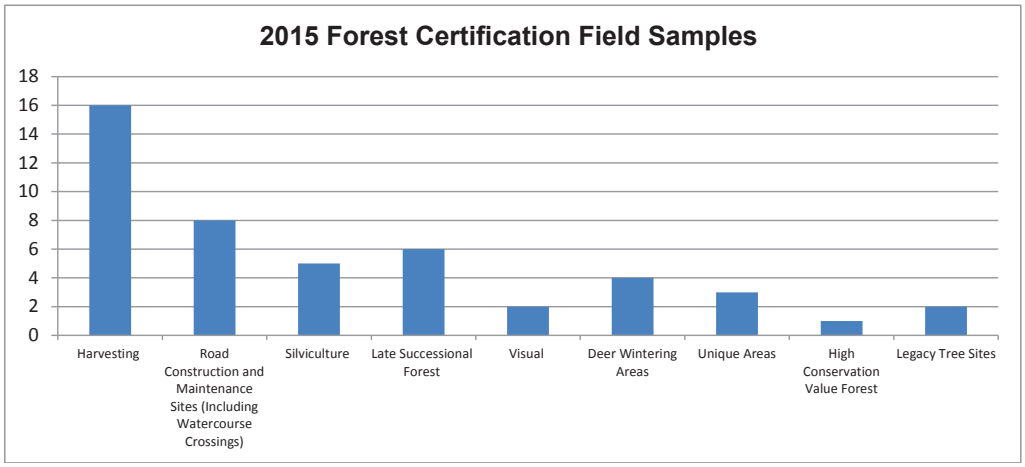
IRVING


FOREST MANAGEMENT AND STUMP-TO-FOREST GATE CHAIN-OF-CUSTODY SURVEILLANCE EVALUATION REPORT

J.D. Irving Northern Maine Woodlands Forestry Division
Irving Woodlands, LLC

SCS-FM/COC-00121N

SCSglobal



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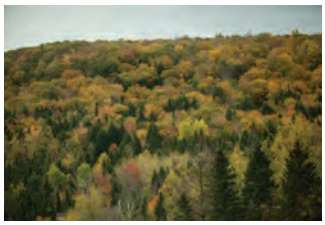
IRVING WOODLANDS DETAILED SCORECARD

IRVING WOODLANDS, LLC




MAINE WOODLANDS DETAILED SCORECARD

Sustainable Forestry	2015 Maine Data
Resource holdings (freehold - Maine) - Acres	1,255,000 acres in 2015
Land base harvested (%)	2.3% in 2015
Trees planted - # of seedlings	3.4 million in 2015
Forest lost from disease	0 acres in 2015
Forest lost from windthrow	250 acres in 2015
Forest lost from fire	0 acres in 2015
Forest lost from all causes	250 acres in 2015
Mapped watercourse buffers (total)	94,000 acres in 2015
Watercourse distances sustainably managed (total)	3,000 miles in 2015
Forestry road building (new roads)	54 miles in 2015
Pre-commercial thinning & plantation cleaning completed	6,160 acres in 2015
Tree planting completed	4,789 acres in 2015
Sustainable Forestry Initiative Certification (SFI)	100% of Maine holdings
Environmental Management System Registration (ISO 14001)	100% of Maine holdings
Forest Stewardship Council Certification (FSC)	100% of Maine holdings
Certification Non-Conformances (FSC, SFI & ISO 14001)	0 in 2015
Volunteer Conservation areas on JDI land # of unique areas set aside	228 sites / 21,132 acres

From the Auditor's Report

"Numerous examples of effectively protected riparian areas and waterbodies were observed during the field audit."

"A number of vernal pools were observed during the field audit to be well protected under the Company's Vernal Pool Policy."

"JDI planners do an effective job of tailoring the silviculture system(s) being prescribed to the stand characteristics (species composition, structure, condition, age(s), etc.), site characteristics (fertility, trafficability) and broad management objectives pertaining to a particular stand. In addition to clearcut systems, a variety of partial cutting silviculture systems are prescribed and implemented by the Company."

2015 OPERATIONS REPORT

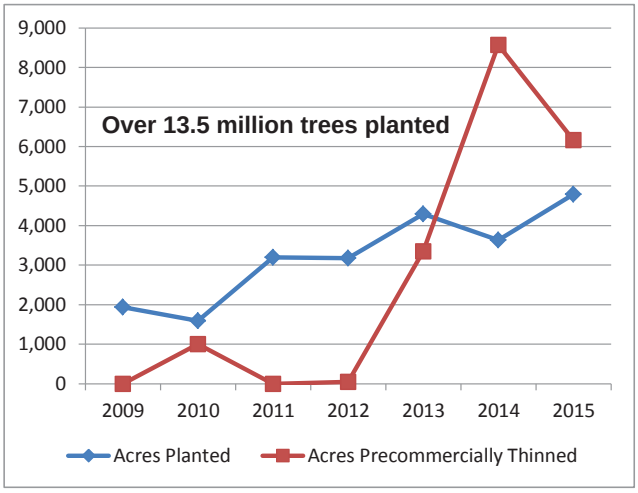
IRVING WOODLANDS, LLC



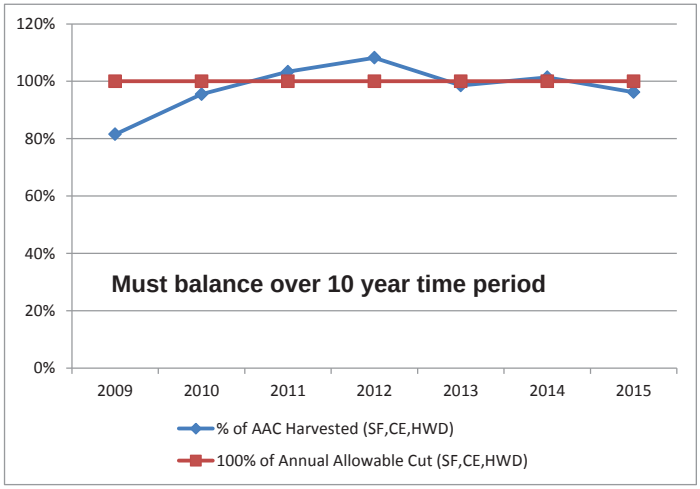


In 2015, our foresters implemented an operating plan that was designed to meet our sustainable forest management strategy as outlined in our management plan under OBF. Operations were conducted under complex environmental, market and economic conditions this past season. The flexibility afforded by OBF to properly plan and execute operations to meet the daily challenges that our people face was a tremendous asset in closing a successful operating year.

Silviculture – Growing a Healthy Forest



Sustainable Harvesting of Forest Products



FOREST MONITORING RESULTS

IRVING WOODLANDS, LLC





As part of our commitment to improve the health, growth and long term yield from our lands, we continuously monitor forest health, development and growth and yield (often in cooperation with the MFS). Monitoring is achieved through staff training and observation, stakeholder consultation and input, regular aerial reconnaissance, and an intensive ground sampling program that measures growth and yield dynamics for long term planning needs. The following provides a sample of our 2015 monitoring program.

FOREST SURVEYS		
1st year Planted Stand Survival Plots	95.9%	Survival issues are mostly related to weather extremes in July.
2nd year Planted Stand Survival Plots	91.2%	Survival issues are related to weather and Hylobius weevil.
5th year Planted Stand Survey	3166 Acres	were surveyed and 75% were found to be free from significant competition.
10th year Planted Stand Survey	3260 acres	were surveyed and 65% of the sites had significant natural competition that now requires intermediate thinning treatments.
High Conservation Value Forest (HCVF) Survey	7 areas	No management activities occurred in or adjacent to any HCVF. No significant changes have occurred within the designated areas. Old trees continue to show signs of stress and dieback. Insect and disease damage is still evident. No evidence of fire.
Insect Monitoring	188 plots	Irving foresters assisted MFS personnel with insect monitoring, primarily looking for spruce budworm activity (see: MFS website for regional results of findings).

In addition to monitoring forest health and growth, we are obligated and required to measure our impact on the environmental and social aspects of our operations. We strive to protect our environment with programs to improve operations, lessen our impacts on water resources and improve our handling of dangerous goods such as fuel. Operations improvement is the focus of our daily work. It covers all of our operations from planning to reforestation of harvest areas. Programs to improve operations include sustainability of wood supply, public education and communication in forest management affairs, soil conservation by controlling equipment rutting, conservation of biodiversity by protection of habitat, respecting forest cover type distribution and site specific and forest level habitat protection.

Water protection programs include managing our use of dangerous goods near water, careful planning and management of riparian areas, management of siltation from harvest areas, proper installation and maintenance of watercourse crossings, and strict control of activities within municipal water supply areas. These programs all follow existing government regulations
and are part of all staff and contractors' daily routines.

The environmental and social impact of our operations is monitored by following an Environmental Management System (EMS) that allows us to record, monitor and respond to incidents as they are reported. Our EMS system is based on a "top to bottom" communication system. Corporate leadership to our regional team flows through the operations. Staff meetings are regular, and operational issues in the form of Incident's and Non- conformances are discussed between staff and contractors every week. All incidents and non-conformances are entered into a database where corrective actions are reported, prioritized and tracked to monitor trends for determining where we are off plan and where improvements need to be made.

In 2015, improvement was below expectation for oil/fuel handling and equipment rutting. Further action plans have been established to assist in meeting established targets. In 2015, 5 public complaints were received and action plans to address those concerns were completed.

STAKEHOLDER ENGAGEMENT

IRVING WOODLANDS, LLC





Meeting with and formally addressing stakeholder concerns is part of our 3rd party certification requirements. We have met both formally and informally with individuals and organizations in an effort to incorporate responsible ideas, guidance, suggestions, information/data, positive comments, complaints and concerns into our management planning process.

Organization	Nature of Business
Maine Natural Areas Program	Gathering spatial information on any recent finds of Maine's rare and invasive plants as well as providing the state with details on staff finds. This is done annually.
Maine Inland Fisheries & Wildlife	Gathering spatial information on recent finds of Maine endangered/threatened fauna species and provide details to the State on any JDI staff finds. This is done annually. Spent time with MIFW staff in the field to confirm the use of a number of Great Blue Heron colonies. Regular discussions on issues such as deer and moose management, heron colonies, etc.
Maine Heritage Preservation Commission	Gathering spatial information on any recent archeological finds.
University of Maine (Presque Isle)	Discuss operational constraints on our harvesting equipment that will be in the vicinity of an historic native site.
New England Wildflower Society (NEWFS)	NEWFS provides Irving Woodlands, LLC with detailed information on the status of particular rare plant sites on our land in northern Maine.
Manomet Center for Conservation Sciences	Advice on rare/uncommon forest communities and late successional forests.
Penobscot Environmental Consulting	Advice on retaining and recording legacy trees.
SFI Fisheries Improvement Network (FIN)	Maine Forest Products Council / SFI led group consisting of Landowners, State and ENGO groups dedicated to improving fish habitat state-wide.
Maine Stream Connectivity Network	Regulator, landowner ENGO group formed to improve fish and aquatic connectivity on Maine watercourses.
MFPC Wildlife Technical Committee	Landowner group who discuss fish & wildlife issues, usually with state regulators and user groups like SAM.
Cooperative Forest Research Unit (CFRU)	UMaine researcher-landowner sponsored body which develops and researches a variety of forestry and wildlife interaction issues.
Maine Department of Environmental Protection	Issues concerning invasive forest plant species.

In 2015 we also met with the following:

- Numerous Individuals
- Local Town Boards
- Aboriginal Groups
- Sportsmen Organizations
- Technical Schools
- Other Landowners
- Numerous Forestry Organizations
- Sportsmen Forest Landowner Alliance
- Maine Snowmobile Association Clubs
- ATV Clubs
- North Maine Woods
- Allagash Wilderness Waterway
- Maine Forest Service
- Fish River Lakes Association

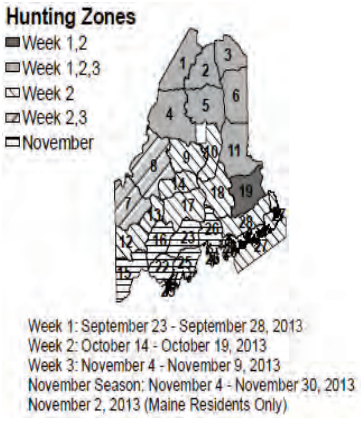
RECREATIONAL USE

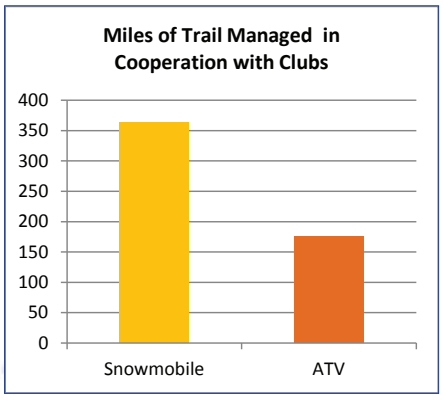
IRVING
IRVING WOODLANDS, LLC





Irving Woodlands LLC continues to provide historic, traditional recreational opportunities. Both inside and outside the North Maine Woods framework of Aroostook County, there is a well developed culture that provides public access to private land for engaging in traditional recreational uses. The working relationships developed with both individuals and groups from this sector has been mutually beneficial to all. Continued support of traditional uses such as hunting, fishing, trapping and hiking on our lands are welcome.





North Maine Woods, Inc.
P. O. Box 425, 92 Main Street, Ashland, Maine 04732
"Experience the Tradition"

MAINE SNOWMOBILE MSA ASSOCIATION

CAN-AM CROWN SLED DOG RACE FORT KENT, MAINE

Portage Lakers Member ATV Club

INVESTING IN MAINE

IRVING WOODLANDS, LLC





WE ARE COMMITTED TO CONTINUOUSLY IMPROVING EVERY ASPECT OF OUR MANAGEMENT AND OPERATIONS.

We want to be partners and good neighbors and we continue to actively work to support our state, our communities, workers, contractors, suppliers and customers.

- ✓ ***In 2015 we worked with 30 commercial outfitters offering outdoor experiences in our woodlands.***

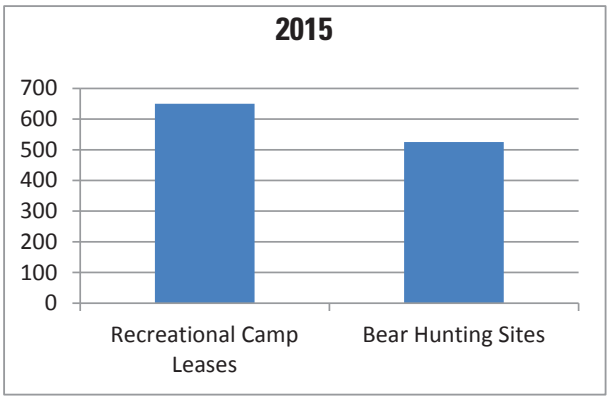
2015 INVESTMENTS IN GROWING HEALTHY FORESTS

- ✓ 3,400,000 trees planted
- ✓ 6,160 acres of pre-commercial forest thinning
- ✓ $3,000,000 silviculture investments in 2015

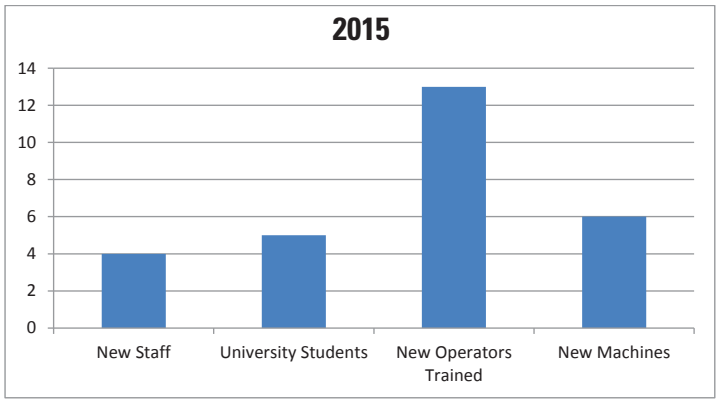
ADDITIONAL PROJECTS UNDERWAY

- ✓ Increased spruce budworm monitoring levels
- ✓ Increased commercial thinning capacity for young forest stands
- ✓ Leveraging LIDAR to improve our inventory knowledge and planning
- ✓ Precision planning - Rosco

Stakeholders



Developing People



OUTCOME BASED FORESTRY SUSTAINS A VALUE-CHAIN OF JOBS THROUGHOUT MAINE

IRVING WOODLANDS, LLC

HEALTHY FORESTS • GROWING JOBS • VIBRANT COMMUNITIES

TOP LEVEL VALUE-ADDED MANUFACTURING

TRANSPORT TO MARKET

SECONDARY MANUFACTURING

TRANSPORT TO FURTHER MANUFACTURING OPERATIONS

PRIMARY MANUFACTURING

TRANSPORT TO MILLS

SUSTAINABLE HARVESTING
(Less than 3% of land base per year)

GROWING AND PROTECTING THE FOREST

Outcome based forestry means a competitive wood supply to many non-Irving mills in the state, including:

B & A Fort Kent
C&W Kennedy Farms
Carrier Chip Plant
Columbia Forest Products
Costigan Chip Plant
Gardner Chipmills
Huber
Louisiana Pacific
Lumbra HW Sawmill
Moose River-Jackman
New Page - Rumford
Northeast Pellets
Pleasant River Lumber
Re-Energy Ashland
Re-Energy Fort Fairfield
Sappi
Skills Inc
Verso Jay
Woodland Pulp

IRVING™

J.D. IRVING, LIMITED

Unique Areas

A voluntary Conservation Program in the forests that we own or manage.


Charles Neveu, Block Planner.


Rare plant training with Kelly Honeyman.


John Gilbert, Manager, Fish & Wildlife.


Rare plant training.


Kelly Honeyman. Naturalist.

JDI is the only forestry company in Atlantic Canada to have a full-time Wildlife Manager and Naturalist on our team.

Table of Contents

Sustainable Forestry

At J.D. Irving, Limited (JDI), wildlife conservation within a working forest is an important goal in the woodlands we own and manage. The maintenance of natural systems and biological networks by our team of over 150 forestry professionals is key to sustainable forest management and the legacy we leave for future generations.

JDI's biodiversity strategy encompasses research, training, and the application of technology to ensure that our forestry operations meet our biodiversity objectives. JDI's international award-winning Unique Areas Conservation Program has grown from 29 sites in the 1980's to 1,277 sites in 2016.

These sites include:

- **Birds & Mammals**
- **Fish**
- **Lakes & Wetlands**
- **Unique Forest Stands**
- **Old Growth & Conservation Forests**
- **Plants**
- **Historic Sites**
- **Geological & Fossil Sites**
- **Reptiles & Invertebrates**
- **Late Successional Forests**

JDI has set an objective to designate and maintain old forest habitats within the working forest landscape. To date, more than 66,138 hectares (163,431 acres) have been designated.

Our Unique Areas Program

The program is designed to encompass a wide range of values commonly shared by today's society, with respect to the conservation of our natural and cultural heritage and recognizes a multitude of lesser-known, yet significant or "unique" elements found in our working forests.

Any proposed operations in these unique areas are governed by site-specific management instructions known as prescriptions. In many cases, the prescription forbids harvesting within a given site. In areas where limited harvesting is permitted, a management plan is formulated with the intent of preserving the elements that give these sites their significance.

The boundaries of any given Unique Area are typically governed by the element that is targeted for preservation and its habitat requirements. Some sites are as small as 0.5 hectares (1.2 acres), while others exceed thousands of hectares. To date, the average size of a Unique Area is approximately 67 hectares (166 acres).

Rare or Uncommon Species.
These include any type of plant or animal that is considered endangered, rare, or uncommon in their distribution and/or abundance on a national, provincial, or regional level, according to the available literature and accredited agencies or sources. Most of these species are not covered under any federal or provincial protection measures.

Indicator Species.
Sensitivity to changes within the environment is often reflected in species' reproductive success. Frogs and salamanders are generally recognized as indicator species due to their sensitivity to certain environmental factors. Areas with a variety of amphibians are considered unique by this program.

Comparatively little research has been carried out on the status of rare and uncommon species. Accurate and up-to-date information on their true distribution is often difficult, if not impossible to obtain. The information compiled from the ecological inventories completed on each site will assist the scientific community in assessing the distribution of these rare and uncommon species.

UNIQUE AREA SELECTION AND EVALUATION

Potential sites are often proposed through dialogue with biologists, foresters, concerned citizens, and environmental groups or through scientific or historical literature. Once this information is obtained, the site undergoes an ecological survey. An inventory of the plant and animal species, as well as other features on the site is compiled. Photographs are also taken in the documentation process. Scientifically-based decisions are then made to determine whether the site qualifies as a unique area. If accepted, a boundary is delineated and a management recommendation is created to ensure the preservation of the feature(s). All information relating to any of the approved sites such as coordinates, descriptions, management recommendations, a sampling of photographs and species lists is gathered in a master database.

The number of unique areas within our database will not remain static. As public awareness of this program increases, it is expected more sites will be proposed and will likely be accepted as unique areas. However, as nature is a dynamic force, it is also likely that some sites may be removed from the database. For example, known heron or eagle nesting sites will eventually be abandoned by these birds because of fouling or perhaps wind damage, in which case these sites would not remain unique.

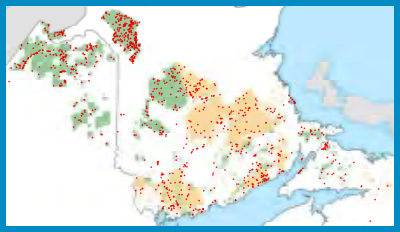
Unique Areas Objectives

The following are the broad-based objectives of the Unique Areas Program:

- Preservation of rare and uncommon species or significant landscape features.
- Preservation of "indicator" species from which we may monitor for changes in the environment caused by man or nature.
- Establishment of a database which will aid regional scientists and policy makers in determining the abundance and distribution of species or natural features.
- Public Education: Use of the information within the database to formulate better management plans for unique areas, educate the public on how our company manages its resources and invite their support in identifying significant sites.

1,277

VOLUNTARY CONSERVATION SITES ARE PART OF OUR 2016 UNIQUE AREAS PROGRAM



New Brunswick

SITE TYPE	# SITES
Aesthetic	30
Birds & Mammals	265
Fish	21
Unique Forest Stands	107
Lakes & Wetlands	95
Plants	392
Historic	30
Geological & Fossil	13
Reptiles & Invertebrates	38
Total	**991**

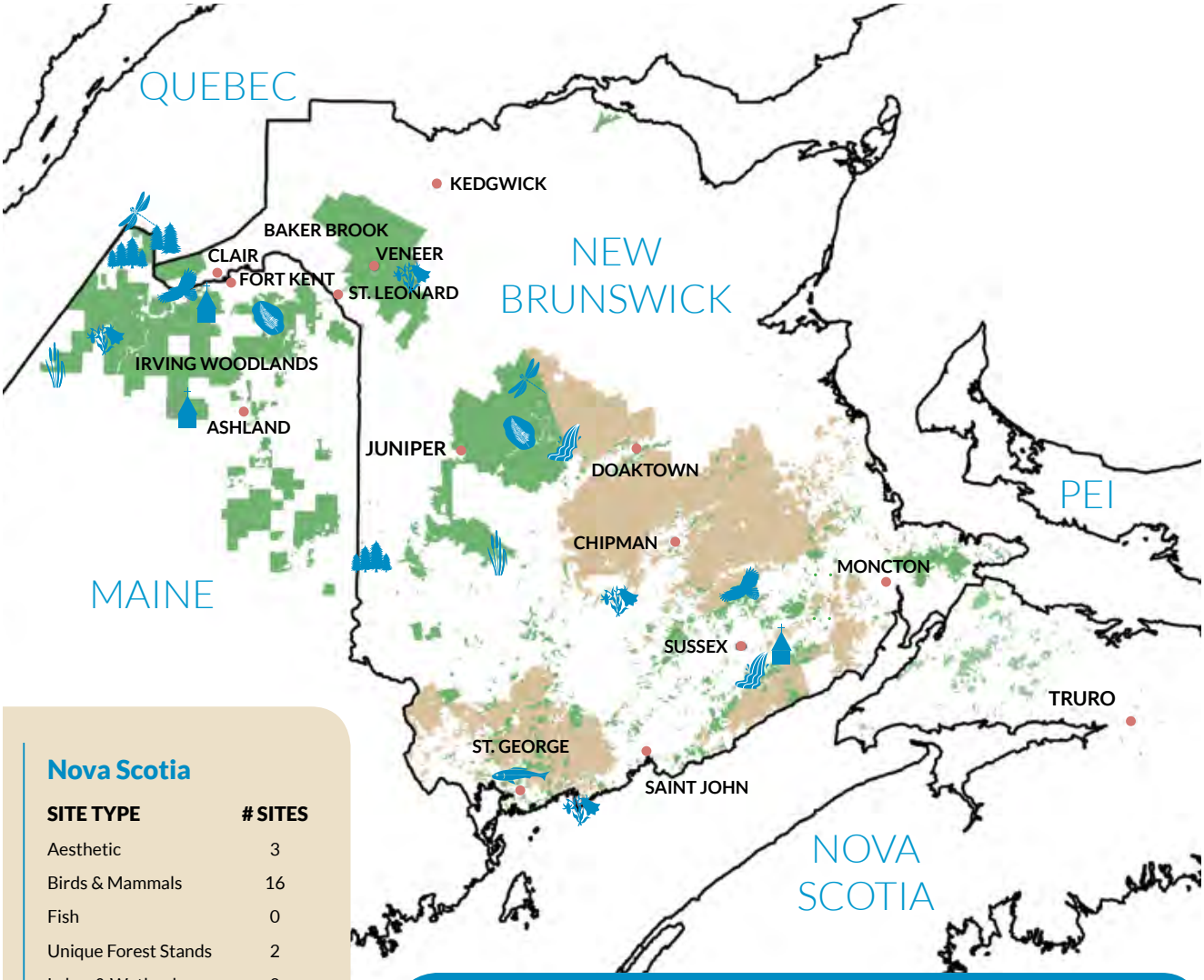
61,969.7 ha

Maine

SITE TYPE	# SITES
Aesthetic	9
Birds & Mammals	47
Fish	0
Unique Forest Stands	18
Lakes & Wetlands	12
Plants	85
Historic	40
Geological & Fossil	3
Reptiles & Invertebrates	20
HCVF	7
Total	**241**

7,838.2 ha

Unique Areas Featured in This Publication



Nova Scotia

SITE TYPE	# SITES
Aesthetic	3
Birds & Mammals	16
Fish	0
Unique Forest Stands	2
Lakes & Wetlands	0
Plants	14
Historic	3
Geological & Fossil	3
Reptiles & Invertebrates	4
Total	**45**
2,417.3 ha	

Legend

- AESTHETICS
- BIRDS & MAMMALS
- FISH
- OLD GROWTH & CONSERVATION FORESTS
- LAKES & WETLANDS
- PLANTS
- HISTORIC
- GEOLOGICAL & FOSSIL
- REPTILES & INVERTEBRATES
- UNIQUE FOREST STANDS
- OLD FOREST SITES

Unique Area Categories

AESTHETICS

This category includes areas that can arguably have an impact on human well-being. Waterfalls are, by in large, visually pleasing to the public. As such, certain falls are designated as unique. Impressive mountain vistas may also be considered within this category.

Walker Settlement Look off.

BIRDS & MAMMALS

Be it waterfowl staging/breeding areas, hawks nests or trees inhabited by Chimney Swifts, we recognize the importance of maintaining these avian wonders on the landscape. This category also retains important moose calving areas, natural mineral salt licks, and other critical habitat for uncommon to rare northeastern mammals.

Northern Goshawk.

FISH

The northeast is famous for its pristine waters, hosting a large diversity of fish species. While our riparian management zones provide ample watercourse protection, the sites within this category are extraordinary in nature. The category includes important cold water refugia and the world's only spawning grounds for rare type of smelt.

Lake Utopia Dwarf Smelt.

OLD GROWTH & CONSERVATION FORESTS

While it is almost impossible to locate an area of the northeast that has not undergone some form of human disturbance in the 400+ years since European settlement, occasionally our company locates or is informed of such an area. Conservation forests are those that are critical to the long-term maintenance of rare forested ecosystems or those forests that are critical to the needs of the local community for resources such as drinking water wellfields.

Yellow Lady Slipper.

LAKES & WETLANDS

This category includes rare to uncommon aquatic ecosystems such as the small temporary bodies of water known as vernal pools that are prodigious breeding and nursery grounds for amphibians, invertebrates, and reptiles. This category could also include lakes and wetlands that host a large diversity of rare or uncommon plants.

Wood Frog egg masses.

PLANTS

This area of the northeast is in the enviable botanical position of being on the southern range of some of the near-arctic plant species and for being on the northern extreme range of some more southern plants. This category also includes the plant species Furbish's Lousewort that is not found anywhere else in the world.

Showy Lady Slipper.

HISTORIC

Historical and archeological sites of higher than average cultural value are included in this category. These may include old logging, fishing, or hunting camp locations, long abandoned and with only a few scattered remains to indicate their locations.

Some sites are designated to preserve more significant settlement areas, where old stone foundations and structures can still be located. The category also includes sites of importance to First Nations culture, like traditional camp locations and meeting places, where travellers would have gathered.

Grave Stone - Baskin Cemetery.

Otter Brook Canyon.

GEOLOGICAL & FOSSIL

Unique geological features include sites such as rare geological formations, fault lines that define distinct types of bedrock and significant geomorphological phenomena such as eskers, moraines, and drumlins left behind on the landscape by the flow of ancient glaciers and rivers. Another element within this criterion is fossils. These may be found in the sedimentary rocks of some locations along the coast of the Bay of Fundy as well as in northern Maine limestone.

Purple Lesser Fritillary.

REPTILES & INVERTEBRATES

The breeding and rearing habitat of rare to uncommon amphibians, reptiles and invertebrates are represented in this category.

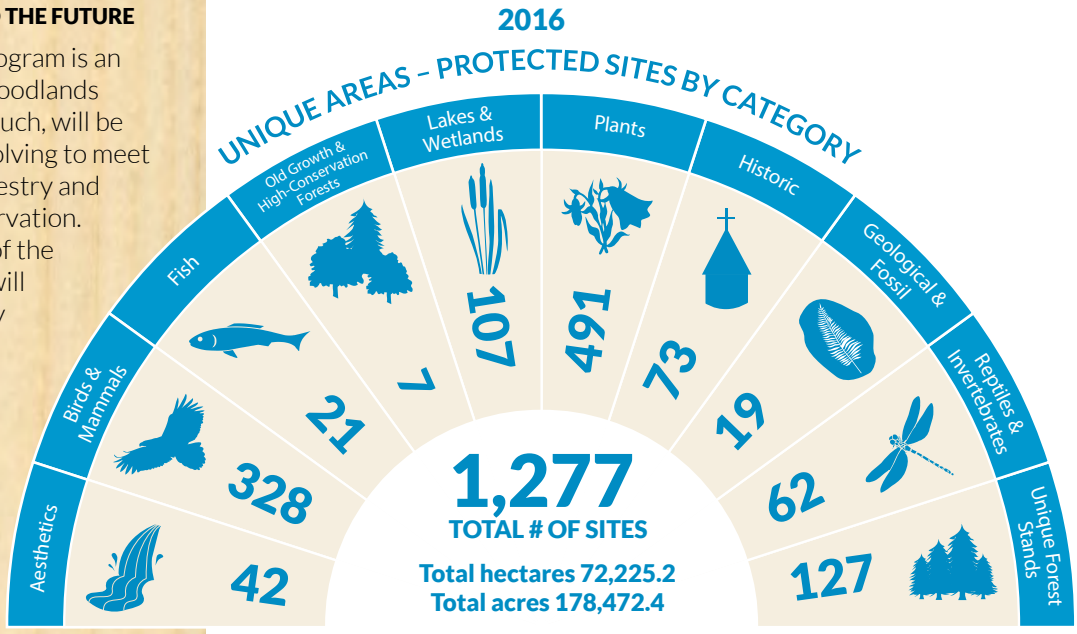
Bear claw scarred beech tree.

UNIQUE FOREST STANDS

This category features forest stand types, or individual trees, that have attained an unusual size, or are in themselves rare or uncommon for a given area. A stand containing Red Oak (*Quercus rubra*) in Northern New Brunswick or Maine is considered significant because this region is close to the northernmost limit of its distribution.

OUR COMMITMENT TO THE FUTURE

The Unique Areas Program is an integral part of our woodlands management and as such, will be an ongoing effort, evolving to meet the needs of both forestry and environmental conservation. Periodic monitoring of the more sensitive sites will be necessary to verify the success of the various management prescriptions for maintaining their respective unique elements. Also, more time will be spent surveying some of the larger sites, which to date may have only been partly investigated.



66,138 hectares Old Forest Sites

JDI has set an objective to designate and maintain old forest within the working forest landscape. To date, more than 66,138 hectares (163,431 acres) have been designated towards meeting this objective.

FALLS BROOK FALLS

Location: Along SW Miramichi, New Brunswick

Falls Brook Falls is the largest "plunge-type" waterfall in the province with a vertical drop of over 30m (100'). The water running over these 440-460 million-year-old rocks provides a cool spot in the adjoining Southwest Miramichi River for resting Atlantic Salmon.

This site is enjoyed by the public as a favourite hiking and swimming area as well as a scenic stop-over on canoe trips down the famous Southwest Miramichi.

Natural history discussion at Falls Brook Falls.

Aesthetics

Late January at the Amphitheatre. Both yellow and red light are easily absorbed by the ice but the green to blue end of the colour spectrum are bounced back providing for some incredible photography.

PARLEE BROOK AMPHITHEATRE

Location: Southeastern New Brunswick

This is an eye-catching geological formation. From an elevation of 330m above sea level, a flat plateau drops suddenly straight down into a deep gorge (150m) to the brook. The bottom of this gorge is shaped like the letter "U". This shape (much like the design of a theatre) allows even the most subtle of noises to be heard throughout the gorge, echoing off the rock walls. The gorge has a 75m cliff face. In the winter, trained professionals climb straight up the cliff on the ice that has formed. The walls of this formation are so deep and sheltered from the sun, snow was found on the site in late June! The surrounding forests of Hemlock, Spruce and Sugar Maple add to the impressive scenery and a closer look reveals some beautiful and unusual plants such as the rare Large-Round Leaved Orchid and the scattered Purple Trillium. During a winter trip into the site in 2009, the company Naturalist found a population of the rare (S1) White Mountain Saxifraga (*Saxifraga paniculata*) clinging to a bare patch of high cliff wall.

Saxifraga is latin for "stone breaker" referring to its historical and unsubstantiated use as a remedy for kidney stones.

Birds & Mammals

NORTHERN GOSHAWK NEST NEAR WALLAGRASS LAKES

Location: Northern Maine

Although the hardwood hills south of the Wallagrass Lakes are infamous for their cedar side hill seeps that support the endangered plant Giant Rattlesnake Plantain (*Goodyera oblongifolia*), it is a look up into the tree canopy that reveals this site's avian treasure.

While planning for a harvest in the area, Max Petrashune found himself faced with a very vocal and angry Northern Goshawk (*Accipter gentilis*). While most birds tend to flee a nest site when humans unwittingly approach, Goshawks not only hold their ground, but very actively attempt to push the intruder out of their territory, typically with blood curdling screeches followed by a few "near-miss" swoops. Max took the hint and retreated but not before getting coordinates of the nest tree so that the site could be buffered off from harvesting.

Goshawks tend to nest in the first big crotch of large yellow birch or sugar maple within a mature hardwood stand. At 60+cm (24+ inches) across, the nests are hard to miss in the winter months. Within the Unique Areas Program there are 24 Northern Goshawk nest sites, while over 14,300 hectares (35,335 acres) of nest habitat is specifically maintained for other bird species.

Male Northern Goshawk watching over his territory.

Young Great Blue Heron within colony.

MILLER ROAD GREAT BLUE HERON COLONY

Location: Southern New Brunswick

Found by a contractor who was in the area looking for harvest blocks, this site contains over 30 nests nestled near the tops of white birch, red maple, and trembling aspen.

Great Blue Herons are gregarious nesters, meaning that they tend to nest in groups. Great Blue Herons are easily identified as they stand over 1m tall, have a slate blue body, long neck and long, thin legs. These are wading birds, frequenting nearby wetlands and slow-moving streams looking for meals of fish, frogs, shellfish, and even snakes and small rodents at times.

Having a large body and a very small tail, Great Blue Herons are not the most graceful of fliers, especially on take-off and landings. As a result, these birds have learned to make their nest within the upper canopy of tall trees to allow for easy access with little fine maneuvering. The nests are a rather crude affair, built of pencil to marker thick twigs loosely piled together. These birds will return to their nesting area year after year, adding more and more layers, with some reaching a depth of a half a meter. In total 14,792 hectares (36,550 acres) of heron habitat is a part of our Unique Areas Program.

Fish

Lake Utopia Dwarf Smelt - Endemic to Lake Utopia.

LAKE UTOPIA DWARF SMELT

Location: Lake Utopia, New Brunswick

A genetic variant of the more common Rainbow Smelt (*Osmerus mordax*), this small bodied population are not found anywhere else in the world but within Lake Utopia, southwest New Brunswick, and spawns only in three of this lake's numerous feeder streams. This limited dispersal range has prompted the Federal Government to declare this sub-species as "Threatened" under the Species at Risk Act. As the name suggests, these rare fish are smaller than their cousins (10cm long verses 13cm) and are somewhat dissimilar in their gill structure. Their slender body is olive to pale green with a silvery stripe along the side, while freshly caught smelt have a purple, blue, and pink iridescent side and silvery belly, hence the common name "Rainbow" smelt. Although most Rainbow Smelt tend to migrate from salt to freshwater for spawning, this dwarf population does not move out to the coasts saltwater to complete its growth/maturation phase.

The Dwarf's diet consists mostly of microscopic animals and algae.

Lakes & Wetlands

Nine Mile Deadwater Area.

Early spring image of pool. By summer's end, this site is largely dry but not before providing critical aquatic habitat to frogs and salamanders.

NINE MILE DEADWATER PLANT SITE

Location: Northwestern Maine

Although this 696 hectare (1,720 acres) site is not a particularly rare type of forested wetland community, the diversity of rare plant species within is the reason this site is in our Unique Areas Program. Two of the rare species have a tenuous hold on their habitat there, and could eventually benefit from a light winter-time (frozen ground) harvest done with the right equipment by our skilled operators. Marsh Valerian (*Valeriana uliginosa*) and Showy Lady Slipper (*Cypripedium reginae*) eventually begin to die out as trees start overtopping the site. A partial removal of the tree canopy would help these sun-loving species stay vigorous. The fact that these two species are growing there, as well as an uncommon type of honeysuckle (*Loncera oblongifolia*), indicates that the bedrock in the area is likely calcium-based like limestone and the soil is fairly sweet.

Another common name for the Showy Lady Slipper is the Queen's Lady Slipper, as suggested by the latin *reginae* and is named such for the crisp whiteness of its sepal and petals as well as the rich pink-purple of the pouch of the flower. Lest you think it would look good in a vase on your kitchen table, you should be warned that it produces a substance called "phenanthrenequinone" which can leave a nasty rash on some.

A Showy Lady Slipper (*Cypripedium reginae*) within the wetland. *Reginae* is latin meaning "of a queen" referring to the plants alternate common name: Queen's Lady Slipper.

NORTH FORKS STREAM AREA VERNAL POOL

Location: Near Keswick River, New Brunswick

A vernal pool is a body of water that has no inlet nor outlet streams, fed typically by either rainwater or snowmelt. It is an important type of wetland in that its isolation from predatory fish keeps its amphibian population (frogs and salamanders) safe during their vulnerable early life stages before they are able to fan out into the landscape. This site, first identified by a Department of Natural Resources biologist, is a rather large body of water by vernal pool standards at 20m by 40m. It is surrounded by a stand of spruce/fir as well as red maple and white birch and contains both Wood Frogs (*Lithobates sylvaticus*) and Yellow Spotted Salamanders (*Ambystoma maculatum*). The egg masses floating near the surface of the pool that resemble a cluster of marbles are those of the frog while the Jell-O-like clumps attached to submerged vegetation are those of the salamander. While both species require this wetland type to lay their eggs, after hatching and a bit of aquatic development, they emerge on land and disperse into the adjacent forest, returning the next spring to the same site for reproduction. A Spotted Salamander may return to the same vernal pool for up to twenty years.

Wood Frog egg masses. Each female lays up to 1,000 eggs!

Unique Forest Stands

HOVEY HILLS HARDWOODS

Location: Western New Brunswick

Despite its small size, this 3.8 hectare (9.3 acres) site has a vast diversity of trees. Within the stand, one may find black ash, white ash, American elm, red maple, black cherry, yellow birch, butternut, balsam poplar, ironwood, trembling aspen, basswood as well as Eastern hemlock, Eastern cedar, and balsam fir. In addition the arboreal diversity, there is a high diversity of ground vegetation including the uncommon yellow lady slipper and maidenhair fern. Daniel Langlais, a harvest block planner, saw the incredible richness of the site and called in the company naturalist for a complete botanical survey. This site is of particular importance as it is located in an intensive agricultural area.

Basswood within the Hovey Hills Forest.

Within the roots of the yellow lady slipper live fungi that help the plant to grow and in turn, receives sugars from the plant.

JONES POND RED OAK

Location: Northern Maine

Our forestry staff are trained to look for the unusual during the course of their job, be it small rare plants around their feet, hawks nests in the trees, or a Canada lynx. In this case, a forester noted the abundance of red oak (*Quercus rubra*) on this south-facing slope of northern Maine and immediately flagged the area off from operations on account of the rarity in this area. Mixed with a bit of sugar maple, beech, and a little red spruce, this mature stand is an impressive site on the landscape. The Maine Natural Areas Program (MNAP), a State program that employs biologists and ecologists to locate and monitor rare to uncommon forest community types, lists this community type (Red Oak – Northern Hardwood Forest) as common in the State but less so in this particular area. J. D. Irving, Limited has a great working relationship with the staff at MNAP, placing their sites of ecological concern into our Unique Areas Program as well as keeping them informed of our staff's finding so that they have a more complete picture of the wilds of Northern Maine.

A good look at some of the tree trunks in the stand will show some deep intermittent gouges approximately half a centimeter wide. This is evidence that a black bear was in the area, climbing the beech and oak for nuts. During the fall of the year, this type of fat, rich food is high on the bears menu as he/she prepares to bulk up for the winter denning period. Northern Maine boasts some of this region's highest black bear populations. Given that an adult male will try (before hibernation) to add about 100 lbs of fat in the short fall foraging season, this is just one more reason to retain this unique stand of oak trees.

Old Growth & Conservation Forests

YANKEETULAHDI OLD GROWTH FOREST

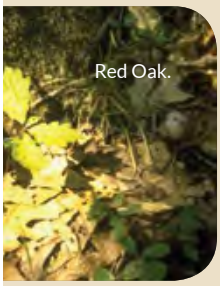
Location: Northern Maine

This jewel, in the most northern limits of our Maine woodlands, is an ecologist's dream. Yankeetouladi hardwood forest has been under the microscope of a broad range of forest scientists for years, each verifying it as a true old growth forest. Less than 0.5% of the present northeastern forest is termed "old growth". What is old growth? It's more than just a group of large trees. In fact, most old growth stands also host smaller diameter trees that fill in the gaps created where some of the big bruisers fell. Also, a site's soil condition, as well as light and moisture levels, greatly affects the annual growth of a tree. There are 1500 year-old trees in the Niagara Escarpment that are no bigger around than a baseball!

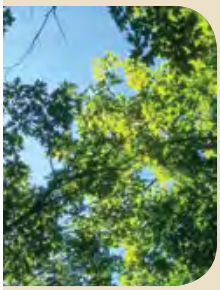
Our foresters are trained to recognize the signs of old growth. Taking a small, pencil-sized core of a selected set of trees on a site allows a forester to count the annual growth of a tree without undue harm. Other old-growth indicators can include:

- The presence of a suite of very slow-growing lichens on the tree bark, as well as a good survey of the site for any anthropomorphic (man-made) disturbance such as old road beds, or cut tree stumps.

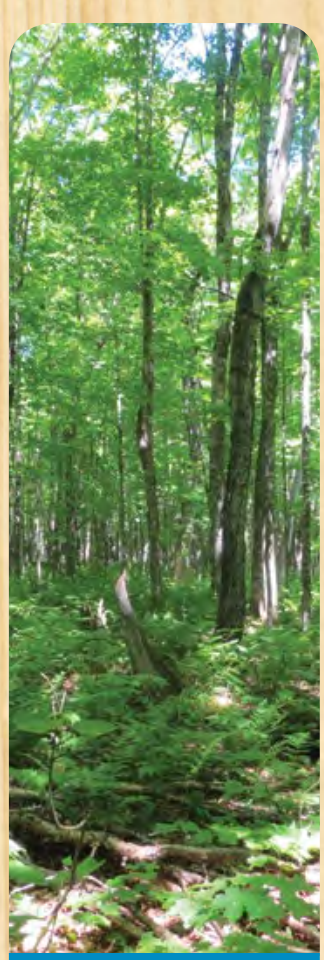
- The presence of large wood debris (dead trees decaying on the forest floor), large standing dead trees (snags) as well as "pits and mounds" where large trees have long ago been toppled by the wind, creating a hole.



Red Oak.



Indicator lichens on hardwood.



Old Growth hardwood stands with new growth filling in canopy gaps.

Plants

DIPPER HARBOUR VAN BRUNTS JACOB LADDER SITE

Location: Southwest New Brunswick

Van Brunts Jacob's Ladder.
Photo Credit: Nature Conservancy of Canada.

Long thought to have disappeared from the province, the Van Brunts Jacob's Ladder (*Polemonium vanbruntiae*) is back on New Brunswick's botanical map. With a new population found a few years back near Lake Utopia, and another more recent find in the Dipper Harbour area, the long-term stability of this plant in the province is looking better. The Dipper Harbour find was part of a partnership between J.D. Irving, Limited and the Nature Conservancy of Canada. Staff from both organizations combed an area deemed as high potential and within four hours found clusters of the showy purple bell-like flowers along the edge of a stream in Charlotte County. The common name alludes to the way in which the leaflets attach to the leaf, resembling a primitive ladder. Prior to these populations, the plant had not been seen in the province since the 1880's.

Paula Noel & Josh Noseworthy of the Nature Conservancy Canada

FOX BROOK LEDGES RARE PLANT SITE

Location: Northern Maine

The Upper St. John River is the only place in the world where you would find the endangered Furbish's Lousewort (*Pedicularis furbishiae*). At this particular site you will find other botanical rarities such as Cut-leaved Anenome (*Anenome multifida*), Alpine Sweet Broom (*Hedysarum alpinum*), Sticky False Asphodel (*Tofieldia glutinosa*), and others. Why is this area such a hot spot for these plants? Furbish's Lousewort is not the type of plant that competes well with others for nutrients, moisture, and sun. The banks along this section of the St. John can get scoured by ice flows during the spring break up so much so that the site remains free of trees and tall shrubs. Banks along the south side are even more popular as they do not dry as easily as those north side banks receiving the southern sun exposure. The Anenome and Sweet Broom appreciate the site as its bedrock is a type of calcareous slate that tends to sweeten the soil so that the plants are able to take up more nutrients from the soil, just as liming our lawns tends to allow our grass to grow better. With the exception of Mt. Katahdin, the St. John River supports more rare species of plants than any other area in Maine. The New Brunswick side of the Upper St. John also hosts populations of Furbish's Lousewort.

Furbish's Lousewort and ice scoured river shore of the upper St. John River, Maine.

Furbish's Lousewort was first discovered by botanist Kate Furbish in 1880 although it wasn't until 1882 that professors at Harvard University declared it a new species of plant and named it to honour Ms. Furbish. In 1975, the Smithsonian declared Furbish's Lousewort as "probably extinct". Thankfully, botanists from the Maine Natural Areas Program undertake surveys of hotspots such as this site to document the health of the population and to find out where they may spread from year to year. In turn, JDI protects these and other new populations as they spread out along the riverbanks of northern Maine.

INDIAN LAKE GOODYERA SITE

Location: Grand Lake Area, New Brunswick

Annually, key Woodlands staff receive training to identify potential rare plant habitat within the forests of New Brunswick, Nova Scotia, and Maine. It was just a few weeks after one of those training sessions in 2010, when the company Naturalist received an email from block layout forester, Jonathan Carson, stating he may have found something of interest. It had the distinctive broad white stripe on the leaf contrasted with green pigment, suggesting Goodyera family. Carson had located a population of Downey Rattlesnake Plantain (*Goodyera pubescens*), a type of orchid, previously known from only three other sites in the province at the time. The pubescens portion of its Latin name refers to the downy "hair" of the leaves.

Left: Distinctive venation of Downy Rattlesnake Plantain. Right: Plantain in flower.

SIROIS ROAD RARE PLANT SITE

Location: Northwestern New Brunswick

Fir Clubmoss

Charles Neveu, a company forester and amateur botanist extraordinaire, has a number of first-time finds for rare plants in New Brunswick. This site is particularly fine as it hosts the first known New Brunswick population of Common Moonwort (*Botrychium lunaria*) as well as the rare Northern Adder's Tongue (*Ophioglossum pusillum*) and Fir Clubmoss (*Lycopodium selago*). Contrary to its name, the Common Moonwort isn't common at all, found in less than five areas within the province (Charles has found three!). This plant is a member of the fern family that stands only about 5-7cm tall and has a very bland look that allows it to blend in with other vegetation. This is a northern plant on the southern edge of its range in northern New Brunswick. In Maine, there are no recent records of this plant, making it one of the State's rarest plants. Our Black Brook woodlands district has some of the richest soils in the province, which allows some of our provinces rarest plants to thrive here. It may take between five and eight years for a windblown spore to develop into a plant visible above the soil surface. These moonworts are often found in patches of ground that have very little other vegetation as they do not compete well with other plants for live sustaining resources.

Common Moonwort.

Historic

Markers within the cemetery feature names such as Lockhart, McAfee, and Baskin, with most members originating from Donegal, Ireland.

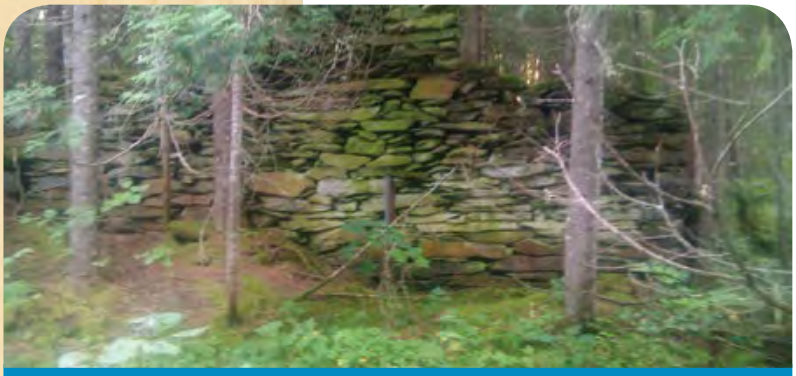
BASKIN CEMETERY

Location: Southern New Brunswick

Lumbering has had a long and proud tradition in our region. From as early as the mid 1700's, people were earning an honest living in some of what may be considered today as the "backwoods". In a number of cases, small communities were built up around remote lumber mills. Today, our foresters stumble across long-forgotten family and community gravesites in the course of surveying the woodlands. Baskin Cemetery was actually brought to the company's attention by the director of a county museum and was immediately placed in the Unique Areas Program not only to protect the sanctity of the area but also to help the area "live on" within our database. The Unique Areas Program contains data sources from across the spectrum of society; rare plant enthusiasts, historians, zoologists, and archeologists make sure these special spots remain on the landscape.

OLD MILL STONE BOILER

Location: Northern Maine



Stone face that had been built around the boiler.

The north Maine woods are littered with the artifacts of the State's rich logging/lumbering history. Parts of Lombardy Log Haulers, Peavy heads and even old long forgotten locomotives have been uncovered in what most would consider the "deep woods". Also occasionally uncovered, are the remnants of old lumber mill sites. Records on this site are unclear, but it is thought to have been a cedar mill. Likely at the turn of the last century, a "portable" boiler weighing somewhere around 3,000-5,000 lbs, was hauled by horse to the site, its firebox covered on the outside with the stone you see in the photos. Water from the adjacent stream fed the boiler, with the fire fueled by sawdust and slab wood. Given the size of the rock walls uncovered, this boiler would have fed a 6-12 hp steam engine; enough to power a ripping saw as well as an edger. A number of these wood powered steam boilers were in use right up into the 1940's when diesel engines became more popular.

CHARLIE BEAR PETROGLYPH SITE

Location: Northern Maine

The Unique Areas Program is more than just rare plants and bird nests. There are a considerable number of sites within our database that are conserved for their historic or cultural value. A petroglyph is the engraving or carving of a stone surface often associated to prehistoric times. In this case, the United States Government recognizes this site not just for the simple lettering on the stone done by a Native American in the late 1800's, but for the repetitive use of the area as a native campsite, going back to at least European contact (mid 1590's) as evident by the trade goods unearthed.

Petroglyph from the late 1890s.

The stone is engraved with the name "Charlie Bear 1889" as well as that of "JR Prosser 1899". Charlie Bear was a well-known and successful Maliseet fishing and hunting guide of the area. Just as a real bear scratches and claws trees to mark its territory, Charlie Bear might have been doing the very same thing: marking his favourite hunting/fishing spot with the hopes of keeping other guides away!

Lakeshore rock face featuring the petroglyph.

Geological & Fossil

OTTER BROOK CANYON

Location: Western New Brunswick

Located in a valley that was once severely burned in a forest fire in 1982, Otter Brook Canyon has a number of interesting features. The most important of these is the narrow but deep canyon, eroded in a layer of brittle bedrock by the rushing water. River canyons in this region are rare and are usually the result of fault activity, where two portions of the earth's crust pull away from each other. At the mouth of the canyon are the remains of an old dam. Below the dam is a cavern, carved out by the rushing water. The cave is 4-5m deep and has several round pillars at its entrance. As a result of a severe fire in the valley, the poorly regenerated site allows for a clear view of a number of glacial deposits such as moraines and drumlins scattered on the landscape.

Caverns of Otter Brook.

SQUARE LAKE MARINE FOSSIL SITE

Location: Northern Maine

Around 350-400 million years ago, the landscape of northern Maine was quite unlike that of today. The most notable difference is that this part of Maine was underwater in an ancient ocean called Iapetus (it would be another 100 million plus years before the Atlantic Ocean is formed after more continental movement). The marine fossils found within the lakeshore rock includes corals, brachiopods (shelled animals that somewhat resemble small clams), and crinoids. Crinoids come from the Greek "*krinon*" meaning lily and "*eidos*" meaning form. A look at modern day crinoids shows they have the form of a lily, despite being a marine animal. With a stem attached to the sea floor, the "petals" of this flower-like animal wave about in the water, capturing microscopic plants and animals floating by in a sticky mucus that is directed to the mouth in the center of the "flower". The most noticeable portions of the crinoids at this site are the small sections of stem in the rock. We often associate coral with the warmer waters down south and while we do have some slow forming corals in this part of the world, the fossilized coral found at this site was formed while this area was a great deal nearer to the equator. Continental drift has shifted our region around quite a bit in the last billion years and continues to do so at a timescale in which we do not readily notice. For perspective, North America is moving toward Africa at about the same rate as your fingernails grow. This will mean that in 250 million years we could walk to South Africa.

Crinoid fossil pieces with a band of white quartz running through rock.

Lakeshore fossil bed.

Reptiles & Invertebrates

EMERALD POND HATCH SITE

Location: Central New Brunswick

This site is named after an impressive hatch of a particular type of dragonfly known as the Muskeg Emerald (*Somatochlora septentrionalis*), witnessed by naturalist Stu Tingley in 1998. This was the first record of the species in the province of New Brunswick. With a brassy green thorax (mid-section) and a short yellow stripe at the base of the wings, this dragonfly tends to be found in wetlands that are high in sphagnum moss with little open water. Eggs are laid on submerged vegetation with this particular species of nymph, spending its first couple of years underwater until it crawls up to the surface where it splits off its old skin and a body with wings emerge. The diet of the water-bound nymph consists of essentially any critter that moves. Mosquito larva, tadpoles, aquatic insects, and even small fish are fair game! In pursuit of quick prey, the nymph will eject water from its behind for a bit of a rocket boost. As an airborne adult, their diet changes to flies, mosquitoes, butterflies, moths, and even bees. The Muskeg Emerald is capable of eating its own weight in invertebrates in a half an hour.

Muskeg Emerald dragonfly - first found in New Brunswick at Emerald Pond.
Photo copyright Colin D. Jones

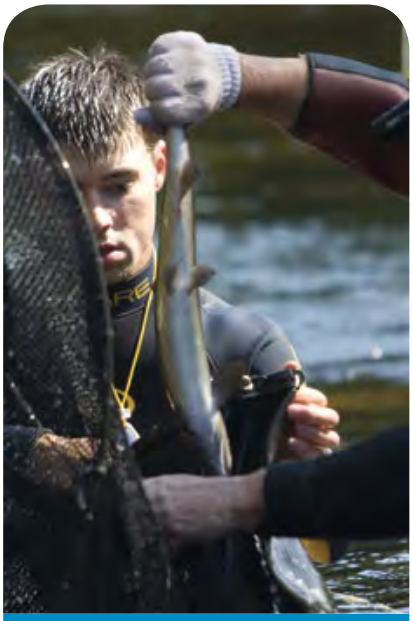
PURPLE LESSER FRITILLARY (BUTTERFLY) SITE

Location: Northern Maine

When one hears of place described as a "barren" , all kinds of negative imagery comes to mind. Sparse vegetation, windy, devoid of colour and wildlife. When a Purple Lesser Fritillary (*Boloria chariclea grandis*) butterfly encounters a black spruce barren such as this site, they settle in to a habitat they enjoy most. This species of butterfly is more at home in more northern regions, so it should come as no surprise that another common name for this species is "Arctic Fritillary". So what makes this site one of the only places in the state to find this type of butterfly? What is the attraction? The dominant weather patterns, as well as soil type and drainage, has created an area that mimics the taiga of the north and provides great growing conditions for the Fritillary's host plant Dwarf Willow (*Salix herbacea*). The Purple Lesser Fritillary larvae feed on the willow, while adults lay their eggs on the backside of the willow leaves. The common name refers to the purple-brown hindwing colour while fritillary comes from the latin word *fritillus*, meaning checkerboard, referring to the pattern on the upper side forewings.

Purple Lesser Fritillary showing the distinctive purple on the hindwing.

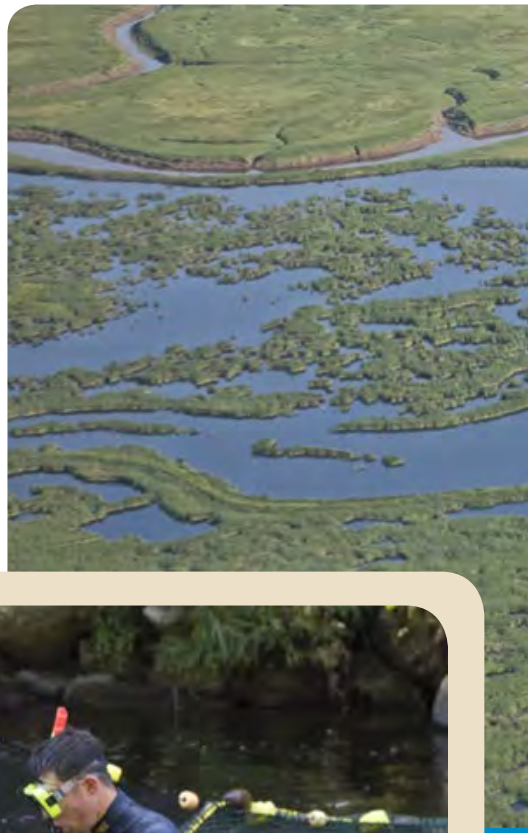
Other Conservation Efforts



Atlantic salmon grilse (captured to collect eggs for rearing program).

ATLANTIC SALMON

JDI has had a long history of cooperation with Atlantic salmon conservation groups. We are active members in the Atlantic Salmon Federation (ASF), Miramichi Salmon Association (MSA) and the Restigouche River Watershed Management Council (RRWMC) in a variety of capacities. Our salmon stocking program in affiliation with MSA has resulted in the stocking of over 1 million juvenile salmon in the past ten years. We have also partnered with MSA on upstream salmon passage issues, donating helicopter flying time to identify beaver blockages on important headwater spawning streams. We work closely with the RRWMC, flying watercourses after heavy rainfall events to search for possible siltation issues on older forest roads not built to current standards. Our association with ASF has been in a supportive role at a directorship and donor level.

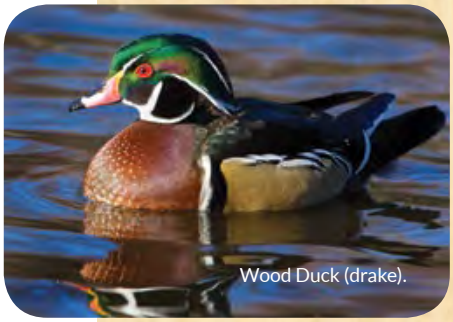


JDI assisting with brood stock capture for Miramichi Salmon Association hatchery.

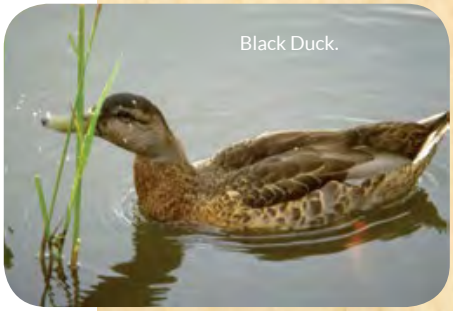
DUCKS UNLIMITED

JDI has been a proud and active partner in waterfowl conservation with Ducks Unlimited Canada since the late 1970's when the first control structures were installed on JDI wetlands to set optimal water levels for duck nesting / rearing. Additionally, JDI staff have hosted thousands of youth through a Ducks Unlimited Canada Project Webfoot (wetlands awareness) course over the last 15 years.

Musquash Estuary donated to the Nature Conservancy by JDI. A portion of this estuary is managed by Duck's Unlimited.



Wood Duck (drake).



Black Duck.

NATURE CONSERVANCY OF CANADA (NCC)

JDI has a long-standing history of responsible land stewardship in the Maritimes and has been actively involved with many NCC projects through gifts of land, financial contributions, and partnerships in scientific discovery. In 2013 we were a part of the largest land gift to the NCC in Atlantic Canada.

BIRD STUDIES CANADA

Irving Nature Park has partnered with Bird Studies Canada to install a Motus Wildlife Tracking System at the Park. The Motus Wildlife Tracking System is a technology that tracks small organisms using very high frequency radio transmissions. Researchers tag small birds such as warblers with small transmitters that weigh less than 0.3 grams. The transmitter emits a short pulse, broadcasting individual signals. Each Motus tracking station can detect and record radio-tags at distances of up to 15 km. With over 250 stations in total, Motus receiving stations have been established throughout southern Ontario, Quebec, the Maritimes, and as far north as Southampton Island, Nunavut. In 2014, researchers and organizations radio-tagged over 1,800 birds and bats of more than 30 species.

Red-eyed vireo - one of the many species whose migration was tracked by the Motus system at the Irving Nature Park.

White-tailed deer.

QUALITY DEER MANAGEMENT ASSOCIATION (QDMA NNB)

J.D. Irving, Limited commissioned a study with the Northern New Brunswick chapter of Quality Deer Management Association (QDMA NNB) to have a better understanding of the White-tailed deer and moose populations on J. D. Irving, Limited's (JDI) freehold land in Black Brook.

The QDMA study combined a network of infrared triggered cameras using salt licks as an attractant with knowledge of deer and moose behavior and ecology to gain greater insight into population dynamics on the JDI Black Brook landbase.

Investing In Research

JDI invests $1.5 Million annually in forest research. This investment continues to guide best practices on the ground. On average, 12 graduate students and assistants are engaged in research every year on lands owned or managed by JDI.

A large portion of this research is conducted in collaboration with a number of different universities. Projects seek to build our knowledge which is integrated into adaptive forest management.

The list of Areas of Research to the right summarizes graduate student projects supervised by leading academic experts across five universities and represents 71 students and 28 academic advisors. This also results in training of high-quality biological science and forest management professionals.

AREAS OF RESEARCH

- Forest Health
- Forest Communities and Landscapes
- Biodiversity
- Wildlife Habitat
- Fresh Water Fisheries and Fish Habitat
- Hydrology
- Silviculture Growth and Yield
- Soil
- Carbon Sequestration
- Climate Change

Dr. Kate Frego and student examining the moss and liverwort diversity within a planted forest.

J.D. IRVING, LIMITED

If you would like more information on our Unique Areas Program or any of our other conservation efforts, please contact Corporate Communications at 1-506-632-7777 or e-mail us at info@jdirving.com

300 Union Street,
Saint John, New Brunswick
E2L 4M3 Canada

2012 Rusty Blackbird Detections on J.D. Irving, Ltd. Lands

Square Lake and Long Lake Regions

Submitted by Dr. Judith Scarl
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24 July 2012

Introduction

Rusty Blackbirds, once-common breeders in boreal wetlands across NY, VT, NH, and ME, have experienced chronic long-term and severe short-term population declines. Recent estimates suggest that Rusty Blackbird populations have declined by 85-99% over the past 40 years; Breeding Bird Survey data document a 10% decline per year for the last 30 years (Greenberg and Droege, 1999). In a recent study of boreal forest-breeding birds, Rusty Blackbirds experienced the steepest declines, leading scientists to state that the Rusty Blackbird is "one of the most precipitously declining species in North America" (Niven et al, 2004). Until 1999, these alarming losses went unrecognized; only for the last decade have scientists finally struggled to understand the roots of this decline.

Rusty Blackbirds breed in boreal forest wetlands from northern New England throughout Canada to Alaska. While the eastern portion of the breeding range may have once contained the highest densities of breeding birds (Erskine, 1977), this region may have experienced the steepest population declines (IRBTG, 2009). Surveys of wetlands throughout Maine between 2001 and 2007 documented a range contraction of 160 km since 1983 (Powell, 2008), and data from Vermont's second-generation Breeding Bird Atlas also suggest that the Rusty Blackbird breeding range is shrinking in this state (Fisher and Powell, in prep). The Rusty Blackbird is listed as a Species of Special Concern in NY, VT, NH, and ME, and the IUCN Red List denotes this species as globally Vulnerable. Despite recent research, however, scientists and landowners lack a clear understanding of the driving forces behind these declines, or the requirements for this species to persist. This information is critical in forming effective management plans for the conservation of this vulnerable species.

Rusty Blackbird declines may reflect a broader crisis across a sensitive ecosystem. Rusty Blackbirds, the avian species most closely tied to boreal forest wetlands (Niven et al, 2004), are considered a "poster child" for boreal forest conservation (IRBTG, 2009). Boreal forests suffer from wetland drying, logging, acidic precipitation, and mercury accumulation, and several diverse species that also breed in these forested wetlands, such as the Horned Grebe (*Podiceps auritus*), Lesser Scaup (*Aythya affinis*), and Lesser Yellowlegs (*Tringa flavipes*), are suffering similar severe and alarming declines (Greenberg and Matsuoka, 2010). Understanding factors that influence Rusty Blackbird declines in the boreal forests of North America will advance the conservation of this potentially threatened ecosystem.

To determine the current status of Rusty Blackbirds in the Northeastern U.S. and to evaluate the current distribution of this species, we conducted 280 surveys at locations in ME and VT in 2012. 10 of these surveys were at locations on J.D. Irving lands near Square Lake and Long Lake that had not been previously surveyed.

Methods

On June 18, 2012, a team of one trained technician and one trained intern conducted 10 surveys on J.D. Irving land in northern Maine. Survey locations were selected by J.D. Irving and included locations at different types of wetlands near Square Lake and Long Lake. Each survey included a point count component and a habitat measurement component.

Point Counts (Bird Surveys)

Point count surveys were conducted during all daylight hours (approximately 6 a.m. to 8 p.m.) in periods of good weather (wind no greater than 18 miles per hour and no steady rain). The primary target species is the Rusty Blackbird (RUBL); however, we also collected data on 10 other species that may occur in similar habitats: Common Grackle (COGR), Red-winged Blackbird (RWBL), Brown-headed Cowbird (BHCO), Blue Jay (BLJA), Gray Jay (GRJA), American Robin (AMRO), Olive-sided Flycatcher (OSFL), Northern Waterthrush (NOWA), Tennessee Warbler (TEWA), and Red Squirrel (RESQ).

Each point count was 14 minutes and 18 seconds long and was broken into three periods. Observers conducted repeated simple counts for all target species during each period:

Period 1:	0-2:59, passive observation
Period 2:	3:00-3:38; 38-second playback
	3:39- 8:38, 5 minutes of passive observation
Period 3:	8:39-9:17, 38-second playback
	9:18 to 14:18, 5 minutes of passive observation

During the first two periods, each individual Rusty Blackbird was tracked minute-by-minute. Information about wind, cloud, and insect conditions were noted at the start of each survey.

Playbacks consisted of Rusty Blackbird calls and were broadcast on either a Western Rivers Predation or Apache game caller.

Habitat Measurements

Observers collected the following habitat information:

Distance that view is unobstructed in each cardinal direction- how far away are trees/other features that prevent the observer from seeing the entire wetland or upland?

Wetland Habitat (within the bounds of the wetland)

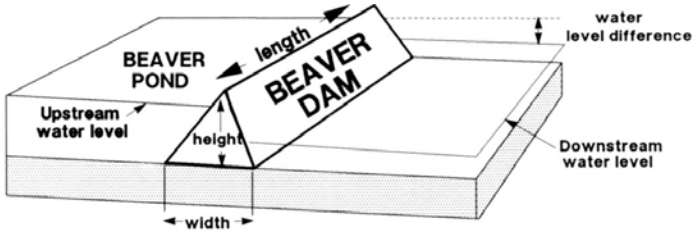
1. **Wetland Categorization**: percentage of wetland that is Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS), Palustrine Emergent (PEM), and Palustrine Unconsolidated Bottom (UB).
2. **Count of Visible Puddles**- areas of standing (stagnant) water unconnected to the wetland center and independent of wetland water.

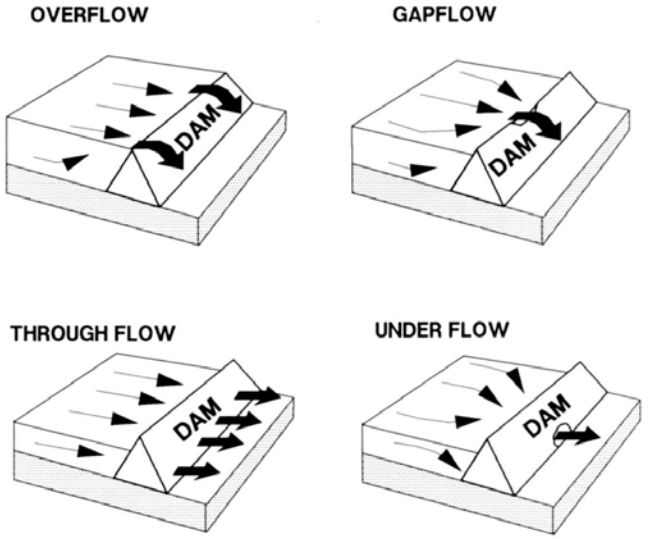
3. **% Mud**- Estimate the percentage of the wetland covered by exposed mud visible from survey location.
4. **Number of snags**- Dead standing trees in the wetland area. Estimates were appropriate for numbers greater than 50.
5. **Tussocks**: a count of the number of vegetation tussocks in the wetland area. Estimates were appropriate for numbers greater than 50.
6. **Beaver Dam Stage**: If there was a beaver dam, observers noted the STAGE of the dam (active, old, relict, or none):

   (reproduced from Woo and Waddington 1990)

Class	Materials	Stage
1	Stones, new branches, fresh mud	active
2	No stones, new branches, fresh mud	active
3	Stones, old branches, mud, and debris	old
4	No stones, old branches, mud, and debris	old
5	No stones, old branches, some mud and debris remain	old
6	Only large branches remain	old
7	Only small branches remain	relict
8	Most branches gone, only half of original structure remains	relict

7. **Flow**: If there was a beaver dam, observers noted the primary course/flow of water across the dam. If there was no flow, "no flow" was indicated. If no dam, "no dam" indicated. Diagrams reproduced from Woo and Waddington 1990.





8. **Alder Thicket Percent**: If there was an alder thicket present, observers estimated what percentage of the visible wetland was covered by alder thicket.
9. **Sphagnum**: percent of the wetland covered in sphagnum ("peat moss").
10. **Open Water**: Estimate of the approximate percentage of the wetland visible from the survey location that was open water.

Upland Habitat (visible uphill from the wetland)

1. **Percent Forested**: Estimate of the percent of the upland that was forested (has trees).
2. **Percent Softwood and Hardwood**: Estimate of the percent of the forested upland that was softwood and the percent of the forested upland that was hardwood.

3. **Tree Height**: Observers used a clinometer to measure to the top and bottom of a tree of average height. Observers also measured the distance to the tree. These measurements can be used to calculate tree height.
4. **Size Class**: Average size class of trees in the upland.

Size Classes

CWHR Code	CWHR Size Class	Conifer Crown Diameter	Hardwood Crown Diameter	DBH
1	Seedling tree	n/a	n/a	<1.0"
2	Sapling tree	n/a	<15.0'	1.0" - 5.9"
3	Pole tree	<12.0'	15.0' - 29.9'	6.0" - 10.9"
4	Small tree	12.0' - 23.9'	30.0' - 44.9'	11.0" - 23.9"
5	Medium/large tree	≥24.0'	≥45.0'	≥24.0"
6	Multi-layered tree	A distinct layer of size class 5 trees over a distinct layer of size class 4 and/or 3 trees, and total tree canopy of the layers ≥60% (layers must have ≥10.0% canopy cover and distinctive height separation).		
0	Not Applicable (no trees)			

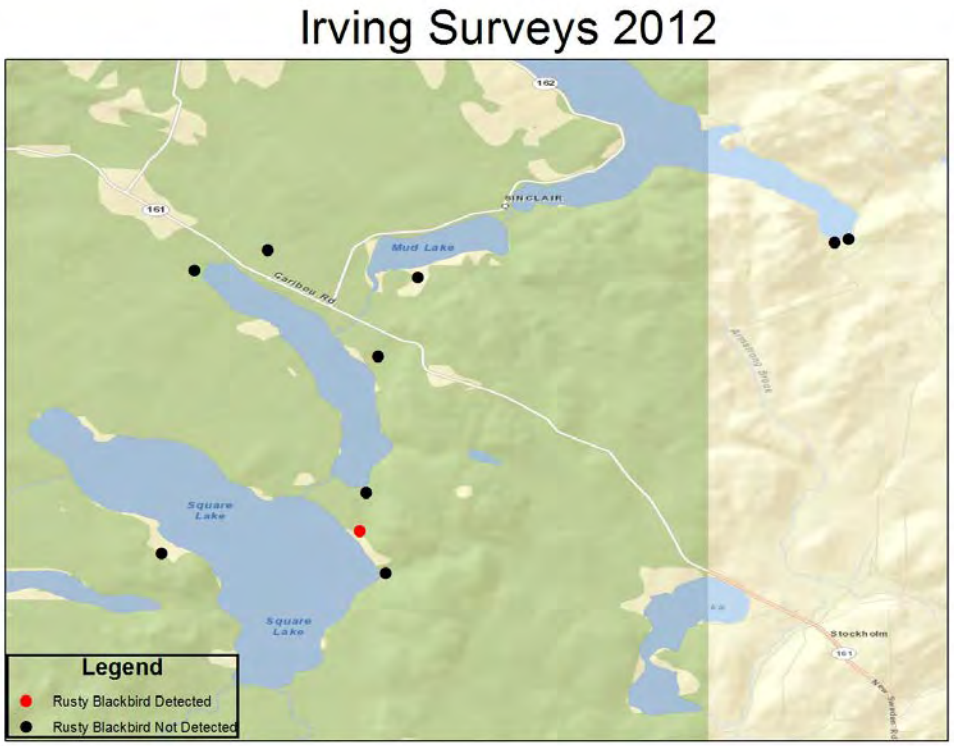
(reproduced from http://www.fs.fed.us/r5/rsl/projects/frdb/tables/table114b.html)

5. **Buffer**: Estimate of the width of the buffer (uncut trees) around the wetland.
6. Snags: Number of snags in the upland.
7. **Road Class**: Unimproved Dirt, Improved Dirt, Paved, or Remote ("remote" is any wetland >100 meters from a road; generally these are not surveyed).
8. **Nesting Habitat**: Observers noted whether there was a dense thicket of spruce or fir that is less than 5 meters tall.

Results

Observers detected Rusty Blackbirds at only one of the J.D. Irving survey sites; two Rusty Blackbirds were detected a Square Lake East, 4 (N 47□□'57", W68□19'24")
during a survey initiated at 0750 on June 18, 2012. This was a remote, highly forested site with no visible evidence of beaver activity near the survey point. The nine other J.D. Irving survey sites did not have any Rusty Blackbird detections during the survey periods (see Figure 1).

Figure 1: 10 Rusty Blackbird surveys conducted on J.D. Irving lands in northeastern Maine, June of 2012.



References

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TRACT	LIC #	ACRES	LOT#/ADD'L	LAST	FIRST	ADDRESS	CITY	ST	ZIP	TOWNSHIP RANGE
G1705	3176	0.47	#164A &#164S	Albair	Harold & Elizabeth	458 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3105	0.23	#105A	Albair	James and Sandra	36 Prospect Street	Caribou	ME	04736	T17R5 - SPEC Tract
G1703	3395	0.23	#24A	Albert	Michelle and Denton Roy	13 Leighton Ave	Limestone	ME	04750	T17R3 - N/2
G1705	3396	0.23	#25A	Albert	Michelle and Denton Roy	13 Leighton Ave	Limestone	ME	04750	T17R3 - N/2
L1705	2931	0.16	#99	Albert	Alan M. & Joan M.	53 Charles Street	Caribou	ME	04736	T17R5 - Dickey Tract
L1705	2660	0.29	#33A	Albert	Rev. James R.	270 St Peter St	Cross Lake	ME	04779	T17R5 - Dickey Tract
L1705	2599	0.18	#37A	Albert	Peter and Ann	33 Church Street	Presque Isle	ME	04769	T17R5 - Dickey Tract
L1705	1627	1.64	#---	Albert	Jeanette	5 Dominion Road	Windham	ME	04062	T17R5 - Dickey Tract
G1705	1832	0.24	#62	Smith	Jody R	21 York St	Caribou	ME	04736	T17R5 - SPEC Tract
C1605	1525	0.69	#17	Anderson & Michaud	David & Sara, Richard & Kathleen	204 New Sweden Rd	New Sweden	ME	04762	T16R5
G1705	3094	0.23	#111A	Andrade	Santiago	37 Shoreline Drive	Sinclair	ME	04779	T17R5 - SPEC Tract
G1705	1647	0.40	#28 & #79	Archer	Carl	256 Bishop Road	Troy	ME	04987	T17R5 - SPEC Tract
G1705	1649	0.17	#29	Archer	Carl	256 Bishop Road	Troy	ME	04987	T17R5 - SPEC Tract
G1703	2263	0.23	#106	Argraves	Gary M.	21 Cote Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1703	2836			Ayotte	Patrick & Tina	117 Lords Rd	North Waterboro	ME	04061	T17R3
G1703	2888	0.46	#95 & 95S	Ayotte	Eric	599 Hamlin Rd	Hamlin	ME	04785	T17R3 - N/2
G1703	2785	0.28	#61	Ayotte	Patrick & Tina	117 Lords Rd	North Waterboro	ME	04061	T17R3 - N/2
G1703	2387	0.51	#50 & 50A	Ayotte	Chad E. and Michelle	422 Champlain Street	Van Buren	ME	04785	T17R3 - N/2
L1705	1630	0.40	#9B & 11	Bacon	Randy & Paula	114 Gray Rd	Easton	ME	04740	T17R5 - Dickey Tract
G1705	4891	0.23	#76	Bacon	Douglas & Rinette	11301 Woodbrook Lane	Reston	VA	20194	T17R5 - SPEC Tract
C1605	1564	0.69	#16	Bartlett	David Jr. & Sally	PO Box 155	Bethel	ME	04217	T16R5
G1705	2265	0.64	#20 + Add't lot	Bates	Rose Mary	PO Box 163	Sinclair	ME	04779	T17R5 - SPEC Tract
G1705	2502	0.34	#24	Beaulieu	Cathy	2006 Chapman Road	Chapman	ME	04757	T17R5 - SPEC Tract
G1705	2267	0.41	#107 & 107S	Beaulieu	Paul J & Doreen J	211 Morris Rd	Limestone	ME	04750	T17R5 - SPEC Tract
G1705	2701	0.29	#109 & Add'l lot	Beaulieu	Peter J. & Jeri I.	264 Morris Road	Limestone	ME	04750	T17R5 - SPEC Tract
L1705	2011	0.46	#5 & Add'l lot	Belanger	Stephen & Debra	127 Cyr Road	Cross Lake	ME	04779	T17R5 - Dickey Tract
L1705	2929	0.23	#87	Belanger	Joshua	143 Cyr Rd	Cross Lake	ME	04779	T17R5 - Dickey Tract
G1705	2728	0.23	#111	Belanger	Wayne & Mary Lee	595 Van Buren Road	Caribou	ME	04739	T17R5 - SPEC Tract
G1703	6110		DB1	Belanger	Daniel	PO Box 7365 34 Portage Rd	Grand Falls, NB	NB	E3Z 2Y4	
G1703	6111		ED1	Belanger	Edward	PO Box 7365 34 Portage Rd	Grand Falls, NB	NB	E3Z 2Y4	
G1703	3218	0.49	#82 & Add'l lot	Bell	Glenn	PO Box 232	Limestone	ME	04750	T17R3 - N/2
G1705	3119		#140A - #141A - #141B	Bell	Frederick & Lynn	352 W Side Road	Cross Lake	ME	04779	T17R5
G1705	3172	0.23	#126A	Belleville	J Donald & Mary A	7 School St	Lewiston	ME	04240	T17R5 - SPEC Tract
L1705	2620	0.23	#36A	Bennett	Jonathan	10915 Hermit Thrush Lane	Charlotte	NC	28278	T17R5 - Dickey Tract
L1705	2673	0.44	#32 & Add'l lot	Bennett	Jonathan	10915 Hermit Thrush Lane	Charlotte	NC	28278	T17R5 - Dickey Tract
G1703	2511	0.57	#29 & 29S	Berube	Gilman	PO Box 285	Madawaska	ME	04756	T17R3 - N/2
L1705	2670	0.25	#23A	Bird	Dean E. & Debbie L.	49 Hemlock Point Road	Orono	ME	04473	T17R5 - Dickey Tract
C1605	1395	0.69	#6	Blackstone	Gregory & Virginia	379 Centerline Road	Presque Isle	ME	04769	T16R5
C1605	1398	0.69	#5	Blackstone	Grgeory	379 Centerline Road	Presque Isle	ME	04769	T16R5
C1605	2230	0.69	#11	Bouchard	Hazel & Timothy Cates	60 Stevens Rd	Augusta	ME	04330	T16R5
G1705	1543	0.23	#34	Bouchard	Kathleen & Frances	24 Blanchard St	Bangor	ME	04401	T17R5 - SPEC Tract
G1705	3102	0.23	#139A	Bouchard	Sophronia, Bennett, Joseph, Daniel	2471 Brentwood Dr.	Clearwater	FL	33764	T17R5 - SPEC Tract
G1705	3335	0.23	#36	Bouchard	Roy	27 Sandy Point Rd	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3334	0.34	#35 & #35A	Bouchard	Roy & Marie Minet	27 Sandy Point Rd	Cross Lake Twp	ME	04779	T17R5 - SPEC Tract
G1705	3162	0.60	#158A & 157A & Add'l lot	Bouchard	Rickey & Danna	156 East Road	New Sweden	ME	04762	T17R5 - SPEC Tract
G1705	3639	0.32	#232A	Bouchard, Jr.	Dwayne M.	303 Tupper Rd.	Perham	ME	04766	T17R5 - SPEC Tract
G1703	2738	0.46	#71 & Add'l	Boucher	Michael & Elizabeth	PO Box 287	Islesboro	ME	04848	T17R3 - N/2
G1703	3397	0.23	#31A	Bourgoine	Daniel J	589 W Linestone Rd	Fort Fairfield	ME	04742	T17R3 - N/2
G1705	3237	0.23	#183A	Bourgoine	John	58 Campground Hill Rd.	Caribou	ME	04736	T17R5 - SPEC Tract
L1705	2918	0.48	#92 & #92S	Bowden	Winfield B. & Linda	283 New Rd	Penobscot	ME	04476	T17R5 - Dickey Tract
G1705	1489	0.69	#38 & #39	Branscom	Bert P & Michelle	17 Windy Hill Dr	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	1555	0.23	#31	Branscom	John M & Cynthia L	9 Chamberlain Dr	Hallowell	ME	04347	T17R5 - SPEC Tract
G1705	2748	0.23	#112	Brawders	Sandra	280 Princeton Ave	Mill Walley	CAN	94941	T17R5 - SPEC Tract
L1705	3104	0.33	#51A	Brescia	Stanley & Louiselle	PO Box 575	Caribou	ME	04736	T17R5 - Dickey Tract
G1703	2890	0.23	#87	Buckley	Tammy	29 Moose Ridge Road	Mapleton	ME	04757	T17R3 - N/2
L1705	2879	0.46	#B & #D	Butt & Jane V. Butt	Larry S.	PO Box 1207	Harlem	GA	30814	T17R5 - Dickey Tract
G1705	4894	0.23	#93	Byrnes	Thomas & Kathleen	765 Rosevelt Trail #16	Windam	ME	04062	T17R5 - SPEC Tract
G1705	1547	0.37	#37	c/o David Soucy	Estate of Robert G. Soucy	46 E Main St	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1703	2354	0.51	#4 & Add'l	Caron	Reginald & Armande	PO Box 175	Van Buren	ME	04785	T17R3 - N/2
G1705	1734	0.64	#56 & Add'l lot	Caron	Garland	54 Duck Cove Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3257	0.34	#23	Caron	Roger	1049 Caribou Road	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1703	2934	0.23	#92	Caron and Colby Caron	Spencer	306 Main St.	Van Buren	ME	04785	T17R3 - N/2
L1705	2922	0.39	#96 & #96A	Carter	Jason T & Heidi E	177 Cyr Rd	Cross Lake	ME	04779	T17R5 - Dickey Tract
L1705	2114	0.21	#3A	Carter	Mark & Deberah	PO Box 741	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1705	4893	0.65	#94 & #95 & Add'l lot	Carter	G. Milton	2550 Aspen Creek Lane	Naples	FL	34119	T17R5 - SPEC Tract
G1703	2883	0.57	#84 & 84B	Castonguay	Paul & Gisele	630 B Boul. Everard H Daigle Box 7296	Grand Falls, NB	CAN	E3Z 2R8	T17R3 - N/2
G1703	2885	0.23	#85	Castonguay	Paul & Gisele	630 B Boul. Everard H Daigle Box 7296	Grand Falls, NB	CAN	E3Z 2R8	T17R3 - N/2
G1703	3317		#83	Castonguay	Paul & Gisele	630 B Boul. E H Daigle Box 7296	Grand Falls, NB	CAN	E3Z 2R8	T17R3 - N/2
G1703	3672	0.23	#107	Chalet Poitras Inc.		587 Rue Poitras	Grand Falls, NB	CAN	E3G 1J7	T17R3 - N/2

TRACT	LIC #	ACRES	LOT#/ADD'L	LAST	FIRST	ADDRESS	CITY	ST	ZIP	TOWNSHIP RANGE
G1705	3077	0.23	#123A	Chapman	James	19 Hickory Drive	East Waterboro	ME	04030	T17R5 - SPEC Tract
G1703	3403	0.46	#39A & Add'l lot	Charette	Albeo & Patricia	PO Box 55	Van Buren	ME	04785	T17R3 - N/2
G1703	2723	0.53	#67 & 67B	Chettiar, M.D.	Ramen V.	651 Everard H. Daigle Blvd. Suite 200	Grand Falls, NB	CAN	E3Z 2S2	T17R3 - N/2
G1703	2462	0.28	#41	Chiasson	Louine	PO Box 283	Van Buren	ME	04785	T17R3 - N/2
G1705	3091	0.46	#104A + 103A	Chick, Jr	John M & Cynthia	104 Shoreline Drive	Sinclair	ME	04779	T17R5 - SPEC Tract
L1705	1623	0.86	#37A	Cloutier LLC	Bill	3049 Olde Cove Way	Naples	FL	34119	T17R5 - Dickey Tract
G1703	2378	0.25	#34	Club 17		PO Box 126	Van Buren	ME	04785	T17R3 - N/2
L1705	2523	0.29	#14A	Condon	Albert D.	PO Box 1320	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1705	1646		#27C & #77	Cormier	Matthew	51 Skinner Road	Colchester	CT	06415	T17R5 - SPEC Tract
G1703	2543	0.25	#55	Cote	Daniel P. and Barbara M.	PO Box 185	Van Buren	ME	04785	T17R3 - N/2
G1705	3240	0.23	179-A	Cote	Galen	PO Box 1193	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1703	2406	0.28	#48	Cote- Gagnon	Colleen	19 Ledgewood Drive	Glenburn	ME	04401	T17R3 - N/2
G1705	3198	0.34	#154 & #155A	Cousins	Lewis E. & Kimberly A.	PO Box 1413	Caribou	ME	04736	T17R5 - SPEC Tract
L1705	3638	0.23	#55A	Cullins	Lynn	PO Box 317	Washburn	ME	04786	T17R5 - Dickey Tract
G1703	4265	0.69	#16A & #15A & 16B	Cyr	Dorothy	17 Hoover Ave.	Caribou	ME	04736	T17R3 - N/2
G1703	2372	0.28	#22	Cyr	John F. & Diane M.	25 Stackpole Way	Ellsworth	ME	04605	T17R3 - N/2
G1703	2886	0.23	#90	Cyr	Rodrick & Yvette	78 Nowland St.	Grand Falls, NB	CAN	E3Z 1B2	T17R3 - N/2
G1703	2737	0.57	#70 & 70B	Cyr	Donald & Donna	PO Box 45	Madawaska	ME	04785	T17R3 - N/2
G1703	2358		#8	Cyr	William	1885 E King St	Mohave	AZ	86440	T17R3 - N/2
G1703	2887	0.67	#94 & 94B	Cyr	Alan & Lisa	PO Box 53	Van Buren	ME	04785	T17R3 - N/2
G1703	3402	0.41	#38A & 38S	Cyr	Frederick & Rhonda	PO Box 205	Van Buren	ME	04785	T17R3 - N/2
G1703	3219	0.23	#88	Cyr	Gerald & Kathleen	125 St Mary's Road	Van Buren	ME	04785	T17R3 - N/2
G1703	2363	0.28	#13	Cyr	Lawrence & Debra	PO Box 184	Van Buren	ME	04785	T17R3 - N/2
G1703	3137	0.45	#103 & Add"l lot	Cyr	Randy J.	146 St. Bruno Street	Van Buren	ME	04785	T17R3 - N/2
L1705	1625	0.41	#14 & #41A	Cyr	Ronald & Louise A	97 Cyr Rd	Cross Lake	ME	04779	T17R5 - Dickey Tract
L1705	2764	0.18	#42A	Cyr	Ronald & Louise A	97 Cyr Rd	Cross Lake Twp	ME	04779	T17R5 - Dickey Tract
G1705	3100	0.23	#136A	Cyr	Thomas	338 West Side Road	Sinclair	ME	04779	T17R5 - SPEC Tract
G1703	4264		#40A	Cyr (c/o Lou Cyr)	Mark & Matthew	PO Box 75	Van Buren	ME	04785	T17R3 - N/2
G1703	3418	0.23	#41A	Cyr (c/o Lou Cyr)	Mark & Matthew	PO Box 75	Van Buren	ME	04785	T17R3 - N/2
G1703	2501	0.28	#3	Cyr, Emelda Holeton & Margaret Clair	Janet	244 Marquis Road	Van Buren	ME	04785	T17R3 - N/2
G1705	2635	0.37	#81 & Add'l lot	Cyr, Trustees under the Ruth A. Cyr Living Trust	Ruth A. Cyr and Roland W. Cyr	12 Maryland Drive	Atkinson	NH	03811	T17R5 - SPEC Tract
G1705	1911	0.23	#80	Cyr,Trustees under the Ruth A. Cyr Living Trust	Ruth A. Cyr and Roland W. Cyr	12 Maryland Drive	Atkinson	NH	03811	T17R5 - SPEC Tract
L1705	2507	0.23	#11A & 12A N1/2	Daigle	Louise & Harold	253 Cyr Road	Cross Lake	ME	04779	T17R5 - Dickey Tract
G1703	2725	0.55	#66 & 66S	Daigle France	Andre & Louise	10909 Route 144	St Leonard	NB	E7E 2S	T17R3 - N/2
G1703	2366	0.18	#16	Damboise	Wayne & Cynthia	50 Dubay Pit Road	Connor	ME	04736	T17R3 - N/2
G1703	3129		#43	Davenport	Dannie & Anne-Marie	PO Box 483	Fort Fairfield	ME	04742	T17R3 - N/2
G1703	3136	0.46	#102 & 102S	Derosier	Jacqueline	PO Box 265	Van Buren	ME	04785	T17R3 - N/2
G1703	2388	0.28	#30	Deschaine and Fr. Raymond Picard	Philip and Barbara	PO Box 25	Sinclair	ME	04779	T17R3 - N/2
G1703	2735	0.25	#62	Desjardins	Anne	PO Box 302	Van Buren	ME	04785	T17R3 - N/2
L1705	1755		#7	Dick	Carlene J.	105 Hardy St.	Presque Isle	ME	04769	T17R5 - Dickey Tract
C1605	1587	0.69	#22	Dickinson	Wendell & Betty	164 Montgomery Rd.	Westfield	MA	01085	T16R5
G1703	2381	0.28	#38	Dionne	Ruth P	75 Spruce Ridge Rd	Caribou	ME	04736	T17R3 - N/2
G1703	2945	0.28	#44	Dionne	Marlene M.	276 Chapel St.	Grand Falls, NB	CAN	E3Z 2M3	T17R3 - N/2
G1705	3226	0.23	#178A	Dobbins	Kimberly & James	60 Union Street	Hillsboro	NH	03244	T17R5 - SPEC Tract
G1705	3263	0.23	#172A	Doody	Philip & Beatrice	PO Box 323	Caribou	ME	04736	T17R5 - SPEC Tract
G1703	3134	0.23	#100	Doucette	Phyllis	128 Violette Street	Van Buren	ME	04785	T17R3 - N/2
G1703	3133	0.39	#99 &99S & Add'l lot	Doucette	Robert G.	134 High St.	Van Buren	ME	04785	T17R3 - N/2
G1703	3406	0.46	#46A & Add'l lot	Dow	Dean	15 Maple Grove Rd.	Presque Isle	ME	04769	T17R3 - N/2
G1703	3643	0.23	#26A	Dube	Keith & Kirk	114 Adams St	Van Buren	ME	04785	T17R3 - N/2
G1705	3121	0.23	#147A	Dubois	Robert	380 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1703	2370	0.23	#20 & Add'l	Dufour-c/o Philip L. Dufour, Pers. Rep.	Estate of Fernand Dufour	PO Box 40	Van Buren	ME	04785	T17R3 - N/2
G1703	3642	0.23	#12A	Durepo	Travis & Carolyn Dorsey	153 Main Street	Fort Fairfield	ME	4742	T17R3 - N/2
G1703	2509	0.28	#31	Durepo	Jeffery	354 Blake Road	Limestone	ME	04750	T17R3 - N/2
G1705	3249	0.23	#186A	Durost	Lewis H. Jr.	9 South St.	Houlton	ME	04730	T17R5 - SPEC Tract
G1703	2847	0.61	#63 & add'l lot	Entrust of Colorado		1070 West Century Dr Ste 101	Louisville	CO	80027	T17R3 - N/2
C1605	6105		#5S	Everett	Jeffery F	160 Mif's Lane,	Cross Lake	ME	04779	
G1705	5018			FairPoint Communcations		908 W Frontview	Dodge City	KS	67810	T17R5 - Spec Tract
L1705	5019		.	FairPoint Communcations		PO Box 199	Dodge City	KS	67801	T17R5 - Dickey Tract
G1703	2849	0.23	#75	Feeney	Gary, Jacinthe, & Allyson	146 Sheriff St.	Grand Falls, NB	CAN	E3Z 2Z9	T17R3 - N/2
L1705	2504	0.17	#7A & #7B	Felch	David N. & Brenda J.	237 Cyr Rd	Cross Lake	ME	04479	T17R5 - Dickey Tract
G1705	3080	0.23	#127A	Ferguson	Arline & Sandra & Colleen Macklin	415 East Road	New Sweden	ME	04762	T17R5 - SPEC Tract
L1705	2926	0.45	#100 & Add'l lot	Flewelling	Frederic	Box 398	Crouseville	ME	04738	T17R5 - Dickey Tract
L1705	2695	0.30	#2	Flewelling	Brian & Lynn	41 Ladner Rd	Easton	ME	04760	T17R5 - Dickey Tract

TRACT	LIC #	ACRES	LOT#/ADD'L	LAST	FIRST	ADDRESS	CITY	ST	ZIP	TOWNSHIP RANGE
L1705	1988	0.39	#1A	Flewelling	Richard P.	PO Box 244	South Freeport	ME	04078	T17R5 - Dickey Tract
L1705	2527	0.18	#18	Fox & Sylvia B. Fox	Larry K.	72 Hardy St	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1703	3138	0.39	#104 & 104A	Franck	Danny	27 Wesstland Ave	Biddleford	ME	04005	T17R3 - N/2
G1703	3318	0.23	#105	Franck	Danny	27 Wesstland Ave	Biddleford	ME	04005	T17R3 - N/2
G1703	3405	0.62	#45A & #45B & #45C	Franck	Living Trust	PO Box 27	Van Buren	ME	04785	T17R3 - N/2
G1703	3046	0.57	#32A	Gagnon	Natalie & Daniel	472 Chemin Petite Montagne	DSL de St Andre	NB	E34 1h4	T17R3 - N/2
G1703	2736	0.90	#69 & 69S	Gagnon	Miguel	10551 RTE 144	St Andre	NB	E3Y 3H9	T17R3 - N/2
G1703	2542	0.29	#54	Gagnon	Christopher E	106 Monroe Street	Van Buren	ME	04785	T17R3 - N/2
G1703	3008	0.44	#79 & # 79A &79S	Gagnon	Donna & Bill LaPlante	PO Box 211	Van Buren	ME	04785	T17R3 - N/2
G1703	2612	0.57	#28 & 28A	Gagnon	Wayne & Jeannine	106 Monroe Street	Van Buren	ME	04785	T17R3 - N/2
L1705	2601	0.34	#39A	Gahagan	Arnold Jr. /Michael/Mark	219 South Shore	Stockholm	ME	04783	T17R5 - Dickey Tract
L1705	2667	0.25	#21A	Gahagan	Kim	15 South Park Street	Caribou	ME	04736	T17R5 - Dickey Tract
G1705	1833	0.40	#48 & #48A	Garrison	Kelly A & Stephan L	PO Box 14	Mars Hill	ME	04758	T17R5 - SPEC Tract
L1705	2524	0.30	#15A	Gendreau	Peggy	PO Box 124	Limestone	ME	04750	T17R5 - Dickey Tract
L1705	1952	0.31	#6	Gentile	Susan D.	33 Center St.	Yarmouth	ME	04096	T17R5 - Dickey Tract
L1705	2528	0.25	19A	Gervais	Joseph & Joanna	23 North Street	Caribou	ME	04736	T17R5 - Dickey Tract
L1705	2306	0.11	#E	Glidden	Mavis & Jason Briggs	290 Skyway Trailer Park-Lot #6	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1705	3174	0.23	#144A	Goff	Brian	16 Presque Isle Street	Fort Fairfield	ME	04742	T17R5 - SPEC Tract
G1705	3149	0.23	#165A	Grass	Andrew & Brittany	279 Millitary Rd	Blaine	ME	04750	T17R5 - SPEC Tract
G1705	1648	0.37	#40 & Add'l lot	Graves	Michael O. & Susan M.	PO Box 1027, 90 Centerline Road	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1705	3103	0.23	#118A	Green	Laurel R.	93 Pine St.	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1705	3729	0.23	#119A	Green	Laurel R.	93 Pine St.	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1705	2246	1.03	#103A & 104	Griffeth	Robert L & Lona M	PO Box 149	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	4895	0.33	#99	Griffiths	Matthew & Diane	85 Goudy Street	S Portland	ME	04106	T17R5 - SPEC Tract
G1703	3394	0.23	#23A	Grivois	James & Gaetane/Don & Dan Grivois/Tammy Cyr	150 Champlain Street Box 3A	Van Buren	ME	04785	T17R3 - N/2
C1605	2042	0.69	#3	Grondin	Kenneth & Carolyn	39 Belanger Ave	Windham	ME	04062	T16R5
L1705	2800	0.23	#47A	Guerette	Roderick	215 Grines Rd	Caribou	ME	04736	T17R5 - Dickey Tract
L1705	1628	0.51	#---	Guerette	James P. & Mark T.	3599 Caribou Riad	Sinclair	ME	04779	T17R5 - Dickey Tract
G1705	3202	0.23	#171A	Haines	Paul	52 Streamside Paul Lande	Bangor	ME	04736	T17R5 - SPEC Tract
G1705	3168	0.38	#153A & Add'l lot	Hale	Terrance L.	50 Dupont Drive	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1705	1809	0.23	#60	Hamilton	Christopher	35 Shady Lane	Cross Lake Twp	ME	04779	T17R5 - SPEC Tract
G1703	2385	0.28	#49	Hand	Dr. Paul & Georgette	1429 Miranda Lane	Warminster	PA	18974	T17R3 - N/2
G1705	3082	0.23	#129	Harmon	Colleen/Judson Drake	678 Fort Fairfield Rd	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	2008	0.40	#43 & Add'l lot	Harvey	Jeffrey	7 Connection Lane	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3072	0.23	#102A	Haskell	Rebecca & Dana	44 Westwind Dr.	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	3090	0.23	#101A	Haskell	Rebecca & Dana	44 Westwind Dr.	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	3108	0.36	#131A & #131B	Heald	David & Troy	PO Box 254	Washburn	ME	04786	T17R5 - SPEC Tract
G1703	2360	0.28	#10	Hebert	John H.	PO Box 157	Van Buren	ME	04785	T17R3 - N/2
G1703	2361	0.28	#11	Hebert	John H.	PO Box 157	Van Buren	ME	04785	T17R3 - N/2
G1705	3147	0.23	#160A	Helstrom	James	8 Country Rd	Caribou	ME	04736	T17R5 - SPEC Tract
L1705	1624	0.23	#9C	Hill	Ricky D.	28 Getchell Lane	Litchfield	ME	04350	T17R5 - Dickey Tract
G1705	1878	0.19	#70	Hill	Thomas M. Jr. & Rinette	PO Box 6	Sinclair	ME	04779	T17R5 - SPEC Tract
G1703	2353	0.39	#2 & #2B	Hixon	Kenneth A. & Kelli J	1201 Westmanland Rd	Westmanland	ME	04783	T17R3 - N/2
L1705	2508	0.44	#4A & 1/2 #5A	Holmquist	Harvard A. & Madeleine	166 Sweden Street Apt 20	Caribou	ME	04736	T17R5 - Dickey Tract
G1705	3241	0.60	184A #57A & 184S	Holmquist	John & Robin	18 Pilgram Road	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	1812	0.18	#42	Hopkinson	Betty N	4590 Brookhill Dr	Manlius	NY	13104	T17R5 - SPEC Tract
G1703	2377	0.28	#27	Hunsader	Lt.Col.Thomas & Jacqueline D.	1 Bayberry Drive	Amherst	NH	03031	T17R3 - N/2
L1705	2923	0.45	# 97 & Add'l lot	Jalbert	Jesse & Jessica	183 Cyr Rd	Cross Lake Twp	ME	04779	T17R5 - Dickey Tract
G1705	2778	0.57	#---	Jalbert	Daniel & Bonnie	3137 Caribou Road	Cross Lake Twp	ME	04779	T17R5 - SPEC Tract
G1705	3248	0.46	#185A & 185 & Add'l lot	Jalbert	Anthony J	368 West Side Rd.	Sinclair	ME	04779	T17R5 - SPEC Tract
G1705	3167	0.23	#143A	Jalbert	Paul & Cynthia	368 West Side Rd.	Sinclair	ME	04779	T17R5 - SPEC Tract
G1703	2724	0.23	#52	Jandreau	Rod & Amy and Chanel Michaud	11 Dennett Hill Road	Mapleton	ME	04757	T17R3 - N/2
G1705	4888	0.46	#74	Jandreau	Lincoln & Betty	122 Aroostook Rd	Wallagrass	ME	04781	T17R5 - SPEC Tract
G1703	2382	0.28	#39	Jenkins	Brian	PO Box 13	New Sweden	ME	04762	T17R3 - N/2
G1703	3130	0.48	#74	Johnson	Erik & Denise	180 E Cove Rd	Van Buren	ME	04785	T17R3 - N/2
G1705	2813	0.53	#58 & #58A	Jordan	Dalton & Eileen	36 Duck Cove Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
L1705	2769	0.18	#50A	Joy	Walter	26 N. Charlame Ct.	Boston	MA	02119	T17R5 - Dickey Tract
L1705	2647	0.14	#85	Keaton	Hubert & Marlene	32 Lombard Rd	Caribou	ME	04736	T17R5 - Dickey Tract
G1703	3045	0.21	#33A	Kelley	Peggy H	210 Washburn Road	Washburn	ME	04786	T17R3 - N/2
G1703	3398	0.44	#34A #34B	Kelley	Peggy H	210 Washburn Road	Washburn	ME	04786	T17R3 - N/2
G1703	3399	0.23	#35A	Kelley	Peggy H	210 Washburn Road	Washburn	ME	04786	T17R3 - N/2
L1705	3898	0.23	#52A	Kelley	Curtis N.	83 Cyr Road	Cross Lake	ME	04779	T17R5 - Dickey Tract
G1705	4886		#72	Kenney and April L. Kenney	Stephen B.	1691 State Road	Mapleton	ME	04757	T17R5 - SPEC Tract
G1705	2294	0.69	#53A & 53S	Kiesow	Louise D.	PO Box 186	St Agatha	ME	04772	T17R5 - SPEC Tract
L1705	1786	0.49	#12 & #12A	Killarney	Marie	9 Sunset Lane	Cross Lake	ME	04779	T17R5 - Dickey Tract
C1605	2197	1.50		Kinney	Robert G.	164 Houlton Rd.	Presque Isle	ME	04769	T16R4
G1705	1808	0.17	#46	LaFlamme	David	PO Box 126	Caribou	ME	04736	T17R5 - SPEC Tract

TRACT	LIC #	ACRES	LOT#/ADD'L	LAST	FIRST	ADDRESS	CITY	ST	ZIP	TOWNSHIP RANGE
G1703	3141	0.69	#109 & Add'l lot	Laforge	Sylvie	25 Camp Rd	Drummond, NB	CAN	E3Y 3X9	T17R3 - N/2
G1703	2799	0.55	#68+68A	LaForge	Donna or Guy McCluskey	73 Deschene Street	Grand Falls, NB	CAN	E3Y 1 B8	T17R3 - N/2
G1703	3809	0.23	#11A	Lafrance	Rino & Lynda	107 Long St	Grand Falls, NB	CAN	E3Z 1B3	T17R3 - N/2
G1703	3983	0.23	#50A	Lajoie	Michael and Ann-Marie	395 Caribou Road	Cyr Plantation	ME	04785	T17R3 - N/2
G1703	2726	0.55	#65 & 65S	Lajoie	Phillip & Susan	375 Caribou Rd	Cyr Plantation	ME	04785	T17R3 - N/2
L1705	2602	0.21	#40A	Lambert	Tim & Jon	13 Gagnon Rd	Cross Lake	ME	04779	T17R5 - Dickey Tract
G1705	1730	0.29	#57 & #69	Lancaster	Juanita D.	40 Dewberry Dr	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1703	2364	0.28	#14	Landry	Rejean & Nicole	682 Second Ave.	Grand Falls, NB	CAN	E3Z 1A3	T17R3 - N/2
G1703	2711	0.28	#51	Lapierre	Steve R.	391 Hamlin Road	Hamlin	ME	04785	T17R3 - N/2
G1703	2733	0.21	#59	Lapierre	Tyler & Kylie	233 Lake Rd	Van Buren	ME	04785	T17R3 - N/2
G1703	2734	0.34	#60 & 60A	LaPlante	Brian	16 Longfellow Drive	Newburyport	MA	01950	T17R3 - N/2
G1703	3131	0.98	#89 & #89S	Laplante	Bill & Donna Gagnon	PO Box 273	Van Buren	ME	04785	T17R3 - N/2
G1703	3393	0.23	#22A	Laplante	Louis	193 Lake Rd	Van Buren	ME	04785	T17R3 - N/2
G1703	3139	0.23	#106	Laplante	Richard & Lucille	286 State Sttreet	Van Buren	ME	04785	T17R3 - N/2
G1703	2384	0.51	#47	Laplante	Cory & Monica	86 Sprague Road	Presque Isle	Me	04769	T17R3 - N/2
G1705	1893	0.46	#82 & 83	Leeman	Katarina K.	13 Ducas Avenue	Nashua	NH	03063	T17R5 - SPEC Tract
G1703	2375	0.82	#25 & #25S	Futch	Lee & Diane	221 Whitman Road	Arcadia	LA	71001	T17R3 - N/2
G1703	2848	0.23	#73	Levaseur	Peter & Leah	107 Castonguay Road	Van Buren	ME	04785	T17R3 - N/2
G1703	3135	0.23	#101	Levasseur	John & Linda	5802 E Carnifax Ferry Rd	Fredericksburg	VA	22407	T17R3 - N/2
G1703	2933	1.02	#77 & 78 & Add'l	Levine	Elizabeth	122 Thorndike Street	Arlington	MA	02176	T17R3 - N/2
G1705	1560	0.23	#33	Libby	Rose G. & Paul A.	PO Box 516	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1705	1540	0.44	#41 & Add'l lot	Llewellyn	Matthew & Tammy	PO Box 62261	Virginia Beach	VA	23466	T17R5 - SPEC Tract
L1705	2443	0.69	#6A + 1/2 5A	Lynch	Eugene A.	7 Ward St	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1703	3392	0.40	#10A & Add'l lot	Madore	Peter	173 Violette ST	Van Buren	ME	04785	T17R3 - N/2
G1703	2379	0.51	#35 & #35A	Madore	Rodney & Vanda	144 Fulton St.	Van Buren	ME	04785	T17R3 - N/2
G1705	1561	0.33	#32 & Add'l lot	Madore-State of maine took over	Madore Family Revocable Trust, Brenda Johnson, Trustee	13 Lyons St	Rochester	NH	03867	T17R5 - SPEC Tract
G1705	3078	0.23	#124	Mahoney	Graydon M.	PO Box 38	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	3062			Maine, State of	Dept. of Conservation	Bureau of Forestry	Augusta	ME	04330	T20R11 & 12 - Wildcat
G1703	2380		#37 & 37S	Marquis	James E. $ Margaret Levasseur	PO Box 152	Van Buren	ME	04785	T17R3 - N/2
G1703	2531	0.46	#32 & Add'l lot	Marquis	Nathan & Elise	254 Marquis Rd	Van Buren	ME	04785	T17R3 - N/2
L1705	2529	0.41	#25A & 25B	Marshall	Winston Jr. & Gwendolyn	317 Cyr Road	Sinclair	ME	04779	T17R5 - Dickey Tract
G1705	1731	0.18	#45	Martin	James P. & Eulalia Mae	30 Harvest Rd.	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	1817	0.18	#47	Martin	James P. & Eulalia Mae	30 Harvest Rd.	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	3265	0.23	#174A	Masse	Olida M.	181 Perry St.	Unionville	CT	06085	T17R5 - SPEC Tract
C1605	1593	0.69	#28	Maynard	Donald & Julee	PO Box 1	Presque Isle	ME	04769	T16R5
L1705	2921	0.23	#95	McBreairty	Cathie J.	898 Sweden Rd.	Caribou	ME	04736	T17R5 - Dickey Tract
G1705	2626	0.34	#25	McBreairty	Donald & Dorthy	1393 St John Road	St John Plt	ME	04743	T17R5 - SPEC Tract
G1705	1912	0.54	#84 & #84A	McCrum	Galen & Becky	424 Ridgemoor Pass	Canton	GA	30115	T17R5 - SPEC Tract
G1705	3081	0.23	#128	McCubrey	Duane & Melinda Hahn	PO Box 568	Caribou	ME	04736	T17R5 - SPEC Tract
G1703	2373	0.55	#23 & #24	McGillan	Janet	5 McGillan Drive	Fort Fairfield	ME	04742	T17R3 - N/2
G1705	1558	0.23	#30	McGillan	Fred & Shane	5 McGillan Drive	Fort Fairfield	ME	04742	T17R5 - SPEC Tract
G1705	3153	0.23	#159A	McGlauflin	Carl & F. Catherine (& Carlene Kilby)	11 Barton St.	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1705	3203	0.23	#175A	McGlinn	Andrew	57 Ginn Rd	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1703	2365	0.28	#15	McGreal	Gloria G. & James F. Delia Sainteross	100 Starbird Rd.	Portland	ME	04102	T17R3 - N/2
L1705	1629	0.23	#13	McLellan	Connie	5 Sunset Lane	Cross Lake	ME	04779	T17R5 - Dickey Tract
L1705	2629	0.21	#35A	McNally	Joseph & Duska	1966 McKee Ave.	Deptford	NJ	08096	T17R5 - Dickey Tract
G1703	2362	0.28	#12	Michaud	Emily M.C.	54 Morningside Dr. Apt.32	New York	NY	10025	T17R3 - N/2
G1703	3481	0.80	#13A & #13S & 13G	Michaud	Karla & Lyn	31 Main Street	Van Buren	ME	04785	T17R3 - N/2
G1703	2367	0.28	#17	Michaud	Ronald S.	273 Main St.	Van Buren	ME	04785	T17R3 - N/2
L1705	3364	0.21	#9A	Michaud	Heather	21 Mitchel Rd	Caribou	ME	04736	T17R5 - Dickey Tract
L1705	2526	0.37	#17A & #17AA	Michaud	Douglas & Elaine, Hope Skidgel	41 Garden Circle	Caribou	ME	04736	T17R5 - Dickey Tract
L1705	1942	0.23	#2A	Michaud	Gene & Carolyn	73 Hardy Street	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1705	1906	0.37	#61 & #61A	Michaud	Jean Pierre	35 Harvest Rd	Caribou	ME	04736	T17R5 - SPEC Tract
L1705	1756	0.23	#8	Mills	Hylyn M. and Nancy	9508 East Riggs Rd Unit C305	Sun Lakes	AZ	85248 -7565	T17R5 - Dickey Tract
L1705	2560	0.25	#22A	Mockler	James R. & Christine M.	11 Caroline Ave.	Caribou	ME	04736	T17R5 - Dickey Tract
G1705	3101	0.23	#138A	Mockler	David & Roxann	26 Pioneer Ave	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	3096	0.23	#130A	Mockler	Stephen J & Beth Q	66 Turner Rd	Townsend	MA	01469	T17R5 - SPEC Tract
C1605	1576	0.69	#13	Moir	Jason R & Krsitie A	29 Morse Rd	Woodland	ME	04736	T16R5
G1705	3099	0.23	#135A	Moreau (& Dwight Helstrom)	Suzanne	94 Hanson Lake Rd.	Mapleton	ME	04757	T17R5 - SPEC Tract
C1605	1030	0.69	#8	Morin	Timothy & Joan	PO Box 34, Heath Road	Whitefield	ME	04353	T16R5
G1705	2679	0.46	#108 & 108A	Morin	Paul & Ann	1066 Albair Rd	Caribou	ME	04736	T17R5 - SPEC Tract
G1703	2948	0.23	#93	Morrow	David A. & Bobbie	9 Skyview Drive	Presque Isle	ME	04769	T17R3 - N/2
G1703	2383	0.28	#40	Morrow	Leigh	PO Box 433	Washburn	ME	04786	T17R3 - N/2
G1703	3132	0.46	#98 & 98S	Morrow, Nancy M	Russo, Martha D	104 Adams St Apt 201	Van Buren	ME	04785	T17R3 - N/2
G1705	3083	0.23	#137A	Mucci	Virginia, Leanard, John, Cynthia Greene, Kathy Meehan	3741 Dunbar Rd	Venice	FL	34293	T17R5 - SPEC Tract
L1705	2671	0.19	#30A	Murphy	John D	PO Box 14	Fort Kent	ME	04743	T17R5 - Dickey Tract
L1705	2675	0.34	#31A	Murphy	John D. & Terry L.	P.O. Box 14	Fort Kent	ME	04743	T17R5 - Dickey Tract
G1703	3407	0.23	#47 A	Nadeau	Clarence Jr. & Jo Ann	28 Albair Road	Caribou	ME	04736	T17R3 - N/2
G1705	3201	0.23	#170A	Nichols	Wayne & Deborah	482 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3224	0.23	#169A	Nichols	Wayne & Deborah	482 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract

TRACT	LIC #	ACRES	LOT#/ADD'L	LAST	FIRST	ADDRESS	CITY	ST	ZIP	TOWNSHIP RANGE
G1705	3169	0.23	#162A	Norsworthy	Randolph D. & Robin	72 Lombard Street	Presque Isle	ME	04769	T17R5 - SPEC Tract
C1605	2119	0.69	#34	Nunes	Richard & Sandra	5 Shady Dr	Fairhaven	MA	02719	T16R5
G1703	2544	0.28	#56	Oliver	E Jean	PO Box 21	Levant	ME	04456	T17R3 - N/2
C1605	1541	0.69	#1	Olmstead	Kirt & Cheryl	349 Center Street	Wolcott	CT	06716	T16R5
G1705	4261	0.36	#217A & #218A	Olmstead	Cheryl Sue	741 E. Presque Isle Rd	Caribou	ME	04736	T17R5 - SPEC Tract
C1605	4320		#20	Ouellette	Hubert	594 Main St	Caribou	ME	04736	T16R5
G1703	2369	0.28	#19	Ouellette	Peter & Megan	200 Champlain Street	Van Buren	ME	04785	T17R3-
G1703	2356	0.28	#6	Ouellette	Spenser	PO Box 296	Caribou	ME	04736	T17R3 - N/2
G1703	2962	0.37	#80 & #80A	Ouellette	Denis & Velma	PO Box 7845	Grand Falls, NB	CAN	E3Z 3E8	T17R3 - N/2
G1703	2510	0.61	#42 & 42A	Ouellette	Donald & Rita (Ouellette Family Living Trust)	10 Victoria Way	Hampden	ME	04444	T17R3 - N/2
G1703	3949	0.23	#9A	Ouellette	Donald & Rita (Ouellette Family Living Trust)	10 Victoria Way	Hampden	ME	04444	T17R3 - N/2
G1703	3589	0.46	#29A & 28A	Ouellette	Michael & Rachel	PO Box 91	Van Buren	ME	04785	T17R3 - N/2
G1703	2786	0.44	#58 & 58B	Ouellette	Rudy & Nancy	PO Box 195	Van Buren	ME	04785	T17R3 - N/2
G1703	2376	0.31	#26	Ouellette	Donald & Lea	PO Box 82	Van Buren	ME	04785	T17R3 - N/2
G1705	3190	0.23	#152A	Ouellette	Timothy M	17 New Canada Rd	New Canada	ME	04743	T17R5 - SPEC Tract
G1705	1712	0.17	#44	Page (and Maryilyn Thompson)	David	17 Mill Road	Limestone	ME	04750	T17R5 - SPEC Tract
G1703	3142	0.38	#111 & 111S	Paradis	James	PO Box 1045	Jackson	SC	29831	T17R3 - N/2
G1703	3143	0.23	#110	Paradis	James	PO Box 1045	Jackson	SC	29831	T17R3 - N/2
G1705	3159	0.69	#133A	Paradis	Bernard & Nancy	388 West Side Rd	Sinclair	ME	04779	T17R5 - SPEC Tract
G1705	3122	0.46	#148A & #148AA	Paradis	Bernard & Nancy	388 West Side Rd	Sinclair	ME	04779	T17R5 - SPEC Tract
G1703	3417	0.33	#30A & 30B	Parent	Rudolph & Dinah Living Trust	1151 Hamlin Rd	Hamlin	ME	04785	T17R3 - N/2
G1703	2461	0.56	#33 & 33A	Parent	Donald & Kathy	PO Box 234	Van Buren	ME	04785	T17R3 - N/2
G1705	3093	0.18	#108A	Parent	Ronald & Barbara	325 Flander St	Southington	CT	06489	T17R5 - SPEC Tract
G1705	3170	0.40	#163A + 163B	Parker	Sherri, Nicole Farley, Lori Albair	113 Colby Siding Rd	Woodland	ME	04736	T17R5 - SPEC Tract
L1705	2674	0.51	#34A #34AA	Parr	Phillip & Danna	128 Torrington Ave	Canton	CT	06019	T17R5 - Dickey Tract
L1705	2506	0.18	#10A	Pelkey	Rodney & Carol	638 Access Highway	Caribou	ME	04736	T17R5 - Dickey Tract
G1703	2884	0.56	#76 & #76A	Pelletier	John & Noreen	199 Main Street	Van Buren	ME	04785	T17R3 - N/2
L1705	2646		#20A	Pelletier	Kevin	46 Klein Road	Fort Kent	ME	04743	T17R5 - Dickey Tract
G1705	1539		#---	Pelletier	Raynold & Rolande	3141 Caribou Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3189	0.23	#150A	Pelletier	Richard & Leeta	605 Frenchville Road	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1705	2708	0.23	#114	Pelletier	Ronald	PO Box 1411	Presque Isle	ME	04769	T17R5 - SPEC Tract
G1705	4892	0.58	#98 & 98B	Penninger	Jarvis & Erika	5620 Georgia Okeeffe Rd	Las Cruces	NM	88011	T17R5 - SPEC Tract
G1705	3095	0.46	#114A #113A	Penta	Laura & Bryan Carpenter	99 Bartlett St	Portland	CT	06480	T17R5 - SPEC Tract
G1705	3079	0.23	#125A	Peterson	Frederic & Christine	121 Chapel St.	Holden	MA	01520	T17R5 - SPEC Tract
G1705	4890	0.23	#97	Philbrick	E. James c/o Janet Chandler	PO Box 657	Lincoln	ME	04457	T17R5 - SPEC Tract
L1705	3363	0.16	#8A	Phillips	Albertine - Gayle Baber as Trustee of the Albertine T Phillips Revocable Trust	29 Silver Ridge	Veazie	ME	04401	T17R5 - Dickey Tract
C1605	1500	0.69	#35	Plourde	Michael & Nadeen M.	103 Lynn Drive	Caribou	ME	04736	T16R5
L1705	2925	0.69	#86 & Add'l lot	Plourde	Richard & Deborah	32 Sullivan Dr Suite 1	Caribou	ME	04736	T17R5 - Dickey Tract
G1705	3120	0.23	#145A	Plourde	Jessica	57 Spruce Ridge Road	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	3236	0.46	#182A & 182S	Plourde	Jay and Natasha	522 West Side Rd	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3227	0.75	#180A & 181A & 180-B	Plourde	Jay	522 West Side Rd	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1703	2949	0.21	#97	Poitras	Clermont	Box 212	Van Buren	ME	04785	T17R3 - N/2
G1705	2614	0.25	#73	Prashaw	Wendy & Travis	164 McIntyre Road	Woodland	ME	04736	T17R5 - SPEC Tract
G1705	2247	0.34	#103B	Prescott	Peter	91 Pleasant Street	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1705	1831	0.43	#49 & 49A	Prescott	Kenneth & Lisa	398 Houlton Road	Fort Fairfield	ME	04742	T17R5 - SPEC Tract
L1705	2919	0.23	#93	Pryor	Wayne & Jane	66 Williams Road	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1705	1759		#1 & #2	Raymond	Kate	3089 Caribou Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1703	2715	0.23	#53	Reynolds	Jay and Karen	51 High Street	Fort Fairfield	ME	04742	T17R3 - N/2
G1705	3264	0.23	#173A	Richards	Dennis	1351 Albair Rd.	Caribou	ME	04736	T17R5 - SPEC Tract
G1705	2061	0.45	#101 & #101A	Robbins	Richard and Karen	3107 Caribou Road	Sinclair	ME	04779	T17R5 - SPEC Tract
C1605	2186	0.69	#4	Roberts	Douglas & Cheryl	PO Box 72	Sinclair	ME	04779	T16R5
G1705	3066	0.38	#117A & #117S	Robertson	Sherry	7 Shoreline Dr	Sinclair	ME	04779	T17R5 - SPEC Tract
G1705	3075	0.23	#115A	Roderick	Gary B.	75 High St.	So. Windsor	CT	06074	T17R5 - SPEC Tract
G1703	2386	0.68	#36 & #36S	Rossignol	Mark J. & Colleen	410 New Sweden Rd.	New Sweden	ME	04762	T17R3 - N/2
L1705	2561	0.20	#24A	San Antonio	Albert & Sandra	72 Chasse Road	St. Agatha	ME	04772	T17R5 - Dickey Tract
G1705	4887	0.49	#75 & #75S	SARA, LLC		85 Griffin Ave.	Hampden	ME	04444	T17R5 - SPEC Tract
G1705	3225	0.23	#177A	Saucier	James	8 Richards Road	Caribou	ME	04736	T17R5 - SPEC Tract
G1703	3401	0.42	#37A+ 37S	Saucier Irrevocable Trust	Joyce/Dedra Lizotte/POA	132 Lincoln Street	Van Buren	ME	04785	T17R3 - N/2
L1705	2920	0.22	#94	Savoy	Mark & Lisa	1574 State St	Mapleton	ME	04757	T17R5 - Dickey Tract
L1705	2955	0.22	#98	Sawyer	John & Marguerite	33 Teller Steet	Marlborough	MA	01752	T17R5 - Dickey Tract
G1703	2963		#86 & 86S	Scott	David & Debra Reynold	129 G Street	Salt Lake City	UT	84103	T17R3 - N/2
L1705	3088	0.18	#43A	Segerson	Thomas & Marcia	75 Dawes Rd.	Dover-Foxcroft	ME	04426	T17R5 - Dickey Tract
G1703	2589	0.21	#57	Selle	Hobart F. & Judith G.	289 Cliff Street	St. Johnsbury	VT	05819	T17R3 - N/2
L1705	2915	0.46	#89 & 90A	Seymour	Robert & Louella	4061 Lupine Pass	Lake Wales	FL	33898	T17R5 - Dickey Tract
G1703	2947	0.23	#91	Sirois	Kenneth & Michael	41 Higgins Rd	Presque Isle	ME	04769	T17R3 - N/2
G1703	2355	0.25	#5	Sirois	Kenneth	PO Box 214	Van Buren	ME	04785	T17R3 - N/2
G1705	3151	0.51	#112A & 112S	Sirois	Laurie A.	9 Hillside St	Presque Isle	ME	04769	T17R5 - SPEC Tract
C1605	1600	0.69	#15	Smith	Barbara A.	P.O. Box 1225	Caribou	ME	04736	T16R5
L1705	3089	0.38	#88 & #88A	Smith	Steven & Kimberly	147 Cyr Rd	Sinclair	ME	04779	T17R5 - Dickey Tract
L1705	2917	0.23	#91	Soucy	Erin & Mark	PO Box 42	Fort Kent Mills	ME	04744	T17R5 - Dickey Tract
C1605	0990		#3	Sportmen Inc.	c/o Thomas Devoe	322. Main Street	Limestone	ME	04750	T16R5
G1705	1837	0.30	#52 & 71B	St Peter	Larry & Bonnie Joler	31 Durgin Rd	Cross Lake	ME	04779	T17R5 - SPEC Tract
L1705	1785	0.28	#1 & Add'l lot	St. Peter	Cheryl	203 Cyr Road	Cross Lake	ME	04779	T17R5 - Dickey Tract

TRACT	LIC #	ACRES	LOT#/ADD'L	LAST	FIRST	ADDRESS	CITY	ST	ZIP	TOWNSHIP RANGE
L1705	1981	0.55	#---	St. Peter	Cheryl	203 Cyr Road	Cross Lake	ME	04779	T17R5 - Dickey Tract
G1705	3251	0.23	#167A	St. Peter	Patrick	468 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	3199	0.57	#166A & #166S	St. Peter	Patrick & Claire	468 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	2745	0.23	#113	St. Pierre	Lisa M.	1423 Van Buren Road	Caswell	ME	04750	T17R5 - SPEC Tract
L1705	1626	0.42	#113	St.Peter	Andrew & Roselyn	464 Route 49	Westfield	PA	16950	T17R5 - Dickey Tract
G1705	2814	0.23	#59	Stevens	Thomas & Claudia	804 State Rd	Mapleton	ME	04757	T17R5 - SPEC Tract
G1705	3097	0.23	#132A	Stevens	Thomas R.	804 State Rd	Mapleton	ME	04757	T17R5 - SPEC Tract
G1705	4889	0.23	#96	Sutherland	Jane (Soucia)	14 Washington St.	Caribou	ME	04736	T17R5 - SPEC Tract
G1703	3409	0.34	#58- 1/2 57	Sweeney	Robert	1301 Alfred Rd	Lyman	ME	04002	T17R3 - N/2
G1703	2371	0.28	#21	Tardif	Stephen, Laurie, Thomas, Julie DiPierro	9 Clearview Dr	Scarborough	ME	04074	T17R3 - N/2
C1605	2248	0.69	#7	Thatcher	Wayne A.	9 Algonquin Drive	So. Darthmouth	MA	02748	T16R5
L1705	2630	0.18	#26	Thebarge	John D and Ryan	422 West Old Town Road	Old Town	ME	04468	T17R5 - Dickey Tract
G1705	3158	0.23	#106	Theriault	Jason & Christina	227 North Caribou Road	Fort Fairfield	ME	04742	T17R5 - SPEC Tract
G1703	2702	0.60	#45 & add'l lot	Theriault	Sylvio	62 Wilson Cres	Grand Falls, NB	CAN	E3Y 1G3	T17R3 - N/2
G1703	4708	0.34	#17a & #18A	Theriault	Reynold A. & Jeanne M.	PO Box 314	Van Buren	ME	04785	T17R3 - N/2
G1705	3076	0.23	#116	Theriault	Gervais	15 Shoreline Dr	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	1729	0.36	#54 & Add'l lot	Theriault	Carl & Patricia	183 Third Ave	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1705	2611			Theriault	Duane	100 Daigle Cross Rd	St. Agatha	ME	04772	T17R5 - SPEC Tract
G1703	3217	0.23	#81	Theriault	Bertrand and Ella Pelletier	35 Violette Road	DSL Drummond, NB	CAN	E3Y 2R4	T17R3 - N/2
C1605	1585	0.69	#30	Thibault	Gary	PO Box 73	Portage Lake	ME	04768	T16R5
G1703	2359	0.23	#9	Thibodeau	Frank H. & Rebecca R.	187 Reach Road	Presque Isle	ME	04769	T17R3 - N/2
G1705	3092	0.23	#107A	Thibodeau	Fernand	852 Caribou Road	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1705	1657	0.62	#53 * Add'l lot	Thibodeau	James A.	PO Box 204	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1705	1728	0.70	#55 & Add'l lot	Thibodeau	James A.	PO Box 204	Fort Kent	ME	04743	T17R5 - SPEC Tract
G1703	3411	0.46	#60A & Add'l lot	Thivierge	Gary	PO Box 472	Van Buren	ME	04785	T17R3 - N/2
L1705	2525	0.23	#16A	Thomas	Frederick A.	PO Box 450	Washburn	ME	04786	T17R5 - Dickey Tract
G1705	3117	0.41	#110A + 110B	Tibbetts	Lorraine	12024 Venice Blvd	Foley	AL	36535	T17R5 - SPEC Tract
G1703	2935	0.46	#96 & 96S	Toner	Gerald & Yvette	PO Box 7987	Grand Falls, NB	CAN	E3Z 3E9	T17R3 - N/2
G1703	2750	0.48	#72 & Add'l	Toner	Teddy & Madeleine	590 Chapel Street West	Grand Falls, NB	CAN	E3Z 2M8	T17R3 - N/2
G1703	4935		#---	Town of Van Buren		51 Main St	Van Buren	ME	04785	T17R3 - N/2
L1705	2572	0.25	#3	Trask	Norman & Ellen	PO Box 264	Easton	ME	04740	T17R5 - Dickey Tract
G1703	3140	0.57	#108 + 108B	Tremblay	Bertin, Sylvie, & Luc	26 Dube St	Grand Falls, NB	CAN	E3Y 1E6	T17R3 - N/2
G1705	2266	0.23	#74	Tweed	John W. & Gail	861 Blake Road	Limestone	ME	04750	T17R5 - SPEC Tract
G1705	3146	0.23	#142A	Tweed	Timothy	861 Blake Road	Limestone	ME	04750	T17R5 - SPEC Tract
G1705	2081	0.23	#51	Tweed	Tyler J. & Rhonda A.	64 Elinor Lane	Wells	ME	04090	T17R5 - SPEC Tract
G1703	3645	0.31	#52A & Add'l lot	Vaillancourt	Gary J.	PO Box 10	Van Buren	ME	04785	T17R3 - N/2
G1703	2749	0.64	#64 & 64B	Vaillancourt	Kristen	135 Monroe St	Van Buren	ME	04785	T17R3 - N/2
L1705	2600	0.46	#38A & Add'l lot	Vandrilla	Philip & Richard	PO Box 123	Cross Lake Twp	ME	04779	T17R5 - Dickey Tract
G1703	4247	0.23	#20A	Vincent	Paul & Jacqueline	59 Adams Road	Connor Township	ME	04736	T17R3 - N/2
G1703	2357	0.51	#7 & 7A	Violette	Richard	PO BOX 76	Van Buren	ME	04428	T17R3 - N/2
G1703	3419	0.21	#44A	Violette	Rodney	6970 Wedgewood Way	Las Vegas	NV	89117	T17R3 - N/2
G1703	2368	0.28	#18	Violette	Ann Marie & Daniel Violette	145 State Street	Van Buren	ME	04785	T17R3 - N/2
G1705	3160	0.46	#156A & 157A	Voisine	Philip & Linda	418 West Side Rd	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1703	2613	0.28	#46	Voyer	Gerard & Denise	98 Deschenes St	Grand Falls, NB	CAN	E3Y 1B8	T17R3 - N/2
G1705	2264	0.46	#105 & Add'l lot	Ward	Darrell	6 Ayer Ridge Rd	Freedom	ME	04941	T17R5 - SPEC Tract
C1605	1482	0.69	#31	Warren	Jeffrey	8 Warren Drive	Dedham	ME	04429	T16R5
G1705	3150	0.37	#109 & #109S	Watson	Sandra & James	45 Shoreline Dr	Cross Lake	ME	04779	T17R5 - SPEC Tract
G1705	2810	0.57	#21 & #21S	Watt	Albert & LouAnn	58 Duck Cove	Sinclair	ME	04779	T17R5 - SPEC Tract
G1705	3390	0.46	#176A & #176B	Welch-Shaw	Lorraine	12152 Venice Blvd	Foley	Al	36535	T17R5 - SPEC Tract
L1705	2522	0.34	#13A & 12 S1/2	Whitaker	Jennifer	46 Third Ave	Presque Isle	ME	04769	T17R5 - Dickey Tract
G1705	3171	0.23	#120A	White	Kenneth & Susan	956 Mapleton Rd.	Mapleton	ME	04757	T17R5 - SPEC Tract
G1705	3200	0.46	#168 & Add'l lot	Willey	Barrett	476 West Side Road	Cross Lake	ME	04779	T17R5 - SPEC Tract
C1605	1258	0.69	#18	Wilson	George B.	479 Hudson Hill Road	Hudson	ME	04449	T16R5
G1705	2471	0.34	#26	Wyman	John and Janet Wyman-Spinney	1 Lakeshore Dr	Stockholm	ME	04783	T17R5 - SPEC Tract

RESOURCE MANAGEMENT PLAN OF THE FISH RIVER CHAIN OF LAKES CONSERVATION EASEMENT

This Resource Management Plan (the "Management Plan"), dated as of ●, 2016, developed by **Maine Woodlands Realty Company, Allagash Timberlands LP and Aroostook Timberlands LLC**, each with a place of business in Bangor, Maine (hereinafter referred to collectively as the "Landowner", which is intended to include, unless the context clearly indicates otherwise, the above named and their successors and/or permitted assigns) pursuant to Section 3.2(b) of that certain conservation easement known as the Fish River Chain of Lakes Conservation Easement, as the same may be amended from time to time, granted by Grantor to the Forest Society of Maine (the "Holder") on ●, 201● (the "Conservation Easement"), wherein Landowner reserves the right to conduct Forest Management Activities on the Protected Property, as those terms are defined in the Conservation Easement, as applied to those portions of the Protected Property on which Landowner conducts Forest Management Activities

1. DEFINITIONS.

In this Management Plan, the following terms shall have the following meanings:

"Exemplary Natural Communities and Ecosystems" means plant communities identified and defined by MNAP as common types, with a State rarity rank of S4 and S5 (as defined in Appendix [●], attached hereto and incorporated herein), that are exemplary because of their size, condition and landscape context (element occurrence ranks of A or B).

"MDEP" means the Maine Department of Environmental Protection, or any successor state department, agency or bureau thereto that performs similar public functions.

"MDIFW" means the Maine Department of Inland Fisheries and Wildlife, or any successor state department, agency or bureau thereto that performs similar public functions.

"MNAP" means the Maine Natural Areas Program, a program of the Maine Department of Agriculture, Conservation and Forestry, or any successor state program thereto that performs similar public functions.

"MNAP Mapped Feature" means a point or polygon feature in the MNAP Biotics database depicting a known Rare, Threatened, or Endangered Plant, Rare Natural Community and ecosystem, or Exemplary Natural Community and Ecosystem that has been surveyed in the field or mapped at a sufficient scale to reasonably identify boundaries of the feature and does not include a buffer. Historic features are excluded from this definition.

"OBF" means Outcome-Based Forestry Standards and the standards, policies, programs, practices and agreements set forth therein, all as outlined in the Outcome-Based Forestry

Agreement #2015-1 entered into by Irving Woodlands LLC ("Irving") and the Maine Department Of Agriculture, Conservation and Forestry, Maine Forest Service, attached hereto as Appendix [●], as such agreement may be amended from time to time.

"Rare, Threatened, and Endangered Plants" means plant species that are listed as Endangered, Threatened, or of Special Concern with a State rarity rank of S1, S2 or S3 (as defined in Appendix [●]).

"Rare Natural Communities and Ecosystems" means plant communities identified and defined by MNAP as being rare, with a State rarity rank of S1, S2 or S3 (as defined in Appendix [●]).

Unless defined herein, terms used in this Management Plan that are defined in the Conservation Easement shall have the same meanings as set forth in the Conservation Easement.

2. PURPOSE AND GENERAL REQUIREMENTS.

2.1 Purpose.

(a) The purpose of this Management Plan is to guide Forest Management Activities so as to be in compliance with the terms and conditions of the Conservation Easement. The Management Plan shall both protect the Conservation Values of the Protected Property and allow its continued operation as a Commercial Working Forest.

(b) All Forest Management Activities, except management of non-commercial vegetation, which shall be governed by Section 3.2(b)(ii) of the Conservation Easement, timber cruising and resource evaluation [**NTD: What provision governs these activities?**], shall be conducted in accordance with this Management Plan. This Management Plan shall remain in effect any time during which Landowner conducts Forest Management Activities on the Protected Property.

(c) This Management Plan will be implemented in conjunction with Irving's larger scale management plan entitled "J.D. Irving Northern Maine Woodlands 2013 – 2037 Strategic Forest Management Plan," attached hereto as Appendix [●] and incorporated herein, and any successive such management plans. **[NTD: Is Section 2.1(c) necessary, and is Irving comfortable providing the larger scale management plan to FSM?]**

2.2 Standard. Grantor will conduct Forest Management Activities on the Protected Property in accordance with OBF and ensure that all Forest Management Activities are in accordance with Desired Outcomes as that term is defined in OBF, and as measured by the Criterion as set forth therein. In addition, Grantor shall conduct all Forest Management Activities in a manner consistent with accepted Best Practices around Forest Management Activities, attached hereto as Appendix [●] as the same may be amended from time to time, and

to undertake periodic ongoing training for employees and contractors, and their operators, on accepted Best Practices and standards required under OBF**.**

3. IMPLEMENTATION.

3.1 Unless otherwise specified herein, Grantor is hereby responsible for the compliance of Grantor's employees, agents, contractors, and designees with the standards, policies, programs, practices and agreements set forth in this Management Plan, when said parties are engaged in Forest Management Activities on the Protected Property and other actions covered by the requirements of this Management Plan in the capacity of employees, agents, contractors and designees for Grantor.

3.2 All Forest Management Activities occurring on the Protected Property shall be supervised by a licensed professional forester and conducted under written or digital work instructions with competent operators, which work instructions shall specify relevant requirements for compliance with the Conservation Easement and this Management Plan.

4. ADMINISTRATION, MONITORING, ENFORCEMENT, AMENDMENTS AND OTHER PROVISIONS.

4.1 **Information to Holder.** Landowner and the Holder will meet at least annually to review the information outlined below, to the extent applicable to Landowner's Forest Management Activities to be conducted on the Protected Property, which information Landowner will provide to Holder at or prior to the annual meeting, subject to the limitations set forth in Section 11 of the Conservation Easement:

(a) Trends in silvicultural investments, including, but not limited to precommercial thinning and competition control, and pesticide applications expected in the coming year;

(b) Estimates of harvest acreage summarized for the coming five-year period by silvicultural prescription, including overstory removal, commercial thinning, shelterwood, and clearcut, including proposed future roads;

(c) A specific annual harvesting plan that describes the planned acreage for harvest for the upcoming year and the approximate locations; and

(d) A copy of any audits undertaken under OBF and any Qualifying Forestry Certification Program audit completed during the preceding year.

4.2 **Monitoring and Enforcement.** Evaluation of Landowner's compliance with this Management Plan and the Conservation Easement, and Holder's rights to monitor and enforce the same, shall be as specified in the Conservation Easement, including but not limited to, the terms and conditions of Sections 3 and Sections 12 therein.

4.3 Amendment. The standards, policies, programs, practices and agreements set forth herein and other actions required in this Management Plan may require amending from time to time, based upon the results of audits, or other advances in knowledge and understandings. Landowner reserves the right to amend this Management Plan at any time, but at least once every five years, and not more frequently than annually. Landowner shall provide a copy of the amended plan, if any, to Holder at the annual meeting set forth in Section 4.1 above. Holder will keep an accurate copy of the current Management Plan in its files and will make the current Management Plan available to successors in interest to the Protected Property or any portion thereof.

4.4 Requirements to Comply with Laws and Regulations. Nothing in this Management Plan is intended to supersede, eliminate or otherwise change any obligation of the Grantor under the Conservation Easement or any applicable law, including but not limited to the obligation to obtain all required regulatory approvals for activities permitted under the terms of this Management Plan. Nothing in this Management Plan may be construed to permit an activity otherwise prohibited or restricted by state, local, or federal laws or regulations.

FISH RIVER CHAIN OF LAKES CONSERVATION EASEMENT – PROTECTED PROPERTY RULES AND REGULATIONS

Irving Woodlands LLC ("**Irving**"), as land manager for Aroostook Timberlands LLC (**"Landowner"**), hereby establishes the following rules and regulations (**"Protected Property Rules and Regulations")** pursuant to § 6.1 of the Fish River Chain of Lakes Conservation Easement, dated _____, and recorded in the Aroostook County Registry of Deeds in Book ____, Page ___ ("**FRCE**"). Capitalized terms not defined herein shall have the meaning set forth in the FRCE. The Protected Property Rules and Regulations govern public access to and use of the Public Property, as those rights are established in the FRCE. Users are encouraged to report violations of the Protected Property Rules and Regulations or vandalism of the Protected Property to Irving's Regional Forester at 207-837-5761. Entry upon and use of the Protected Property is at the user's own risk. Irving and the Landowners claim all of the rights and immunities against liability for injury to the general public to the fullest extent of the law under Title 14 M.R.S. § 159-A, under the Maine Tort Claims Act, Title 14 M.R.S. §§ 8101 et seq., and/or under any other applicable provision of law or equity.

1. ACCESS TO THE PROTECTED PROPERTY

Access to the Protected Property is by public roads and access routes open to the public only. Users of the Protected Property shall not trespass on non-Irving private property to access the Protected Property. Vehicular access to the Protected Property may be restricted or limited from time to time, in Irving's sole discretion, which restrictions and limitations may be enforced by gates, barricades, and earthen barriers, or signage. Said restrictions apply to gated routes and will be enforced along gated routes, even in the event of vandalism to the gate. Earthen barriers indicate closure to all motorized vehicles, except for snowmobiles between December 1 and April 1.

2. DAY USE

Day users are required to pack out all of their garbage and leave a clean area. Tree cutting or removal of vegetation of any kind is prohibited. Firewood cutting is by permit only. Permit holders must comply with all rules and regulations set forth in the permit. Except in designated Campsites or Remote Rental Cabins, overnight camping and open fires outside of designated fire pits or rings at the Campsites or Remote Rental Cabins on the Protected Property are not permitted. Open burning of any type is prohibited. Users of the property agree to act at all times in such a manner as to minimize the risk of fires on the Property. All unauthorized fires should be immediately reported to Irving at 506-632-7777 and will be handled in conjunction with the forest rangers of the Maine Bureau of Forestry (the "**Bureau**") and the State Supervisor of the forest protection unit of the Bureau. Commercial activity on the Protected Property is by permit only. To apply for permits, users should contact Irving's Regional Forester at 207-837-5761.

3. MOTORIZED RECREATIONAL USE PLAN

3.1 Snowmobiles and All Terrain Vehicles.

(a) Registered snowmobiles and registered all-terrain vehicles (**"ATVs"**) may be operated on the Protected Property solely on trails marked, managed, and maintained by clubs that have entered into written agreements with Irving for such use on the Protected Property. All riders are required to follow applicable laws and these Protected Property Rules and Regulations.

(b) Authorized ATV trails and authorized club-groomed snowmobile trails are identified in the Resource Information System and updated periodically as needed.

(c) Maintenance of authorized snowmobile and ATV trails and signage are the responsibility of the associated snowmobile or ATV clubs.

(d) New snowmobile and ATV trails shall be authorized through a process involving snowmobile or ATV club proposals and consideration by Irving, which shall include consideration of the potential effects of the trails on the Conservation Values.

(e) Unauthorized trail use and suspected illegal activities involving snowmobile and ATV use shall be reported to the appropriate State enforcement agencies and Irving's Regional Forester.

3.2 Miscellaneous Rules and Regulations. In addition to the above provisions, all public motorized recreation use of the Protected Property must comply with the rules and regulations set forth below.

(a) Irving may post and restrict public motorized vehicle access to and/or motorized recreational use of the Protected Property at any time and for any reason in Irving's sole discretion.

(b) Public access to and use of the Protected Property must be in compliance with all State and Federal laws and all rules and regulations set forth herein.

(c) Unauthorized use of roads and suspected illegal activities involving motorized vehicle use will be reported to the appropriate State enforcement agencies.

4. AMENDMENT

This plan may be amended at any time pursuant to § 6.1 of the FRCE.