

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

Habitat Conservation Priority – Tidal Flats

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.

Tidal flats are a common coastal feature of the Southwest Nova Scotia (SWNS) bioregion, particularly in shallow estuaries along the Atlantic Coast. Tidal flats in the bioregion support vast numbers of shorebirds which congregate to feed on abundant burrowing invertebrates, including clams, worms, and amphipods (Anderson *et al.* 2006). Tidal flats also support extensive beds of Eelgrass, a highly productive perennial aquatic plant that is a 'keystone species' found on coarse sand to mud bottoms in low intertidal and subtidal environments (DFO 2009b). Eelgrass beds provide nursery habitat for juvenile stages of fish and invertebrates, and important feeding habitat for migrating waterfowl. The primary productivity of Eelgrass and their associated epiphytic communities exceeds that of many cultivated terrestrial systems, playing an important role as biological filters, sediment stabilizers, and exporters of organic matter and nutrients to subsidize the productivity of other coastal ecosystems. The extensive mud flats and eelgrass beds that can be found along the Atlantic Coast of the bioregion, particularly in the areas around Port Joli and Cape Sable Island, support significant numbers of migrating and overwintering waterfowl, including Canada Goose, Common Goldeneye, Barrow's Goldeneye, Common Loon, Common Eider, American Black Duck, and the federally endangered Harlequin Duck (Hanson 2004; NS EHJV 2008). There is also a significant moulting area for Common Eider located between Liverpool and Baccaro. Conservation of tidal flats within the SWNS bioregion will contribute to the conservation of at least 23 priority species.

Nested Conservation Priority Species

- Barrow's Goldeneye (SC)
- Eastern Lilaepsis (SC)
- Semipalmated Plover
- Harlequin Duck (SC)
- Common Goldeneye
- Dunlin
- Piping Plover (EN)

Landscape context assessment of tidal flats: Good

The highly indented and irregular coastline of the Atlantic Coast provides the most suitable depositional environments (i.e., shallow estuaries) to support the development of tidal flats within the bioregion and is where they are primarily found (Figure 1). Development within the bioregion is concentrated along the coastlines; nonetheless approximately 80% of the land adjacent to the coast is classified as undeveloped (CBCL Ltd. 2009). Though a high percentage of the coastline is under private ownership, in Nova Scotia a grant of land typically only extends to the ordinary high water mark of tidal or coastal land; land between the mean high and low water marks of coastal water is considered to be Crown land under management by the Nova Scotia Department of Natural Resources (CBCL Ltd. 2009; NSDNR 2013c). In addition to this, tidal flats do not have a great deal of development potential, however they may be severely impacted by adjacent onshore development if there are resulting changes to sedimentation patterns, or an increase in urban waste water, agricultural, forestry, or industrial effluents. At present, there is very little commercial or industrial activity in the proximity of tidal flats in the bioregion. The sensitivity of the bioregion to sea-level rise and hence coastal erosion is high to moderate along the Atlantic Coast where the majority of tidal flats occur (Shaw *et al.* 1998). Shoreline hardening and associated loss of sediment supply may further compound the impacts of sea-level rise by limiting the landward migration of tidal flats. The average Landscape Context Index¹ for tidal flats in the SWNS bioregion is 10.63, which is considered to be an indication that, on average, the habitat conservation priority is surrounded primarily by natural cover and has good landscape context that will contribute toward the long term viability of the ecosystem type (calculated using NAAP data). There are currently no areas of tidal flats in the bioregion that are under protected or conservation status.

Condition assessment of tidal flats: Fair

Eelgrass declines in recent decades have been reported on the Atlantic Coast of the bioregion. Losses of 30% and 44% of eelgrass cover from 1978-2000 were recorded at two sites in Lobster Bay, Nova Scotia (Sharp & Semple in Hanson 2004), and eelgrass at Kejimikujik Seaside is reported to have declined to less than 2% of its 1987 distribution (McCarthy & Kehler in MTRI & PC 2013). Possible contributing factors to the observed declines in eelgrass distribution include disease,

¹ *Landscape Context Index (LCI) is a measure that refers to the relative amount of development, agriculture, quarries, roads, and other fragmenting features directly surrounding ecosystem occurrences. It provides an estimate of isolation of occurrence as well as potential future encroachment on the occurrence. An LCI below 20 (30 for coastal ecosystems) indicates that the habitat conservation priority is surrounded primarily by natural cover with higher LCIs indicating increasing amounts of development directly surrounding ecosystem occurrences. An LCI above 50 is considered to be high, with individual occurrences usually rejected as critical (Anderson et al. 2006).*

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eutrophication, human activities, environmental changes, and disturbance by invasive European Green Crab (*Carcinus maenas*) (DFO 2009b; Hanson 2004). Associated with these dramatic declines in eelgrass biomass within estuaries in Maritime Canada, significant changes in the distribution and declines in the abundance of fall-staging waterfowl have been observed (Seymour *et al.* 2002). Historical evidence suggests that if eelgrass declines were to become widespread, there would be major impacts on waterfowl feeding behaviour, migration patterns, and over-wintering survival (Hanson 2004). Without proper regulation, recreational and commercial harvesting of clams and marine worms reduce invertebrate populations, degrading tidal flat habitat. Further, these activities can negatively alter the habitat structure of tidal flats, particularly mud flats, which have reduced resilience to physical disturbance compared to sandflats (GOMC 2005). Such activities can also lead to negative impacts on waterfowl and shorebirds.

Size assessment of tidal flats: Good

Within the SWNS bioregion there are 53,483 ha of tidal flats, accounting for 3.3% of the total area of the bioregion. Of this area, 29,609 ha were identified as critical in the NAAP, representing 39% of the critical occurrences of tidal flats in Nova Scotia (note that the bioregion contains 29.3% of the total area of the province). The screening criterion for the minimum size of critical occurrences of tidal flats in the NAAP was 40 ha (Anderson *et al.* 2006). The average size of occurrences of tidal flats in the bioregion is 180 ha, which is substantially larger than the NAAP minimum size criteria for tidal flats in the region.

Current threats to tidal flats

- 1.1 Cottage and residential development
- 2.4 Marine shellfish and finfish aquaculture
- 4.3 Oil spills and discharges from shipping activity
- 5.4 Clam and baitworm harvesting
- 9.1 Household sewage & urban waste water
- 9.3 Agricultural and forestry effluents
- 8.1 Invasive European Green Crab (Threat status: High)

Emerging threats to tidal flats

- 11.1 Sea-level rise and coastal erosion

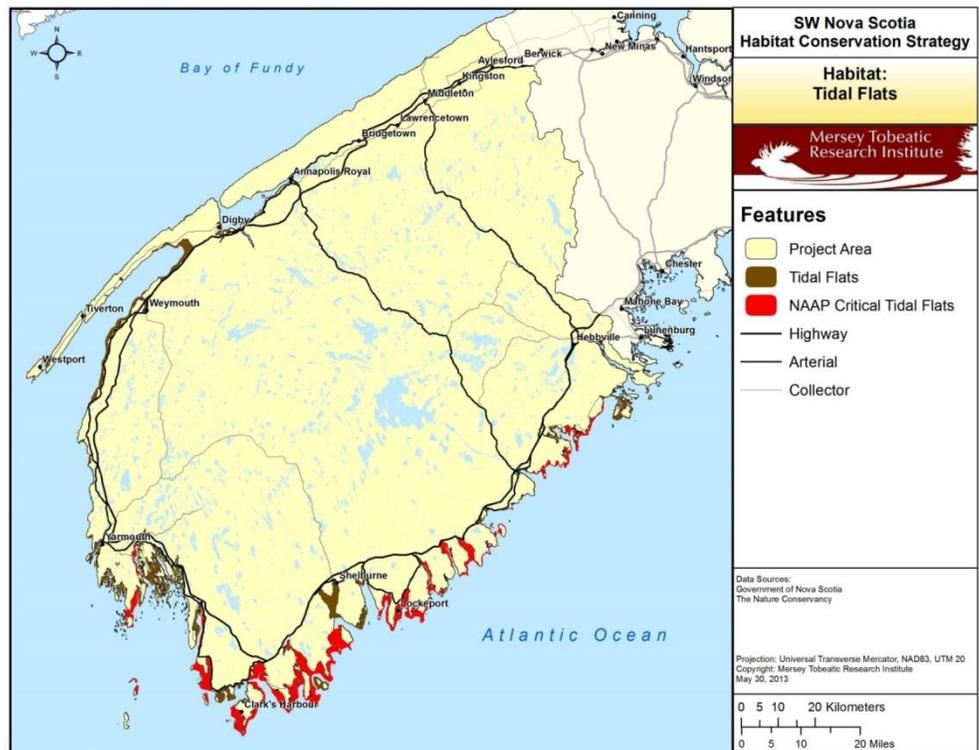


Figure 1. Tidal flats within the Southwest Nova Scotia bioregion.

Overall assessment of tidal flats in the Southwest Nova Scotia bioregion: Good

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Table 1. Conservation actions related to tidal flats 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 Contribute to Marine Protected Area planning within the Scotian Shelf marine bioregion, and the identification and description of Ecologically and Biologically Significant Areas and other habitat classification schemes that contribute towards the protection of 10% of coastal and marine areas by 2020.	DFO, EC, PC	Necessary	2020	Beaches and Dunes, Tidal Marshes, Tidal Flats, Coastal Islands	
1.1 Site/Area Protection Secure 500 ha of priority 1 and priority 2 coastal habitat to protect them from development.	NCC	Necessary	2025	Beaches and Dunes, Tidal Marshes, Tidal Flats, Coastal Islands	1.1 Cottage and residential development
1.1 Site/Area Protection Acquire priority coastal habitat and priority habitat for Piping Plover as opportunities arise.	NSNT	Necessary	2025	Beaches and Dunes, Tidal Marshes, Tidal Flats, Coastal Islands	
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, Riparian and Floodplain Systems, Grasslands	
2.1 Site/Area Management Implement management plans for Sand Pond National Wildlife Area 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 spatial layer of sensitive habitats and ecosystems to aid in planning and an action plan for protected area managers.	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 mosaic, riparian and floodplain systems, grasslands/agro-ecosystems, barrens.

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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)
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, soft-shell clams, Eelgrass) and by summarizing these findings in the <i>State of the Park Report</i> .	Parks Canada through collaboration with many partners	Necessary	Ongoing	All	
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
2.2 Invasive/Problematic Species Control Continue research to investigate population dynamics of invasive European Green Crab, assess their ecological impacts on coastal ecosystems, and determine if physical removal (i.e., trapping) can effectively and sustainably control invasive green crab in Kejimikujik National Park Seaside Adjunct estuaries. Continue to work with local interests and other government departments to develop a positive use for removed crabs (e.g., lobster bait, fertilizer, compost).	PC	Critical	Ongoing	Tidal Marshes, Tidal Flats	8.1 Invasive non-native/ alien species/ diseases
2.3 Habitat and Natural Process Restoration Monitor the temporal trends in Eelgrass extent and condition within the Kejimikujik Seaside, and assess whether management responses (e.g., invasive European Green Crab reduction, Eelgrass transplanting) have been effective in reversing Eelgrass loss.	PC	Critical	Ongoing	Tidal Flats	8.1 Invasive non-native/ alien species/ diseases
3. Species Management					
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					
4.3 Awareness and Communications Address habitat threats through the education and engagement of stakeholders, landowners, and landusers.	NSNT	Beneficial	Ongoing		
5. Law and Policy					
5.1.2 Legislation (National level) <i>Implement the Migratory Bird Convention Act, Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act,</i>	EC, DFO	Necessary	Ongoing		

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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)
<i>Species at Risk Act, Canadian Environmental Protection Act, Canada Wildlife Act, Environmental Enforcement Act, Canadian Environmental Assessment Act, Fisheries Act.</i>					
5.2 Policies and Regulations Implement the federal policy on wetland conservation.	EC	Necessary	Ongoing	Tidal Marshes, Tidal Flats, Freshwater Wetlands, Riparian and Floodplain Systems	
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					
6.4 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 (NAWCA)/Eastern Habitat Joint Venture (EHJV)</i> , 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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