

**Southwest Nova Scotia Habitat Conservation Strategy
Summary Report January 2017**

Habitat Conservation Priority – Riparian and Floodplain Systems

The following represents one of a series of summary documents that have been developed to aide in the dissemination of information presented in the *Southwest Nova Scotia Habitat Conservation Strategy*. For more detailed information, please see the final report, Farrow & Nussey 2015.

Riversides and floodplains are some of the most dynamic areas of the landscape and within Southwest Nova Scotia there is a high concentration of ecoregionally critical occurrences of these ecosystems (Anderson *et al.* 2006). These terrestrial ecosystems are dependent on the seasonal rise and fall of water levels, with high spring and storm waters submerging floodplains, depositing fresh sediment and nutrients, enriching the soils (Anderson *et al.* 2006). Not easily delineated, terrestrial riparian areas may be treed, shrubby, or herbaceous, depending on site conditions, though in northeastern North America, natural riparian areas are typically forested (Environment Canada 2013). Forested riparian areas are used by a broad range of terrestrial and semi-aquatic taxa, and typically support higher diversity and density of amphibians, reptiles, birds, and mammals than adjacent uplands (McEachern 2003). It has been estimated that 70 percent of terrestrial vertebrates use riparian areas during some part of their life (Naiman *et al.* 1993). Forested riparian areas are particularly important habitat for a number of breeding bird species, given the diversity and abundance of invertebrates available for food, diverse and complex vegetation, and favourable microclimates (Akerman 2007). They may also serve as important dispersal corridors for a range of taxa (Naiman *et al.* 1993), and are important for the conservation of sensitive aquatic species, such as Atlantic Salmon, Brook Trout, and Atlantic Whitefish. Though dynamic in width and extent, these generally linear features also play a vital role in water filtration and freshwater temperature and flood control (Semlitsch & Bodie 2003; Taylor 2002).

The highest concentrations of Atlantic Coastal Plain Flora (ACPF) species can be found along exposed, gently sloping lakeshores composed of sand, cobble, gravel, or peat, mainly in the lower Tusket River valley, and the Medway, and Roseway River watersheds in Southwest Nova Scotia (Blaney & Mazerolle 2009; EC & PCA 2010). Along lakeshores ACPF are dependent upon natural disturbances such as seasonally fluctuating water levels, wave action, and ice scour to maintain their habitat characteristics and reduce competition (EC & PCA 2010; Wisheu & Keddy 1989). Lakeshore species of ACPF face the greatest number of threats, including cottage and residential development, shoreline alterations, off-highway vehicle use, infilling, eutrophication from mink farms, and invasive species (e.g., Glossy Buckthorn; S. Eaton, per. comm.; EC & PCA 2010). With over 70% of the province privately owned, the majority of ACPF species and locations occur on private land (EC & PCA 2010).

The Wood Turtle is generally more terrestrial than most freshwater turtles, but is still semi-aquatic and is most often associated with riparian areas and rivers and streams with sand or gravel bottoms. Threats to Wood Turtle across its range include increased mortality of adults on roadways and off-highway vehicle trails, loss of nesting and riparian habitat, and nest predation (COSEWIC 2007). In addition to freshwater wetlands, Blanding's Turtle and Eastern Ribbonsnake are also associated with riparian areas. Conservation of terrestrial riparian systems within the SWNS bioregion will contribute to the conservation of at least 149 priority species.

Nested conservation priority species

- Blanding's Turtle (EN)
- Eastern Ribbonsnake (EN)
- Wood Turtle (TH)
- Pink Coreopsis (EN)
- Plymouth Gentian (EN)
- Sweet Pepperbush (TH)
- Water Pennywort (SC)
- Eastern White Cedar (VU NS)
- Black Ash (TH NS)

Landscape context assessment of riparian and floodplain systems: Good

The bioregion contains nine provincially delineated primary watersheds, encompassing a large network of freshwater lakes, rivers, and streams, including some of the longest rivers, and largest and highest concentration of freshwater lakes in the province (Figure 1). Given their proximity to water and related soil characteristics, terrestrial riparian ecosystems are threatened by cottage, residential, and agricultural development, and forestry activities, which in turn makes them vulnerable to contamination from agricultural and forestry effluents (Environment Canada 2013). The rich floodplains of the Annapolis Valley have undergone extensive conversion to agriculture over the past 400 years, and consequently little of the original floodplain forest remains intact (Neily *et al.* 2003). Nonetheless, the SWNS bioregion contains a high concentration of ecoregionally critical occurrences of riparian and floodplain forest (Anderson *et al.* 2006).

Condition assessment of riparian and floodplain systems: Fair

Cottage and residential development, with their associated shoreline alterations (e.g., infilling, wharves, breakwaters, mowing), are considered to be the most significant and widespread threats to some of the most ecologically significant and

sensitive riparian systems within the SWNS bioregion, particularly along lakeshores (EC & PCA 2010). The use of off-highway vehicles in sensitive riparian areas is also considered to be a widespread and significant threat to this ecosystem type. Current forest harvesting regulations in Nova Scotia require that all forestry operations leave a minimum 20 m forested buffer along watercourses, though some level of harvesting is permitted within these buffers. At present, riparian buffers are not required on land cleared for agriculture, which is known to impact aquatic systems through direct erosion, increased sedimentation, pesticide runoff, nutrient loading and increased water temperatures due to the removal of riparian natural cover. At the present time, threats associated with the construction and operation of hydroelectric dams, including habitat conversion and the alteration of natural disturbance processes through the stabilization of water levels, are also generally considered to be low within some of the most sensitive riparian habitats in the bioregion (EC & PCA 2010).

Although exotic species are present along watercourses, invasive species are generally not dominant, although a number of invasive species are emerging as threats within the province, such as Glossy Buckthorn, Common Reed, Garlic Mustard and Purple Loosestrife, all of which can have various degrees of negative impacts on riparian zones. Additionally, aquatic invasive species are of considerable concern, such as Smallmouth Bass, Muskellunge, and Chain Pickerel, the latter of which is considered a high threat. These species are voracious predators and both directly prey upon and out-compete native fish species.

Size assessment of riparian and floodplain systems: Very Good

The SWNS bioregion contains a high concentration of ecoregionally critical occurrences of riparian and floodplain forest (**Error! Reference source not found.**; Anderson *et al.* 2006). Of the 56,960 ha of ecoregionally critical occurrences of riparian and floodplain forest identified in the NAAP, 55,547 ha are located within the bioregion; therefore, the bioregion, which makes up 29.3% of the total area of Nova Scotia, contains 97.5% of the province’s critical occurrences of riparian and floodplain forest.

Current threats to riparian and floodplain systems

- 1.1 Cottage and residential development
- 2.1 Annual and perennial non-timber crops
- 2.3 Mink Farming
- 2.3 Livestock farming and ranching
- 4.1 Roads and railroads
- 5.3 Forest harvesting practices
- 6.1 Off-highway vehicle use
- 7.2 Dams and other aquatic barriers
- 8.1 Invasive predatory fish species
- 8.1 Invasive plants
- 8.2 Problematic native species
- 9.1 Household sewage and urban waste water
- 9.3 Agricultural and forestry effluents
- Air pollution and acid precipitation

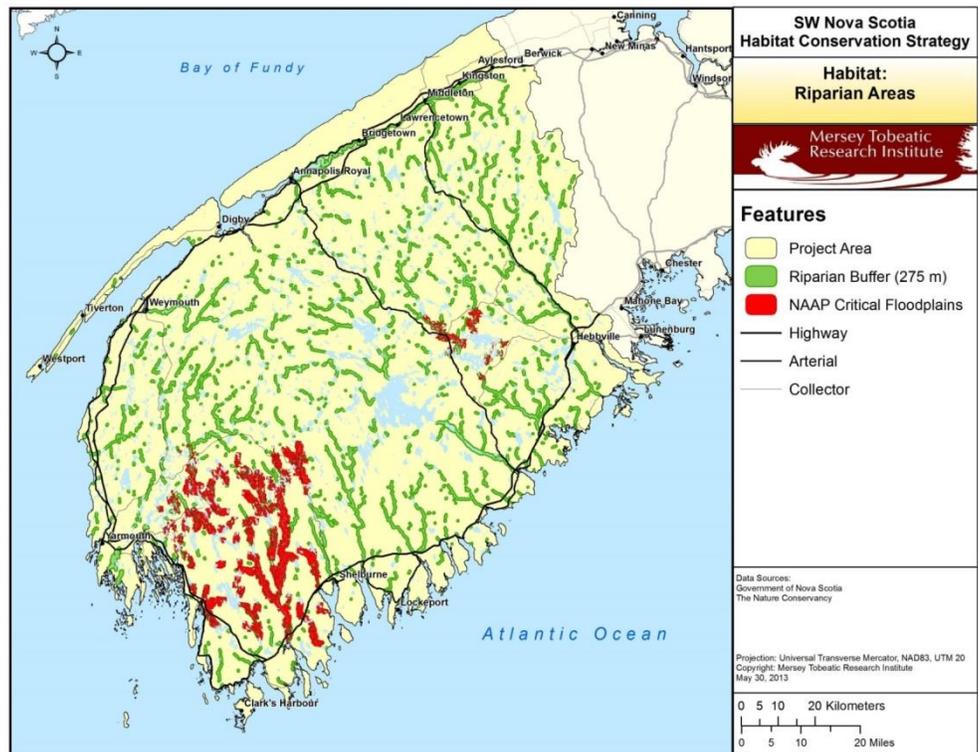


Figure 1. Riparian and floodplain systems within the Southwest Nova Scotia bioregion.

Emerging threats to riparian and floodplain systems

- 11.1 Habitat shifting and alteration (Climate Change)

Overall assessment of riparian and floodplain systems in the Southwest Nova Scotia bioregion: Good

Southwest Nova Scotia Riparian and Floodplain Systems

Table 1. Conservation actions related to riparian and floodplain systems for conservation partners in the Southwest Nova Scotia bioregion.

Conservation Actions¹ Description of related action (specific and measurable if possible)	Collaborators	Importance²	Date for Completion	Priority Habitat(s)³	Primary Related Threat(s)
1. Land/Water Protection					
1.1 Site/Area Protection Province of Nova Scotia to designate 68 000 ha of new protected areas under the 14% Protected Areas Initiative.	Province of NS	Necessary	2025	All	
1.1 Site/Area Protection Complete a gap analysis for the system of protected areas in the province.	Province of NS	Beneficial		All	
1.1 Site/Area Protection Secure 2500 ha of priority 1 and priority 2 forest habitat to protect them from harvesting.	NCC	Necessary	2025	Acadian Forest Mosaic	5.3 Forest harvesting practices
1.1 Site/Area Protection Secure 500 ha of priority 1 and priority 2 habitat for species at risk to protect them from development.	NCC	Necessary	2025		
1.1 Site/Area Protection Develop detailed assessment of land tenure within critical habitat areas for ACPF.	NCC	Beneficial	2017	Freshwater Wetlands, Riparian and Floodplain Systems	1.1 Cottage and residential development
1.1 Site/Area Protection Acquire priority habitat for Blanding's Turtle, Eastern Ribbonsnake, and ACPF as opportunities arise.	NSNT	Necessary	2025	Freshwater Wetlands, Riparian and Floodplain Systems	
2. Land/Water Management					
2.1 Site/Area Management Inform and implement the North American Waterfowl Management Plan (NAWMP) and conduct waterfowl surveys as required by the plan.	EC, EHJV, USFWS, USGS	Necessary	Ongoing	Tidal Marshes, Tidal Flats, Freshwater Wetlands, Grasslands, Floodplain Systems	
2.1 Site/Area Management Implement management plans for Sand Pond NWA and Sable River, Port Joli, Haley Lake, and Port Hebert Migratory Bird Sanctuaries.	EC	Necessary	Ongoing	All	
2.1 Site/Area Management Complete ecological risk assessments to assess threats to species and ecosystems within existing and proposed protected areas. Create a	Province of NS	Beneficial		All	

¹ Categories based on IUCN – CMP Unified Classification of Conservation Actions Needed (Version 2.0). Actions are meant to be specific and measurable if possible, and are not listed in order of importance.

² CRITICAL: Conservation actions that, without implementation, would clearly result in the reduction of viability of a biodiversity target or the increase in magnitude of a critical threat within the next 5-10 years. Also includes research information that is needed before key decisions can be made on the management of biodiversity targets. NECESSARY: Conservation actions that are needed to maintain or enhance the viability of biodiversity targets or reduce critical threats. Also includes research that will assist in decisions on management of biodiversity targets. BENEFICIAL: Conservation actions that will assist in maintaining or enhancing viability of biodiversity targets and reducing threats.

³ Priority Habitats: Beaches and dunes, tidal marshes, tidal flats, coastal islands, freshwater wetlands, Acadian forest, riparian/floodplain systems, grasslands/agro-ecosystems, barrens.

Southwest Nova Scotia Riparian and Floodplain Systems

Conservation Actions ¹ Description of related action (specific and measurable if possible)	Collaborators	Importance ²	Date for Completion	Priority Habitat(s) ³	Primary Related Threat(s)
spatial layer of sensitive habitats and ecosystems to aid in planning and an action plan for protected area managers.					
2.1 Site/Area Management Continue ecological integrity monitoring to assess the state of forest, freshwater, wetland, and coastal ecosystem health in Kejimikujik National Park through the monitoring, analysis, and reporting of approximately 30 measures (e.g., forest birds, salamanders, water quality, Eelgrass) and by summarizing these finding in the <i>State of the Park Report</i> .	Parks Canada through collaboration with many partners	Necessary	Ongoing	All	
2.1 Site/Area Management Conduct wildlife connectivity analyses to identify optimal connectivity corridors between core protected areas/natural habitats.	NCC	Necessary	2018	All	
2.1 Site/Area Management Continue to monitor populations of endangered, threatened, and special concern species of ACPF on the 36 high priority lakes identified in the ACPF recovery strategy to complete a full inventory and to document lake-level population changes. Continue to sample water quality on a sub-set of the 36 high priority lakes. Continue to engage volunteers in the monitoring of ACPF and threats along lakeshores in southwest Nova Scotia. In Kejimikujik National Park and National Historic Site, continue annual Water-pennywort surveys on Kejimikujik and George Lakes.	MTRI, PC	Necessary	Ongoing	Riparian and Floodplain Systems, Freshwater Wetlands	1.1 Cottage and residential development
2.1 Site/Area Management Conduct botanical surveys of potential ACPF habitat between Tusket watershed and Queens County.	ACCDC	Necessary	2020	Tidal Marshes, Freshwater Wetlands, Floodplain Systems	
2.1 Site/Area Management Conduct insect biodiversity surveys in southwestern Nova Scotia, focusing on the discovery of disjunct species associated with the Atlantic Coastal Plain, including targeted efforts to find species dependent on rare ACPF, such as Sweet Pepperbush and Eastern Baccharis.	ACCDC	Beneficial	2020	Tidal Marshes, Freshwater Wetlands, Riparian and Floodplain Systems	
2.1 Site/Area Management Map the 'active river area' (i.e., 100-year floodplain) to define floodplains for primary rivers in SWNS.	NCC	Necessary	2018	Riparian and Floodplain Systems	
2.2 Invasive/Problematic Species Control Establish a structure to facilitate collaboration and strategic decision making regarding invasive species control techniques.	NCC, MTRI	Beneficial	2020	All	8.1 Invasive/ alien species/ diseases
2.2 Invasive/Problematic Species Control Raise awareness of invasive species in Nova Scotia and the role they play in ecosystems through the Backyard Biodiversity project.	PC, MTRI	Beneficial	Ongoing	All	8.1 Invasive / alien species/ diseases

Southwest Nova Scotia Riparian and Floodplain Systems

Conservation Actions¹ Description of related action (specific and measurable if possible)	Collaborators	Importance²	Date for Completion	Priority Habitat(s)³	Primary Related Threat(s)
2.2 Invasive/Problematic Species Control Continue to monitor and eradicate all mature, seed-producing Glossy Buckthorn plants within Kejimikujik National Park and National Historic Site as locations become known, and educate and engage the public on the ecological impacts of this species, its identification, and how to employ the most effective means of control.	PC, MTRI	Necessary	Ongoing	Acadian Forest Mosaic, Riparian and Floodplain Systems	8.1 Invasive non-native/ alien species/ diseases
3. Species Management					
3.1 Species Management Continue the long-standing volunteer program to protect Blanding's Turtle nests from predation, flooding, and other risks and work with landowners to protect turtles on their properties. Develop a long term monitoring plan and continue to monitor the three known populations in Southwest Nova Scotia to collect long term data on survivorship, clutch size, headstarting, hatchling success, habitat use, and site fidelity. Search for new populations by soliciting and following up on public sighting reports, and provide information on high priority sites to land trusts.	MTRI, PC, EC, Acadia University, Friends of Keji, Blanding's Turtle Recovery Team	Necessary	Ongoing	Freshwater Wetlands, Riparian and Floodplain Systems	
3.1 Species Management Continue to conduct systematic surveys and solicit public sightings of Eastern Ribbonsnake to determine their range and abundance in the bioregion. Continue to monitor the one known Eastern Ribbonsnake overwintering site to document site use, snake abundance, and site fidelity, and conduct field surveys around known concentration sites in spring and fall to locate additional overwintering sites.	MTRI, PC, Dalhousie University, Eastern Ribbonsnake Recovery Team	Necessary	Ongoing	Acadian Forest Mosaic, Riparian and Floodplain Systems	
3.1 Species Management Continue to monitor populations of endangered, threatened, and special concern species of ACPF on the 36 high priority lakes identified in the ACPF recovery strategy to document lake-level population changes. Continue to sample water quality on a sub-set of the 36 high priority lakes. Continue to engage volunteers in the monitoring of ACPF species and the identification of threats along lakeshores in southwest Nova Scotia. In Kejimikujik National Park and National Historic Site, continue annual Water-pennywort surveys on Kejimikujik and George Lakes.	MTRI, PC	Necessary	Ongoing	Riparian and Floodplain Systems, Freshwater Wetlands	1.1 Cottage and residential development
3.1 Species Management Continue the volunteer-based Kejimikujik and Mersey LoonWatch Programs to monitor loon abundance and breeding success on lakes in the SNBR, with a focus on the Mersey and Medway watersheds. Continue to work with partners on studies of reproduction, survivorship, and the role of mercury in the Kejimikujik ecosystem.	PC, MTRI, EC, Biodiversity Institute, Acadia University	Necessary	Ongoing	Riparian and Floodplain Systems	

Southwest Nova Scotia Riparian and Floodplain Systems

Conservation Actions¹ Description of related action (specific and measurable if possible)	Collaborators	Importance ²	Date for Completion	Priority Habitat(s) ³	Primary Related Threat(s)
3.2 Species Recovery Engage and consult with all partners in the development of SAR recovery documents, and support the activities described within recovery documents for the schedule of studies for SAR and the identification of their critical habitat within the SWNS bioregion.	EC, NSDNR, Academic Institutions, NSNT, NCC, MTRI	Necessary	Ongoing	All	
4. Education and Awareness					
4.2 Training Continue to facilitate opportunities for volunteers to engage in regional SAR and conservation programs in the Southwest Nova Biosphere Reserve through the Kejimkujik Southwest Nova Volunteer Program. Stewardship tools and guides will be developed and distributed, including <i>Species at Risk in NS</i> , <i>Atlantic Coastal Plain Flora in NS</i> , <i>Healthy Lakes and Wetlands for Tomorrow</i> , and <i>Invasive Alien Species in NS</i> .	PC, Friends of Keji, MTRI, BSC, Acadia University	Beneficial	Ongoing	All	
4.3 Awareness and Communications Address habitat threats through the education and engagement of stakeholders, landowners, and landusers.	NSNT	Beneficial	Ongoing		
4.3 Awareness and Communications Engage in partnerships with agricultural producers and practitioners to improve the conservation and restoration of wetland habitat in the agricultural landscape, primarily through the promotion and delivery of Agricultural Biodiversity Conservation (ABC) Plans, which allow farmers to clearly identify existing and potential BMP that will promote the maintenance or enhancement of biodiversity on farms.	EHJV	Necessary	Ongoing	Freshwater Wetlands, Riparian and Floodplain Systems, Grasslands	2.1 Incompatible agricultural practices
4.3 Awareness and Communications Continue to engage local citizens through outreach and social media to create habitat for the Monarch Butterfly by joining the Butterfly Club and planting butterfly gardens at their homes, businesses, community centers, and schools.	MTRI, PC	Beneficial	Ongoing	Freshwater Wetlands, Grasslands, Riparian and Floodplain Systems	
5. Law and Policy					
5.1.2 Legislation (National level) Implement the <i>Migratory Bird Convention Act</i> , <i>Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act</i> , <i>Species at Risk Act</i> , <i>Canadian Environmental Protection Act</i> , <i>Canada Wildlife Act</i> , <i>Environmental Enforcement Act</i> , <i>Canadian Environmental Assessment Act</i> , <i>Fisheries Act</i> .	EC, DFO	Necessary	Ongoing		
5.2 Policies and Regulations Implement the federal policy on wetland conservation.	EC	Necessary	Ongoing	Tidal Marshes, Freshwater Wetlands, Floodplain Systems	

Southwest Nova Scotia Riparian and Floodplain Systems

Conservation Actions¹ Description of related action (specific and measurable if possible)	Collaborators	Importance²	Date for Completion	Priority Habitat(s)³	Primary Related Threat(s)
5.2 Policies and Regulations Collaborate with the Province of Nova Scotia and other stakeholders regarding changes to the <i>Code of Forest Practice for Crown Land</i> .	MTRI	Beneficial	Ongoing	Acadian Forest Mosaic, Freshwater Wetlands, Floodplain Systems	5.3 Forest harvesting practices
5.4 Compliance and Enforcement Undertake wildlife and environmental enforcement activities (EC Wildlife Enforcement, Environmental Enforcement); address illegal hunting and disturbance, illegal activities and habitat destruction	EC, Province of NS	Necessary	Ongoing	All	
6. Livelihood, Economic, and Other Incentives					
6.1 Linked Enterprises & Livelihood Alternatives Demonstrate strong environmental stewardship and woodland management through the development of the Medway Community Forest Cooperative, a locally governed, long-term, ecologically-based stewardship plan that allows multiple uses of a working community forest, while nurturing new and innovative forest-based businesses that support the local economy.	MTRI, Wind Horse Woods, North Queens Board of Trade, FNSWO, NSWOOA, NS Co-operative Council, EAC, forestry contractors, mills	Beneficial	Ongoing	Acadian Forest Mosaic, Freshwater Wetlands, Riparian and Floodplain Systems	5.3 Forest harvesting practices
6.4 Conservation Payments Implement and encourage the use of EC Ecological Gifts (Ecogifts) program.	EC, NCC, NSNT	Necessary	Ongoing	All	
7. External Capacity Building					
7.2 Alliance and Partnership Development Provide EC-CWS input into: Staying Connected Initiative, Western Hemispheric Shorebird Reserve Network, and Important Bird Areas.	EC through collaboration with many partners	Beneficial	Ongoing	All	
7.3 Conservation Finance Communicate, inform, and increase awareness related to funding opportunities for conservation: <i>North American Wetland Conservation Act</i> (NAWCA)/Eastern Habitat Joint Venture (EHJV), North Atlantic Landscape Conservation Cooperative (NALCC); National Conservation Plan (NCP): Atlantic Ecosystems Initiative (AEI), Habitat Stewardship Program (HSP), Aboriginal Fund for Species at Risk (AFSAR), National Wetland Conservation Fund (NWCF).	EC, US Federal and State partners	Necessary	Ongoing	All	
7.3 Conservation Finance Continue to engage longstanding/key funding partners to support conservation work in the SWNS bioregion.	NCC, MTRI, NSNT, ENGOs	Necessary	Ongoing	All	

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