



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.

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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

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).



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.

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.

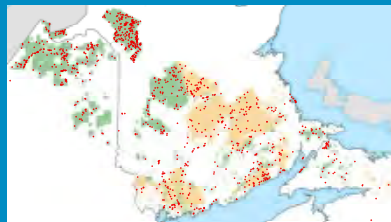
The number of unique areas within our database will not remain static. As public awareness of this program increases, it is expected more sites will be proposed and will likely be accepted as unique areas. However, as nature is a dynamic force, it is also likely that some sites may be removed from the 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



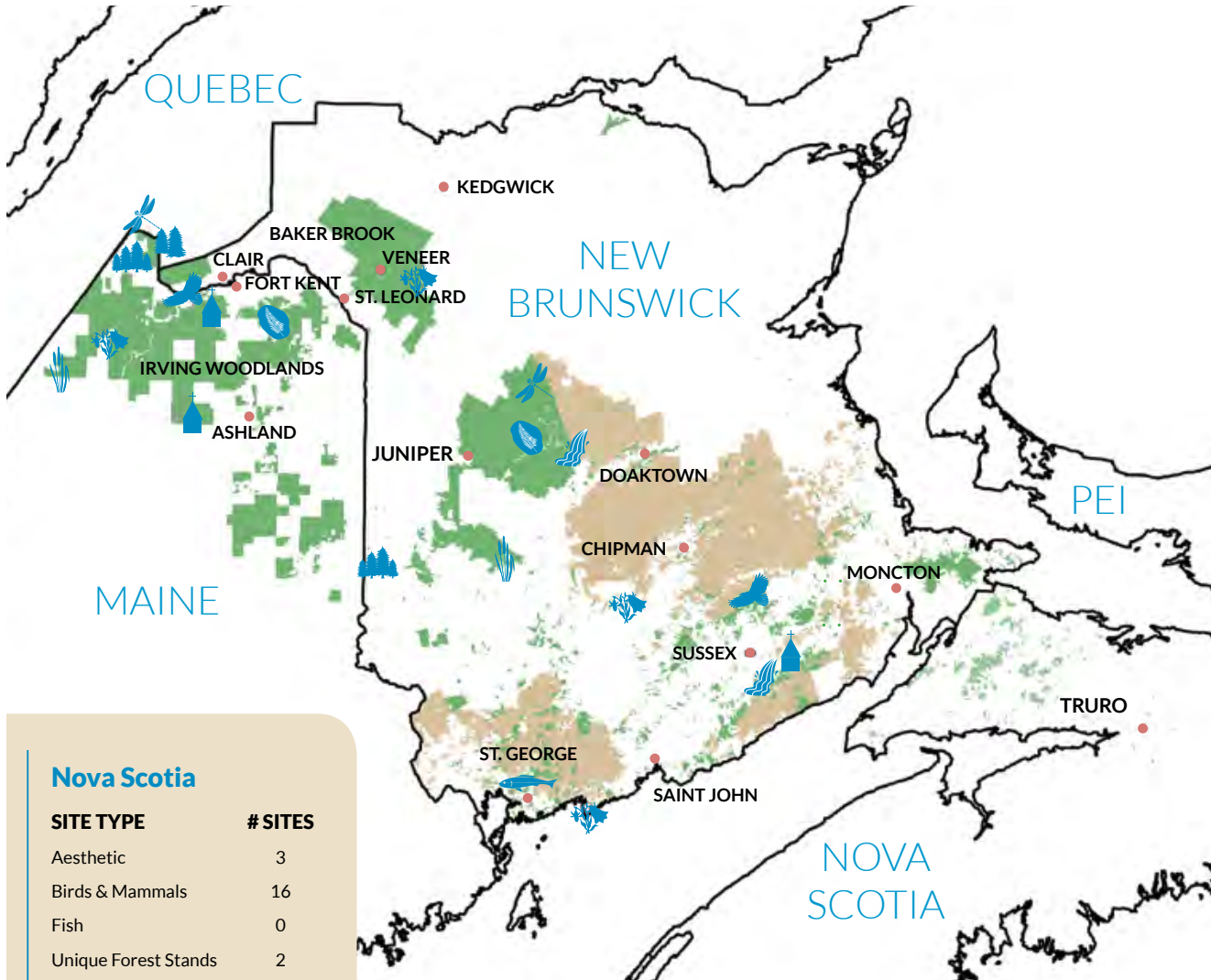
New Brunswick

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

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.

Grave Stone -
Baskin Cemetery.



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.



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.



REPTILES & INVERTEBRATES

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



Purple Lesser Fritillary.



UNIQUE FOREST STANDS

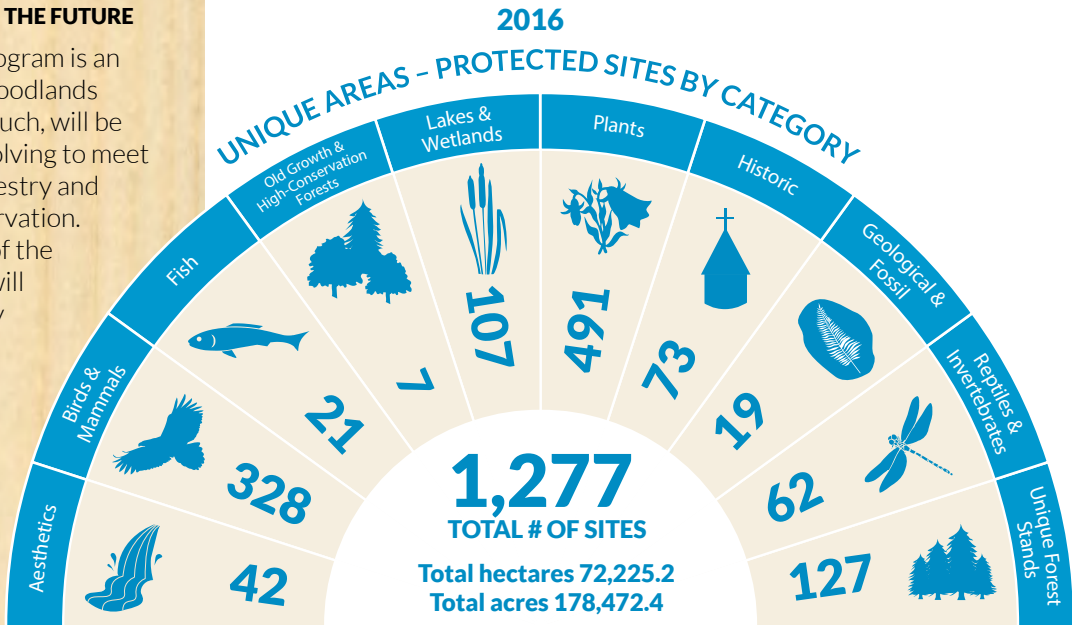
This category features forest stand types, or individual trees, that have attained an unusual size, or are in themselves rare or uncommon for a given area. A stand containing Red Oak (*Quercus rubra*) in Northern New Brunswick or Maine is considered significant because this region is close to the northernmost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



Bear claw scarred beech tree.

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 (*Accipiter 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 versus 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.

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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.

UNIQUE AREAS



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 (*Lonicera 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.

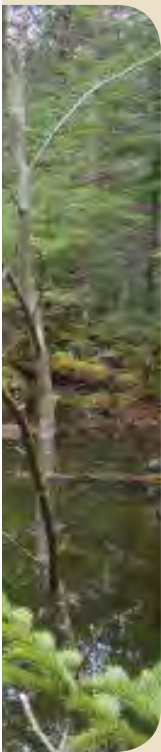


A Showy Lady Slipper (*Cypripedium reginae*) within the wetland. *Reginae* is latin meaning "of a queen" referring to the plants alternate common name: Queen's Lady Slipper.

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

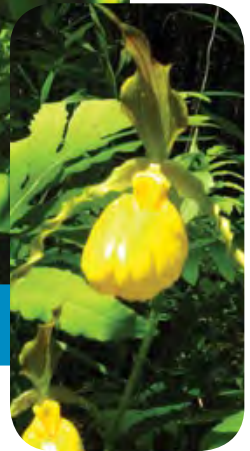
HOVEY HILLS HARDWOODS

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.



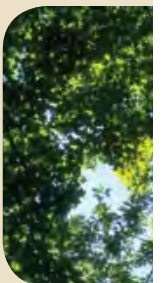
Within the roots of the yellow lady slipper live fungi that help the plant to grow and in turn, receives sugars from the plant.

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

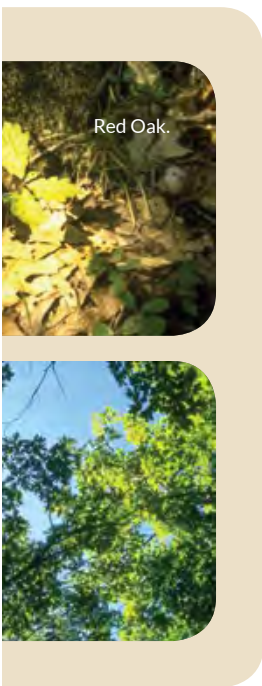
YANKEETULAHDI OLD GROWTH FOREST

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.





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 Anemone (*Anemone 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 Anemone 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 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.



Furbish's Lousewort and ice scoured river shore of the upper St. John River, 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 Downey Rattlesnake Plantain. Right: Plantain in flower.

SIROIS ROAD RARE PLANT SITE

Location: Northwestern New Brunswick

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.



Fir Clubmoss



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

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.



Stone face that had been built around the boiler.



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.

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



Petroglyph from the late 1890s.

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.

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



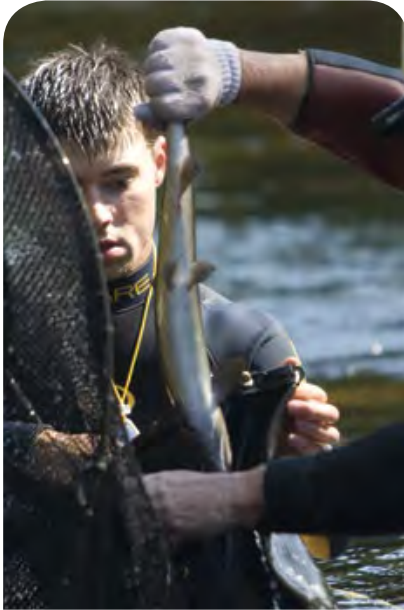
Purple Lesser Fritillary showing the distinctive purple on the hindwing.



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

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.

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

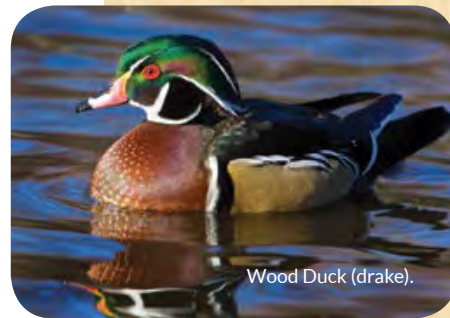
JDI has been a proud and active partner in waterfowl conservation with Ducks Unlimited Canada since the late 1970's when the first control structures were installed on JDI wetlands to set optimal water levels for duck nesting / rearing. Additionally, JDI staff have hosted thousands of youth through a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



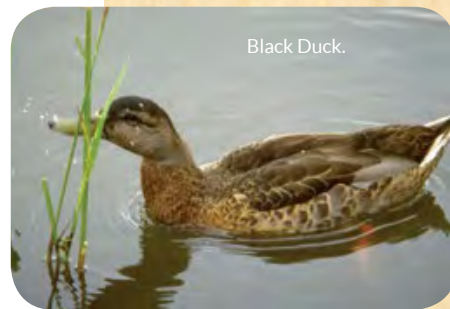
Musquash Estuary donated to the Nature Conservancy by JDI. A portion of this estuary is managed by Duck's Unlimited.

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.



Wood Duck (drake).



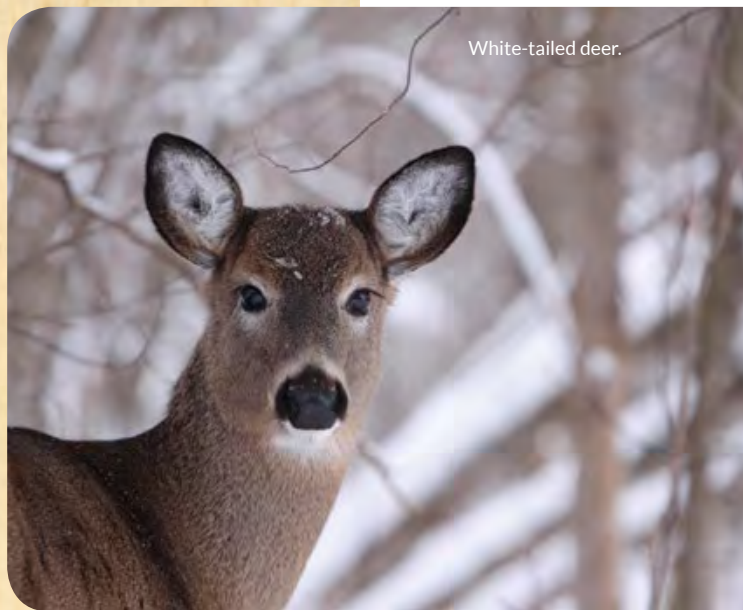
Black Duck.

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.



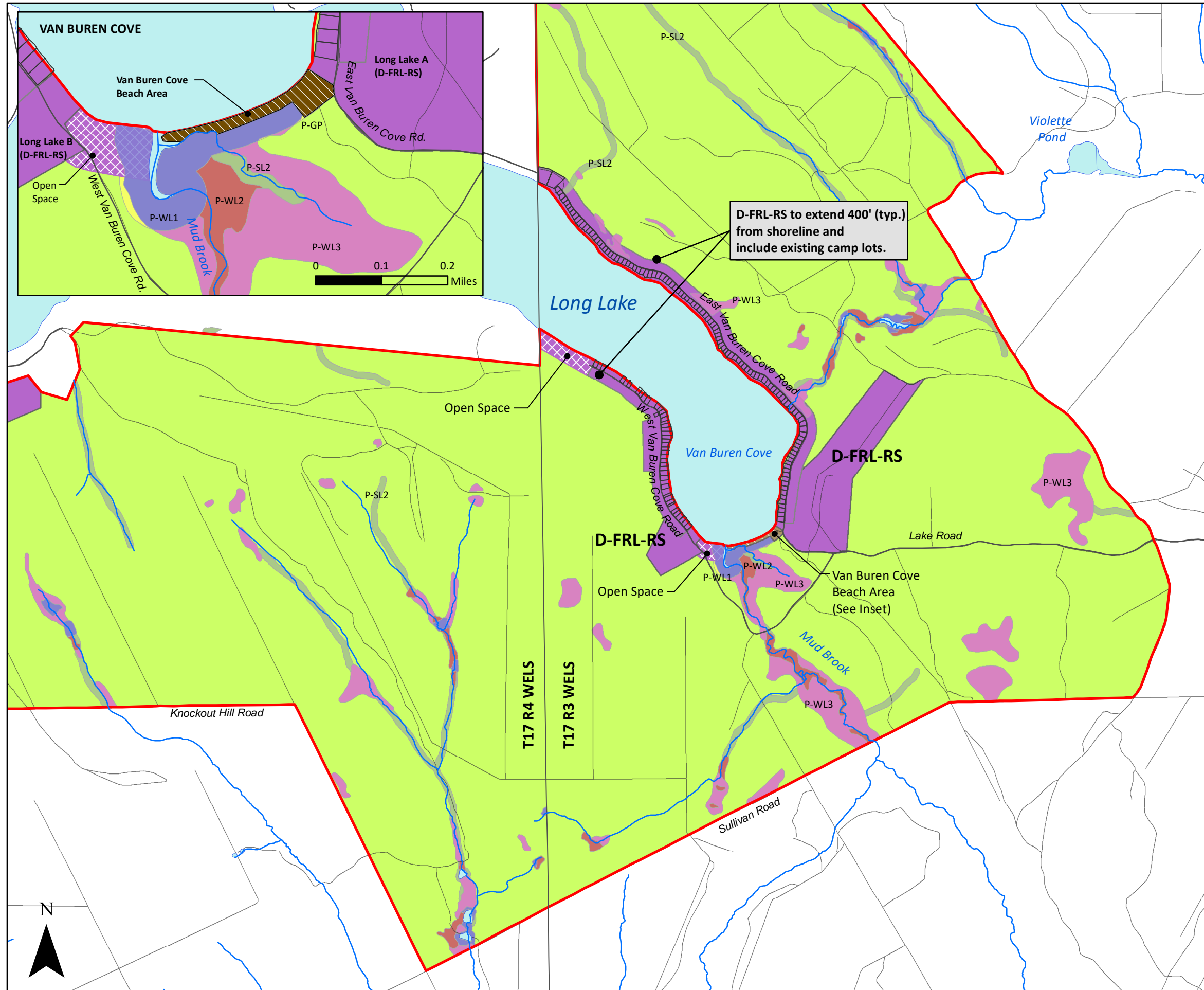
J.D. IRVING, LIMITED



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

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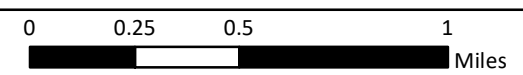
PROPOSED LAND USE ZONES

Detail Plan A

Fish River Chain of Lakes Concept Plan

- #### Legend
- Major Roads
 - Secondary Roads
 - Existing Camp Lots
 - Concept Plan Area
 - Proposed D-FRL-RS
 - ▨ Proposed Residential Open Space
 - ▩ Van Buren Cove Beach
 - P-GP: Great Pond Protection
 - P-SL2: Shoreland Protection
 - P-WL1: Wetland Protection
 - P-WL2: Wetland Protection
 - P-WL3: Wetland Protection
 - Proposed M-FRL-GN

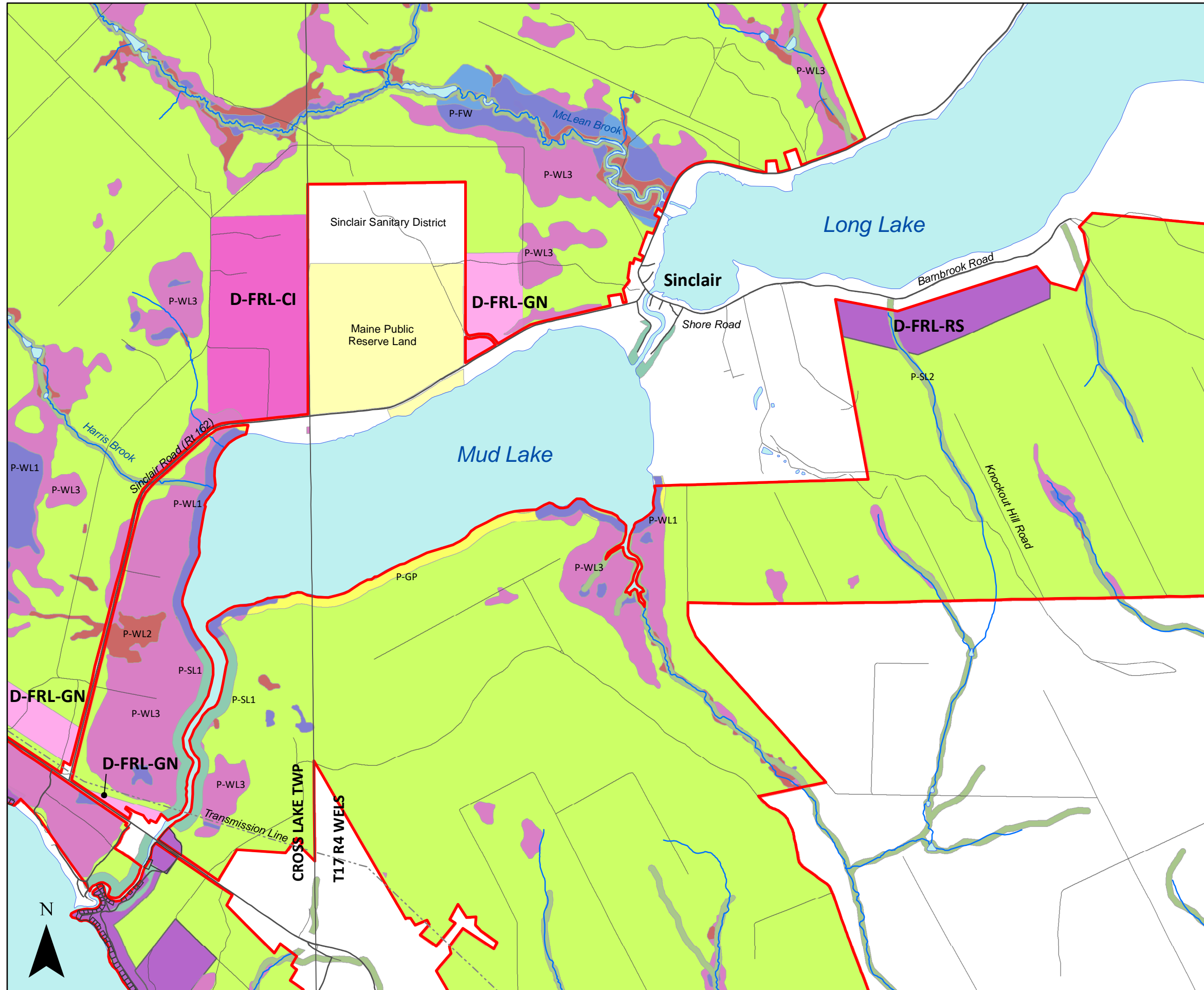
- #### Notes
1. Plan area will be rezoned to P-RP (Resource Plan Protection)
 2. Proposed D-FRL-RS includes lands currently zoned D-RS



April 2018

MAP 27

Petitioner's Exhibit 9



PROPOSED LAND USE ZONES

Detail Plan B

Fish River Chain of Lakes Concept Plan

Legend

- Major Roads
- Secondary Roads
- - - - Transmission Line
- Existing Camp Lots
- Concept Plan Area
- Proposed M-FRL-GN
- Proposed D-FRL-CI
- Proposed D-FRL-GN
- Proposed D-FRL-RS
- Maine Public Reserve Land
- P-FW: Fish/Wildlife Protection
- P-GP: Great Pond Protection
- P-SL1: Shoreland Protection
- P-SL2: Shoreland Protection
- P-WL1: Wetland Protection
- P-WL2: Wetland Protection
- P-WL3: Wetland Protection

Notes

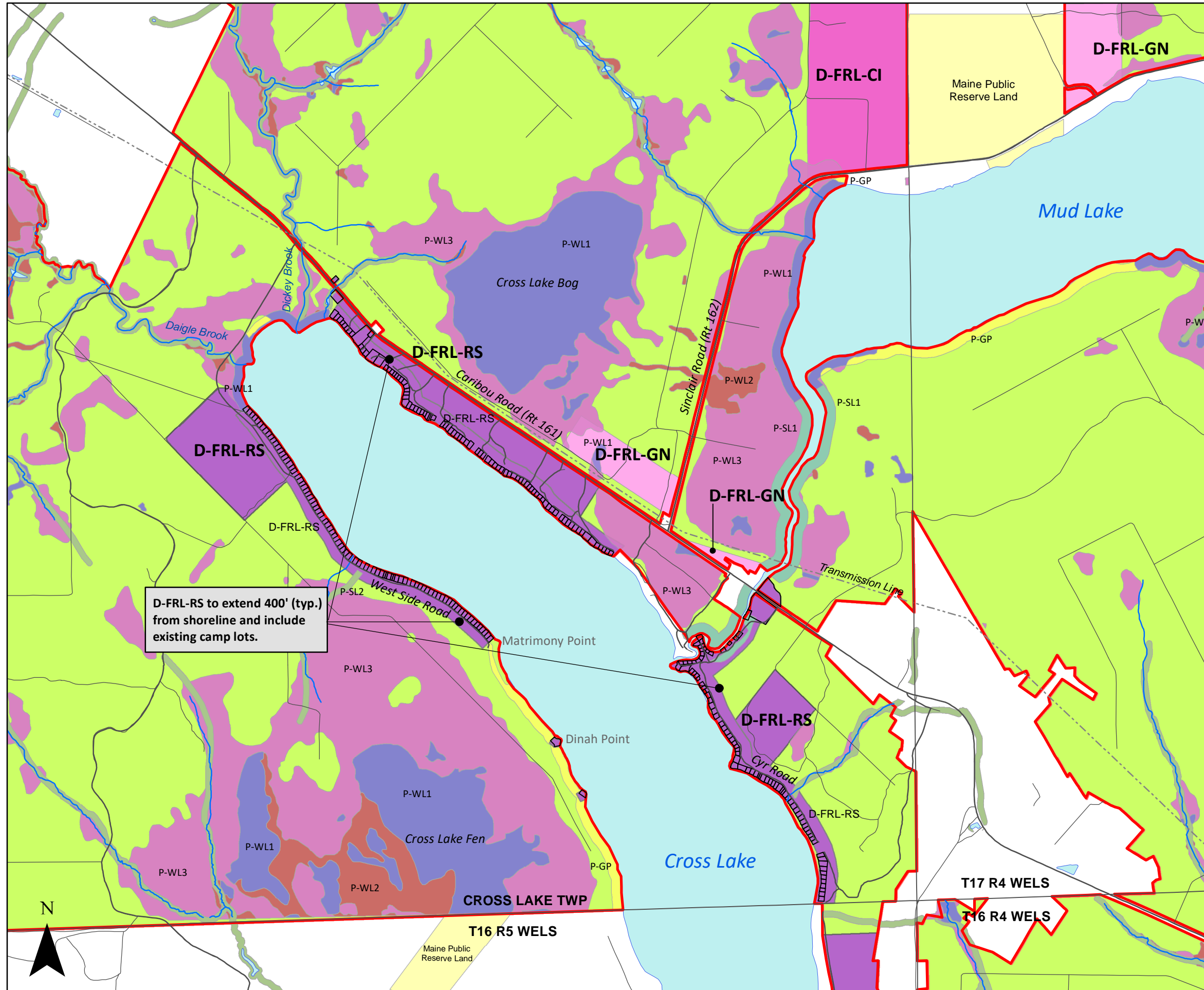
1. Plan area will be rezoned to P-RP (Resource Plan Protection)
2. Proposed D-FRL-RS includes lands currently zoned D-RS

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0 0.25 0.5 1 Miles

April 2018

MAP 28



D-FRL-RS to extend 400' (typ.) from shoreline and include existing camp lots.

PROPOSED LAND USE ZONES

Detail Plan C

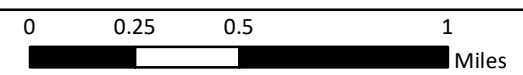
Fish River Chain of Lakes Concept Plan

Legend

- Major Roads
- Secondary Roads
- - - Transmission Line
- Existing Camp Lots
- ▭ Concept Plan Area
- ▭ Proposed M-FRL-GN
- ▭ Proposed D-FRL-CI
- ▭ Proposed D-FRL-GN
- ▭ Proposed D-FRL-RS
- ▭ Maine Public Reserve Land
- ▭ P-GP: Great Pond Protection
- ▭ P-SL1: Shoreland Protection
- ▭ P-SL2: Shoreland Protection
- ▭ P-WL1: Wetland Protection
- ▭ P-WL2: Wetland Protection
- ▭ P-WL3: Wetland Protection

Notes

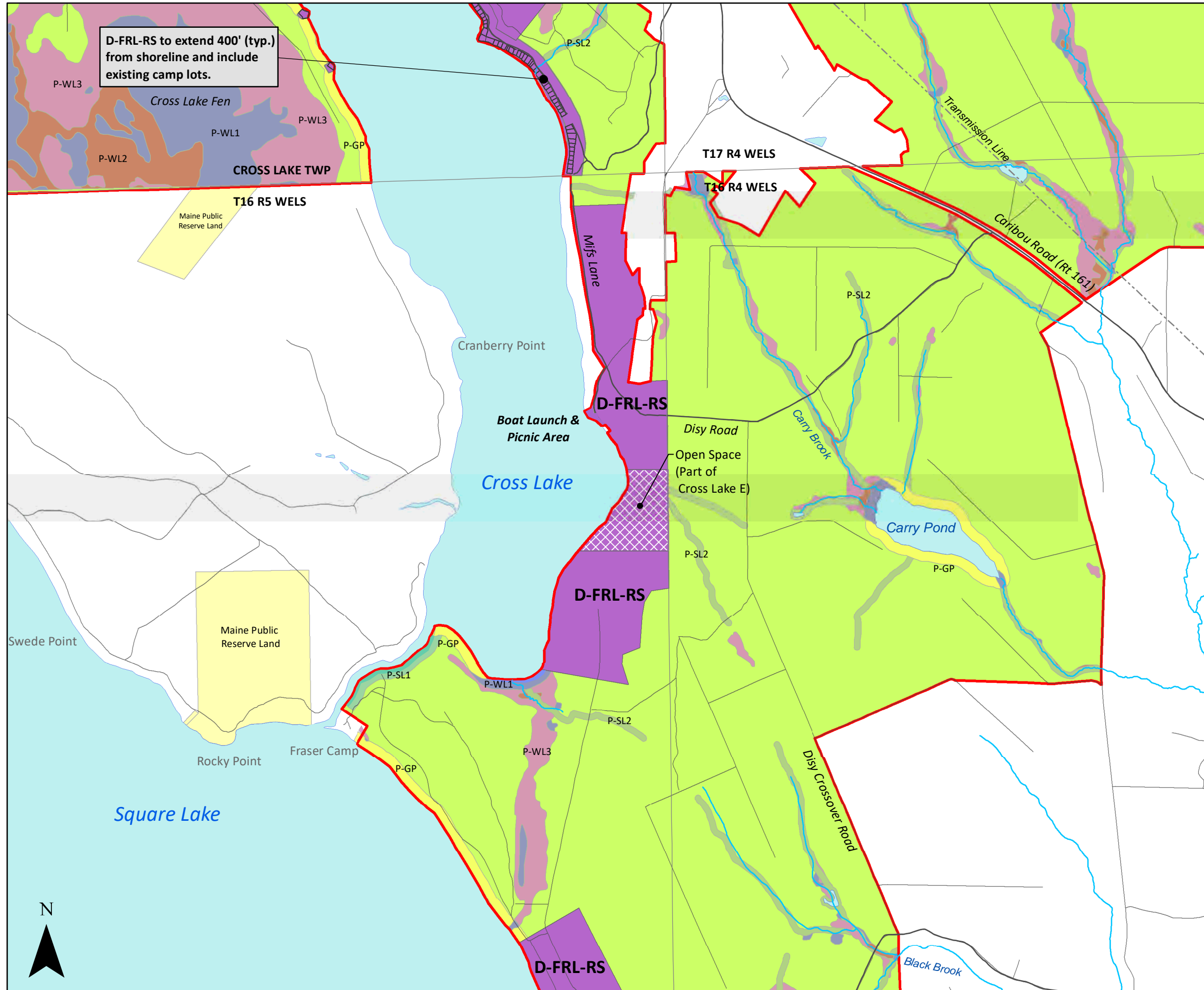
1. Plan area will be rezoned to P-RP (Resource Plan Protection)
2. Proposed D-FRL-RS includes lands currently zoned D-RS



April 2018

MAP 29

Petitioner's Exhibit 9



D-FRL-RS to extend 400' (typ.) from shoreline and include existing camp lots.

PROPOSED LAND USE ZONES

Detail Plan D
Fish River Chain of Lakes
Concept Plan

Legend

- Major Roads
- Roads
- - - Transmission Line
- Existing Camp Lots
- Concept Plan Area
- Proposed M-FRL-GN
- Proposed D-FRL-RS
- Proposed Open Space
- Maine Public Reserve Land
- P-GP: Great Pond Protection
- P-SL1: Shoreland Protection
- P-SL2: Shoreland Protection
- P-WL1: Wetland Protection
- P-WL2: Wetland Protection
- P-WL3: Wetland Protection

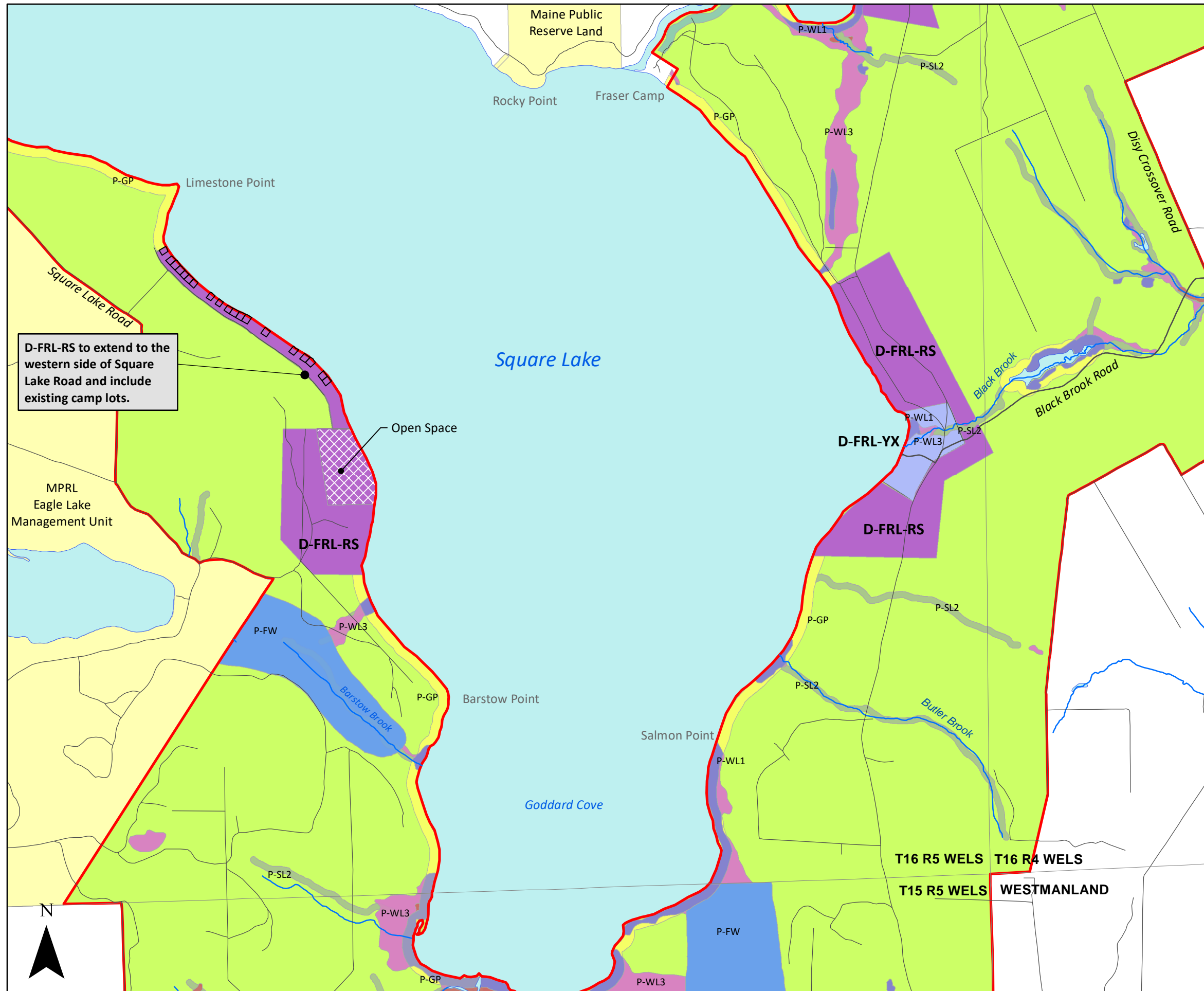
Notes

1. Plan area will be rezoned to P-RP (Resource Plan Protection)
2. Proposed D-FRL-RS includes lands currently zoned D-RS

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IRVING WOODLANDS, LLC

0 0.25 0.5 1
Miles

April 2018 **MAP 30**



D-FRL-RS to extend to the western side of Square Lake Road and include existing camp lots.

PROPOSED LAND USE ZONES

Detail Plan E

Fish River Chain of Lakes Concept Plan

Legend

- Major Roads
- Roads
- Existing Camp Lots
- Concept Plan Area
- Proposed M-FRL-GN
- Proposed D-FRL-RS
- Proposed Open Space
- Proposed D-FRL-YX (Yexas)
- Maine Public Reserve Land
- P-FW: Fish/Wildlife Protection
- P-GP: Great Pond Protection
- P-SL2: Shoreland Protection
- P-WL1: Wetland Protection
- P-WL3: Wetland Protection

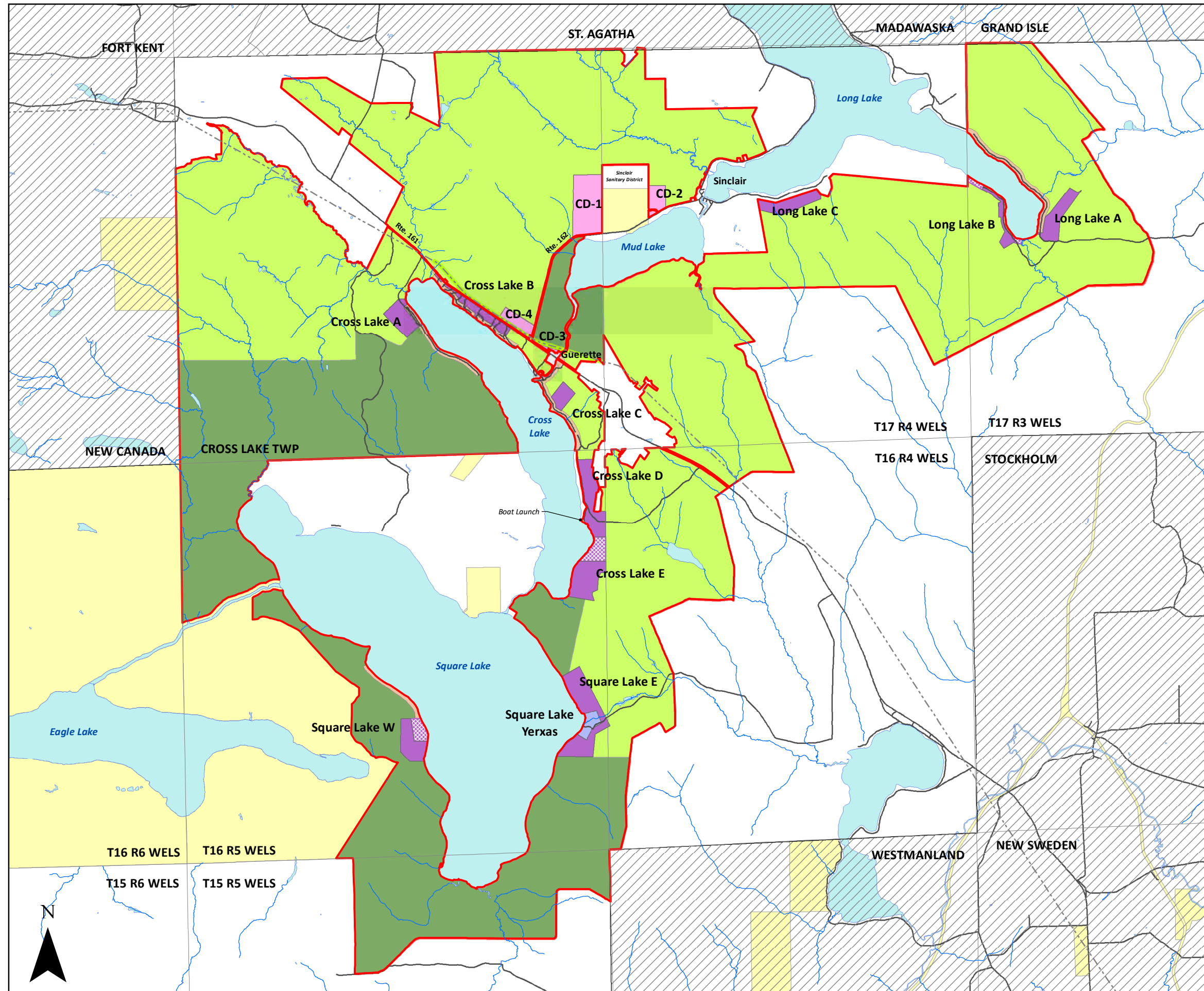
- ### Notes
1. Plan area will be rezoned to P-RP (Resource Plan Protection)
 2. Proposed D-FRL-RS includes lands currently zoned D-RS

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IRVING WOODLANDS, LLC

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CONCEPT PLAN SUMMARY

Fish River Chain of Lakes Concept Plan



Legend

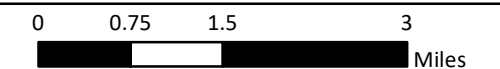
- Major Roads
- - - Transmission Line
- Streams
- ▨ Organized Towns
- Water Bodies
- Proposed Recreational Lodging Area
- Proposed Comm/Econ Development Areas
- Proposed Residential Development Areas
- Proposed Open Space
- Existing/Expanded D-FRL-RS
- Maine Public Reserve Land
- Conservation Easement Area
- ▭ Concept Plan Area

Note

1. The Concept Plan includes other elements (such as water access sites, outpost facilities and public elements) that are described in the Petition. See Map 33 Remote Campsites and Remote Rental Cabins and Map 34 Publicly Accessible Water Access Sites for the location of these elements.



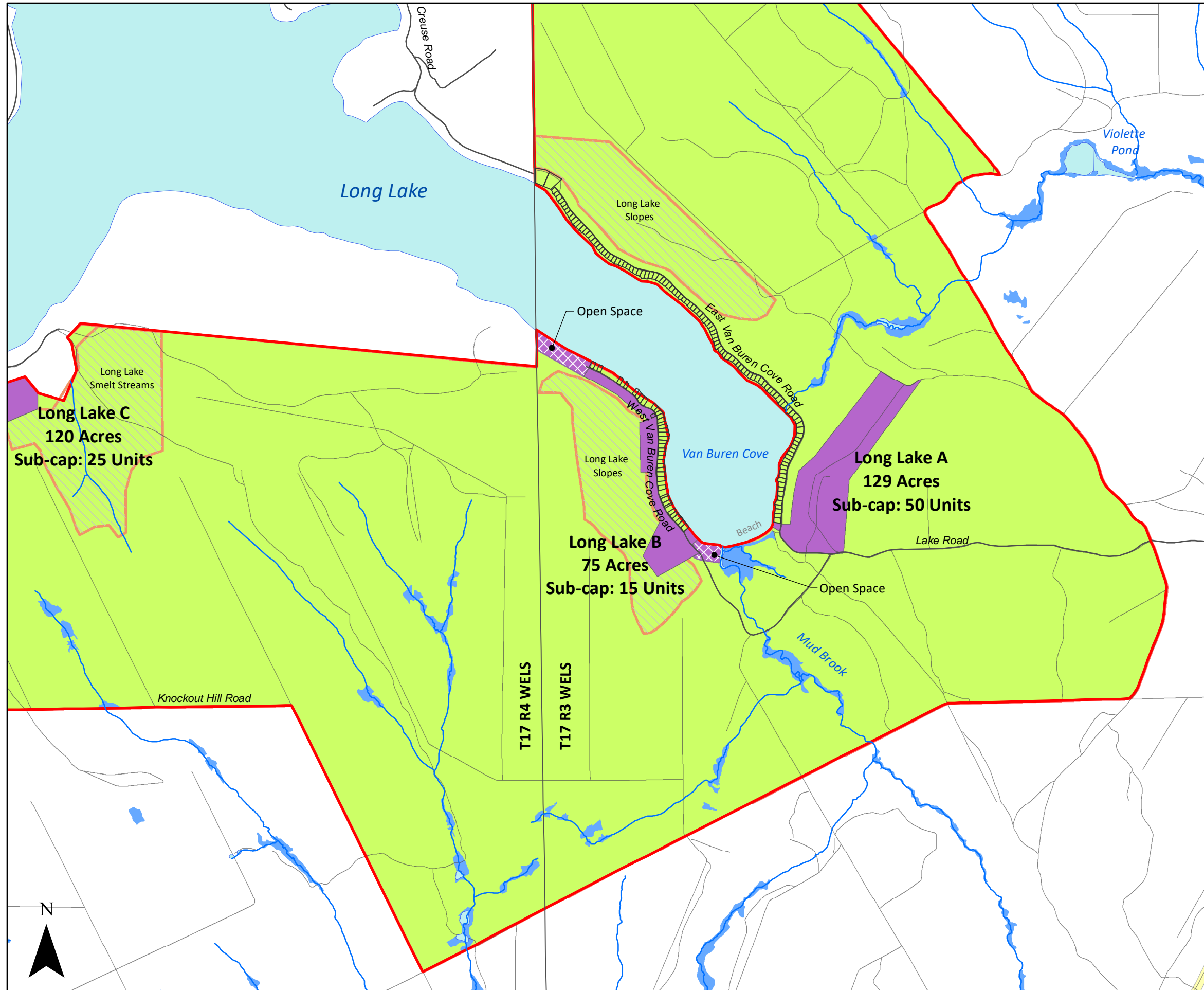
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April 2018

MAP 21

Petitioners Exhibit 10



DEVELOPMENT AREAS


Detail Area A

Fish River Chain of Lakes Concept Plan

Legend

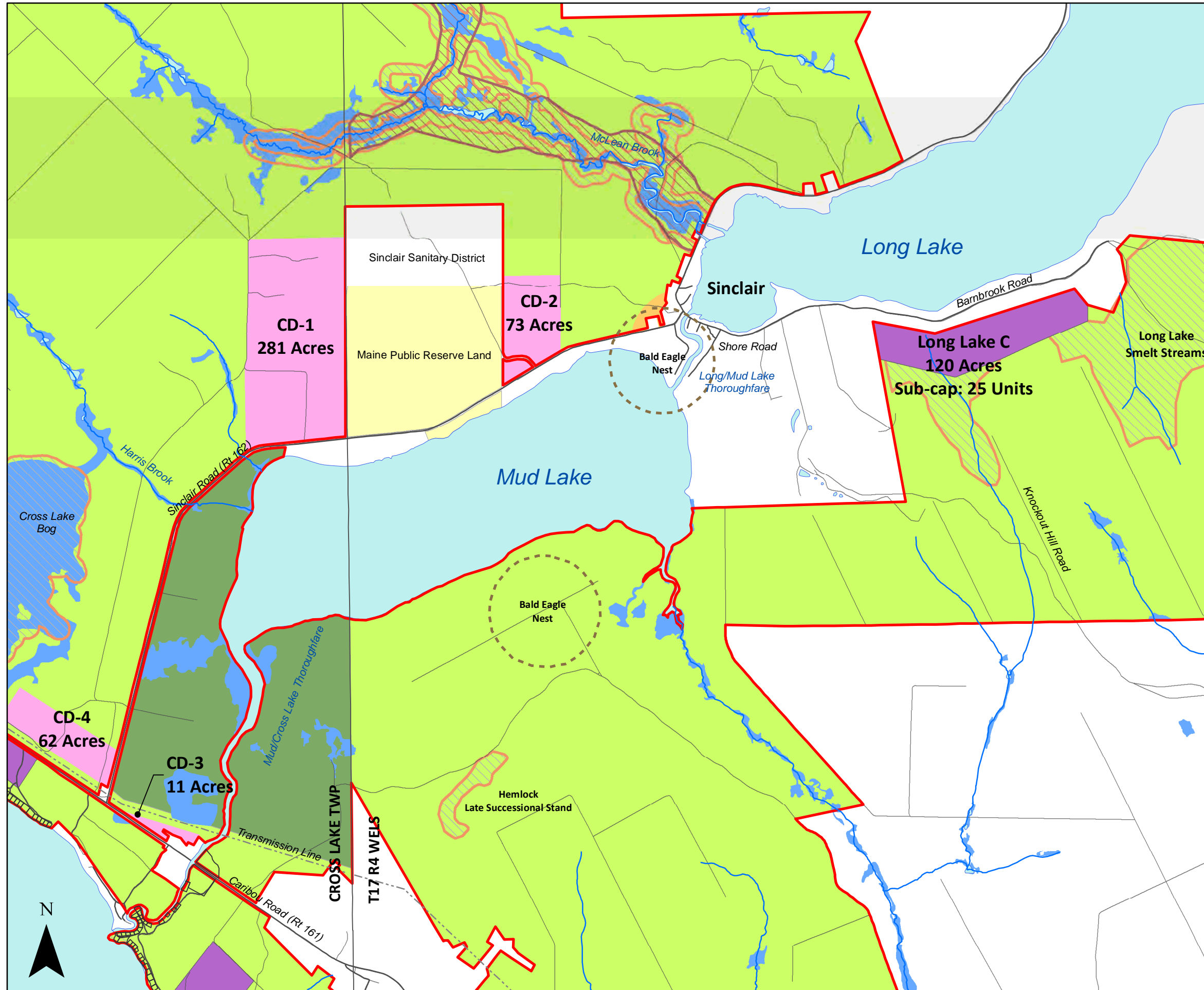
- Major Roads
- Secondary Roads
- Streams
- Wetlands
- Existing Camp Lots
- Proposed Residential Development Areas
- Proposed Open Space
- Irving Unique Areas
- Concept Plan Area

- Notes**
1. The total number of new Development Units within the proposed residential development areas (including Square Lake Yexas) is capped at a maximum of 330 units.
 2. Maximum number of new Development units for Long Lake: 75 units.
 3. See Maps 14-17 for existing zoning and Maps 27-31 for proposed land use zones.



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0 0.25 0.5 1 Miles



DEVELOPMENT AREAS

Detail Area B

Fish River Chain of Lakes Concept Plan

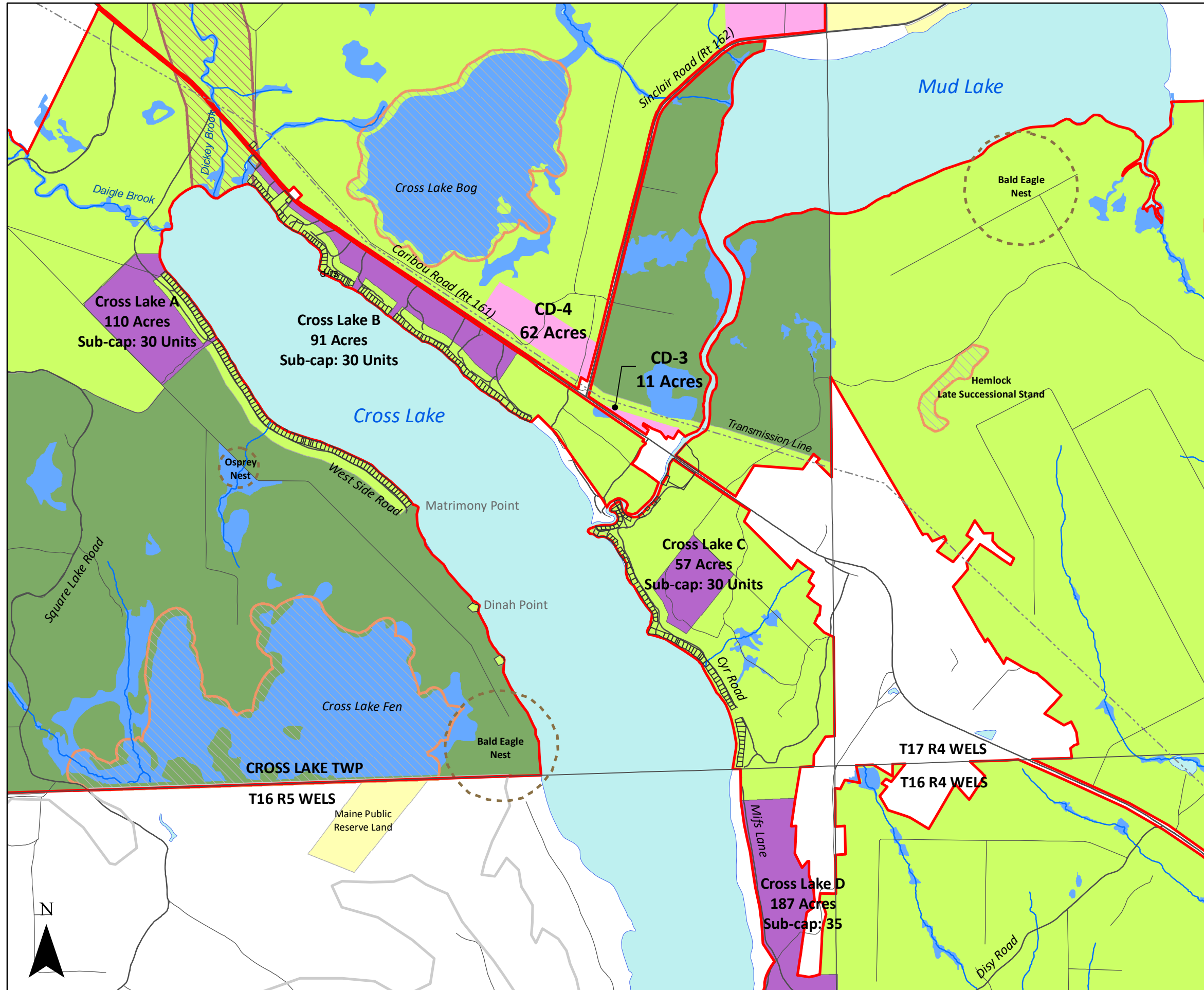
Legend

- Major Roads
- Secondary Roads
- - - Transmission Line
- Streams
- Wetlands
- Existing Camp Lots
- ▨ Deer Wintering Areas
- ▧ Irving Unique Areas
- Nesting Site
- Proposed Comm/Econ Development Areas
- Proposed Residential Development Areas
- Maine Public Reserve Land
- Conservation Easement Area
- Concept Plan Area

- Notes**
1. The total number of new Development Units within the proposed residential development areas (including Square Lake Yexas) is capped at a maximum of 330 units.
 2. Maximum number of new Development units for Long Lake: 75 units.
 3. See Maps 14-17 for existing zoning and Maps 27-31 for proposed land use zones.
 4. See Concept Plan narrative for density limits for CD-1, 2, 3 (a,b,c), and 4.

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IRVING WOODLANDS, LLC

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DEVELOPMENT AREAS

Detail Area C

Fish River Chain of Lakes Concept Plan

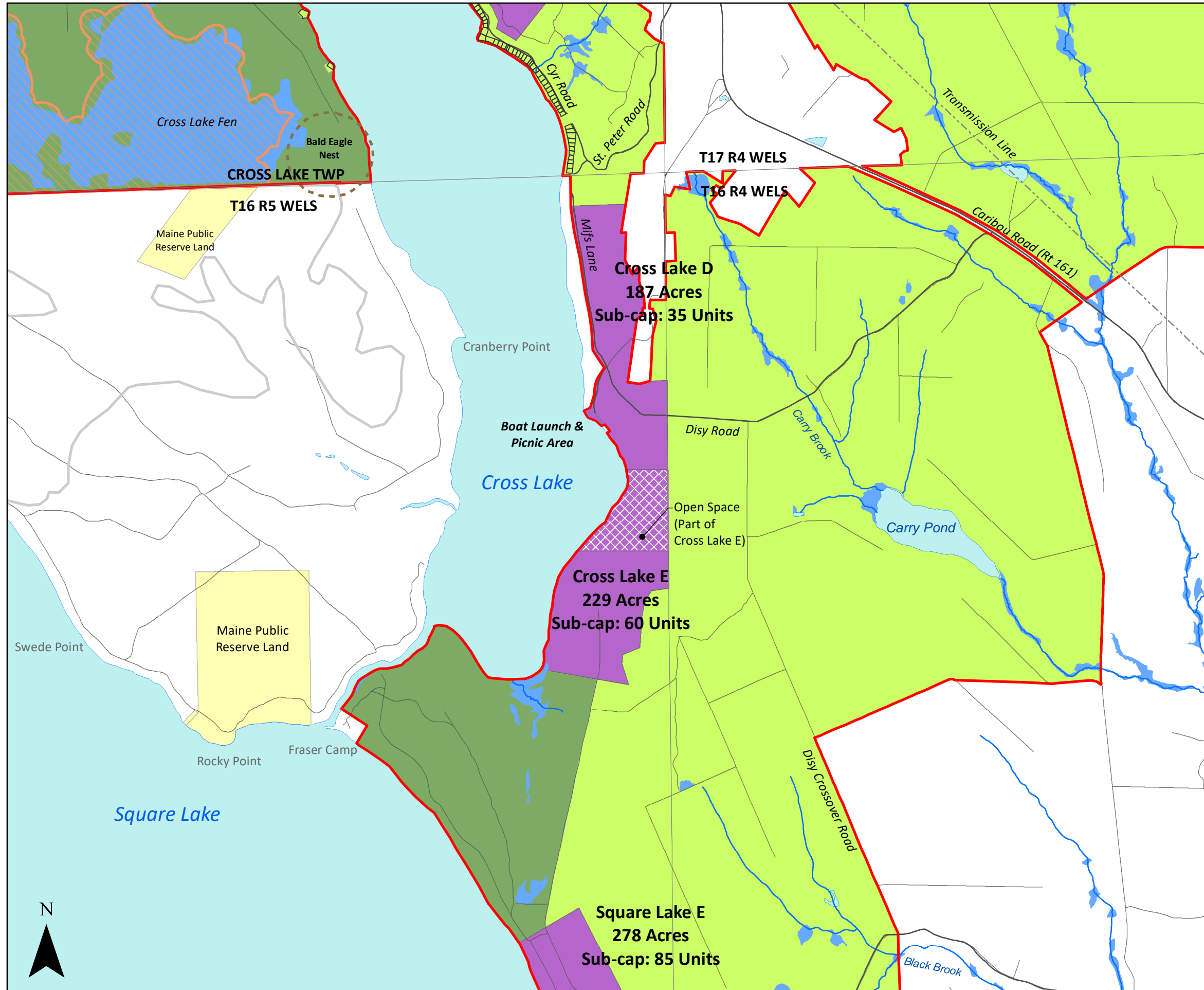
Legend

- Major Roads
- Secondary Roads
- - - Transmission Line
- Streams
- Wetlands
- Existing Camp Lots
- Deer Wintering Areas
- Irving Unique Areas
- Nesting Site
- Proposed Comm/Econ Development Areas
- Proposed Residential Development Areas
- Maine Public Reserve Land
- Conservation Easement Area
- Concept Plan Area

- Notes**
1. The total number of new Development Units within the proposed residential development areas (including Square Lake Yexas) is capped at a maximum of 330 units.
 2. Maximum number of new Development units for Cross Lake: 125 Units.
 3. See Maps 14-17 for existing zoning and Maps 27-31 for proposed land use zones.
 4. See Concept Plan narrative for density limits for CD-1, 2, 3 (a,b,c), and 4.

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IRVING WOODLANDS, LLC

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Miles



DEVELOPMENT AREAS

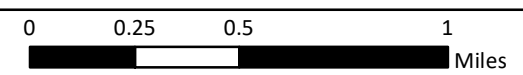
Detail Area D

Fish River Chain of Lakes Concept Plan

Legend

- Major Roads
- Secondary Roads
- - - Transmission Line
- Streams
- Wetlands
- Existing Camp Lots
- ▨ Irving Unique Areas
- Nesting Site
- Proposed Residential Development Areas
- ▨ Proposed Open Space
- Maine Public Reserve Land
- Conservation Easement Area
- Concept Plan Area

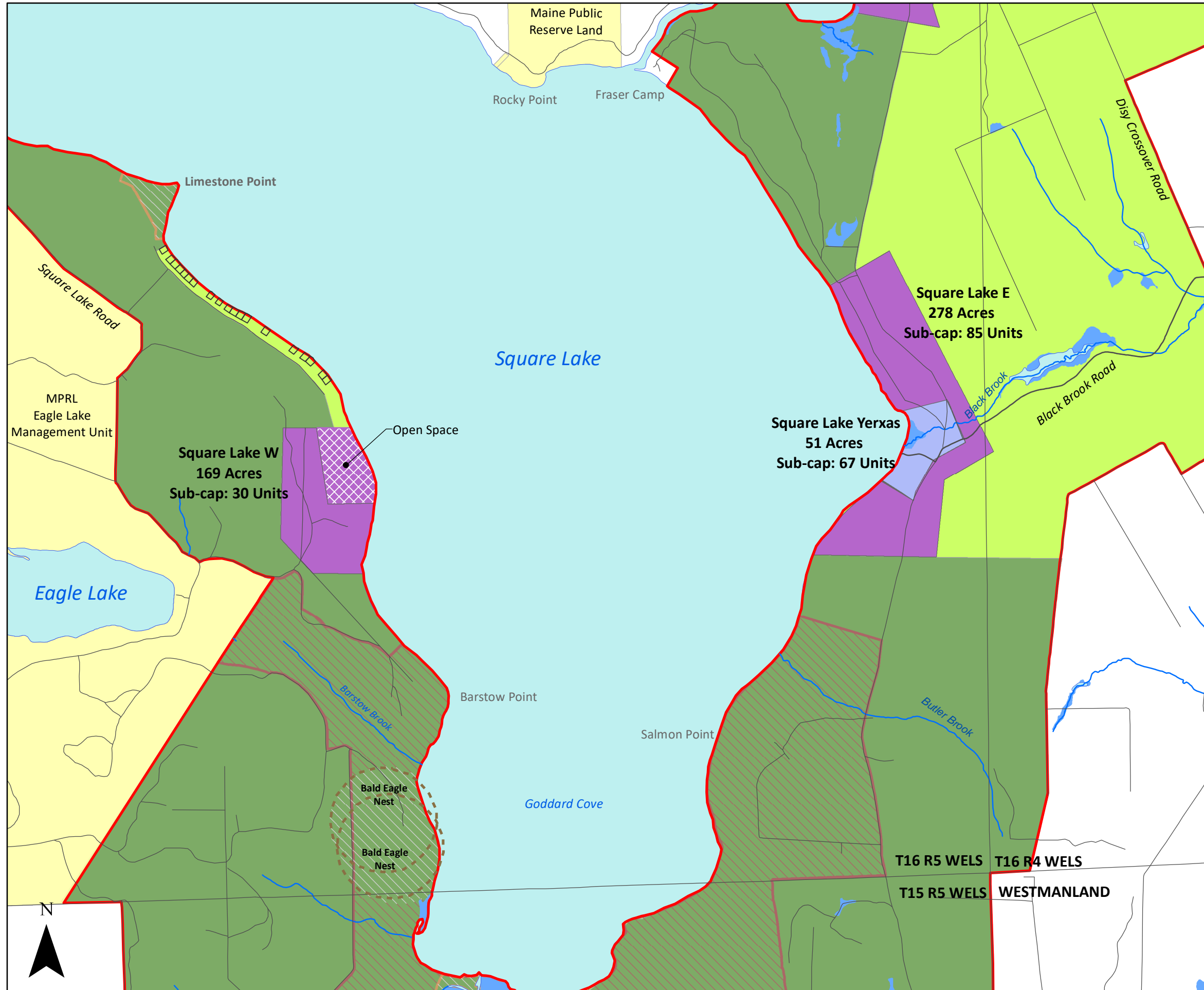
- Notes**
1. The total number of new Development Units within the proposed residential development areas (including Square Lake Yexas) is capped at a maximum of 330 units.
 2. Maximum number of new Development units for Cross Lake: 125 Units.
 3. See Maps 14-17 for existing zoning and Maps 27-31 for proposed land use zones.



April 2018

MAP 25

Petitioners Exhibit 10



DEVELOPMENT AREAS

Detail Area E

Fish River Chain of Lakes Concept Plan

Legend

- Major Roads
- Secondary Roads
- Streams
- Wetlands
- Existing Camp Lots
- ▨ Irving Unique Areas
- ▨ Deer Wintering Areas
- Proposed Square Lake Yexas Area
- Proposed Residential Development Areas
- ▨ Proposed Open Space
- Maine Public Reserve Land
- Conservation Easement Area
- Concept Plan Area
- Nesting Site

- Notes**
1. The total number of new Development units within the proposed residential development areas (including Square Lake Yexas) is capped at a maximum of 330 units.
 2. Maximum number of new Development units for Square Lake: 130 Units.
 3. See Maps 14-17 for existing zoning and Maps 27-31 for proposed land use zones.

IRVING
IRVING WOODLANDS, LLC

0 0.25 0.5 1 Miles