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Rare Plant Inventory of Lower Saint John River Shorelines

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Report to New Brunswick Environmental Trust Fund and New Brunswick Wildlife Trust Fund

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Silky Dogwood (*Cornus obliqua*, S2), found at several sites on Belleisle Bay and Washademoak Lake, which represent the first Saint John River records for the species and are a 100 km disjunction from next nearest known locations on the Eel River south of Woodstock.

Introduction

The diverse shoreline and wetland habitats of the Lower Saint John River support an especially high diversity of provincially rare plants, including many largely or entirely restricted to those areas within New Brunswick. With the exception of recent Grand Lake Meadows fieldwork by the New Brunswick Federation of Naturalists (outside the area studied in 2008 or proposed for study in 2009) and a few environmental impact assessment studies covering very limited areas, no formal botanical surveys have been conducted in the immediate area we surveyed in 2008. Our prior knowledge of the study area's flora was thus based on sporadic local collecting efforts mostly undertaken 15 or more years ago.

Rare plant occurrence is a very important factor in the environmental assessment process by which significant land use questions are evaluated, but a lack of strong scientific evidence behind plant rarity ranks frequently makes those land use decisions more difficult. Our fieldwork has helped address this issue through the discovery and documentation of many new rare species locations and sites of high conservation value supporting concentrations of rare species. This information will be permanently stored in the AC CDC database where it will be accessed for species' conservation status re-assessment, land-use planning and other conservation purposes. Our use of randomized selection of survey sites also allows defensible estimation of the actual rarity of significant species observed at multiple sites over the entire study area, resulting in substantial improvements to the rare plant status ranks.

This project is likely to prove especially valuable over in the coming decades because land along the Lower Saint John River shoreline in the study region is among the most valued for recreational or rural residential development in all of New Brunswick. Regional shoreline development within the past 10 years has been extensive with much more likely in the near future, causing further impacts on rare species and habitats. Knowledge of rare species' status and specific locations will help mitigate these impacts.

Methods

Scope of work

Because we did not receive full funding for this project from the New Brunswick Environmental Trust Fund and the New Brunswick Wildlife Trust Fund we reduced the scope of work relative to the original proposal by removing the portion of work proposed for Grand Lake and by slightly reducing the amount of time spent looking for specific historic records of rare species from four separate days to two full days plus portions of two other days. The eight days of fieldwork surveying eight 10km shoreline segments of Grand Lake will be completed in 2009 under funding from the New Brunswick Wildlife Trust Fund and (pending confirmation) the New Brunswick Environmental Trust Fund.

Study Area and Site Selection

Our study area is mapped in Figure 1. It consisted of the Saint John River and its major bays and branches from the Gagetown Ferry downstream to Browns Flats. This area was divided into 2km segments as follows:

1) roughly 34km of river distance along the main Saint John River (Gagetown Ferry downstream to Browns Flats - 19 2km segments);
2) the entire 4km length of Otnabog Lake (two 2km segments);
3) 30km of Washademoak Lake from its mouth at the Saint John River upstream to the hamlets of Codys and Washademoak, including a 4km branch of Mill Cove, Washademoak Lake (17 2km segments);

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4) the entire 20km length of Belleisle Bay, including 2km of the Gorhams Creek and 4km of Kingston Creek bays (13 segments).

Twelve of the 51 2km segments above were randomly selected for field survey and these are indicated in Figure 1.

Field Coverage

We covered field sites between July 2 and August 21, 2008. Coverage was predominantly by AC CDC botanists Sean Blaney and David Mazerolle, with assistance at most sites from AC CDC Botany Technician Jesse McNicholl and at two sites by expert amateur botanist Jim Goltz. Table 1 indicates field days and observers at each site. Almost all shoreline at each site was covered on foot, with some shoreline that was very difficult to walk or with minimal likelihood of rare plant occurrence covered by canoeing as close to shore as possible. Extent of shoreline and ease of movement varied greatly across 2km segments. In most cases, both sides of a single segment were covered in a single day but some days two sites were completed while some sites required two days to complete. In all, we spent roughly 360 person hours (45 person days) on fieldwork, including travel and specimen processing, over 14 calendar days in the field. Two sites on Belleisle bay were revisited in late August at sites where potential Anticosti Aster (*Symphyotrichum anticostense*, which was not readily identifiable during early July visits), had been recorded. Roughly 200 person hours were spent covering sites in the field. Fieldwork was extended outside survey segments on Belleisle Bay near Hatfield Point and at Shampers Bluff to try to relocated particular historic locations of very rare plant species.

Each botanist kept GPS units on while in the field to precisely record area covered. We compiled full vascular plant species lists with a general abundance ranking for every species at each site. Te following four qualifiers were used to characterize the relative on-site abundance of species: *rare* – present in small numbers at very few locations; *uncommon* – present at roughly four or five sites in small numbers or one or two sites in large numbers; *fairly common* – widespread at the site but generally not in very high numbers; *common* – widespread at the site and present in large numbers.

For provincially rare species (those species with S-ranks of S1 to S3S4; S-ranks defined at www.natureserve.org/explorer/ranking.htm#globalstatus), we recorded locations by GPS, along with information on population size and extent, habitat and associated species. A majority of rare species occurrences recorded were also documented by voucher specimens that will be deposited at the Connell Memorial Herbarium at the University of New Brunswick, Fredericton and the New Brunswick Museum herbarium at Saint John. All species data (species lists by site with generalized locations and precisely documented rare species' records and non-rare species specimen records) will be permanently maintained in the Atlantic Canada Conservation Data Centre database.

Results

We recorded 60 provincially rare plant species from more than 600 locations in all, with rare species and the river segments on which they were observed, listed in Table 2. The successful outcome of our work came despite river conditions that were not what we had hoped for in planning our efforts. Many of the most interesting plants along the river are found in the zone that is covered by water in the spring and early summer (preventing establishment of many of the most common and competitive shoreline plants) and then exposed as water levels retreat later on. The wet spring and summer meant that river levels were consistently higher than average through the summer, with two major rainfall events raising those levels significantly. At the start of July, we were actually seeing Blue Flag Irises (*Iris versicolor*), normally a shoreline or very shallow water species of about 50cm tall, with their flowers under 15 cm of flood water. Some of the shoreline flora were thus less evident than they might be in a lower water year.

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Some of the most interesting rare species records are highlighted individually below.

Virginia Mountain-Mint (*Pycnanthemum virginianum*) was rediscovered at its only known site on a rocky shore of Jenkins Cove on Belleisle Bay. This species is known nowhere else in the Maritimes and had not been documented in New Brunswick since 1980.

Silky Dogwood (*Cornus obliqua*) was locally common on Belleisle Bay and Washademoak Lake around the margins of swampy woods and marshes and was also present at Otnabog Lake. Silky Dogwood is quite similar to the abundant and well-known Red-osier Dogwood (*Cornus sericea, =C. stolonifera*) but differs in having newly grown twigs covered in white silky hairs. It also reaches greater maximum heights (to about 3m) and has a duller purple-red colour to the twigs. It was previously known in New Brunswick only from the St. Croix and Eel Rivers 100 km further west near the Maine border.

Brookside Alder (*Alnus serrulata*) was found only on a short stretch of rocky shoreline on Otnabog Lake, near Queenstown. This species is also a bit tricky to distinguish from our common Speckled and Green Alders (*Alnus incana* ssp. *rugosa*, *Alnus viridis* ssp. *crispa*). It has leaves with a shiny upper surface that are consistently widest toward their tip and are not whitened beneath, and it is restricted to open or semi-open conditions along shores, usually in rocky areas. Like Silky Dogwood above, it was previously known in New Brunswick only from the St. Croix and Eel Rivers 100 km further west near the Maine border.

Four-leaved Loosestrife (*Lysimachia quadrifolia*), only known from the rivershores near the Kingston Peninsula in the Maritimes, was at a number of new sites on Belleisle Bay. At Shampers Bluff, we also found the first provincial record for the hybrid (*Lysimachia x producta*) of this species and the common Yellow Loosestrife or Swamp Candles (*Lysimachia terrestris*).

Stout Wood-Reed (*Cinna arundinacea*) was rediscovered near Hatfield Point on Belleisle Bay, one of only two sites known in New Brunswick, where it had not been seen since 1990.

Narrowleaf Sedge (*Carex grisea*) was found at four locations along Belleisle Bay, where it had been found at Hatfield Point in 1980 but not recorded since. It is known in New Brunswick from only two other recent sites further upstream on the Saint John River and from two historic and potentially extirpated sites near Sussex and Woodstock.

Columbia Water-Meal (*Wolffia columbiana*), this tiny floating aquatic plant was previously known only from the Saint John River near Fredericton. Jim Goltz discovered it in a pond on Long Island near Queenstown. Dwayne Sabine also collected it in large amounts on the upper Hampton marshes in 2008.

Anticosti Aster (*Symphyotrichum anticostense*) is a nationally and provincially listed species with Threatened status. Recent work, primarily by AC CDC, has found it to be more widespread in New Brunswick and will likely result in its down-listing after the next federal status report in preparation in the coming year. We found what appears to be this species at numerous sites on rocky shores of Belleisle Bay, with identifications to be confirmed by experts in the coming months.

In addition to these generally highly rare species, we found certain rare plants repeatedly at many sites to the point that their status ranks may warrant revision to lower levels of rarity. Table 3 lists nine species for which our 2008 records may produce changes in the New Brunswick S-ranks administered by the AC CDC or the General Status ranks administered by the New Brunswick Department of Natural Resources.

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All in all, our 2008 fieldwork on the Lower Saint John River has significantly increased our understanding of the flora of this important region for New Brunswick biodiversity and has greatly improved our understanding of the provincial status of certain rare plants. In documenting many very significant natural areas with data that will be entered permanently into the AC CDC database, our fieldwork also provides some of the baseline data necessary to justify their conservation.

Table 1. Survey segments with dates surveyed and observers. Segment numbers correspond to those mapped in Figure 1.

Segment	Survey Date	Observers
1	July 7, 2008	David Mazerolle, Jesse McNichol
3	August 4, 2008	David Mazerolle, Jesse McNichol
9	July 26, 2008	Sean Blaney, Jim Goltz
18	July 15, 2008	Sean Blaney, David Mazerolle, Jesse McNichol
28	July 17, 2008	David Mazerolle, Jesse McNichol
30	July 24, 2008	Sean Blaney, Jesse McNichol
30	July 27, 2008	Sean Blaney, Jim Goltz
39	July 8, 2008	David Mazerolle, Jesse McNichol
42	July 14, 2008	Sean Blaney, David Mazerolle, Jesse McNichol
47	July 2, 2008	Sean Blaney, David Mazerolle
50	July 3, 2008	Sean Blaney, David Mazerolle
52	July 3, 2008	Sean Blaney, David Mazerolle
54	July 9, 2008	David Mazerolle, Jesse McNichol
50	August 6, 2008	David Mazerolle, Jesse McNichol
54	August 6, 2008	David Mazerolle, Jesse McNichol
47	August 21, 2008	David Mazerolle, Jesse McNichol
52	August 21, 2008	David Mazerolle, Jesse McNichol

Table 2. Rare species observed, with New Brunswick status ranks, number of sites recorded and segments where observed. Segment numbers correspond to those mapped in Figure 1 and "o" = observed (sometimes multiple times) outside survey segment. In the "ID" column, "x" indicates at least some records of the species require further confirmation of identification.

ID	Species	Common Name	NB S-rank	NB General Status	# Sites	Segments Observed
	Agrimonia gryposepala	Tall Hairy Groovebur	S3	Secure	2	30, 47
	Alnus serrulata	Brook-Side Alder	S2	Sensitive	1	9
x	*Callitriche hermaphroditica*	Autumnal Water-Starwort	S2	Secure	2	9, o
	Carex arcta	Northern Clustered Sedge	S3	Secure	1	52
	Carex conoidea	Field Sedge	S3	Secure	5	18, 28, 30, 42, 47
	Carex grisea	Narrowleaf Sedge	S1	May Be At Risk	2	50, 52
x	*Carex haydenii*	Cloud Sedge	S3	Secure	10	1, 9, 18, 28, 30, 39, 42, 47, 52, 54
	Carex lupulina	Hop Sedge	S3	Secure	7	3, 18, 28, 30, 39, 42, o
x	*Carex ormostachya*	Necklace Spike Sedge	S3	Secure	1	1
	Carex rosea	Rosy Sedge	S3	Secure	1	52
	Carex tenera	Slender Sedge	S3	Secure	7	1, 9, 28, 30, 47, 52, 54
	Carex tuckermanii	Tuckerman Sedge	S3	Secure	5	1, 3, 30, 42, 47
	Cinna arundinacea	Stout Wood Reed-Grass	S1	May Be At Risk	1	52
	Cornus obliqua	Silky Dogwood	S2	Sensitive	4	9, 18, 28, 42
	Crassula aquatica	Water Pigmy-Weed	S3	Secure	1	30
	Cyperus dentatus	Toothed Sedge	S3	Secure	7	9, 18, 30, 50, 52,

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ID	Species	Common Name	NB S-rank	NB General Status	# Sites	Segments Observed
						54, o
	Elatine minima	Small Water-Wort	S3	Secure	2	9, 52
x	*Elodea nuttallii*	Nuttall Waterweed	S2	Sensitive	1	42
	Erigeron hyssopifolius	Daisy Fleabane	S3	Secure	1	o
	Heteranthera dubia	Grassleaf Mud-Plantain	S2S3	Secure	8	3, 9, 30, 39, 42, 47, 52, 54
	Juglans cinerea	Butternut	S3	At Risk	2	47, o
	Lechea intermedia	Narrowleaf Pinweed	S3S4	Secure	1	47
	Leersia virginica	Virginia Cutgrass	S2	May Be At Risk	2	3, 30
	Lycopodium hickeyi	Hickey's Clubmoss	S3	Secure	1	9
	Lysimachia quadrifolia	Whorled Loosestrife	S1	May Be At Risk	2	42, 52
	Lysimachia x producta	Hybrid Loosestrife (*L. quadrifolia* x *terrestris*)	HYB	Not Assessed	1	42
	Megalodonta beckii	Beck Water-Marigold	S3S4	Secure	4	30, 42, 47, 52
	Muhlenbergia frondosa	Wirestem Muhly	S3	Secure	11	3, 9, 18, 28, 30, 42, 47, 50, 52, 54, o
	Myriophyllum heterophyllum	Broadleaf Water-Milfoil	S3	Secure	6	3, 39, 42, 47, 52, 54
	Myriophyllum sibiricum	Common Water-Milfoil	S3	Secure	6	30, 42, 47, 50, 52, o
x	*Myriophyllum verticillatum*	Whorled Water-Milfoil	S3	Secure	4	9, 18, 30, 47
	Nuphar lutea ssp. pumila	Yellow Cowlily	S3	Secure	1	30
	Nuphar lutea ssp. rubrodisca	Red-disk Pond-lily	S2	Sensitive	1	42
	Penthorum sedoides	Ditch-Stonecrop	S2S3	Secure	4	3, 9, 30, 47
	Pilea pumila	Canada Clearweed	S3	Secure	3	3, 30, 52
	Polygonum arifolium	Halberd-Leaf Tearthumb	S3	Secure	1	30
	Polygonum hydropiperoides	Mild Water-Pepper	S3	Secure	1	54
	Polygonum scandens	Climbing False-Buckwheat	S3	Secure	1	3
x	*Potamogeton richardsonii*	Redhead Grass	S2	Sensitive	4	1, 3, 39, 54
	Prenanthes racemosa	Glaucous Rattlesnake-Root	S3	Secure	6	18, 42, 47, 52, 54, o
	Pycnanthemum virginianum	Virginia Mountain-Mint	S1	May Be At Risk	1	47
	Quercus macrocarpa	Bur Oak	S2	May Be At Risk	1	o
	Ranunculus flabellaris	Yellow Water-Crowfoot	S2	Secure	2	3, 30
	Riccia sullivantii	a Liverwort	S2	Not Assessed	1	30
	Salix nigra	Black Willow	S3	Sensitive	7	3, 30, 39, 42, 50, 54, o
	Salix pedicellaris	Bog Willow	S3	Secure	3	9, 30, 42
	Schizachyrium scoparium	Little Bluestem	S2	Sensitive	1	42
	Schoenoplectus fluviatilis	River Bulrush	S2S3	Sensitive	5	3, 30, 42, 52, 54
	Schoenoplectus torreyi	Torrey's Bulrush	S3	Secure	5	3, 9, 28, 30, 42
	Scirpus pedicellatus	Stalked Bulrush	S3	Secure	7	3, 9, 28, 30, 42, 52, o
x	*Sisyrinchium angustifolium*	Pointed Blue-Eyed-Grass	S1	May Be At Risk	1	52
	Spirodela polyrrhiza	Common Water-Flaxseed	S3S4	Secure	2	3, 30
x	*Stachys tenuifolia*	Smooth Hedge-Nettle	S3	Sensitive	3	42, 47, 52
x	*Symphyotrichum anticostense*	Aster d'Anticosti	S3	At Risk	6	42, 47, 50, 52, 54, o
x	*Symphyotrichum racemosum*	Leafy-Bracted Aster	S2	Sensitive	1	47
	Symphyotrichum tradescantii	Tradescant Aster	S3?	Secure	10	3, 9, 18, 28, 30, 42, 47, 50, 54, o
	Thalictrum venulosum	Veined Meadowrue	S3	Secure	9	1, 3, 30, 39, 42, 47, 50, 54, o
	Tilia americana	American Basswood	S4	Secure	5	1, 3, 18, 30, 42
	Toxicodendron radicans	Eastern Poison Ivy	S2?	Sensitive	3	28, 52, 54

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ID	Species	Common Name	NB S-rank	NB General Status	# Sites	Segments Observed	
	Trisetum melicoides	Purple False Oats	S3	Secure	1		54
	Wolffia Columbiana	Columbia Water-Meal	S1	May Be At Risk	1		30

Table 3. Rare species for which fieldwork from this project may result in status rank changes, pending review by the New Brunswick Vascular Plant Ranking Group. In the "ID" column, "x" indicates at least some records of the species require further confirmation of identification.

						Potential Revised NB Ranks	
ID	Species	Common Name	# Sites	Current NB S-rank	Current NB General Status Rank	S-rank	General Status Rank
x	*Carex haydenii*	Cloud Sedge	10	S3	Secure	S4	Secure
	Carex tenera	Slender Sedge	7	S3	Secure	S4	Secure
	Heteranthera dubia	Grassleaf Mud-Plantain	8	S2S3	Secure	S3	Secure
	Leersia virginica	Virginia Cutgrass	2	S2	May Be At Risk	S2S3	Sensitive
	Muhlenbergia frondosa	Wirestem Muhly	11	S3	Secure	S4	Secure
x	*Myriophyllum verticillatum*	Whorled Water-Milfoil	4	S3	Secure	S4	Secure
	Schoenoplectus fluviatilis	River Bulrush	5	S2S3	Sensitive	S3	Secure
	Scirpus pedicellatus	Stalked Bulrush	7	S3	Secure	S4	Secure
	Symphyotrichum tradescantii	Tradescant Aster	10	S3?	Secure	S4	Secure

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