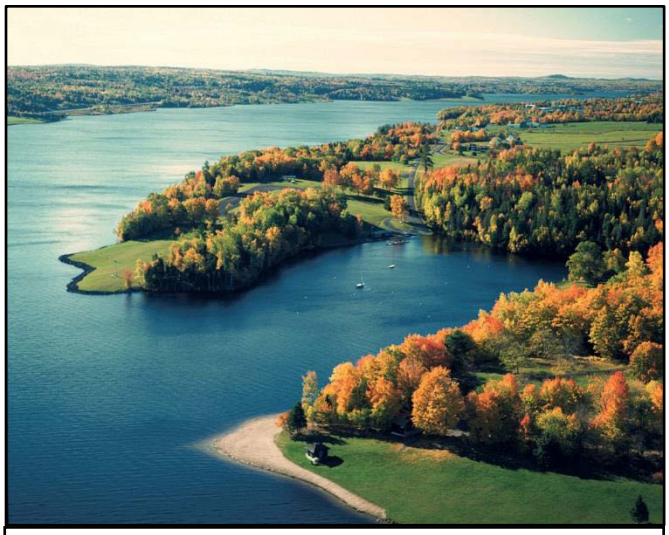
12.0 HUMAN OCCUPANCY AND RESOURCE USE

12.1 SCOPE OF THE REVIEW

The scope of the Comparative Environmental Review (CER) of human occupancy and resource use is based on the regulatory setting, anticipated issues and concerns, existing knowledge and potential interactions. Aboriginal engagement related to the current use of land and resources for traditional purposes by Aboriginal persons is discussed separately in Section 16.

12.1.1 Why Human Occupancy and Resource Use Is a Valued Component

Human occupancy and resource use refers to current and future proposed occupancy, and public and private use of land and resources by humans as part of their everyday lives. It includes uses such as residency, commercial ventures, recreation, and public and private enjoyment of land and resources, and the interactions between the Project and those uses.



Source: New Brunswick Tourism (2010)

Human occupancy and resource use was selected as a valued component (VC) because it could be affected by all Options by interacting with current and future proposed occupation, and public and private enjoyment of the land and resources in the vicinity of the Project. The human use and occupancy of land and resources in an area play an important role in shaping nearby communities and can affect the day-to-day quality of life of residents. The Saint John River and the Mactaquac headpond are important to local residents, businesses and visitors to the area because they facilitate a variety of resource-based industries (*e.g.*, recreation, fisheries, agriculture) and activities involving the use of the land and resources. Any of the Options could cause changes in land use and the character of those uses (*e.g.*, residential, recreational, industrial, and commercial), in navigation of the river and the headpond, in the community experience of the area, as well as local recreational and residential property values.

12.1.2 Regulations and Policies Relevant to Human Occupancy and Resource Use

Various levels of government administer land and resource use in the area of review. The Province of New Brunswick, through the New Brunswick Department of Natural Resources (NBDNR), manages land and resource use on Crown land (*e.g.*, forestry). NBDNR also manages resource use, including wildlife harvesting (*e.g.*, hunting and fishing restrictions, fur trapping licences), both on public and private land in the province.

Land use planning in New Brunswick is based on the New Brunswick *Community Planning Act*, and in incorporated areas, the New Brunswick *Municipalities Act*. Outside incorporated areas, Regional Service Commissions throughout the Province provide various planning and management services in their regions. These include: regional planning, local planning in local service districts, solid waste management, regional policing collaboration, regional emergency measures planning, and regional sport, recreational and cultural infrastructure planning and cost-sharing under the authority of the *Community Planning Act* (GNB 2012c).

Other provincial legislation and regulations relevant to human occupancy and resource use include the following New Brunswick legislation.

- *Crown Lands and Forests Act* – regulates development, use, protection, and management of Crown lands resources.
- *Fish and Wildlife Act* – regulates hunting, fishing and trapping on private and public land, and establishes protected areas under *Wildlife Refuges and Wildlife Management Areas Regulation*.
- *Parks Act* – regulates designation of land as a provincial park for the protection of ecosystems, biodiversity and the elements of natural and cultural heritage and to provide opportunities for recreational and outdoor educational activities.
- *Tourism Development Act* – encourages and promotes enhancement of accommodation and facility standards, enhancement of professionalism in the tourism industry, provide information services for tourist, and tourism marketing.
- *Protected Natural Areas Act* – protect the biological diversity of fauna and flora within the Province and the relationship between such fauna and flora and the environment by protecting, conserving and managing natural landscapes and habitat.

Federal legislation relevant to human occupancy and resource use include the *Migratory Birds Convention Act (MBCA)*, the *Species at Risk Act* (*SARA*), and the *Navigation Protection Act* (*NPA*). Migratory birds and their habitats, as well as their hunting, is managed by the Canadian Wildlife Service (CWS) under the *MBCA*, and CWS is also responsible for the protection of listed species under *SARA*.

The *NPA* is administered by Transport Canada. Transport Canada describes navigable waters as "*any body of water capable of being navigated by any type of floating vessel for the purpose of transportation, recreation or commerce*". Waterways designated as "scheduled" support commercial or recreational-related navigation. Transport Canada has designated the Saint John River as a scheduled waterway (Schedule 2), between the Mactaquac Generating Station (the Station) to the Atlantic Ocean (Government of Canada 2014). Although the dam presents a barrier to continuous navigation on the Saint John River, navigation continues independently both upstream and downstream of the Station.

12.1.3 Area of Review

The area of review includes the Station and adjacent areas, including the communities and areas (both incorporated and unincorporated) between the city of Fredericton and the town of Woodstock on both sides of the river and headpond (Figure 12.1). Many land and resource-based activities and supporting infrastructure take place and are located within and adjacent to the Saint John River and headpond. This area of review has been selected because land and resource-based activities that take place in and around the headpond and Saint John River could result in temporary or permanent changes under each Option, particularly in the area immediately upstream of the Station in the community of Mactaquac.

12.1.4 Key Issues

Option 1 or Option 2 could result in potential short-term changes in land and/or resource use, navigation, and community, both upstream and downstream of the Station. Each of these Options would require excavation of the right bank of the Saint John River (*i.e.*, on the south side of the river) to create and approach and discharge channel for the new facilities, thereby resulting in some temporary and permanent change to recreational and commercial activities in the vicinity of the new Station components (and to a lesser extent, farther upstream and downstream). It would also restrict unauthorized access to that area as a safety measure. Option 3 is expected to cause a change in land and/or resource use and a change in land use opportunities for both residents and visitors, particularly those associated with the current headpond that would be lost under Option 3.

All Options may result in some changes in access between communities, as well as changes in how community members access services and interact with one another and with the resources in the area.

The key issues of concern for human occupancy and resource use are listed in Table 12.1.

Table 12.1 Description of Key Issues for Human Occupancy and Resource Use

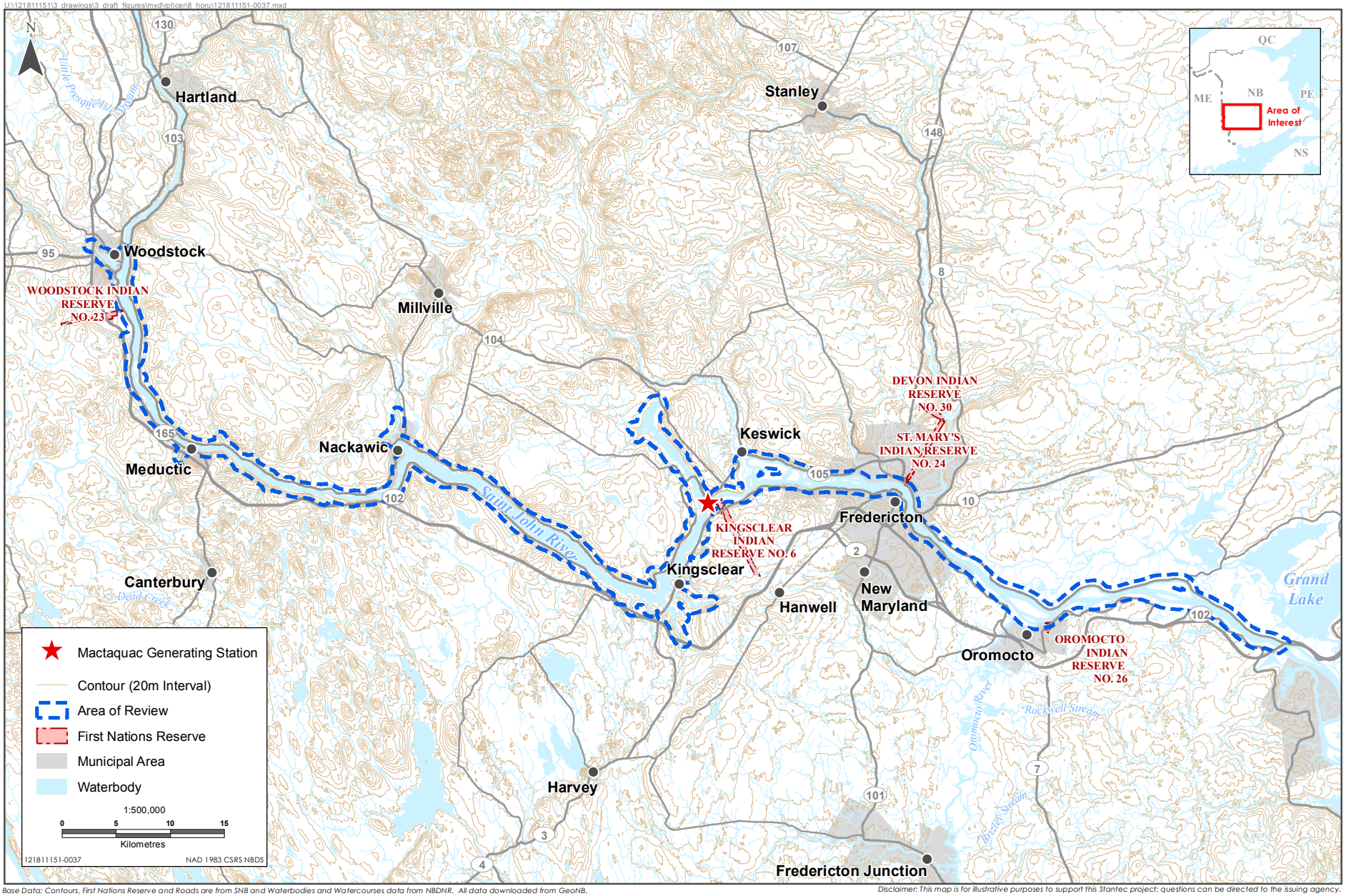
Key Issues	Description
Potential change in land and resource use	• Change in access to, or enjoyment of, land and resources, including changes in aesthetics (*e.g.*, visual landscape). • Properties immediately adjacent to construction activities may experience changes in property values as a result of nuisance-type interactions (*e.g.*, dust, noise, vibration).
Potential change in navigation	• Change in access to existing waterways as a result of water level fluctuations • Potential long-term change in the Saint John River.
Potential change in community	• Change in community structure or dynamics.

12.2 EXISTING CONDITIONS

12.2.1 Sources of Information

Information on existing conditions was drawn from:

- informant interviews, including local historians;



Base Data: Contours, First Nations Reserve and Roads are from SNB and Waterbodies and Watercourses data from NBDNR. All data downloaded from GeoNB.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Stantec

121811151 - Mactaquac Project - NB Power

Area of Review for Human Occupancy and Resource Use

Figure 12.1

- published maps and aerial photography;
- GIS databases;
- Statistics Canada;
- Department of Fisheries and Oceans Canada (DFO);
- the Government of New Brunswick (various departments);
- municipal governments;
- community organizations;
- public and stakeholder engagement;
- background information reports previously prepared for the Project;
- literature review;
- qualitative and quantitative analyses; and
- experience and judgment of the review team, and industry professionals as needed.

12.2.2 Description of Existing Conditions

12.2.2.1 Land and Resource Use

The Saint John River and Mactaquac headpond are a tourism hub for central New Brunswick. They provide the basis for tourism-related services and accommodations, which are an integral component of the well-developed tourism industry in the area of review, and particularly in the Mactaquac area. Additionally, the headpond and its recreational infrastructure provide opportunities for a variety of activities, such as camping, boating, golfing and swimming, to name a few. The community of Mactaquac, in particular, attracts numerous tourists because it offers a variety of recreational opportunities. The importance of tourism-related businesses to the local economy is discussed in Section 11 (economy and employment).

12.2.2.1.1 Property

The original construction of the Station resulted in the creation of additional residential, commercial and agricultural development, recreational access and opportunities, and scenic views. Because the presence of the Station and the associated headpond is important with respect to property appeal and value, this discussion focuses on the area upstream of the Station, between the community of Mactaquac and the town of Woodstock.

The Mactaquac headpond is a popular area for both permanent residences as well as recreational properties. Many cottages are located in the vicinity of the headpond. According to the Recreational Property Report (Royal LePage 2014), New Brunswick experienced an overall increase demand in the recreational property market during 2014. While there are a limited number of waterfront properties across the province, the ones that are available are well priced when compared to recreational properties located in other provinces, and provide what is considered to be some of the best value within the Canadian market (Royal LePage 2014).

Waterfront properties, with land access are priced substantially higher on average than those located in-land with no water-frontage. Waterfront properties typically range from $120,000 to $180,000 compared to properties located in-land, which range in price from $30,000 to $70,000 (Royal LePage 2014).

The Fredericton Real Estate Board compiles statistics on the volume of sales and prices of properties using multiple listing service (MLS®) data. In each of the years during the period of 2009 to 2013, the average sales price has experienced a decline in at least one community located in the area of review (Table 12.2). Downtown Fredericton and Woodstock Road experienced a decline in the average sale price of a home during three of the five years (2010, 2011 and 2013), dropping just over 20% in 2013. The same area experienced declines in the total number of sales during the same years.

Data presented in Table 12.2 provide summarized information of MLS® sales data for some communities within the area of review. As these data are collected by the Fredericton Real Estate Board, the focus is on the area in an surrounding the City of Fredericton. Fredericton urban includes areas in the city of Fredericton, including the downtown and Woodstock Road. Fredericton suburban south includes Silverwood, Island View, and Kingsclear. Fredericton suburban north includes Nashwaaksis, Douglas, Keswick Ridge, and Burtts Corner. Areas outside the greater Fredericton area have been combined and include Harvey, Longs Creek, Prince William, Woodstock, and Sunbury, Queens, York, and Carleton counties.

Table 12.2 MLS® Statistic Report: Residential (Single Family) Activity for Selected Communities, 2009-2013

Years 2009-2013	Area*	Total Number of Listings	Total Number of Sales	Average Sale price	% Change of Average Sale Price
2009	Fredericton urban	217	116	$252,941	N/A
	Fredericton suburban south	58	25	$183,968	N/A
	Fredericton suburban north	510	300	$193,778	N/A
	Outside Fredericton	1272	418	$98,061	N/A
2010	Fredericton urban	249	109	$248,472	-1.8
	Fredericton suburban south	75	36	$200,994	9.3
	Fredericton suburban north	552	311	$200,765	3.6
	Outside Fredericton	1,194	411	$106,232	8.3
2011	Fredericton urban	240	97	$240,826	-3.1
	Fredericton suburban south	71	29	$231,741	15.3
	Fredericton suburban north	564	283	$207,749	3.5
	Outside Fredericton	1,149	418	$102,010	-4.0

Table 12.2 MLS® Statistic Report: Residential (Single Family) Activity for Selected Communities, 2009-2013

Years 2009-2013	Area*	Total Number of Listings	Total Number of Sales	Average Sale price	% Change of Average Sale Price
2012	Fredericton urban	231	103	$276,659	14.9
	Fredericton suburban south	60	22	$220,523	-4.8
	Fredericton suburban north	605	244	$212,668	2.4
	Outside Fredericton	1,228	401	$114,609	12.4
2013	Fredericton urban	344	134	$229,894	-16.9
	Fredericton suburban south	96	27	$259,589	17.7
	Fredericton suburban north	643	270	$194,066	-8.7
	Outside Fredericton	1,196	425	$107,328	-6.4

Notes:
* Data discussed includes some communities not included as part of the area of review.
Source: Adapted from MLS® (2013)

Property types in the area of review are listed in Table 12.3 and shown in the land use mapbook (attached under separate cover).

Table 12.3 Property Types within the Area of Review

Property Category	Total Area of Properties (ha)	Number of Properties
Commercial	373	783
Farm	13,046	712
Industrial	1,480	284
Institutional	849	346
Recreational	2,969	603
Residential	12,822	12,446
Woodland	27,598	664

Source: SNB (2015)

Approximately 12,400 residential properties are located within 500 m of the river and headpond. Residents have benefitted from having access to, or a view of, the headpond from their residence. Additional benefits are derived from local biodiversity, water recharge and discharge, and recreational opportunities. Local recreational use of the headpond is evident from the extent of private infrastructure (*e.g.*, docks) in that area.

12.2.2.1.2 Parks and Protected Areas

Parks

The area of review includes public parks and associated public recreational access points, including boat launches and trail access (Figure 12.2). Mactaquac Provincial Park (525 ha) has a campground, two beaches, a golf course, and hiking and cycling trails. During the 2014 season, approximately 3,000 daily vehicle passes for entrance to the public beach were sold, which represented about 11,000 individual users (MacMullin, M., pers. comm., 2014).

York Centennial Park is operated by the Province of New Brunswick and is located off Route 105 on the banks of the headpond. It has a privately owned and operated aerial adventure park, which draws 12,000–15,000 visitors per season (LaViolette, M., pers. comm., 2014).

Kings Landing Historical Settlement is an outdoor historical museum situated on Route 102 near the community of Prince William. The settlement is a Crown Corporation of the Province of New Brunswick, under the Department of Tourism, Heritage and Culture, and is governed by a Board of Directors. It was created in the late 1960s to preserve some historic homes near the Saint John River that were displaced as a result of construction of the Station (GNB 2014b).

Protected Areas

The Nature Trust of New Brunswick, a charitable land trust dedicated to the acquisition of private lands to maintain biological diversity, has established three nature preserves within the area of review (NTNB 2012), as follows.

- Burpee Bar and Sugar Island: These are part of a group of islands, referred to as the Keswick Islands, located in the Saint John River between Fredericton and the Station. These islands are also identified as Environmentally Significant Areas (ESA), and are under the stewardship of the Nature Trust of New Brunswick. They are accessible only by boat. Burpee Bar was formerly used for agricultural purposes, such as pasturing cattle, and is known for the presence of rare plants (NTNB 2012).

- James C. Yerxa: This is a 3-ha nature preserve on the Keswick River, and is accessible by car. It supports large hardwood trees and numerous rare plants and birds (NTNB 2012).

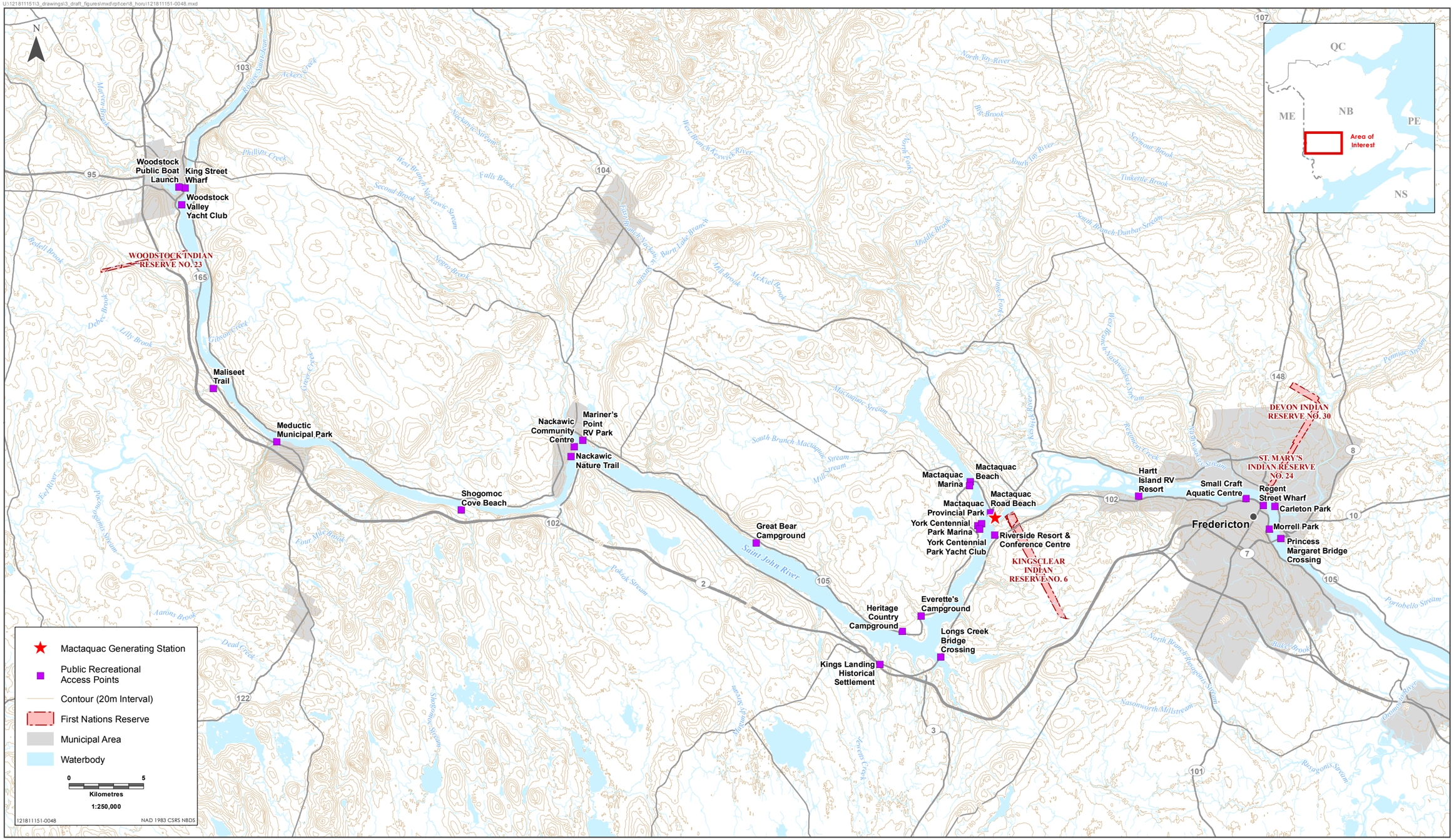
- Fredericton Wildlife Refuge: This site was established in 1962 as the Fredericton Game Management Area. It is bounded by the Bill Thorpe Walking Bridge and the Princess Margaret Bridge, and by the high water line on the east and west banks of the river (Pearce 2006). It is also identified as an ESA, and is located within a bird migration corridor. It is a popular area for birdwatching: 220 species have been recorded in the refuge (Pearce 2006). The City of Fredericton is responsible for managing the site, under the direction of the Department of Natural Resources (Pearce 2006).

12.2.2.1.3 Campgrounds

Mactaquac Provincial Park Campground is a popular destination for local residents and visitors offering approximately 300 serviced campsites. On average, these sites host three person-night stays. During the 2014 season, the campground occupancy rate was 62%. In 2014, 86% of campground visitors were New Brunswick residents, 13% were from other parts of Canada, and 1% were from the United States (MacMullin, M., pers. comm., 2014).

Several commercial campgrounds are located along the shores of the headpond (Figure 12.2). Some of these include Woolastook Family Park, Everett's Campground and Great Bear Campground near Queensbury, among others. Many offer recreational opportunities, including swimming, boat rentals and dock space for personal water craft. They are popular destinations for both campers and residents (McGarvie, A., pers. comm., 2014).

U:\121811151\3_drawings\3_draft_figures\mxd\rpt\cen\8_hori\121811151-0048.mxd



Base Data: Contours , First Nations Reserve and Roads are from Service New Brunswick and Waterbodies and Watercourses data from New Brunswick Department of Natural Resources. All data downloaded from GeoNB.
Project Data: Digitized from New Brundwick Conservation Council - http://www.conservationcouncil.ca/our-programs/freshwater-protection/saint-john-river-mapping/

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Stantec

121811151 - Mactaquac Project - NB Power

Public Recreational Access Points

Figure 12.2

12.2.2.1.4 Trails

New Brunswick has a well-developed network of multi-use trails. The New Brunswick Trail and the TransCanada Trail both pass through the area between Fredericton and Woodstock. In addition, many municipalities have their own path/trail networks that are suitable for all users. Recreational activities on the trail systems include walking, hiking, cycling, cross-country skiing and snowshoeing (Jorgenson, P., pers. comm., 2014).

Six official trails are located within Mactaquac Provincial Park, including a wheelchair-accessible trail along the Old Beaver Pond Trail. The trails range in difficulty, and are shared by many different non-motorized recreationalists, including hikers, cyclists and cross-country skiers. Some parts of the trails can be used by snowmobilers (Jorgenson, P., pers. comm., 2014).

During the winter, the New Brunswick Federation of Snowmobile Clubs (NBFSC) uses the headpond as a connector between the provincial and local trails, at four crossing locations (Figure 12.3). Two are located on the headpond, upstream of the Station, between it and the Mactaquac Provincial Park Marina (Figure 12.3). They connect the NBFSC Provincial Trail No. 44 with NBFSC Local Trail No. 733. The other two crossings are located at the headpond in Woodstock, and connect NBFSC Provincial Trail No. 44 with NBFSC Local Trail No. 441. The headpond crossings are currently the only safe connectors between the provincial and local trails (Antworth, R., pers. comm., 2014).

12.2.2.1.5 Recreational Fishing

Recreational fishing refers to angling, sport fishing, and other non-commercial fishing activity. According to the Survey of Recreational Fishing in Canada, most active anglers in Canada are residents who fish within their home province or territory (DFO 2010). Catch data and fishing efforts are collected and reported for the Province as a whole, but not for regions or fishing areas (Seymour, P., pers. comm., 2014). Resident angler participation rates in New Brunswick increased from 43,382 in 2005 to 52,770 in 2010 (DFO 2010).

The Province is divided into eight Recreational Fishing Areas (RFAs). The area of review is located in the Lower Saint John RFA (RFA 6), which includes all lakes, rivers and streams of the Saint John River drainage and tributaries downstream of the covered bridge at Hartland to the Saint John harbour bridge. Fishing is prohibited downstream of the Station, between the Station and a boundary created by the Springhill Brook (GNB 2014c).

The Saint John River watershed supports 53 fish species, and the lower Saint John River (Woodstock to Saint John) has the highest freshwater fish diversity east of Québec (CRI 2011). The lower reaches of the river near the City of Fredericton experience two runs of striped bass every year (McFarlane, R., pers. comm., 2014). The Mactaquac Stream Basin (also known as the Mactaquac Arm) is a popular

fishing location (Blanchard, D., pers. comm., 2015). Small boats can easily travel back and forth through the large culvert under the Route 105 causeway.

Recreational fishing in the lower Saint John River and headpond generally focuses on smallmouth bass, trout and muskellunge (commonly known as muskie). Fishing for Atlantic salmon is prohibited in RFA 6 (GNB 2014c). Catch and release fishing for smallmouth bass, an invasive species, in the river system is a popular pastime. Several smallmouth bass tournaments are held each year between the communities of Nackawic and Woodstock (McFarlane, R., pers. comm., 2014) and downstream in Fredericton. Open season for trout fishing within the Saint John River extends from April to September, except in reservoirs such as the headpond where it is open from May to September. Fishing for trout is limited to a daily bag and possession limit of 2 to 5 per day, depending on the type of trout caught and the recreational fishing area (GNB 2014c).

The recreational fishery for muskie is growing. Muskies, an invasive species, occur within the Mactaquac headpond, and to a lesser extent downstream of the Station in the lower section of the Saint John River. These areas are becoming an increasingly popular destination for recreational angling for muskies (McFarlane, R., pers. comm., 2014).

12.2.2.1.6 Other Recreational Activities and Facilities

The Riverside Resort and Conference Centre is located in the community of French Village, near the Station (Figure 12.2). It is on 35 ha of leased land on the banks for the headpond. The resort facilitates recreational activities because it is near Mactaquac Provincial Park and its marina and beach. Additionally, the resort provides its own dock space to guests.

The Royal Canadian Sea Cadets (RCSC) is a program run in partnership with the Navy League of Canada and the Department of National Defence. The RCSC has historically used York Centennial Park and the headpond for training activities, including watercraft operation, diving and safety. The RCSC is planning to move its facilities to a new location, on Route 105 near the Mactaquac Provincial Park marina, by summer 2015 (Sandwith, N., pers. comm., 2015). TreeGo is an aerial adventure course located in York Centennial Park. TreeGo, opened in 2009 and averages approximately 12,000 to 15,000 visitors during an average season (LaViolette, M., pers. comm., 2014).

12.2.2.1.7 Hunting, Trapping and Harvesting

The area of review encompasses portions of provincial Wildlife Management Zones 15 and 16 (Figure 12.3). Wildlife Management Zone 16 follows the Saint John River along its western boundaries, and is considered prime hunting territory for white-tailed deer (Currie, R., pers. comm., 2014). In 2013, 757 deer were harvested; this was a 34% increase from 2012, and a 70% increase from 2011. In addition to large and small game hunting, waterfowl hunting occurs, typically in agricultural areas near waterbodies and wetlands at the mouth of the Keswick River and in some areas of Mactaquac Arm near the community of Jewetts Mills (Currie, R., pers. comm., 2014). A variety of migratory waterfowl, including duck and goose, are hunted in the area surrounding the Keswick Islands

(McAllister, S., pers. comm., 2014). Many hunters use the wetland area and agricultural property along the shoreline of the river downstream of the Station to hunt geese. Trapping also occurs in parts of the Keswick Islands (Currie, R., pers. comm., 2014).

Fiddlehead (ostrich) fern (*Matteucia struthiopteris*) is common in the Saint John River valley. This traditional country food is most abundant in wet areas and islands along streams and rivers, and is considered a seasonal local delicacy. It tends to thrive in riparian areas along moving water where the pH is moderate and the water table is high (Quinn, G., pers. comm., 2015). In several locations along tributaries to the Saint John River, this species grows in sufficient quantities that it can be harvested for personal use and local sale. The lower reaches of the Keswick River, including the island complex at its mouth, provide high-quality habitat for this species. Locals harvest the fiddleheads in this area during the spring. Fiddlehead harvesting is a local tradition, and has become a source of income for some residents (McAllister, S., pers. comm., 2014). Specific locations for fiddlehead harvesting are typically closely guarded by harvesters.

12.2.2.1.8 Agriculture

Agricultural activities are often concentrated near rivers because fertile land generally occurs on river floodplains (Kinnie, B., pers. comm., 2015). Approximately 700 properties in the area of review are designated as farmland; they cover approximately 13,000 ha (SNB 2015). Mixed farming is the most common, but there are some dedicated dairy, pasture, horticultural, and vegetable farms (SNB 2015). Most farmland upstream of the Station on the headpond is used for hay farming. Immediately downstream of the Station (an area commonly referred to as the interval), hay is farmed from June to August (Black, P., pers. comm., 2015). Further downstream, in the Keswick Islands, several thousand hectares of farmland are used for growing corn, soybeans and various types of cereals (*e.g.*, barley, wheat) (Kinnie, B., pers. comm., 2015).

Farmland identified through property attribute data is classified as either abandoned or non-abandoned. The number of active farms in the area of review is unknown.

Soils in the Saint John River Valley consist primarily of clay. They can withstand dry periods, typically without irrigation. Additionally, commodity-type crops (*i.e.*, crops sold in bulk) typically grown along the Saint John River and headpond do not require irrigation. However, when irrigation is required, it can alter the physical environment through changes in terrain and drainage patterns (Kinnie, B., pers. comm., 2015).

12.2.2.2 Navigation and Marinas

Recreational boating within the Saint John River and headpond is a popular pastime for many residents and visitors, and is strongly linked to other activities, such as fishing, waterfowl hunting, and tourism.

Several public recreational access points are located within the area of review (Figure 12.2). Common routes travelled by boaters within the headpond include the area surrounding Mactaquac Provincial Park and coves located along the river (*e.g.*, Wheelers Cove, Jewett's Cove and Steeple Cove near Kings Landing). A variety of motorized and non-motorized watercraft, including sailboats, ice boats, pontoon boats and house boats, use the river and headpond. In addition, guided boat tours and day adventure camps take place along their shores (City of Fredericton n.d.). Additionally, more than 200 tributaries flow into the headpond, including the Meduxnekeag River, Longs Creek, Kellys Creek, Nackawic Stream, and the Mactaquac Stream Basin (formerly the Mactaquac Stream). Many of these tributaries are currently navigable and used by boaters (Bulmer, S., pers. comm., 2014).

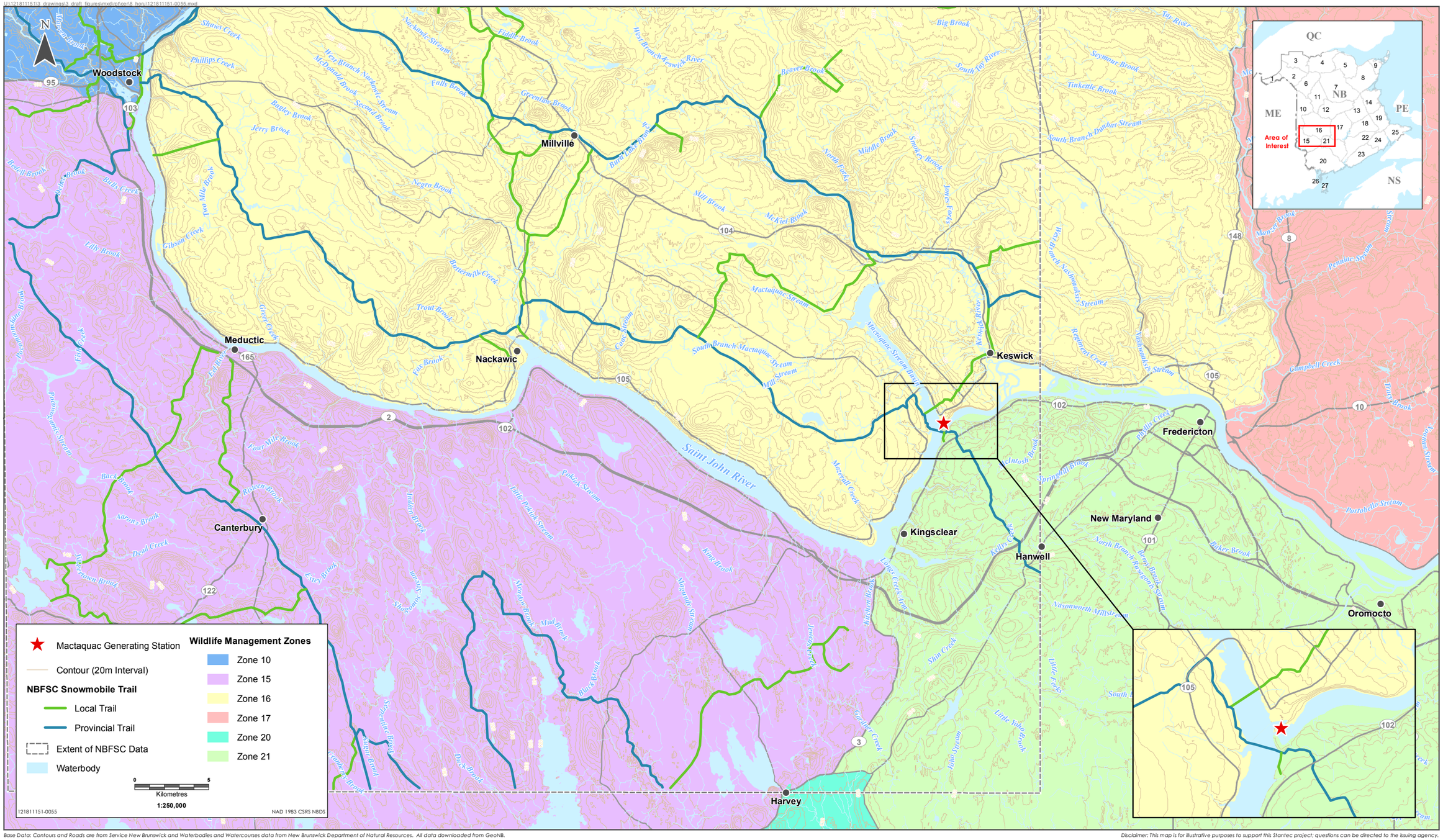
York Centennial Park Marina is located off Route 105 on the shore of the headpond, a few kilometres south of the Mactaquac Park entrance. The marina is home to the Mactaquac Sailing Association, which hosts monthly races on the headpond. The watercraft used are mostly sailing vessels that range in size from 6 m to 9 m, and require a minimum depth of 1.2 m (Bulmer, S., pers. comm., 2014). The marina has a docking system with nine boat slips, open docking area, 30 moorings, a secured area to store dinghies and tenders, two boat sheds with lockers, a sheltered common area, and an eating space.

Mactaquac Provincial Park has a privately operated marina, located off Route 105 near Mactaquac Beach. The marina hosts 120 boats, on average, during the season, and is generally at capacity for seasonal members. Lakehouse Boat Rentals is also located at the marina, and conducts its boat rental pickups and drop-offs at this location.

Woodstock marina is located on the Saint John River and is operated by the Woodstock Valley Yacht Club. The marina has more than 30 large and 28 small berths. The river and marina are in constant use by recreationalists during the summer (Harding, K., pers. comm., 2014). The marina also hosts three major fishing tournaments every year. Many tournament participants spend 2–4 days, on average, in the Woodstock area during each tournament. Fishing activity is discussed in Section 12.2.2.1.2, while fish and fish habitat is discussed in Section 8 (aquatic environment).

The Regent Street Wharf (RSW) is located on the Saint John River, downstream of the Station, within the City of Fredericton. Seasonal dock and mooring space is available to members and visitors from June to September. The RSW is co-owned by the City of Fredericton and Downtown Fredericton Incorporated, and is managed by the Capital City Boat Club (CCBC). The RSW provides dock space to members of the CCBC, which currently has 60 members. Seasonal membership at the RSW is currently at capacity; an additional 61 m (200 feet) of dedicated visitor dock space is reserved for nightly visitors (Sheppard, R., pers. comm., 2014).

U:\121811151\3_drawings\3_draft_figures\mxd\rpt\cen\8_hgn\r121811151-0055.mxd



Base Data: Contours and Roads are from Service New Brunswick and Waterbodies and Watercourses data from New Brunswick Department of Natural Resources. All data downloaded from GeoNB.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Stantec

121811151 - Mactaquac Project - NB Power

Wildlife Management Zones and Snowmobile Trails

Figure 12.3

12.2.2.3 Community

The Saint John River, and particularly the headpond, have created and promoted a number of land use opportunities that may not have existed if it were not for the construction of the Station, which has contributed to the structure and dynamics of the communities in the area. The community of Mactaquac has become a resort area. Its many features make it an appealing destination for people who want to buy a primary or secondary residence or have access to a broad range of activities. Thousands of homes are situated along the Saint John River and Mactaquac headpond between the city of Fredericton and town of Woodstock (SNB 2015). Waterfront properties, similar to those found adjacent to the headpond are often considered to be a desirable property location, and are less common, making them high in demand (Otteson, D., pers. comm., 2014).

The presence of the headpond is thought to be closely linked to the structure and dynamics of the communities along its banks, reflected in the sense of community felt by local residents near the headpond. This is reflected in the type of businesses (*e.g.*, campgrounds) presence of recreational infrastructure (*e.g.*, marinas, beaches), creation of communities (*e.g.*, town of Nackawic) and presence of heritage features (*e.g.*, Kings Landing Historical Settlement) along the headpond. Together, these features contribute to the appeal of the area, and are closely tied to the character of its communities.

12.3 SUMMARY OF STANDARD MITIGATION FOR HUMAN OCCUPANCY AND RESOURCE USE

Construction activities are often incompatible with recreational and other land uses. For all Options, safety exclusion zones will be required to manage access to construction sites. These zones will be consistent with existing safety exclusion zones for the Station and associated facilities.

Option 1 or Option 2 will include substantial construction and demolition activities over approximately 10–11 years. As a result, additional measures for managing the interaction between the construction labour force and land and resource use will be considered. Final mitigation measures will be evaluated based on the size of the workforce, chosen alternative, and level of disturbance.

Due to the strong link between resource use and the environmental components that are the focus of land use activities (*e.g.*, hunting and fishing), human occupancy and resource use will rely on the mitigation measures presented in the following sections:

- Section 4: atmospheric environment;
- Section 5: acoustic environment;
- Section 8: aquatic environment;
- Section 10: wildlife and wildlife habitat
- Section 11: economy and employment; and
- Section 13: infrastructure and services.

12.4 POTENTIAL INTERACTIONS BETWEEN HUMAN OCCUPANCY AND RESOURCE USE AND THE OPTIONS

Table 12.4 provides an overview of how each Option might interact with human occupancy and resource use.

Table 12.4 Potential Interactions between Human Occupancy and Resource Use and the Options

Phase	Option 1			Option 2			Option 3		
	Potential Change in Land and Resource use	Potential Change in Navigation	Potential Change in Community	Potential Change in Land and Resource use	Potential Change in Navigation	Potential Change in Community	Potential Change in Land and Resource use	Potential Change in Navigation	Potential Change in Community
Construction (New facilities, Option 1 or Option 2)	✓	✓	NI	✓	✓	NI			
Demolition (Existing structures, Option 1 or Option 2)	✓	✓	NI	✓	✓	NI			
Operation (Option 1 or Option 2)	✓	NI	NI	✓	NI	NI			
Decommissioning (Option 3)							✓	✓	✓

Notes:
✓ = Potential interaction.
NI = No interaction.
Shaded cells are not applicable to the particular Option and phase.

Changes in navigation are not anticipated during operation activities for Option 1 or 2. There will likely be no interaction between these Options and navigation beyond that which currently exists.

Changes in community are not anticipated for Option 1 or 2. The headpond and existing transportation links will be retained for these Options, with the structure and dynamics of the community remaining largely unchanged except for short-term disruptions caused by construction and demolition. Consequently, the communities along the banks of the headpond, and activities associated with the Saint John River and headpond, will be unchanged. Therefore, changes in community for Option 1 or 2 are not anticipated.

All Options hold the potential to result in changes to land and resource use in the area of review.

Additional potential interactions for Option 1, 2 or 3 are discussed below.

12.4.1 Potential Change in Land and Resource Use

Because Options 1 and 2 include many of the same activities and are of similar nature and duration (Option 1 duration is approximately 11 years; Option 2 duration is approximately 10 years), the potential interaction between land and resource use and Option 1 or Option 2 is expected to be similar for both options. They are thus evaluated together, below.

12.4.1.1 Option 1 or 2

The presence of the headpond and shore areas has helped shape recreational, industrial and commercial land use activities in the area. Construction of the Station resulted in physical changes in the river, which created opportunities for recreational activities (*e.g.*, boating, sailing, swimming and fishing) and the operation of associated infrastructure (*e.g.*, marinas). However, constraints and limitations, such as marked safety exclusion zones and setbacks that prohibit boaters and other users from approaching the Station, have resulted in some limitations on the extent of these activities in the immediate vicinity of the Station (Blanchard, D., pers. comm., 2015). These exclusion zones are well known to boaters and recreational users of the headpond, and do not represent an important concern with respect to the use of the headpond or river for such purposes. NB Power has installed a series of yellow buoys marking the exclusion zone near the headpond infrastructure, to alert boaters of dangerous conditions in this area.

Under Option 1 or 2, commercially-zoned land on the right bank of the Saint John River (currently consisting of a large gravel parking lot and lookout area) will be removed and will be rezoned as industrial land. This disturbance has the potential to displace recreational users and other uses in this immediate area, including the use of this area as a common lookout point to the headpond and Station.

Both Options 1 and 2 may also affect the Riverside Resort and Conference Centre and associated facilities on the right bank near the Station, on a temporary or permanent basis. The resort is a tourism destination, and facilitates recreational activity and overall use of the area. During operation, other public recreation access points near the resort will continue to be available. Accordingly, this change in land use is expected to have only a small interaction with land and resource use beyond the immediate area of construction activities. The implications for tourism-related accommodations are discussed in Section 13 (Infrastructure and Services).

Options 1 and 2 are expected to create nuisance-type interactions (*e.g.*, noise, vibration, and dust) during construction and demolition (*e.g.*, blasting events), but they will be incidental to disturbances from other activities. As discussed in Section 4 (Atmospheric Environment), no exceedances of the ambient air quality (*e.g.*, dust) are predicted at nearby receptors (*e.g.*, dwellings). Due to the infrequent and short-term nature of blasting noise, the magnitude of this interaction will be low (Section 5, Acoustic Environment). Area residents will be given advanced warning of blasting activities, which will reduce annoyance levels. Consequently, while Option 1 and Option 2 interactions with land and resource use due to noise, vibration, and dust emissions are anticipated to be negative, they will affect a small geographic area, will occur multiple times and last for a medium amount of time (*i.e.*, three months to a year) during the construction phase, but should not cause a long-term nuisance or loss of enjoyment of property at nearby residential receptors. Standard mitigation practices will be implemented during

activities that are expected to result in temporary exceedances of ambient air quality and increased noise; they are discussed in Section 4 (atmospheric environment) and Section 5 (acoustic environment).

Two NBSFC snowmobile trail crossings are located on the headpond. One crossing is located on the headpond in Woodstock. The other, the NBFSC Provincial Trail crossing immediately upstream of the Station, is one of only two crossings that connect the south and north sides of the Saint John River. It is also the last official crossing of the river until the mouth of the Bay of Fundy (Figure 12.3). Under Option 1 or 2, access to the snowmobile trail crossing located immediately upstream of the Station could be temporarily or permanently affected or removed. However, ample space will continue to be available to extend or move the trail location outside of the newly disturbed area which will allow snowmobile enthusiasts the ability to safely cross the headpond. NB Power will engage with the NBSFC and other users about developing appropriate mitigation measures.

Under Option 1 or 2, recreational boaters will continue to have access to the headpond outside of the exclusion zones and sufficient space will continue to be available to travel on the headpond between the community of Woodstock and the Station. Mitigation measures will include clearly marked set-back areas to delineate exclusion zones based on accepted industry practices (*i.e.*, the use of buoy markers), as regulated by Transport Canada. Following construction and demolition, Option 1 or 2 will provide the same level of recreational opportunities as current operations.

During operation, Option 1 or 2 will allow current land and resource use practices to occur. Access to property and current land use (*e.g.*, residential, commercial, and agricultural land uses) will be maintained. As there would be little change to the headpond for Option 1 or 2, residential land will maintain its aesthetic appeal, and views of the water will remain largely intact. Any loss of recreational land use will be mitigated by the availability of alternative locations that will provide continuous access to the headpond.

Changes in property values as a result of Option 1 or 2 will be temporary, if they occur at all. They will occur during construction and demolition, and will involve primarily nuisance-type interactions, such as loss of access to properties adjacent to activities.

In summary, Option 1 or Option 2 will interact with a variety of uses within the immediate area of construction and demolition activities; however, relatively few changes will occur beyond the area to be directly disturbed to make way for the new facilities associated with Option 1 or Option 2. Construction and demolition will prevent public access to the areas of the site that will be earmarked for the new facilities during these activities; however, alternative locations provide public recreational access within the area upstream of the Station. Though Option 1 and Option 2 interactions with land and resource use will be negative, they will occur only temporarily (occurring only during construction and demolition), they will be low in magnitude, and will extend into the immediate area surrounding the Station and its new facilities. Once construction and demolition is complete, interactions with land and resource use would return to largely what exists today, with the exception of the new exclusion zones associated with the new facilities.

12.4.1.2 Option 3

Option 3 activities associated with decommissioning of the structures and rehabilitation of the land has the potential to create the same nuisance-type concerns relating to dust, noise, and vibration as Options 1 and 2. These can be mitigated through proper planning and implementation of standard mitigation techniques, and as such are expected to be low in magnitude and extend to the immediate area surrounding the Station.

Option 3 would result in the removal of the headpond, which would change the nature and character of the landscape in the area considerably, both physically and aesthetically. This change would affect land use activities, experiences, and opportunities upstream of the Station. While changes of the landscape from a lake-like environment in the headpond currently, to a river-like environment following the removal of the Station, could be seen as positive to some, it is generally thought that most residents and users would view the change negatively as their way of life, use of the land and resources, and the opportunities these uses bring would be lost, or at least disrupted, temporarily or permanently. Changes in the Saint John River downstream of the Station are also anticipated to occur from Option 3, but these changes would likely be less pronounced than those upstream of the Station, and would be largely limited to changes in water levels and flows that would mostly occur seasonally.

Removal of the Station and the subsequent alteration of the landscape have the potential to affect property values in the area. However, the interaction between dam removals and the resulting changes in property values has not been widely studied (Kruse and Ahmann 2009). Headponds commonly enhance property enjoyment (*e.g.*, recreational use). Property owners that have direct access or views of the headpond could experience a change in property value, either real or perceived. Properties located in areas where the integrity and use of the headpond will experience a permanent change, or where water levels decline to a point where current use of the headpond is no longer possible (*e.g.*, areas that may become impassable by larger vessels) will likely be affected differently than those areas that experience a less pronounced change (*e.g.*, properties located further upstream, toward the town of Woodstock). It is also unclear how the Station removal will affect neighbouring communities.

Determining potential changes in property values is challenging because numerous variables influence the market which, in turn, affect property value. Access to, or a view of, the Saint John River and headpond may enhance property values, and influence some buyers to purchase such property. However, other factors, such as neighbourhood characteristics (*e.g.*, distance or availability to quality educational institutions), social and economic characteristics (*e.g.*, property tax), physical characteristics (*e.g.*, age and type of home), recreational characteristics (*e.g.*, parks), and economic and general market trends also affect property values. The result is a complex mix of factors that, individually or collectively, influence property values, but ascribing a cause-and-effect relationship between one specific factor and increases or declines in property values is difficult. Generally speaking, dwellings located close to waterbodies tend to have higher insurance premiums than those in other areas due to a perceived or real increase in the risk of flooding. However, insurance premiums are based on a number of variables, not just proximity to water (Cho *et al.* 2006). More expensive houses tend to be built on waterfront locations; available information does not separate land value from the value of the home (Rouwendal *et al.* 2014).

As discussed in Section 6 (surface water), removal of the Station could allow for increased movement of ice downstream, potentially resulting in floods from ice jamming. Floods and ice jams can cause extensive damage, particularly if left unmitigated. Increased flooding downstream of the Station could affect land and property owners. Ice movements and flood forecasts are currently monitored by the New Brunswick Emergency Measures Organization during the spring freshet, and it would be expected that they would pay particular attention to areas downstream of the current Station in their River Watch forecasting and related activities.

Option 3 will allow the headpond to drain into the Saint John River, and will restore the portion of the Saint John River valley currently covered by the headpond to a conditions similar to those that existed before the Station was constructed. The headpond facilitates resource-based industries (*e.g.*, recreation, fisheries, and agriculture). Option 3 would re-expose the land that was flooded to create the headpond as it reverts to a river environment. Under Option 3, water levels immediately upstream of the Station will decline substantially. This will be evident throughout the headpond area, but most pronounced between the Station and the town of Nackawic. As a result, it may not be possible to conduct some recreational activities at their current locations or levels in the headpond. This newly exposed land will be covered with some sediment. Some excavation or remediation could be required if the sediments contain contaminants or if they pose a particular health or aesthetic concern (*e.g.,* dust, odour) as vegetation takes hold over the newly exposed sediments (which typically begins to re-establish within one or two growing seasons). The exposed area would be allowed to re-vegetate naturally to the extent possible; however, some tree planting or hydroseeding would likely be required in some areas that may be prone to substantive negative change (*e.g.,* erodible shorelines, unstable banks). Locations farther upstream in the headpond (*e.g.,* Woodstock) may experience some change, though likely more limited than immediately near the Station.

The two NBSFC crossings located on the headpond between the Station and the Mactaquac Provincial Park marina (Figure 12.3) connect the provincial and local trails on both sides of the river and headpond. According to the NBSFC, the crossing locations are strategic because the frozen lake provides the safest way to cross. Frozen waterbodies that are free flowing, such as rivers, and smaller waterbodies, such as streams, do not offer the same level of safety (Antworth, R., pers. comm., 2015). Dewatering of the headpond would not force the removal of the crossings, but could affect their safety.

Agriculturalists use the headpond water for irrigation. Following dewatering of the headpond, there may be a need to develop additional infrastructure for irrigation. However, the newly exposed land will be partially reclaimed, which may provide an opportunity for increased agriculture in the area. This would be considered when evaluating the possibility of re-vegetating the reclaimed area. Agricultural users will be engaged throughout this process.

Changes in land use activities that are associated with the headpond will be both positive and negative, and high in magnitude. Change in land use and access will be permanent, continuous, and will affect a large geographic area. Mitigation in the form of engagement with affected land users is suggested. Some recreational activities and opportunities will still be able to continue, but will likely require adjustment according to the change in landscape.

12.4.2 Potential Change in Navigation

Because Options 1 and 2 include many of the same activities and are of similar nature and duration (Option 1 duration is approximately 11 years; Option 2 duration is approximately 10 years), the potential interaction between navigation and Option 1 or Option 2 is expected to be similar for both options. They are thus evaluated together, below.

12.4.2.1 Option 1 or 2

Construction of the Station increased the water level upstream of the dam by approximately 35 m above the normal level of the Saint John River. The resulting headpond is approximately 97 km long and ends approximately 15 km upstream of the town of Woodstock, near Hartland. Construction of the Station restricted vessel travel along the length of the river by creating a barrier to navigation at the dam and an associated exclusion zone near the dam. Under Option 1 or 2, water levels will not be lowered below current operational limits during construction, and the current flow regimes would likely be maintained during operation.

During construction and demolition of Option 1 or 2, navigation will be interrupted only in a safety exclusion zone near the active construction areas that will be largely consistent with existing safety exclusion zones for the current operation of the Station. This interruption will be limited to the construction phase and, therefore, will be short term and low in magnitude. Long-term navigation both upstream and downstream of the Station is expected to remain largely the same as currently during operation. Under Option 1 or 2, the continued presence of the dam and Station will continue to maintain a barrier to continuous navigation on the Saint John River at Mactaquac, and the existing safety exclusion zones will remain in place, but users are already used to these restrictions and thus present no incremental change to navigation on the Saint John River beyond those occurring currently.

Water levels in the headpond during operation will be similar to those at the existing Station: the maximum water elevation will remain at approximately 40 m. Therefore, levels of the Saint John River are expected to be largely similar to current levels, although variations in the daily or seasonal discharge may change because newer and more efficient equipment would be used. Interactions are therefore considered to be neutral, low in magnitude, and limited to the site. Operating practices may be updated based on improved understanding of the interaction between flows and the environment.

12.4.2.2 Option 3

Decommissioning activities associated with Option 3 will temporarily affect navigation in the immediate area of the Station. A safety exclusion zone similar to that proposed for Option 1 or 2 will be required. This zone will be similar to existing operations-related restrictions on navigation.

Over the long term, Option 3 will cause changes in surface water flow as water levels in the headpond and adjacent tributaries are lowered; these include Mactaquac Stream Basin, Walinaik Cove, Hammond Brook Basin, McNally's Cove, Kellys Creek Basin, Culliton Cove, and Shogomoc Cove, among others (Figure 12.2). Lower water levels will make some areas of the River or its tributaries impassable for some of the larger vessels that are currently used on the headpond, particularly during dry conditions. Additionally, some structures (*e.g.*, buildings, bridges, railroads) in the headpond area were flooded following construction of the Station; remnants of those structures that pose a navigation hazard will be removed once the headpond has been dewatered.

Under Option 3, the dam and the Station will no longer be a physical barrier to navigation, and navigation on the Saint John River would likely resemble pre-dam conditions. Downstream of the Station, some temporary sedimentation-related navigation limitations may occur for a short period following dewatering. Seasonal changes in river flow may also cause navigation limitations in some areas, particularly in the drier summer months. Despite this, navigation downstream of the Station would be expected to improve generally due to increased connectivity to upstream portions of the River.

NB Power will continue engagement with area users regarding the changes that would likely result from Option 3 as they relate to the navigability of the river and its tributaries. This will also be managed by the *Navigation Protection Act* (*NPA*) permitting process in place for Schedule 2 waterways, as applicable.

12.4.3 Potential Change in Community

12.4.3.1 Option 3

The Saint John River and headpond are seen as natural and cultural resources, with historical importance. The headpond is important for recreation, agriculture, and tourism. As a result, the area and its facilities and infrastructure have special value, and provide an important component of the overall sense of community. The community of Mactaquac, in particular, is known for its recreational appeal and is a desired location for homes and cottages.

Place attachment is defined as a complex creation of social and individual interactions and meanings that inform how people perceive the world around them (Amsden *et al.* 2011). Place attachment can include direct experiences with landscape features, and can be based on what a particular feature or place represents. As a result, community can be built on direct experiences. While creation of community requires interaction between its residents, it is not required for place attachment, which can be established through interactions with the natural and human-made environment. The Saint John River and Mactaquac headpond provide important resources and features for local communities. Their presence has encouraged the creation of other recreational features and services.

The Saint John River and headpond have contributed to the social capital of the area. Social capital is based on a sense of community and shared sense of identity (Australian Bureau of Statistics 2002). The presence of the river and headpond add to the quality of life for residents by facilitating active and passive recreation, providing educational opportunities (*e.g.,* RCSC training facility) and economic benefits (*e.g.*, tourism). The creation of the headpond has facilitated recreational and commercial development; expenditures by visitors to the area have created employment and income.

Community members typically identify beauty of landscape, social elements of the local community, solitary and social recreation, friends and family, home and tourism as contributing to feelings of attachment to a particular area (Amsden *et al.* 2011). Similarly, socio-demographic characteristics, such as sense of community, have a positive effect on quality of life, and people who live in small towns tend to self-identify as having a better quality of life than their urban counterparts due to a stronger sense of community (De Piccoli *et al.* 2013). Sense of belonging to the community and perception of connection (*e.g.*, social relationships that created community) have a positive effect on quality of life (De Piccoli *et al.* 2013). In the case of Mactaquac, although most residents feel a strong sense of community and attachment to the headpond and the resources and opportunities it brings, many residents asserted during engagement opportunities for the CER that they still carry considerable feelings of loss from when their families and ancestors were displaced from the Saint John River valley to make way for the headpond and Station. Many fear the extent of change that might result from Option 3 would exacerbate already strong opinions in this regard and cause further disruption.

Literature reviewed discussing sense of community and place consider how sense of place can be created through a variety of community features and opportunities (*e.g.*, recreation) (Amsden *et al.* 2011). Based on much of the literature, it can be expected that the recreational opportunities provided by the headpond are strongly linked to the sense of community in the area. Removal or disruption of the headpond, and the change in overall aesthetics of the area, will have a negative interaction with the sense of community. This interaction will be limited to the region and will be continuous and long term. However, as occurred when the area was first flooded, it is expected that residents and users will adapt to the new conditions, over time, and will find new ways to identify with the character and feel of the area as the new conditions become more and more familiar and as new or existing opportunities for recreation and other uses of the area arise.

12.5 SUMMARY OF INTERACTIONS BETWEEN HUMAN OCCUPANCY AND RESOURCE USE AND THE OPTIONS

Table 12.5 summarizes potential interactions between human occupancy and resource use and each of the Options.

Table 12.5 Summary of Interactions between Human Occupancy and Resource Use and the Options

Key Issues	Is the interaction negative or positive?	What is the amount of change?	What is the geographic extent?	How long does the interaction last?	How often does the interaction occur?	Has additional mitigation been recommended?
Potential Change in Land and Resource Use						
Option 1: Construction, demolition and operation	Negative	Low	Area	Medium	Multiple	Yes
Option 2: Construction, demolition and operation	Negative	Low	Area	Medium	Multiple	Yes
Option 3: Decommissioning	Negative/Positive	High	Region	Permanent	Continuous	Yes

Table 12.5 Summary of Interactions between Human Occupancy and Resource Use and the Options

Key Issues	Is the interaction negative or positive?	What is the amount of change?	What is the geographic extent?	How long does the interaction last?	How often does the interaction occur?	Has additional mitigation been recommended?
Potential Change in Navigation						
Option 1: Construction, demolition and operation	Negative	Low	Site	Short	Multiple	No
Option 2: Construction, demolition and operation	Negative	Low	Site	Short	Multiple	No
Option 3: Decommissioning	Negative/Positive	High	Region	Permanent	Continuous	Yes
Potential Change in Community						
Option 3: Decommissioning	Negative	High	Region	Long	Continuous	Yes

KEY

Is the interaction negative or positive?
- Positive.
- Negative.

What is the amount of change?
- Low – a change that remains near existing conditions, or occurs within the natural variability for human occupancy and resource use.
- Medium – a change that occurs outside the natural variability for human occupancy and resource use but does not change the overall status of human occupancy and resource use.
- High – a change that occurs outside the natural range of change for human occupancy and resource use that will change the status of human occupancy and resource use locally or regionally.

What is the geographic extent?
- Site – the interaction is limited to the immediate area where Project-related activities occur.
- Area – the interaction is limited to the general area surrounding the Station.
- Region – the interaction occurs throughout the area of review and may extend to other regions.
- Province – the interaction affects the entire province.

How long does it last?
- Short – the interaction occurs for less than 3 months.
- Medium – the interaction occurs for 3 months – 1 year.
- Long – greater than a year.
- Permanent – there is no foreseeable end-date for the interaction.

How often does it occur?
- Single – the interaction occurs once.
- Multiple – the interaction occurs several times, either sporadically or at regular intervals.
- Continuous – the interaction occurs continuously.

Has additional mitigation been recommended?
- Yes.
- No.

Note:

[1] Some of the ratings for the environmental interactions in the table above have been updated from those provided in the Draft CER Report dated September 2015 (Stantec 2015b), to more accurately reflect the nature and extent of the anticipated interactions with the Options and to reflect feedback received during the public comment period.

12.5.1 Summary of Additional Potential Mitigation and Information Requirements

As described in Section 12.4, this review has identified the potential requirement for some additional potential mitigation and requirements for further study in some areas. These potential requirements are summarized in Table 12.6.

Table 12.6 Summary of Additional Potential Mitigation and Information Requirements

Option	Additional Potential Mitigation	Additional Information Requirements
Option 1: Construction, demolition and operation	• Limitations on land use activities and use of recreational vehicles by construction employees. • Consider the use of a work camp. • Rotational work force. • Engagement with all users regarding potential loss of land use, associated infrastructure and opportunity.	• None
Option 2: Construction, demolition and operation	• Limitations on land use activities and use of recreational vehicles by construction employees. • Consider the use of a work camp. • Rotational work force. • Engagement with all users regarding potential loss of land use, associated infrastructure and opportunity.	• None
Option 3: Decommissioning	• Engagement with all users regarding potential loss of land use, associated infrastructure and opportunity.	• Property value market analysis. • Further information on sense of place/sense of community at Mactaquac.

The mitigation noted above can be used to contain a large, non-local workforce and establish controls that manage the interactions between the workforce and the human environment, including resource use activities. Policies can be put in place to limit activities such as hunting and fishing on-site, as well as unmonitored use of ATVs or boats. The implementation will be evaluated based on the size of the labour force, chosen alternative and level of disturbance

12.5.2 Discussion

Option 1 or Option 2 will change land use in the area immediately surrounding the Station from commercial and recreational to industrial. Construction will require rezoning the area on the south side of the Saint John River, immediately adjacent to the Station. Construction, demolition and operation associated with Options 1 or 2 will prevent public access to the specific area where new facilities are to be built and will require use of the right bank of the Saint John River (*i.e.*, on the south side of the river). Construction of the new facilities may affect the operation of the Riverside Resort and Conference Centre, and restrict public access to that area, including the snowmobile trails. Additionally, navigational exclusion zones currently in place would remain, or increase slightly particularly near the new facilities on the south bank of the river. These changes in land use and navigation will be neutral to negative in the long term. However, for both of these Options, the Saint John River and headpond will continue to provide recreational opportunities, including several public access points and navigable waters.

Dewatering associated with Option 3 will eliminate the headpond, and changes in the flow regime are expected particularly upstream of the Station where the water level will drop as the lake-like environment of the headpond converts to a river-like environment. Some changes to downstream flow regimes may also occur, particularly during the warmer summer months, potentially affecting navigation. It is assumed that the past landscape is a fair predictor of what the future landscape of the area occupied by the headpond could be. While the river will be navigable without the current barrier

presented by the Station, some areas that have been navigable following the construction of the Station, specifically tributaries that flow into the headpond, are not expected to remain navigable during times of low water, and thus will reflect pre-dam conditions.

12.5.3 Assumptions and Limitations

This review assumed that pre-dam conditions provide an adequate representation of post-dam surface water flow, depth and channel width. However, predictive modelling and detailed field data collection are needed to confirm this assumption. In addition, the format of historical aerial imagery did not permit detailed GIS analysis of pre-dam conditions to be made, but it was used to give an indication of pre-dam wetted width and water depth conditions. The advancement of engineering studies for Option 3 have considered many of the necessary shoreline interventions needed to reduce interactions with land and resource use upstream and downstream of the Station.

Additional information is required to fully assess potential changes in property values along the banks of the headpond. Once a Preferred Option is selected, a thorough market analysis should be conducted by a third party firm with expertise in property value, in conjunction with industry professionals (*e.g.*, real estate professionals and appraisers).

Limited research has been conducted on the social environment related to dam removal. Decisions to proceed with a particular project have the ability to affect people as much as the environment. As a result, project decisions are dictated not only by physical, biological and economic factors, but also on public perceptions, attachments and experiences (Heinz Center 2002). Refer to the Social Impact Comparative Review for additional discussion of the potential changes in the communities surrounding the Saint John River and headpond.