

Understanding human pressures at critical shorebird roost habitats in the Minas Basin

Final Report to NS Habitat Conservation Fund (2016-17)

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Project Goal: Gain understanding about recreational and other human-use pressures that disturb migrant shorebirds and degrade habitats at critical roost sites in Minas Basin, Bay of Fundy in order to inform development of conservation strategies.

Project Objectives:

1. Understand patterns of human use and map “roost risk zones” where human activities are degrading habitats and disturbing roosting shorebirds during peak shorebird migration at four mainland Minas Basin roost sites: Evangeline Beach, The Guzzle, Avonport Beach and Blue Beach.
2. Compile knowledge gathered from site visits and local experts to inform development of effective, on-the-ground conservation strategies in year-two and year-three of project.
3. Engage regional and local partners in project planning and execution towards collaborative shorebird habitat conservation efforts in the Minas Basin Important Bird Area (IBA) and Western Hemisphere Shorebird Reserve Network (WHSRN).

Project Outcomes:

Activity #1: Project planning meeting with regional and local conservation partners.

Expected Outcomes:

- a) Regional and local partners are engaged in project from outset.
- b) Existing knowledge about roost sites and results from past work by partners, including Eastern Habitat Joint Venture (EHJV) and Dept. Natural Resources (DNR), will guide project planning and ensure project activities fill knowledge gaps and build on lessons learned.

Project Outcomes:

- a) All project partners were engaged in project from start to finish. We reached partners through regular email correspondences and a total of seven project meetings as follows:

<u>Meeting Date</u>	<u>Partner engaged</u>
31 May 2016	Dalhousie University (Halifax, NS)
21 July 2016	Dalhousie University (in field visits to all four roost sites)
27 July 2016	NS Dept. Natural Resources staff (Kentville, NS)
27 July 2016	Blomidon Naturalists Soc. (in field visits to all four roost sites)
08 Aug 2016	Dr. Trevor Avery, Acadia University (Wolfville, NS)
26 Jan 2017	All project partners: NS Dept. Natural Resources, Blomidon Naturalists Society, Dalhousie U., and Nature Conservancy of Canada (Wolfville, NS)
9 Feb 2017	Dalhousie University (Halifax, NS)

- b) Meetings with Dalhousie University's Dr. Kate Sherren and Karen Beazley were essential in the development of human-use audit and interview methods. Important feedback from Dr. Trevor Avery (striped bass expert) regarding striped bass fishers was integrated into interview methods.

Activity #2: Site visits to assess human pressures conducted at high-tide during peak shorebird migration at four key roost sites in Minas Basin.

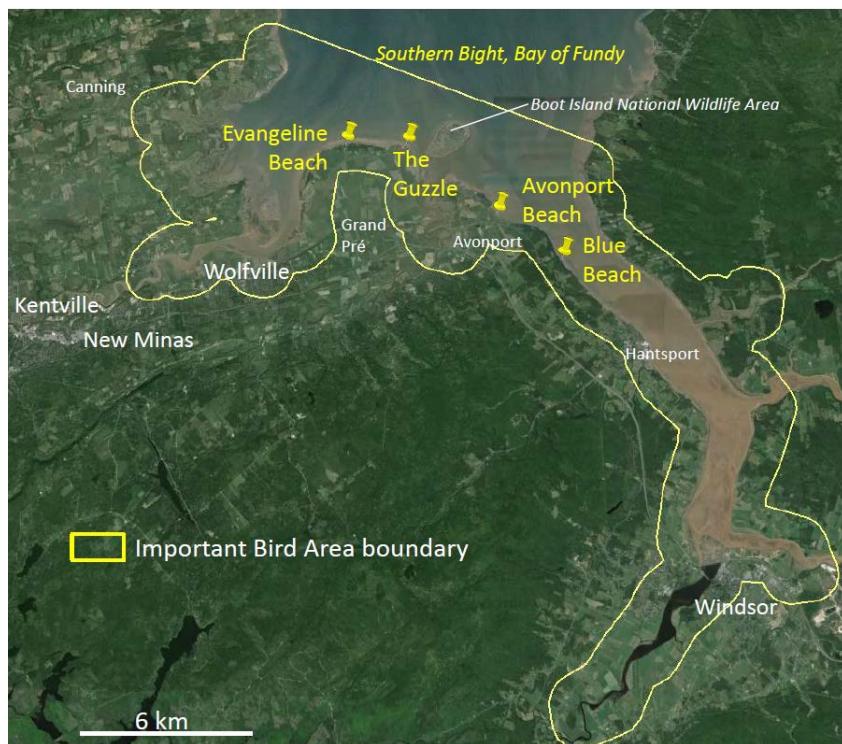
Expected Outcomes:

- a) Blomidon Naturalists Society (BNS) volunteers provide on-the-ground support to identify timing of peak shorebird migration in 2016. *Target= 40 volunteer hours*
- b) Numbers and types of coastal users and patterns of use of activities gathered at each roost site during high-tide periods of peak shorebird migration (August). *Target= 20 visits to four sites including min. five visit/roost site and min. one night-time roost visit.*
- c) Habitat use by roosting shorebirds also mapped during site visits.
- d) Disturbance events recorded during each site visit.
- e) Contacts obtained from coastal users (e.g., walkers, fishers) at roost sites to engage in development of conservation strategies (project year-2). *Target= min. two contacts obtained.*

Project Outcomes:

- a) We exceeded our target of 40 hours volunteer support. Nine volunteers provided 48.5 hours of on-the-ground support, particularly during night surveys at roost sites.
- b) We doubled our target of 20 visits to four roost sites. We conducted 40 visits to four roost sites with a minimum of nine visits/roost site and a minimum of one night-time roost visit. We gathered numbers and types of coastal users and patterns of use of activities at each roost site during high-tide periods of peak shorebird migration (August-early September).

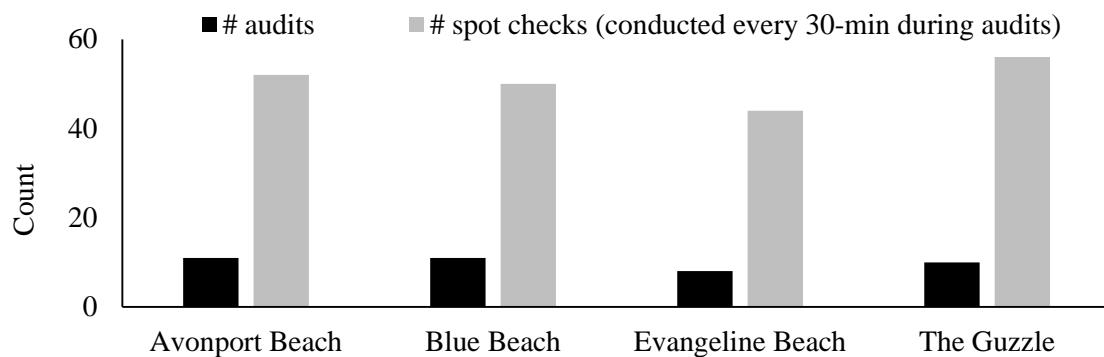
Figure 1. Map of Southern Bight, Minas Basin Important Bird Area and four shorebird roost sites.



Methods for assessing types, numbers and patterns of human-use at roost sites were developed for the project. Methods were adapted from Burger and Niles (2013) and Ravenscroft (2012). A total of 40 site audits comprised of 202 spot checks were conducted at Avonport Beach (11 audits; 52 spot checks), Blue Beach (11; 50), Evangeline Beach (8; 44) and The Guzzle (10; 56) during peak shorebird migration in August 2016 (**Figure 2**). Site audits occurred within the period of two hours before and after peak high tide for a maximum effort of four hours. Spot checks were used to document total numbers and locations of recreational users and shorebird flocks present at the roost site over the course of an audit. Spot checks involved the observer conducting a visual sweep of the roost site at the start of each audit and at subsequent 30-minute intervals until the end of the audit. Spatial use of individual and groups of recreational users were also noted on site maps during each spot check. Numbers, locations and causes of shorebird disturbance incidents were recorded any time during audits.

Numbers and types of recreational users were summed for each roost site and divided by the number of spot checks per beach to provide mean number of incidents per spot check (Table 1).

Figure 2. Numbers of site audits (conducted within two hours of peak tide) and spot checks (data collection at 30-minute intervals during audits) conducted at four shorebird roost sites.



Numbers and types of recreational users were summed for each roost site and divided by the number of spot checks per beach to provide mean number of incidents per spot check (Table 1).

Table 1. Mean number of recreational users per spot check at four shorebird roost sites (top three in bold)

Recreational user type	Avonport Beach	Blue Beach	Evangeline Beach	The Guzzle
Birder	0.03	0.03	0.35	0.64
Boater	0.17	0.03	0.07	0.01
Dog walker	0.08	0.12	0.06	0.09
Fisher	0.05	0.89	0	4.11
Fossil hunter	0	0.79	0	0
Sunbather	4.36	0.38	0.47	0.13
Swimmer	1.15	0.03	0.66	0.08
Walker	1.45	0.73	1.19	0.51

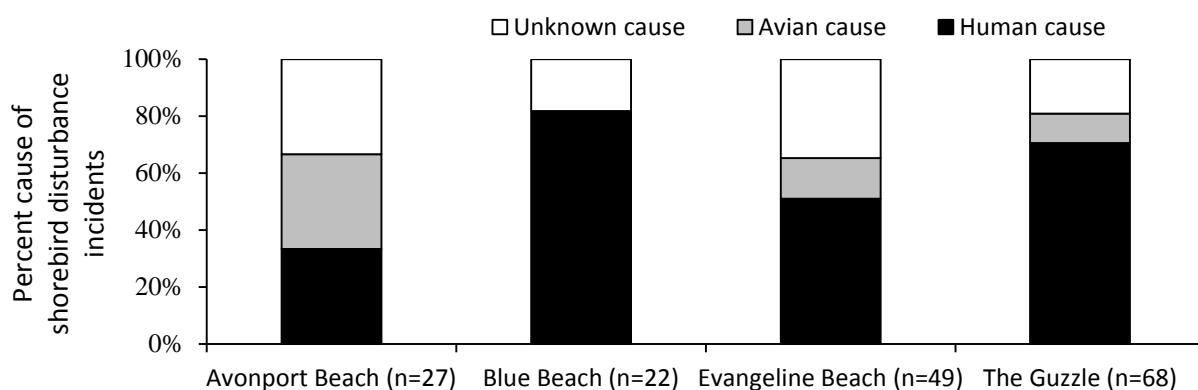
Types and mean number of recreational use varied between the four sites (Table 1). Top three recreational users at Avonport Beach were sunbathers, walkers and swimmers; at Blue Beach were fishers, fossil hunters and walkers; at Evangeline Beach were walkers, swimmers and sunbathers; and at The Guzzle were fishers, birders and walkers. Highest mean number of recreational users observed were sunbathers at Avonport Beach (mean 4.36) and fishers at The Guzzle (mean 4.11). Walkers were among the top three users at all four sites and the top user at Evangeline Beach.

c) Habitat use by shorebirds at each roost site was mapped during site visits in order to understand how shorebirds used each site and where these uses came into conflict with human uses. We delineated the extent of use by flocks and categorized each polygon by flock size. We plotted shorebird flocks at Evangeline and Blue beaches using Google Earth. Thanks to support from a co-op student interning at Canadian Wildlife Service in fall 2016, extensive mapping for The Guzzle and Avonport was done using Arc GIS (see Appendix 1 Project Maps).

d) Incidents of shorebird disturbances were documented over the course of audits, including location and size of shorebird flock disturbed and cause of disturbance. A total of 166 disturbance incidents were documented. The highest number of incidents was at The Guzzle (68) followed by Evangeline Beach (49), Avonport (27), and Blue Beach (22) (Figure 3). Shorebird disturbance incidents were mapped for all sites (see Appendix 1. Project Maps). Support from a Canadian Wildlife Service co-op student intern allowed us to identify disturbance ‘hot spots’ using kernel density analysis at The Guzzle and Avonport Beach.

Overall, humans caused 60% of all disturbance incidents, followed by unknown (26%) and avian (14%) causes. A disturbance incident was categorized as unknown if the observer could not determine an apparent disturbance vector. Avian-caused disturbances were mostly due to attacks by Peregrine Falcon (*Falco peregrinus*), but also included other predatory birds as well as American Crow (*Corvus brachyrhynchos*) and gulls (*Larus sp.*). The proportion of human-caused incidents varied by site. Blue Beach had the lowest number of disturbance incidents recorded, but 82% were caused by humans – the highest proportion among all four sites. The Guzzle had the second highest percent of human-caused disturbances (71%). Just over half of disturbances (51%) at Evangeline Beach were human-caused. Avonport Beach had the lowest percent of human-caused disturbances (33%).

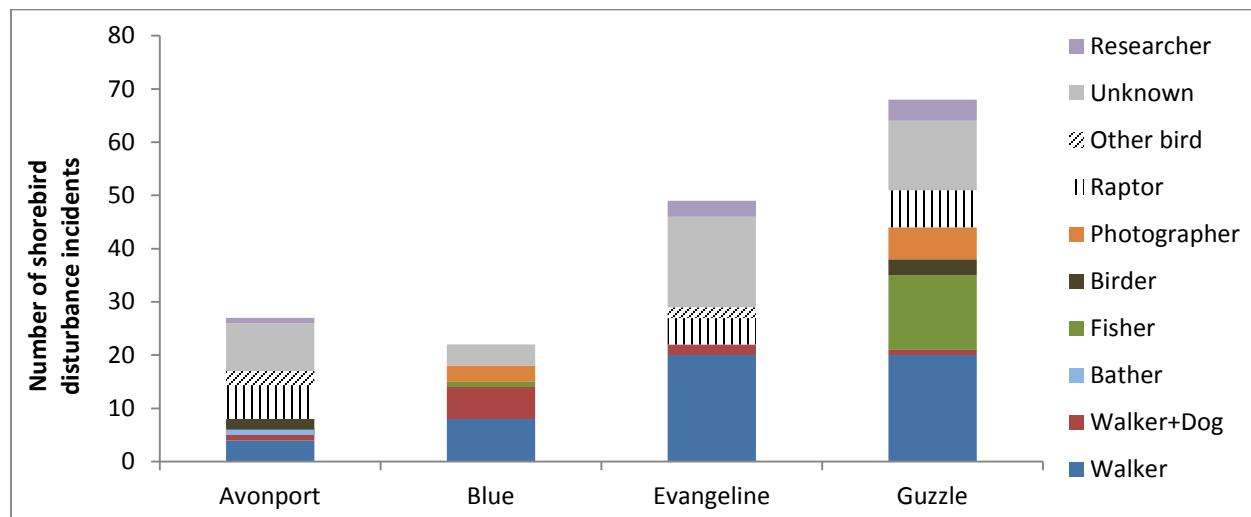
Figure 3. Percent of unknown, avian and human caused shorebird disturbance incidents at four roost sites during site audits (n= number disturbance incidents documented at each site).



Walkers caused 31% of the 166 shorebird disturbance incidents at the four roost sites and were the leading cause of shorebird disturbance at all sites except Avonport Beach (Figure 4). Yet, walkers did not represent the highest mean recreational use during spot checks with the exception of Evangeline Beach (Table 1). The impact of walkers on shorebirds is not surprising given that their movement around the

site leads to a higher likelihood of interacting with shorebird flocks. Fishers at The Guzzle were the highest mean recreational user and were the second leading cause of disturbances at this site (21%). Fishers movements tend to be more restricted, as they stay near their fixed fishing rods along the shore. Off-leash dogs are a main cause of shorebird disturbance at many coastal sites (e.g., Murchison et al. 2016). The presence of dog walkers at the four Minas Basin roost sites in 2016 was notably low (maximum 3 observed during a spot check) and walkers with dogs did not represent a significant cause of disturbance to flocks with the exception of Blue Beach (27%).

Figure 4. Causes of shorebird disturbance incidents by type at four roost sites during site audits



e) We obtained 17 contacts obtained from coastal users (e.g., walkers, fishers) at roost sites (minimum three at each site) during interviews (see Activity #3 for more information) whom we hope to engage in the development of conservation strategies (project year-2 and -3).

Activity #3: Interviews conducted with local experts, including land owners, nearby residents and habitat managers

Expected Outcomes:

- Information about type, volume and timing of human activities (e.g., main coastal access points, nighttime use, motorized vehicle use) and shorebird use provided by local experts and identified on site maps. *Target= Eight local expert interviews including min. two individuals with local expertise interviewed at each roost site.*
- Additional information about human threats at roost sites will supplement information gathered through site visits.

Project Outcomes:

- To further improve our understanding of human and shorebird use at key roost sites, we gathered information from nine individuals (target= eight) with extensive past history and knowledge about shorebirds in the Minas Basin and specific roost sites as follows:
 - NS DNR (2): Donald Sam and Glen Parsons
 - Env. & Climate Change Canada's Can. Wildlife Service (1): Julie Paquet
 - Blomidon Naturalists Society (2): Rick Whitman and Richard Stern
 - Evangeline Beach (2): Two interviews with motel owner and a cottager

- Avonport (1): Reached out to 4 cottages/ houses, and interviewed one
 - Blue (1): Blue Beach Fossil Museum owner
- b) During site audits, we documented all vehicles and vehicle tracks observed as well as evidence of bonfires. Avonport Beach had the highest levels of vehicle use due to the easy access from the road onto the beach. Motorized vehicle tracks were also observed at The Guzzle.

Activity #4: Identify “roost risk zones” based on information gathered from site visits and expert interviews with project partners.

Expected Outcomes:

- a) Top threats to shorebirds and habitats identified at each roost site.
- b) Maps developed showing “roost risk zones” where human activities potentially conflict with shorebird roost habitat. *Target= Roost risk zone map generated for each roost site.*
- c) Information gathered and “roost risk zone” maps will inform development of conservation strategies to be piloted during project year-2 and year-3.

Project Outcomes:

- a) Overall, walkers were the main source of human-caused disturbances to shorebird flocks leading to a total of 100 out of 166 (60%) disturbance incidents (Figure 4). We identified walkers as the top disturbance threat to roosting shorebirds at Blue, Guzzle and Evangeline roost sites. Excluding incidents with unknown causes, raptors caused the most disturbances to flocks at Avonport.
- b) Maps were generated for each site showing extent of use of shorebird flocks and locations of shorebird disturbance incidents see Appendix 1. Project Maps). “Roost risk zones” were identified at each site. For The Guzzle and Avonport beach, a more in depth assessment was conducted by a Canadian Wildlife Service co-op student during fall 2016 using kernel density analysis. Results highlighted two hot spots at each site where shorebirds were disturbed by human activities.
- c) We presented mapping results to project partners at the January 2017 meeting. These results directly informed recommendations for next steps, specifically with regard to selecting priority sites for targeted conservation actions and identifying exact locations at each site on which to focus disturbance reduction interventions (also see Activity #5 outcomes).

Activity #5: Establish next steps for engaging coastal users in developing effective conservation strategies at key roost sites.

Expected Outcomes:

- a) Completion of plan to engage coastal users in developing effective conservation strategies at key roost sites during peak migration of 2017 (year-2 of project). *Target= Plan developed before spring 2017.*

Project Outcomes:

We held a meeting with project partners in January 2017 to present key results from site audits, identify two priority sites to focus conservation actions in 2017 and 2018 and discuss next steps. A complete summary of discussions and recommendations for all sites can be found in Appendix 2. Project Partner Meeting Notes. The Guzzle and Avonport Beach were selected as sites to target conservation actions in 2017 and 2018. Though Evangeline supported high numbers of shorebirds and higher levels of human-caused disturbance, its extensive private ownership and limited habitat at high tide (due to armouring)

did not make it an ideal choice to focus concerted conservation action compared to The Guzzle and Avonport. The group recommended that Evangeline Beach remain as a “celebration” or “honour” site for shorebirds and that existing interpretive materials be supported and refreshed. Blue Beach had the lowest shorebird use and was thus identified as a lower priority site; however, key stewardship messages for beach users should be promoted at site particularly around off-leash dogs.

Acknowledgements

We are extremely grateful for the support from the NS Habitat Conservation Fund Contributions from Hunters and Trappers. We also thank our project partners who provided unique expertise, skills and insights into the project. BNS’s Rick Whitman provided valuable local knowledge of Minas Basin roost sites and shared data on shorebird usage patterns through eBird.ca. Dal-SRES’ Dr. Kate Sherren and Dr. Karen Beazley provided expertise in project development, questionnaire design and analysis of interview data. EHJV’s Glen Parsons and NSDNR’s Mark Elderkin and Donald Sam provided important historic perspective on shorebird conservation activities at roost sites as well as guidance on project planning and methods. ECCC-CWS’s Julie Paquet supported project planning. NCC’s Kerrie-Lee Morris Cormier shared her expertise managing shorebird roost site at NCC’s Johnson’s Mills site. We also acknowledge Acadia University’s Dr. Trevor Avery for providing insights into striped bass ecology and recreational fishing at shorebird roost sites and for reviewing the interview questionnaire.

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