Chapter 8
2. Northern Uplands Ecoregion

The Northern Uplands Ecoregion arcs across northernmost New Brunswick between the two separate portions of the Highlands Ecoregion. Its northern edge borders the lower Restigouche River and Chaleur Bay, and its east side follows the geological contact between flat-lying sedimentary rocks and rugged igneous landscape. The ecoregion climatically is intermediate between the colder Highlands Ecoregion and the slightly warmer and wetter Central Uplands Ecoregion. Its vegetation and fauna consequently display a mixture of northern and southern affiliations that give the area an ecologically distinctive character.
Geology and Landscape

The Northern Uplands Ecoregion comprises an assortment of Ordovician to Devonian metasedimentary rocks interfingered with granitic and volcanic rocks. The western half is dominated by a broadly uniform terrain of calcareous and non-calcareous metasedimentary rocks. The eastern area forms a quilt of mainly igneous rocks that end abruptly at the huge wedge of Carboniferous sedimentary rocks that cover much of central and eastern New Brunswick.

Elevations in the region average about 150 to 300 meters, but descend from 522 meters at the summit of Blue Mountain down to sea level at the Chaleur Bay coast. The landscape generally is highest along the curved boundary with the Highlands Ecoregion and then dwindles gradually towards the coast. As a result, many slopes in the region have a northerly aspect — that is, they face north — which plays a significant role in determining local climate and vegetation.

The landscape has been deeply marked and incised by many legendary New Brunswick rivers: the Restigouche, Upsalquitch, Tetagouche, Jacquet, Northwest Miramichi, and Sevogle. These waterways and their tributaries subdivide the crescent-shaped region with a network of waterways that flow briskly down from the uplands towards Chaleur or Miramichi bays. Ancient glacial deposits along the Tetagouche River valley have blocked the flow of water sufficiently to create a chain of three small lakes; lakes otherwise are quite rare in the region.

Climate

The average annual temperatures of the Northern Uplands Ecoregion are warmer than in the adjacent Highlands Ecoregion, due to slightly lower elevations and a proximity to Chaleur Bay. Even so, the higher ground away from the Chaleur coast can be bitterly cold in winter. The region has roughly the same range of latitude and
elevation as the warmer Central Uplands Ecoregion, yet experiences a cooler overall climate. This is probably because its mainly north-facing slopes receive less solar exposure (and hence have lower ambient temperatures) than the largely south- and west-facing slopes of the Central Uplands Ecoregion. Much of the Northern Uplands Ecoregion lies in the rain shadow of the mountainous Gaspé area of Quebec, and is markedly drier than the Highlands Ecoregion. Wildfire has been a regular occurrence here, due in part to the lower precipitation.

Forest Cover

Forests of the Northern Uplands Ecoregion show some affinities with the Valley and Eastern Lowlands ecoregions, owing to its dry climate; however, the cooler temperatures limit the distribution of species that commonly occur in those regions. Tolerant hardwoods such as sugar maple and yellow birch occur with some beech on well-buffered soils and along the hilltops at lower elevations. The more southerly species of ironwood and white ash are extremely scarce here. Cedar also can be found on calcareous soils in the warmer, northern ecodistricts.

The ecoregion encompasses the northern range limit of red spruce, beech and hemlock, all of which can be found at lower elevations. Black ash and balsam poplar form a distinctive association on river floodplains in the ecoregion.

As one moves inland and toward the higher elevations, coniferous cover becomes more prevalent. Forest of balsam fir with black spruce and white spruce dominate in areas of poor, volcanic-derived soils such as occur around the headwaters of the Benjamin and Jacquet rivers, and near Blue Mountain and Rocky Brook. Some river valleys feature white pine, red pine, and jack pine alongside the spruce and fir. White pine and trembling aspen are particularly common in these ecodistricts.

One notable site in the Upsalquitch River valley shelters an extensive stand of red pine accompanied by poplar and white pine with some largetooth aspen. The location seems to have been a ‘hotspot' touched repeatedly by fire which, over time, encouraged the plentiful germination of these fire-adapted species.

The coniferous forests shelter a typical boreal assemblage of ground vegetation such as wood-sorrel, wood fern, and wild lily-of-the-valley. The stands of sugar maple, beech, and yellow birch are testament to a more moderate climate than the Highlands
Ecoregion. Even so, these stands lack the characteristic understory species found in more southerly locations including spring beauty, bellwort, trout lily, and Christmas fern.

**Wetlands**

The wetlands of the Northern Uplands Ecoregion appear mainly as narrow zones alongside streams and rivers, dominated by a tangle of shrub swamp but often grading into marsh. Shallow open water wetlands tend to occur in proximity to ponds and streams nearer the coast. The eastern ecodistricts support several large peatlands, while salt marshes also can be found associated with some coastal estuaries. Of note are the marshes at the mouth of Restigouche River, home to several rare plant species and valuable habitat for migrating and nesting waterfowl.

2.1. **Upsalquitch Ecodistrict**

The Upsalquitch Ecodistrict lies in northern New Brunswick adjoining Québec and is separated from that province by the Restigouche River. The ecodistrict has a western panhandle that extends south through the village of Kedgwick River.

**Geology**

Bedrock in the north and the west areas of the ecodistrict is dominated by Ordovician calcareous and argillaceous metasedimentary strata with small intrusions of Devonian granitic rock that occur in the vicinity of Squaw Cap Mountain. The remainder of the terrain is underlain by an assemblage of northeast-trending Silurian to Devonian sedimentary rocks that are interbedded with mafic and felsic volcanic rocks. The sedimentary lithologies consist mainly of shale, siltstone and greywacke with limestone. Some of the calcareous Silurian rocks are particularly soft, whereas others are slightly more resistant to erosion.

Two major northeast-trending faults intersect the ecodistrict and are part of a regional structural pattern that has influenced the flow direction of rivers and lakes.
Landscape and Climate

The landscape is etched by two major rivers: the Restigouche and the Upsalquitch. Together, they help to delineate a central plateau that lies roughly southwest of the Upsalquitch River and southeast of Boland Brook.

The Restigouche River passes through the village of Kedgwick River to drain the panhandle area before reaching the northwest border of the ecodistrict, at which point it is joined by the Patapedia River. Million Dollar Pool occurs at the juncture and reportedly is the most important salmon pool on the Restigouche River system. After the pool, the Restigouche continues on its way to Chaleur Bay, tracing the Quebec-New Brunswick border.

The Upsalquitch River begins in the southeast extremity at Upsalquitch Lake, then travels northwest gathering tributaries until it reaches Upsalquitch Forks. There, it joins the Northwest Upsalquitch river, which drains the southwest terrain, and, united, they rush downhill to meet the Restigouche in a tremendous confluence near Robinsonville.

Several lakes dot the terrain including Upsalquitch Lake and Popelogan Lake, which are associated with rivers of the same name. The bottom of the latter lake is covered in places with a deposit of marl, a highly calcareous clay material that can be used for a variety of commercial purposes.

This upland ecodistrict forms a geographic interlude between the even more rugged ecodistricts of the Highlands Ecoregion. Although its average elevation is only 300 meters it peaks at about 470 meters along the headwaters of Ritchie Brook. The many tributaries of the Restigouche, Northwest Upsalquitch and Upsalquitch rivers have incised the landscape continuously over geological time by as much as 180 m into a corrugation of steep, parallel gulches and ravines.

The ecodistrict has a moderately cold, wet climate and lies partially in the rain shadow of the Kejwik Ecodistrict in the Highlands Ecoregion. Average temperatures increase slightly across the area from east to west.
Soils

The soils of moderate to low inherent fertility are those associated with interbedded metavolcanic and metasedimentary bedrock. The metagreywackes comprise sandy loams with a high gravel content that belong to the McGee Unit and cover upper elevations in the central plateau area. Those obtained from argillite produce finer textured Victoria Unit soils and are found near Menneval.

The eastern terrain is overlain by soils derived from moderately calcareous sandstone, siltstone and slate. They are a mixture of non-compact tills of the Thibault Unit, plus compact tills of the Kedgwick Unit, and possess intermediate fertility.

The richest soils derive from argillaceous limestone and belong to the Caribou and Undine units. They occur intermittently in the central plateau along the Northwest Upsalquitch, Popelogan and Restigouche rivers. These deep, fine-textured, relatively neutral soils provide ample nutrients, rooting depth, and moisture for plant growth.

Biota

A combination of strong relief and high fire frequency has resulted in a diverse forest cover. Many of the upper slopes (7) in the central plateau support a mixed-forest community of balsam fir, sugar maple, red maple, yellow birch with occasional white spruce and beech.

The calcareous plateau (5c) along the mid-section of Upsalquitch River is dominated by a mixed community of sugar maple, balsam fir, yellow birch and beech. Limestone ridges (7c) tend to support tolerant hardwoods, and also host unusual calcareous-loving plants.

On poorly-drained calcareous soils such as flatter areas in the Restigouche and Upsalquitch river valleys (6c), mixtures of black spruce, white spruce, balsam fir and cedar prevail. On Interval soils subject to spring flooding (6f), balsam poplar and black ash are added to this mixture.

The steep valley slopes (4, 2c) more commonly support coniferous forests of balsam fir and white spruce with some white pine and black spruce. Within these forests is a provincially endangered plant called pine drops.

In the large areas of forest that were burned during the 1930s, balsam fir and white spruce often occur beneath an overstorey of Grass-of-Parnassus is uncommon in New Brunswick but is often seen on calcareous shores in the Upsalquitch ecodistrict. Debby Peck photo.
intolerant hardwoods. The 1934 Restigouche fire affected about 745 sq km in the centre of the ecodistrict, creating an extensive cover of early successional growth with trembling aspen and white birch on all ecosites. Harvesting disturbances also have contributed to the propagation of these pioneering species.

Several interesting stands of pine occur in the Upsalquitch area. One is a knoll of century-old white pine northwest of Upsalquitch Forks. As well, banks of Upsalquitch River in places are covered with red pine and white pine stands.

The 55 km stretch of the Restigouche River between Jardine Brook on Little Main Restigouche and Million Dollar Pool received Canadian Heritage River status in 1998. Part of this stretch is within the Upsalquitch ecodistrict. Larry’s Gulch in the designated zone hosts rare plants on its wet shaded limestone cliffs, including a small fern called the Northern Woodsia.

Osprey occasionally can be glimpsed along riverbanks in this ecodistrict, whereas American pine marten and the Canada lynx prefer to roam the more secluded corners of this and other northern ecodistricts.

**Settlement and Land Use**

The name *Upsalquitch* derives from the Mi’kmaq apsetkwechk meaning ‘little river’, referring to the river’s size compared with the larger Restigouche River. The Upsalquitch Ecodistrict lies within the traditional Mi’kmaq territory of Gespegeog. For at least 2500 years before European contact, aboriginals used the land regularly for hunting expeditions and for overland travel between the Saint John and Restigouche rivers. The salmon-rich Restigouche River was a primary source of food and a major transportation route.

Europeans began to establish trading posts and salmon fisheries in the coastal area around the mid-1600s. A village at Atholville down the coast was settled in the 1700s, but the more upriver villages such as Tide Head and Flatlands seem not to have been established much before the early 1800s.

Lumbering activities also began in the late 1700s, then escalated dramatically after the 1825 Miramichi Fires forced timber barons to move their focus northward into Restigouche country. By
1850 much of the large pine and spruce have been felled for ship masts, but numerous local sawmills continued to process the smaller logs being floated down the Upsalquitch and Restigouche rivers.

The lumbering communities of Kedgwick at the confluence of the Kedgwick and Restigouche rivers, and Upsalquitch on the Upsalquitch River, were almost the only inland settlements in the ecoregion until the 1910 completion of the International Railway between Saint-Léonard and Campbellton. The railroad encouraged the growth of several railside communities such as Menneval and Felix Gulch.

Today, the ecoregion’s few residents rely largely on tree harvesting, sawmills, and outfitting activities for their livelihood. Copper, lead, zinc, gold, silver, and uranium prospects have been discovered in the area over the last century but are not yet considered to have commercial potential.

### 2.1. Upsalquitch Ecoregion at a Glance

Ecoregion: Northern Uplands

Area: 330,157 ha

Average elevation above sea level: 278 m

Average May–September precipitation: 475–500 mm

Average annual degree-days above 5°C: 1300–1450

**96% of Upsalquitch Ecoregion has forest cover**

**4% of Upsalquitch Ecoregion is not forested**

**Land uses of non-forest area**

- Wetland: 45%
- Agriculture: 9%
- Roads: 21%
- Other: 13%
- Developed: 13%
### Ecosite Map Legend

- **ecosite**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
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- **ecosite modifiers**
  - c (calcareous)
  - o (organic)
  - f (periodically flooded)
  - h (high elevation)
  - m (mining debris)
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#### Percent cover of forest stand types by ecosite

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**Vertical axis**: BS—black spruce; JP—jack pine; PINE—white pine; SP—white spruce; BF—balsam fir; HWSW—intolerant hardwood and softwood species; EC—eastern white cedar; HWTH—intolerant hardwood and tolerant hardwood species; THSW—tolerant hardwood with softwood species; TH—tolerant hardwood species. **Horizontal axis**: percent cover.

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**2.1. Upsalquitch Ecodistrict**
2.2. Tetagouche Ecodistrict

The Tetagouche Ecodistrict is situated in northern New Brunswick. It is a transitional area between the highlands of Ganong and Upsalquitch ecodistricts to the west and the lower terrain of the Tjigog Ecodistrict to the east.

**Geology**

The bedrock here appears in three basic divisions: a southern plateau of volcanic and metasedimentary rocks, a central wedge of sedimentary and metasedimentary strata, and a northern plateau of volcanic and metasedimentary rocks. Several regional northeast-trending faults offset the bedrock, the largest being the Rocky Brook-Millstream Fault. The southern plateau encompasses the area south of the Tetagouche River and is composed mainly of highly deformed Ordovician felsic and mafic volcanic rocks, with some calcareous metasedimentary rocks. The northern plateau lies north of the Jacquet River and is underlain by Silurian volcanic and metasedimentary rocks.

Between the northern and southern plateaus — that is, between about Jacquet River and Tetagouche River — lies a wedge of diverse rock types. Devonian and Silurian metasedimentary rocks predominate, but are partially covered by much younger Pennsylvanian conglomerates and sandstones that surround two of the three Tetagouche Lakes.

**Landscape and Climate**

The Jacquet and Tetagouche rivers transect the ecodistrict from west to east en route to Chaleur Bay and, together with their tributaries, are the ecodistrict’s most obvious landscape feature.

The Jacquet River begins gently enough at source, but before long gathers enough momentum to sculpt the bedrock deeply into gorges that at some locales drop over 200 m. The river’s south-flowing tributaries tumble down from the northern plateau into the main stream through a series of shadowed gulches.

The Tetagouche River lies further south flows more gently than
does the Jacquet River. This has enabled a necklace of three small glacially influenced lakes to widen along its length: the Upper, Middle and Lower Tetagouche. Only after leaving Lower Tetagouche Lake does the river gain enough energy to noticeably incise the bedrock and develop rapids. Other lakes in the area include Black Lake, known for its extremely cold summer temperatures, and California Lake.

New Brunswick has two Blue Mountains. One occurs in this ecodistrict, and the other lies just east of Tobique River on the border of Wapske and Serpentine ecodistricts. Blue Mountain and Black Top Mountain preside over the northern plateau and are underlain by felsic volcanic rocks. The summit of Blue Mountain at 522 m is the highest point in the ecodistrict and, with its blanket of grey-blue conifers, lends a quiet grandeur to the terrain. Relief elsewhere is generally moderate except for where rivers have etched the bedrock.

The Tetagouche Ecodistrict is intermediate in elevation between the highlands of Ganong and Upsalquitch ecodistricts to its west, and the lowlands of Tjigog Ecodistrict to its east. The highlands of the Gaspé Peninsula create a partial rain shadow that gives the ecodistrict a moderately dry, cool climate. Average summer precipitation diminishes from west to east across the landscape.

Soils

Areas underlain by felsic volcanic rocks are associated with shallow stony soils of the Lomond Unit, which are present on hilltops such as the ridges southwest of Blue Mountain. Compact loams to sandy loams of the Popple Depot Unit are more prevalent along middle to lower slopes in felsic bedrock areas. Felsic volcanic rocks weather slowly to yield highly acidic soils of low fertility.

In areas underlain by mafic volcanic rocks, the upper slopes and hillcrests tend to be covered by shallow, non-compact tills of the Mafic Volcanic Unit, whereas the middle and lower slopes are blanketed by deeper, loamy soils of the Tetagouche Unit. Both units possess intermediate fertility. The sandy loam soils derived from non-calcareous metasedimentary rocks also have only moderate fertility.

Soils derived from calcareous siltstone and sandstone are associated with the Carleton and Thibault units and tend to be a
mixture of compact and non-compact loams. These fertile soils occur over the central wedge between Jacquet and Tetagouche rivers and also overlie the upper reaches of South Charlo River.

**Biota**

The northern plateau is covered by a widespread coniferous forest that consists mainly of balsam fir with some white spruce and black spruce (ecosite 2h). Lower McNair Brook east of Blue Mountain typifies a forest of this type. It has a balsam fir and black spruce canopy protecting succulent undergrowth, all thriving on a terrain intersected by narrow stream gorges with dramatic slopes approaching the vertical.

The acidic mid-slopes (5), and the lower slopes and flatlands (2), are composed mainly of spruce and pine. The acidic upper slopes (7) have a greater proportion of broad-leaved tree species with sugar maple, yellow birch in combination with balsam fir, white spruce, red maple and white birch. Beech reaches its climatic limit in the ecodistrict and is generally found only below elevations of 400 m.

In more calcareous regions, the mid-slopes (5c) have a strong balsam fir and mixed-forest component, whereas steeper valley slopes (2c) support black spruce and pine. Both coniferous and mixed forests occur on the slopes descending toward the Tetagouche Lakes.

Stands dominated by cedar with balsam fir, white spruce and black spruce are found on wet sites along rivers (6, 6c) and moist, gently sloping flatlands (3).

The intolerant hardwood community consists of white birch and trembling aspen, with balsam fir and occasional spruce.

**Settlement and Land Use**

The Tetagouche Ecodistrict lies within the traditional Mi’kmaq ecodistrict of Gespegeog. For at least the last 2500 years, aboriginals from the adjacent coastal communities used Jacquet River and other waterways to hunt, fish, and travel overland.

Some sources suggest that the name Tetagouche originated with the Mi’kmaq odoodooguech, meaning squirrel, although the relationship between river and rodent seems a little tenuous. Whatever its true derivation, the river and lakes were being called toutgouch (hence, Tetagouche) by 1686, shortly after French explorers began to visit the nearby coastal areas.

It is not known when Europeans initially ventured into the ecodistrict. The most likely initial inroad was Tetagouche River, and it
seems plausible that prospectors and others explored the river's upper reaches throughout the early 1800s. Lumbermen began to seriously exploit forests in the area at this time, starting along the most easily accessible river valleys.

Today, tree harvesting is conducted in the area by various Crown Land leaseholders. Temporary lumber camps aside, the ecodistrict is very sparsely populated. Mineral occurrences of base and precious metal deposits are scattered throughout the terrain, but appear concentrated in volcanic rocks of the Tetagouche Group.

### 2.2. Tetagouche Ecodistrict at a Glance

**Ecoregion:** Northern Uplands  
**Area:** 128,029 ha  
**Average elevation above sea level:** 350 m  
**Average May–September precipitation:** 450–500 mm  
**Average annual degree-days above 5°C:** 1400–1500
2.3 Tjigog Ecodistrict

Tjigog Ecodistrict is a crescent-shaped inland plateau in northern New Brunswick that parallels the shape of Chaleur Bay between Bathurst and Dalhousie.

Geology

The bedrock here occurs in two broad sections: a southern terrain of Ordovician volcanic and metasedimentary rocks, and a northern terrain of Silurian to Devonian volcanic and metasedimentary rocks, with intrusions of Devonian granite and gabbro. The landscape is intersected by a series of major and minor northeast-trending faults, the largest of which is the Rocky Brook-Millstream Fault.

The southern terrain extends south from Millstream River and is underlain by Ordovician rocks of the Tetagouche Group. These highly folded and deformed rocks consist primarily of felsic and mafic volcanic rocks with some non-calcareous meta-sedimentary rocks including schist, slate, and phyllite.

The terrain north of the Millstream River contains Silurian
felsic and mafic volcanic rocks with calcareous metasedimentary rocks. It also includes younger, Lower Devonian mafic volcanic and calcareous metasedimentary rocks. Both the Silurian and Lower Devonian lithologies have been intruded by Upper Devonian granitic and gabbroic plutons.

Sugarloaf Mountain near Campbellton represents a Devonian volcanic neck that became plugged with felsic lava during the final stages of volcanism.

**Landscape and Climate**

The Tjigog Ecodistrict represents an undulating plateau that reaches from the Nepisiguit River in the south to the North Charlo River in the north, beyond which the land drops abruptly to Campbellton and Chaleur Bay.

Waterways are a dominant landscape feature. Numerous streams and rivers interrupt the terrain as they race or meander downslope to Chaleur Bay. Many of the rivers display a northeasterly flow that reflects the regional trend of bedrock faulting.

The largest rivers — Jacquet, Tetagouche and Nepisiguit — have incised the bedrock in places to create breathtaking gorges. One of the more delightful spots is Tetagouche Falls where the Tetagouche River slides through a canyon before becoming a waterfall that tumbles over Ordovician slate and volcanic rocks.

The Upper Jacquet River and Lower South Branch Jacquet River have remote and inaccessible gorges that rise 350 meters in less than half a kilometre.

The largest lake in the ecodistrict is Antinouri Lake, which straddles a contact between a large Devonian granite pluton and Ordovician metasedimentary rocks. The relatively impermeable nature of the granite likely contributed to the lake’s formation. Nigadoo Lake, at the headwaters of the Nigadoo River, is notable for its depth (nearly 30 m).

The Tjigog Ecodistrict is transitional between the higher elevation Tetagouche Ecodistrict to the southwest, and the low-lying Nicolas Denys Ecodistrict to the northeast. Elevation dwindles from about 300 m in the west to 100 m in the east, but relief is otherwise minimal except where rivers deeply dissect the bedrock.

The climate here is somewhat warmer than in the higher elevation ecodistricts to the west, and is moderated by its proximity to Chaleur Bay. The land lies partially in the rain shadow of the highlands to the west and north (Gaspé peninsula) and so receives
medium to low precipitation during the growing season.

Soils

The mafic volcanic bedrock on hills and ridges south of Campbellton have produced stony residual soils of the Mafic Volcanic Unit, which are moderately fertile. Where calcareous sedimentary rocks underlie steep slopes, soils have developed as non-compact, sandy loams and loams of the Thibault Unit such as are present in the Jacquet River and Charlo River valleys. Where these rocks occur in gentler terrain, they develop as the compact, mostly finer textured tills of the Carleton and Kedgwick units.

Compact, medium-textured soils derived from a mixture of metasedimentary and igneous rocks and belonging to the Long Lake Unit dominate the southern section between the Tetagouche and Nepisiguit rivers.

Biota

The relatively warm waters of Chaleur Bay moderate the temperatures here, causing an extended growing season and encouraging species that otherwise would be less abundant at this latitude. A site just west of South Tetagouche, for instance, supports a grove of red oak which is uncommon in the north of the province.

The calcareous and moderately acidic upper slopes (7c, 7) are associated with mixed forests of sugar maple and yellow birch with balsam fir; beech becomes more dominant in the east. One such mixed forest occurs at Prichard Lake near Sugarloaf Mountain and features beech, ash, and Canada yew.

The steeper, dry slopes in calcareous areas (2c) such as along the Jacquet River support white pine and black spruce. Conversely, the strongly acidic mid-slopes (5) and flatlands (2) are blanketed by coniferous forests that commonly consist of balsam fir, red spruce and black spruce.

The ecodistrict’s widespread intolerant hardwood community reflects the combined influences of fire and logging and is typified by trembling aspen and white birch.

Cedar and black spruce are associated with wet flatlands and gentle slopes (3, 6). A fine representative cedar stand is located in a swamp just north of the Nepisiguit River near Bathurst Mines and contains century-old
eastern white cedar.

The Booming Grounds at Tide Head has been designated as an Eastern Habitat Joint Venture site and includes 118 ha of wooded alluvial islands, tidal wetlands, and shoreline. It provides shelter for migrating and nesting waterfowl, as well as habitat for great blue heron, osprey, and mammals. Uncommon plants within the designated area include Nuttell’s waterweed, creeping rush and yellow sanicle.

Settlement and Land Use

The Tjigog Ecodistrict lies within the traditional Mi’kmaq territory of Gespegeog. The aboriginal village of Tjigog was located near present-day Atholville and was a major pre-contact settlement for at least 2500 years. People lived on the coast for much of the year, spearing fish, gathering crustaceans, and hunting birds and seals.

In the middle to late 1700s, European traders were granted land in and around the aboriginal village site, forcing its original inhabitants to move elsewhere. Early British merchants established coastal settlements and erected salmon-pickling factories, taking advantage of the area’s location near the mouth of the Restigouche River with its bountiful salmon resources.

After the 1825 Miramichi Fires destroyed huge tracts of forest in central New Brunswick, lumbermen swarmed north into the Nepisiguit, Jacquet, and Tetagouche river valleys seeking easily accessible timber. Shipbuilding facilities and sawmills were erected at Campbellton and Atholville, and logging joined commercial fishing as an economic mainstay of the area. The 1875 completion of the International Railway from Saint-Léonard provided an additional economic boon, and turned Campbellton into a major railway centre. Campbellton and Atholville are now the major communities in the ecodistrict.

Forest lands in the area are presently held by two Crown Land leaseholders and several non-industrial and large private woodlot owners.

Between 1950 and 1982, dimension stone was quarried from a Devonian granite quarry at Antinouri Lake. It was used to erect several New Brunswick buildings including Notre-Dame-des-Sept-Douleurs Church in Edmundston.

The rocks here are rich in base metals and other economic minerals. Large-scale mining within the ecodistrict begin with the
opening of the massive Brunswick lead-zinc operation southwest of Bathurst in the 1950s. Today, the No. 12 is one of the largest zinc producer in the world.

2.3. Tjigog Ecodistrict

Ecoregion: Northern Uplands
Area: 159, 454 ha
Average elevation above sea level: 205 m
Average May—September precipitation: 400—450 mm
Average annual degree-days above 5ºC: 1450—1550
Ecosite Map
Legend

ecosite
1
2
3
4
5
6
7
8

ecosite modifiers
• c (calcareous)
• o (organic)
• f (periodically flooded)
• h (high elevation)
• m (mining debris)
• water

Percent cover of forest stand types by ecosite

Vertical axis: TH—tolerant hardwood species; TSW—tolerant hardwood with softwood species; HWTH—intolerant hardwood and tolerant hardwood species; EC—eastern white cedar; HWSW—intolerant hardwood and softwood species; BF—balsam fir; SP—red or white spruce; PINE—white pine; JP jack pine; BS—black spruce

Horizontal axis: percent cover.
2.4. Tomogonops Ecodistrict

Tomogonops Ecodistrict is a gently rolling portion of northeast New Brunswick that is transitional between the mountainous Ganong Ecodistrict to the west and the low-lying Red Bank Ecodistrict to the east.

Geology

Rocks in the Tomogonops Ecodistrict occur in two distinct physiographic areas, separated by a fault that trends southeastward across the ecodistrict beginning at South Little River Lake.

The northern section contains Ordovician metavolcanic and metasedimentary rocks of the Tetagouche Group and is intersected by a web of northeast-trending faults. The volcanic rocks include rhyolite, metabasalt and sericite schist; the metasedimentary rocks are non-calcareous and consist mainly of phyllite, slate, and greywacke.

The southern section covers the lower two-thirds of the ecodistrict. It is underlain primarily by Ordovician metasedimentary strata, mainly phyllite, metaquartzite, and metagreywacke. These rocks also belong to the Tetagouche Group but are slightly older than those in the northern division.

A band of metamorphosed Ordovician granite interrupts the metasedimentary terrain, forming a crescent-shaped body that parallels Guagus Stream and Mullin Stream Lake before trending northeast to Sheephouse Brook.

Landscape and Climate

The Tomogonops Ecodistrict is a zone of topographic transition between the Ganong Ecodistrict and the Red Bank Ecodistrict. The rugged hills along the western Tomogonops Ecodistrict border echo the highlands of Ganong Ecodistrict and average about 500 m in elevation. Moving eastward, the altitude drops steadily to about 140 m on the eastern boundary where the land merges with more...
Many rivers in the Tomogonops Ecodistrict — the North Sevogle, South Sevogle, Clearwater, Guagus, Northwest Miramichi, North Branch Renous and others — have their modest beginnings in the mountainous Ganong Ecodistrict. Gathering water and momentum as they tumble from the highlands, the rivers cross the border into Tomogonops, then journey east towards the same destination: the north-trending arm of Northwest Miramichi River, which lies just beyond the eastern margin.

During their passage from west to east, the rivers interact with bedrock and topography to create spots of remarkable beauty. One site, Square Forks, is so breathtaking that early naturalist William Ganong felt moved to describe it as ‘one of the most notable localities of New Brunswick’. Here, the North and South Branches of Big Sevogle River meet head-on in a gorge, and then turn their mingled waters together at right angles to flow into another canyon.

As might be expected in an inclined landscape of many rivers, waterfalls abound here. Just east of Peabody Lake, the North Sevogle passes through steep, rocky narrows in an impressive display of waterfalls and rapids. The Pallisades at the confluence of North Pole Stream and Little Southwest Miramichi River possess a myriad of small but thunderous waterfalls.

In 1989, Repap New Brunswick designated the Sheephouse Falls Nature Reserve along Sheephouse River, partly to recognize the locale's three picturesque waterfalls.

Lakes in this area are small and occur mainly in the western half of the terrain. They tend to overlie felsic volcanic rocks or granitic rocks, which are less porous than sedimentary strata and hence are more likely to retain water. One obvious example of the differential absorption can be seen at Mullin Lake, which is bound north and south by the bedrock contact between sedimentary and granitic rocks.

The transitional nature of the Tomogonops Ecodistrict is also evident in its climate. The ecodistrict is wedged between the cold, wet Highlands Ecoregion and the dry, relatively warm Eastern Lowlands. Its climate is a blend of the two, and is both moderately cool and wet.
Soils

The soil here is poor to only moderately fertile. The most common types are those of mixed igneous and metasedimentary derivation. Compact loams to sandy loams of the Long Lake Unit cover much of the southern section of the ecodistrict. Britt Brook Unit material is found on the lower slopes and valley bottoms, whereas Serpentine Unit soil usually frequents the upper slopes and crests. Soils of these units are coarse textured and droughty and are best tolerated by coniferous vegetation.

The least fertile and most acidic soils are those associated with areas underlain by felsic volcanic rocks. Soils of the shallow, stony Lomond Unit belong to this category, and cover hilltop sites in the extreme northwest part of the ecodistrict. Compact loams to sandy loams of the Popple Depot Unit are more prevalent along the middle to lower slopes, especially in the north.

Mafic volcanic rocks produce moderately fertile soils that are represented by the Kingston and Tetagouche units. The granitic gneiss around Mullin Lake has produced soils of the Tuadook Unit, which are fairly infertile and typically are associated with rolling hills.

Biota

The prevalence of acidic soil with low to moderate fertility has favoured a largely coniferous forest in this ecodistrict.

Acidic mid-slopes and flatlands (5, 2) have a high proportion of spruce-fir communities dominated by red spruce, balsam fir and black spruce. Dense balsam fir regeneration occurs in the west, notably north of Mullin Stream Lake where cool, moist climatic conditions resemble those of the adjacent Ganong Ecodistrict. Fir becomes less common along the steep dry slopes that line major valleys such as those of the Northwest Miramichi, Little Southwest Miramichi and Sevogle rivers.

A balsam fir forest along North Branch Big Sevogle River, upriver from Square Forks, is home to the silvery checkerspot butterfly.

Cedar and black spruce dominate the wet flatlands and gentle slopes (3, 6). A site located just north of the junction between Lower North Branch Little Southwest Miramichi and Little Southwest Miramichi River, for instance, supports large specimens of cedar and white spruce, accompanied by a rich diversity of plant understory species.
White pine occurs throughout the ecoregion, especially in the west. Conversely, beech is relatively abundant in eastern areas, but diminishes toward the west. Tolerant hardwood forests tend to have sugar maple, yellow birch and beech, and are associated with well-drained, rolling hills. One of the more unusual hardwood stands is at Peabody Lake and contains scattered red oak, an unusual species for the area.

The intolerant hardwood community here is represented by white birch, trembling aspen and red maple with balsam fir and red spruce. Another mature forest lies 5 km west of Sheephouse Falls Reserve. It has an almost pure sugar maple with a thriving population of broad-lipped twayblade in terrain frequented by bear, moose, osprey and barred owl.

Several species of orchids (*Platanthera* spp.) grow on the floodplains along Big Sevogle River about 5 kilometers east of Peabody Lake. The peaty shores at the northwest end of Mullin Lake are a haven for a rare twig rush. Guagus Lake also harbours rare plants including creeping rush and lesser bladderwort. Several rivers and their tributaries in this ecoregion contain salmon spawning grounds for the famous Miramichi salmon. Also in this ecoregion are significant populations of resident and sea-run brook trout.

**Settlement and Land Use**

The Tomogonops Ecodistrict lies within the traditional Mi’kmaq territory of Gespegeog and adjoins Red Bank Ecodistrict, which has been settled by aboriginals for least the last 2800 years. People from the Red Bank villages used the Tomogonops Ecodistrict for hunting, fishing, and overland travel to northwest New Brunswick. The word *tomogonops* is Mi’kmaq for *pipestone*. Early aboriginals visited this ecodistrict to quarry local deposits of sericite schist, which they carved into pipes.

The first Europeans reached the Tomogonops Ecodistrict sometime in the early 1700s. By the early 1800s, lumbermen were swarming across its valleys, using the rivers to reach stands of pine and spruce. The frenzy abated somewhat after the 1825 Miramichi Fires razed the area, then resumed a few decades later to feed hungry shipyards and sawmills in nearby Chatham and Newcastle (now called the City of Miramichi).

The rocks here contain many mineral deposits, several of which were formerly developed. The most recently active operation was the Heath Steele Mine located between the north and south branches of
Tomogonops River. The mine worked sporadically from 1957, producing primarily base metals, and closed in October 1999. The area's scenery and salmon-rich rivers have attracted visitors to canoe, fish, and hunt from the early 1800s to the present day. Several stretches of Crown Reserve Water allow many New Brunswickers access to high-quality salmon angling.

2.4. Tomogonops Ecodistrict at a Glance

Ecoregion: Northern Uplands
Area: 164,938 ha
Average elevation above sea level: 357 m
Average May—September precipitation: 450 – 500 mm
Average annual degree-days above 5°C: 1400 – 1550

91% of Tomogonops Ecodistrict has forest cover

9% of Tomogonops Ecodistrict is not forested

Ecosite coverage of forest area

Uses of non-forest area

agriculture 0%
other developed 6%
roads 20%
wetland 56%
water 18%
ecosite

c (calcareous)
o (organic)
f (periodically flooded)
h (high elevation)
m (mining debris)

Percent cover of forest stand types by ecosite

Vertical axis: TH—tolerant hardwood species; THSW—tolerant hardwood with softwood species; HWTH—intolerant hardwood and tolerant hardwood species; EC—eastern white cedar; HWSW—intolerant hardwood and softwood species; BF—balsam fir; SP—red or white spruce; PINE—white pine; JP—jack pine; BS—black spruce

Horizontal axis: percent cover.
2.5. Nicolas Denys Ecodistrict

Nicolas Denys Ecodistrict is a narrow, gently sloping strip of land that lies along the coast of Chaleur Bay. It stretches from the Dalhousie Peninsula southward to the Nepisiguit River mouth, at which point the river itself becomes the boundary.

Geology

The bedrock in this ecodistrict can be separated into a northern section and a southern section, separated by a major fault that transects the ecodistrict from Beresford to Val-Michaud. A third, tiny zone called the Elmtree Inlier is enclosed within the northern section and contains its own distinct suite of rocks.

The southern section is characterized by Ordovician metasedimentary and mafic volcanics of the Tetagouche Group. The metasedimentary rocks include phyllite, slate and metaquartzite, whereas the mafic volcanics are primarily metabasalt. A large stock of Devonian red granite intrudes the metasedimentary rocks west of Nepisiguit River and south of Bathurst.

Lithologies are more diverse in the northern section. The bedrock is composed mainly of Silurian and Devonian mafic and felsic volcanic rocks accompanied by calcareous and non-calcareous sedimentary strata of both ages. Deposits of younger, Pennsylvanian sedimentary rocks overlie the older rocks in the vicinities of Eel River Crossing and Nash Creek, and in a narrow band south of Bathurst.

The Elmtree Inlier forms a roughly circular pattern near the Madran and Elmtree rivers and includes gabbro, peridotite, and metasedimentary rocks. The assemblage represents a remnant of oceanic crust that was upthrust over continental crust during a major Ordovician mountain-building event, which accompanied the closing of a proto-Atlantic Ocean. Some of the Silurian and Devonian sedimentary rocks are fossiliferous. A careful perusal of shorelines at Chapel Point near Belledune and Stewart's Cove...
near Dalhousie will reveal corals, crinoids, gastropods, brachiopods and several other fossil specimens.

The red granite along Nepisiguit River was quarried irregularly from the 1860s to 1985 for material to erect some of the stone buildings in downtown Bathurst.

The Devonian volcanic rocks at Inch Arran Point near Dalhousie contain tiny vesicles that are filled with a range of unusual minerals including a white calcite that fluoresces bright pink under ultraviolet light.

The beach at Chapel Point contains sizeable pebbles of a pistachio-green mineral called epidote, some of which are suitable for polishing.

**Landscape and Climate**

Nicolas Denys Ecodistrict averages only 10 km wide and is the most subdued of all ecodistricts in the Northern Uplands Ecoregion. Its rock formations are similar to those of other ecodistricts, but are topographically much less dramatic than elsewhere in the ecoregion.

Elevations range from sea level or low coastal cliffs at Chaleur Bay up to a maximum height of about 150 m on the western boundary. Instead of highlands, there are several linear outcroppings including Black Brook Escarpment south of Dalhousie where a narrow resistant ridge of rock called diabase intrudes the landscape.

Many of the larger rivers have their exuberant origins elsewhere, but pass quietly through this ecodistrict to Chaleur Bay before discharging into a series of estuaries that teem with bird life. The Tetagouche, Jacquet, Nepisiguit, and Charlo rivers possess just enough energy to have moderately incised the landscape. In two instances—the South Charlo and Nepisiguit— they are decorated with waterfalls. Pabineau Falls on the Nepisiguit River south of Bathurst is one of the most beautiful features in the region and provides a popular recreation area for local residents and visitors. Lakes in the area are extremely
few. Pabineau Lake occurs south of Bathurst surrounded by relatively impermeable granitic bedrock. Mountain Brook Lake lies just west of Charlo and is blanketed on the bottom by one of the few marl deposits in New Brunswick. Marl is a soft, highly calcareous clay material that can occur as an unconsolidated layer in the bottom of lakes.

The climate here is relatively dry and cool, with temperature extremes that are moderated by Chaleur Bay.

**Soils**

The most fertile soils belong to the Carleton and Thibault units and comprise well-drained, medium- to fine-textured material derived from calcareous sedimentary rocks. These soils support the best quality tolerant hardwood stands.

Soils of moderate to good fertility can be found throughout the area and originate from three rock sources. Soils of the Holmesville Unit were derived from non-calcareous sedimentary rocks. Those of the Long Lake and Pinder units originated from a mixture of igneous and sedimentary lithologies. Areas of granitic and gabbroic bedrock coincide roughly with soils of the Tuadook and Kingston units.

Terrain underlain by felsic volcanic rocks weathers slowly to yield acidic soils of very low fertility. Well-drained soils of this type typify the Lomond and Jacquet River units and support forests of spruce, balsam fir, and white pine.

In addition to the above, small patches of marine glaciofluvial deposits occur adjacent to Chaleur Bay in areas underlain by Pennsylvanian sedimentary rocks. These range from the compact, fine-textured soils of the Tracadie Unit to the non-compact, coarse-textured soils of the Grand Falls Unit.

The more clay-rich, poorly drained soils of the Tracadie Unit tend to support cedar, tamarack, black spruce or, occasionally, black ash. Where well drained, they have been successfully cultivated for agricultural land.

**Biota**

The long history of human settlement has reduced the ecodistrict's formerly extensive coniferous forest cover to small patches of coniferous forests scattered in a predominantly mixed forest. The low, acidic flatlands (2) are now covered instead with a forest dominated by intolerant hardwoods such as trembling aspen, red maple, and white birch, with associated balsam fir, white spruce, and cedar representing the more tolerant coniferous climax
community. The acidic slopes (5) tend to support mixed forests of balsam fir, red maple, and cedar accompanied by sugar maple and yellow birch.

Black spruce and cedar grow on broad valleys and flatlands that are moderately to poorly drained (6, 3). In fact, this ecodistrict has a high overall frequency of cedar, due to the prevalence of calcareous soils. Sugar maple, yellow birch, and beech are less common, and generally accompany conifers on calcareous slopes (5c, 7c).

One characteristic feature here is the estuaries, tidal flats and salt marshes that have developed where its rivers meet Chaleur Bay in a confluence of salt water and fresh water. These diverse and vulnerable sites contain many unusual or rare species of flora and fauna.

The Maritime ringlet butterfly is found in only a handful of locales in the world outside Nicolas Denys Ecodistrict. This species and its habitat are protected under legislation. Local salt marshes also host the more common salt-marsh copper, another endemic species of butterfly.

Rare plants in the southern part of Nicolas Denys Ecodistrict include the northern comandra and the lepidocarpate sedge. Eel River Cove is a local birding spot and hosts the one of the few known provincial occurrences of the rare plant white water crowfoot.

Visitors in nesting season can watch freshwater birds in the cove, then turn seaward for a different view: small craggy islands which, up close, are raucous with seabirds, osprey, and great blue heron.

**Settlement and Land Use**

The Nicolas Denys Ecodistrict lies within the traditional Mi’kmaq territory of Gespegeog. The early Mi’kmaq were primarily a maritime people who inhabited this coastal area where fish, crustaceans, seals, and seabirds provided ample food sources.

Archaeologists have found abundant evidence of early aboriginal activity along the shoreline and lower Nepisiguit River dating back at least 4000 years. The most important village was Oinpegitjoig in Bathurst Harbour. The Nepisiguit River not only supplied salmon, but also served as a major overland route to Saint John River and Maliseet territory via connecting portages. Sweet grass, a sweet-smelling grass that is considered sacred and is used ceremonially by aboriginal people, grows in several locales in the

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The Maritime Ringlet butterfly. *Photograph courtesy of Reg Webster.*
ecodistrict.

Despite pre-1500s visits from European fishermen and explorers, the first non-aboriginal settlement did not arise until the 1600s. Evidence suggests that Jesuits established a mission at Point au Père in 1620, a year before the pilgrims landed at Plymouth Rock. The famous trader and explorer Nicolas Denys was among the first non-aboriginal settlers in the ecodistrict. In 1668 he retired to a fortified red sandstone house in Bathurst Harbour to write a book about the geography and natural history of North America.

Fishing, fur trading, farming, shipbuilding and sawmills supported the area throughout the 1700s and 1800s, with Dalhousie and later Bathurst as the major economic centers. Both towns entered a new industrial era in the 1920s with the construction of pulp and paper mills. Dalhousie depends largely on its pulp and paper mill for employment. Bathurst’s economic base includes mining, which began commercially with the development of the Brunswick lead-zinc deposits southwest Bathurst in the Tjigog Ecodistrict. The mine opened in the 1950s and operates in conjunction with the lead smelter at Belledune, another major regional employer. NB Power Thermal Generating Station is also located in Belledune and is a major employer in the region.

The Elmtree quarry located south of Madran produces limestone from remnants of an ancient coral reef complex that is about 400 million years old.

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2.5. Nicholas Denys Ecodistrict at a Glance

<table>
<thead>
<tr>
<th>Ecoregion: Northern Uplands</th>
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<tbody>
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<td>Area: 92, 443 ha</td>
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<tr>
<td>Average elevation above sea level: 72 m</td>
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<td>Average May-September precipitation: 350–450 mm</td>
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<td>Average annual degree-days above 5ºC: 1400–1600</td>
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### Percent cover of forest stand types by ecosite

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<th>TH</th>
<th>TSW</th>
<th>HWT</th>
<th>HWSW</th>
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<th>SP</th>
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</tbody>
</table>

Vertical axis: TH—tolerant hardwood species; TSW—tolerant hardwood with softwood species; HWT—intolerant hardwood and tolerant hardwood species; HWSW—intolerant hardwood and softwood species; BF—balsam fir; SP—red or white spruce; PINE—white pine; JP—jack pine; BS—black spruce

Horizontal axis: percent cover.
Our Landscape Heritage

2.5. Nicholas Denys Ecodistrict

Ecosite Map Legend

- ecosite
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8

- ecosite modifiers
  - c (calcareous)
  - o (organic)
  - f (periodically flooded)
  - h (high elevation)
  - m (mining debris)
  - water

Reference Map