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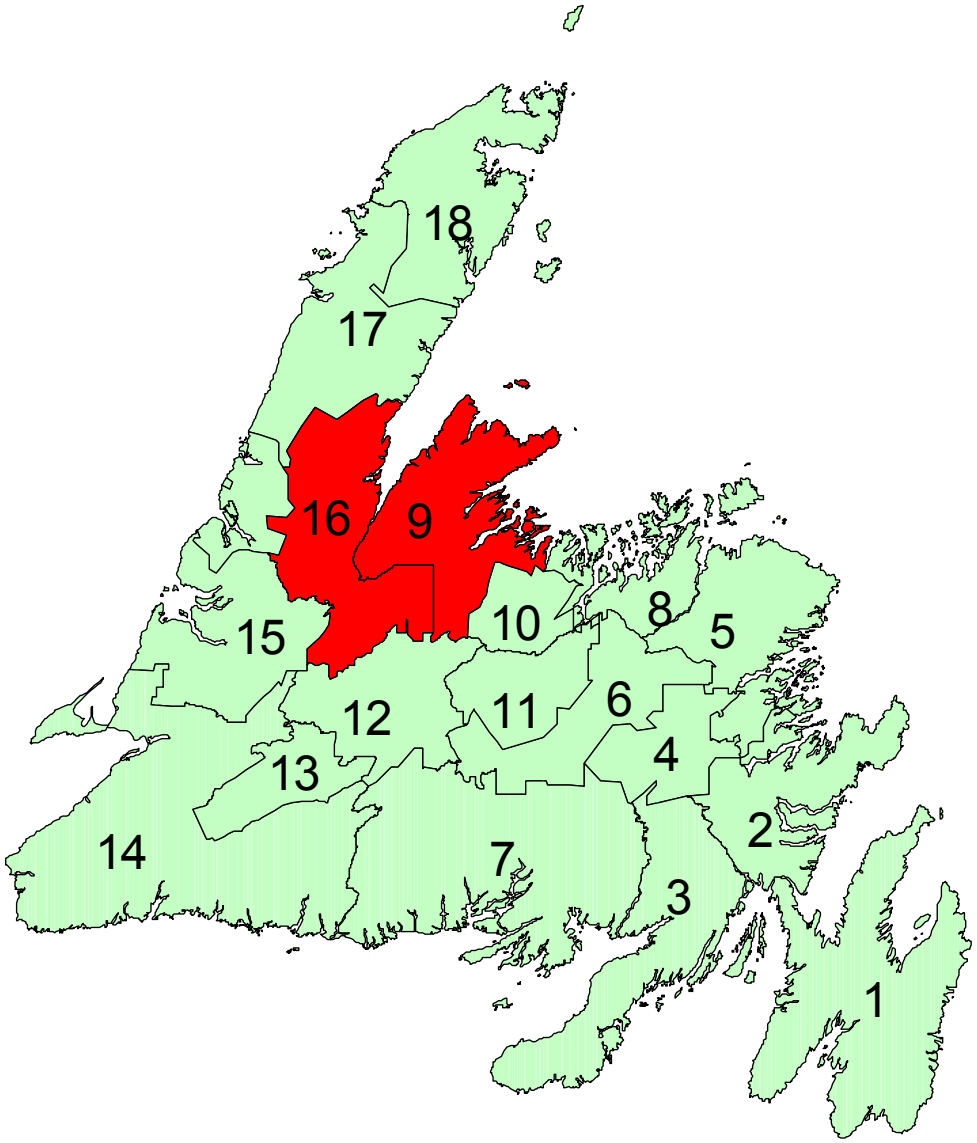
Corner Brook Pulp and Paper Limited
Five-Year Operating Plan
Forest Management Districts 9 and 16

January 1, 2012- December 31, 2016



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INTRODUCTION

This five year operating plan covers the period January 1, 2012 to December 31, 2016 and represents the second iteration that incorporates the new provincial planning requirements. In the past, there were five major planning documents; the provincial sustainable forest management strategy, the district strategy document, the five year operating plan, the annual operating plan, and the past annual report. This new planning framework has eliminated the district strategy document; however, its former contents are now split between the provincial sustainable forest management strategy and the five year operating plan. Sections that are provincial in scope such as carbon, global warming and criteria and indicators are now included in the provincial sustainable forest management strategy while sections that are more descriptive or depict local conditions such as values, forest characterization and ecosystem description are moved to the five year operating plan. Linkages between strategies from the provincial sustainable forest management strategy and on the ground activities in the five year operating plan will be provided where applicable.

Another major change to the planning process is the creation of eight planning zones on the island which are based primarily on ecoregion composition. Districts 9 and 16 are adjacent and share common ecoregion characteristics and collectively form Planning Zone Seven. The requirement for submission to the Forestry Services Branch and for environmental assessment is one five year operating plan for each owner in each zone. In this zone there will be two separate submissions by the Crown and Corner Brook Pulp and Paper Limited. The past requirement was one five year operating plan by each owner in each district. Throughout this five year plan, references will be made to Districts 9 and 16 individually but when combined they will collectively be referred to as Planning Zone Seven or the zone. Planning teams for this zone are located in Pasadena for District 16 and Springdale for District 9. Planning team format and structure will be discussed in a later section.

This document will try to fully integrate presentation of information and discussion for crown land in the zone, where possible. This will be done by combining statistics and other information from each district and reporting for the zone. However, tables and figures will be constructed such that

information for individual districts will be available if a breakout is required. Discussion and information will be presented separately for each district where warranted based on unique and distinct differences in scope and content. The more descriptive sections of this plan will be generic in nature and give information for the entire zone as well as some broad comparative statistics.

Finally, this document will attempt to build on previous documents and on efforts of previous planning teams. Information will be updated as required or new sections will be added if any new information is available. Sections from previous documents will be included if they are still relevant, even if they were not discussed by the current planning team.

Section 1 Description of the Land Base

1.1General

1.1.1 Location

Planning Zone Seven encompasses Forest Management Districts 16 and 9 (Figure 1). It extends from Deer Lake in the west to Cat Arm in the north and includes all of the Baie Verte Peninsula. Major towns located within the zone include Deer Lake, Hampden, Sops Arm, Springdale, and Baie Verte. District 16 is administered from Pasadena with a depot in Sops Arm while District 9 is administered from Springdale with depots in Baie Verte and Millertown.

1.1.2 History

The natural resources of the zone have played a major role in the well being of the residents. Since the earliest settlement, the forest and fish resources were the mainstay of the economy. Generally, settlement occurred around the coastal areas where the fishery was prevalent. Initially the forest was used as a source of fuelwood as well as construction materials for houses and fishery related items (stages, lobster pots, boats etc.). Sawmills developed to supply the local demand for lumber and construction timber and there was a small export market for pulpwood. In the interior of the zone, logging towns such as Howley and Deer Lake developed as a result of the pulp and paper mill in

Corner Brook. Today pulpwood and pulp chips are shipped to the mill in Corner Brook. As well, there is a major integrated sawmill in Hampden that produces lumber for both the local and export market and pulpchips which are sold to Corner Brook Pulp and Paper Limited (CBPPL).

1.1.3 Ownership

There are two major ownerships in the zone; Crown and (CBPPL) (Figure 2). Crown land accounts for 46 percent of the area and is located around the extremities of the zone. Corner Brook Pulp and Paper timber rights account for 54 percent

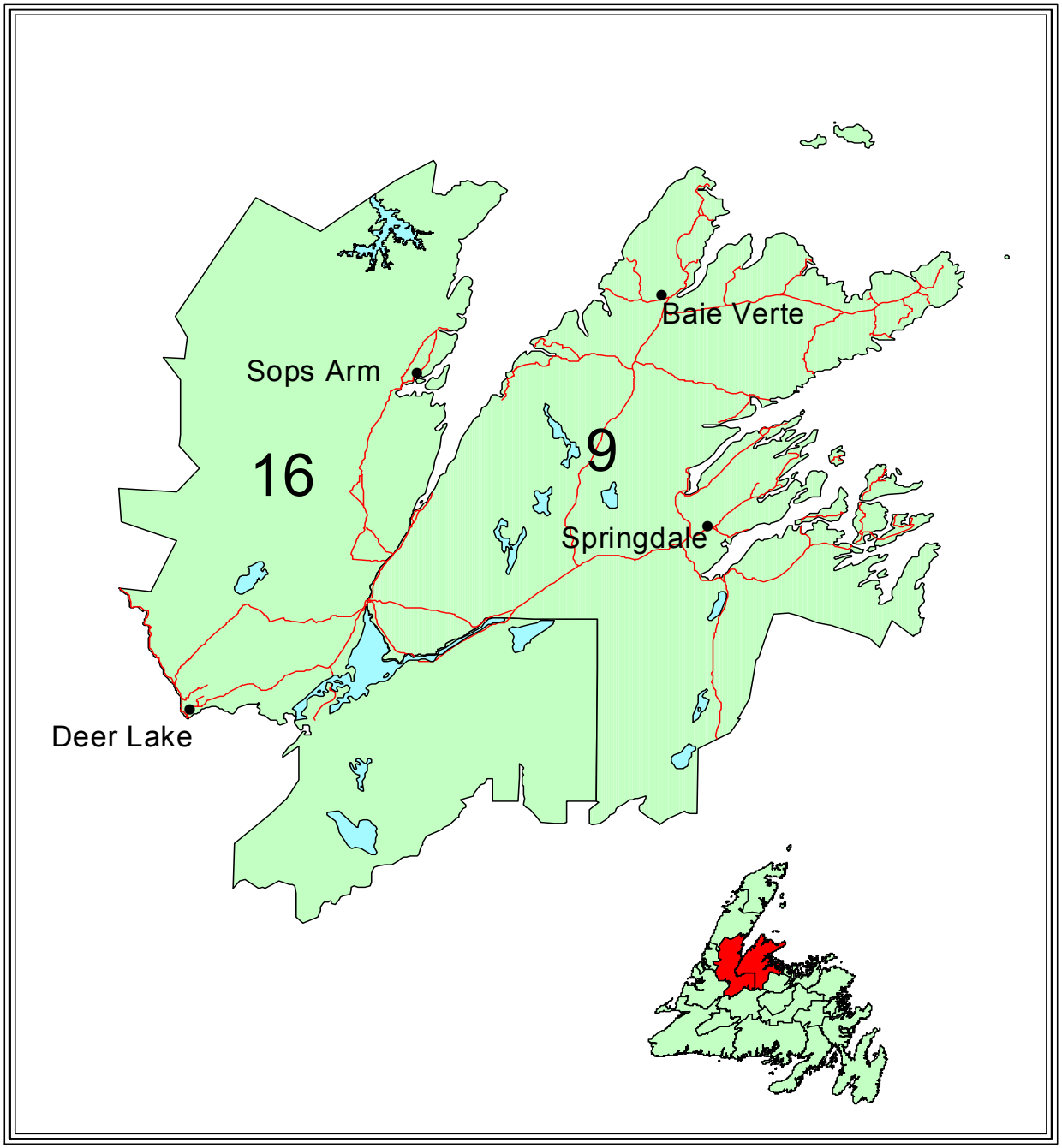


Figure 1. Location of Planning Zone 7.

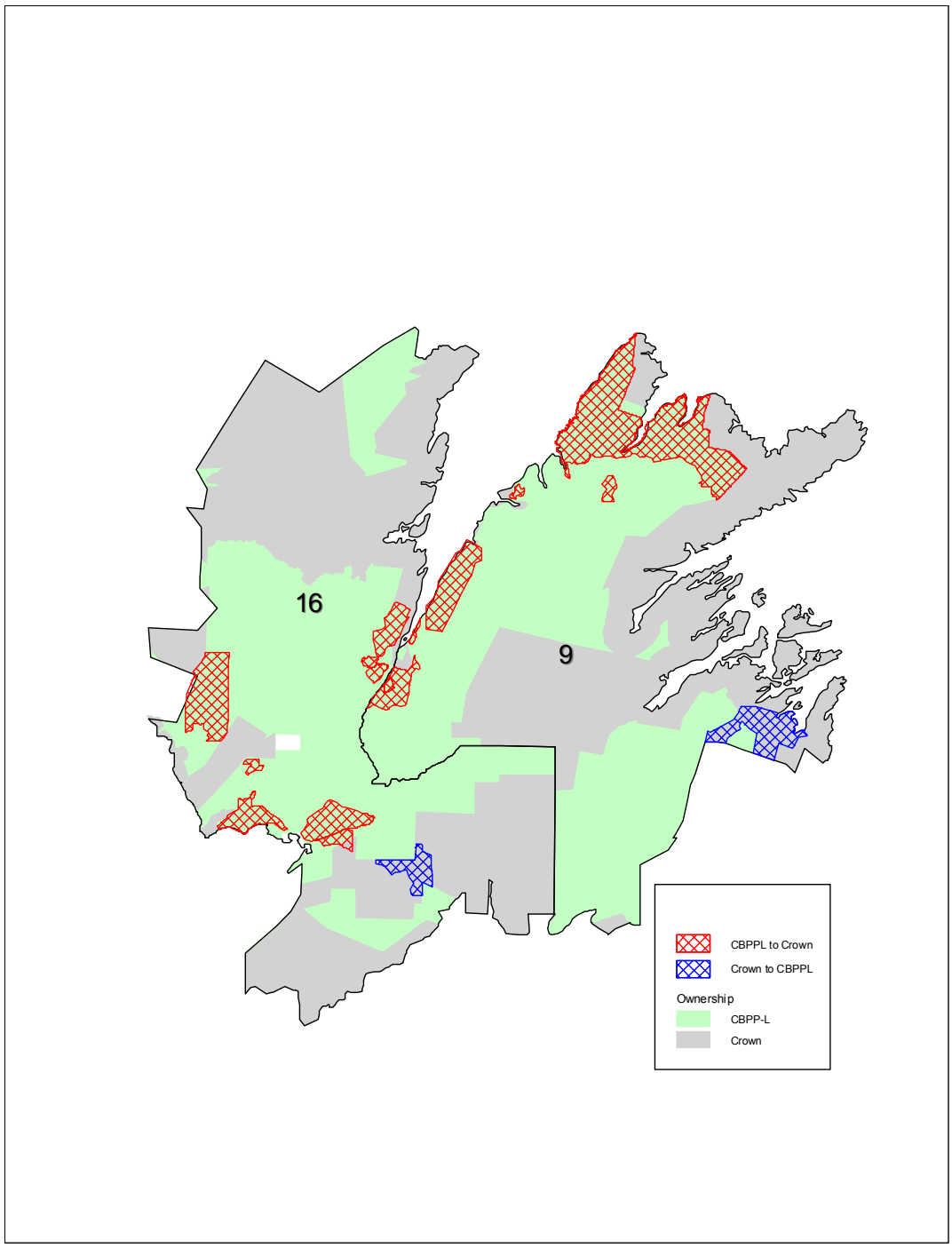


Figure 2. Ownership map of Planning Zone 7 showing transfers and exchanges

of all land holdings. The timber holdings are in the form of long term licenses that are not due to expire until 2037. Since the last five year plan there also has been a major purchase of timber

holdings by the Crown from CBPPL in the Main River watershed and near the Gros Morne National Park boundary. In District 9 all timber licenses formerly held By Abitibi-Bowater have been expropriated and have returned to the Crown.

Within these ownerships there have been a number of exchanges and transfers between the Crown and CBPPL that are mutually beneficial to both parties (Table 1) (Figure 2). The CBPPL to Crown transfers and exchanges provide a sawlog supply for commercial operations and a firewood supply near communities for domestic cutters.

Table 1 Exchanges and transfers in Planning Zone 7

District	Type	Expiry Date(s)
16	CBPPL to Crown	2019-2021
16	Crown to CBPPL	2021
9	Crown to CBPPL	none
9	CBPPL to Crown	2019-2021

1.2 Physical

1.2.1Topography and Hydrology

The topography of the area is varied ranging from coastal lowlands to broadly rolling uplands to undulating plateaus to hilly, mountainous regions. Bogs with wooded ridges can be found throughout.

The northern part of District 16 includes the southern extent of the Long Range Mountains while in the southern portion the Topsails form several prominent hills that rise above undulating plateaus that extend over 460 meters above sea level. The northern edge of these plateaus is dissected by a

number of valleys. Between these two extents lies a large lowland region extending northeast from Deer Lake.

The coastal areas of District 9 are hilly and mountainous with flat areas of bog containing woody ridges. These areas fall steeply into the lowland and coastal areas forming a rugged coastline. The central and southern portions of this district consist of broadly rolling uplands with low, parallel, northeasterly trending ridges.

The area contains several large drainage basins which flow in a general easterly or northerly direction and empty into the Atlantic Ocean. The main exception is in the southwest portion of District 16 which forms the upper reached of the Humber River watershed and empties into the Gulf of St. Lawrence. Other prominent rivers include the Main, Indian River, South Brook and Taylors Brook. These rivers have sources from lakes along their courses plus other feeder streams and ponds. Other small streams and ponds feed directly from the higher elevations into the ocean. Major watersheds include the Humber, Main, South Brook and Indian River.

1.2.2 Geology

The area is underlain by areas of contrasting geology and varying mineral potential. Five different geological terrains are exposed at various locations. Some material for geology section from (McCuaig 2003).

The oldest rocks in the zone consist of metamorphic rocks (gneisses) that are part of the ancient Canadian Shield and are approximately 1.2 billion years old. These rocks have been intruded by younger granite and gabbroic rocks. They are referred to as the Long Range Complex or the Long Range Inlier. This complex forms the core of the Great Northern Peninsula and is exposed in the northwestern part of District 16.

Sandstone, limestone and marble overlie the basement rocks of the Long Range Complex. These are of Cambrian to Ordovician age and correlate with similar rocks that form an extensive carbonate

platform that was deposited along the ancient margin of the North American continent. Within District 16, these rocks are exposed in the Great Coney Arm area and southwards close to the Jackson's Arm - Sop's Arm highway.

Rocks of oceanic affinity are exposed between Coney Head and Frenchman's Cove and extends to the southwest as narrow thrust slices. These rocks consist of gabbro to granite and deformed basaltic, volcanic and sedimentary rocks. They are of Cambrian to Ordovician age and were thrust from the eastern oceanic area westwards over the ancient continental margin. Correlative rocks occur within the oceanic terrain southwest of Grand Lake.

Terrestrial volcanic and sedimentary rocks overlie the Cambro-Ordovician platformal and oceanic rocks in the Sop's Arm area in the west and between Springdale and Grand Lake in the southeast and are of Silurian age. The volcanic rocks consist of rhyolitic and basaltic flows, tuffs and braccia. The sedimentary rocks are widespread in the Sop's Arm area and consist of conglomerates, sandstones, silt stones and shales. Southwest of Springdale, sedimentary rocks are less widespread and consist of red sandstones and pebble conglomerates. These volcanic and sedimentary rocks were deposited in a sub-aerial to shallow sub-aqueous environment in large caldera complexes. Equivalent granitic rocks occur in the Topsails area and probably were sub-volcanic magma chambers that fed the overlying volcanic pile.

The youngest rocks are of Carboniferous age and occupy the central part of the zone. They extend southwards from White Bay through the area between Deer Lake and Grand Lake. This area is known as the Deer Lake Basin. The rocks consist of red, grey and brown sandstones, conglomerates, shale and limestones. They were deposited in a non-marine environment on lakes and rivers.

The whole area has been glaciated by an ice sheet in the Wisconsin age. On the whole, erosion by the glaciers has exceeded deposition and the greater part of the upland areas consist of ice scoured bedrock exposures, thinly littered with stones and boulders ranging from rhyolite and porphyry to granite gneiss and greenstone.

In the lowland areas there is however, a considerable amount of drift deposit. This occurs chiefly in the form of till consisting of the harder rocks such as granite, rhyolite, diorite, and quartzite. It is, therefore, full of large stones and boulders as this material has been resistant to mechanical abrasions and chemical weathering. There are, however, considerable deposits of marine deltaic, lacustrine, and outwash materials in the lower valleys of the major rivers. In some areas, till deposits composed largely of slate, shale, and sandstone occur. These materials have been pulverized and weathered and are far less stony than deposits composed of harder rock.

1.2.3 Soils

The soils of the area can be identified by three separate modes of deposition: morainal (till), glaciofluvial/fluvial (water deposited), or organic (bogs/fens).

The majority of the soils in the zone have developed on morainal tills. These soils range in thickness from thin veneers over bedrock to thick extensive deposits. The textures range from silty loam to loamy sand and are usually stony. These soils are found throughout the area with the thinner veneers usually found in the higher elevations such as the Whites River/Silver Mountain areas. The predominant soil classification of these tills would be orthic humo ferric podzols and in poorly drained areas, gleyed orthic humo ferric podzols. In areas such as the Topsails, ortstein humo ferric podzols (cemented) are common.

Other soils have developed on glaciofluvial/fluvial deposits with greatest occurrence being in the Sandy Lake/ Grand Lake areas. The textures range from coarse sand to sandy loam and can be stone free to very stoney. The predominant soil classification associated with these types of deposits would be ortstein humo ferric podzols as well as orthic humo ferric podzols. Where poor drainage occurs these soils will be “gleyed.”

Organic depositions occur throughout the entire zone. These deposits vary in depth from less than one meter to more than five meters. They are derived from sphagnum moss and sedges. The most

common organic deposits are blanket bogs and sloping fens. The predominant soil classification is typic fibrisols and terric mesisols.

In addition to the mineral and organic soils, some areas can be referred to as rockland. Rockland consists of very shallow soils (< than 10 cm.) and exposed bedrock, enough to be dominant over the soils.

1.2.4 Climate

The climate of the area is variable as a result of differences in topography and the proximity to the sea. January mean temperatures average about -14 ^{o}C, and July mean temperatures range from over 15.5^{o}C in the valleys to less than 13°C in the mountains. The frost-free period averages 110 days at lower elevations. The growing season (mean daily temperature above 6°C) is more than 160 days at Deer Lake and less than 130 days in the mountains, and begins between May 10 and 30. Annual precipitation ranges from 1020 to 1400 mm and is lowest in the Deer Lake valley. Summer rainfall normally accounts for 250-300mm while the balance is snow. Generally, snowfall on the Baie Verte Peninsula is the highest in the zone, 5.0 to 6.0 meters compared to 3.0 to 3.5 meters in the southern part. The average potential evapotranspiration ranges from less than 430 to more than 510 mm.

The forests in the zone are directly related to climatic influences. The Baie Verte Peninsula has mostly balsam fir forest because of the abundance of moisture. The southern part has mainly black spruce and hardwoods due to drought and fires. The central part of the zone forms a transition area between of these two extremes with a mixture of these two main species plus white birch and trembling aspen. (from Meades, 1990)

1.3 Ecosystems

1.3.1 Forest Ecosystems

An ecosystem is a community of interacting and interdependent plants, animals and microorganisms, together with the physical environment within which they exist (adapted from Perry, 1994). It is important to remember that within an ecosystem the interactions between the biotic and abiotic components are at least as important as the component themselves. Another critical characteristic of ecosystems is their overlapping boundaries. While each is definable in time and space, and distinguishable from adjacent ecosystems, each is intimately integrated with other local ecosystems. Additionally, each local ecosystem is nested within increasingly larger ecosystems. The scale at which an ecosystem is viewed is contingent on the species or abiotic characteristic under consideration. While planet Earth represents the ultimate global ecosystem, complex ecosystems also exist under fallen logs and rocks.

A forest ecosystem, as the term implies, is an ecosystem dominated by tree cover. At the coarsest level, the forests of Planning Zone 7, like all forests on the island, form part of the boreal forest ecosystem. The boreal forest is a green belt which spans much of the northern hemisphere. It stretches from the Atlantic shores of Scandinavia through Russia, across Alaska, through the mid latitudes of Canada until it reaches the Atlantic Ocean again in Newfoundland and Labrador. One of the distinguishing characteristics of the boreal forest is the phenomena of periodic, catastrophic stand replacement natural disturbances such as fire and insect outbreaks which typically give rise to uniform, even aged forests dominated by a few tree species.

The tree species which characterize the Canadian boreal forest include black spruce, white spruce, balsam fir, eastern larch, trembling aspen, white birch and jack pine. All of these, with the exception of jack pine, commonly occur on the Island. However, by far the dominant species are black spruce and balsam fir; together they represent more than 90 percent of the growing stock on the island. Spruce is most abundant in north central Newfoundland where a climate characterized by relatively dry, hot summers has historically favoured this fire-adapted species. In western Newfoundland the climate is somewhat moister and fires are far fewer in this region resulting in the ascendance of balsam fir, a species which is poorly adapted to fire.

1.3.2. Ecoregions and Subregions

Damman 1979, defined ecoregions as areas where comparable vegetation and soil can be found on sites occupying similar topographic positions on the same parent material, provided that these sites have experienced a similar history of disturbance. Thus, an ecoregion cannot be defined in isolation from the physical landscape, but vegetation toposequence, vegetation structure, floristic composition, and floristic distributions can provide the primary criteria. According to Damman, nine ecoregions are represented in Newfoundland. Each of these is further divided into subregions (also known as ecodistricts) All of the Newfoundland ecoregions and subregions contain many of the same ecosystem variables. It is the dominance and variance of these variables (e.g., vegetation and climate) that determine their classification.

Figure 3 depicts Planning Zone 7 relative to Damman's ecoregion classification system. The North Central Subregion of the Central Newfoundland Forest encompasses the majority of District 9 and a large portion of District 16. The North Shore Forest Ecoregion covers the remainder of District 9 primarily in a narrow band along the north and east coasts of the Baie Verte Peninsula. The Western Newfoundland Forest, Northern Peninsula Forest and Long Range Barrens Ecoregions cover the remainder of District 16.

Table 2 depicts the percentage of the ecoregions and subregions that are represented in the zone. It describes each ecoregion and subregion as a percentage of the total in the Province as well as the relative importance within each District and in both Districts combined. For example, District 9 contains 22 percent of the Northcentral Subregion of the Central Newfoundland Forest Ecoregion in the Province. As well, 82 percent of the District is located within this ecoregion. The following is a detailed description of each ecoregion and subregion (from Meades, 1990) in both Districts.

1.3.2.1 The Central Newfoundland Ecoregion

This ecoregion is located in the north-central part of the Island with a small outlet near Bay D'Espoir. The topography is gently rolling to hilly with most elevations between 150 and 450

meters. It has the most continental climate in insular Newfoundland with the warmest summers

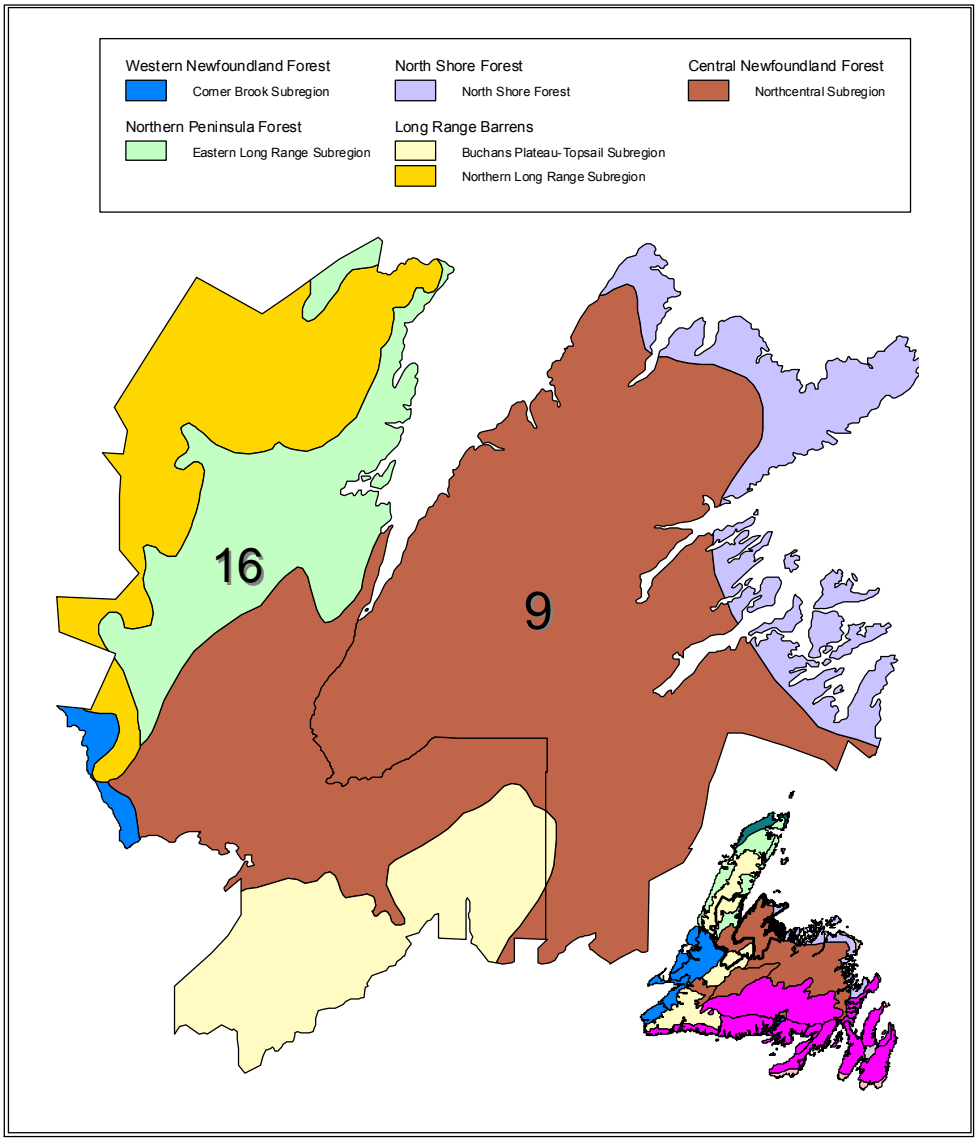


Figure 3 Ecoregions and subregions of Planning Zone 7.

Table 2. Percentage of ecoregions and subregions in Planning Zone 7.

Name of Ecoregion and Subregion	Total Area in Province (ha)	Percentage of Total Area in Districts			Relative Percentage of Ecoregion and Subegion in Districts		
		9	16	Total	9	16	Combined
Western Newfoundland Forest Corner Brook Subregion	515637	0	13	13	0	9	5
Northern Peninsula Forest Eastern Long Range Subregion	268059	0	56	56	0	23	11
North Shore Forest	550622	19	0	19	11	0	8
Long Range Barrens Buchans Plateau-Topsail Subregion	369811	<1	38	38	1	19	11
Northern Long Range Subregion	689562	0	24	24	0	23	12
Central Newfoundland Forest North Central Subregion	2310742	22	9	31	82	31	53

and coldest winters. It has the least wind and fog of any ecoregion and a growing season of 140-160 days and average precipitation of 900-1300mm.

This ecoregion is heavily forested and is the most distinctly boreal part of the Island. Balsam fir, black spruce, and to a lesser extent white birch are the dominant tree species. There is an extensive fire history thus fire origin stands of black spruce and white birch cover extensive areas particularly in the northern and eastern portions. Trembling aspen forms local stands after fire but is restricted to the central and northern portion.

Hylocomium-balsam fir is the zonal forest type and is dominant in areas not disturbed by fire. Kalmia-black spruce and pleurosium-balsam fir forests are also common. The kalmia-black spruce-lichen forests, which occur on outwash sands and gravels, are unique to this ecoregion. Red pine also occurs but is restricted to extremely dry sites.

1.3.2.1.1 North Central Subregion

The North Central Subregion has the highest maximum temperatures, lowest rainfall, and highest forest fire frequency on the Island. The subregion extends from Clarenville to Deer Lake with a mostly rolling topography of less than 200 meters. The history of fire is evident by the pure black spruce forest with white birch and aspen stands that dominate the subregion.

1.3.2.2 Northern Peninsula Ecoregion

This ecoregion differs from most other forested parts of the Island by the shortness of the growing season, 110-150 days compared to 145-170 days for other areas. The frost-free period is comparable to most other areas and somewhat better than in central Newfoundland. Precipitation is lower, but, because of low summer temperatures and a shorter growing season, soil moisture supply is probably adequate at most times. The soils are comparable to those of western Newfoundland. Limestone underlies most of the region, with acidic rocks more common on the eastern side of the Great Northern Peninsula.

Balsam fir is the dominant forest cover except at high elevations (300-400 m) on the eastern side of the peninsula where black spruce appears to be a natural component of the stands. There is very little fire history in this ecoregion. White pine, red maple, yellow birch and trembling aspen are conspicuous by their absence. One of the most obvious changes is the replacement of speckled alder by green alder, satiny willow and balsam willow in swamps. Also tall shrubs such as mountain-holly, wild raisin and rhodora are sparse or lacking in the scrub bog-border forests. Silviculturally, they are similar to western Newfoundland with hardwoods rather than ericaceous shrubs being the most common brush problem on understocked cutovers. Skunk currant, swampy red currant and red-osier dogwood appear to be a more common component of seral vegetation on cutovers. Raspberry is also very abundant in the early years of succession.

1.3.2.2.1 Eastern Long Range Subregion

This subregion includes the productive but inaccessible forest on the eastern slopes of the Long Range Mountains up to 450 m elevation. The forests tend to be somewhat open balsam fir-black spruce mixtures. The tree line decreases towards the northern end of the subregion.

1.3.2.3 Long Range Barrens Ecoregion

This ecoregion comprises the highlands which extend from the southwestern coast to the northern part of the Northern Peninsula. It consists of three distinct subregions, the Southern Long Range, the Buchan's Plateau-Topsails, and the Northern Long Range. They are separated by areas of more or less continuous forest. Fire is of little importance, and has played no role in the formation of these barrens. Cool summers and cold winters are typical of this ecoregion. It has a relatively short growing season due to the persistence of the heavy snow cover late into spring.

This area is covered by mostly barren vegetation with shallow, ribbed fens and tuckamoor dominating the landscape. Sheep laurel heath is the predominant dwarf shrub vegetation and covers large areas. Arctic-alpine vegetation is common on all highlands and exposed sites. Snow bank species like moss heather, mountain sorrel and dwarf bilberry are common in areas with persistent snow cover. Forests dominated by balsam fir occur only in deep, sheltered valleys. Extensive areas of black spruce tuckamoor occur on slopes and in valleys.

1.3.2.3.1 Buchan's Plateau-Topsails

A small part of the Buchan's Plateau-Topsails subregion occurs in District 16. The northern extensions of the Topsails and possibly White Bay Downs are also part of this subregion. Most of the ecoregion is barren. Dwarf shrub heaths, shallow patterned peatlands, and areas with low "Krummhotz" or tuckmoor dominate the landscape. Small patches of forest occur in some sheltered valleys.

The northern portion of District 16 is encompasses by the southern extent of this subregion. The best developed snow bank vegetation occurs in this subregion. Mountain alder thickets are characteristic of alluvial soils in deep valleys. Many northern plant species occur in the forested valleys.

1.3.2.4 Western Newfoundland Ecoregion

This ecoregion just touches District16 and is characterized by a humid climate with a relatively longer frost-free period. It contains some of the most favourable sites for forest growth although there is considerable variation due to altitude and proximity to the coast. The dryopteris-hylocomium-balsam fir forest type is the zonal forest for this region. The zonal soils are nutrient rich humic podzols with a very dark podzolic B horizon due to humus enrichment. The absence of prolonged dry periods appears to have excluded fires from all but the coarsest textured soils. Consequently, balsam fir rather than black spruce is the dominant forest cover. Yellow birch is common and it displays its best growth in protected valleys below 200m elevation. This species also occurs in less vigorous forms in the Maritime Barrens and Avalon Forest Ecoregions, but it is absent at higher elevations and north of Deer Lake. Red maple is also most common and robust in this ecoregion.

As a general rule overstocking is a more common silvicultural problem than understocking in western Newfoundland. Localized regeneration failures can occur in forests with a very dense fern and herb stratum such as the rubus-balsam fir and the dryopteris-balsam fir forest types. On these types, hardwoods, particularly mountain maple on seepage slopes, can form semi-stable thickets. These thickets may eventually develop into hardwood forest types. The development of ericaceous heath after logging or fire is only observed on very small areas of coarse textured till. This is in stark contrast to central Newfoundland where succession to kalmia heath is a common occurrence. The Western Newfoundland Ecoregion is subdivided into six subregions.

1.3.2.4.1 Corner Brook Subregion

This subregion is characterized by hilly to undulating terrain from Bonne Bay to Stephenville and east to Grand Lake. The parent materials in this subregion are dominated by slates and limestone till. Areas with calcareous till are distinguished by the occurrence of light colored marl deposits around ponds and in valleys. The parent material consists of shallow, stony silt loam underlain by limestone bedrock or calcareous basal till. The rugged topography is dominated by the taxus-balsam fir and dryopteris-rhytidiadelphus-balsam fir forest types.

The hilly, non-calcareous terrain in this subregion is dominated by shallow loamy soils over shale bedrock. However, the shallowness of the till does not adversely affect forest growth since nutrient rich seepage waters are held in the rooting zone by bedrock or a fragipan layer. The steep topography is dominated by the dryopteris-balsam fir forest and supports some of the most productive stands in Newfoundland.

1.3.2.5 North Shore Forest Ecoregion

This ecoregion includes the coastal zone along the north side of the Island extending from the Bonavista Peninsula to the tip of the Baie Verte Peninsula. This ecoregion is mainly forested and black spruce stands are common. Increased wind exposure causes a decrease in the quality and height of the forest towards the coast therefore coastal headlands are dominated by barrens. Overall, vegetation is similar to the Central Newfoundland Ecoregion, however, white spruce is more abundant and aspen is less common.

The topography is irregular along the coast with many bays and inlets extending inland and is rolling to hilly. Elevations in this ecoregion are highest on the Baie Verte Peninsula reaching 315 m. The climate is the driest on the Island with warm coastal summers and cold winters. High summer temperatures can cause moisture deficiencies. The growing season is approximately 150 days and precipitation ranges from 900-1200 mm.

1.4 Ecosystem Dynamics

1.4.1 Ecosystem Condition and Productivity

As with other parts of the Newfoundland and Labrador's boreal forest, those of Planning Zone 7 have evolved in concert with a history of fire, insect attack and subsequent wind throw. Human intervention in this forest has been extensive and widespread with a resultant significant impact on current landscape patterns.

Landscape patterns determine the variety, integrity, and interconnectedness of habitats within a region. These landscape patterns are a direct result of the relationship between physical landforms and soils, disturbance history, and relationships among various species that make up the ecosystem communities. These factors, while listed separately for clarity, are unavoidably interrelated. Landscape patterns play a pivotal role in determining the current conditions and health of forest ecosystems. These variables are evaluated in terms of productivity, stability and resilience.

Another important role determining the condition of a forest is change. Forests are an ever evolving entity, resisting stagnation, and constantly moving through their cycles of life, death, and renewal. The process of change over time is the essence of nature itself. It has been nature's underlying storyline since time began, and will continue to be until time ends.

The main forces of change in our natural forest ecosystems are disturbance and succession. A definition of disturbance would indicate that it initiates a change in a community structure which often ends up in the replacement of one set of species by another. However, replacement is not always the end result (e.g., a species like black spruce is aided in germination by disturbances like forest fire).

Disturbances range from the fall of a single tree, to the destruction of thousands of hectares by forest fires. While disturbances may be very destructive, they can often rejuvenate ecosystems and diversify landscapes.

Succession involves changes in both community composition and in the ecosystem structure and process. Succession is the orderly change whereby the dominant species is replaced by another species, then another etc. until a new dominant species establishes a relatively stable community.

The following sections will discuss each of these concepts in more detail as they relate to the ecosystems of Planning Zone 7. For the most part this section will be descriptive and explanatory in nature. Specific examples of strategies and linkages to the Provincial Sustainable Forest Management Strategy will be detailed in subsequent sections.

1.4.1.1 Productivity

Productivity is the accrual of matter and energy in biomass. In simple terms, primary productivity is the sum total of all biomass produced through photosynthesis. Secondary productivity occurs when this "primary" biomass is ingested and is added to that organism's biomass. Since secondary productivity is directly dependant on primary productivity, it is this primary productivity component that drives the system.

The level of primary production is dependant on the ability to produce biomass. This in turn is dependent on landscape features, soil, climate etc. In general terms, the more productive (ability to grow trees) a site is, the higher level of primary productivity. For example a forested stand would have a higher primary productivity than a bog or a good site would have a higher potential than a poor site.

Overall, the landscape in Planning Zone 7 has approximately 50 percent productive forest. As well, the relative proportion of site types is 10 percent good, 70 percent medium and 20 percent poor with a mean annual increment (MAI) of 2.6, 1.7, and, 0.8 m3/ha/yr respectively. The distribution of productive sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils.

The more productive areas of the zone occur in the lowlands. These areas have deeper soils and less exposed bedrock. The landscape patterns are more consistent and the growing season is longer. In the northern part of District 16 and along the coast in District 9 the soils are shallower with bedrock at or near the surface. The terrain in much rougher and the growing season is shorter (130 as opposed to 160 days).

In practice, it is nearly impossible to measure the amount of biomass produced in an ecosystem, or the energy consumed in the process. However, in the Provincial Sustainable Forest Management Strategy, criteria and indicators to monitor productivity have been identified. One method outlined is tracking mean annual increment in m3/ha/yr of tree species by ecoregion. This can be readily measured over time and manipulated through silviculture treatments or affected by poor harvesting practices which increase soil compaction. An example of secondary productivity is the number of moose per unit area. One must also recognize the forests inherent biological limits however, when attempting to measure or manipulate site productivity.

1.4.1.2 Resilience

Ecosystem resilience reflects the ability of the ecosystem to absorb change and disturbance while maintaining the same productive capacity and the same relationships among populations. Healthy forest ecosystems maintain their resilience and adapt to periodic disturbances. The renewal of boreal forest ecosystems often depend on these disturbances. Resilience is characterized by the forest's ability to stabilize vital soil processes and maintain succession whereby the system is returned to a community composition and the productivity level is consistent with the ecosystems physical constraints. To a large degree, a forest ecosystems' resilience is controlled by properties such as climate, parent soil, topography and flora.

The potential for populations to recover from low levels following disturbance by having adequate regeneration capacity and a balanced distribution of forest types and age classes provides a reliable measure of resilience at the landscape level. Indicators include the percent and extent of area by

forest type and age class and the percentage of disturbed areas that are successfully regenerated. Resilience is determined by measuring and monitoring these parameters. Forest activities must be carefully planned to not upset the natural balance and lower an ecosystem's resilience. An example is harvesting on the more fragile sites where steep slopes and shallow soil over bedrock increase the potential of site degradation beyond repair.

1.4.1.3 Stability

Nature is constantly changing and going through the unending processes of disturbance, growth, senescence, and decay. Therefore, stability of a forest ecosystem does not refer to one fixed position without variation. Ecosystem stability is more accurately defined as the maintenance of ecosystem changes within certain boundaries and the functional continuation of important potentials and processes such as energy capture.

There are three levels of stability; species stability, structural stability, and process stability. Species stability is the maintenance of viable populations or meta-populations of individual species. Structural stability is the stability of various aspects of ecosystem structure such as food web organization or species numbers. Process stability is the stability of processes such as primary productivity and nutrient cycling. To put stability in perspective, it must ensure that the system does not cross some threshold from which recovery to a former state is either impossible, (extinction) or occurs only after long time periods or with outside inputs (eg. loss of topsoil)

Some indicators of stability which can be monitored are: area of forest converted to non-forest use, area, percentage and representation of forest types in protected areas, percentage and extent of area by forest type and age class, and change in distribution and abundance of various fauna. These indicators can be measured and monitored to ensure stability is maintained and to evaluate the impact, if any, of forest activities on ecosystem stability.

1.4.1.4 Disturbance Regimes and Successional Patterns

There are four main driving forces that cause disturbance in the boreal forest. As stated in section 1.4.5, harvesting accounts for the majority of disturbance in the zone and occurs on a regular and consistent basis. Fire and insect damage are the other two major disturbances and occur on a more irregular or cyclic basis. With the exception of a major atypical windstorm, wind throw usually occurs after a stand is weakened by some other agent like insects. For this reason successional patterns after insect damage and wind throw will be discussed together. The following is a brief synopsis of successional patterns after each major disturbance type by forest type, site type, and ecoregion.

1.4.1.4.1 Harvesting

Regeneration patterns in the black spruce type after harvesting is generally back to the black spruce type with a minor component of balsam fir and some white birch on the better sites. There is a higher component of black spruce regeneration in the Central and Long Range Barrens Ecoregions (CLRBE) than in the Western and Northern Ecoregions (WNE). There is substantial regeneration failure in this forest type with average not sufficiently restocked (NSR) rates at 25 percent in CLRBE and 45 percent in WNE. Another general trend is that the poorer the site quality the higher the NSR rate. These sites would be candidates for planting with black, white, or Norway spruce. An exception to this trend occurs when the pre harvest crown density is class 2 or denser. On these areas, black spruce layering is prevalent and is responsible for the majority of stocking. In some instances where balsam fir does regenerate on black spruce sites it becomes very chlorotic at a young age and is highly susceptible to attack from the balsam woolly adelgid.

In the balsam fir types, regeneration success back to balsam fir is much higher averaging 75 percent in CLRBE and 85 percent in WNE. Regeneration rates to balsam fir are higher on the poor sites and fall off somewhat as site quality increases. There is also some regeneration to black spruce and softwood hardwood mixed wood types with the former being more prevalent in the CLRBE. Regeneration failure is relative constant across all ecoregion types at 10 percent.

Regeneration pattern in the mixed wood types is generally back to mixed wood that is dominated by balsam fir and white birch. In the CLRBE there is a larger component of black spruce regeneration after harvesting than in the WNE. There is a higher component of white birch regeneration after harvesting in types that had a higher percentage of hardwood before harvest. As well, the better the site class the more hardwood regeneration. Regeneration failure on the mixed wood types is highest in poor sites and lowest on the better sites.

There are few pure hardwood stands in the zone. Harvesting of these sites has only recently been occurring with the development of a value added hardwood industry therefore regeneration patterns are unknown. Anecdotal evidence from domestic cutting in these types indicates that they will regenerate to mixed wood types dominated by balsam fir and white birch.

1.4.1.4.2 Fire

Since black spruce is a fire adapted species, it is not surprising that it is the most prolific regeneration species after fire across all forest types, site types and ecoregions within the zone. It regenerates as pure stands or in combination with white birch. Balsam fir is conspicuously absent after fir because most advanced regeneration in the under story is killed by the fire. Black spruce regeneration is somewhat correlated with the amount present in the pre fire stand. Generally, the higher the component of black spruce in the original stand, the higher the percentage of regeneration to black spruce. In mixed wood stands a higher component of white birch and sometimes trembling aspen is present after fire. Fire in pure hardwood stands can sometimes regenerate to trembling aspen in certain areas. Regeneration failure after fire is on average 20 percent across all forest types and is higher as sites get poorer.

1.4.1.4.3 Insect

Balsam fir is highly susceptible to insect attack from the hemlock looper, balsam woolly adelgid, balsam fir sawfly, and spruce budworm whereby black spruce is hardly impacted by these insects.

For this reason, stands with a high component of balsam fir are more susceptible to insect attack and subsequent wind thrown.

Mature balsam fir types usually regenerate to balsam fir or to balsam fir hardwood mixtures. Disturbance by insect kill in young balsam fir stands can cause succession to white spruce. Regeneration patterns in mixed wood types usually depend on the type of mixture. If black spruce is a component then it will persist and form part of the new stand. Otherwise balsam fir and balsam fir/hardwood mixtures regenerate after insect attack. Regeneration failure occurs approximately 20 percent of the time particularly if pure stands of immature balsam fir are killed.

1.4.2 Biodiversity

Biodiversity is a term used to describe the variety of life on earth. A basic definition of biodiversity includes the variety of animals, plants and microorganisms that exist on our planet, the genetic variety within these species and the variety of ecosystems they inhabit.

Some scientists estimate the total number of species on earth between two and 100 million, however, the best estimate is considered to be within the range of 10-30 million. This is remarkable considering only 1.4 million species have actually been given names. The largest concentration of biodiversity on the planet is found in the tropical areas of developing countries. Small areas of rainforest often contain species that are found nowhere else on earth. Mishandling even small tracts of land could lead to extinction of several species, one of which may hold the key for the prevention or cure of some disease.

While the boreal forest does not have the extent of biodiversity that some of the equatorial regions possess, Canada does have just over 70 000 species of plants, animals, and micro organisms in its boreal and other forest regions. An equivalent number remain un-described or unreported by science. While the boreal forest has less diversity of large plants than many other forest regions, it has greater

biological diversity in some micro organisms. For example, the boreal forest has fewer tree species than the tropical rainforest but 500 times as many mycorrhizal fungi. Despite the large number of organisms contained within the boreal forest, only five percent are actually plants and vertebrates. The other 95 percent remain largely unrecorded and unstudied. As a result, we need to conduct more surveys and studies and manage with caution so that species are not inadvertently wiped out.

Biodiversity provides such essential services for humans as climate control, oxygen production, purification of freshwater supplies, carbon dioxide removal from the atmosphere, soil generation, and nutrient cycling. Without the species that provide these processes, humanity would be unable to survive.

There have been several international initiatives during the 1900's directed at developing strategies to protect Earth's biodiversity. Canada signed the *United Nations Convention on Biological Diversity* in 1992 at the Rio de Janeiro earth summit. All governments at both the federal and provincial level have agreed to meet these objectives through implementation of the 1995 *Canadian Biodiversity Strategy: Canada's Response to the Convention on Biodiversity.*

The three components of biodiversity are species diversity, genetic diversity, and ecosystem diversity.

1.4.2.1 Species Diversity

Species diversity describes the overall range of species in a given area or ecosystem. Species are groups of animals, plants, and micro organisms capable of producing fertile offspring. An example would be all breeds of domesticated dogs are of the same species, while dogs and cats are members of different species. Species extinction is the most dramatic and recognizable form of reduced biodiversity; habitat loss the most drastic in terms of far reaching effect. The prevention of species extinction is a key factor in the conservation of biodiversity. Changes in species population levels indicate the potential for serious changes in ecosystem integrity.

1.4.2.2 Genetic Diversity

Genetic diversity describes the range of possible genetic characteristics found within and among different species. Hair and eye colour, weight and height, are examples of genetic diversity found in humans. Genetic diversity within species is the foundation of all biodiversity. Assessing genetic diversity does not mean tracking every gene in the zone's forest. Responsible planning should design and implement measures which maintain or enhance viable populations of all forest vegetation species and which use the genetic diversity of commercially important species to a maximum benefit. The genetic diversity of commercially important species can also be managed to increase economic benefit from some portions of the landscape while allowing other portions to provide greater social and ecological values. Genetic diversity is the basis by which populations (flora and fauna) can adapt to changing environmental conditions.

1.4.2.3 Landscape Diversity

Ecosystem diversity describes the range of natural systems found throughout a region, a country, a continent, or the planet. Wetlands and grasslands are examples of ecosystems in Canada. A complex and intricate mix of plants, animals, micro organisms and the soil, water, and air they occupy create virtually limitless ecosystems around the world.

A forest interspersed with barrens, marshes, lakes and ponds provides for diversity across the landscape. Each ecoregion in the province should have representative areas protected which displays the diversity where such exists. These areas can serve as a benchmark from which to measure and guide management decisions. These representative areas protect the integrity of the ecoregion and are vital for guiding management actions. As benchmark areas, they will illustrate the multi-species mosaic that planning actions must maintain. One unique aspect of landscape diversity in Planning Zone 7 is the presence of an old growth forest in the northern part of District 16.

As stated, specific examples of on the ground actions in support of these concepts will be presented throughout the plan.

1.5 Forest Characterization

1.5.1 Land Classification

Table 3 displays the land classification broken down by ownership and district for Planning Zone 7. The total mapped land area in the zone is approximately 1.2 million hectares. There is also around 30000 hectares in District 16 that is not mapped but will be during the next inventory cycle. There are four basic categories that currently represent how the land is classified; productive, non productive, non-forest and fresh water. The ratios across ownerships in each district are fairly consistent with some minor variations. Individual break outs by district and owner are shown in Table 3. Figures 4 and 5 displays the relative percentages of each major land class category in each district with all ownerships combined.

In general, District 9 has 55 percent of its total land area in the productive forest category while District 16 has 38 percent. The higher the percentage of productive forest generally means that the forest is more contiguous and not as fragmented by bog, scrub and water. This has implications for harvesting and road building costs which are generally higher when the forest is more fragmented. Another point is that the Forest Service is now classifying scrub by site, height and density class as new inventories are completed. This information will be invaluable in determining which scrub area are marginally productive or can meet some other non-timber objective.

Table 3 Land classification by district and ownership in hectares for Planning Zone 7.

Land Class	Ownership				Total		
	Crown		CBPPL				
	9	16	9	16	9	16	Total
disturbed	5199	6345	7575	6241	12674	14448	27122
age class 1	35285	11881	51597	30354	86882	42235	129117
age class 2	31338	6483	28541	15253	59879	21736	81615
age class 3	14647	3536	26748	19905	41395	23440	64835
age class 4	19662	3534	12657	14119	23319	17753	41072
age class 5	26448	6355	20137	9375	46585	15730	62315
age class 6	17320	26739	17285	10403	34605	37142	71747
age class 7	10377	35531	22959	23272	33336	58804	92140
Total Productive	151214	100505	187497	128932	338711	229437	568148
softwood scrub	52703	115636	72093	98424	124796	214062	338858
hardwood scrub	2054	549	2743	2436	4797	2985	7782
Total Non-Productive	54757	116185	74836	100864	129593	217049	346642
rock barren	12311	7672	5552	3360	17863	11033	28896
soil barren	3455	18941	9325	6635	12780	25581	38361
bog	18581	35225	48814	33721	67395	68944	136339
cleared land	1594	1091	1324	1222	2918	2313	5231
agriculture land	355	1477	79	389	434	1866	2300
residential	1698	519	459	448	2157	967	3124
right of ways	502	240	518	1042	1020	1282	2302
miscellaneous	44	304	66	112	110	416	426
Total Non Forested	38540	65472	66138	46929	104678	112401	217079
Fresh Water	18683	21494	28488	21970	47171	43355	90526
Total All Classes	263194	303111	356959	298630	620153	602241	1222394

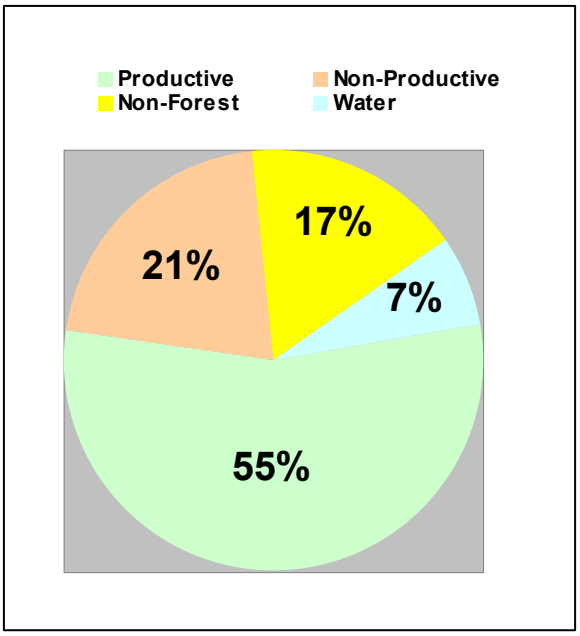


Figure 4 Land class breakout for all ownerships in District 9

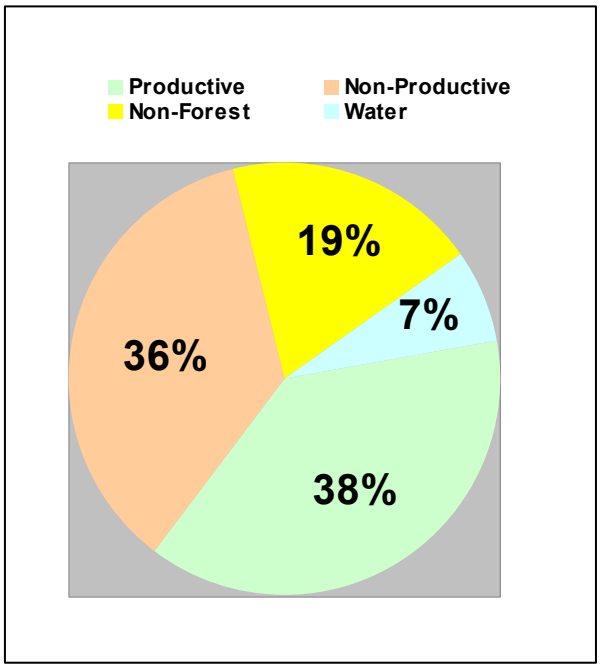


Figure 5 Land class breakout for all ownerships in District 16

1.5.2 Age Class

Individual tree ages in a stand can all be the same after fire or planting however, in most cases the ages vary. Foresters describe ages in terms of age classes which generally encompass 20 years. The age classes present in the zone are regenerating (age class 1, 0-20 years), immature (age class 2, 21-40 years), semi-mature (age class 3, 41-60 years), mature (age class 4, 61-80 years), and over mature (age class 5, 81-100 years), (age class 6, 100-120 years), (age class 7, 120+ years). The combined age class distribution in each district for the entire productive forest is shown in Figures 6 and 7. In general terms, the more balanced the age class distribution in a district, the higher the potential even flow sustained yield of timber can be because continuous timber supply is limited by the age class with the lowest area. The age class structure for District 9 has an abundance of area in the younger age classes with a slight dip at age class 4. All the other age classes are relatively balanced at 40 000 ha. The age class structure for District 16 is typical of that of the island with an abundance of area in the young and old age classes with a dip in the intermediate age classes. The age class structures for both districts are skewed toward CBPPL because that owner controls 58 percent of the area. Age class structures by owner and district will be discussed in more detail in each pertinent five year plan. The age class structures for Crown land in Districts 9 and 16 as well as strategies to rectify any imbalances or impacts on wood supply of poorly structured age classes will be presented in Section 3 of this plan.

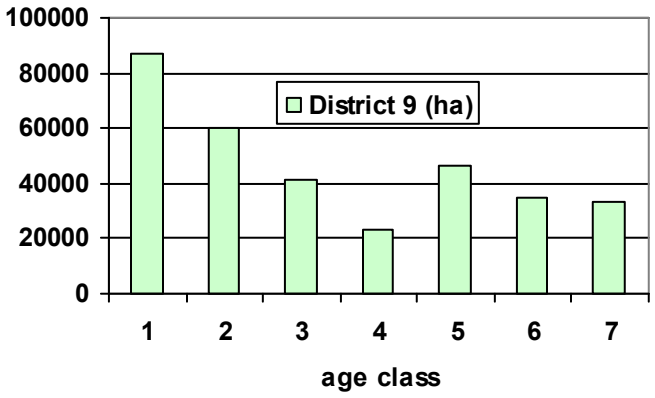


Figure 6 Age class distribution for all ownerships in District 9

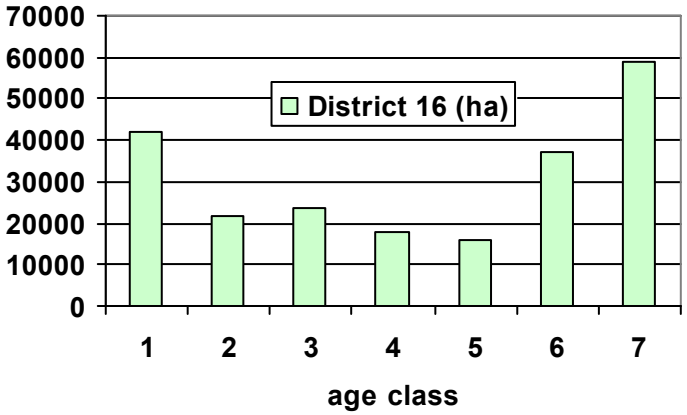


Figure 7 Age class distribution for all ownerships in District 16

1.5.3 Site Class

The productive forest in the zone is further sub-divided along a gradient of productivity ranging from poor to high site class. The site class is determined through air photo interpretation supplemented with field checks and is based primarily on the sites ability to produce timber. Site capability is determined on a number of factors some of which include soil fertility, moisture regime and geographic (slope) position. Generally the balsam fir and softwood hardwood working groups occupy the better sites in the zone. The black spruce working groups dominate the very dry and very wet areas that are of poorer site quality.

The distribution of area of all ownerships combined by site class for each district is shown in Figures 8 and 9. This percentage distribution holds relatively true for individual ownerships with the exception of District 9 whereby the Crown has a higher proportion of poor sites and ACI has a higher proportion of goods sites. On average, good sites are capable of producing > 2.6 m3/ha/yr, medium sites 1.7 m3/ha/yr, and poor sites 0.8 m3/ha/yr.

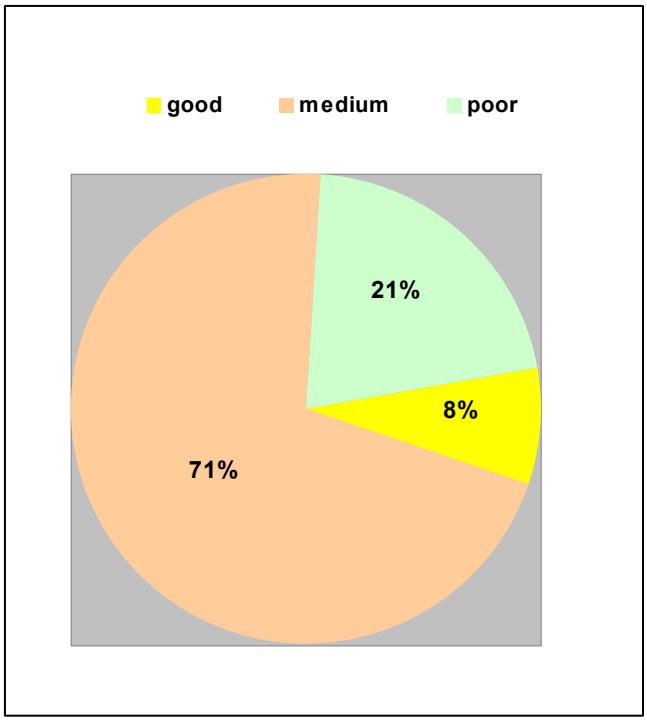


Figure 8 Site class breakdown for all ownerships in District 9

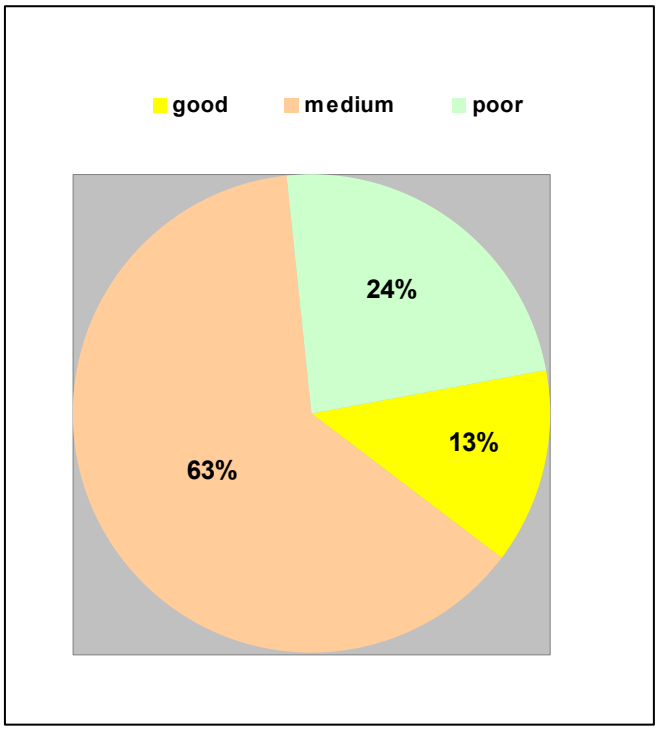


Figure 9 Site class breakdown for all ownerships in District 16

1.5.4 Species and Working Group

Working group describes the dominant tree species present in a forest stand. This species may occupy 100 percent of crown closure of a stand or may be present in association with other species. The working group designation describes the stand in general terms based on the prevalent species whereby species composition describes specifically, the relative proportion of each individual tree species that make up a stand.

In the zone, the softwood working groups dominate accounting for over 90 percent of the productive forest. Balsam fir (bF) is by far the most prolific accounting for 60 percent of the working groups in District 16 and 46 percent in District 9 (Figures 10 and 11). Balsam fir can occur in pure stands or in association with one or more of black spruce, white spruce, white birch, trembling aspen, or larch in varying species compositions. The black spruce (bS) working group is the second most abundant accounting for 26 and 33 percent in Districts 16 and 9 respectively. As with balsam fir, black spruce can occur as pure stands or in association with other species listed above. Softwood hardwood working groups occupy six and 12 percent of the productive forest area in Districts 16 and 9 respectively. This working group occurs as varying mixtures of fir, spruce, birch and aspen. The hardwood softwood (hS), and white birch (wB), trembling aspen (tA), white spruce (wS) and jack pine (jP) working groups occupy less than five percent of the productive forest in both districts. Approximately five percent of the productive forest is classed as disturbed (DI). Disturbances include harvesting, which accounts for most of the total, insect damage, fire, wind throw, and flooding. The relative percentages hold true for all ownerships in both districts.

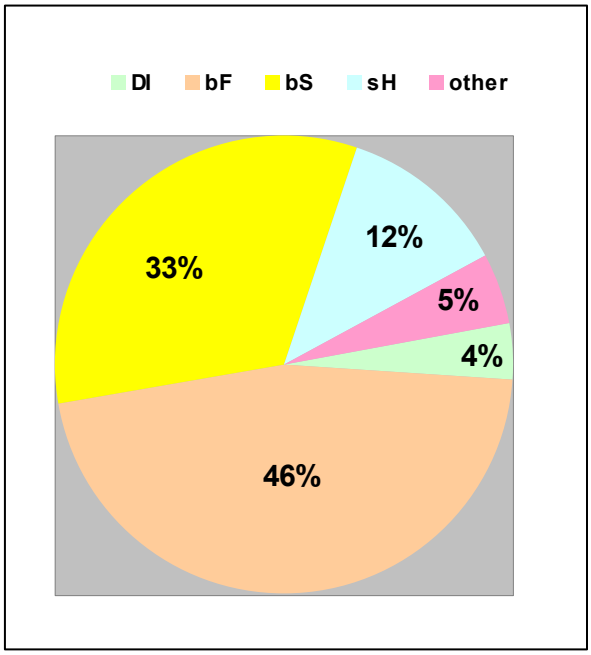


Figure 10 Working group breakdown for all ownerships in District 9

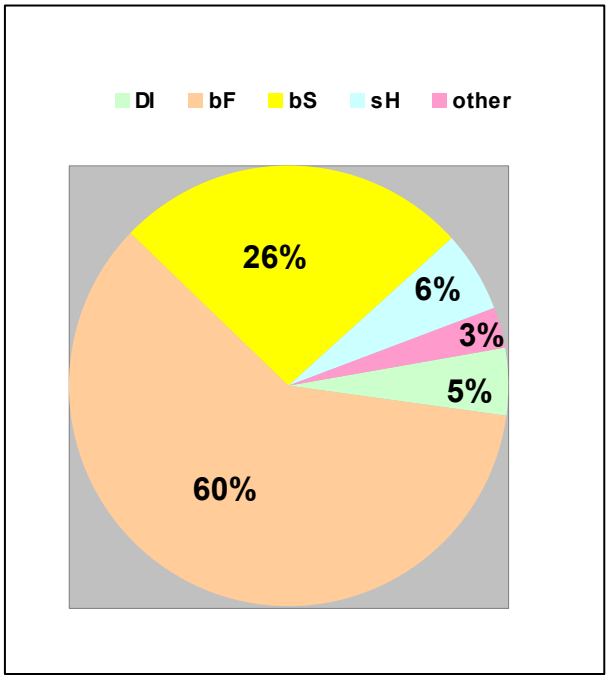


Figure 11 Working group breakdown for all ownerships in District 16

1.5.5 Forest Disturbances

In the past 20-25 years approximately 146 000 ha have been disturbed by some means in the zone which represents 25 percent of the total productive forest. Harvesting has accounted for the largest portion of this disturbance at approximately 125 000 ha. Insect damage has occurred on over 10 000 ha with 10 percent in light (0-25 percent mortality), 10 percent in moderate (26-50 percent mortality), 10 percent in severe (51 -75 percent mortality) and 70 percent in extreme (76+percent mortality). Fire has disturbed over 11 000 ha, mainly in District 9 in the late 1980's and early 1990's. There has been a slight amount of mortality due to blow down. This usually occurs after another disturbance (like insect damage) has weakened a stand.

The main forest insects which have affected forests in the zone are the hemlock looper (1949, 1961, 1962, 1969, 1986-88, 1995, 1996), the spruce budworm (1956, 1978-80 to present at lower levels), the balsam woolly adelgid (1963, 1970-present) and the birch casebearer (1970-present). To aid in the control of the hemlock looper, a chemical spray program was initiated in 1969. Since then the aerial application of insecticides has been used regularly as a management tool to control insect pests of balsam fir. In more recent years chemical insecticide use has been dropped in favour of the more environmentally benign bacillus thurengiensis (bT), a naturally occurring, biological control agent. Despite the use of insecticides, the hemlock looper, spruce budworm, and balsam fir sawfly continue to pose a significant threat to the forests of the zone due to the dominance of balsam fir. New infestations are likely to develop over the next 20 years. The balsam woolly adelgid also poses a threat to balsam fir. The dynamics of this insect and its potential impact on the forests, particularly in District 16, will be discussed a later section on silviculture prescriptions.

Section 2 Past Activities Planning Zone 7 – Corner Brook Pulp and Paper Limited

2.1.1 Overview

As stated in the introduction, Forest Management Districts 9, and 16 have been amalgamated to form Planning Zone 7. For consistency purposes, a description of the past five years activities will cover the period from 2007 to 2011 inclusive. This section will include those forest activities within the zone that were on historically CBPPL tenure.

2.1.2 Harvesting

For the most part, the harvest was distributed throughout FMD's 9 and 16. In total, over the five-year period, there was approximately 896,577m ^{3} harvested on CBPPL tenure from 2007 to 2011. Table 4 summarizes the total harvest administered by CBPPL in the districts of this Planning Zone.

Table 4 Summary of softwood harvest in Zone 7 by Crown for 2007 to 2011

District	Softwood / Hardwood	2007 (m^3)	2008 (m^3)	2009 (m^3)	2010 (m^3)	2011 (m^3)
9	Softwood	160,019	129,322	100,443	86,122	72,525
16	Softwood	61,623	60,554	124,422	57,067	44,480

Note: table includes estimates for 2011

2.1.3 Silviculture

Table 5 summarizes the silviculture treatments completed for the past five years. There were a total of 9,737 ha of silviculture treatments completed by CBPPL within Planning Zone 7 from

2007 to 2011. By treatment, 1968 ha of site preparation, and 1064 ha of planting and 1627ha of PCT were completed.

Table 5 Summary of CBPPL silviculture treatments in Planning Zone 3 from 2007 to 2011

District	Planting / PCT / Scarification	2007 (ha)	2008 (ha)	2009 (ha)	2010 (ha)	2011 (ha)
9	Planting	0	0	208	77	330
	Scarification	0	208	77	479	425
	PCT	262	229	0	0	0
	Prescribed Burn	0	0	0	148	0
16	Planting	0	234	84	37	94
	Scarification	0	0	131	0	300
	PCT	325	0	185	296	330
	Prescribed Burn	0	0	0	0	200

2.1.4 Road Construction

There were 97.4 km of new primary access roads constructed in Planning Zone 7 by the CBPPL. Table 6 summarizes the roads constructed in each district. All roads built during the period were required to access commercial timber.

Table 6 Summary of CBPPL primary access roads built in Planning Zone 3 from 2007 to 2011

District	2007 (Km)	2008 (Km)	2009 (Km)	2010 (Km)	2011 (Km)
9	25.9	21.4	4.8	9.7	8.5
16	14.6	4.0	2.5	3.0	3.0

NOTE: All summary numbers submitted for 2011 are estimates based on planned activities.

2.1.5 Natural Disturbance

2.1.5.1 Fire

Planning Zone 7 does not have a very active fire history due to its long winters with abundant precipitation. Very little productive forest is lost each year due to fire.

2.1.5.2. Insect

There has been little insect activity in District 9 over the past 7 years. There have been approximately 2 300 ha defoliated by the hemlock looper mainly in 2009 and 2010. There was a small treatment program of approximately 19000 ha with bacillus thurengiensis (bT) in 2010 and as a result of the infestation in 2009-10. Populations of this insect are being closely monitored since a large portion of the district is comprised of highly susceptible balsam fir.

There has been light insect activity in District 16 in the last five years. There were over 7 600 ha defoliated by the hemlock looper in 2008-10 and a subsequent treatment of 19 300 with bacillus thurengiensis (bT) in these three years. Populations of this insect are being closely monitored since a large portion of the district is comprised of highly susceptible balsam fir. The balsam woolly adelgid population and distribution has been increasing in the District in recent years. If it continues to spread, the presence of this insect will have a major influence on the silviculture treatments in the future. Treatments will move toward stand conversion, after harvest, of highly susceptible balsam fir to spruce.

Section 3 Timber Supply Analysis

Note that any numbers presented are interim and may be subject to change when the results of the timber supply analysis are officially released

In 2009, the Forest Service began another review of the provincial timber supply which was completed in January of 2011. Consistent with department's vision, the analysis was structured to determine sustainable timber supplies while respecting a multitude of social, economic and environmental objectives. Timber supply, in this context, refers to the rate at which timber is made available for harvesting on a sustainable basis.

The determination of supply (represented as AAC's) involved the use of computer models that forecast the sustainability of possible AAC levels. These models require three basic inputs. First, a description of the current state of the forest (forest characterization and availability), second, the growth rates associated with the current forest, and third, the management strategies applied to the forest. To arrive at these basic inputs requires careful and detailed consideration of a broad range of both timber and non-timber values. More specifically, the following was considered in determining the sustainable timber supply.

3.1 Forest Characterization

To get a current description of the forest resource (or stock), the province has invested significant resources into creating and maintaining a Provincial Forest Inventory. An estimate of forest stock is kept current through an update program which is conducted each year to account for all natural and man-made disturbances such as fire, insects, and harvesting, and any enhancement programs such as tree planting and pre-commercial thinning. Also, each stand in the forest inventory is updated to reflect any yield changes that may have occurred since the previous inventory update.

3.2 Land Availability

The updated Forest Inventory was reviewed and classified at the stand level on the basis of the availability of each stand for harvest. The classification system consists of two broad classes; class 1 - available for harvest under normal conditions, and class 3 - has restrictions for harvesting due to economic constraints. The class 3 has been further subdivided into a) can be harvested with reasonable economic restrictions (expensive wood) and b) highly unlikely to be

harvested under current economic conditions. Only the former portion of class 3 is used to calculate an AAC for that category. The categories associated with the portion of class 3 land, which are deemed unavailable for harvest, incorporates a broad range of timber and non-timber values. These values include:

3.2.1 Non-Timber Related

Consideration of these non-timber values had a direct impact on provincial AAC's. It is obvious that as the amount of productive forest land available for timber management drops, so too will the AAC. With the current restrictions, the AAC land base (area where harvesting operations can occur) is only 17% of the total landmass on the island or 66% of the total productive forest land base. In any one year, less than1% of the productive forest land base is influenced by harvesting operations.

3.2.1.1 No-Cut Buffer Zones

The province has guidelines that require all water bodies (visible on a 1:50,000 map sheet) be given a minimum 20 meter (from waters edge) uncut buffer. In addition to these legislated water buffers, District Ecosystem Managers, in consultation with planning teams, have increased buffer zone widths beyond the 20 meter minimum to protect special values such as; salmon spawning areas, cabin development areas, aesthetic areas, wildlife habitat, outfitting camps, etc.

3.2.1.2 Pine Marten and Caribou Habitat

Habitat specialists are working in consultation with industry to ensure adequate habitat will be available for the pine marten and caribou into the future. This work is examining the quantity and quality of habitat as well as the connectivity of habitat. The team is also looking at how this arrangement of habitat would change over time. Results from any ongoing studies and research are incorporated during the timber supply analysis where possible or are used to conduct sensitivity analysis.

3.2.1.3 Protected Areas

All established and proposed protected areas under the Natural Areas Systems Plan are removed from the AAC calculations.

3.2.1.4 Watersheds

For each forest management district several of the major watersheds were digitized and captured within the forest inventory. These watersheds were added to the database in order to address any concerns about forest management within these watersheds and to permit the Forest Service to report on proposed activities within the watershed over time. This is in line with Value 3.1, Water, of the Soil and Water Element of Criterion 1, Biodiversity, in the *Provincial Sustainable Forest Management Strategy.*

3.2.2 Timber Related

Compounding the effect of downward pressure on the AAC, the department also reduces the AAC's by taking into account other potential losses of timber:

3.2.2.1 Insect/Fire/Disease Losses

The department reduces AAC's to account for anticipated future losses resulting from insects, disease and fire using historical information.

3.2.2.2 Logging Losses

Surveys of recent harvested areas are conducted each summer throughout the province to determine the quantity and quality of fiber remaining. The estimates of loss from these surveys are used to reduce the AAC.

3.2.3.3 Operational Constraints

Areas that are inaccessible (surrounded by bogs or hills), timber on steep slopes, and low volume stands are removed from the class 1 AAC calculation up front. Also, significant adjustments are applied to the provincial forest inventory for stands deemed operable in the timber analysis but left unharvested within operating areas. The reasons for this are linked to the character of Newfoundland's forests; low volume, steep slopes, rough terrain, and excessively wet ground conditions etc.

Again, all these timber and non-timber related issues are applied directly in the AAC calculation to ensure harvest levels do not exceed the sustainable level. With the introduction of new values and the broader application of current values, the pressure on future AAC's will continue to increase. These factors and their impacts on timber supply will be further discussed in section 3.5.

3.3 Growth Forecasting

A key requirement for forecasting future wood supply is an understanding of how forest stands grow and develop through time. That is, as a forest stand develops, how much merchantable (i.e. harvestable) volume does it carry at any given point? These yield forecasts (referred to as yield curves) are required for each type of forest stand (called a stratum) comprising the forest under consideration. In Newfoundland there are dozens of distinct forest strata for which separate yield curves are required. These are defined by the tree species in question (e.g., balsam fir, black spruce), the site quality (e.g., good, medium, poor), the geographic region (e.g., the Northern Peninsula, Western Newfoundland) and other factors likely to affect yield.

Yield curves are a key element in a wood supply analysis. In fact, the validity, or "usefulness", of the wood supply analysis is determined by the truth, or "correctness", of the yield forecasts. While there is no way of predicting with certainty how stands will actually grow in the future, care must be taken to ensure that the yield projections used are realistic and reasonable. Respecting the sensitivity and importance of these forecasts, the Newfoundland Forest Service has directed a large portion of its resources and time into developing realistic yield curves. Two growth models were used, one for projecting stand development under natural conditions and the other for projecting growth under managed (i.e., silviculturally enhanced) conditions. Tree and stand development data generated from the Forest Service's forest inventory program were used to make stand growth predictions. These projections were then checked against empirical data from thousands of temporary plots established throughout the island. If the projections varied from the real life evidence, the curves were adjusted to make them more accurate.

In this analysis, yield curves were developed on an ecoregion basis. As well, special yield curve sets were developed for defined geographic areas with demonstrated uniqueness. These included areas where chronic insect activity is ongoing and areas that have unique growth characteristics.

3.4 Management Strategies

With the current state of the forest described and the yield forecasts developed, the next step was to design a management strategy for each sector of the forest. The key objective was to maximize long term AAC while at the same time taking into account other forest values. This involved developing strategies that minimize fiber losses, and enhance forest sustainability.

3.4.1 Harvest Flow Constraints

An even-flow harvest constraint was used in the analysis to maximize the sustainable harvest level. This strategy produced the maximum even flow harvest but resulted in less than optimum economic use of the forest resource. If no even flow constraint is used and harvest levels are

permitted to fluctuate in response to market value, the overall economic potential of the forest will increase. However, the lower economic potential is offset by stability in mills and employment. This is in line with Goal 1 of Value 5.1, Commercial Timber, of the Economic Benefits Element of Criterion 5, Economic and Social Benefits, in the *Provincial Sustainable Forest Management Strategy.*

3.4.2 Spatial Analysis

A major improvement in the wood supply analysis is the introduction of manual harvest scheduling. In 2001, the harvest scheduling was an automated process where the software picked the stands to be harvested over the 25 years based on user supplied criteria. While, the 2001 approach was an improvement over previous wood supply analysis where no harvest scheduling was done, the software used cannot realistically know all the operational restrictions within a forest management district. In the manual process, the on the ground conditions that restrict harvesting are accounted for when a spatial harvest schedule is defined. The proposed harvest schedule is then played back through the modeling software to see if it is sustainable and see if non-timber objectives are met. In most case, this harvest schedule has to go through several cycles before an acceptable harvest schedule could be found. The spatial arrangement of areas for timber harvesting is especially challenging in this province because of the natural fragmentation of our forests. This model provided forest planners with the ability to mimic realistic timber harvest schedules based on current practices and to identify other forest stands that are not as accessible for harvesting.

Manual harvest scheduling has several major benefits. First, it fosters the long term sustainability of our AAC's by mimicking current harvest practices and accounting for actual on the ground conditions that delay or restrict the harvesting of stands. These restrictions, which were previously unaccounted for, have made our past AAC's higher than was realistically sustainable. Secondly, the mapped 25 year harvest schedules build credibility into the forest management process. A common misconception is that the province is running out of wood and

soon will not be able to support existing forest industries. Every stand that will be harvested over the next 25 years must already be in the second (20-40 years old) or third (41-60) age class and can be easily identified and highlighted on the harvest schedule maps. Being able to see the wood that will be harvested in the future will help reassure people that the resource is being used in a responsible manner. Next, harvest scheduling will help integrate the management of other forest resource values into timber management planning. All forest values can be tied directly to discreet forest areas, and these forest areas can be the link that allows the many different forest values to be managed simultaneously. The forested areas needed for each resource can be mapped and potential conflicts can be addressed before they become an issue. Finally, the harvest schedule maps developed for the wood supply analysis can be a starting point for the 5 year planning process, especially the first two periods. The harvest schedule maps, if done correctly, can help reduce the work of the 5 year planning process. One point to note is that harvest scheduling is only done for the class 1 land base. The class 3 AAC, for the most part, is opportunistic at best and is harvested only if extra effort is applied. It is not scheduled because of the uncertainty of obtaining extra funding for access and harvesting.

3.4.3 Planning Horizons

Given the province's commitment to long term sustainability of our forest resource, timber supplies were projected 160 years (equivalent to two forest rotations) into the future to ensure actions and strategies applied today will result in a sustainable forest in the future. Long term planning is fundamental in timber supply forecasting.

3.4.4 Operable Growing Stock Buffer

The province imposed an operable growing stock constraint in the analysis to ensure the sustainability of calculated timber supplies. The constraint imposes a condition that in any period there must be a minimum operable growing stock of two times the harvest level on the landscape. In other words, for every hectare that is harvested another harvestable hectare must

exist on the landscape. The requirement for a growing stock buffer is based on a number of factors. First, several of our non-timber objectives are not explicitly accounted for in our planning process and therefore will require a growing stock buffer to achieve them. Second, we are unable to follow optimum harvest schedules explicitly due to operational restrictions on harvesting. Third, the province is not willing to assume high risk with the sustainability of the timber supply. For these reasons a growing stock constraint of two times was used. This constraint was used in concert with harvest scheduling to help map out a reasonable harvest for the next 25 years.

3.4.5 Old Forest Targets

Consistent with our ecosystem policy, the province introduced into the analysis an old forest target that at least 15 percent of forests be older than 80 years. While this is a minimum target, actual results are usually higher. In fact, over the next 25 years there is an average of 23 and 49 percent of 81+ timber left on the landscape for Districts 9 and 16 respectively. There is approximately one percent of the productive landbase disturbed by harvesting each year. This initiative was designed to provide a coarse filter approach to maintaining representative forest structure. It ensures the presence of certain amounts of old forest across the landscape into the future. With advances in modeling, this target can now be tracked across a district rather than a single ownership. This has resulted in this strategy being less restrictive than the last analysis. As well, the site class distribution of the older forest reserve is being examined in an attempt to make it representative of each ecoregion and subregion. This is in line with Value 1.1, Representative Landscapes, of the Ecosystem Diversity Element of Criterion 1, Biodiversity, in the *Provincial Sustainable Forest Management Strategy.*

3.4.6 Operability Limits

Operability limits are the time windows in which forest management actions such as harvesting can be undertaken within forest stands. Stand growth development as measured in stand

merchantable timber volume and individual piece size of trees determine a stands readiness for harvest. In some young stands, one can have acceptable harvest volumes, but still have trees that are too small to harvest. In the 2006 wood supply analysis both stand volume and tree size were used to determine the earliest age when a stand could be initially harvested. In addition to determining the absolute earliest age a stand can be harvested, it was recognized that not all stands on the same site develop exactly the at the same rate. A small portion of a stand will develop faster; a small portion will lag behind; with the bulk of the stand type representing the average condition. Therefore, the first operability limit was staggered by 5 year intervals with the 10 percent, 30 percent, and 60 percent assigned to each availability class listed above respectively. The ending operability limits or the last age in which a stand can be harvested before it becomes too old to harvest is solely determined on a minimum stand volume of between 60 to 80 m3/ha, after which that stand does not have enough volume to make it economical to harvest. It should be noted that while the operability limits define the extreme end points of when stands can be harvested, very few stands are ever harvested at these extreme points. In order to meet other non-timber objectives and in order to maximize the total volume of wood harvested the model schedules stands to harvest somewhere inside the operability limit window.

3.4.7 Silviculture

Silviculture is one of the main forest management tools available to forest managers when they are analyzing the many different future forests that are generated using the wood supply modelling software. The silvicultural actions use in the 2006 analysis include; 1) precommercial thinning of balsam fir, black spruce, and softwood hardwood stands, 2) full plant of any areas that do not regenerate naturally with either white spruce, black spruce, or Norway spruce, and 3) gap planting of either black spruce or balsam fir stands with either white spruce or black spruce. Gap plant is the filling of "holes" within stands that have inadequate natural regeneration of either balsam fir or black spruce. The thinning levels (ha) for districts 9 and 16 used in the analysis were 100 ands 25 ha respectively. The planting levels (ha) for districts 9 and 16 used in the analysis were 100 and 75 ha respectively.

3.5 Inventory Adjustments

One of the limitations of the current wood supply model is its inability to account for volume depletions outside of what is reported for harvesting operations. The model produces a gross merchantable volume (GMV) figure which needs to be adjusted to account for volume losses as a result of; fire, insects and disease, timber utilization practices and the presence of stand remnants. In previous analyses the lack of province wide digital stand information, the absence of computer tools and the small number of people involved with the wood supply analysis, resulted in a high degree of uncertainty around values derived for each depletion. It was recognized that a need existed to study each component more intensely and to expand the time frame and staff responsible for such an analysis. Such was the task of the Forest Engineering and Industry Services Division whose staff, over a seven year period, completed an analysis of the individual components.

3.5.1 Fire

An estimate of productive area loss as a result of fire was based on an analysis of the historical fire statistics maintained by DNR. The fire and insect deduction for operations in both District 9 and District 16 was 2 percent.

3.5.2 Insects

An aerial mortality survey was completed on areas with historically high insect infestations. This information along with a GIS analysis of areas salvaged enabled DNR to determine the amount of productive area lost to insect mortality each year. These numbers were in turn reviewed by district managers and adjustments were made for local conditions. The fire and insect deduction for operations in both District 9 and District 16 was 2 percent.

3.5.3 Yield Comparison

Information for this adjustment was derived by comparing the anticipated volume from an operating area by using the yield curves and operability limits as specified in the timber supply analysis with the actual volume that was attained after harvesting. The difference between the anticipated harvest volume and the actual harvest volume is the deduction applied for yield. The yield deduction for both District 9 and 16 was 16 percent

The total inventory adjustment for both District 9 and 16 was 18 percent

3.6 Timber Supply

The previous discussion in this chapter on wood supply forms the basis of the 2010 analysis. As well, the 25-year spatial plan provided to the planning team during the development of this plan reflects the new analysis conducted in 2010. However, at the time of writing, the new AAC's for the period 2011-2015 were not available publicly for inclusion into this document. As such Table 7 summarizes the results of the 2005 timber supply analysis for District 9 and 16.

However, it should be noted that when producing this plan, Forest Services Branch managers utilized the new wood supply analysis.

Table 7 Annual Allowable Cut results for districts in Planning Zone 7 for 2006-2010

District	Ownership	Softwood		Hardwood	
		Class 1	Class 3	Class 1	Class 3
9	CBPPL	161,000	11,000	10,350	870
16	CBPPL	129,000	30,000	9,140	2,700

Section 4 Values

4.1 Guiding Principles of Sustainability

There are five guiding principles of overall sustainability; environmental, economic, political, social, and cultural sustainability.

Environmental sustainability looks directly at ecosystem health, both now and in the long run. Ecosystem health is determined by such factors as ecosystem integrity, biodiversity, productive capacity, and resiliency as previously discussed. The five year operating plan must ensure that these factors are intact or there would be very few values left to manage.

Economic sustainability demands that forest resources be managed and distributed efficiently and equitably among the stakeholders, within the capacity and limits of the forest ecosystem. Economic development has been given top priority by many of Newfoundland's people and their representative, the government. This will probably remain the case until the economy improves. However, economic development should not proceed without the incorporation of the other factors into the decision making process.

Political sustainability refers to the goals and management objectives being applicable, administrable, and practical. These goals and objectives must then maintain these qualities well into the future with the aid of public input and support.

Social sustainability means fairness and equity to all stakeholders. The forest management strategy should not jeopardize the basic needs of the public; therefore, public involvement and awareness, participation, and decision-making clout are a necessity.

Cultural sustainability is attained by applying Newfoundland's culture to the planning process. A forest management strategy cannot be successful without allowances within the strategy for traditional access and use of the land. For generations, many of Newfoundland's public has had free range in our pristine wilderness, a fact that can not be ignored when planning for the zone.

All are key interlocking components and each must be maintained if sustainable development is to be achieved.

4.2 Value Description

The forest ecosystems of the zone provide a wide range of values to different individuals and groups. These include consumptive values such as timber products, hunting, trapping, sport fishing, and berry picking, and non-consumptive values like skiing, snowmobiling, hiking, and bird watching. Also, there are intrinsic and intangible values such as a feeling of wilderness and peace which some people describe as spiritual. Although difficult to spatially describe or quantitatively measure, these spiritual values are considered to be a product or an accumulation of all values. Other values such as water quality, parks and protected areas etc. provide for the protection of the forest ecosystems which can enhance the other values listed above.

Many of the values in the zone were identified by this or previous planning teams. Presentations of pertinent information on each value by knowledgeable individuals or groups provided stakeholders with relevant information to make informed decisions. Other values, while not specifically outlined by the planning team, are also identified and discussed to provide a more complete description of the range of values found in the zone. The following represents a framework for characterizing values in a clear and consistent manner. This approach consists of three components:

Characterization

• Description: Why the value is important, types of activities, intensity, spatial extent, employment, etc.
• Data in support: Statistical references.

Critical Elements

• Forest Features: Elements at risk from harvesting or enhanced by harvesting (viewscapes, adjacency to water, mountains, habitat, wilderness ambiance, road access, etc.)

Guiding Principles

A guiding principle is defined as "a fixed or predetermined policy or mode of action". These 'modes of action' would be implemented in the five year plan in the form of:

1. policies that should be in place to protect or enhance the resource value;

2. methods for negotiation or inclusion of other stakeholders in resolving potential conflicts;

3. special management provisions/strategies - such as buffer zone consideration, temporal operating periods, modified harvesting, or a best management policy; and/or

4. models and/or forecasting strategies to determine economic contribution, biodiversity impact, or community sustainability

Each individual value was discussed both at the strategic and operational level. Strategic level information (characterization, critical elements, and guiding principles) are the focus of discussion in this section. They provide a mechanism to resolve conflicts that might arise throughout or after the five year planning process. Where possible, the physical location of the value on the landscape (operational level) was also identified during the discussion of each value. This will help facilitate the preparation of the five year operating plan by identifying potential areas of conflicting use early into the process.

In many instances, the EPG's **(**Appendix 1**)** form the guiding principles for a value. Quite often the spatial extent or location of all values is not known (eg., raptor nests). Specific guidelines are still listed in order to provide a direction or course of action when and if these values are encountered.

4.2.1 Biotic Values

4.2.1.1 Big Game

4.2.1.1.1 Moose

Characterization:

Moose are not native to the island. A pair was introduced to Gander Bay in 1878 and two pairs were introduced to Howley in 1904 (Northcott, 1980). Today, moose are distributed throughout the island and the population is estimated to be about 125,000 - 140,000.

Currently, moose are managed on an area/quota system in the province. The island is divided into 50 management areas and license quotas are set annually for each area. Quotas are set based upon the management objective for each area (i.e., whether it is desired that the population increase, decrease or stabilize). Generally, if an area has too high of a moose population, managers will increase quotas to bring down the population in order to prevent damage to the habitat. However, if the habitat is in good condition, and the area could support more animals, future quotas may be increased. All or portions of moose management areas 3, 4, 12, 13, 14, 15 and 41 are located within the zone.

Critical Elements:

Harvesting is not expected to have a negative impact on moose populations in the zone because moose prefer the early seral stages of a forest and generally do well in areas after harvesting.

4.2.1.1.2 Caribou

Characterization:

Caribou is the only native ungulate species on the island (Northcott, 1980). Prior to the railway being built in 1898 there was a healthy population on the island but by 1930 the population had declined to about 2,000 animals (Murphy and Minty 1993). Between 1980 and 2000 the number of caribou has increased considerably on the island with a population estimated at 70,000+

animals. In the past few years however populations have declined significantly with Planning Zone Seven being no exception. All or portions of caribou management areas 62, 66, 69, 78, and 78 are located in the zone.

Critical Elements:

Any potential impact of forestry activities on caribou in the zone depends on the distribution, movements, and habits of these animals. It has been thought that forestry activities in the immediate vicinity of calving areas during the calving period may have an impact on caribou populations. Resent information collected from radio telemetry data suggest that caribou usage of the habitat and dispersal across the landscape may be significantly different than first thought. Forest road construction provides improved access into remote areas, which may account for and contribute to an increase in road-kill and poaching. The abundance and distribution of arboreal lichens has also been shown to impact caribou populations.

4.2.1.1.3 Black Bear

Characterization:

The black bear is native to the island and is found in forested areas (Northcott, 1980). Currently, the number of black bears occurring on the island is not known but is crudely estimated to be about 6 - 10,000 animals (Christine Doucette, Pers. Comm.). All or portions of black bear management areas 3, 4, 12, 13, 14, 15 and 41 are located within the zone.

Critical Elements:

- den sites for winter hibernation;
- forest cover

Guiding Principles:

Big Game Management Strategy (moose, caribou and black bear)

Management of big game species in the province is accomplished by a planning process in which a Big Game Management Plan is prepared annually by the Wildlife Division (WD) of the Department of Environment and Conservation. This process takes into consideration information provided by the public and wildlife and forestry staff. Each year the WD reviews all relevant data, such as recent census work, information provided on license returns, and jawbone or skull data and makes decisions on types and numbers of licenses of each species in each management area. Management of big game in the zone will continue to be addressed through this process.

Moose

Mature stands of timber serve as moose shelter or moose yards and will be identified in consultation with the Wildlife Division.

Caribou

- In areas where caribou utilize lichens, a minimum amount of forest which supports these lichens should be maintained for caribou.

Because the caribou population has experienced a decline in the past, the WD in conjunction with forestry division and industry has identified important caribou habitat areas which were incorporated into a document produced by WD entitled *Forest Management Guidelines for Woodland Caribou for the Island of Newfoundland 2007*. Since that time new information has been collected from radio collared animals which suggest that usage of the habitat and dispersion across the landscape is different from the original thinking. This data will be used to develop a new set of caribou guidelines. The forest service, in conjunction with wildlife division are currently conducting an adaptive management experiment using operating areas from Zone 5 (Districts 10, 11, 12, and 13).

Bear

A 50-metre, no-cut, treed buffer must be maintained around known bear den sites (winter) or those encountered during harvesting. This distance will be reviewed when the EPG's are updated. Den sites must be reported to the WD.

4.2.1.2 Furbearers

Characterization:

A number of furbearers occur in the zone the more prominent of which include lynx, red fox, beaver, otter, muskrat, short-tailed weasel, red squirrel, mink, coyote, and pine marten (will be discussed in more detail in next section). Of these, red squirrel, mink and coyote are not native.

Critical Elements:

- water quality maintenance;
- riparian buffer zones along aquatic areas;
- maintaining a mosaic of forest age and development classes
- snags and coarse woody debris (denning, nesting sites, etc.)

Guiding Principles:

Fur Bearer Management Strategy:

Recommendations concerning the management of furbearer species are developed annually, upon consultation with provincial trappers, Newfoundland and Labrador Trappers Association, general public, and departmental staff. Like the big game management plan, the fur management plan reviews the status of each fur bearer species annually and addresses the season dates and lengths, and if necessary closure of areas (or no open season). Management of all fur bearing species in the zone will continue to be managed through this process.

Environmental Protection Guidelines:

To protect beaver habitat, all hardwoods within 30 metres of a waterbody occupied by beaver are to be left standing during harvesting operations.

4.2.1.3 Species of Interest

4.2.1.3.1 American Marten

Characterization:

Before 1900, American marten ranged over most of the forested areas of the island, however in 1934 numbers had declined significantly and marten were only found in limited regions. (Bergerud, 1969). In 1986, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed the Newfoundland population of the American marten and the species was listed as threatened. Revisions in 1996 and 2000 resulted in an uplisting to endangered due to further declines. Habitat loss, trapping and incidental snaring are possible reasons for the marten population decline. The status of marten has been upgraded from endangered to threatened in 2007 because new population estimates were stable and distribution of marten was increasing. The American marten (island population) is currently (2010) listed as threatened under both the federal *Species at Risk Act* and provincial *Endangered Species Act*.

Since the initiation of the live-trapping program, it has been revealed that Main River, Little Grand Lake and Red-Indian Lake are high-density marten areas on the island. Based on this information, it is important that marten habitat be protected in these areas. Furthermore, it is important that some remnant stands of old growth (80+) forests be left throughout the zone and provision made to have connectivity (i.e., unbroken corridors of forest) between such stands. To accomplish this, a landscape approach to habitat management was initiated by the Forest Service in 1999. This involved working with stakeholders to identify critical or potential marten habitat, locating possible corridors, and identifying areas which would not be cut in the near future. This initiative has been ongoing since that time. To identify all factors affecting marten survival, stakeholders from the Canadian Forest Service, WD, Corner Brook Pulp and Paper and the Forestry and Agrifoods Agency sit on the Newfoundland Marten Recovery Team. The primary functions of the Recovery Team are to prepare and periodically revise the recovery plan for

American marten in Newfoundland and to provide advice to Government on species recovery. The recovery plan may include short and long-term population goals and outlines actions required to reach recovery goals. The team has identified critical marten habitat and is in the process of determining what forestry activities should be permitted within the boundaries of critical habitat. The team is also investigating the best way to approach long-term landscape level planning for marten recovery. In addition, Brian Hearn of the Canadian Forest Service is close to completing an analysis of the impact of the scheduled 25 year harvest plan on the availability, distribution and connectivity of marten habitat.

Critical Elements:

- sufficient habitat to support a viable population of marten;
- areas of known marten populations remain closed to trapping
- only allow use of legal snare wire types

Guiding Principles:

Critical marten habitat has been identified. The development and evolution of the marten habitat suitability model in recent years has been a useful tool in identifying potential marten habitat and evaluating potential impacts of harvesting on this habitat and resultant changes to population levels. Continued development and refinement of this model will provide a more reliable means of evaluating impacts of harvesting on marten habitat in the future.

Early indications from Brian Hearn's work with the harvest schedule indicate that there is abundant suitable habitat in districts tested and that the amount will increase over the next 10 years, even if the full harvest schedule is implemented. Work is now underway to extend this analysis to 20 years. Anecdotal evidence also seems to suggest that snaring and trapping may be the main impediments to marten recovery. Maintenance of appropriate forest habitat is also integral to the long-term recovery of this species. More testing of the model needs to be undertaken especially on the distribution of suitable habitat and on the occupancy of this habitat.

The current timber supply model is constructed in such a way that analysis of marten critical habitat can be evaluated at the landscape level to determine any impacts on timber supply. Recommendations resulting from any of these ongoing initiatives will be incorporated into harvesting prescriptions as required.

4.2.1.3.2 Harlequin Duck

Characterization:

The eastern North American population of harlequin duck was listed as endangered in Canada in 1990, however in May of 2001 the status was changed to special concern. In Newfoundland these birds breed along clear, turbulent rivers, in Labrador and on the Northern Peninsula. These birds winter along the east coast at Cape St. Mary's. In District 16, harlequins have been reported by the Canadian Wildlife Service (CWS) in the Upper Humber River (at a density of 0.051 females/km of river). Although no harlequins have been seen in the Main River area to date, it is thought the upper reaches of this river may contain suitable habitat.

Critical Elements:

- Buffered rivers near or around waterfowl breeding, moulting, and staging areas.

Guiding Principles:

CWS recommend that a 100 metre buffer zone be left on any river where harlequins are found as well as, in the upper reaches of the Main River, which potentially could support breeding harlequins. On all other stretches of the Main River, a treed buffer of at least 30 metres should be maintained for other waterfowl species utilizing the area. This is in agreement with the Department's Environmental Protection Guidelines which state that a minimum 30 metre, no-cut, treed buffer will be maintained from the high watermark in waterfowl breeding, moulting, and staging areas.

4.2.1.3.3 Other Species

Other species, particularly the red crossbill, are currently listed as endangered. The Newfoundland Forest Service currently has a representative that sits on the recovery team for this species. Any recommendations on modified forestry activities, if any, for this species will be developed with input from all members and followed by the Forest Service.

4.2.1.4 Water Resources

Characterization:

The protection of water resources has emerged as a major issue in recent years both nationally and provincially. Events such as the E.coli 0157 outbreak in Walkerton, Ontario, our own Triahlomethane (THM) controversy, and numerous incidents of giradiasis in community water supplies have heightened public awareness on water issues. While much of the current focus is directed toward drinking water, it is also recognized that an equal importance must be attached to waters which have other beneficial uses. Human impacts both locally and globally have the potential to impair water for future uses.

In Planning Zone 7, water is used beneficially for numerous purposes. There are 34 communities within the zone which have water supplies. Thirty one of these supplies are protected under the province's Protected Water Supply Program and the remaining three are categorized as unprotected although still monitored by the program. Recreational waters within this zone are used for activities such as fishing, boating and as a water supply source for numerous cabin owners. Industrially, waters within the zone are primarily used for hydroelectric production at Cat Arm, Deer Lake and Rattle Brook and for irrigation on

agriculturally developed land, primarily in the Cormack and Green Bay areas with smaller hobby type farms dispersed throughout the zone.

Human activity on the land has the potential to alter water quality and water quantity. Commercial forest harvesting is the predominant activity and occurs throughout the zone. Hydroelectric development has resulted in several river diversions. There is a vast array of roads associated with the harvesting and traditional access routes as well as newly constructed roads which dissect the unit. Mining operations within the zone are limited to mostly small quarrying operations associated with road construction. Some exploration activity for hydrocarbons, dimension stone and base metals has occurred sporadically throughout the region

Critical Elements:

Forest management activities such as road construction, use and maintenance, timber harvesting, and silviculture may substantially alter the quality of water draining from watersheds as well as other defining characteristics such as stream hydrology, sediment loadings, stream characteristics, and aquatic discharges from municipalities. Careless storage and handling of fuels by industrial and recreational users, stream diversions and agricultural operations are other examples.

Guiding Principles:

There are numerous protective measures listed in the Environmental Protection Guidelines under the broad categories of road construction, stream crossings, road abandonment, fuel oil handling and storage, support services and structures, harvesting, silviculture, and protected water supply areas. The EPG's are listed in their entirety in Appendix 1 and specific guidelines under the above sections can be found there.

4.2.2 Human Values

4.2.2.1 Timber Resource

Characterization:

One of the major resource values of the forest ecosystem is the harvesting of timber to provide forest products. Historically timber has been harvested since the first inhabitants settled in the zone. Initial uses were mainly domestic in nature to supply timber to build houses, fishing sheds and equipment and for heating and cooking. With the increase in population, more commercial uses have arisen to supply lumber and pulp and paper products.

Domestic harvesting still provides fuelwood to heat many homes and sawlog material for residential house construction in the zone. In fact, the latter domestic use is one of the reasons why this Province has the highest rate of home ownership in the country. There are approximately 2000 permits issued on Crown land in District 9 and 400 permits in District 16. Approximately 1500 domestic permits are issued on CBPPL limits in the zone as well. Commercial activity accounts for the majority of the harvest by the Crown in the zone. . Commercial activities provide many jobs in harvesting, sawmilling, trucking, pulp and paper manufacturing and related spin off industries for local residents. There are in excess of 150 direct jobs created by the industry with an estimate of nearly twice that many in spin off industries.

Silviculture treatments are important to the forest resource of the zone because they ensure a vigorous and healthy forest is maintained. Forest renewal activities are critical because they ensure that the productive land base is maintained by planting areas that are not sufficiently restocked. Forest improvement activities help improve and enhance the growing stock which can reduce harvest cost, enhance forest product options and increase sustainable timber supply. There is approximately $300 000 spent on silviculture in the zone each year creating more than 30 seasonal jobs.

Timely access to timber is critical to planning any forestry operations. Primary, secondary and tertiary roads form an integral part of operating areas and are used after timber extraction is completed for recreational purposes. In excess of $500 000 is spent by the Crown to construct forest access roads each year in the zone.

Protection of the forest from various disturbances is also a major characteristic of resource management. Because of the long insect history in the zone, protection through integrated pest management techniques is an important activity. While fire has not been a major disturbance, protection is still critical since a large fire can potentially be devastating. Protection of other resource values through modification of activities and enforcement is also important.

Critical Elements:

The overall objective is to ensure the AAC is calculated using the latest information while taking into account other resource values and conducting environmentally sound operations. This is achieved by

- maintenance or enhancement of productive land base
- planting of non-regenerating areas
- minimizing loss of land base to other users
- minimize losses to fire, insect and disease
- timely access road construction
- enhancement of younger age classes through thinning to correct age class imbalance
- maintain both a sawlog and pulpwood industry in the zone through timber exchanges

Guiding Principles:

- enforcement of forestry act, regulations, guidelines and policies
- minimize loss of productive land base through spatial and temporal compromises and continuous dialogue with other resource users
- education (staff, public, operators)
- aggressively conduct silviculture, access road, and protection activities
- implement best management practices. The *Environmental Protection Guidelines for Ecologically Based Forest Resource Management* outline courses of action and

mitigative measures for forest activities. These EPG's are outlined in their entirety in Appendix 1 with some highlighted subject areas listed below.

- garbage disposal
- fuel storage
- mineral soil exposure
- buffer requirements
- road and bridge construction
- silviculture and harvesting activities

4.2.2.2 Agriculture

Characterization:

There is substantial agriculture industry in the zone, an industry with considerable potential to expand and provide increased economic benefits to the local area. Commercial agriculture is concentrated in Cormack, Reidville, Howley, Kings Point, Rattling Brook, and Green Bay and the agriculture products produced represent a significant portion of the total agriculture industry in the province. Most of the major farming activities in the province are represented in the zone. In the livestock sector, dairy, beef, sheep and fur contribute approximately $5.0 million total farm gate value to the provincial output. The crop industry which consists of vegetables, small fruit, forages, Christmas trees and greenhouses production contribute another half million dollars to the total provincial farm gate value.

Critical Elements:

Surveys indicate that approximately five percent of the soils in the province are suitable for agriculture. It is not possible to identify and plan all sites for future agriculture use and often there is a conflict with other land uses particularly forestry because these sites are of high growing capability. Although a suitable land base is the first critical element necessary for a successful agriculture operation, markets and the interest of individuals are also prime factors in the development and location of future farms. In the spirit of managing the ecosystem for multiple benefits, provisions must be given for the agriculture industry to expand. This is particularly important for areas outside established agriculture areas.

Guiding Principles:

Lands designated for forest management can include areas with high potential for agriculture. Consequently, the forest landholders will work with the Department of Agriculture to determine if opportunities exist for an exchange between agriculturally viable forest areas with unsuitable agriculture land within the Agriculture Development Areas.

The agriculture leasing policy initiated in 1976 ensures that new or existing land allocated for agriculture continues to be used for agriculture. The leases have no provision for fee simple grants and must be used exclusively for agriculture purposes.

The following will provide guidance for the development of agriculture within the zone:

- Home gardening leases be confined to areas already developed for this activity.
- Increases to agriculture leases should be adjacent to existing leases.
- New agriculture leases should include a business plan approved by the Agrifoods Division of the Dept. of Natural Resources.
- Wood harvested on agriculture leases shall be completed under a crown cutting permit.
- Where possible, existing commercial forest operators should be encouraged to work with farmers to clear new land for development.

4.2.2.3 Mining

Characterization:

In Planning Zone 7 there is a diverse geological environment which hosts a wide variety of both metallic and industrial minerals including, but not restricted to; copper, nickel, lead, bitumen, granite, gneiss, marble, gold, asbestos, silver, iron, limestone molybdenum, uranium and thorium. There is also granite with dimension stone potential.

In District 16 alone there are over 800 mineral exploration claims staked and registered; the majority being for metallic mineral potential with expenditures in the hundreds of thousands. Exploration activities during this period consisted of prospecting, geological mapping, grid line-cutting, geochemical surveys, ground and airborne geophysical surveys, mechanized trenching and diamond drilling. In addition, there are a large number of active quarries in the zone which generate significant royalties. These figures are included to illustrate the significant contribution that mining has to the local and provincial economy.

Critical Elements:

To minimize the impact of mining and mineral exploration upon the forest ecosystem while providing a source of energy and aggregate material.

Guiding Principles:

Harvesting timber for prospecting lines must meet the same rigor as commercial harvesting. The mining industry will enact best management practices to ensure little to no impact on ecosystem values.

Guiding Principles:

- Ensure that quarries and open-pit mines are rehabilitated. The organic overburden should be stockpiled and stored in a manner so that it can be used to rehabilitate the site.
- Maintain updated maps of mineral potential, mineral claims and aggregate and quarry areas at the district office.
- Avoid planning silviculture activity in areas adjacent to mines or quarries.
- Make every attempt to extract timber harvested as part of exploration and development. If timber can not be feasibly extracted using conventional means then timber shall be piled so that it may be extracted during winter months by snowmobiles.
- Mineral exploration that proposes to explore or develop within a silviculturally treated area must be undertaken with minimal disturbance and provide compensation as required
- Mineral exploration and/or development on mineral licenses within the zone will not be impeded. Specific proposed harvesting activities are identified in the annual operating plan.

- Quarry permits are required for aggregate material taken outside of the road ROW for purposes of road construction
- Non-compliance with exploration permits will be passed to the District Manager and submitted to Mines Division, Dept. of Natural Resources.

4.2.2.4 Historic Resources

Characterization:

The provincial archeology office (PAO) is the agency responsible for the management and protection of archaeological sites and artifacts in Newfoundland and Labrador. This program is carried out under the Historic Resources Act which ensures that developments with potential to have adverse impacts on historic resources are investigated and monitored by a qualified archaeologist through archaeological impact assessments.

Archaeological sites are non-renewable resources and play a vital role in understanding our heritage. It is important to professionally record as much information as possible at an archaeological site in order that one may fully understand its history. In order to do this properly the site must not be disturbed. Very often, archaeological sites are small, spatially bounded units, therefore protecting these resources usually do not have an adverse impact on forestry activities.

Archaeological surveys have been carried out in several areas within the zone over the past 20 years. Many areas still remain to be surveyed so there is potential for other historic resources to be found in the zone. To date there are 19 known archaeological sites within District 16 and over 90 in District 9.

Archaeology is very important for our tourist industry. Archaeological excavations and interpretive sites draw thousands of visitors each year to this province. The preservation and interpretation of archaeological sites will continue to benefit the tourism industry in this province for years to come. Thousands of tourists from all over the world visit our archaeological sites each year and the numbers continue to increase, i.e. Ferryland alone saw 16,500 visitors in 2000.

Archaeology projects provide many seasonal jobs and many of these people are successful in obtaining employment in archaeology and conservation for longer periods of time. By calling for archaeological impact assessments on projects which have potential to negatively impact historic resources the PAO is providing jobs for consulting archaeologists in the province. New businesses are created as a result of archaeological projects. These businesses include bed and breakfasts, boat tours, restaurants and gift shops.

Critical Elements:

Major threats to historic resources are projects involving activities which disturb soil layers and/or provide unintended public access to the archaeological resources. Forestry activities such as construction of access roads and bridges, harvesting and mechanical site preparation have the potential to destroy historic resources.

While forestry activities can have adverse impacts on historic resources there are also beneficial effects. When impact assessments are carried out and new sites found, it adds to our understanding of Newfoundland and Labrador's heritage. When archaeological sites are discovered through impact assessments these resources are protected from damage or destruction and preserved.

Guiding Principles:

Any project involving land-use has the potential to adversely impact historic resources, therefore it is important that the Provincial Archaeology Office be involved at the planning stage in order to ensure that mitigative measures to protect historic resources are developed at the earliest possible time.

In order that known archaeological sites and potential unknown sites are protected from forestry activities buffer zones will be necessary in some areas whereas archaeological assessments may be required in others. Known archaeological sites must be avoided and buffers will be required around them. Buffers will also be required along all rivers and ponds, as well as long the coastline where there is potential for archaeological resources to be found.

Occasionally there are accidental discoveries made of historic resources. In the event that this does happen, activities should cease in this area and contact be made immediately with the Provincial Archaeologists at 729-2462

4.2.2.5 The Greater Gros Morne Ecosystem

Characterization:

The primary role of Canada's national parks is to maintain ecological integrity. Although enshrined in policy for many years, this role has recently been given prominence in legislation by the passing of the Canada National Parks Act in October 2000. The Report of the Panel on Ecological Integrity of Canada's National Parks (February 2000) noted that parks all across the country (including GMNP) are under threat from stresses both within and outside the national parks. Ninety percent of forested parks are under stress from external forestry activities.

The primary challenge for national parks in maintaining their ecological integrity is that most parks are part of larger ecosystems and the area set side for the parks is not large enough to protect the full integrity of that ecosystem. Large-scale changes on the landscape surrounding parks can isolate the park ecologically creating an "island". Parks Canada must work with adjacent land managers in striving to achieve its mandate.

Biodiversity goes beyond the range of wildlife and plant species to include the range of habitats and landscapes. Loss of special habitats such as the old-growth forest and associated species may impair the ecological integrity of GMNP in ways that are not currently understood.

While ecological integrity has prominence regarding the management of national parks, legislation and policy dictate broader responsibilities for national parks. These include providing opportunities for Canadians and others to have high-quality experiences in a natural setting. Currently, 61 percent of GMNP is classified as Zone II - Wilderness. The eastern area of this zone borders on District 16. The Long Range Traverse, a 3-4 day hike within GMNP, currently has a reputation as a high-quality wilderness experience due to its remoteness and difficult access. Increased access, as a result of forestry operations within District 16, threaten this wilderness quality. The presence of the Newfoundland pine marten has been noted in the northern and southern areas of the park. Those sighted in the south are not closely connected with a core population and are likely "dispersers" from either the Little Grand Lake/Red Indian Lake or Main River populations. Habitat connectivity with these other core populations may be critical to long term survival of marten in GMNP.

Critical Elements:

- to maintain ecological integrity:
- to maintain native biodiversity and natural processes.
- to maintain viable wildlife populations

Guiding Principles:

The long-term effect on the park's ecological integrity can rarely be isolated to one cause and is more often due to the effects of many activities. For that reason it would be important to assess the cumulative environmental effects of all activities as part of the forest management planning process.

- maintain species composition as well as the age structure and ecological functions of the various forest-types across the landscape over the long term.
- maintain proportion of interior forest (mature forest >250 m from an “edge”)

- maintain landscape connections between the park and the surrounding landscape. This would require effective, permeable movement zones between populations and/or critical habitats.
- manage and operate according to the precautionary principle, particularly as it relates to species at risk.
- ensure landscape characteristics are maintained that allow marten to achieve their habitat requirements at the landscape scale. This could mean ensuring forest management practices allow for a continuous distribution of marten habitat and home ranges to the park boundary. A conservative approach that preserves future options should be adopted until the marten guidelines are fully developed.

4.2.2.6 Newfoundland T'Railway

A large section of the Newfoundland T'Railway Provincial Park lies in the zone and has an impact on forestry operations. The former CNR right of way, which is 50 feet each side of the center line, is the main route for the T'Railway with some minor deviations. It provides for an all season, multi-use recreation corridor developed and managed with community partners in conjunction with the T'Railway Council to maximize adventure tourism and recreational opportunities.

The T'Railway is protected for the present and future enjoyment of the public as part of the system of provincially designated parks and natural areas. The Provincial Parks Act provides the legislative framework for the administration and management of the T'Railway.

The T'Railway constitutes the province's contribution to the Trans Canada Trail System. It is the largest provincial park in the province with the most users. It is used primarily for cross country skiing, hiking, biking, snowmobile and all terrain vehicle usage. Other new or historical uses such as commercial and domestic harvesting, quarry and mining access and cabin access are also allowed with a special permit.

Critical Element

- protection of the historical landscape integrity of the T'Railway corridor

- preservation of the scenic quality along the corridor
- control of land usage adjacent to the T'Railway

Guiding Principles:

- coordination of activities with various other agencies responsible for land management outside the T'Railway corridor to ensure that the integrity of the park is maintained
- build partnerships with other stakeholders and user groups such as communities, industry and recreational organizations for the long term maintenance and development of the T'Railway
- in an attempt to preserve the natural value of the T'Railway, other land management agencies are requested to maintain a 100 m buffer along the right of way and to consider viewscapes in their harvesting and development plans.
- where access is required from the T'Railway, all roads shall be 100 meters away from the track before a landing or turnaround is constructed.
- where feasible, harvesting using the T'Rrailway shall be from May to December to avoid conflict with other user groups.

4.2.2.7 Parks and Protected Areas

Characterization:

The mission statement of the provincial Natural Areas Program is to protect, in an unimpaired condition, large wilderness areas, representative examples of all of the province's ecoregions including their natural processes and features, and rare natural phenomena, so as to preserve the diversity and distinctiveness of the province's rich natural heritage and to support an ecologically sustainable future for the benefit of present and future generations.

There are several different types of conservation areas in the province that contribute to the provincial system of protected areas, as recognized by the International Union for the Conservation of Nature. Wilderness reserves and ecological reserves are established via the *Wilderness and Ecological Reserves Act*. Wilderness reserves are generally large (>1000 km2) and are designed to protect complete ecological systems. Ecological reserves may be established to protect representative samples of each of the province's natural regions (ecoregions) with a mid-sized reserve (50-1000 km2), or to protect exceptional natural features, occurring in an area

<10 km2, such as rare species or areas of unusual biological richness .Provincial Parks, established under the *Provincial Parks Act*, do play a conservation role but are primarily established as sites for outdoor recreation and nature-based education. Wildlife reserves may be established under the *Wildlife Act* for the protection of specific species or habitats, and public or crown reserves may be established for conservation reasons under the *Lands Act*. Finally, National Parks such as Terra Nova, Gros Morne and Torngat Mountains are established under the federal *National Parks Act*.

The benefits of protected areas are to preserve biodiversity, provide areas for scientific research, provide opportunities for environmental education, provide standards against which the effects of development can be measured, and provide natural venues for recreation, enjoyment of nature and ecotourism.

Protected areas in the zone include: the T'Railway, Gros Morne National Park, Main River Waterway Park, West Brook Ecological Reserve and Squires, Flatwater Pond, and Indian River parks. There are also some areas being considered through the Natural Areas System Planning process as study areas for future protected areas. At the time of the forest management planning process for Zone 7, these areas have not yet been finalized or released for public review.

Critical Elements:

- preservation of biodiversity
- maintenance of protected area integrity
- maintain natural processes and features
- act as control areas against which an assessment of forest management activities elsewhere on the landscape may be made

Guiding Principles:

- the type of activities encouraged or permitted within the different protected areas in the province depends entirely on the type of protected area and the reasons for its establishment
- generally all non-consumptive activities are permitted; educational activities and scientific research within protected areas generally require a permit but are encouraged
- in most protected areas, new development is prohibited, such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads and trails and cabins and new structures; legislation for Wildlife and Crown Reserves is generally more flexible than the other Acts.
- a 500 m no roads buffer is to be maintained around all existing and proposed protected areas to reduce access and resulting damage from motorized vehicles
- where forestry operations are within one kilometre of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary and any amendments to the forest plan within that buffer should be brought to the attention of the managing agency

4.2.2.8 Outfitting

Characterization:

The outfitting industry has been an integral component of the tourism industry in Central Newfoundland since the early 1900's. This region has always been a popular hunting and fishing destination because of the pristine environment and abundance of fish and wildlife species. There are many outfitters operating within the boundaries of the zone that operate and maintain main and/or line camps. These operations provide seasonal employment for many local individuals.

An economic impact study conducted in 1995 by the Department of Industry, Trade and Technology suggests that a big game license has a net economic impact of $6864. By approximating this value at $7500 for 2011, it is possible to estimate the economic contributions of this industry: approximately 300 licenses * $7500 / license = $2.25 million. The many trout and salmon destinations in the zone also make fishing an important economic contributor.

Over the past 10 years, a significant number of traditional hunting and fishing facilities have diversified into the non-consumptive areas of the tourism industry. Such activities include but are not limited to: snowmobiling, dog sledding, kayaking, canoeing, nature viewing, hiking, and

wildlife photography. The ability to diversify has positively impacted the viability of outfitting operations and as such, increasing numbers of operators are considering these opportunities. Diversification can lengthen seasons of operation, increase and lengthen employment, and reduce dependency on a single sector of the tourism industry

Critical Elements:

Remote outfitting camps are dependent on their remoteness. Forest access roads inevitably impact the ability of a camp to maintain its remote status. Increasing accessibility through increased access roads can also lead to increased hunting and fishing pressures in a given area. This can in turn lead to decreased success rates of tourists. This is of particular concern since Newfoundland is often the hunting destination of choice due to success rates upwards of 80 percent. An increase in access roads also tends to lead to increased cottage development that in turn can have an impact on both remoteness and game availability.

Removal of large areas of forest has the immediate effect of destroying big game habitat, particularly winter cover, although this impact has been poorly studied (particularly in remote areas). Forest harvesting also has the ability to impact negatively upon travel corridors, bear denning areas, and caribou feeding and calving areas.

While clients of big game and fishing outfitters are primarily interested in hunting or fishing experiences, they also show a great respect and admiration for pristine conditions and a healthy looking landscape. The landscape view experienced by clients plays a large role in leaving a lasting impression of the province. The view also has a direct impact on repeat client bookings and recommending the destination to others. Viewscapes become even more important once outfitters begin diversification into non-consumptive tourism activities. With these activities, there is no trophy to bring home and that which is taken away is that which has been experienced by the senses (i.e. sights, sounds, smells, etc.).

In some cases, past harvesting practices has resulted in increased levels of garbage (skidder tires, abandoned buses, heaps of oil containers, etc.). This can be frustrating for outfitters who concentrate on not leaving permanent marks on the landscape. Possible erosion caused by hillside logging and heavy equipment use is also a concern - particularly due to its possible effects on water quality for fish habitat.

Guiding Principles:

It is necessary that no harvest buffer zones be left around outfitting camps that are agreed to by all parties involved. Buffer zones can be difficult to negotiate due to varying ranges of activity from operator to operator. Some operators make use of areas that are 8 to 10 kilometers away from their camps.

- consideration should be given to decommissioning roads and bridges (where possible) after harvesting is completed. This will eliminate damage to the hunting area by reducing the possibilities of increased hunting pressure. When roads are in use actively for harvesting purposes, access to hunters should be restricted or limited.
- harvest in the winter whenever possible. Winter roads are less passable in summer and fall and will help to reduce traffic. These roads will also be cheaper and easier to decommission.
- construct new roads as far away from existing outfitting camps as possible. The benefits of this are obvious. Harvesting should be restricted around hunting and fishing camps during their season of operation. At these times, harvesting should occur as far away as possible from outfitters.
- forest operations should be carried out in compliance with existing regulations
- forest operations should ensure that whatever is brought into an area is removed from the area once harvesting is complete.

4.2.2.9 Recreation

Characterization:

The greater White Bay area has outstanding scenery, interesting topography, and opportunities for viewing wildlife and flora in a natural setting. These elements represent a small list of reasons why the zone is used extensively for recreational purposes. Hiking, skiing, canoeing and

snowmobiling are major recreational activities in the area. Non-timber recreational values are expected to play an increasing role in forest management practices.

Canoeing and kayaking on the Main and Indian Rivers, the Alexander Murray and many other hiking trails, numerous ski and snowmobile trails, and excellent hunting and fishing areas highlight some of the recreational opportunities in the zone.

Critical Elements:

Wilderness

Backcountry recreational activities are dependent on the existence of natural pristine wilderness areas. The temporary removal or alteration of this pristine wilderness through forest harvesting practices will result in a decrease in these recreational activities for some period of time.

Accessibility

An increase in forest access roads will inevitably increase the amount of accessibility to remote areas. This in turn will increase the amount of traffic in an area (both vehicular and pedestrian) and decrease the value of the experience for many recreational activities.

Viewscapes

The majority of individuals who are involved in recreational activities are concerned about viewscapes. Many of the recreational activities occur because of a particular viewscape. The destination for many individuals is a result of the viewscape in that particular region.

Guiding Principles:

To prevent negative ecological effects and to ensure a positive experience, access and levels of recreational activities can be monitored. Public surveys can be used to measure the experiences and the levels of recreation occurring in the zone.

Limiting Accessibility

Decommissioning of forest access roads could be a possible option when harvesting operations are completed. Harvesting should be conducted using winter forest access roads where possible. Winter roads create less traffic and require less effort to decommission.

Viewscape

In areas where high concentrations of recreational activities occur, aesthetic views should be maintained using landscape design techniques where possible, when conducting forest operations. This is especially relevant in areas where the recreational activities are occurring because of the aesthetic view. Reforestation of areas with high aesthetic values should occur without delay in returning the site to a forested condition.

4.2.2.10 Tourism

Characterization:

The tourism industry in Newfoundland and Labrador is based on our natural and cultural resources. Protection of these resources is critical for our industry to survive and grow**.** We currently have the resources to compete internationally with tourist destinations, however, competition for the international traveler is high in the tourism marketplace. The tourism industry in Newfoundland and Labrador has experienced significant growth since 1997. Tourism has been contributing between $580 million and $700 million annually to the provincial economy. Government tax revenue from tourism in 1998 was estimated to be $105 million. The worldwide growth of tourism at rate of 41 percent, the national growth of 25 percent and the provincially growth of 33 percent indicates tourism is Newfoundland and Labrador's best opportunity for economic diversification and growth.

There are many excellent tourist destinations in the zone. The Main River (designated as Canadian Heritage River), Gros Morne National Park, Fleur de Lys soapstone quarry (National

Historic Site), Baie Verte self guided geology tours, and Deer Lake insectarium are examples of the more prominent tourist attractions.

Critical Elements:

- viewscape
- accessibility
- wilderness ambiance
- remoteness

Guiding Principles:

Work with GMNP and tourism operators to implement strategies to minimize the visual impact of harvesting operations on the aesthetic values associated with viewscapes. By bringing together GMNP, CBPPL, NFS, and the tourism operators, strategies will be discussed, negotiated, and implemented to provide a balance between harvesting and the values associated with tourism. If required, the Forest Service, CBPPL, local Town Councils, Parks Division and other relevant groups will get together to examine the viewshed issues where applicable in the zone.

Section 5 Public Consultation Process

5.1 Planning Objectives

In recent years, there has been a shift from single resource management to a more comprehensive technique of forest ecosystem management. In its attempt to provide the greatest good for the greatest number of people for the greatest period of time, sustainable forest management (SFM) must be balanced in light of social, economic, and environmental issues. In the context of SFM this shift has resulted in a move from the traditional, narrow focus of timber management to incorporate non-timber values into the management planning framework. Another term that has become closely associated with SFM is “sustainable development.” Sustainable development, or

in this case “sustainable forests”, not only takes into account the social, cultural, economic, and environmental benefits of the present, but those of future generations also.

The Forestry Act of 1990 outlines its approach as providing a "continuous supply of timber in a manner that is consistent with other resource management objectives, sound environmental practices, and the principle of sustainable development."

In the 1995 Environmental Preview Report the Newfoundland Forest Service has proposed an adaptive management planning process. This process has three objectives.

1. Establish a productive planning framework to include all stakeholders. An effective planning framework must have information and issues defined at the beginning of the process.
2. Learn more about forest ecosystems while they are being actively managed (i.e., adaptive management). Adaptive management incorporates strategies which help us to learn about the forest ecosystem and to deal with uncertainties.
3. Establish an ecosystem approach to forest management which integrates the scientific knowledge of ecological relations and limits of growth with social values. This will help to attain the goal of sustaining natural ecosystem integrity and health over the long term.

Adaptive management makes decisions based on input from all the stakeholders involved, and it establishes a continuous learning program. The adaptive approach allows us to communicate, share information and learn about forests being managed. This sharing of information, both old and new, then provides the flexibility necessary to adjust to changes and to set new goals**.** Such interaction is an absolute necessity for a subject as complex as an ecosystem.

5.2 Planning Framework

As previously stated, this plan is being written for Crown Land in planning zone 7 and not a specific district. With previous planning processes there were planning teams set for each district. A strategy document was prepared for the entire district and separate five year operating plans were prepared for each owner within the district. With the change to planning for the zone, a decision had to be made whether to combine planning teams into a single team which would meet in one central location. It was decided that this would probably not be a good idea because

it was anticipated that attendance at the meetings would be down significantly if they were held in a centralized location. It was felt that attendance by the major players (paper companies, provincial and federal governments) would remain constant but attendance by small interest groups and the general public would be down. In order to ensure input from these smaller local groups it was decided to have two separate planning teams, one for District 9 with meetings in Springdale and one for District 16 with meetings in Pasadena.

5.3 Planning Team Participation

An initial advertisement was placed in local and regional newspapers, notices were posted in prominent locations in most communities in the zone, and an extensive email to potential interest groups and individuals was done to inform potential participants of an initial meeting in both Springdale and Pollards Point. The meeting site at Pollards Point was later moved to a more centralized location in Pasadena. The initial meeting was designed to inform attendees of the change in the planning framework as a result of the new legislation, the ground rules for participation, and to form the new planning teams for each district. The second and subsequent meetings were held with the planning team. A list of planning team members and their affiliations is shown in Appendix 2. Planning team membership is not restricted to those listed and is open to anyone who wants to join the process at any time.

As outlined in the timber supply analysis section, harvest scheduling was used to identify, on maps, where harvesting should take place for the next 25 years. These maps were posted early in the planning process and in each subsequent meeting and gave particular emphasis to harvest areas in the next 10 years. Each meeting focused on a particular value or values, so the maps were available to identify any particular area of conflict when the values were discussed. There were presentations at each meeting by different stakeholders who identified their specific value and discussed the importance and potential impacts of forestry activity on these values.

In this way, areas where conflicts exist were identified immediately and any remedial action or process to mitigate this conflict could be put in place right away.

Changes to harvest areas or processes to follow to resolve conflicts, where possible, were ongoing throughout the planning process and are reflected in the final operating areas presented in this plan. These changes or modifications to areas or processes that were established will be discussed in later sections.

Section 6 Management Objectives and Strategies

The overarching goal is to manage the forests of the zone in a sustainable manner. The *Provincial Sustainable Forest Management Strategy* 2003 defines sustainable forest management as:

"to maintain the long-term health of forest ecosystems while providing ecological, economic and cultural opportunities for the benefit of present and future generations."

Specific objectives and strategies employed to work toward achieving sustainable forest management are outlined below.

6.1 Harvesting

As previously stated, the forest in the zone is part of the boreal forest which is characterized as being disturbance driven resulting in the formation of relatively even aged stands. The clearcut silvicultural system most closely emulates this natural disturbance pattern and therefore is the most preferred method employed for harvest. The size, shape, arrangement and juxtaposition of clear cut areas vary across the landscape depending on localized topography and terrain conditions. A modification of the clearcut system takes place in domestic areas whereby the cuts

are relatively small and disbursed resulting in the creation of a range of age and development classes.

6.1.1 Commercial

Section 3 outlines the general approach for the timber supply analysis and outlines the specific results for all districts in the zone. The model used to calculate the annual allowable cut is a spatial optimization model which outlines a specific course and timing of actions. The harvest schedule outlines the specific forest strata to be harvested and the timing of such harvest. The districts must follow this schedule as closely as possible in order to maintain the validity of the AAC.

The older unalienated timber that is in the worst condition and losing volume fastest is targeted as a high harvest priority. Younger stands that have been damaged by insects and disease also receive high priority. In managed stands, this priority changes to allow for a faster rotation on good sites that have been silviculturally treated.

There is an insufficient supply of timber on Crown Land, particularly sawlogs, to supply the current sawmill industry. To help alleviate this problem the Crown has negotiated a series of transfers and exchanges with CBPPL (Section 1.1.3) in order to secure a stable supply of timber for these mills. With this arrangement, these sawmills utilize the sawlog material from these areas and sell the pulpwood and pulp chips (sawmills residue) to CBPPL. As well, these operators trade pulpwood from their Crown cutting permits with CBPPL for sawlogs which also increases their supply.

Specific commercial strategies are as follows:

- utilize irregular cut block sizes that follow contours and natural boundaries where possible
- consider maintenance of unharvested corridors between harvest blocks to act as wildlife travel corridors

- vary buffer widths to protect other values (ie. larger buffers on salmon rivers)
- where possible, utilize winter harvest on wet and sensitive sites
- maintain current size and distribution of clear cuts
- use landscape design techniques to mitigate viewshed impacts on areas of concern
- keep losses through timber utilization to a minimum (< 6 m3/ha)
- continue to encourage and pursue transfers and exchanges with paper companies to ensure sawlog supply for local sawmills.

6.2 Silviculture

Section 1.4.1.4 describes the regeneration patterns of the major tree species by each disturbance type and generally by ecoregion. On average, there is a 20 percent regeneration failure rate (NSR) across all disturbance types. Generally, areas that do not regenerate naturally are renewed by some combination of site preparation and planting or gap planting. Areas that are regenerated are left to develop naturally. In the case of balsam fir which is a prolific regenerator and usually forms an overstocked stand, some form of thinning is usually applied to improve the growth and development characteristics of the regenerating stand. In recent years however, particularly in District 16, there is concern about the type (species) of regeneration because of the increased presence of balsam woolly adelgid in the area. In these areas regeneration to balsam fir may not necessarily be acceptable on certain site types. As well, on certain sites in District 9, particularly in the Seal Bay area, balsam fir has been regenerating on black spruce sites and often forms the majority of available stocking. This regeneration is “off site” and often becomes chlorotic and stagnates at an early age. Prescriptions to deal with these problems will be presented in sections to follow.

6.2.1 Forest Renewal

Since maintenance of the forestry landbase is crucial, forest renewal treatments are the most important silviculture technique in the zone. Forest renewal silvicultural treatments are designed to ensure that a new forest is established after disturbance by harvesting, insect, wind or fire. In most regions of the Province these prescriptions normally involve some form of treatment to

prepare the site to accept planted seedlings, however, in most parts of the zone planting is usually done without site preparation. Planting, whether full planting or gap planting is done to ensure stocking of desired species is at acceptable levels.

As stated, little site preparation has been carried out in the zone. Treatment of sites that have been overgrown with hardwoods and other herbaceous species with herbicides has been done to reduce this competition and make the site more accessible and suitable for planting. Herbicide usually reduces the competition for a few years to allow planted seedlings to get established and "get the jump" on the non crop tree species that occupy the site. Herbicides, while used sparingly, are sometimes a necessary tool to help establishment of a new forest particularly on the better sites.

Complete regeneration failure requiring full planting is rare in the zone because of the excellent regeneration capabilities of balsam fir. When it does happen however, the site is prepared, if necessary, and planted with mainly black or white spruce and to a lesser extent Norway spruce or white pine. The majority of the planting requirement in the zone is for gap planting. This treatment is designed to increase the stocking on sites that have not regenerated to sufficient levels. Gap planting is done with the same species as above, and, coupled with the natural regeneration already present on site result in a mixed softwood forest.

Where possible, seedlings are grown with seed from local seed sources. A seed orchard has been established at Pynns Brook to produce seed from plus trees collected throughout the Province. Plus trees are normally selected because they have superior growth and physiological characteristics. It is hoped that once this orchard starts producing seed the majority of the planting stock will be grown from this source. The ultimate goal is to establish plantations with seedlings that have superior growth characteristics and thus increase yield and maintain genetic diversity.

Exotic species have been planted in trials at some locations in the zone, (eg. Japanese larch at Pynns Brook) however, it is not anticipated that they will form any substantive proportion of the planting program in the future.

Surveys and anecdotal information indicate that hardwoods form a significant portion of stand composition after planting. This is especially true on scarified areas because scarification promotes hardwood establishment.

6.2.2 Forest Improvement

Forest improvement prescriptions are designed to treat existing, established forest stands in an attempt to enhance development. These treatments usually involve thinning overstocked balsam fir stands at either a young age 10 -15 years (precommercial thinning) or an intermediate age 25 - 35 years (commercial thinning)

Precommercial thinning reduces density levels on overstocked areas in order to maximize volume increment and operability (piece size) in the shortest period of time. Trees removed are not of merchantable size and are left behind to return the nutrients to the site. In the zone, balsam fir is usually thinned to favour any spruce that may be in the stand. In this way a mixed softwood stand is produced (depending on the original density of spruce) which is more diverse and less susceptible to insect infestation. As well, any hardwood species that are not in direct competition with spruce or fir are left to increase the biodiversity of the stand. Surveys conducted on precommercially thinned areas many years after treatment have shown that a very large portion of the plots in the treated areas contain hardwoods. In recent years the precommercial thinning program has dropped significantly. This trend is expected to continue.

Commercial thinning is done on older balsam fir stands and is designed to capture any mortality that would normally occur in the stand through self thinning. The trees harvested are of commercial size and are extracted and utilized. The remaining trees are left to grow, free from competition and are harvested when mature. By salvaging this eminent mortality a higher yield can be obtained in these stands. As with precommercial thinning, spruce and hardwoods are left where possible to increase the stand diversity. This treatment has been used sparingly in the zone however.

Both types of thinning will produce large diameter stems in a shorter time period which should increase the percentage of merchantable volume in stands that is suitable for sawlog material.

Specific strategies:

- ensure regeneration of areas disturbed by harvest, insect, wind and fire to prevent loss of productive land base
- use thinning techniques in young stands to increase stand development, reduce rotation age, and increase the percentage of sawlogs in stands
- where possible, promote species mixes particularly with spruce and hardwoods to reduce susceptibility to insect attack and increase biological diversity
- where possible, use seedlings grow from local seed sources to protect genetic diversity
- ensure levels of planting and thinning used in the wood supply analysis are achieved
- work towards pre harvest planning to identify areas with potential balsam woolly adelgid problems so that alternate silvicultural prescriptions can be promptly employed

6.3 Access Roads

Timely access to harvesting areas is the key to successful implementation of harvesting plans. Roads also provide access for other recreational values such as hunting, fishing, skiing, berry picking and hiking. Roads can also have a negative impact both from an environmental perspective (loss of productive land base) and other value perspective (access near remote outfitting lodges).

As a general principle from both an environmental and cost perspective, the minimal amount of road will be built to effectively harvest available timber. As well, road are constructed to standards (minimum right-of-way and driving surface etc.) that are as low as possible but still access the timber in a safe and effective manner. Forwarding distances are maximized to the economic limit to minimize the amount of road constructed. These principles ensure that the minimum amount of road is built and that loss of productive land base and environmental disturbance are minimized.

In sensitive and wet areas, winter harvesting and road construction are encouraged and are often the only option. This minimizes environmental disturbance and provides access to areas that would otherwise be left unharvested.

In many instances forest access roads "open up" new areas which are then subject to cabin development (often illegal). They also provide access to remote areas where outfitting businesses operate. This generally leads to competition for hunting areas between local and "sport" hunters and may detract from the "remote" designation of the lodge. In such instances cabin development should be controlled to limit local access. Road decommissioning may also be considered, depending on cost and mitigation of conflicting uses for that road.

The nature of the current wood supply, particularly in District 9, is that harvestable areas or stands are becoming smaller and more scattered. Achievement of the allocated harvest is contingent on accessing these areas and stands therefore more roads are needed to access this timber. It is imperative that additional funding sources become available to construct these roads if we are to maintain this harvest level. Failure to secure additional road monies will result in potential decreases in commercial timber allocation.

Specific strategies:

- where possible, build winter roads to access sensitive and wet areas
- minimize amount of road built by maximizing forwarding distances
- use minimum road standard to safely and effectively match the logging chance
- work with appropriate agencies (crown lands) to control cabin development

- consider road decommissioning on roads near remote outfitting lodges and other areas of concern where requested and where feasibly possible
- explore all avenues to secure funding for road construction and encourage operators to build their own roads in exchange for royalty reductions

6.4 Forest Protection

6.4.1 Insects and Disease

As indicated in section 1.5.5, insects have been a major natural disturbance factor in the zone. The main tree species, balsam fir, is susceptible to most of the major insects we have including spruce budworm, hemlock looper, balsam fir sawfly, and balsam woolly adelgid. In the past, severe mortality has occurred resulting in massive salvage efforts. In recent years, quality standards at local pulp mills have changed to require a timely supply of fresh, green timber. As a result, the window to salvage insect damaged timber is now one to two years after mortality. On a positive note, access to most areas has increased and improved allowing for quicker reaction to salvage insect mortality.

Populations of hemlock looper and balsam fir sawfly were building in the early 2000's and resulted in a treatment program in 2002 and 2003. Since that time the populations of these insects have been in decline. The balsam woolly adelgid seem to be moving eastward into District 16 in increasing proportions causing growth problems in young balsam fir stands.

As outlined in the harvesting and timber supply analysis sections our timber supply is based on following a rigid predetermined harvest schedule and minimizing inventory deductions (of which insect damage is a portion). In the event of a major insect infestation, salvage efforts may change harvest priorities and thus the optimal harvest schedule may not be followed. If insect damaged stands cannot be harvested in a timely manner, an additional harvest in the form of unsalvaged mortality may occur resulting in inventory deductions that are higher than anticipated. In both eventualities, deviations from harvest schedules and inventory adjustment levels will have to be closely monitored to ensure that the validity of the AAC calculations is not compromised.

Specific strategies:

- use silvicultural techniques at the stand level to alter species mix and increase stand vigor to make stands less susceptible to insect attack
- where possible, use harvest scheduling techniques to alter species mix across the landscape to avoid "setting the table" for severe insect infestation
- use species conversion techniques, where possible, to convert adelgid susceptible balsam fir to other less susceptible species
- in conjunction with Provincial and Federal initiatives, use pertinent and approved biological and chemical insecticides such as BTK, Mimic, Neemix4.5 and NeabNPV (virus)
- in cooperation with Provincial insect and inventory divisions, monitor and measure adelgid infested stands to help refine yield curves to be used in the next timber supply analysis

6.4.2 Fire

As outlined in previous sections, most of the zone has little fire history due to the relatively abundant rainfall and above average snowfall, however, some portions of District 9 has had a higher frequency. A fire in an unusually dry year can have devastating effects on the forest however and can exacerbate an already tight wood supply situation. The zone can minimize the risk of a serious fire by maintaining a highly trained, efficient and effective fire control program and by minimizing the risk in forest stands through maintenance of health and vigour.

Specific strategies:

- use silvicultural treatments and protection from insects to increase health and vigour of stands
- maintain fire control capabilities by both the Crown and Industry.
- where possible, promote species mixes in stands to minimize risk

6.4.3 Windthrow

Wind throw usually occurs in stands that are old and decrepit or in stands that have been predisposed by some other disturbance such as insects and disease. To minimize the effects of blow down, stands will be managed to promote health and vigour mainly through silvicultural treatments and protection from insects.

Specific strategies:

- avoid thinning in areas with high wind damage potential (hilltops on high elevations etc.)
- maintain forest in healthy vigorous condition through silvicultural treatments and protection from insects
- design cut blocks to follow contours and natural boundaries to minimize risk of windthrow to residual forest

6.5 Information and Education

Information and education is one of the key elements to providing for more active and effective participation in the planning process at all levels. Through interaction with various user groups and the general public a better understanding of each others values and positions is gained. The more we know about each others values and where these values are located on the landscape the better the ability to mitigate any potential impacts of harvesting on these values. For example, learning where a cabin is located can help planners when selecting areas for harvest and provide a contact to discuss impacts and mitigations.

Many comments were made during the planning team meetings about the good exchange of information and ideas that occurred. It is through such forums that information can be shared which will provide a basis for more effective and informed participation in such processes. Other such vehicles for information and education which will be actively pursued are:

Specific strategies:

- field trips (e.g. CBPPL woodlands tour, mill tours)
- school visits
- open houses
- commercial operator environmental training programs
- information meetings
- training courses
- seminars
- general day to day contact

Section 7 Proposed Activities

7.1 District 09

7.1.1 Overview

This section will outline all forest activities that will occur on CBPPL Limits in District 09 from 2012-2016. More specifically, all proposed harvesting, silviculture and access road construction activities as well as environmental protection measures, activities inside protected water supply areas, surveys, and information and education initiatives will be presented and discussed in detail.

To present a more comprehensive overview of proposed activities on the entire district an overview map is presented in Appendix 3. This map shows all proposed operating areas by CBPPL so that operations can be viewed from a landscape perspective across all ownerships in District 09. Maps of individual operating areas and summary sheets are also presented in Appendix 3. The summary sheets give a brief description of each area, the type of activities that will occur and any issues raised and mitigation measures employed.

7.1.2 Allocation of Timber Supply

There is 630,560 m^3 of timber scheduled to be harvested by CBPPL in District 09 for the next 5 years.

Summer and winter harvesting operations will be carried out in the District, with summer operations concentrated in areas farthest from the main public highways, and winter operations closer to the public highways to reduce snow-clearing costs.

For the most part, harvesting will be carried out in accordance with the clear-cut silviculture system. All merchantable spruce and fir trees on site will be cut and extracted, leaving only sub merchantable stems and noncommercial species such as eastern larch and white birch. This approach is appropriate for shallow-rooted Boreal conifers such as fir and spruce, which are

prone to wind throw following partial cutting. Additionally, clearcutting enhances the early growth of balsam fir seedlings, which typically exist in large numbers beneath mature balsam fir forests but require full sunlight to achieve optimal growth.

Harvesting and forest access road construction will focus on the harvest of mature and over mature timber throughout the district. Harvesting activities will endeavor to maximize the use of mechanical harvesters, extending winter and summer operating seasons in order to allow for the delivery of fresh wood over the entire twelve months of the year. This will allow us to reduce overall pulpwood inventories, and supply the mill with a constant supply of fresh pulpwood with the optimum species mix, over the maximum number of operating days per year.

Our mechanized logging fleet will be used in combination with our tree length and conventional logging systems to ensure maximum utilization during winter harvesting, harvesting blow down timber, and harvesting low volume stands. Short wood harvesters and forwarders, which are equipped with wide tires and tracks, have a very low ground bearing pressure, and when they spread a brush mat of tops and branches in their travel path, ground disturbance is significantly reduced.

Table 8 details this proposed volume and compares it to the 5 year AAC. There will be no deviation from the five-year AAC in either the Class1 or Class 3 land base.

Table 8 Proposed softwood harvest on CBPPL Limits in District 09 from 2012-2016

Total Class I AAC CBPPL Limits	
CBPPL Harvest on CBPPL Limits	**630,560**
Crown Harvest on CBPPL Limits	**163,200**
Total Harvest CBPPL Limits FMD 09	**793,760**
CBPPL AAC Deviation (+/-)	**0 m3**

Note: The Crown harvest is shown in the Crown 5 Year Plan.

7.1.2.1 Commercial

The timber scheduled for harvest in the district is over mature with some small pockets of mature dispersed throughout. This proposed harvest follows the harvest schedule that was used to determine the AAC in Section 3. The first two five year periods are highlighted on the operating area maps in red. This represents two times the actual proposed harvest. The purpose of including more volume than is actually proposed is to allow for operational flexibility within operating areas without having to constantly amend the plan.

Table 9 CBPPL Harvest by Operating Area in District 09, 2012-2016

Operating Area Name	Operating Area Number	Proposed Harvest Volume (m^3)
Pasture Block	K - 09 - 03	30,000
Rice Mountain	K - 09 - 05	50,000
Middle Arm	K - 09 – 06	110,560
Tommy's Arm	K - 09 – 08	50,000
Pine Pond	K - 09 – 10	40,000
Rambler West	K - 09 – 13	10,000
Lynx Pond	K - 09 – 16	90,000
Main Brook	K - 09 – 17	30,000
Great Gull Pond	K - 09 – 18	20,000
Dawes Pond	K - 09 – 23	80,000
Black Lake	K - 09 – 27	20,000
East Pond	K - 09 – 30	70,000
Southern Pond	K - 09 – 35	10,000
Camp 34	K - 09 – 36	20,000
Total CBPPL Harvest:		**630,560**

7.1.2.2 Hardwoods

The Company policy as it relates to domestic and commercial cutting of hardwoods is that after pulpwood harvesting operations have been completed in an area, domestic and commercial cutting for fuel wood will be allowed on cutover areas to cut hardwoods left behind. Details of the domestic cutting on Crown Lands can be found in the Crown Plan.

7.1.3 Silviculture

The silviculture prescriptions scheduled for the next five years are site preparation, planting/gap planting and pre commercial thinning. Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. There is full planting when there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Precommercial thinning is done to reduce

the density on overstocked regeneration so that growth can be concentrated on the remaining crop trees and thus reduce the time to harvest.

Table 10 summarizes silviculture treatments for the next five-year by treatment. There are 1300 ha of planting and 280 ha of pre-commercial thinning scheduled which meet the assumptions for silviculture in the timber supply analysis.

Table 10 Summary of silviculture treatments on CBPPL Limits in District 09 for 2012-2016

Treatment	Area (ha)
Pre Commercial Thinning	280
Planting	1300
Site Preparation	900
Total	**2480**

Areas that are scheduled for commercial harvest or have been harvested in the past five years are candidates for planting or gap planting to black, white or Norway spruce. These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting. Immature and regenerating stands have also been identified on operating area maps and are candidates for precommercial thinning if reconnaissance surveys deem them suitable.

7.1.4 Primary Access Roads and Bridges

There are 113 km of primary forest access roads scheduled to be built in District 09 in the next five years (Table 11). These roads will be built to access timber for harvesting in the operating areas proposed.

Table 11 Primary Access Road Construction on CBPPL Limits in District 09
For 2012 –2016

Operating Area Name	Operating Area Number	Length (km)	Bridges
Pasture Block	K – 09 - 03	19	1
Tommy's Arm	K – 09 - 08	17	
Pine Pond	K – 09 - 10	21	1
Rambler West	K – 09 - 13	19	1
Lynx Pond	K – 09 - 16	17	
Dawes Pond	K – 09 - 23	4	1
Southern Pond	K – 09 - 35	8	1
Camp 34	K – 09 - 36	8	
Total		113	5

All roads will be built to the specifications of the Class 3 standard and all pertinent EPG's will be followed. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before and construction is initiated.

7.1.5 Activities in Protected Water Supply Areas

For all harvesting operations scheduled to occur in protected water supply areas, wider buffers will be used inside these PWSA's and the pertinent EPG's for operations within PWSA's will be strictly adhered to. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, a Certificate of Approval under Section 10 of the Environment Act must be obtained before any commercial or domestic harvesting commences inside the PWSA.

7.1.6 Environmental Protection

7.1.6.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been few timber losses. There have been major fires in the past however so the district must remain vigilant in its fire suppression program to ensure any future losses are minimized.

There are Crown fire crews and equipment stationed at Springdale and Millertown in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional and provincial level is available should the need arise. There are air tankers stationed at Deer Lake and Gander and helicopters at Pasadena and Gander that are available for initial attack.

7.1.6.2 Insect and Disease

Monitoring and protection for insects and disease is done out of the forest protection division in Corner Brook.

7.1.6.3 General Environment

The environmental protection guidelines form the basis for protecting the environment from the effects of forest activities. Forest activities have the potential to impair water quality, erode and compact soil, impact fish and wildlife habitat, impact viewscape, and disturb sensitive and rare sites etc. The guidelines are designed to provide site specific measured to ensure that these impacts are avoided. Highlights of measures to avoid these impacts include no activity buffer zones, modification of harvesting design and equipment, avoidance of sensitive site during critical periods, consultation with other regulatory agencies and of course, monitoring. Specific measures that govern each forestry activity are detailed in Appendix 1.

7.1.7 Surveys

Utilization surveys will be conducted on all cutovers to insure loss of merchantable timber is minimized. CBPPL will work with the Industry Services Division in Corner Brook to implement a yield comparison study to compare the expected volume in an operating area to those actually attained. The results of this survey will help refine the inventory deduction described in Section 3.

As previously mentioned, reconnaissance and intensive regeneration surveys will be conducted on cutovers created during the next five years as well as those created in the past five years to determine the need for planting. As well, reconnaissance surveys will be done on regenerating stands to determine the suitability for precommercial thinning.

7.1.8 Information and Education

The district will continue to attempt to educate the general public to ensure meaningful and effective consultation and input can be attained. This will be accomplished through planning team fieldtrips and meetings, school presentations, open houses, meetings and National Forest Week activities.

7.2 District 16

7.2.1 Overview

This section will outline all forest activities that will occur on CBPPL Limits in District 16 from 2012-2016. More specifically, all proposed harvesting, silviculture and access road construction activities as well as environmental protection measures, activities inside protected water supply areas, surveys, and information and education initiatives will be presented and discussed in detail.

To present a more comprehensive overview of proposed activities on the entire district an overview map is presented in Figure 15 (Appendix 4). This map shows all proposed operating areas by the Crown and by CBPPL so that operations can be viewed from a landscape perspective across all ownerships in District 16. Maps of individual operating areas and summary sheets are also presented in Appendix 4. The summary sheets give a brief description of each

area, the type of activities that will occur and any issues raised and mitigative measures employed.

7.2.2 Allocation of Timber Supply

There is 372,105 m^3 of timber scheduled to be harvested by CBPPL in District 16 for the next 5 years.

Harvesting activities will be carried out in several locations throughout the District as shown on the operating area maps contained in Appendix 4.

Summer and winter harvesting operations will be carried out in the District, with summer operations concentrated in areas farthest from the main public highways, and winter operations closer to the public highways to reduce snow-clearing costs.

For the most part, harvesting will be carried out in accordance with the clear-cut silviculture system. All merchantable spruce and fir trees on site will be cut and extracted, leaving only sub merchantable stems and noncommercial species such as eastern larch and white birch. This approach is appropriate for shallow-rooted Boreal conifers such as fir and spruce, which are prone to wind throw following partial cutting. Additionally, clearcutting enhances the early growth of balsam fir seedlings, which typically exist in large numbers beneath mature balsam fir forests but require full sunlight to achieve optimal growth.

Harvesting and forest access road construction will focus on the harvest of mature and over mature timber throughout the district. CBPPL has conducted trial harvests in semi-mature PCT in adelgid damaged stands as part of a stand conversion silviculture treatment. The 2012 – 2016 harvest plan for district 16 will include a component of semi-mature PCT timber. Harvesting activities will endeavor to maximize the use of mechanical harvesters, extending winter and summer operating seasons in order to allow for the delivery of fresh wood over the entire twelve months of the year. This will allow us to reduce overall pulpwood inventories, and supply the

mill with a constant supply of fresh pulpwood with the optimum species mix, over the maximum number of operating days per year.

Our mechanized logging fleet will be used in combination with our tree length and conventional logging systems to ensure maximum utilization during winter harvesting, harvesting blow down timber, and harvesting low volume stands. Short wood harvesters and forwarders, which are equipped with wide tires and tracks, have a very low ground bearing pressure, and when they spread a brush mat of tops and branches in their travel path, ground disturbance is significantly reduced.

Table 12 details the proposed volume and compares it to the 5 year AAC. There will be no deviation from the five-year AAC in either the Class1 or Class 3 land base.

Table 12 Proposed Harvest on CBPPL Limits in District 16, 2012-2016

Total Class I AAC CBPPL Limits	**m3**
CBPPL Harvest on CBPPL Limits	**372,105 m3**
Crown Harvest on CBPPL Limits	**180,000 m3**
Total Harvest CBPPL Limits FMD 16	**552,105 m3**
CBPPL AAC Deviation (+/-)	**0 m3**

Note: The Crown harvest is shown in the Crown 5 Year Plan.

7.2.2.1 Commercial

The timber scheduled for harvest in the district is over mature with some small pockets of mature dispersed throughout. This proposed harvest follows the harvest schedule that was used to determine the AAC in Section 3. The first two five year periods are highlighted on the operating area maps in red. This represents two times the actual proposed harvest. The purpose of including more volume than is actually proposed is to allow for operational flexibility within operating areas without having to constantly amend the plan.

Table 13 Summary of CBPPL Harvesting by Operating Area in District 16
2012-2016

Operating Area Name	Operating Area Number	Proposed Harvest Volume (m3)
Faulkners Pond	K – 16 – 03	20,000
Kittys Brook	K – 16 – 08	10,000
Davis Pond	K – 16 – 35	10,000
Sandy Lake	K – 16 – 38	105,000
Angle Pond	K – 16 – 39	60,000
Birchy Narrows	K – 16 – 40	60,000
Taylors Brook	K – 16 – 44	37,105
Adies River	K – 16 – 47	60,000
Gales Brook	K – 16 – 49	10,000
Total		**372,105**

7.2.2.2 Hardwoods

The Company policy as it relates to domestic and commercial cutting of hardwoods is that after pulpwood harvesting operations have been completed in an area, domestic and commercial cutting for fuel wood will be allowed on cutover areas to cut hardwoods left behind. Details of the domestic cutting on Crown Lands can be found in the Crown Plan..

7.2.3 Silviculture

The silviculture prescriptions scheduled for the next five years are site preparation, planting/gap planting, and pre commercial thinning. Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. There is full planting when there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Precommercial thinning is done to reduce the density on overstocked regeneration so that growth can be concentrated on the remaining crop trees and thus reduce the time to harvest.

Table 14 Summary of Silviculture Treatments on CBPPL Limits 2012-2016

Treatment	Area (ha)
Pre Commercial Thinning	1400
Planting	1200
Site Preparation	1000
Total	**3600**

As stated in previous sections, there is a growing problem with balsam woolly adelgid in District 16. This insect affects balsam fir trees by severely reducing growth rates and therefore reducing the productivity of some sites to a point where commercial viability is questionable. The silviculture program in the next five years will be designed to mitigate the impacts of this insect on sites dominated by balsam fir. The problem with this insect is relatively new however, and the extent of affected areas and rate of spread is unknown. For this reason it is extremely difficult to identify specific areas for treatment at this time. Potential silvicultural treatment areas need to undergo reconnaissance and or intensive surveys to determine the severity of attack of this insect. These surveys will be conducted during this five-year period but until they are completed, specific locations and treatment amounts cannot be identified. There has been silviculture

prescriptions developed however, which will be implemented for specific on the ground conditions. These prescriptions are described below.

Immature and regenerating stands have been identified within operating areas. If the regenerating species is balsam fir then the presence of adelgid will be evaluated using reconnaissance surveys. Damage evaluation will be based on damage class as described in Table 15. If presence of adelgid is non existent or light (Codes 1and 2) then the balsam fir stands will be considered for pre commercial thinning, however, if presence of adelgid is Code 3 or higher in the areas, the stands will be left to develop naturally. The increasing adelgid presence however, will see the precommercial thinning program diminish over time in favor of planting.

Areas that are scheduled for commercial harvest or have been harvested in the past five years are candidates for planting or gap planting to black or white spruce. These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting and the presence of adelgid. If adelgid damage is greater than Code 2 in adjacent stands then balsam fir will not be considered an acceptable regeneration species. These areas will be either full planted or gap planted to bring them up to minimum stocking levels to spruce. Site preparation using either mechanical means or prescribed burning will be employed on suitable sites that have impediments to planting.

Table 15 Damage classes for balsam woolly adelgid assessment (after Sutton, 1981)

7.2.4

Code	Damage Class	Description
1	Undamaged	normal branch, no visible symptoms of attack
2	light	node swelling indistinct, apparent only at close examination
3	light to moderate	node swelling distinct, some stunting or distortion present
4	Moderate	distortion prominent, branch tip inhibited, thinly foliated
5	moderate to severe	as in moderate but terminals and some branches bare from tips up to 30 cm or up to one half the length of short branches
6	Severe	as in moderate but terminals and some branches bare for more than 30 cm or more than one half the length of short branches
7	dead trees	inner bark brown at breast height and symptoms or signs of adelgid attack present

Primary Access Roads and Bridges

There are 34 km of primary forest access roads scheduled to be built in District 16 in the next five years. These roads will be built to access timber for harvesting in the operating areas proposed. All roads will be built to the specifications of the Class 3 standard and all pertinent EPG's will be followed. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before and construction is initiated.

Table 16 Summary of Primary Access Road Construction on CBPPL Limits in District 16 2012 - 2016

Operating Area Name	**Operating area Number**	**Length (km)**	**Bridges**
Sandy Lake	K - 16 - 38	4	
Taylors Brook	K - 16 - 44	6	
Adies River	K - 16 - 47	15	1
Gales Brook	K - 16 - 49	9	1
Total		**34**	**2**

7.2.5 Activities in Protected Water Supply Areas

For harvesting operations inside PWSA's, wider buffers will be used and the pertinent EPG's will be attached to any permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, a Certificate of Approval under Section 10 of the Environment Act must be obtained before any domestic harvesting commences inside the PWSA.

7.2.6 Environmental Protection

7.2.6.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been few timber losses. Despite this fact the district must remain vigilant in its fire suppression program to ensure any future losses are minimized.

There are Crown Fire Crews and equipment stationed at Pasadena and Sops Arm in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional and provincial level is available should the need arise. There is an air tanker stationed at Deer Lake and a helicopter at Pasadena that are available for initial attack.

7.2.6.2 Insect and Disease

Monitoring and protection for insects and disease is done out of the forest protection division in Corner Brook. CBPPL and Crown District staff are always available however to provide assistance in detection, monitoring, and protection against insects and disease.

As stated, reconnaissance surveys will be carried out to monitor the extent and rate of spread of the balsam woolly adelgid.

7.2.6.3 General Environment

The environmental protection guidelines form the basis for protecting the environment from the effects of forest activities. Forest activities have the potential to impair water quality, erode and compact soil, destroy fish and wildlife habitat, impact viewscape, and disturb sensitive and rare sites etc. The guidelines are designed to provide site specific measured to ensure that these impacts are avoided. Highlights of measures to avoid these impacts include no activity buffer zones, modification of harvesting design and equipment, avoidance of sensitive site during critical periods, consultation with other regulatory agencies and of course, monitoring. Specific measures that govern each forestry activity are detailed in Appendix 1.

7.2.7 Surveys

Utilization surveys will be conducted on both commercial and domestic cutovers to insure losses of merchantable timber is minimized. CBPPL will work in conjunction with the Industry Services Division in Corner Brook to implement a yield comparison study to compare the expected volume in an operating area to those actually attained. The results of this survey will help refine the inventory deduction described in Section 3.

As previously mentioned, reconnaissance and intensive regeneration surveys will be conducted on cutovers created during the next five years as well as those created in the past five years to determine the need for planting. As well, reconnaissance surveys for balsam woolly adelgid will be done to determine suitable areas to conduct silvicultural treatments.

7.2.8 Information and Education

CBPPL Staff will continue to attempt to educate the general public to ensure meaningful and effective consultation and input can be attained. This will be accomplished through planning

team fieldtrips and meetings, school presentations, open houses, meetings and National Forest Week activities.

Section 8 Mitigations

8.1 District 09

Site-specific mitigations arising from concerns identified during the planning process and from other regulatory agencies are identified on the summary sheets accompanying each operating area in Appendix 3. As well, guiding principles, which outline procedures, to follow should an unforeseen conflict arise have been identified for each value in Section 4. Highlights of the mitigative measures that arose as a result of Planning Team concerns are:

- Existing guidelines for caribou and pine marten will be followed for all affected areas and any new guidelines developed as a result of ongoing processes will be adhered to. No harvesting will take place in Pine Marten Critical Habitat without prior approval from the Wildlife Division.
- Appropriate buffers will be maintained to protect potential archaeological artifacts.

8.2 District 16

Site-specific mitigations arising from concerns identified during the planning process and from other regulatory agencies are identified on the summary sheets accompanying each operating area in Appendix 4. As well, guiding principles, which outline procedures, to follow should an unforeseen conflict arise have been identified for each value in Section 4. Highlights of the mitigative measures that arose as a result of planning team concerns are:

- Existing guidelines for caribou and pine marten will be followed for all affected areas and any new guidelines developed as a result of ongoing processes will be adhered to. No harvesting will take place in Pine Marten Critical Habitat without prior approval from the Wildlife Division.

- Appropriate buffers will be maintained to protect potential archaeological artifacts.

- In areas where there is a concern regarding access, consideration will be given to restricting access after harvesting has been completed provided that there is consensus by the planning team.

Section 9 Plan Administration

9.1 Monitoring

Monitoring of planned activities is critical to ensure objectives and operations are carried out in a manner consistent with various guidelines and provincial and federal legislation. Monitoring occurs at the operational level and the planning level.

9.1.1 Operational Level

Annually, Corner Brook Pulp and Paper Limited is issued a **Certificate of Managed Land**. Attached to this Certificate are schedules that set out the conditions that must be followed in order to maintain managed land status. Schedule five contains the Environmental Protection Guidelines (EPG). Industry planning and operations must comply with schedule five or the land can be declared unmanaged and fines levied. NFS staff will monitor for compliance with schedule five and recommend managed or unmanaged status.

All planned activities are monitored by the NFS to ensure all guidelines and regulations pertaining to environmental protection, harvesting, road construction, and silviculture are followed. Any infractions or deviations from the regulations or guidelines are dealt with as required under the Forestry Act.

In addition to the monthly Government monitoring for compliance Corner Brook Pulp and Paper Limited has put in place an Environmental Management System (EMS), which was registered to the internationally recognized environmental standard ISO 14001 CSA Z809.

As part of this EMS, many monitoring activities take place throughout the year (checking for non-compliances) including:

- Field inspections completed by Operations Superintendents,
- Yearly internal EMS audit,
- Yearly external EMS and field surveillance audits,
- External compliance audit every five (5) years,
- External communication from the public through our web site, cbppl.com.

All non-compliances are documented and reported to the EMS Management Review Committee. All non-compliances are reviewed by the EMS Committee, and corrective action is implemented where and when required.

9.1.2 Planning Level

The planning team has established a monitoring committee (which is the planning team) whose primary role is to monitor implementation of this Five Year Operating Plan as well as those of the Crown and Abitibi Consolidated for the zone. This is a crucial role, as many implementation commitments are stated in the plan. The primary function of the monitoring committee is to:

- Monitor plan implementation for consistency with commitments in the plan.
- Identify concerns with plan implementation to team members.
- Review annual operating plans before implementation.
- Provide recommendations for plan changes.
- Establish protocol for concerns reported to and/or identified by monitoring committee.

The monitoring committee should meet at least once a year to review the annual operating plan. Additional meetings may be required to review amendments or provide recommendations should changes be required as a result of a catastrophic event such as fire which may precipitate changes to the plan. Field trips to view on the ground activities has proven effective by monitoring teams in the past and will be encouraged during the implementation of this plan.

9.2 Amendments

Due to the dynamic nature of forest activities, amendments are often required because of changes in the forest, operational realities, imposition of addition requirements or guidelines, or some other unforeseen circumstance. These changes to the five-year operating plan must be submitted as amendments and approved before they are implemented. There are two types of possible amendments for this plan, one that can be approved internally by the Newfoundland Forest Service and one that must be submitted to the Environmental Assessment Division for public review. Changes to this plan can be approved by the Newfoundland Forest Service if they are:

- Within one kilometer of an operating area described in the five-year operating plan, an additional area for timber harvesting that is, in total, not more than 50 hectares in each year of the plan.
- Within a forest management district, an additional areas for silviculture treatment of not more that 20 percent of the total operating area described in the five year operating plan over the five year term of the plan.
- Within an operating area described in the five year operating plan, not more than one kilometer, in total, of new primary forest access road in addition to existing and proposed primary forest access road in each year of the plan.
- Adjacent to an operating area described in the five-year operating plan, not more that half a kilometer, in total, of new primary forest access road in each year of that plan.

Changes that are not covered by the above must be submitted for Environmental Assessment (EA) in the form of an amendment to the five-year operating plan. Once approved through EA the amendment still has to be approved by the Ecosystem Management Division of the Forest Service however.

Amendments requiring submission through EA will be reviewed by the monitoring committee. The monitoring committee will review other amendments if the District Manager deems that they represent a significant change to the plan.

Appendix 1.

ENVIRONMENTAL PROTECTION GUIDELINES FOR ECOLOGICALLY BASED FOREST RESOURCE MANAGEMENT (STAND LEVEL OPERATIONS)

ENVIRONMENTAL PROTECTION GUIDELINES

■Forests are interconnected webs which focus on sustaining the whole, not the production of any one part or commodity. Trees, the most obvious part of a forest are critical structural

members of a forest framework. However, trees are only a small portion of the structure needed for a fully functioning forest.• (Hammond, 1991).

This ecologically based approach to forest resource management requires that resource managers shift their focus from managing components of the ecosystem to managing the three-dimensional landscape ecosystems that produce them. Primary concern becomes the maintenance of landscapes and waterways as complete ecosystems because the only way to assure the sustained benefit of forest values, now and in the future, is to keep them and all their parts in a healthy state. This is the foundation for an ecologically based approach to forest management. It means that everyone attends to the conservation and sustainability of ecosystems instead of sharply focussing on the productivity of individual or competing resources which has been our traditional mode of operation.

The Newfoundland Forest Service is committed to the concept of forest ecosystem management which is captured in the twenty-year Forestry Development Plan (1996-2016) vision statement:

■To conserve and manage the ecosystems of the Province which sustain forests and wildlife populations and to provide for the utilization of these resources by the people of the Province under the principles of sustainable development, an ecologically-based management philosophy, and sound environmental practices•.

There are five strategic goals in the twenty-year Forestry Development Plan (1996-2016) which provide the foundation upon which ecologically based resource management will be developed.

1. Manage forest ecosystems so that their integrity, productive capacity, resiliency, and biodiversity are maintained.

2. Refine and develop management practices in an environmentally sound manner to reflect all resource values.

3. Develop public partnerships or networks to facilitate meaningful public involvement in resource management.

4. Promote adaptive ecosystem management and conduct research that focuses on ecosystem processes, functions, and ecosystem management principles.

5. Establish and enforce conservation and public safety laws with respect to managing ecosystems.

The environmental protection guidelines provide specific ■on the ground• tasks for loggers and gives management direction to planners. Individually, the guidelines appear as specific rules;

however, when implemented collectively they will facilitate ecologically-based forest resource management.

1.0 GENERAL GUIDELINES

These guidelines are generated from impacts described in the literature and from discussions with resource managers. As new information and management techniques become available the guidelines will be changed to reflect this improved information base. Consequently, the guidelines will be reviewed on an annual basis to incorporate any necessary changes. The ■General Guidelines• apply to all forestry activities (i.e., silviculture, harvesting, road construction). These guidelines form Schedule IV of the Certificate of Managed Land. They are conditions of Crown commercial permits and they form the basis for the voluntary compliance program.

1.1 Planning

1. The location and type of all waterbody crossings must be submitted to the Department of Environment and Labour and the Department of Fisheries and Oceans. Certificates of Approval are required from both departments for waterbody crossings. A waterbody is defined as any water identified on the latest 1:50,000 topographic map. Appropriate protection is still required for streams greater than 1.0 m in width (at its narrowest point from the high water mark) not found on the 1:50,000 topographic map.

2. All waste disposal sites require a Certificate of Approval from the Minister of Government Services.

3. Excessive bulldozing is not permitted and no more than 10% of the total forest within an operating area can be disturbed. In situations where specific operating areas require more than 10% disturbance to capture available timber, the operator is required to rehabilitate the area to reduce the total net disturbance to the 10% maximum. Where disturbance has been excessive, a rehabilitation plan will be developed with the Forest Service District Manager. Disturbance is defined as per the Ground Disturbance Survey Guidelines developed by the Newfoundland Forest Service.

4. When an archaeological site or artifact is found, the *Historical Resources Act* requires that all development temporarily cease in the area and the discovery be reported to the Historical Resources Division (709-729-2462).

   The Historic Resources Division will respond immediately and will have mitigation measures in place within seven days as agreed to by the Historical Resources Division and the operator. Forestry activity can then continue.

The Historic Resources Division will be contacted during the preparation of five-year operating plans to determine the location of historic resources and appropriate mitigation measures will be designed. These measures will include such things as buffer zones and modified operations or surveys.

5. Should an oil or gas spill in excess of 70 litres occur, the operator must make every effort to first, contain, and second, clean up the spill after reporting the spill to the appropriate authorities:

Government Services Centre
Spill Report Line
(709) 772-2083 or 1-800-563-2444

6. The Parks and Natural Areas Division will be contacted during the preparation of five-year operating plans. Where operations are within one kilometre of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations maybe necessary.

7. In areas where caribou utilize arboreal lichens during the summer and/or winter, and terrestrial lichens during the summer, a minimum amount of lichen forest must be maintained for the caribou. Forestry activity will be designed in consultation with the Wildlife Division where this situation has been identified.

8. Areas identified as containing rare and/or unique flora (through literature review) are to be protected from forestry activity by avoiding these areas.

9. Where mature stands of timber for moose shelter and moose yards are required, they will be identified in consultation with Wildlife Division.

10. The impacts of forest operations on pine marten have been an ongoing issue. Until appropriate guidelines are developed for pine marten habitat, forestry activities within high density pine marten areas and dispersion areas required for pine marten recovery will require consultation with the Wildlife Division.

11. During the preparation of five-year operating plans, areas identified as ▪Sensitive Wildlife Areas• in the Land Use Atlas require consultation with the Wildlife Division prior to any forestry activity.

1.2 **Operations**

1. A 20-metre, treed buffer zone shall be established around all water bodies that are identified on the latest 1:50,000 topographic maps and around water bodies greater than

1.0 metre in width that do not appear on the maps. Where the slope is greater than 30% there shall be a no-harvest buffer of 20 m + (1.5 x % slope). All equipment or machinery is prohibited from entering waterbodies; thus, structures must be created to cross over such waterbodies. Every reasonable effort will be made to identify intermittent streams and they will be subject to this buffer requirement. The District Manager of Forest Ecosystems is permitted to adjust the specified buffer requirements in the following circumstances:

- the no-cut, treed buffer can exceed the 20 meters for fish and wildlife habitat requirements.

- a 50-metre, no-cut, treed buffer will be maintained around known black bear denning sites (winter) or those encountered during harvesting. These den sites must be reported to the Wildlife Division.

- no forestry activity is to occur within 800 metres of a bald eagle or osprey nest during the nesting season (March 15 to July 31) and 200 metres during the remainder of the year. The location of any raptor nest site must be reported to the Wildlife Division.

- all hardwoods within 30 metres of a waterbody occupied by beaver are to be left standing.

- a minimum 30-metre, no-cut, treed buffer will be maintained from the high water mark in waterfowl breeding, moulting and staging areas. These sites will be identified by the Canadian Wildlife Service and/or the Wildlife Division.

2. Heavy equipment and machinery are not permitted in any waterbody, on a wetland or a bog (unless frozen) without a Certificate of Approval from the Department of Environment and Labour and without contacting the DFO area habitat coordinator.

3. No heavy equipment or machinery is to be refuelled, serviced, or washed within 30 metres of a waterbody. Gasoline or lubricant depots must be placed 100 metres from the nearest waterbody. All fuel-storage tanks (including JEEP tanks) must be registered with the Department of Government Services and Lands and installed in accordance with the *Storage and Handling of Gasoline and Associated Products Regulations*. Fuel storage within Protected Water Supplies are more stringent. Please refer to ▪Guidelines for Forest Operations within Protected Water Supplies• for more information.

4. Used or waste oil shall be collected either in a tank or a closed container.

5. Above ground storage tanks shall be surrounded by a dyke. The dyked area will contain not less than 110% of the capacity of the tank. The base and walls of the dyke shall have a impermeable lining of clay, concrete, solid masonry or other material, designed,

constructed and maintained to be liquid tight to a permeability of 25L/m^2/d. There shall be a method to eliminate water accumulations inside the dyke.

6. Wherever possible, place slash on forwarded trails while forwarders are operating in an area. Skidding timber through any waterbody (as defined in Section 1.2.1) is prohibited.

7. Any forestry operation that directly or indirectly results in silt entering a waterbody must be dealt with immediately (A government official must be notified within 24 hours). Failure to comply will result in the operation being stopped.

8. Woody material of any kind (trees, slash, sawdust, slabs, etc.) is not permitted to enter a waterbody. Woody material on ice within the high water floodplain of any waterbody is prohibited.

9. To minimize erosion and sedimentation, waterbody crossings shall:

   i) have stable approaches;
   ii) be at right angles to the waterbody;
   iii) be located where channels are well defined, unobstructed, and straight;
   iv) be at a narrow point along the waterbody;
   v) allow room for direct gentle approaches;
   vi) have all mineral soil exposed during bridge construction and culvert installation seeded with grass.

10. Garbage is to be disposed of at an approved garbage disposal site. Prior to disposal it must be contained in a manner not to attract wildlife. All equipment is to be removed from the operating area where operations are completed.

11. Where safety is not an issue, a minimum average of 10 trees or snags per hectare (average on a cut block) or a clump of trees is to be left on all sites (harvesting and silviculture). Preference will be given to trees over 50 cm dbh.

2.0 TIMBER HARVESTING GUIDELINES

2.1 Planning

1. There will be corridors to connect areas of forest that will not be harvested (isolated stands within cutovers are not considered forested areas). These corridors connect wildlife habitat, watersheds and minimize fragmentation. Acceptable corridor vegetation includes productive forest areas (all age classes) and softwood/hardwood scrub. These corridors do not have to be continuous (i.e., breaks in vegetation are permitted) and will be determined in the five-year operating plan and identified in the annual work schedule.

2. Complete utilization of harvested trees is required. (Complete utilization is harvesting trees to a top diameter of 8 cm and stumps to a height of 30 cm). The District Manager can modify the stump height requirement to accommodate snow conditions. Where markets exist, non-commercial tree species that are harvested should be brought to roadside. This will be determined in consultation with the District Manager.

3. Preplanning is required on all forest operations (Industry/Crown) at the request of the District Manager (for Industry) and the Section Head i/c Management Planning (for Crown). Preplanning will include:

- boundaries of protected water supplies (if applicable);
- existing and proposed access roads;
- skid trails and landing locations;
- areas sensitive to erosion;
- buffer zones around water bodies;
- approved stream crossings;
- fuel storage locations;
- wildlife corridors.

4. Harvesting is not permitted within caribou calving areas from May 15 - June 15 (calving period). Harvesting is not permitted within post-calving areas from June 15 to July 31. These areas will be identified by the Wildlife Division.

5. Harvest scheduling should be modified during the migration of wildlife (e.g., caribou) and during temporary wildlife concentrations (e.g., waterfowl staging). Wildlife biologists will identify the areas of concern, and in conjunction with district or company foresters, aid in the modification of forestry operations.

2.2 **Operations**

1. When skid trails and winter roads are to be constructed, soil disturbance and impacts on waterbodies are to be minimized. The operator will use culverts and/or log bridges depending on the conditions. The objective is to minimize erosion and sedimentation, to avoid restricting streamflow, and to ensure fish passage in fish-bearing streams. Erosion control measures (e.g., laying down brush mats and the construction of diversion ditches for water run-off) are to be maintained while the skid trail is in use. All temporary crossings are to be removed at the end of the operating season unless the District Manager agrees to extend the life of the crossing for more than one season.

2. A minimum 50-metre, no-cut buffer is to be left between operations within approved cabin development areas.

3.0 FOREST ACCESS ROADS GUIDELINES

3.1 **Planning**

Forest access roads, borrow pits and quarries shall avoid:

i) wetlands, deltas, and floodplain or fluvial wetlands;
ii) terrain with high erodibility potential;
iii) known sensitive wildlife areas such as;
- calving grounds, post calving areas, caribou migration routes, caribou rutting areas, and winter areas,
- waterfowl breeding areas and colonial nesting sites,
- established moose yards by one kilometre,
- eagle and osprey nest sites,
- where site conditions and engineering permits, main haul roads should be one kilometre from permanent water bodies and all other roads by not more than 100 metres,
- endangered or endemic species or sub-species of flora or fauna and other areas to be determined by qualified authorities;

iv) known sensitive fish areas such as:
- spawning and rearing grounds;
v) historically significant areas such as:
- archaeological sites;
vi) existing reserves such as:
- parks (municipal, provincial, national);
- wilderness areas and ecological reserves;
- rare and endangered plant sites and habitats.

2. With respect to borrow pits and quarries, the operator shall:

i) minimize the number of new borrow areas opened for construction and/or maintenance;
ii) use existing borrow areas whenever practical;
iii) be in possession of a valid quarry permit from the Department of Mines and Energy prior to aggregate extraction activities;
iv) not locate pits and quarries in sensitive areas as identified by planning processes.

3. Forest access roads will not obstruct wildlife migration routes. The following guidelines will be followed to ensure the road is as unobstructing as possible:

i) roads should be of low profile (less than 1 m above the surrounding terrain);
ii) slash and other debris shall be removed;
iii) the slope of ditches and road banks should not exceed 1**.** horizontal to vertical.

4. Culverts and bridges are to be installed in accordance with the manufacturers specifications and the specifications attached to the Certificates of Approval received from the Department of Environment and Labour and from the Department of Fisheries and Oceans. Culvert ends will be properly riprapped.

5. Where road construction is to occur around identified waterfowl breeding, moulting and staging areas, the Canadian Wildlife Service is to be consulted.

6. Road construction is not permitted within any buffer zone except with the permission of the District Manager.

7. When a skid trail is on steep ground and is no longer in use, cut-off ditches and push lanes must be created. The frequency will be determined by the District Manager.

8. When disturbance is over 10%, the conditions in 1.1.3 will apply.

9. There shall be no bulldozing of standing merchantable timber or poor utilization of merchantable softwoods and hardwoods during cutting of the right-of-way.

10. Excavations required for the construction of piers, abutments or multi-plate culverts shall be completed in the dry. (Where exceptions occur, consultation with District manager is required).

11. On a site specific basis, roads can be decommissioned and/or rehabilitated as directed by the District Manager. Decommissioning is defined as barring access; rehabilitation means to re-vegetate the road.

3.2 **Operations**

1. A "no-grub" zone of 30 metres of undisturbed ground vegetation must be maintained around any water body crossing to minimize the damage to the lower vegetation and organic cover, thus reducing erosion potential. Manual clearing at waterbody crossing sites should be used to remove or control vegetation. Right-of-way widths at waterbody crossings should be kept to a minimum.

2. Fill materials for road building must not be obtained from any waterbody or from within the floodplain of any waterbody.
3. Trees are to be felled away from all waterbodies, and slash and debris should be piled above the high water mark so that it cannot enter waterbodies during periods of peak flow.

4. Equipment activity in water crossing areas is to be kept to a minimum. Whenever possible, any work is to be carried out from dry stable areas.

5. Unnecessary side casting or backfilling in the vicinity of waterbodies is not permitted. Where topographical constraints dictate that the roadbed must be constructed adjacent to a waterbody, road slope stabilization is to be undertaken at the toe of the fill where it enters the water (an area where active erosion is likely). The placement of large riprap or armour stone is recommended in such areas.

6. Side casting must be carried out in such a manner that sediment does not enter any waterbody.

7. Where borrow pit or quarry activity is likely to cause sediment-laden run-off to contaminate a waterbody, sediment control measures such as filter fabric berms or sedimentation ponds are to be installed. Contact is to be made with the District Manager prior to construction where such conditions exist.

8. Stabilize cut banks and fill slopes in the vicinity of waterbodies.

9. When using ditches, especially on long slopes, baffles and culverts are to be used at frequent intervals.

10. When constructing ditches near streams, the ditch itself is not to lead directly into the stream.

11. Keep ditches at the same gradient as the road.

12. In side hill and similar areas, install ditches on the uphill sides of roads to intercept seepage and run-off.

13. Borrow pits are to be located 50 metres from the nearest waterbody.

4.0 SILVICULTURAL PRACTICES AND FOREST REGENERATION GUIDELINES

4.1 Scarification

1. Select scarification methods best suited for preparing the area for planting and for minimizing ground disturbance.

2. Where slash is piled into windrows, ensure the windrows are placed where slash cannot be washed into streams at peak flooding conditions.
3. To minimize erosion, do not direct scarification equipment straight down slope.

4. Where safety is not an issue, a minimum average of 10 cavity trees or snags per hectare, or a clump of trees, will be left on all sites.

5. Whenever possible, white pine regeneration will not be disturbed.

4.2 **Planting**

1. Landings will be stabilized through seeding (grass) or planting at time of plantation establishment.

4.3 **Pre-commercial Thinning**

1. Where possible, do not carry out pre-commercial thinning in important wildlife areas during the periods of birth and/or hatching. These areas and times will be identified by the Wildlife Division.

2. Where white pine regeneration is present, the District Manager will determine how the pine will be thinned.

3. Trees cut will not be felled into waterbodies.

5.0 FOREST PROTECTION GUIDELINES

1. A pesticide application licence must be obtained from the Department of Environment. This licence will determine planning and operational requirements.

6.0 GUIDELINES FOR FORESTRY OPERATIONS WITHIN PROTECTED WATER SUPPLY AREAS

The primary function of a protected water supply area is to provide the public with an adequate quantity of safe and good quality water on a permanent basis, to meet its present and future demands. Any other activity within water supply areas is considered secondary, and if permitted, must be strictly regulated and monitored to ensure that the water supply integrity is not threatened and the quality of the water is not impaired.

In Newfoundland, forestry operations are permitted in protected water supply areas on a limited and controlled basis provided the proposed operations have no, or minimal, water quality impairment potential.

The following permits and approvals are required prior to the beginning of forestry operations within a protected water supply area:

1) Approval of the forest operating plan by the Newfoundland Forest Service.

2) Approval of the forest operating plan by the provincial Department of Environment and Labour and issuance of a Certificate of Approval under *Section 10* of the *Department of Environment Act*.

3) Quarry permits from the provincial Department of Mines and Energy for all borrow areas and ballast pits on unalienated Crown lands and alienated Crown land (i.e., leased and licenced land).

4) Stream crossing permits under *Section 11* of the *Department of Environment Act* and from the federal Department of Fisheries and Oceans.

5) Other permits or approvals as required by natural resource management and regulatory agencies.

6.1 **Planning**

1. Prior to beginning any work, a forest operating plan must be prepared and approved by the Newfoundland Forest Service and the Department of Environment and Labour, and a Certificate of Approval must be obtained under *Section 10* of the *Department of Environment Act* for site specific activities such as road construction, commercial harvesting, silvicultural operations, and other activities associated with forestry operations.

2. In addition to the information normally contained in a forest operating plan, the plan must include maps to show:

- the boundary of the protected water supply area;
- existing and proposed access roads;
- proposed harvesting areas;
- areas sensitive to erosion;
- buffer zones around water bodies;
- approved stream crossings;
- proposed landing and skid trail locations;
- proposed fuel storage locations;
- peatland and other wetlands;
- nearby communities;
- other relevant information.

The plan must also contain a written section describing the harvesting techniques to be used, the equipment required for the operation, and the schedule of the operation.

3. Locate roads to avoid all waterbodies and areas of sensitive terrain.

4. The forest operating plan must identify an Operations Manager who shall have the responsibility for ensuring that the special protection measures are followed. The Operations Manager is responsible for co-ordinating clean-up efforts in the event of a fuel or oil spill.

6.2 **Forest Access Road Construction**

1. A "no-grub" zone of 30 metres of undisturbed ground vegetation must be maintained around any waterbody crossing to minimize the damage to the lower vegetation and organic cover, thus reducing the erosion potential. Manual clearing at waterbody crossing sites should used to remove or control vegetation. Right-of-way widths at waterbody crossings should be kept to a minimum.

2. Clear-cutting up to the perimeter of any waterbody is not permitted. In all areas where road construction approaches a waterbody, a buffer zone of undisturbed vegetation must be maintained on both sides of the right-of-way using the buffer zone criteria outlined in section 6.6.

3. Fill materials for road building must not be obtained from any waterbody or from within the floodplain of any waterbody.

4. Provide adequately designed and constructed drainage ditches along forest roads to allow for good road drainage.

5. Take-off ditching can be used on both sides of the road, or in conjunction with culverts, to divert the ditch flow into the woods or into stable vegetated areas above the no-grub zones. Where take-off ditches are unstable or cannot be constructed, the use of check dams and settling basins in the ditches is required until the ditches become stabilized.

6. Trees are to be felled away from all waterbodies, and slash and debris should be piled above the high water mark so that it cannot enter waterbodies during periods of peak flow.

7. Equipment activity in water crossing areas shall be kept to a minimum. Any work will be carried out in dry, stable areas.

8. When working near sensitive areas such as streams or lakes, road building operations causing erosion or siltation are to be followed as per section 1.2.7.

9. Unnecessary side casting or backfilling in the vicinity of water bodies is not permitted. Where topographical constraints dictate that the roadbed must be constructed adjacent to a water body, road slope stabilization is to be undertaken at the toe of the fill where it enters water, an area where active erosion is likely. The placement of large riprap or armour stone is recommended in such areas. Contact is to be made with the District Manager prior to construction when such conditions occur.

10. Side casting must be carried out in such a manner that sediment does not enter any waterbody.

11. Maintenance support sites must be located outside the protected water supply area.

6.3 **Forest Access Road Stream Crossings**

1. Stream fording is prohibited in protected water supply areas.

2. All stream crossings, whether culverts or bridges, require written approval under *Section 11* of the *Department of Environment Act.*

3. The operator must comply with all terms and conditions of a Certificate of Approval for stream crossings.

6.4 **Harvesting**

1. Harvesting or other heavy equipment will not be used on wetlands or bogs.

2. Steep areas with high potential for erosion should not be harvested.

3. Wherever possible, skid trails should run along contours and never cross wetlands and waterbodies.

4. Landings will be few in number with a maximum size of less than 0.25 ha. All landings should be located at least 100 metres from a waterbody.

5. In sensitive areas prone to erosion, equipment must have wide tires, or harvesting must occur during the winter when the ground is frozen.

6. Harvesting equipment shall not enter a buffer zone or any waterbody without permission of the District Manager.

7. The operator must implement erosion control and rehabilitation measures in areas where soils have been unduly disturbed by harvesting activity. In addition to general erosion control measures presented in other sections of these guidelines, the following should also be considered in protected water supply areas:

< undertake contour furrowing;
< construct diversion ditches to lessen the possibility of forming new drainage channels;
< seed or plant areas that are difficult to stabilize by other means;
< plough or rip prior to seeding any surfaces which have been compacted.

6.5 **Buffer Zones**

The Newfoundland Forest Service on unalienated Crown land and the appropriate company on leased, licenced, private or charter land will provide the operator with a map indicating the harvesting area and no-cut treed buffer zones, and will ensure that the operator is familiar with the boundaries.

No forestry activities are permitted within the following buffer zones.

Water Body	Width of Buffer Zone
1. Intake pond/lake/reservoir	A minimum of 150 m
2. River intake	A minimum of 150 m for 1 km upstream and 100 m downstream
3. Main river channel	A minimum of 75 m
4. Major tributaries/lakes/ponds	A minimum of 50 m
5. Other water bodies	A minimum of 30 m

6.6 **Fuel/Oil Handling and Storage**

Fuel storage and the operation of fuel storage equipment is regulated by the *Storage and Handling of Gasoline and Associated Products Regulations (1982)* under the Department of Environment and Lands Act. According to the regulations, the owner or operator of a fuel storage system must submit a Schedule "A" Storage Tank System Application to the Department of Environment. The applicant must be in receipt of a Certificate of Approval for the system before the system is used for fuel storage. Section 9 of the above Act states: "*No owner or operator shall directly or indirectly cause pollution of the soil or water by causing, suffering or permitting leakage or spillage of gasoline or associated products from a storage tank system or vehicle."*

In addition to the above regulatory requirements, the following guidelines are to be followed:

1. Bulk fuel is to be stored outside the protected water supply area. f fuel must be stored in the protected area, it must be in the least sensitive area and be approved by the Water Resources Management Division of the Department of Environment and Labour.

2. Fuel must be stored in self-dyked, above-ground Jeep Tanks which have been approved by the Department of Environment and Labour.

3. A maximum of seven days fuel supply can be stored within a water supply area.

4. Refuelling must not take place within 100 metres of a waterbody.

5. Daily dipping of tanks and weekly reconciliations are mandatory. Visual inspection of the dykes and the surrounding area must be carried out daily and inspection records must be maintained.

6. Each unit must be fitted with a locking valve system for the elimination of water inside the outer tank. The valve must be closed and locked except to drain precipitation.

7. Each person involved with fuel handling must be cautioned that any spillage is to be cleaned up immediately.

8. Each person involved with fuel storage must exercise extreme caution when refuelling equipment.

9. All waste materials and waste oil on the site must be collected in enclosed containers and removed to an approved site at least weekly.

10. Contaminated soil or snow must be disposed of at an approved waste disposal site.

11. Any spill in excess of 70 litres must be reported immediately through the 24- hour Spill Report Number (709-772-2083) or the Government Services Centre (1-800-563-2444).

12. All self-dyked Jeep Tanks must be located at a minimum distance of 500 metres from any major waterbody.

13. A fuel or oil spill clean-up kit must be kept on site within the protected area to facilitate any clean-up in the event of a spill. This kit must include absorbent pads, loose absorbent materials such as dried peat, speedy-dry or sawdust, and a container such as an empty drum for recovering the fuel or oil. If there is a bulk fuel storage facility within the protected area, the clean-up kit must include the following list of fuel or oil spill clean-up equipment:

< Fire pump and 100 metres of hose
< Two hand operated fuel pumps
< Six recovery containers such as empty drums
< Four long handled shovels
< Two pick axes
< Ten metres of containment boom
< Twenty-five absorbent pads
< One hundred litres of loose absorbent material.

When any fuel spill occurs, stop the fuel flow immediately. This may entail repairing a leak, pumping out a tank, or shutting off a valve. If fuel or oil is spilled onto soil, dyking may be necessary. If fuel or oil enters water, absorbent booms or barriers such as fencing or netting with loose absorbent or straw must be used to contain the spill. If necessary, culverts may be blocked off by earth or wooden barriers to contain the fuel or oil provided the threat of flooding is addressed.

All recovered fuel or oil must be stored in containers. Contaminated soil must be removed and placed in containers for transport and disposal. Extensive soil removal may cause problems such as erosion and the subsequent siltation of waterbodies; therefore, the affected area must be backfilled and sloped and revegetated as required by the Department of Environment and Labour.

Recovered fuel or oil should be reused or collected by a waste oil company for recycling. Oily debris and contaminated soils must be disposed of at an approved waste disposal site with the approval of the disposal site owner or operator. Contact must be made with the appropriate regional office of the Department of Environment and Labour before disposal.

6.7 **Support Service and Structures**

1. Storage of any type of pesticide, chemical or other hazardous material isprohibited within a protected water supply area.

2. Dormitory camps, garages or any other structures are prohibited within a protected water supply area.

3. The establishment of new sawmills is not permitted in protected water supply areas.

4. Wherever possible, toilet facilities must be provided in all work areas.

5. Garbage cans must be located in all work areas and garbage is to be collected regularly and disposed of at an approved waste disposal site outside the protected area.

6.8 **Silviculture**

1. Chemicals are to be used within a protected water supply area only under the approval of the Division of Water Resources.

2. Scarification must be minimized and restricted to the trench or spot types.

3. If scarification leads to erosion or sedimentation of small streams or water bodies, scarification operations must be suspended and remedial measures must be taken.

6.9 **Abandonment**

When forestry operations in a protected water supply area have been completed, an abandonment plan for the area should be developed. This will involve input from the Newfoundland Forest Service, the Community involved, and the Water Resources Management Division of the Department of Environment and Labour. In general, the purpose of the plan is: (i) to ensure that the post-harvest conditions do not lead to water quality impairment, and (ii) to discourage activities or use of the area that could lead to water quality impairment.

An important question will be whether access roads will remain open. This will be decided on a case-by-case basis in consultation with the municipality, Water Resources Management Division and the operator. Issues such as the rehabilitation of cutover areas, landing sites, skid trails, and the abandonment of roads are to be discussed during the consultation process to control post-harvesting environmental impacts and activities.

The following are recommended precautionary measures if roads are to be closed to control post-harvesting access to the area:

< Use water bars (trenches 8-10" deep dug across the road) to intercept and deflect surface roadside ditches rather than have it flow into a waterbody. Water bars can

be placed 500 metres apart in gentle to moderate terrain (up to 10% slope), but should be no more than 150 metres apart in terrain greater than 10%. In most cases, it is sufficient to limit water bars to one kilometer on each side of a stream crossing.

< Road-side ditches should flow into the woods or into stable, vegetation covered areas.

< Stable bridge abutments and erosion protection works at crossings need not be removed.

< Bridge decking, culverts and other easily removable structures should be transported out of the watershed area.

< All disturbed areas of river banks will be stabilized and seeded.

6.10 Monitoring and Inspection

1. Forestry operations approved under Section 10 of the Department of Environment Act will be inspected from time to time by the staff of the Water Resources Management Division to ensure the operator's compliance with the environmental protection guidelines and the terms and conditions of the approvals.

2. In case of an oil spill, the sedimentation of a water body, or any other water quality impairment related issue, the operator might be required by the Department of Environment and Labour to undertake water quality monitoring to assess the extent of the damage and to select appropriate mitigative measures to correct the harmful conditions.

3. Any water quality impairment problem should be reported to the Water Resources Management Division.

7.0 PROCESSING FACILITIES AND SUPPORT SERVICES GUIDELINES

1. If possible, use previously disturbed sites (e.g., borrow pit).

2. Minimize the size of the area cleared for the establishment of any camp, processing or support structures. Wherever possible, these facilities should not be established within 100 metres of a waterbody.

3. All sumps containing effluent from a kitchen or washroom facility must be properly treated on a daily basis in compliance with Department of Health regulations.

4. Sewage disposal must be carried out in compliance with the Public Health Act.

5. A permit to occupy is required for Crown Land developments.

6. Facilities will not be located within known sensitive wildlife areas. These areas will be identified by the Wildlife Division.

7. A permit is required for a firearm.

8.0 PLANNING AND MUNICIPAL AREA GUIDELINES

1. Timber harvesting, resource road construction, silviculture, processing facilities, and support services are developments under the Urban and Rural Planning Act. Where these activities occur within a planning area boundary or within 400 metres of a protected road, a development permit is required before any activity takes place.

2. Consultation with the planning agency (usually municipality, but also the Development Control Unit of the Department of Municipal and Provincial Affairs) is to be made at the planning stage so that regulatory requirements can be made known and taken into account. This should occur three months before the desired commencement of the development and the permit obtained about one month before the development is to start.

Appendix 2. List of Planning Team Members

Planning Team Members District 9

Name *	Affiliation
Mark Lawlor	Dept. of Natural Resources - Chairperson
Wilfred Bartlett	Public
Keith Morey	Morey's Logging
Terrence Rideout	Rideout's Wood Products
Tony Bouzane	Dept. of Fisheries & Oceans
David Armstrong	Corner Brook Pulp & Paper Limited
Steve Balsom	Corner Brook Pulp & Paper Limited
Harvey Rice	Springdale Forest Resources
Cyril Pelley	Outfitter
David Frampton	Crown Lands
Keith Anthony	E.K. Anthony
Jamie Tizzard	Dept. of Natural Resources
Brad White	Dept. of Natural Resources
Dennis Young	Springdale Forest Resources
Mike Butt	Bax Butt Sawmill
Scott Young	Springdale Forest Resources
Andrew Pike	Crown Lands

Planning Team Members District 16

Name *	Affiliation
Colin Davis	Parks and Natural Areas
Eli Bishop	White Bay South Development Assn.
Dave Armstrong	Corner Brook Pulp and Paper Limited
Steve Balsom	Corner Brook Pulp and Paper Limited
Maxine Hayden	Town of Deer Lake
Darren Sooley	Fisheries and Oceans
Otto Roberts	Roberts Outfitting
Nathan Wareham	Western Newfoundland Model Forest
Damien Morrissey	Crown Lands Division
Melvin Rideout	Town of Cormack
Stephanie Ganz	Agrifoods
Christa Ramsey	Water Resources
Jerry Martin	Town of Hampden
Fred Osmond	Burtons Cove logging
Zeta Osmond	Burtons Cove logging
Bert Frampton	DEM District 16
James MacNeil	District 16

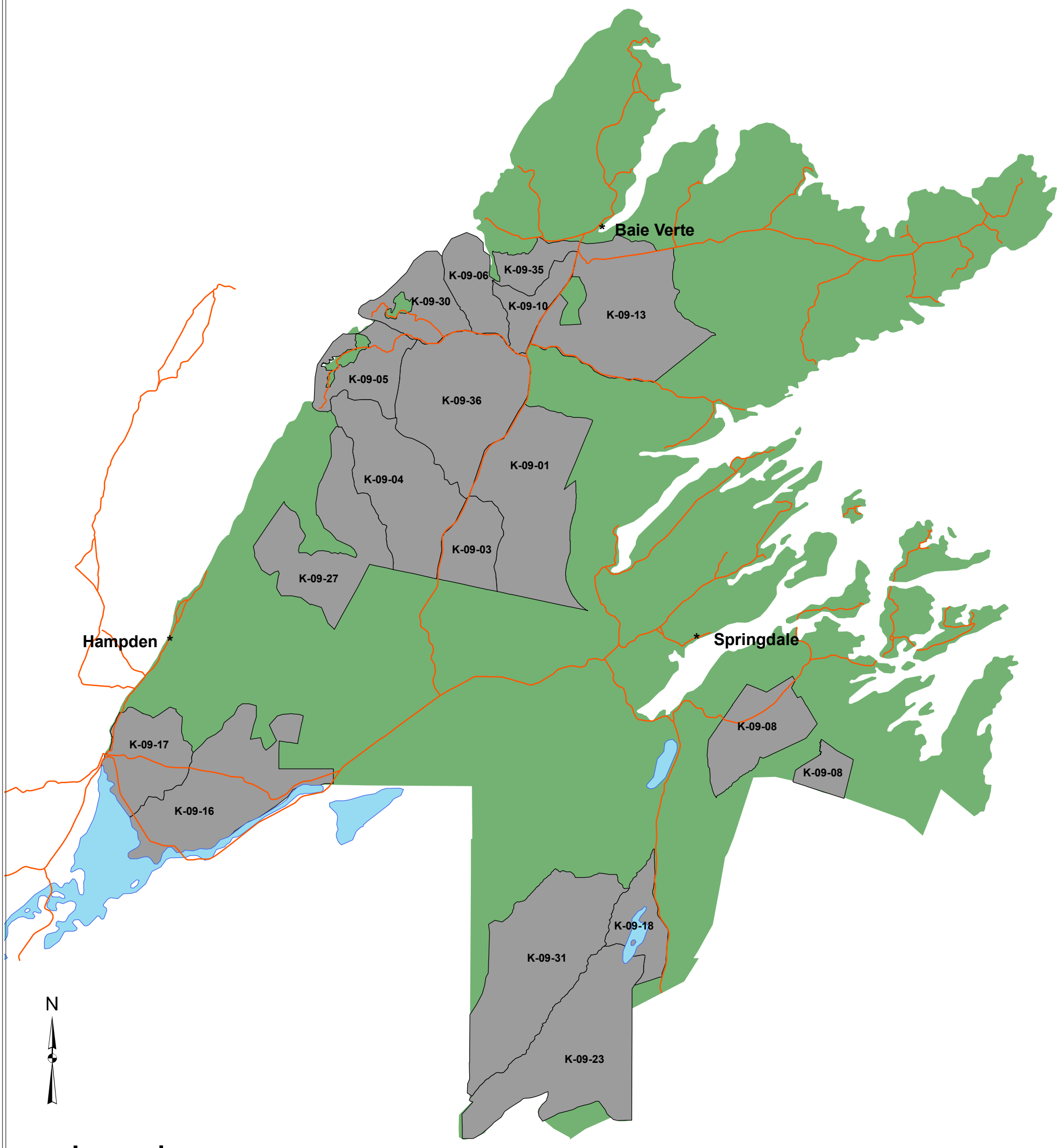
Appendix 3. Operating Area Maps and Descriptions for Forest Management District 09

Appendix 4. Operating Area Maps and Descriptions for Forest Management District 16

Appendix 3

Operating Area Maps and Descriptions for District 9

Corner Brook Pulp and Paper Ltd.
Five Year Plan Operating Areas 2012 - 2016
Forest Management District 09



CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Gull Pond	**Inventory Map #:**	042
Harvest Area #:	K-09-01	**NTS Map #:**	12H09

Forest Inventory

Gross		**Net**		**Working Group**	
Volume:	m3	Volume:	m3	bF:	%
Area:	ha	Area:	ha	bS:	%

Operational Considerations:

Harvest System: NA

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

There isn't any commercial harvesting planned for this area.
There are silviculture activities planned for this area.

No issues identified during the DNR public consultation process.

This operating area is partially contained inside the Protected Water Supply for the Town of King's Point. Forestry activities will conform with the Environmental Protection Guidelines related to operations within Protected Water Supply Areas.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Gull Pond (K - 09 - 01)
Scale 1:115,000

Forest Inventory Map 042
NTS Map 12H09

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

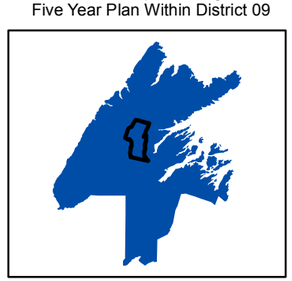
Administration Boundaries
- Management Boundary
- Ownership Boundary

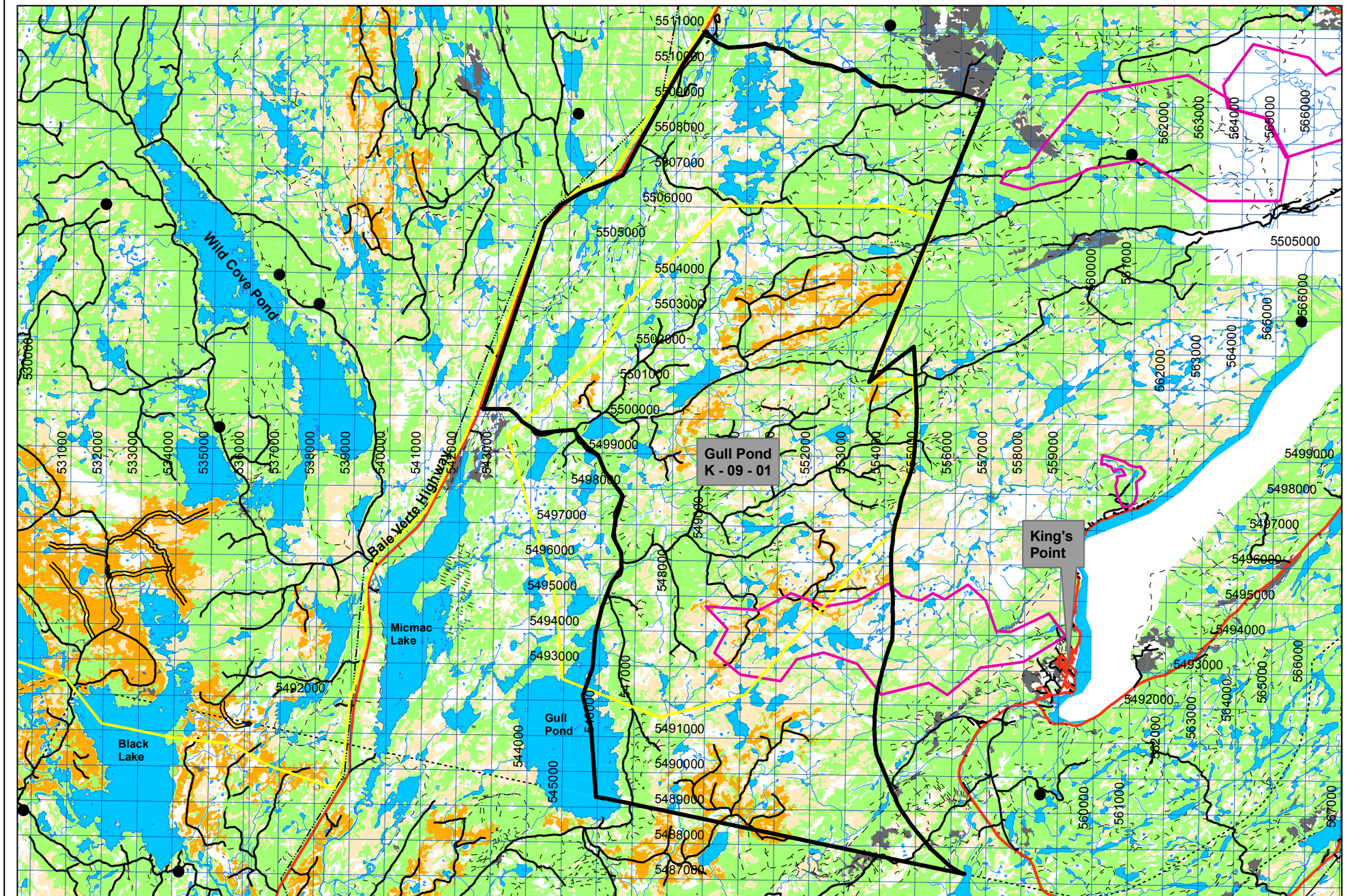
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Pasture Block	**Inventory Map #:**	042
Harvest Area #:	K-09-03	**NTS Map #:**	12H09

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	49,212	m3	Volume:	40,354	m3	bF:	45	%
Area:	492	ha	Area:	492	ha	bS:	55	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Pasture Block (K - 09 - 03)
Scale 1:50,000

Forest Inventory Map 042
NTS Map 12H09

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

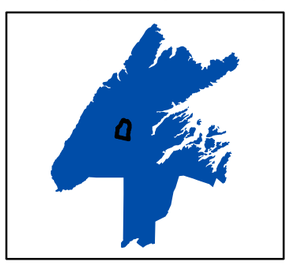
Administration Boundaries
- Management Boundary
- Ownership Boundary

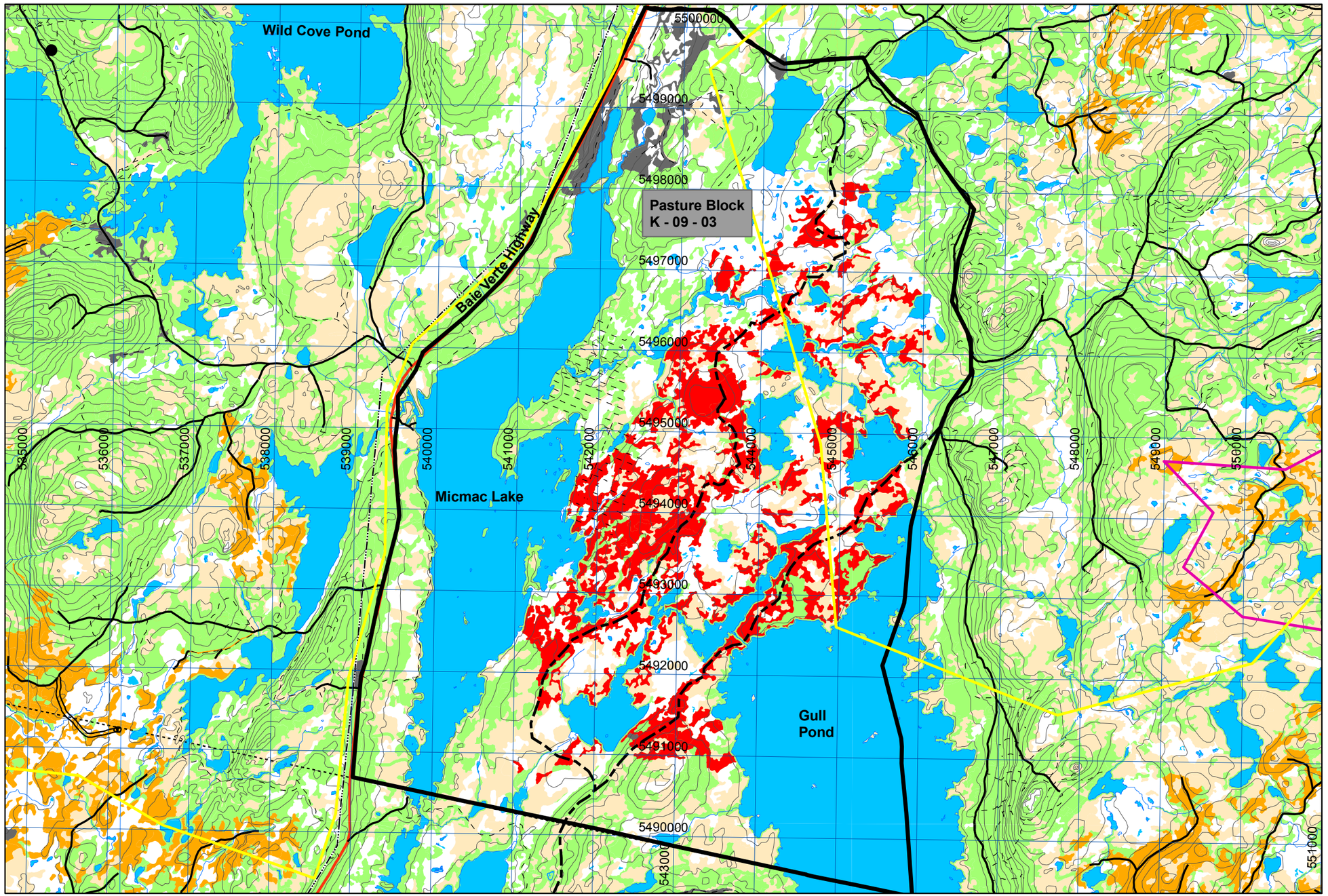
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Wild Cove Pond	**Inventory Map #:**	033, 041, 042
Harvest Area #:	K-09-04	**NTS Map #:**	12H09, 12H10, 12H15

Forest Inventory

Gross		**Net**		**Working Group**	
Volume:	m3	Volume:	m3	bF:	%
Area:	ha	Area:	ha	bS:	%

Operational Considerations:

Harvest System: NA

Terrain Conditions: Predominately gentle terrain in combination with steep rocky slopes, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

There isn't any commercial harvesting planned for this area.
There are silviculture activities planned for this area.

No issues identified during the DNR public consultation process.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Wild Cove Pond (K - 09 - 04)
Scale 1:100,000

Forest Inventory Map 033, 041, 042
NTS Map 12H09, 12H10, 12H15

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

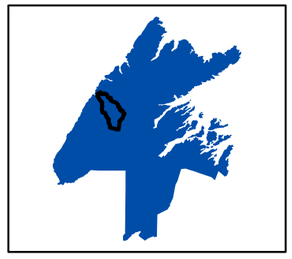
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

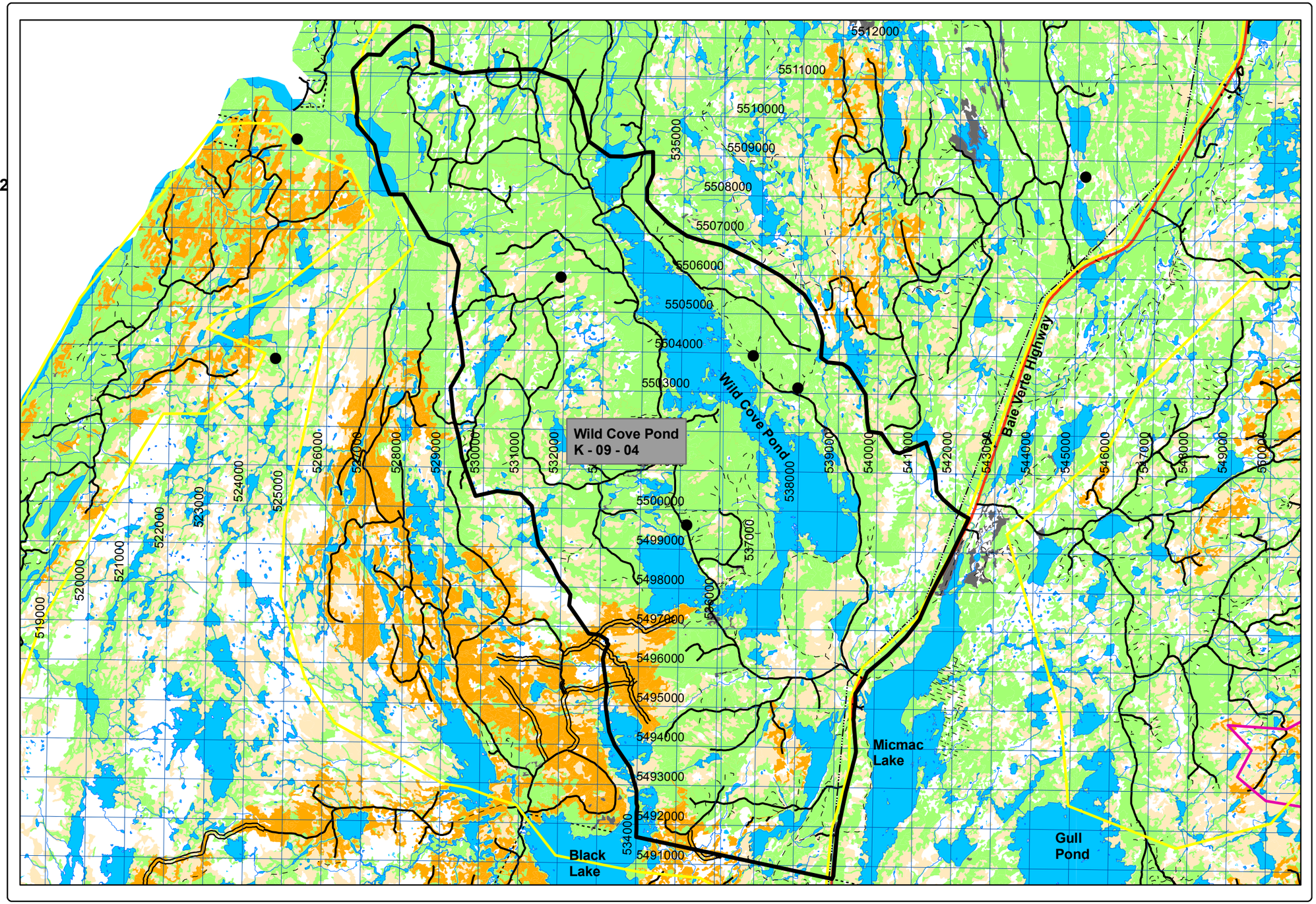
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Rice Mountain	**Inventory Map #:**	033, 034, 041
Harvest Area #:	K-09-05	**NTS Map #:**	12H10, 12H15, 12H16

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	67,448	m3	Volume:	55,307	m3	bF:	35	%
Area:	531	ha	Area:	531	ha	bS:	65	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately coastal terrain comprised of steep slopes, interspersed with sloping valleys, rivers, ponds, streams, barrens and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

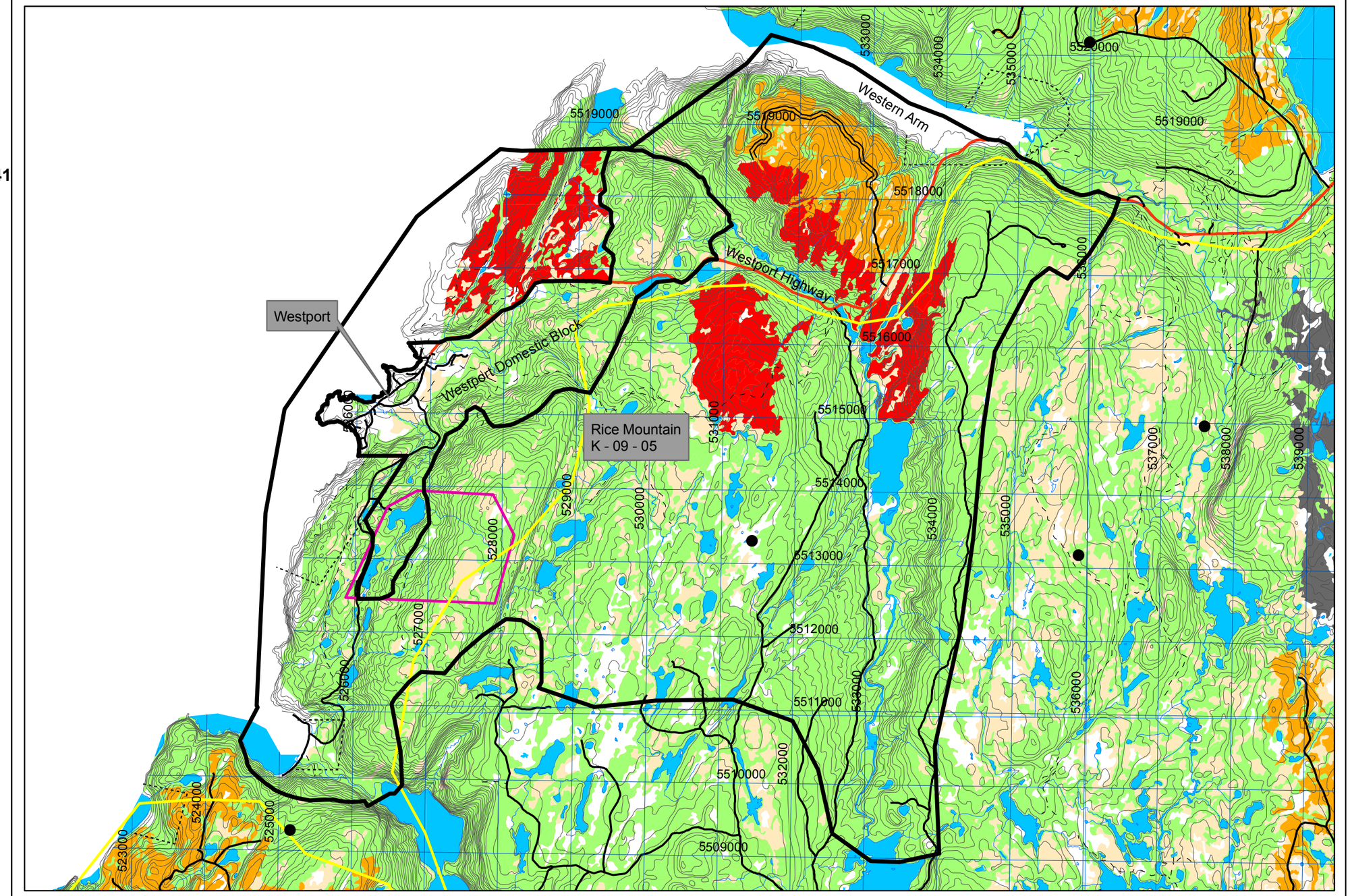
A small portion of area is contained inside the Protected Water Supply for the Town of Westport. Forestry activities will conform with the Environmental Protection Guidelines related to operations within Protected Water Supply Areas.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards. For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Rice Mountain (K - 09 - 05)
Scale 1:55,000

Forest Inventory Map 033, 034, 041
NTS Map 12H10, 12H15,12H16



LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

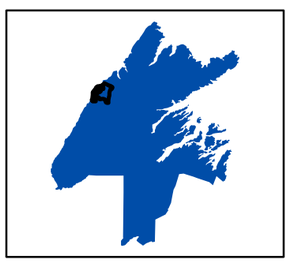
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09



CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Middle Arm	**Inventory Map #:**	034
Harvest Area #:	K-09-06	**NTS Map #:**	12H16

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	191,711	m3	Volume:	157,203	m3	bF:	40 %
Area:	1,681	ha	Area:	1,681	ha	bS:	60 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately coastal terrain comprised of steep rocky slopes, interspersed with sloping valleys, rivers, ponds, streams, barrens and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

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Forest Management District 09
Five Year Plan (2012 - 2016)

Middle Arm (K - 09 - 06)
Scale 1:60,000

Forest Inventory Map 034
NTS Map 12H16

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

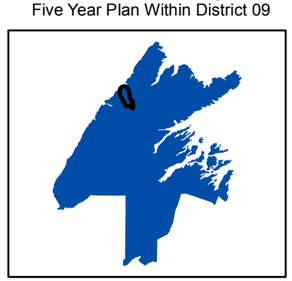
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

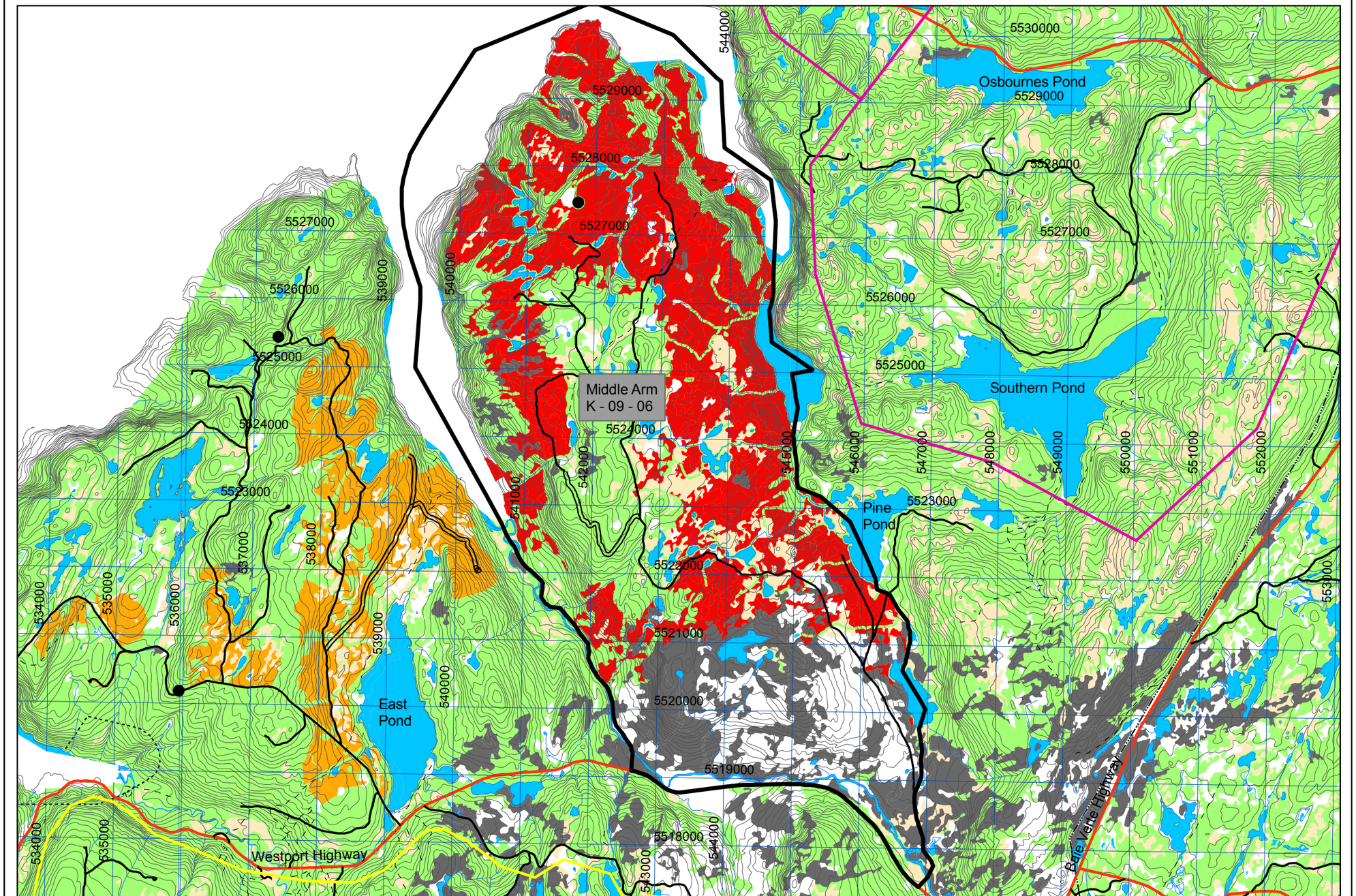
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Tommys Arm	**Inventory Map #:**	052, 053
Harvest Area #:	K-09-08	**NTS Map #:**	12H05, 2E05

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	198,763	m3	Volume:	162,986	m3	bF:	25	%
Area:	2,548	ha	Area:	2,548	ha	bS:	75	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately coastal terrain comprised of steep rocky slopes, interspersed with sloping valleys, rivers, ponds, streams, barrens and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

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GIS

CBPP Woodlands

Certified System

ISO 14001
CSA Z809-02

Forest Management District 09
Five Year Plan (2012 - 2016)

Tommys Arm (K - 09 - 08)
Scale 1:60,000

Forest Inventory Map 052, 053
NTS Map 12H08, 2E05

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

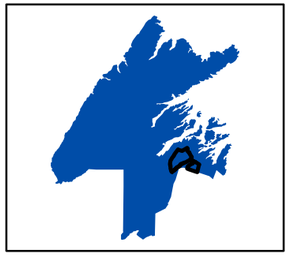
Administration Boundaries
- Management Boundary
- Ownership Boundary

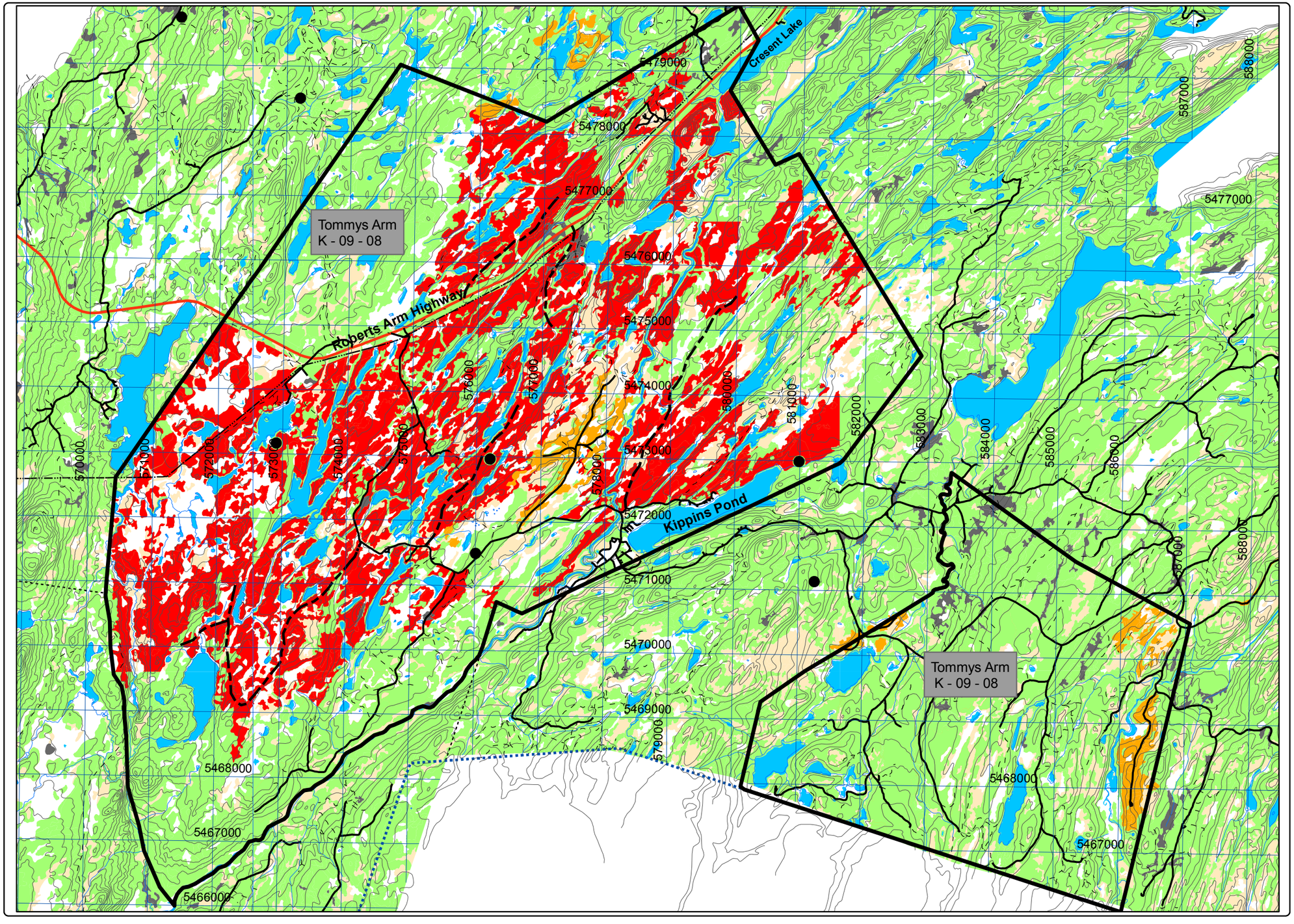
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Pine Pond	**Inventory Map #:**	034
Harvest Area #:	K-09-10	**NTS Map #:**	12H16

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	138,178	m3	Volume:	113,306	m3	bF:	55	%
Area:	1,368	ha	Area:	1,368	ha	bS:	45	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

A small portion of this operating area is contained inside the Protected Water Supply for the Town of Baie Verte. Forestry activities will conform to the Environmental Protection Guidelines related to operations within Protected Water Supply Areas.

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Forest Management District 09
Five Year Plan (2012 - 2016)

Pine Pond (K - 09 - 10)
Scale 1:55,000

Forest Inventory Map 034
NTS Map 12H16

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

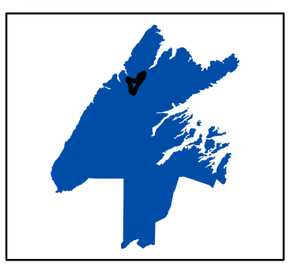
Administration Boundaries
- Management Boundary
- Ownership Boundary

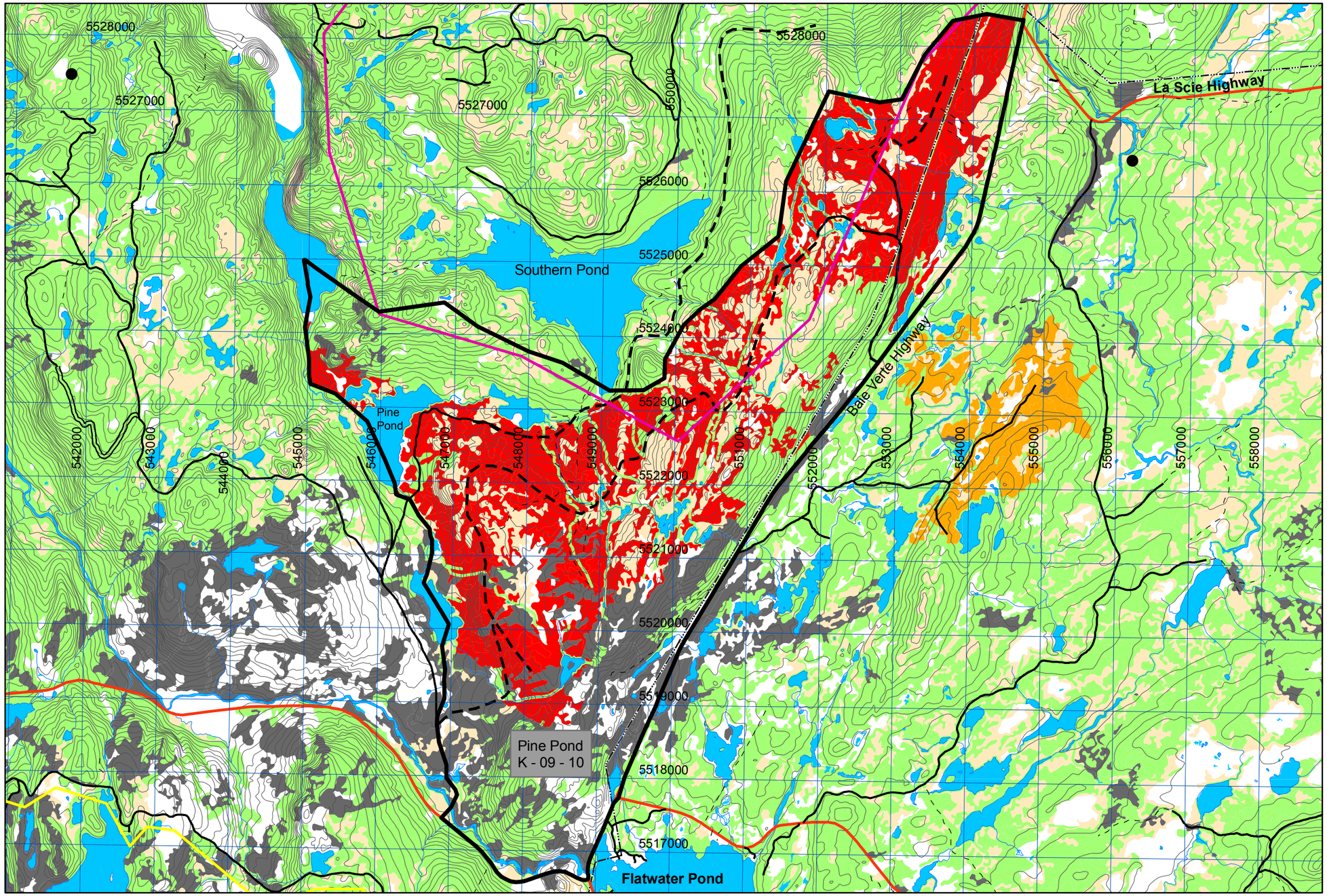
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Rambler West	**Inventory Map #:**	034
Harvest Area #:	K-09-13	**NTS Map #:**	12H16

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	123,801	m3	Volume:	101,517	m3	bF:	45 %
Area:	1,456	ha	Area:	1,456	ha	bS:	55 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams, barrens and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

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Forest Management District 09
Five Year Plan (2012 - 2016)

Rambler West (K - 09 - 13)
Scale 1:85,000 Overview Map

Forest Inventory Map 034
NTS Map 12H16

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

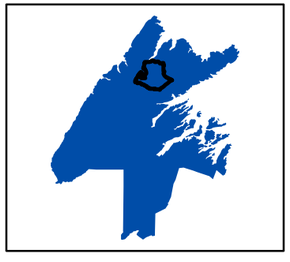
Administration Boundaries
- Management Boundary
- Ownership Boundary

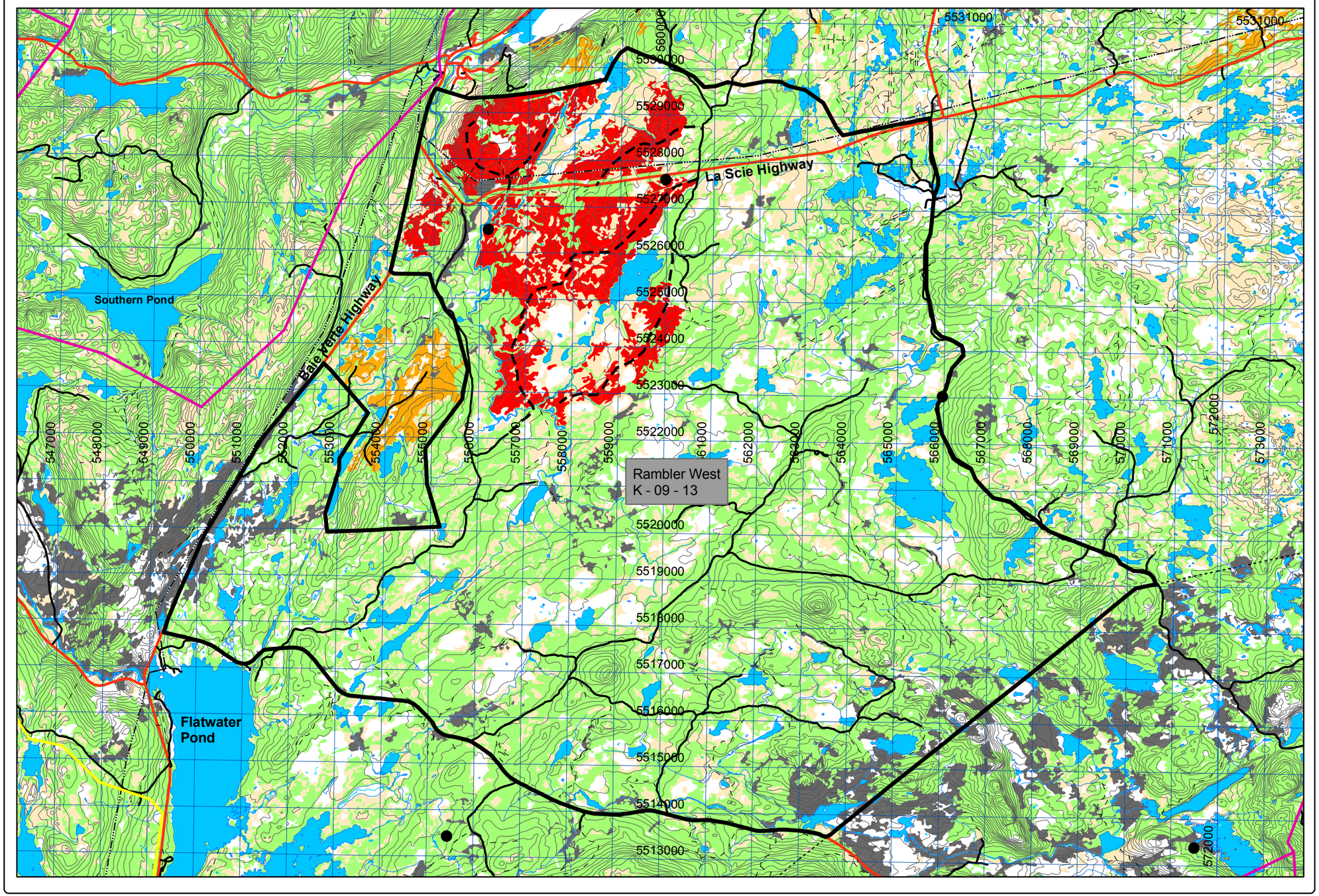
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





Forest Management District 09
Five Year Plan (2012 - 2016)

Rambler West (K - 09 - 13)
Scale 1:50,000 Map 1

Forest Inventory Map 034
NTS Map 12H16

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

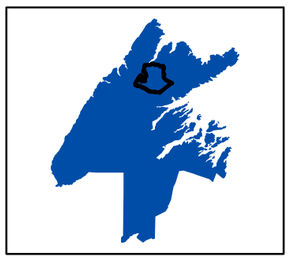
Administration Boundaries
- Management Boundary
- Ownership Boundary

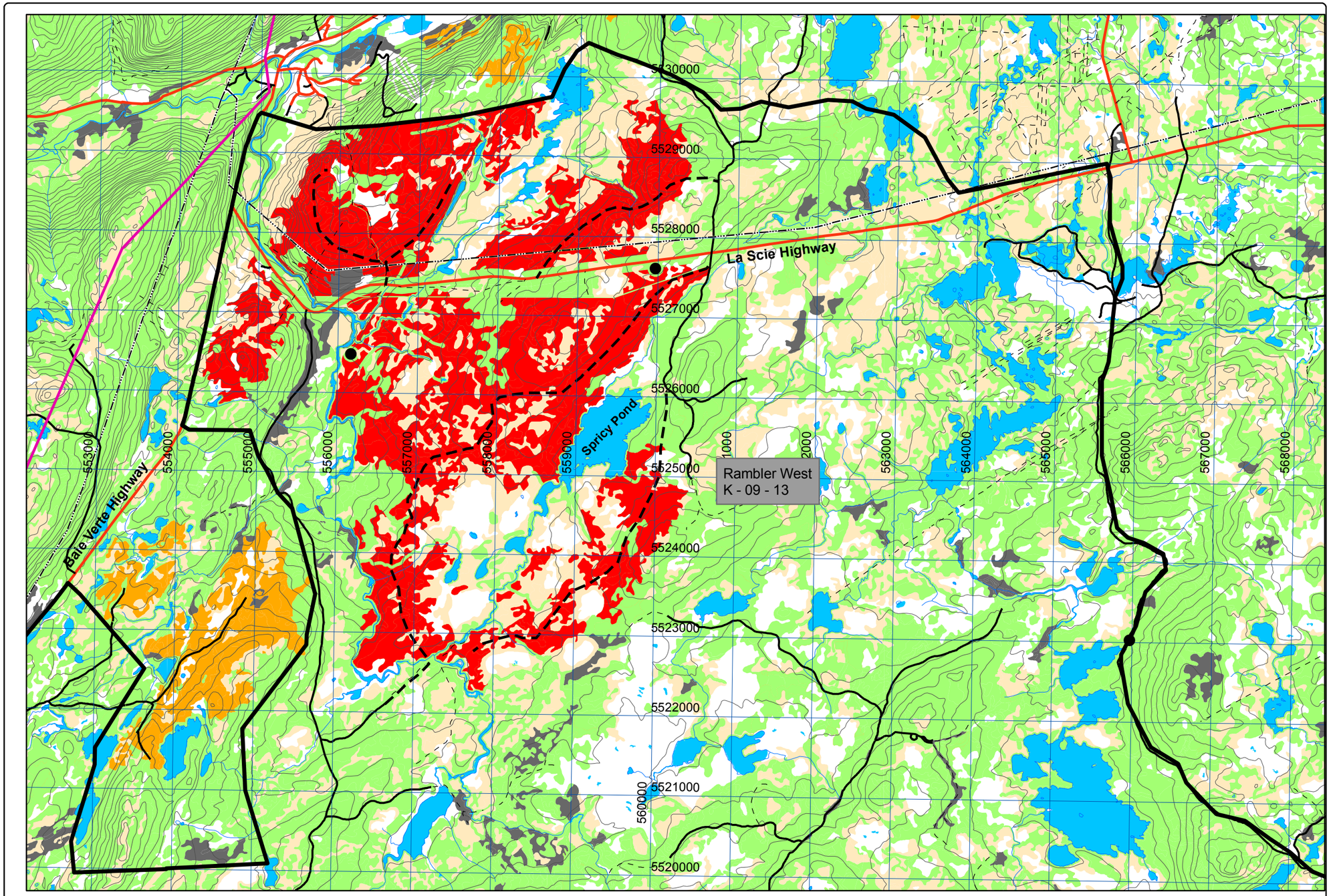
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Lynx Pond	**Inventory Map #:**	051
Harvest Area #:	K-09-16	**NTS Map #:**	12H07

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	165,577	m3	Volume:	135,773	m3	bF:	65	%
Area:	1,537	ha	Area:	1,537	ha	bS:	35	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Secondary Core Area.
Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

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GIS CBPP Woodlands

Certified System ISO 14001 CSA Z809-02

Forest Management District 09
Five Year Plan (2012 - 2016)

Lynx Pond (K - 09 - 16)
Scale 1:90,000 Overview Map

Forest Inventory Map 051
NTS Map 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

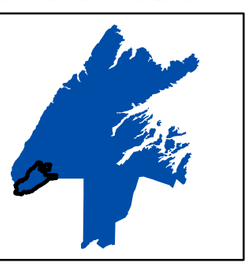
Administration Boundaries
- Management Boundary
- Ownership Boundary

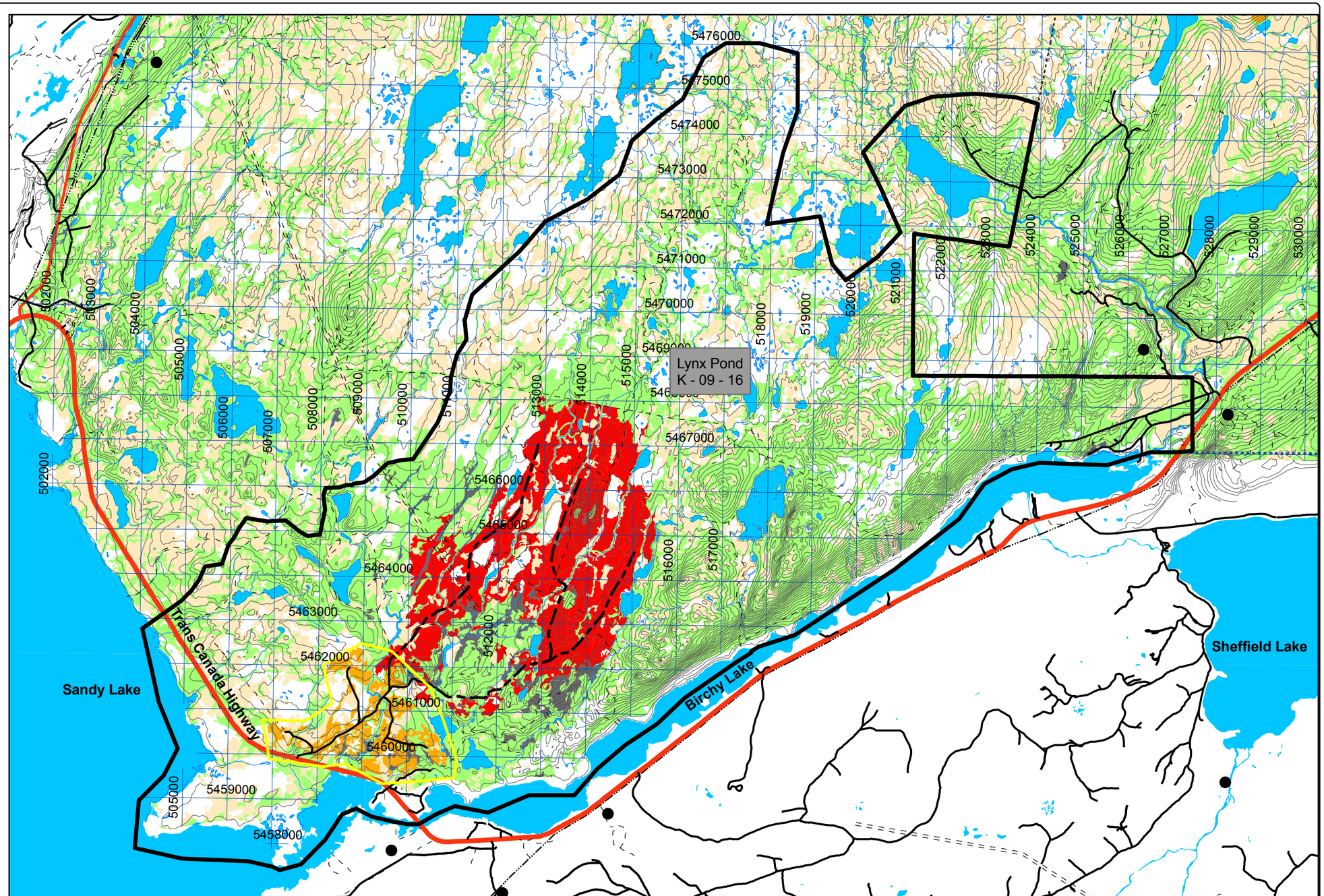
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





Forest Management District 09
Five Year Plan (2012 - 2016)

Lynx Pond (K - 09 - 16)
Scale 1:50,000 Map 1

Forest Inventory Map 051
NTS Map 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
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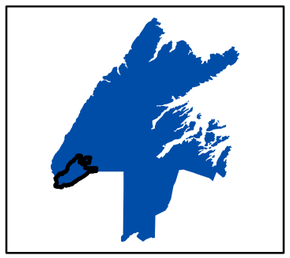
Administration Boundaries
- Management Boundary
- Ownership Boundary

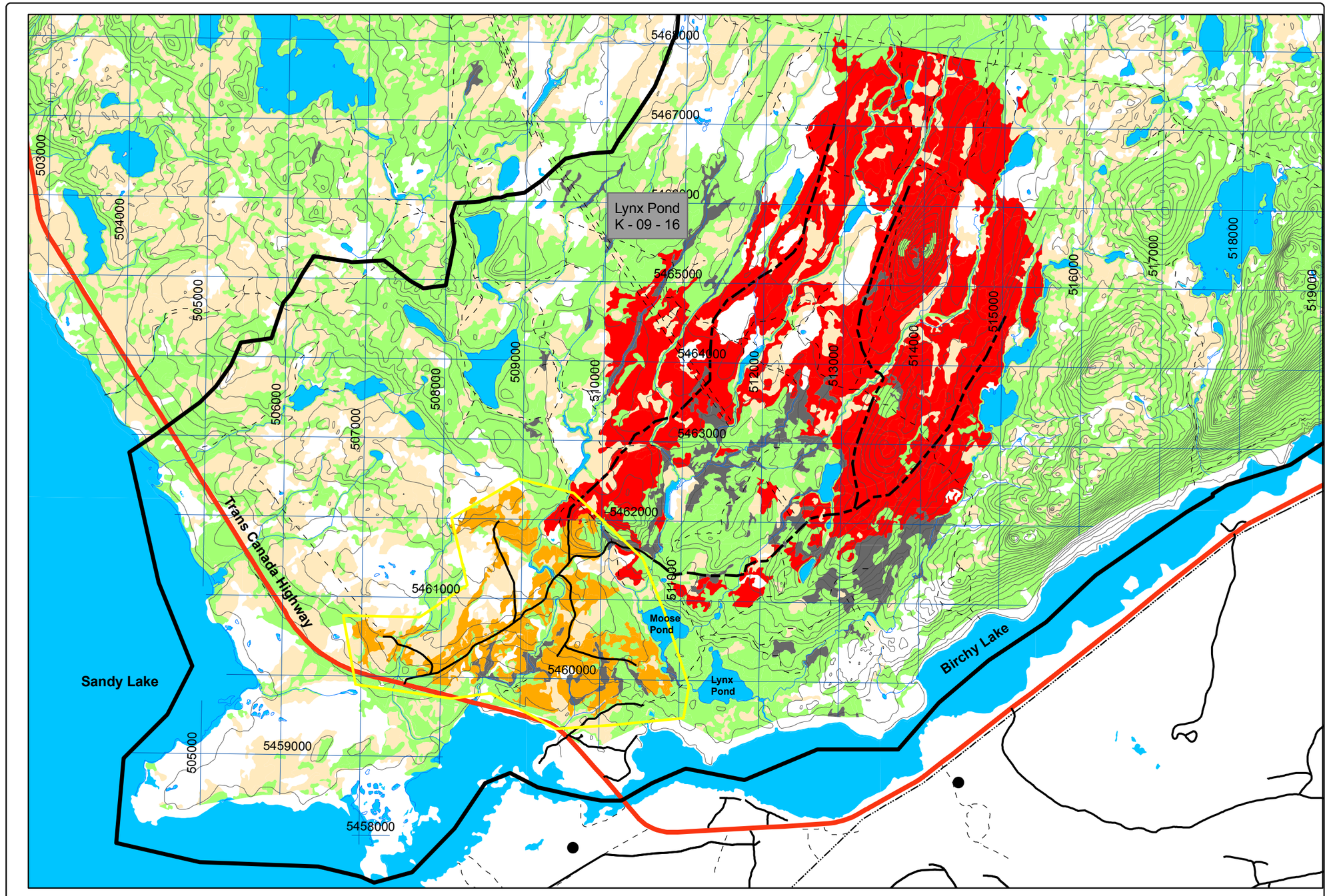
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Main Brook	**Inventory Map #:**	051
Harvest Area #:	K-09-17	**NTS Map #:**	12H07

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	46,524	m3	Volume:	38,150	m3	bF:	70	%
Area:	372	ha	Area:	372	ha	bS:	30	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Secondary Core Area.
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Forest Management District 09
Five Year Plan (2012 - 2016)

Main Brook (K - 09 - 17)
Scale 1:60,000

Forest Inventory Map 051
NTS Map 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
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- Transmission Lines
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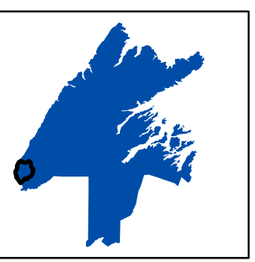
Administration Boundaries
- Management Boundary
- Ownership Boundary

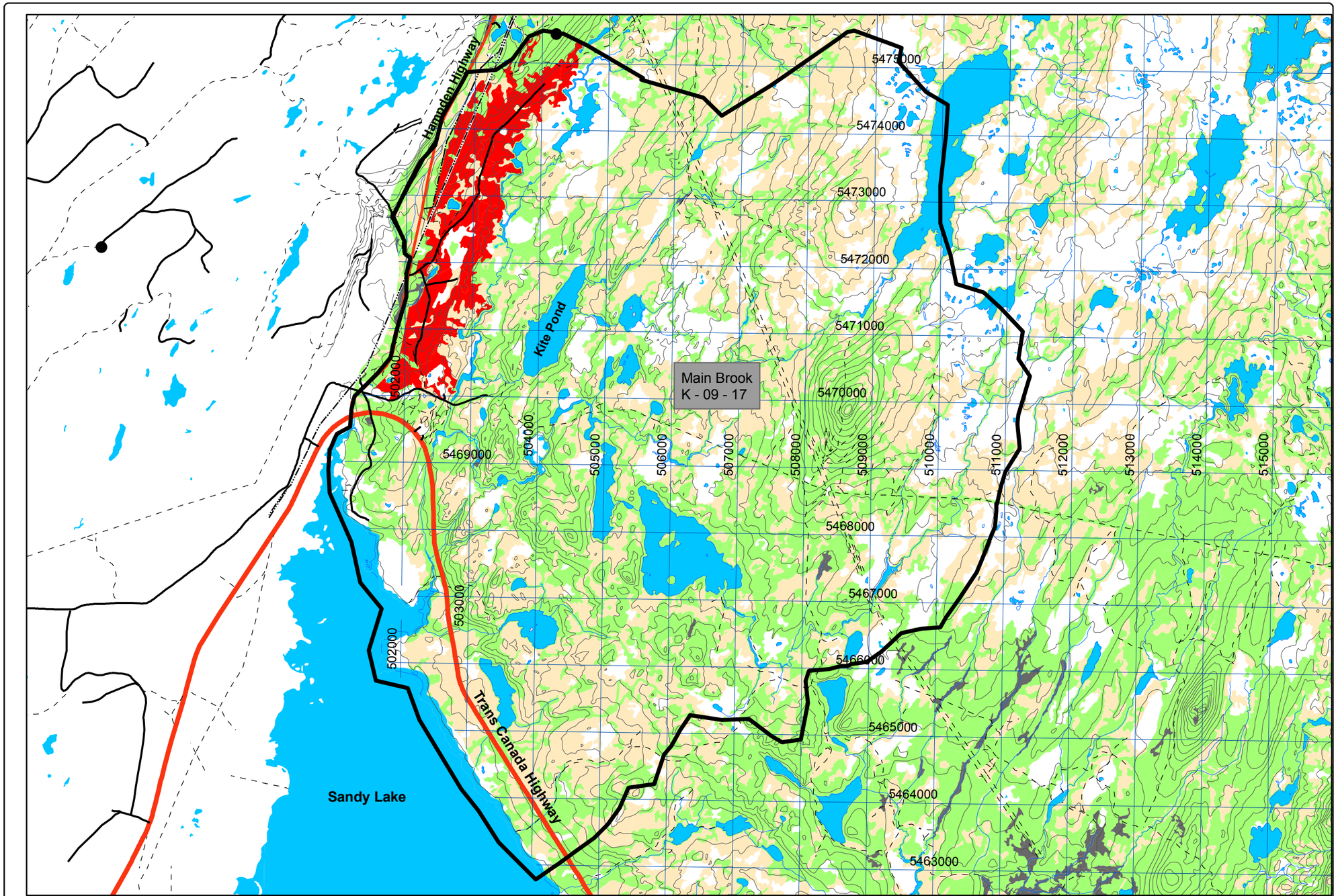
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Great Gull Pond	**Inventory Map #:**	052, 062
Harvest Area #:	K-09-18	**NTS Map #:**	12H08, 12H01

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	40,278	m3	Volume:	33,028	m3	bF:	20	%
Area:	380	ha	Area:	380	ha	bS:	80	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

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Forest Management District 09
Five Year Plan (2012 - 2016)

Great Gull Pond (K - 09 - 18)
Scale 1:75,000 Overview Map

Forest Inventory Map 052, 062
NTS Map 12H08, 12H01

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

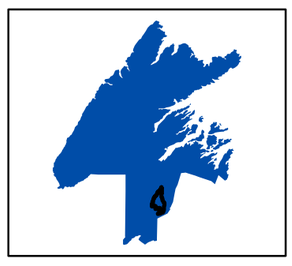
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

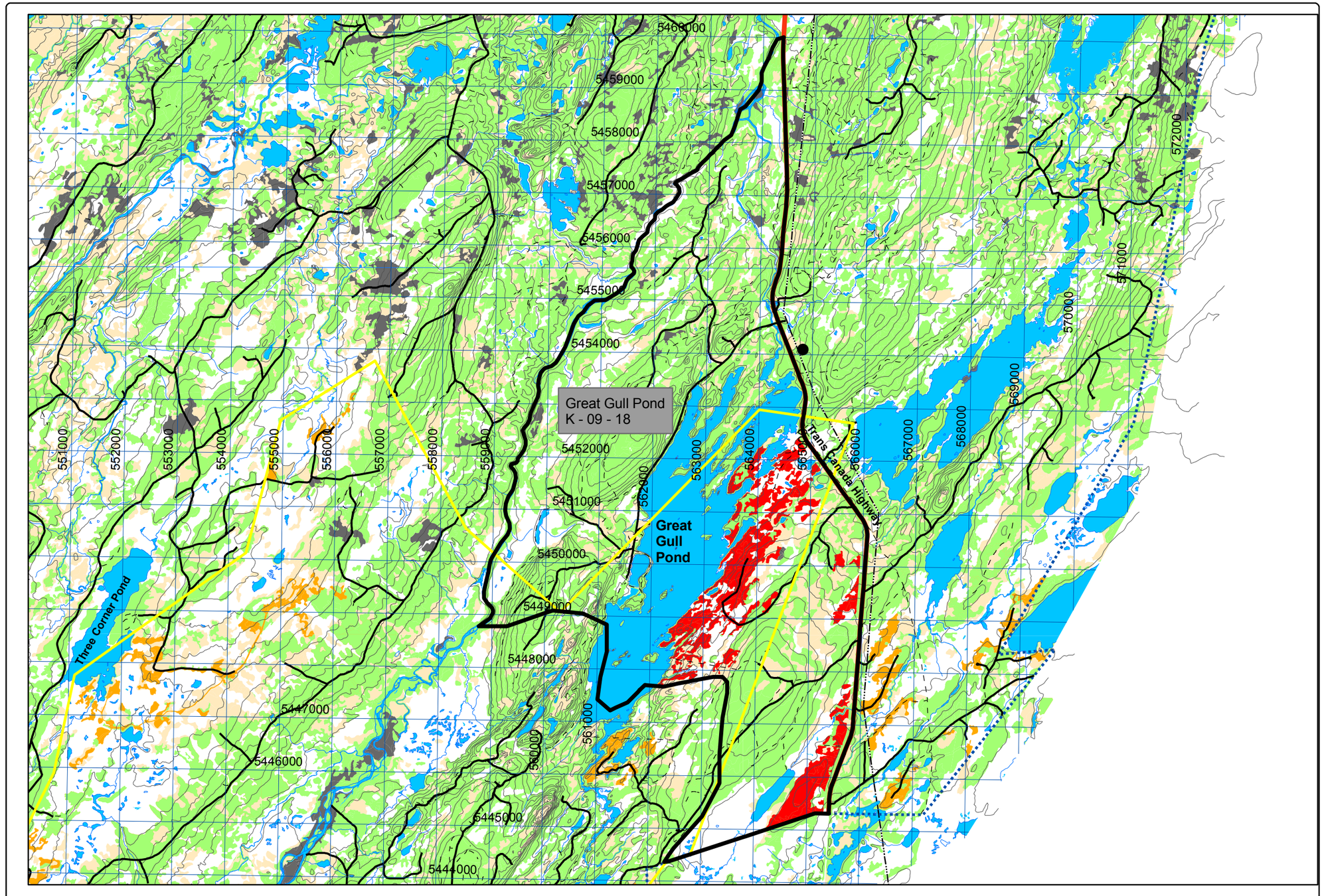
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 09





Forest Management District 09
Five Year Plan (2012 - 2016)

Great Gull Pond (K - 09 - 18)
Scale 1:50,000 Map 1

Forest Inventory Map 052, 062
NTS Map 12H08, 12H01

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
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- Management Boundary
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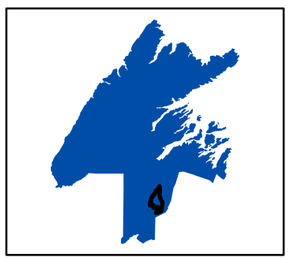
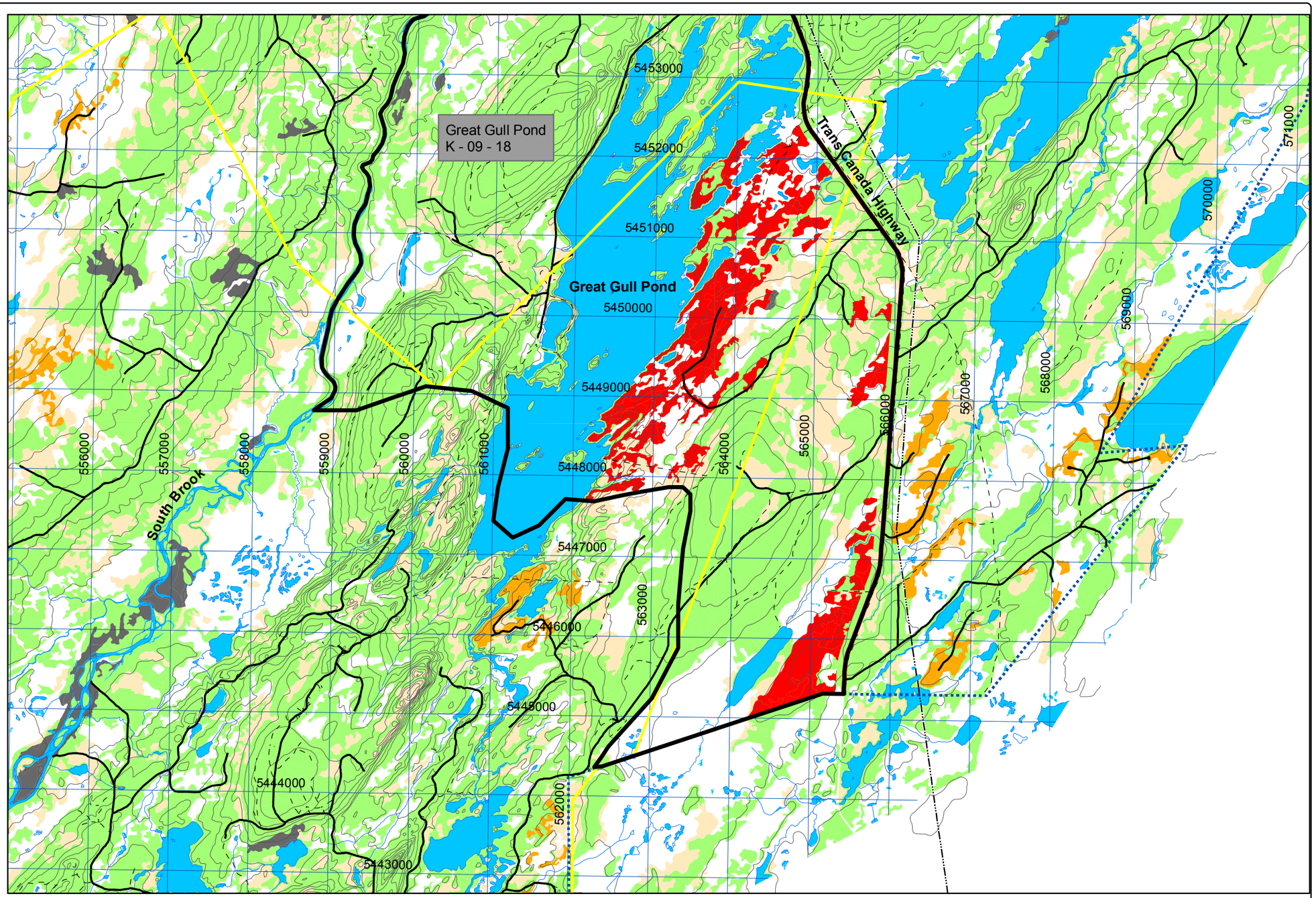
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Dawes Pond	**Inventory Map #:**	062
Harvest Area #:	K-09-23	**NTS Map #:**	12H01

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	127,934	m3	Volume:	104,906	m3	bF:	15	%
Area:	1,195	ha	Area:	1,195	ha	bS:	85	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Core Area and a Secondary Core Area. Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards. For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Dawes Pond (K - 09 - 23)
Scale 1:110,000 Overview Map

Forest Inventory Map 062
NTS Map 12H01

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

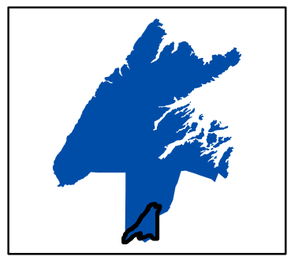
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

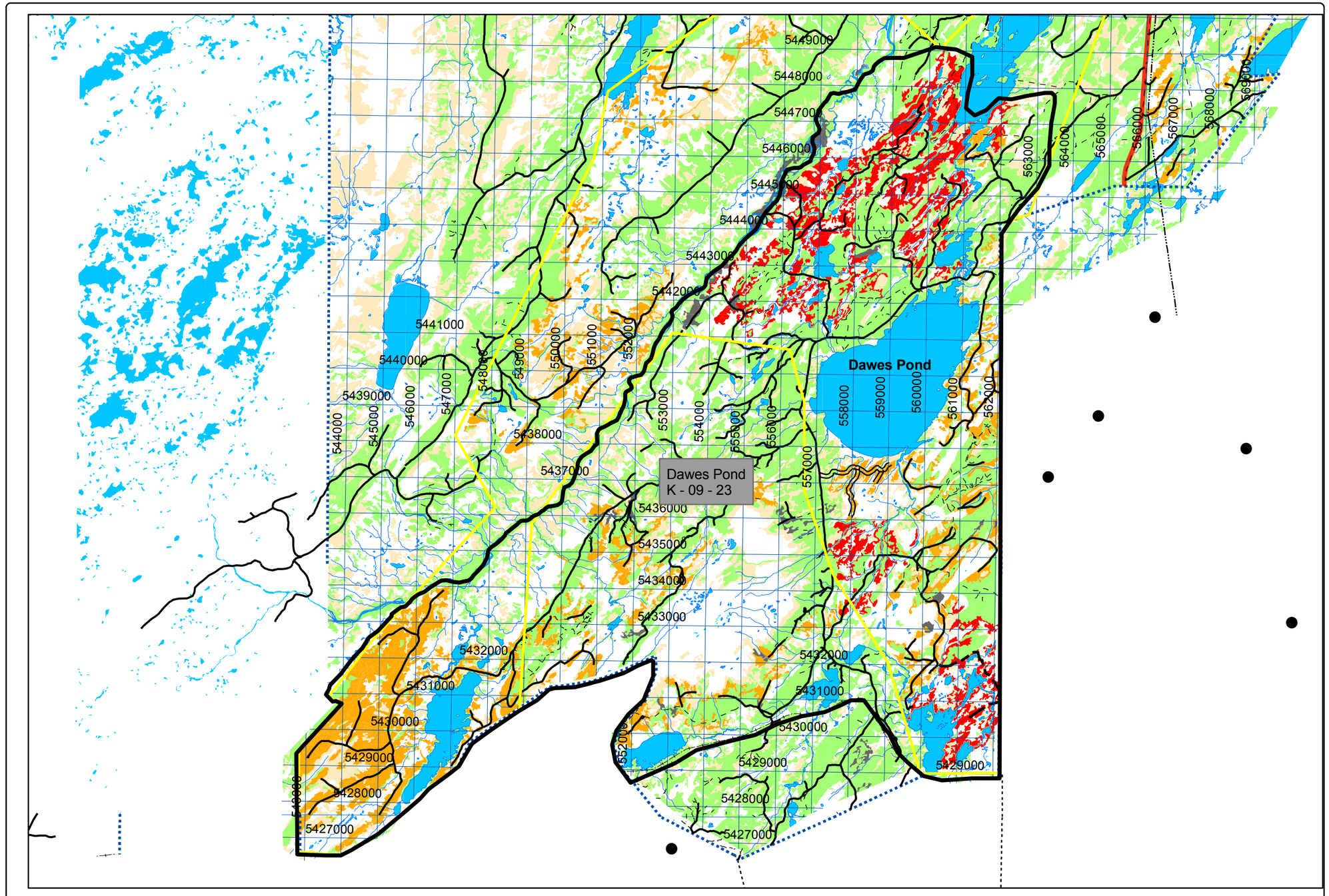
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 09





Forest Management District 09
Five Year Plan (2012 - 2016)

Dawes Pond (K - 09 - 23)
Scale 1:50,000 Map 1

Forest Inventory Map 062
NTS Map 12H01

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

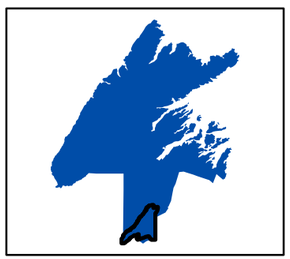
Administration Boundaries
- Management Boundary
- Ownership Boundary

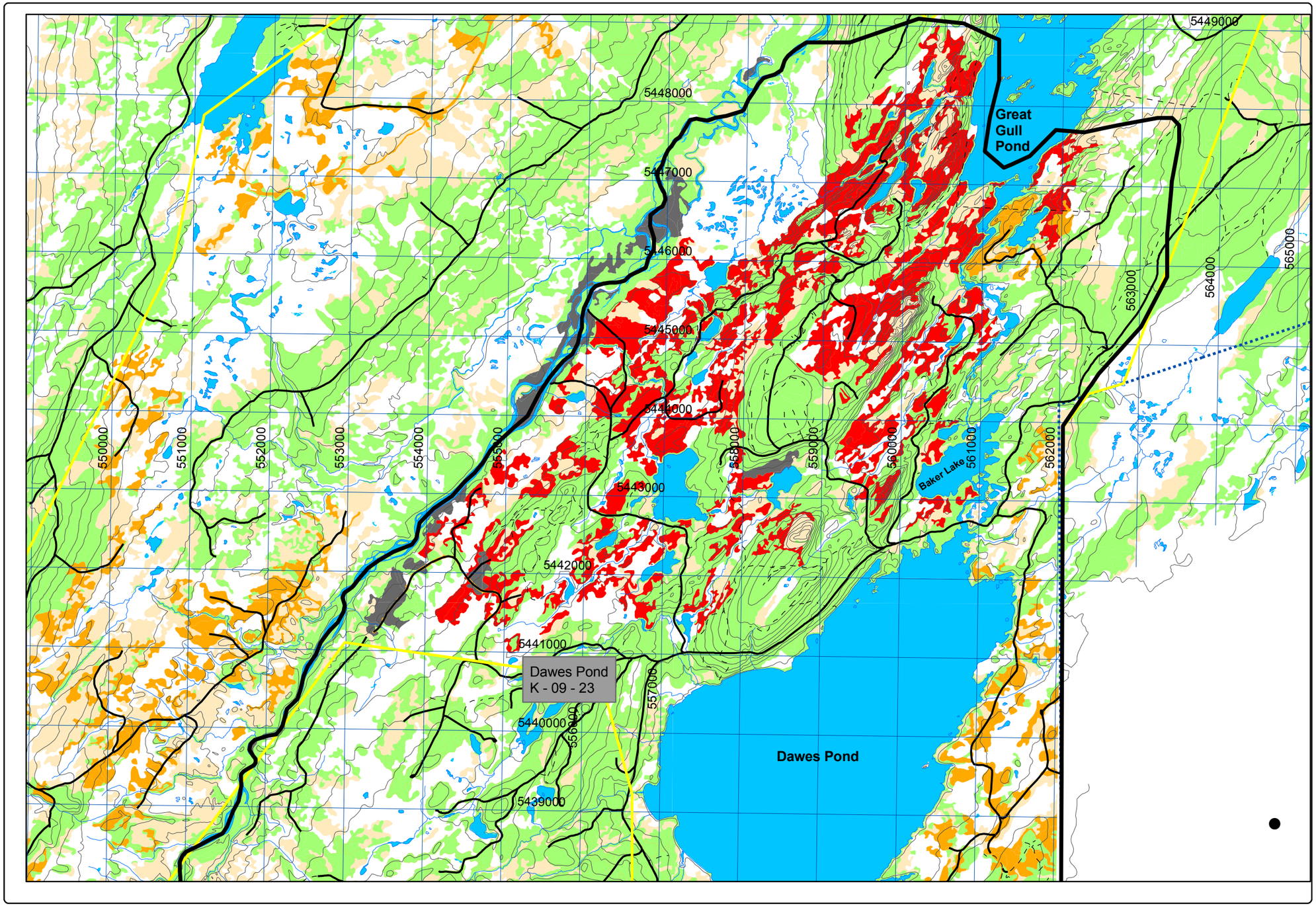
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





Forest Management District 09
Five Year Plan (2012 - 2016)

Dawes Pond (K - 09 - 23)
Scale 1:50,000 Map 2

Forest Inventory Map 062
NTS Map 12H01

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

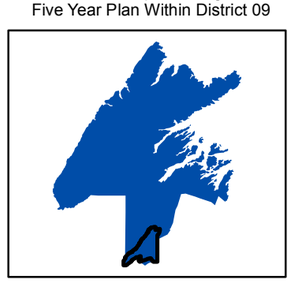
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

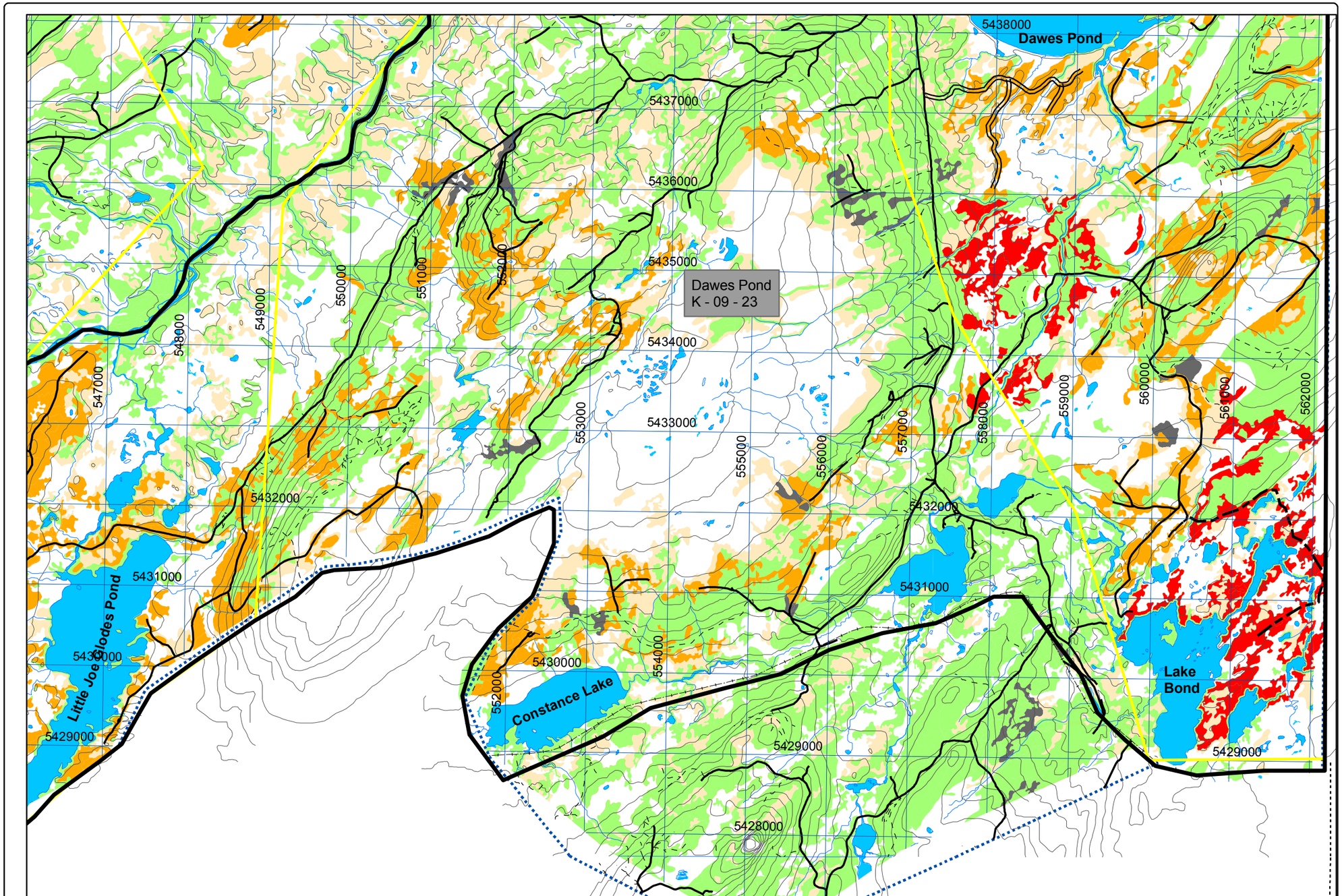
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Black Lake	**Inventory Map #:**	041
Harvest Area #:	K-09-27	**NTS Map #:**	12H10

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	49,152	m3	Volume:	40,305	m3	bF:	40	%
Area:	413	ha	Area:	413	ha	bS:	60	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with steep rocky slopes, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/

Forest Management District 09
Five Year Plan (2012 - 2016)

Black Lake (K - 09 - 27)
Scale 1:110,000 Overview Map

Forest Inventory Map 041
NTS Map 12H10

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

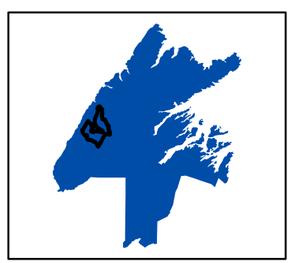
Administration Boundaries
- Management Boundary
- Ownership Boundary

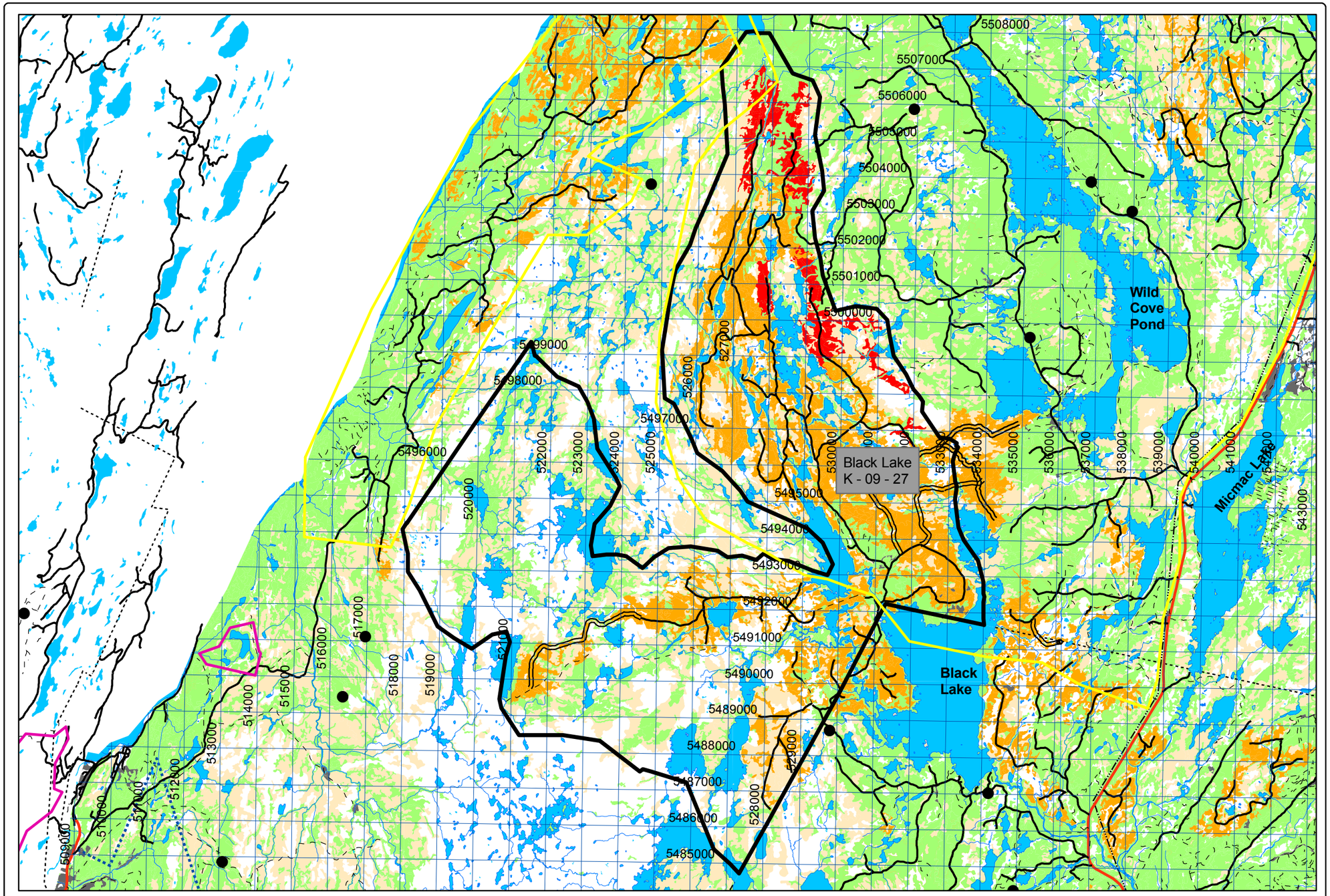
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





Forest Management District 09
Five Year Plan (2012 - 2016)

Black Lake (K - 09 - 27)
Scale 1:50,000 Map 1

Forest Inventory Map 041
NTS Map 12H10

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
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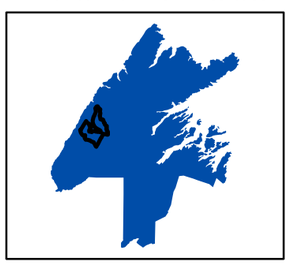
- Ownership Boundary

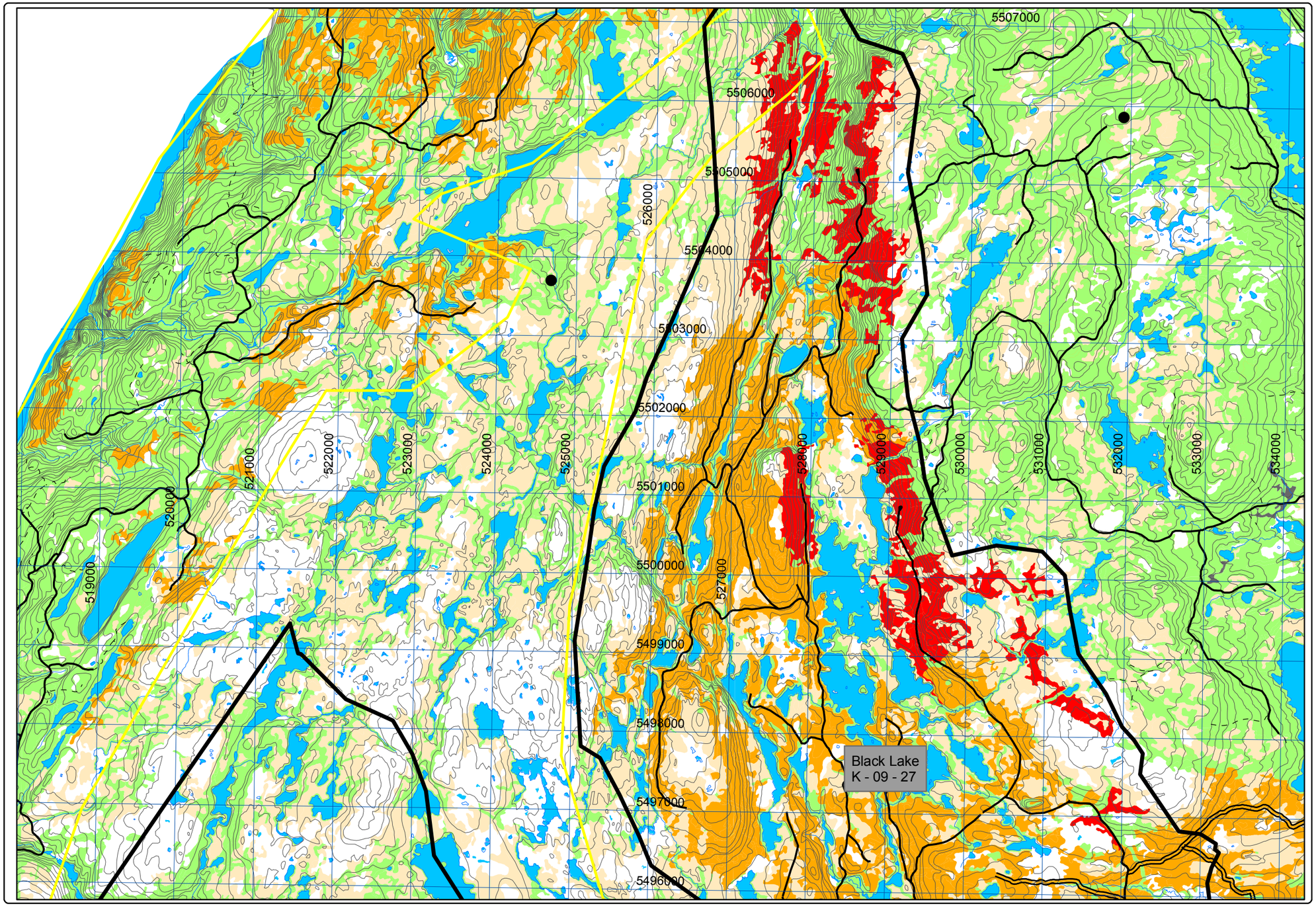
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	East Pond	**Inventory Map #:**	033, 034
Harvest Area #:	K-09-30	**NTS Map #:**	12H15, 12H16

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	93,435	m3	Volume:	76,617	m3	bF:	40	%
Area:	783	ha	Area:	783	ha	bS:	60	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately coastal terrain comprised of steep rocky slopes, interspersed with sloping valleys, rivers, ponds, streams, barrens and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

A wildlife connectivity corridor has been established in consultation with DNR in this operating area.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

East Pond (K - 09 - 30)
Scale 1:50,000

Forest Inventory Map 033, 034
NTS Map 12H15, 12H16

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
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- Transmission Lines
- Protected Public Water Supply Area

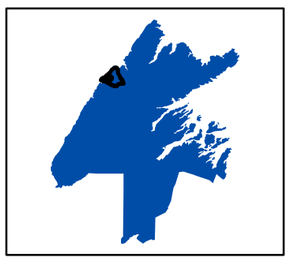
Administration Boundaries
- Management Boundary
- Ownership Boundary

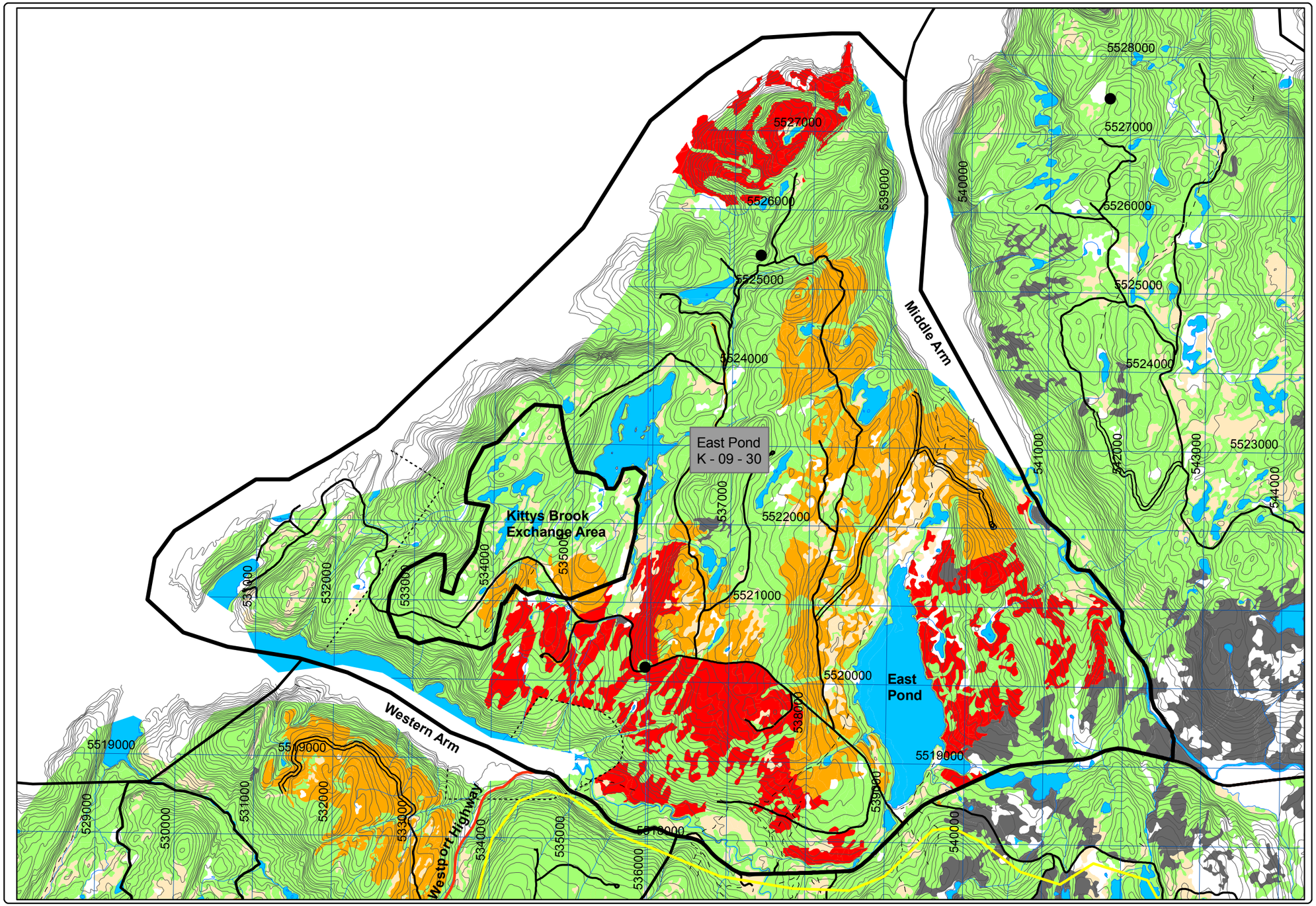
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Three Corner Pond	**Inventory Map #:**	062
Harvest Area #:	K-09-31	**NTS Map #:**	12H01

Forest Inventory

Gross		**Net**		**Working Group**	
Volume:	m3	Volume:	m3	bF:	%
Area:	ha	Area:	ha	bS:	%

Operational Considerations:

Harvest System: NA

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

There isn't any commercial harvesting planned for this area.
There are silviculture activities planned for this area.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Three Corner Pond (K - 09 - 31)
Scale 1:120,000

Forest Inventory Map 062
NTS Map 12H01

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

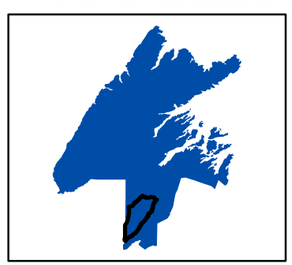
Administration Boundaries
- Management Boundary
- Ownership Boundary

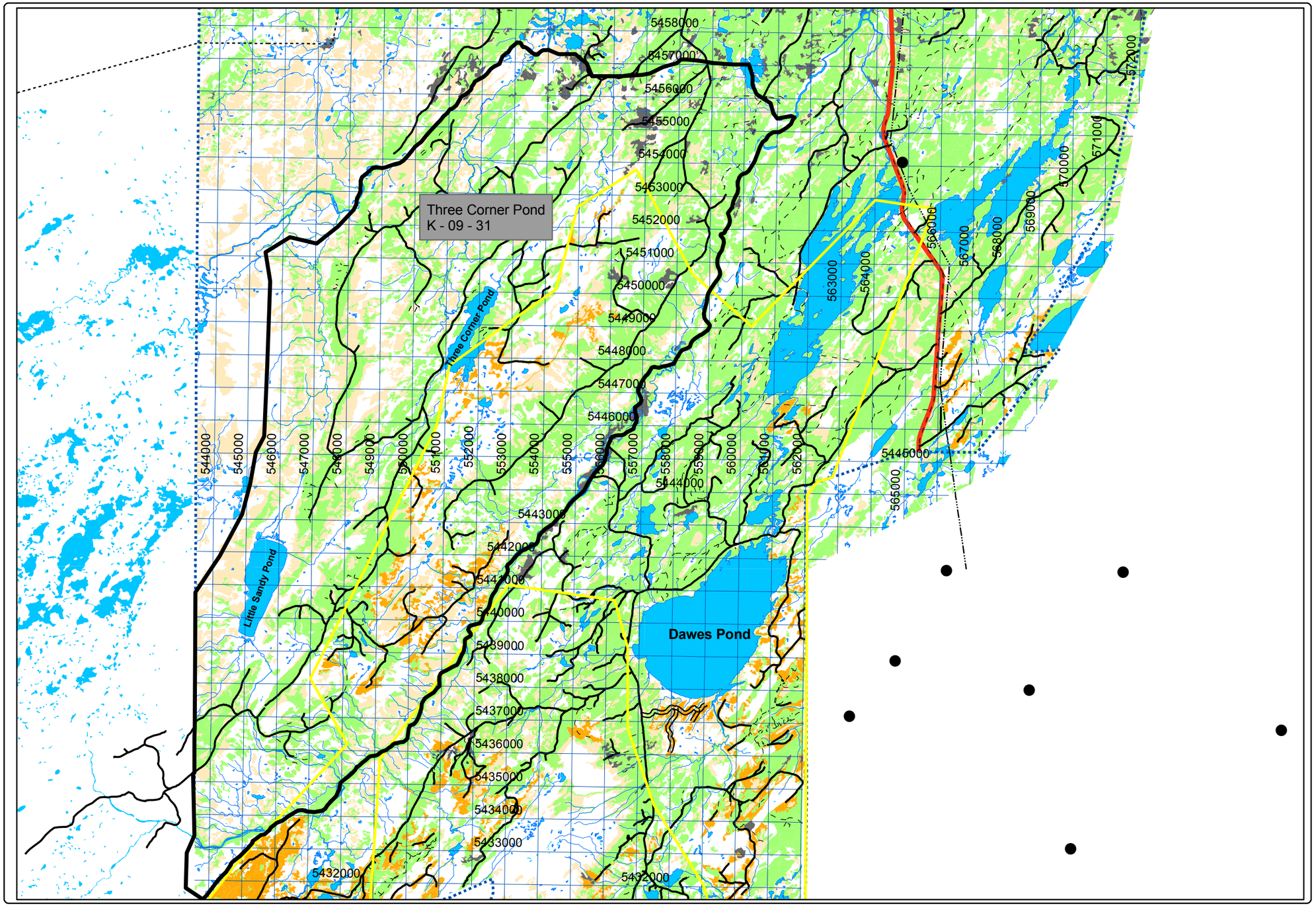
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Southern Pond	**Inventory Map #:**	034
Harvest Area #:	K-09-35	**NTS Map #:**	12H16

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	78,618	m3	Volume:	64,467	m3	bF:	55	%
Area:	708	ha	Area:	708	ha	bS:	45	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

Other Considerations:

No issues identified during the DNR public consultation process.

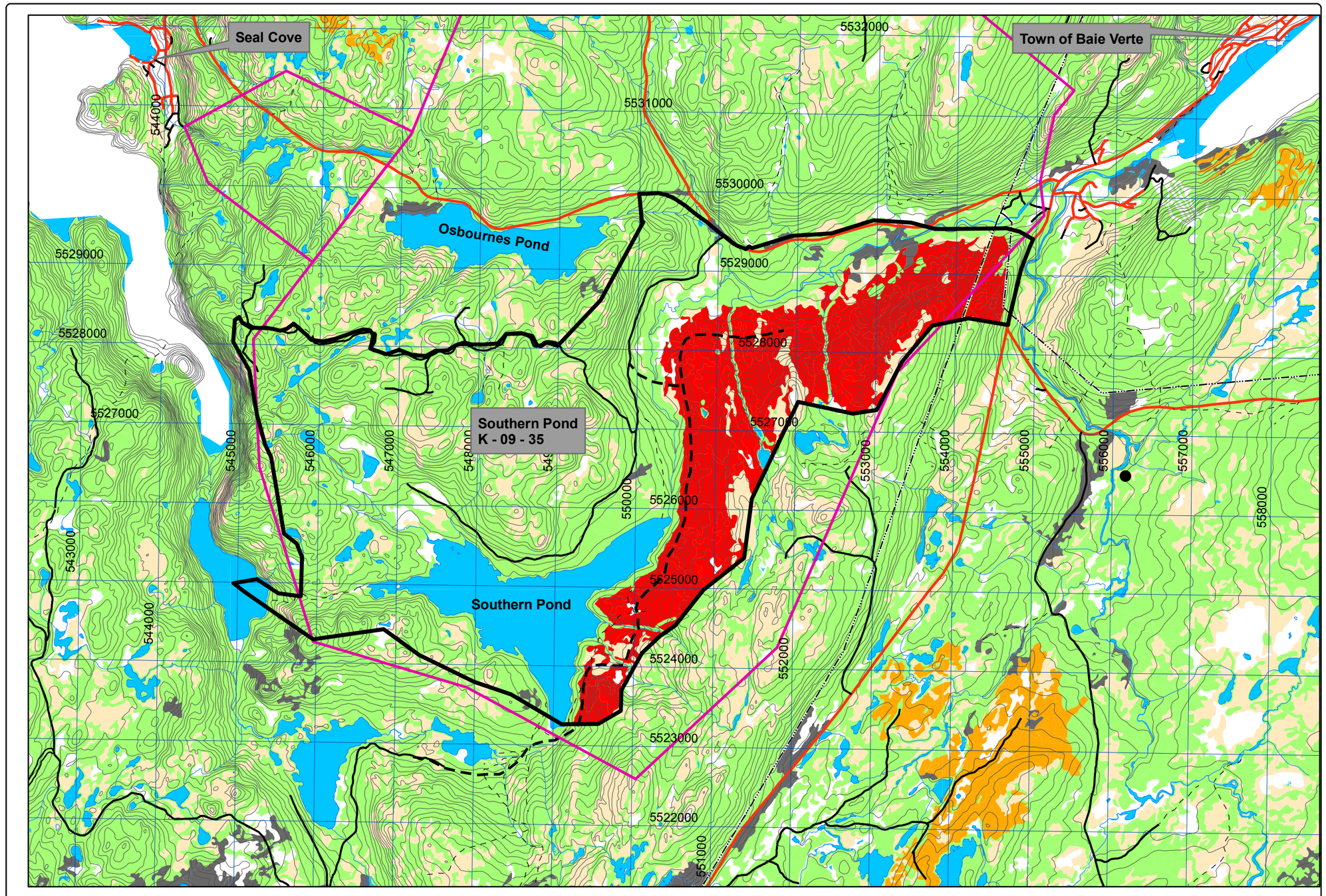
A portion of this operating area is contained inside the Protected Water Supply for the Town of Baie Verte. Forestry activities will conform to the Environmental Protection Guidelines related to operations within Protected Water Supply Areas.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards. For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Southern Pond (K - 09 - 35)
Scale 1:50,000

Forest Inventory Map 034
NTS Map 12H16



LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

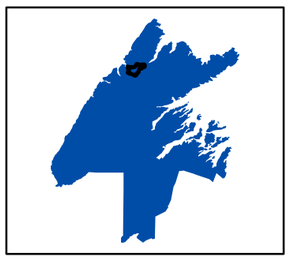
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09



CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	09	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Camp 34	**Inventory Map #:**	033, 034, 041, 042
Harvest Area #:	K-09-36	**NTS Map #:**	12H15,12H16,12H10,12H09

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	186,488	m3	Volume:	152,920	m3	bF:	50 %
Area:	2,005	ha	Area:	2,005	ha	bS:	50 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Predominately gentle terrain in combination with rolling hill top conditions, interspersed with rivers, ponds, streams and bogs.

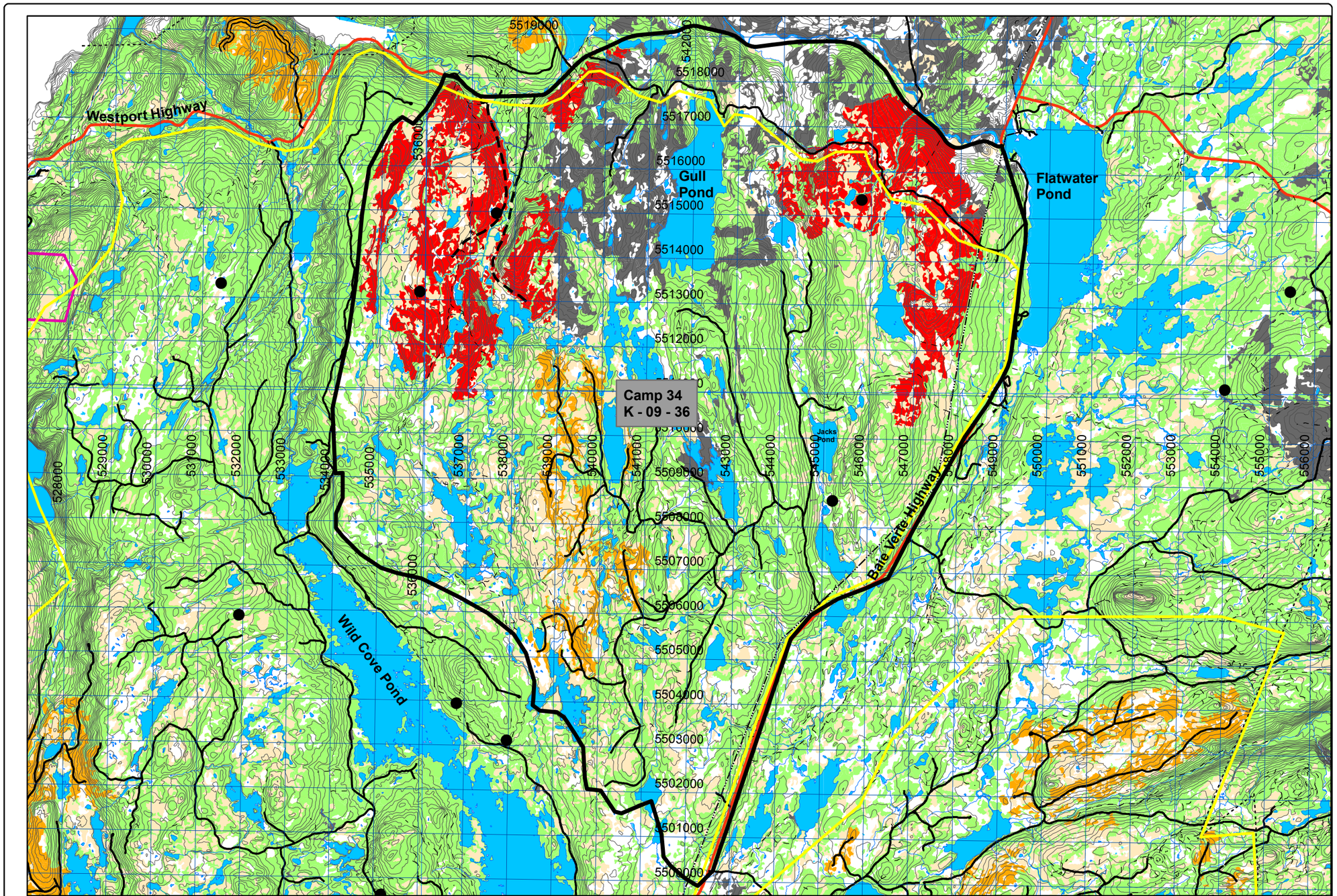
Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Secondary Core Area.
Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/.

Forest Management District 09
Five Year Plan (2012 - 2016)

Camp 34 (K - 09 - 36)
Scale 1:90,000 Overview Map
Forest Inventory Map 033, 034, 041, 042
NTS Map 12H15, 12H16, 12H10, 12H09



LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

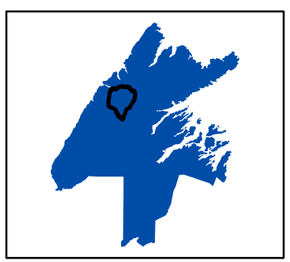
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 09



GIS

CBPP Woodlands

Certified System

ISO 14001
CSA Z809-02

Forest Management District 09
Five Year Plan (2012 - 2016)

Camp 34 (K - 09 - 36)
Scale 1:50,000 Map 1
Forest Inventory Map 033, 034, 041, 042
NTS Map 12H15, 12H16, 12H10, 12H09

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
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Land Features
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- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N
W E
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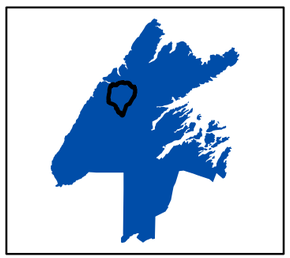
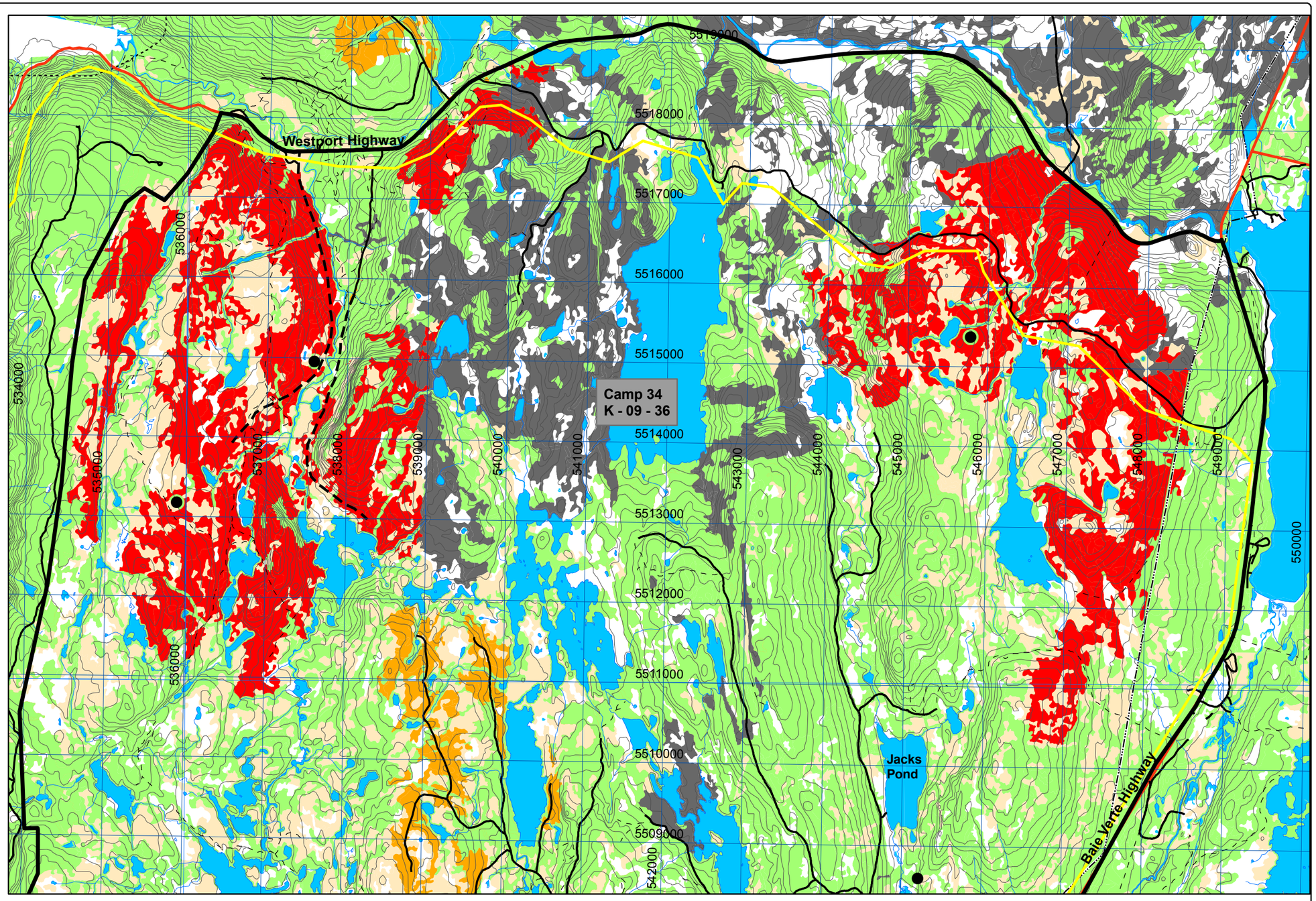
Insert Map Showing
Five Year Plan Within District 09

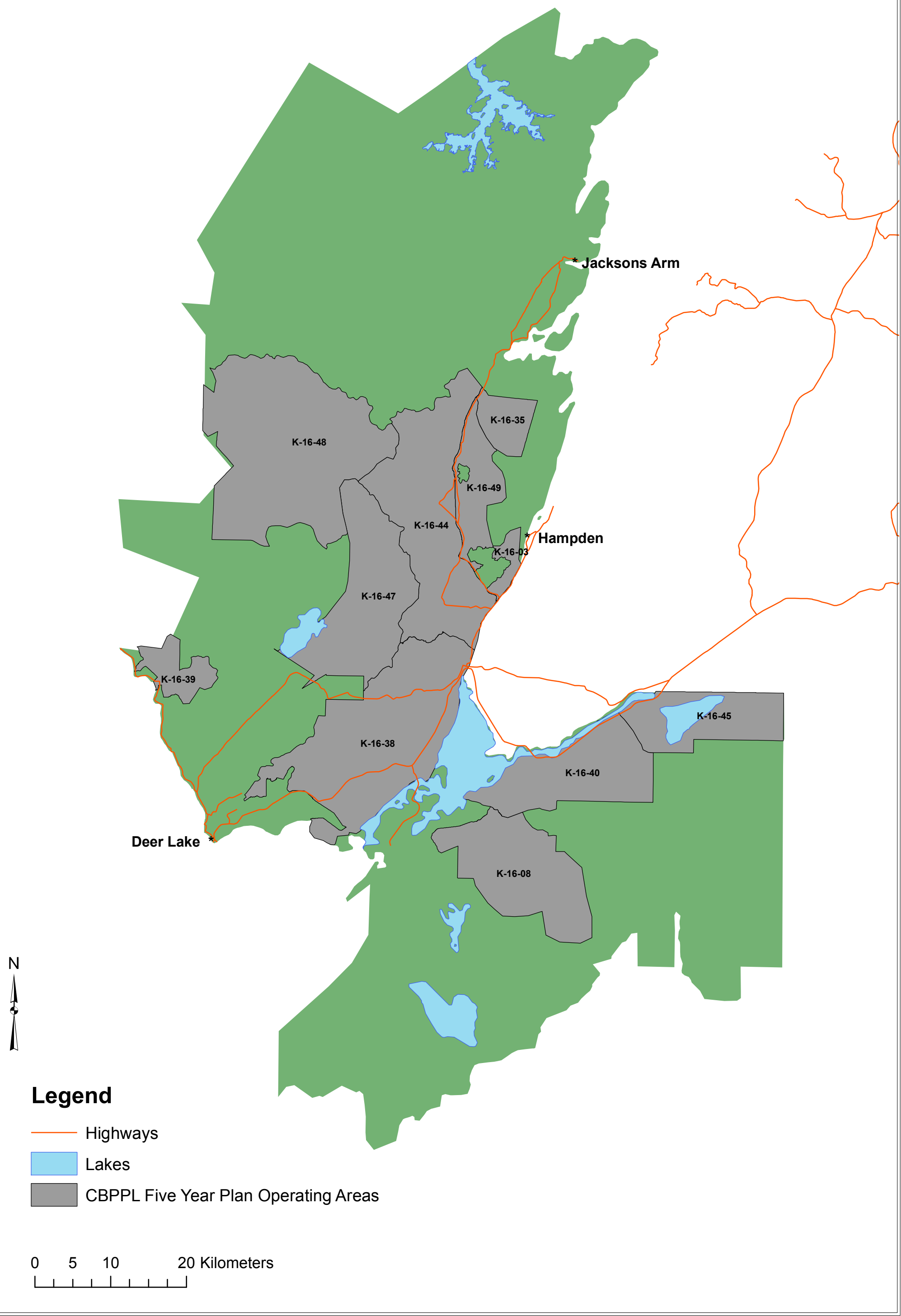




Appendix 4

Operating Area Maps and Descriptions for District 16

Corner Brook Pulp and Paper Ltd.
Five Year Plan Operating Areas 2012 - 2016
Forest Management District 16



CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Faulkners Pond	**Inventory Map #:**	041, 051
Harvest Area #:	K-16-03	**NTS Map #:**	12H10, 12H07

Forest Inventory

Gross			**Net**			**Working Group**		
Volume:	60,505	m3	Volume:	49,614	m3	bF:	85	%
Area:	521	ha	Area:	521	ha	bS:	15	%

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Hilly terrain with steep slopes, shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

No issues identified during the DNR public consultation process

This operating area is partially contained inside the Protected Water Supply for the Town of Hampden. Forestry activities will conform with the Environmental Protection Guidelines related to operations within Protected Water Supply Areas.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards. For further information on the SFM plan visit our website @ http://www.cbppl.com/

Forest Management District 16
Five Year Plan (2012 - 2016)

Faulkners Pond (K - 16 - 03)
Scale 1:50,000

Forest Inventory Map 041, 051
NTS Map 12H10, 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

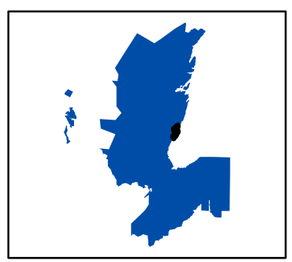
Administration Boundaries
- Management Boundary
- Ownership Boundary

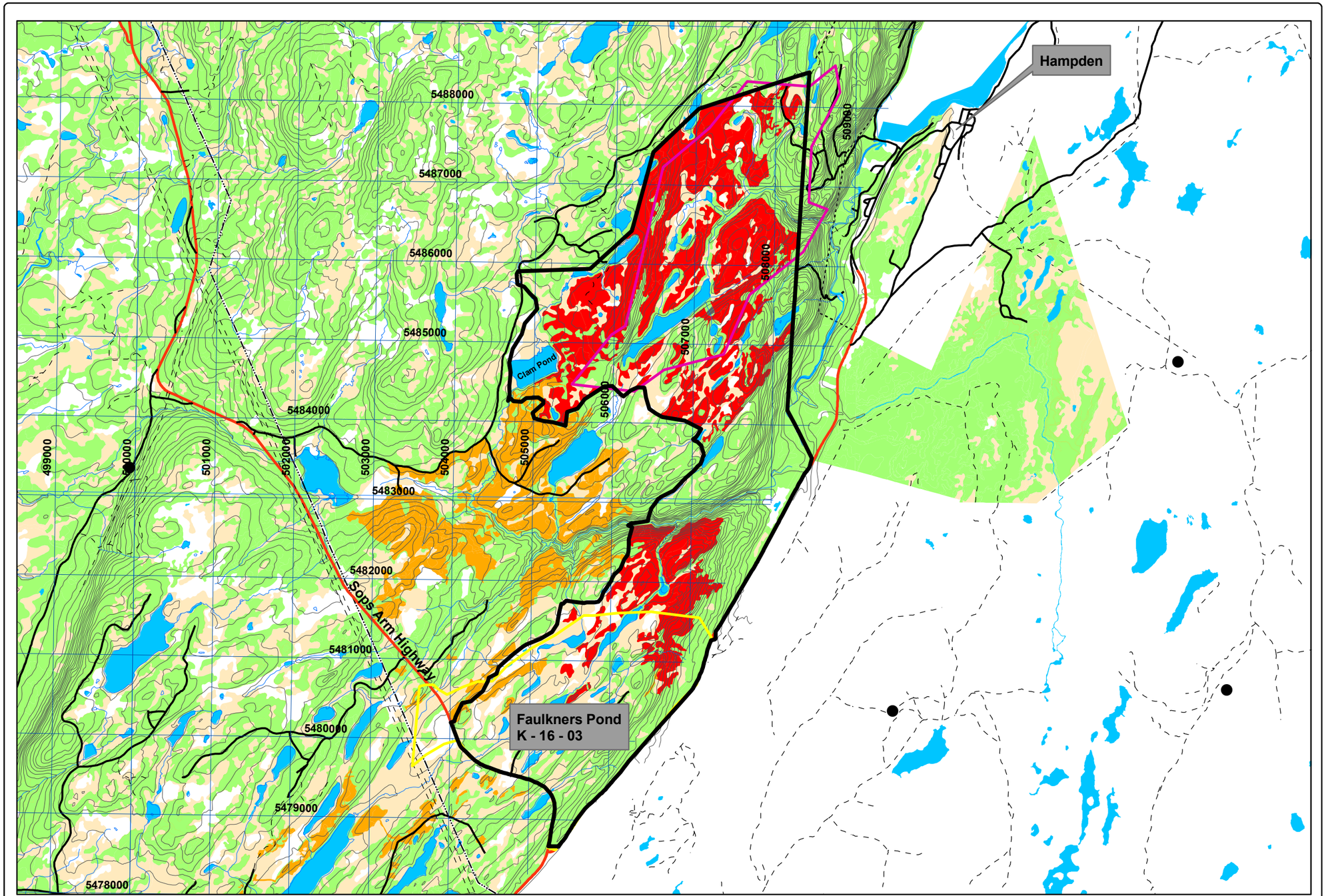
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Kittys Brook	**Inventory Map #:**	060, 061
Harvest Area #:	K-16-08	**NTS Map #:**	12H03, 12H02

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	47,189	m3	Volume:	38,695	m3	bF:	35 %
Area:	386	ha	Area:	386	ha	bS:	65 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Hilly and Flat terrain, moderate to deep topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Secondary Core Area.
Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

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Forest Management District 16
Five Year Plan (2012 - 2016)

Kittys Brook (K - 16 - 08)
Scale 1:90,000 Overview Map

Forest Inventory Map 060, 061
NTS Map 12H03, 12H02

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

Administration Boundaries
- Management Boundary
- Ownership Boundary

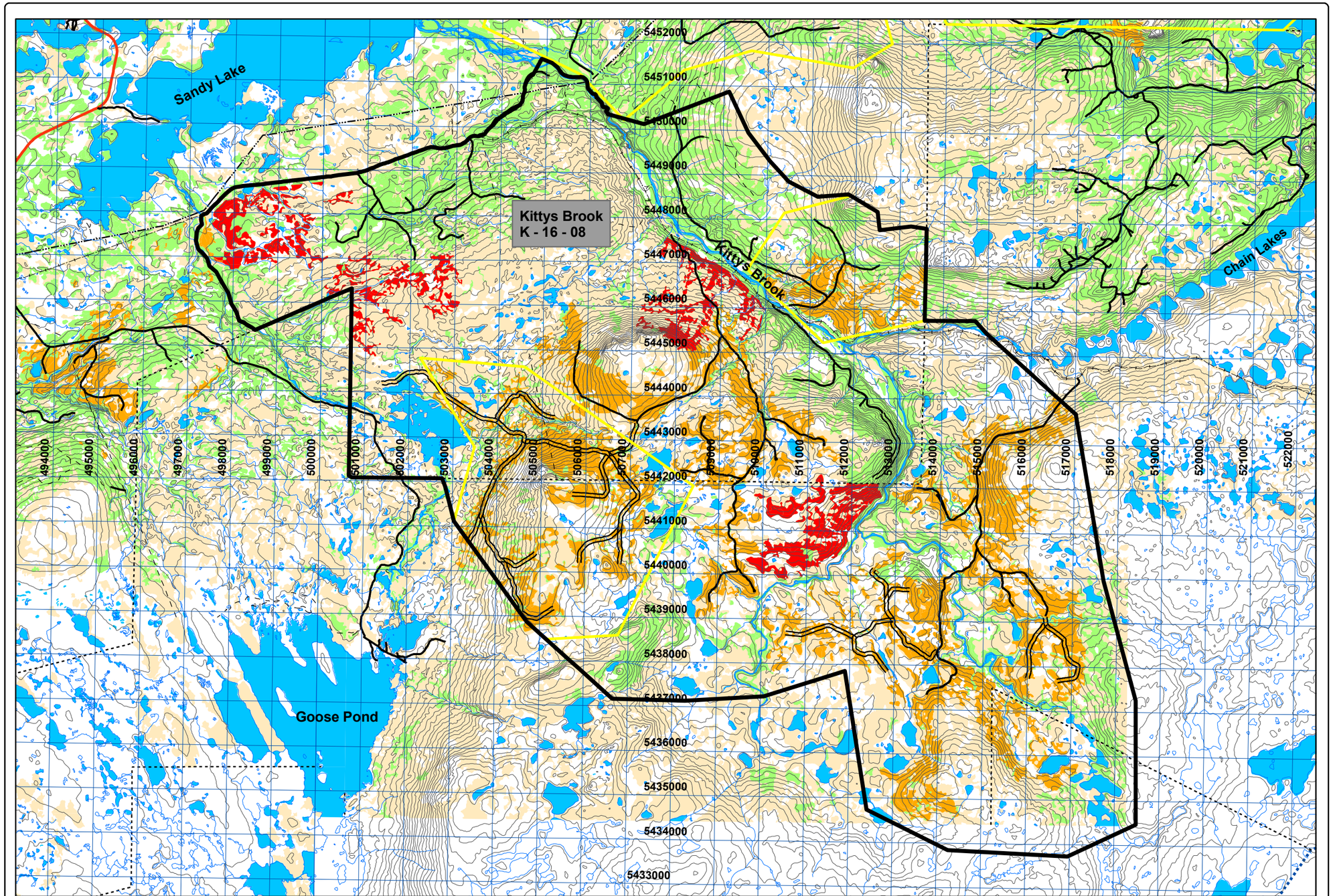
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Kittys Brook (K - 16 - 08)
Scale 1:50,000 Map 1

Forest Inventory Map 060, 061
NTS Map 12H03, 12H02

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
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- Management Boundary
- Ownership Boundary

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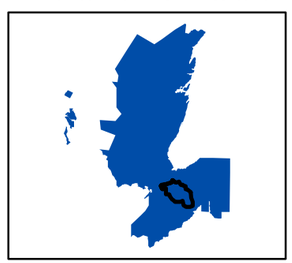
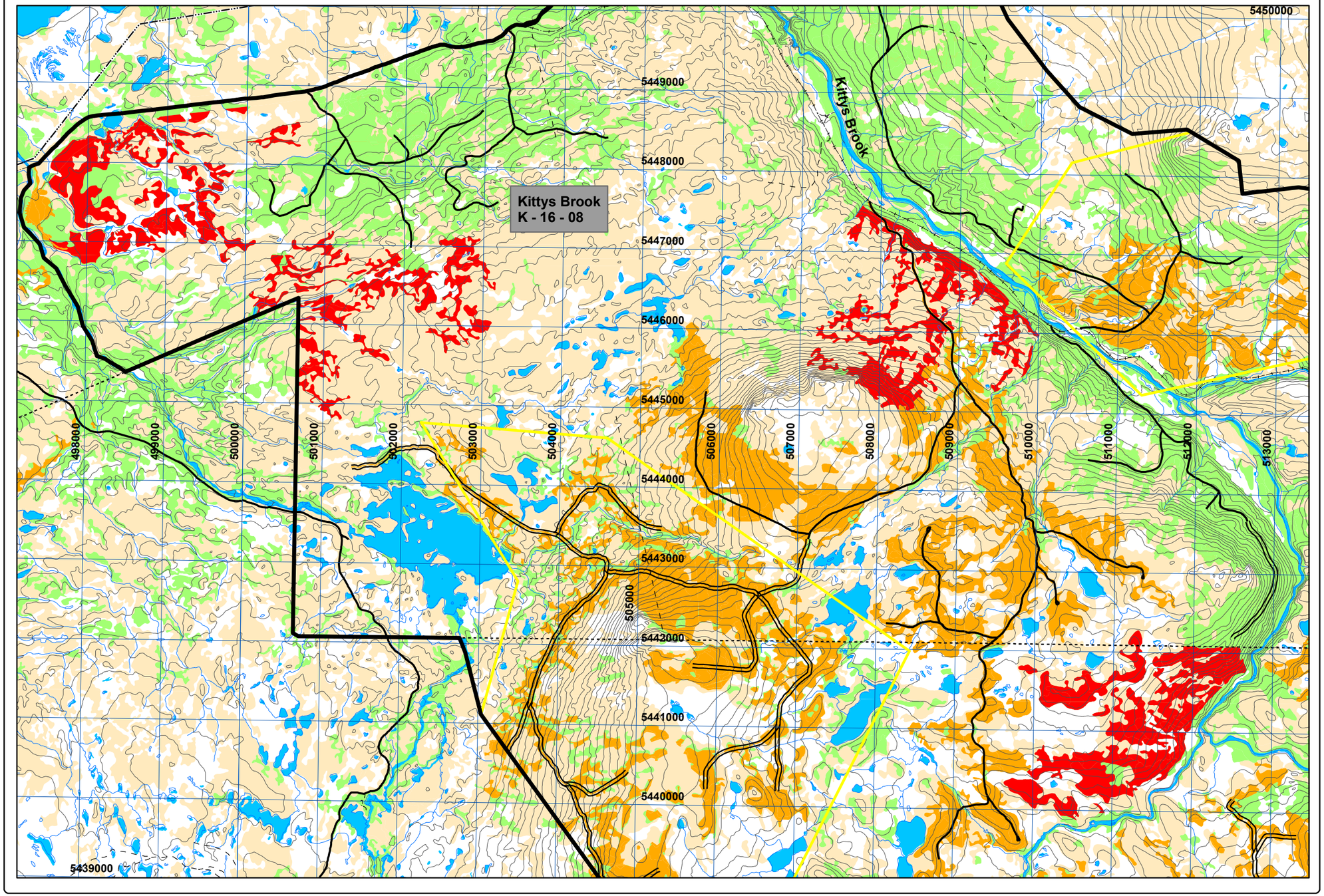
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

ISO 14001
CSA Z809-02

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Davis Pond	**Inventory Map #:**	041
Harvest Area #:	K-16-35	**NTS Map #:**	12H10

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	71,122	m3	Volume:	58,320	m3	bF:	75 %
Area:	599	ha	Area:	599	ha	bS:	25 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Hilly terrain with steep slopes, shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

No issues identified during the DNR public consultation process.

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Forest Management District 16
Five Year Plan (2012 - 2016)

Davis Pond (K - 16 - 35)
Scale 1:50,000

Forest Inventory Map 041
NTS Map 12H10

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

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- UTM Grid
- Contours
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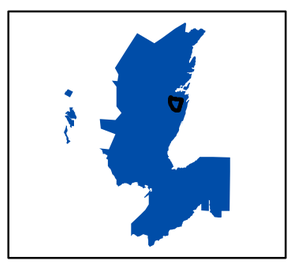
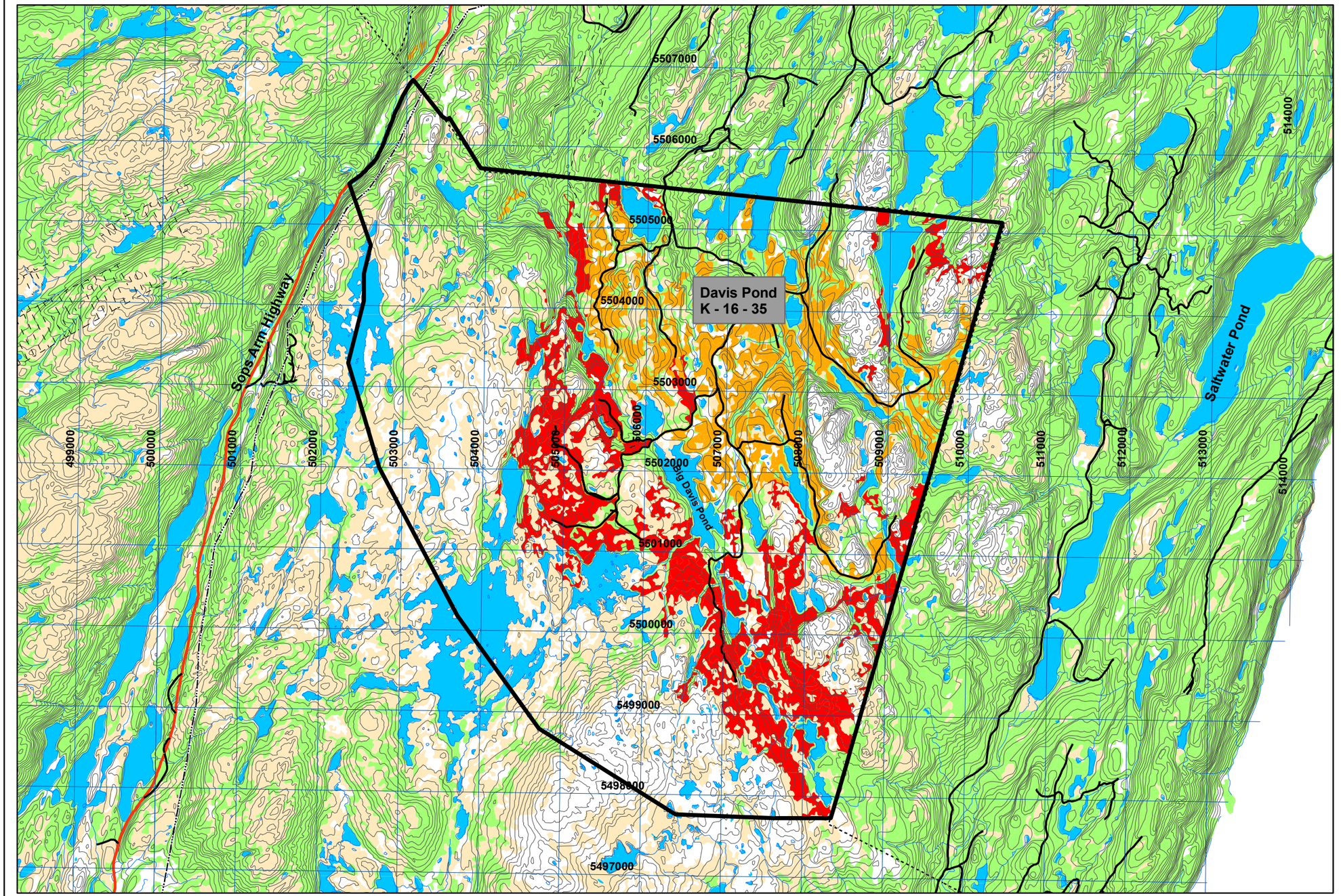
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Sandy Lake	**Inventory Map #:**	050, 051, 060
Harvest Area #:	K-16-38	**NTS Map #:**	12H06, 12H07, 12H03

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	232,605	m3	Volume:	190,736	m3	bF:	50 %
Area:	2528	ha	Area:	2528	ha	bS:	50 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Rolling terrain, moderate to shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Core Area and a Secondary Core Area. Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

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Forest Management District 16
Five Year Plan (2012 - 2016)

Sandy Lake (K - 16 - 38)
Scale 1:130,000 Overview Map

Forest Inventory Map 050, 051, 060
NTS Map 12H06, 12H07, 12H03

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
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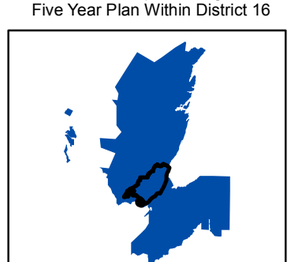
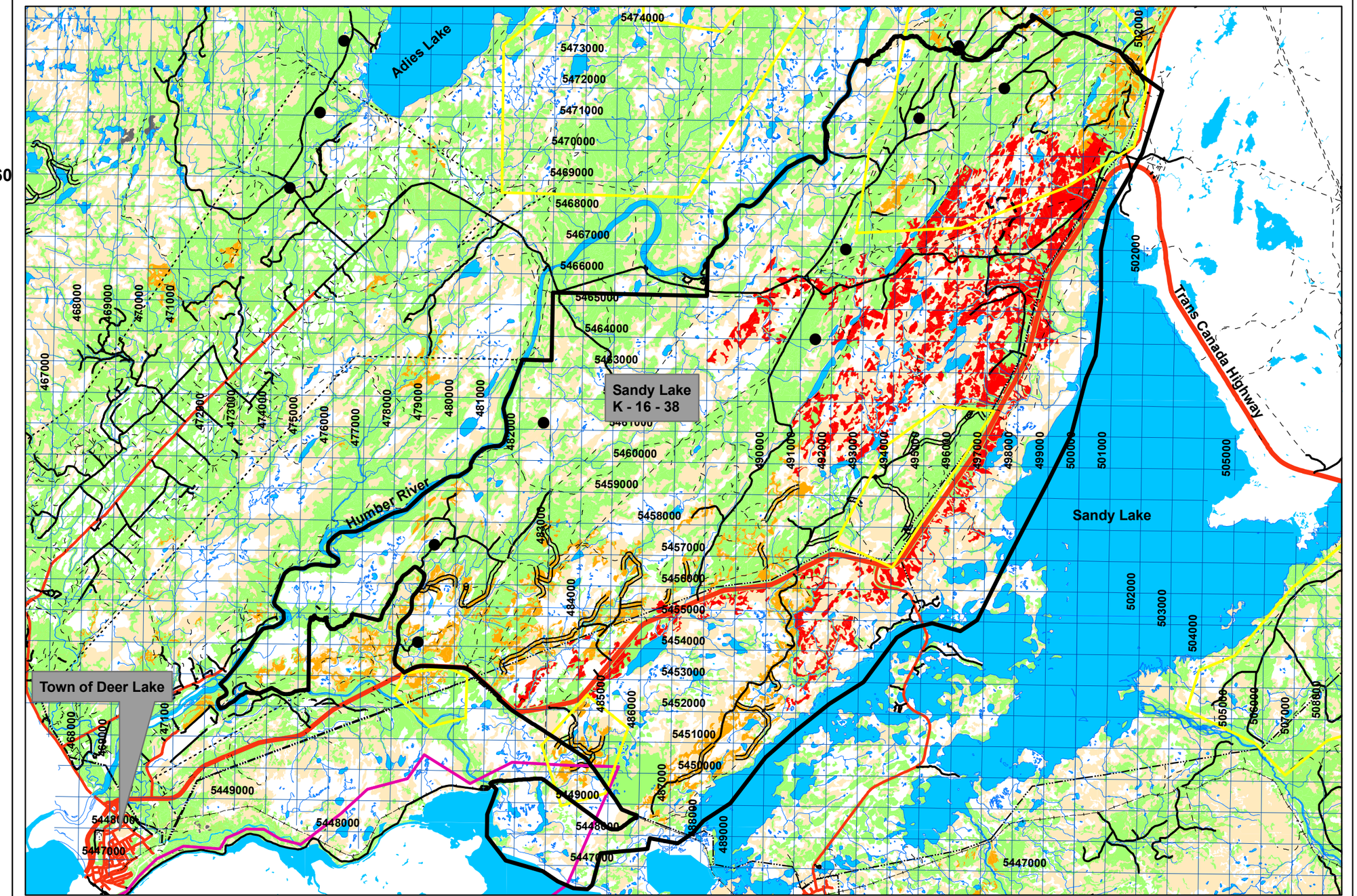
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Sandy Lake (K - 16 - 38)
Scale 1:50,000 Map 1

Forest Inventory Map 050, 051, 060
NTS Map 12H06, 12H07, 12H03

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
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- Proposed Harvest
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- Waterbodies
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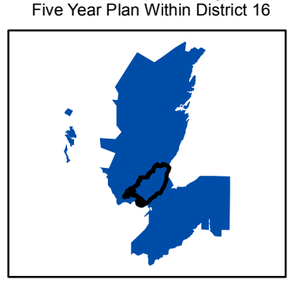
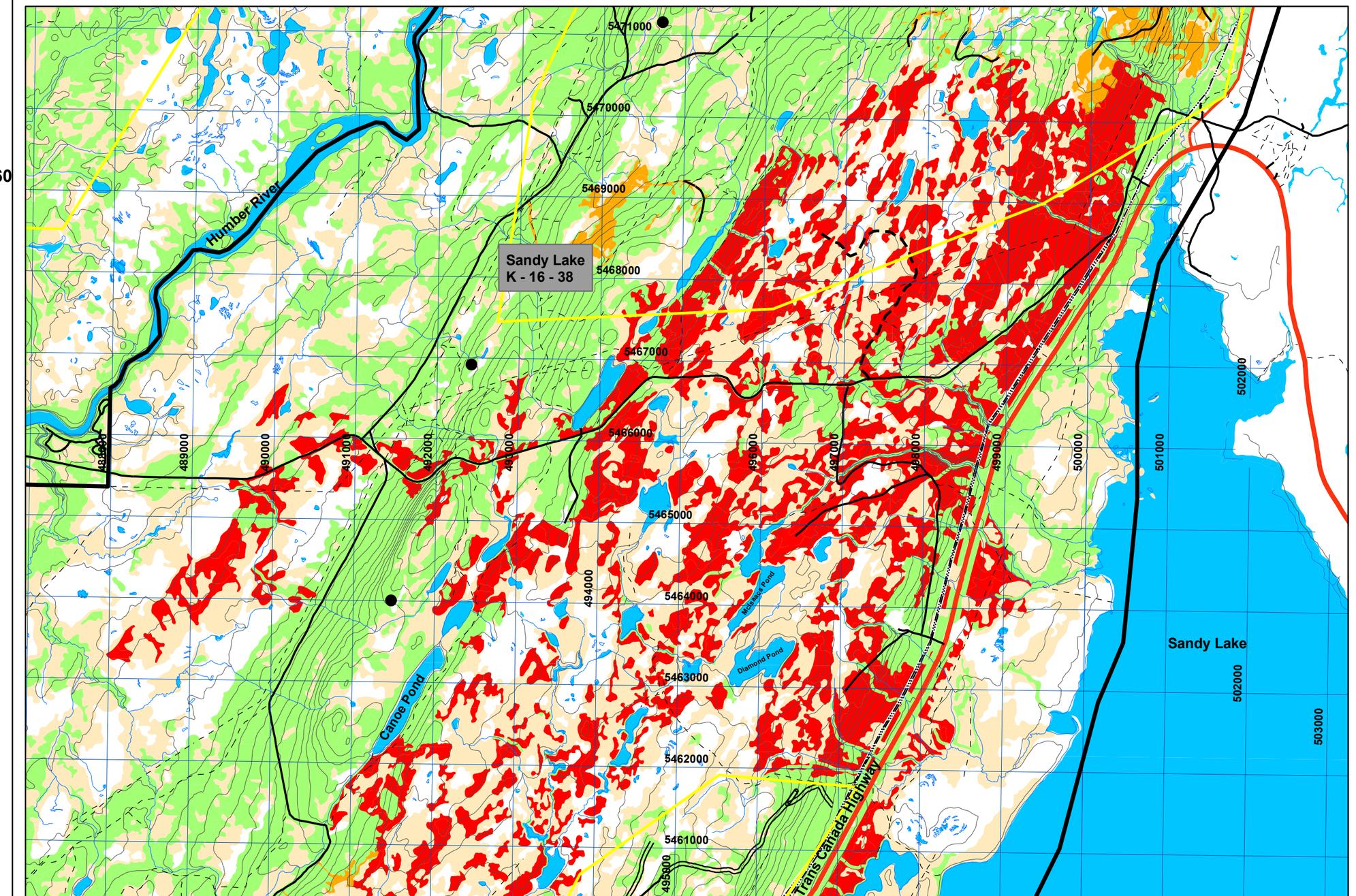
N W E S

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Sandy Lake (K - 16 - 38)
Scale 1:50,000 Map 2

Forest Inventory Map 050, 051, 060
NTS Map 12H06, 12H07, 12H03

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
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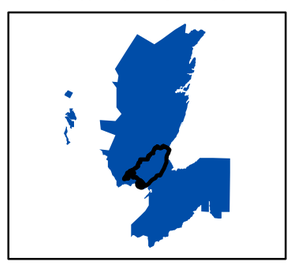
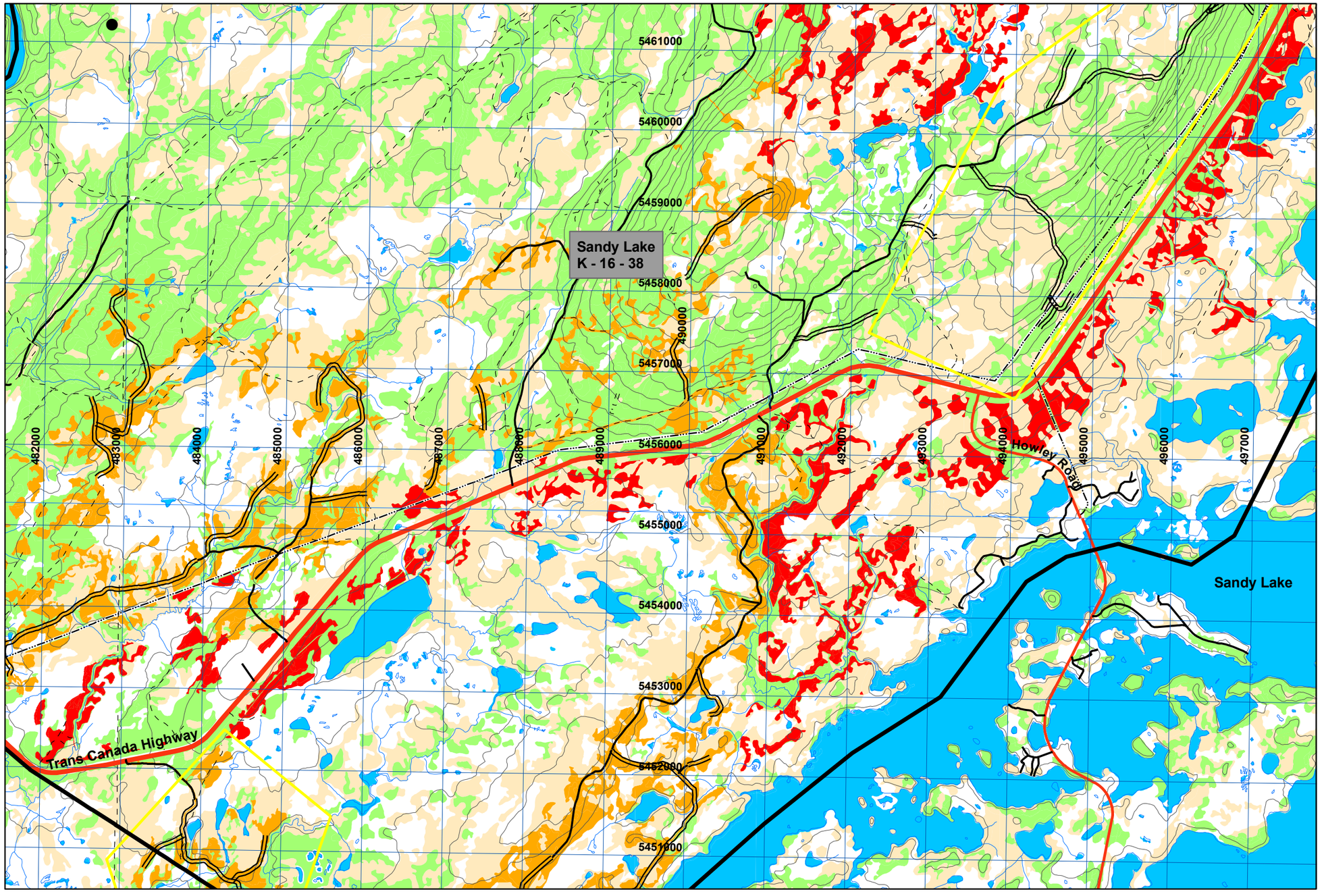
Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Angle Pond	**Inventory Map #:**	049, 050
Harvest Area #:	K-16-39	**NTS Map #:**	12H05, 12H06

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	83,105	m3	Volume:	68,146	m3	bF:	85 %
Area:	654	ha	Area:	654	ha	bS:	15 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Rolling terrain, moderate to shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

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Forest Management District 16
Five Year Plan (2012 - 2016)

Angle Pond (K - 16 - 39)
Scale 1:50,000

Forest Inventory Map 049, 050
NTS Map 12H05, 12H06

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

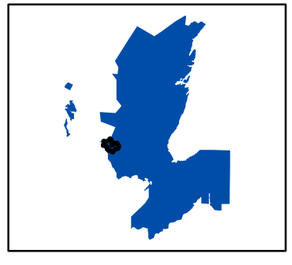
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

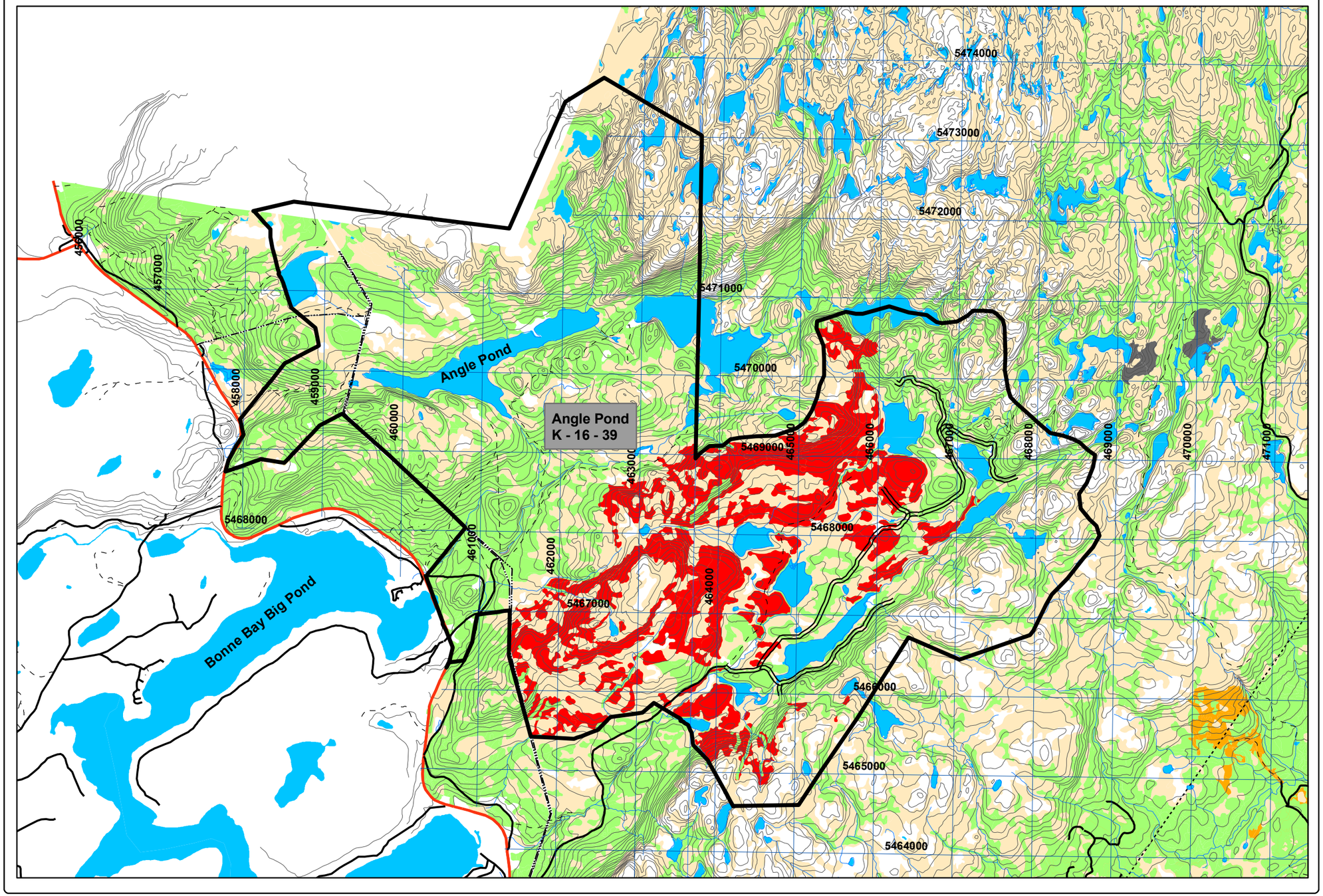
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Birchy Narrows	**Inventory Map #:**	051, 061
Harvest Area #:	K-16-40	**NTS Map #:**	12H07, 12H02

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	131,256	m3	Volume:	107,630	m3	bF:	30 %
Area:	1491	ha	Area:	1491	ha	bS:	70 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Hilly and Flat terrain, moderate to deep topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

No issues identified during the DNR public consultation process.

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Forest Management District 16
Five Year Plan (2012 - 2016)

Birchy Narrows (K - 16 - 40)
Scale 1:85,000 Overview Map

Forest Inventory Map 051, 061
NTS Map 12H07, 12H02

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
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- Management Boundary
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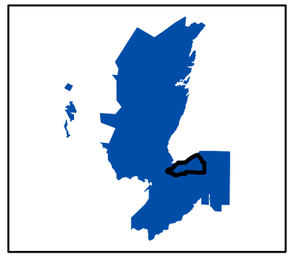
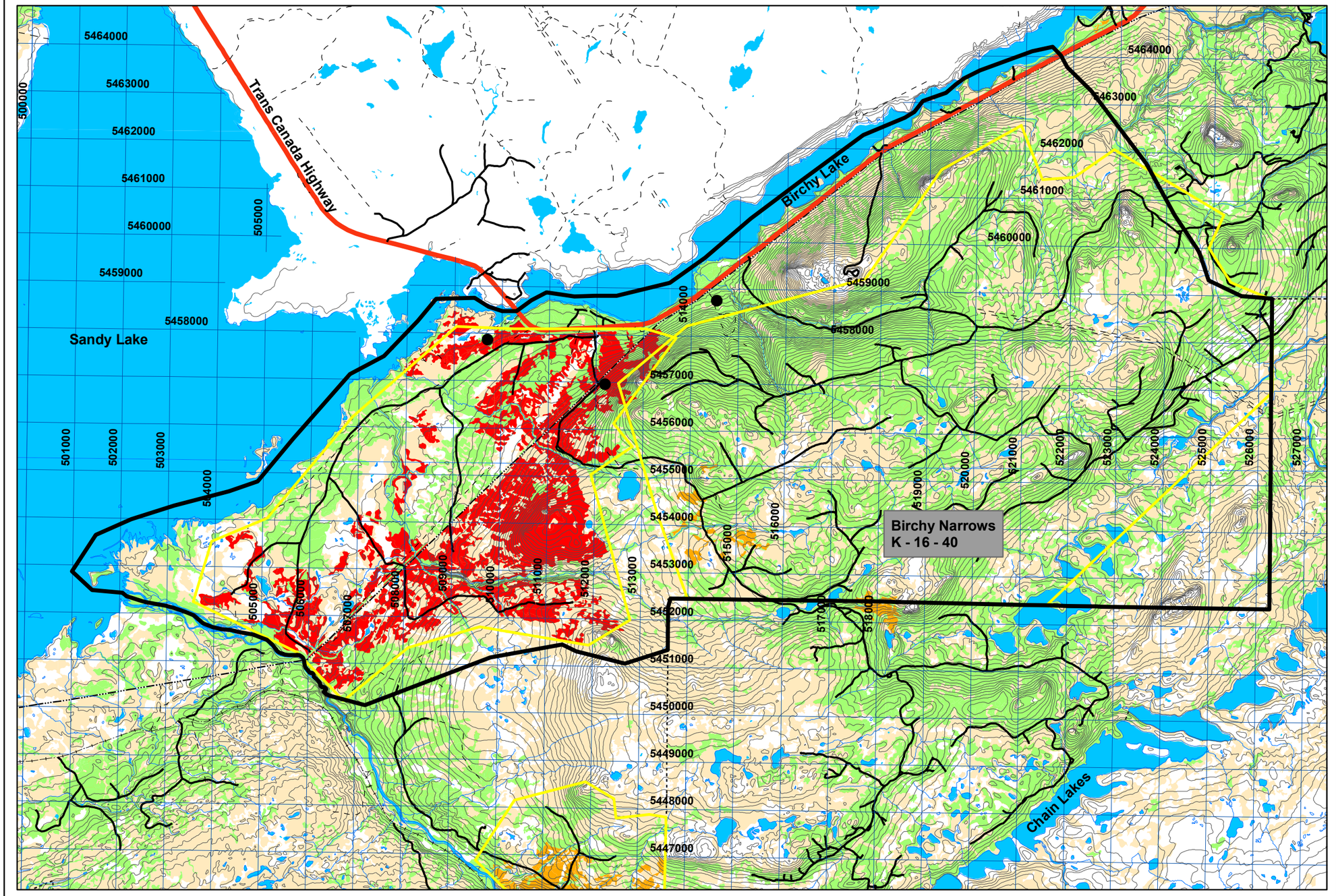
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Birchy Narrows (K - 16 - 40)
Scale 1:50,000 Map 1

Forest Inventory Map 051, 061
NTS Map 12H07, 12H02

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
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- Waterbodies
- Brooks

N W E S

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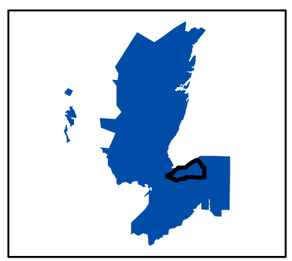
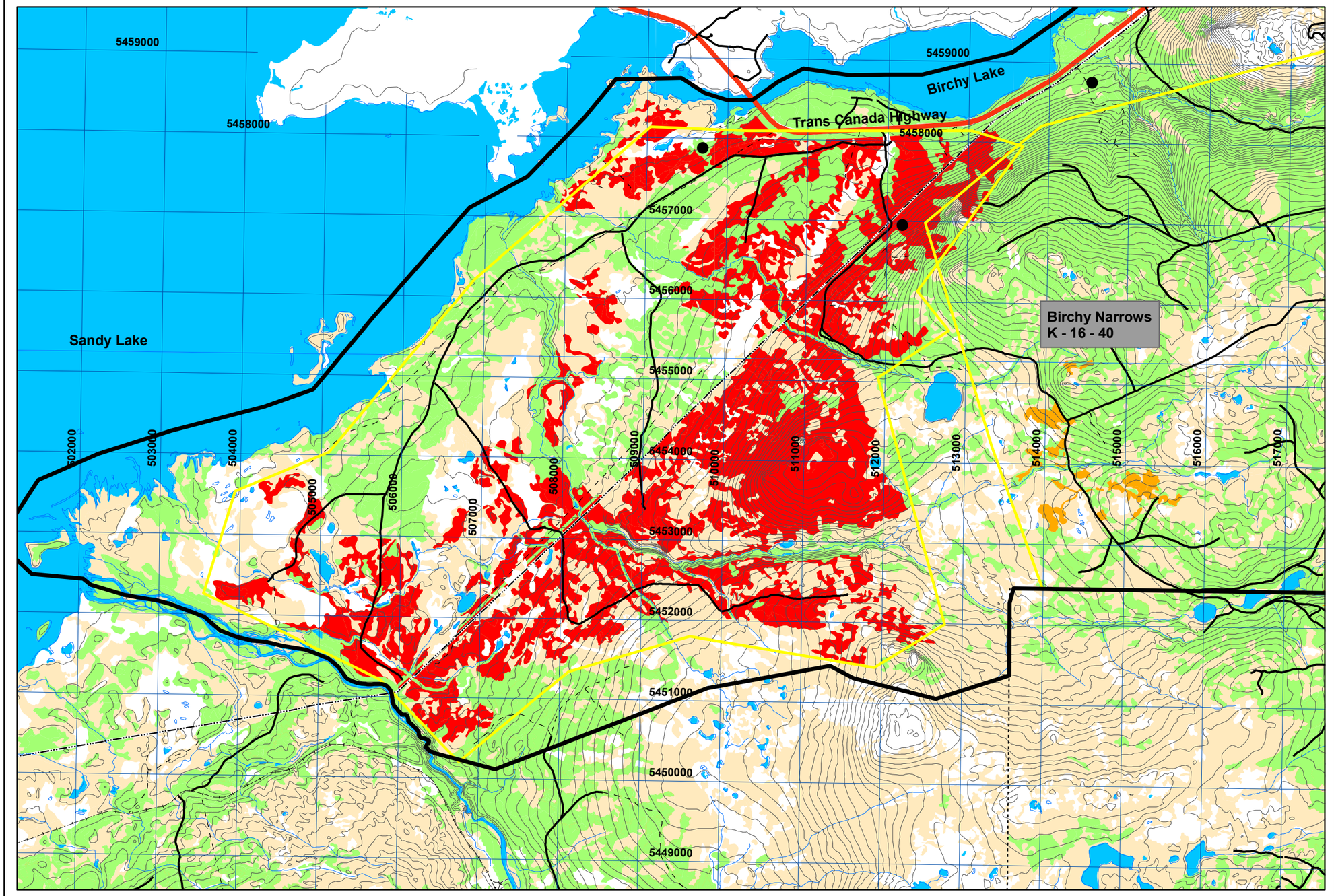
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Taylors Brook	**Inventory Map #:**	040, 041, 050, 051
Harvest Area #:	K-16-44	**NTS Map #:**	12H11,12H10,12H06,12H07

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	98,412	m3	Volume:	80,698	m3	bF:	50 %
Area:	964	ha	Area:	964	ha	bS:	50 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Rolling terrain, moderate to shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Core Area and a Secondary Core Area. Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

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Forest Management District 16
Five Year Plan (2012 - 2016)

Taylors Brook (K - 16 - 44)
Scale 1:170,000 Overview Map
Forest Inventory Map 040, 041, 050, 051
NTS Map 12H11, 12H10, 12H06, 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
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- Management Boundary
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Land Features
- Forested Land
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- Other disturbance
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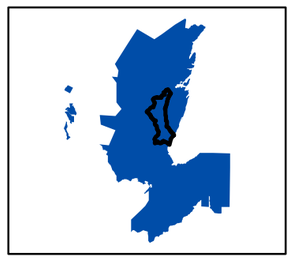
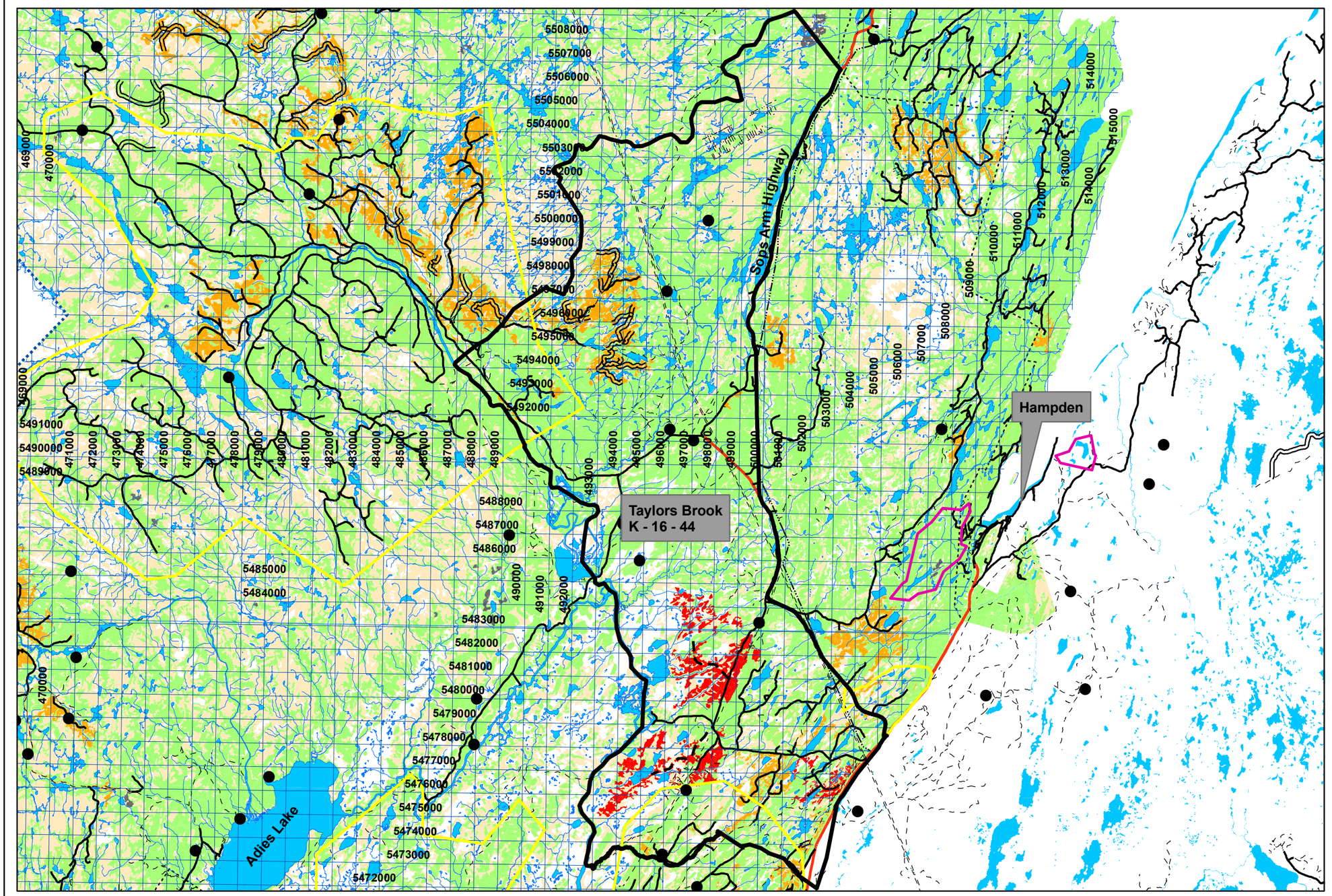
Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Taylors Brook (K - 16 - 44)
Scale 1:50,000 Map 1
Forest Inventory Map 040, 041, 050, 051
NTS Map 12H11, 12H10, 12H06, 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
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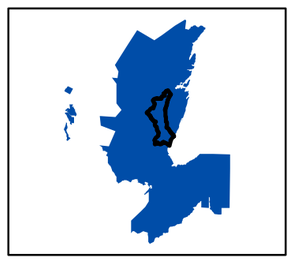
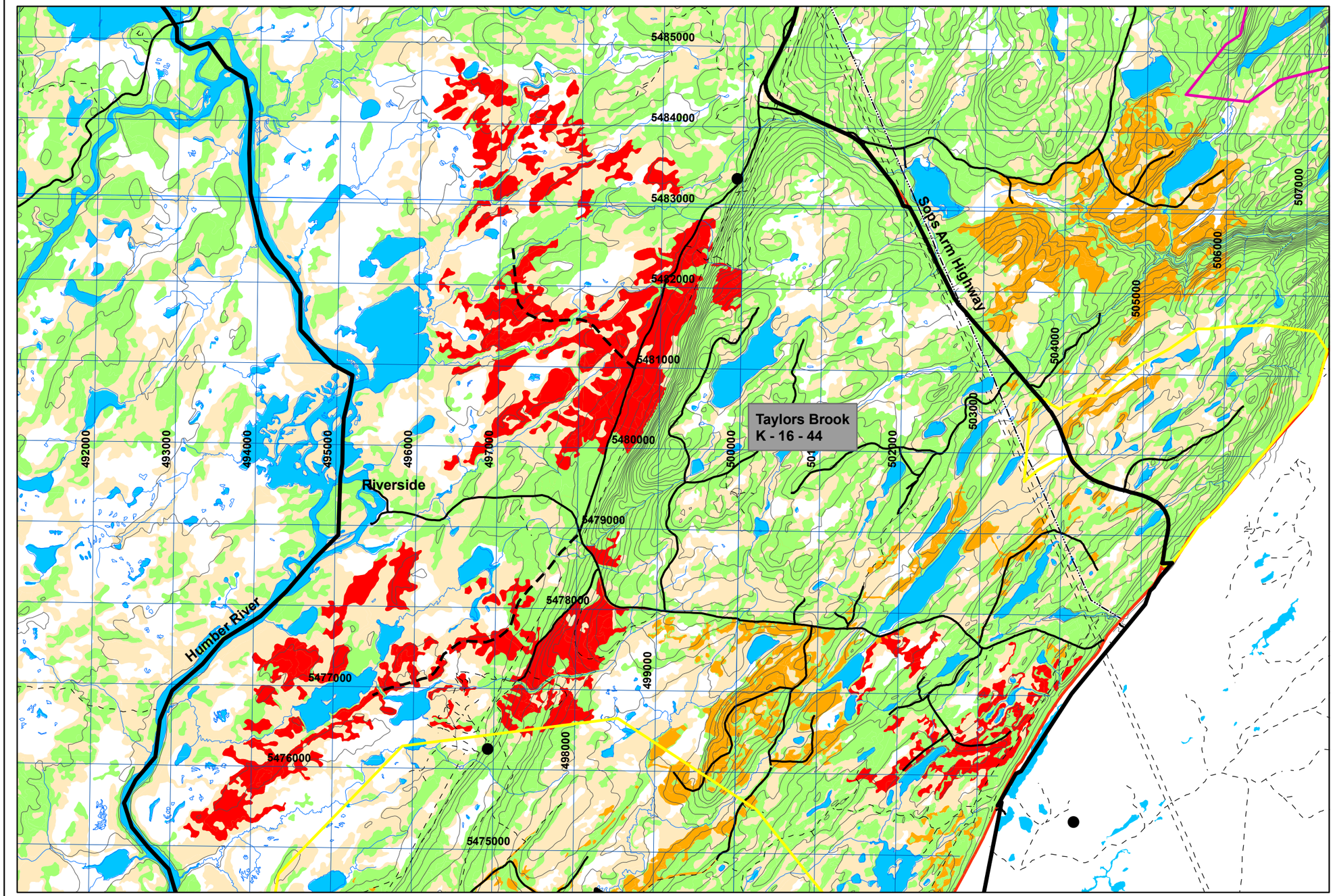
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Sheffield Lake	**Inventory Map #:**	051, 052
Harvest Area #:	K-16-45	**NTS Map #:**	12H07, 12H08

Forest Inventory

Gross		**Net**		**Working Group**	
Volume:	m3	Volume:	m3	bF:	%
Area:	ha	Area:	ha	bS:	%

Operational Considerations:

Harvest System: NA

Terrain Conditions: Hilly and Flat terrain, moderate to deep topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

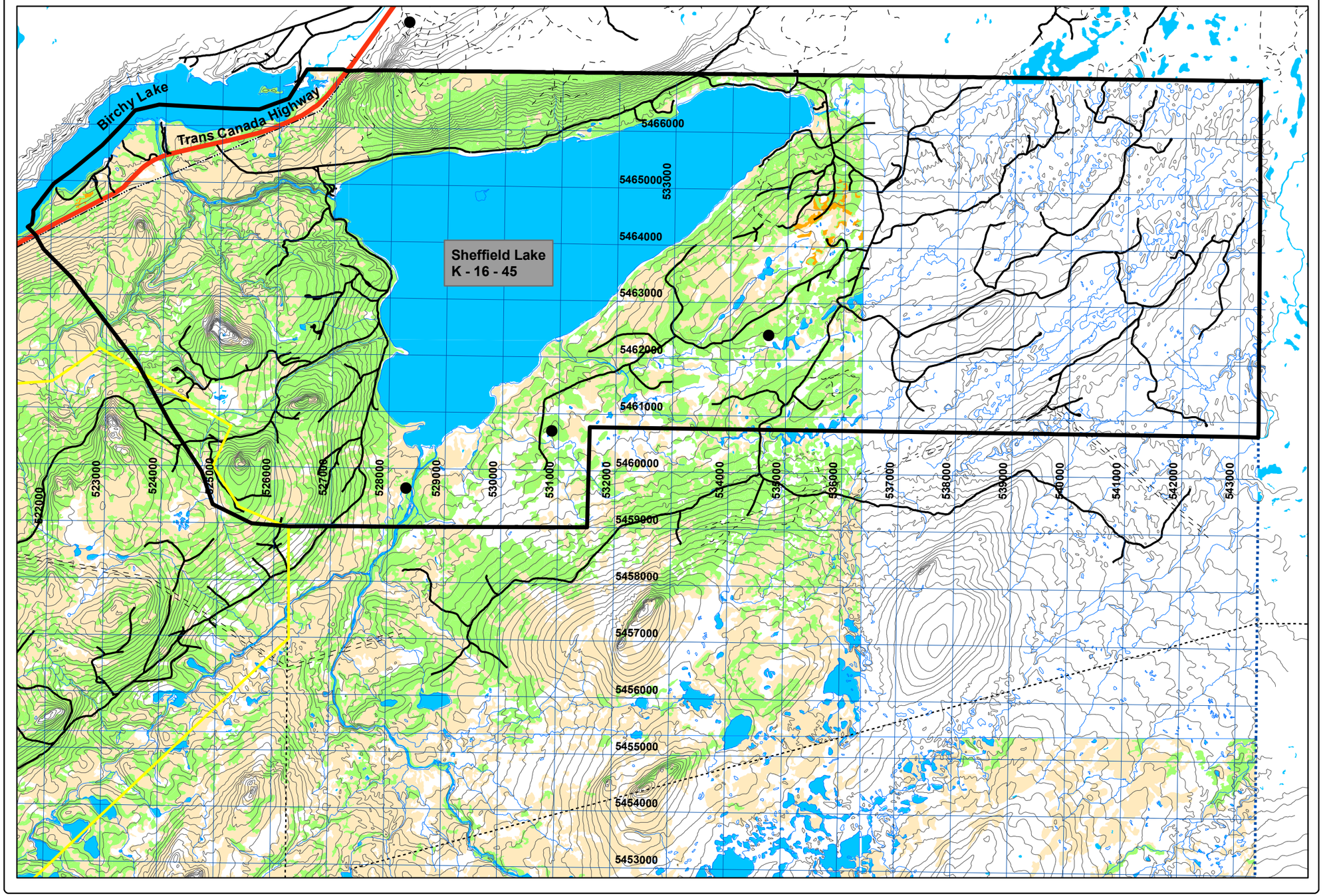
There isn't any commercial harvesting planned for this area.
There are silviculture activities planned for this area.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/

Forest Management District 16
Five Year Plan (2012 - 2016)

Sheffield Lake (K - 16 - 45)
Scale 1:70,000

Forest Inventory Map 051, 052
NTS Map 12H07, 12H08



LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

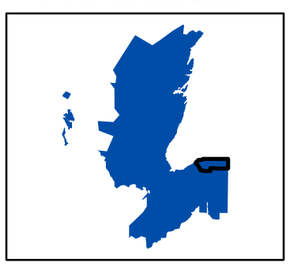
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16



CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Adies River	**Inventory Map #:**	040, 050
Harvest Area #:	K-16-47	**NTS Map #:**	12H11, 12H06

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	154,899	m3	Volume:	127,017	m3	bF:	35 %
Area:	1461	ha	Area:	1461	ha	bS:	65 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Rolling terrain, moderate to shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

Consultation with the Wildlife Division regarding Caribou populations and habitat, has resulted in mitigative measures being adopted in this Five Year Plan. These measures ensure adequate habitat is maintained in Caribou Sensitive Areas. A portion of this operating block lies within a Core Area and a Secondary Core Area. Proposed harvests will follow the Forest Management Guidelines for Woodland Caribou, developed by the Department of Environment and Conservation , Wildlife Division.

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Forest Management District 16
Five Year Plan (2012 - 2016)

Adies River (K - 16 - 47)
Scale 1:130,000 Overview Map

Forest Inventory Map 040, 050
NTS Map 12H11, 12H06

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

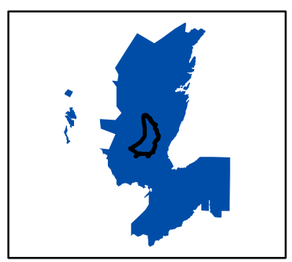
Administration Boundaries
- Management Boundary
- Ownership Boundary

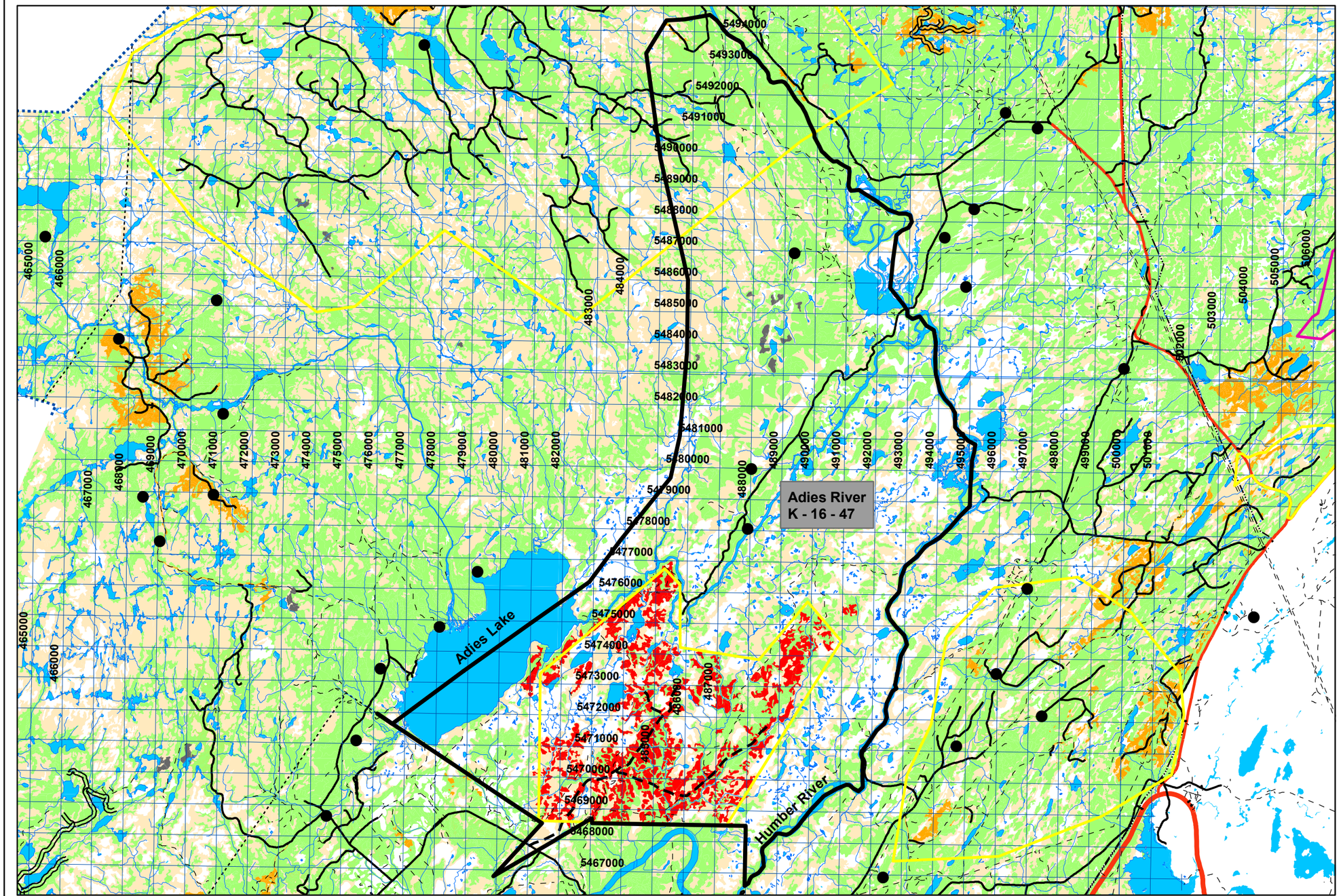
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Adies River (K - 16 - 47)
Scale 1:50,000 Map 1

Forest Inventory Map 040, 050
NTS Map 12H11, 12H06

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

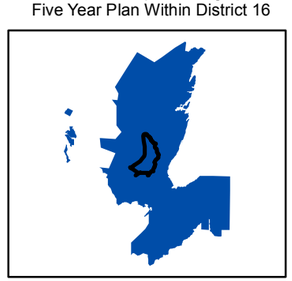
Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

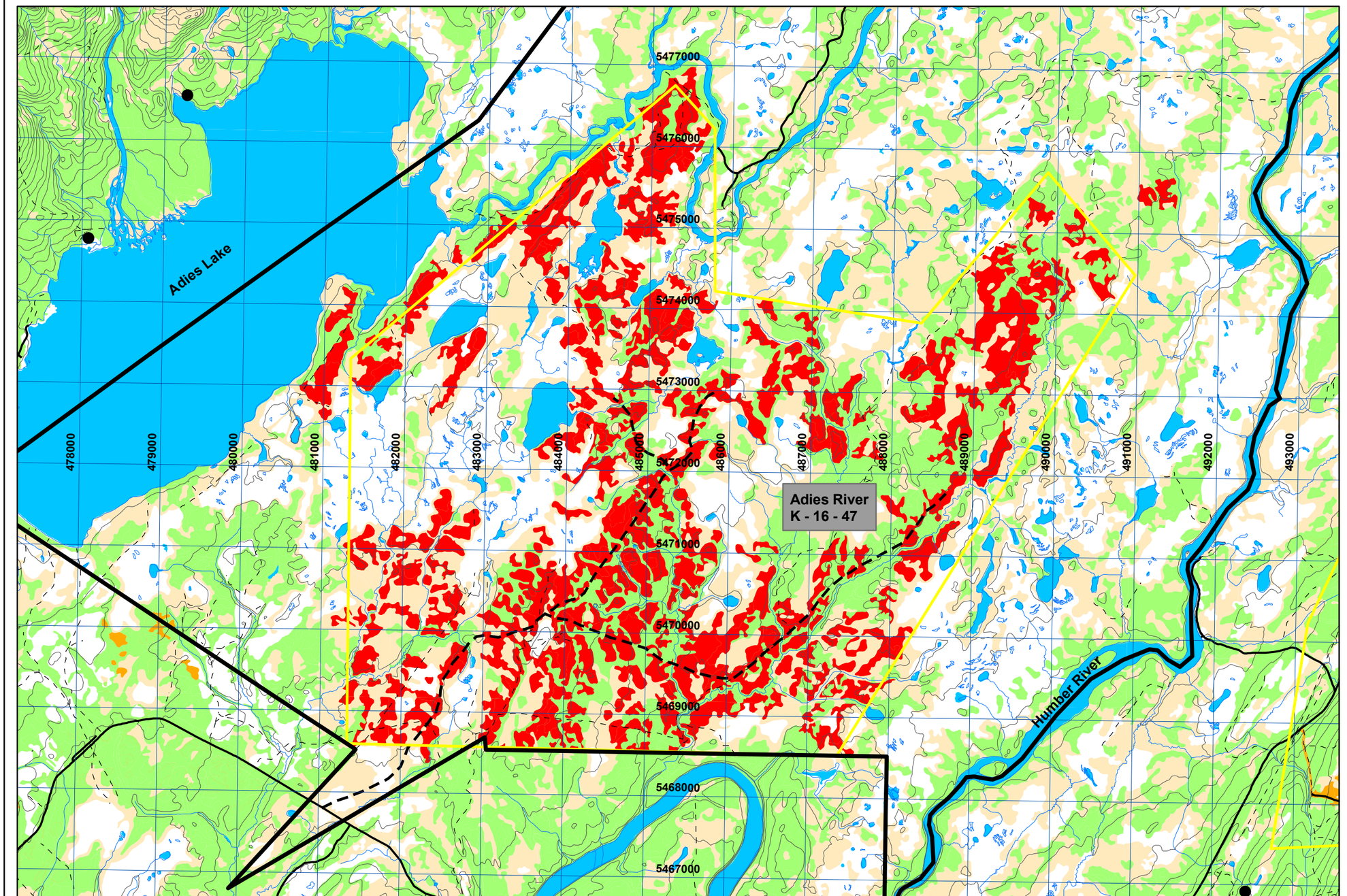
Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Upper Humber	**Inventory Map #:**	040
Harvest Area #:	K-16-48	**NTS Map #:**	12H11

Forest Inventory

Gross		**Net**		**Working Group**	
Volume:	m3	Volume:	m3	bF:	%
Area:	ha	Area:	ha	bS:	%

Operational Considerations:

Harvest System: NA

Terrain Conditions: Rolling terrain, moderate to shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

There isn't any commercial harvesting planned for this area.
There are silviculture activities planned for this area.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/

GIS

CBPP Woodlands

Certified System

ISO 14001
CSA Z809-02

Forest Management District 16
Five Year Plan (2012 - 2016)

Upper Humber (K - 16 - 48)
Scale 1:120,000

Forest Inventory Map 040
NTS Map 12H11

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
- Contours
- Transmission Lines
- Protected Public Water Supply Area

Administration Boundaries
- Management Boundary
- Ownership Boundary

Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N
W
E
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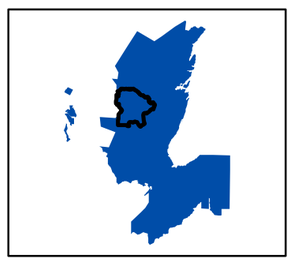
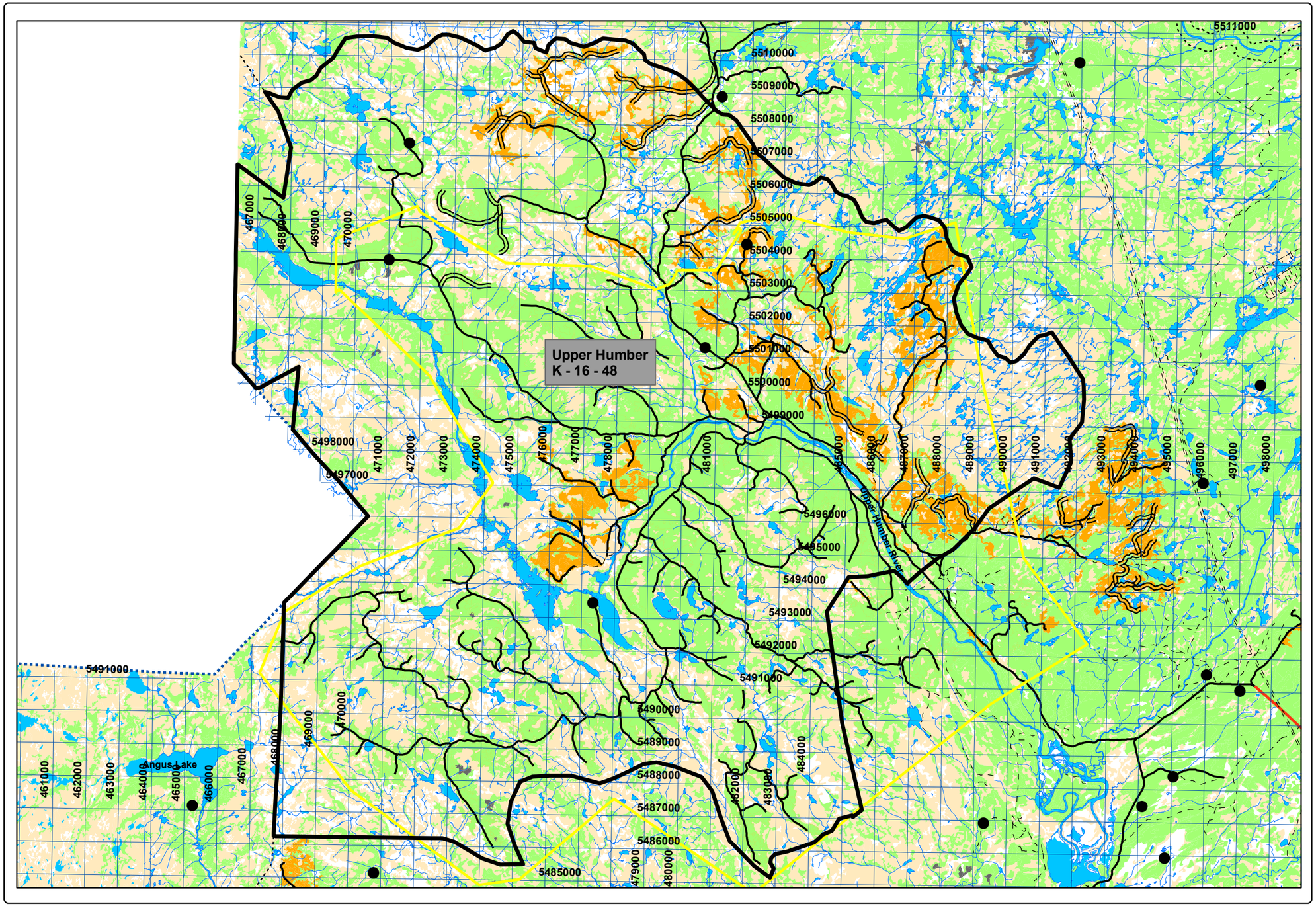
Insert Map Showing
Five Year Plan Within District 16





CORNER BROOK PULP & PAPER LIMITED
FIVE YEAR OPERATING PLAN

FMD:	16	**Plan Period:**	Jan 1,2012 - Dec 31, 2016
Operating Area:	Gales Brook	**Inventory Map #:**	041, 051
Harvest Area #:	K-16-49	**NTS Map #:**	12H10, 12H07

Forest Inventory

Gross			**Net**			**Working Group**	
Volume:	45,406	m3	Volume:	37,233	m3	bF:	60 %
Area:	686	ha	Area:	686	ha	bS:	40 %

Operational Considerations:

Harvest System: Mechanical, Conventional

Terrain Conditions: Rolling terrain, moderate to shallow topsoil over mineral soil
The merchantable forest is broken by bog and scrub areas.

Other Considerations:

No issues identified during the DNR public consultation process.

Corner Brook Pulp and Paper Woodlands developed a Sustainable Forest Management Plan as part of our registration to the ISO 14001 and CSA Z809 standards.
For further information on the SFM plan visit our website @ http://www.cbppl.com/

Forest Management District 16
Five Year Plan (2012 - 2016)

Gales Brook (K - 16 - 49)
Scale 1:110,000 Overview Map

Forest Inventory Map 041, 051
NTS Map 12H10, 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
- TCH
- Paved Roads
- Resource Roads
- Winter Roads
- T'Railway Provincial Park
- Trails

Linear Features
- UTM Grid
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- Transmission Lines
- Protected Public Water Supply Area

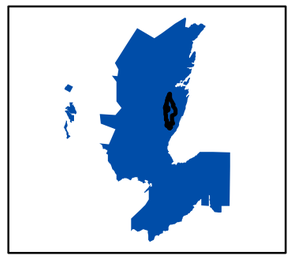
Administration Boundaries
- Management Boundary
- Ownership Boundary

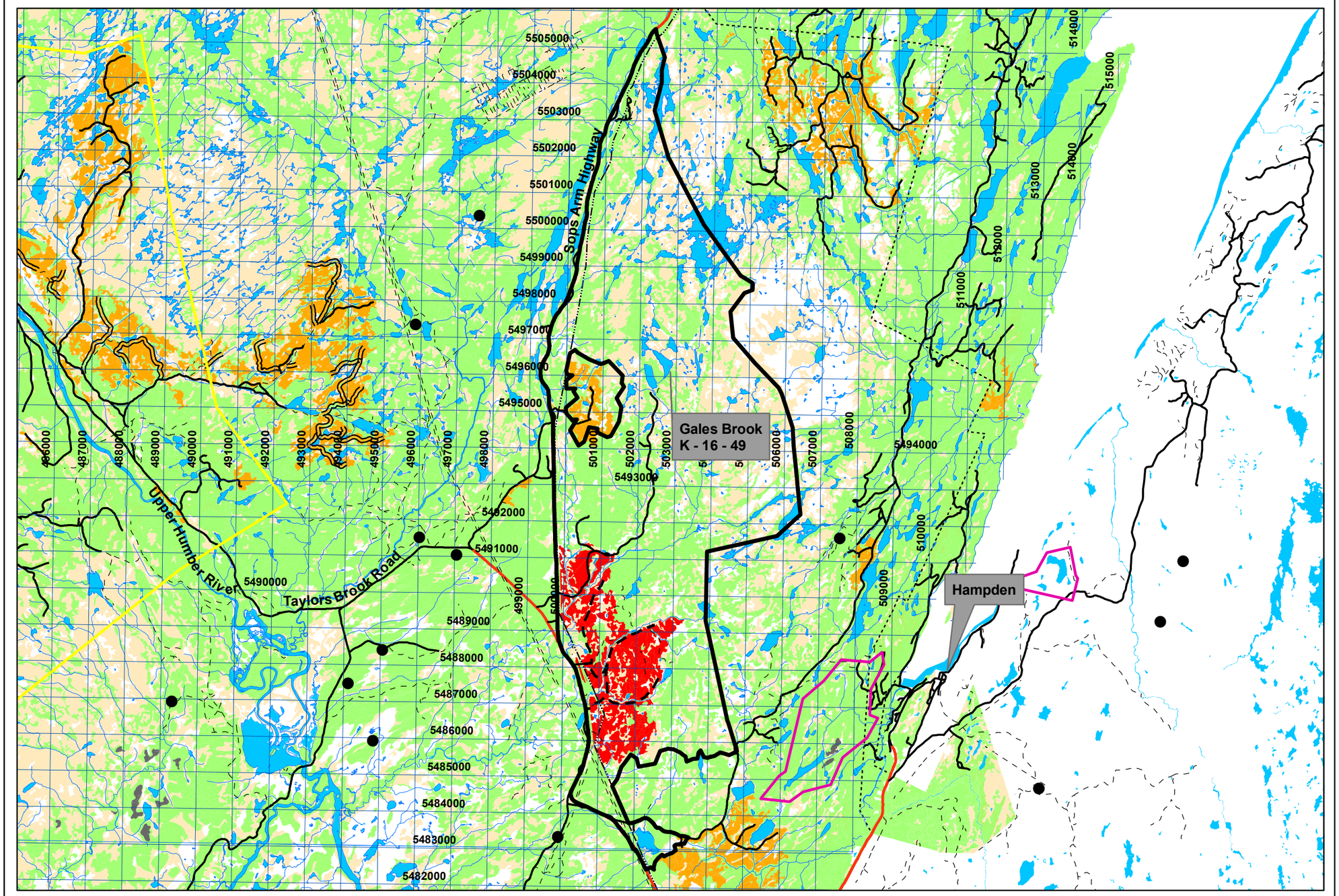
Land Features
- Forested Land
- Cutover
- Other disturbance
- Scrub

Water Features
- Waterbodies
- Brooks

N W E S

Insert Map Showing
Five Year Plan Within District 16





Forest Management District 16
Five Year Plan (2012 - 2016)

Gales Brook (K - 16 - 49)
Scale 1:50,000 Map 1

Forest Inventory Map 041, 051
NTS Map 12H10, 12H07

LEGEND

Five Year Plan Features
- Five Year Plan Boundary
- Proposed Silviculture Area
- Proposed Primary Road
- Proposed Harvest
- Permanent Sample Plots

Road Features
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Insert Map Showing
Five Year Plan Within District 16

