Bird Studies Canada
Final Report for Nova Scotia Habitat Conservation Fund 2016-17

Project Title: Risk hotspot identification for colonial seabirds in Nova Scotia

Background

Coastal and near-shore marine habitat is vulnerable to a wide range of anthropogenic disturbances, ranging from terrestrial light pollution, fishing, marine vessel traffic, to small-scale oil pollution. Seabirds are an important component of our ecosystems and biodiversity within the coastal and near-shore region, and which are at-risk to anthropogenic activities that overlap with their breeding and foraging habitats. Anthropogenic activities pose risks to seabirds through exclusion from feeding sites, disturbance at breeding sites, and mortality from direct interactions. This project focuses on multiple species across a wide range of coastal habitats. By collating and analyzing available data, we will 1) model seabird distributions during the breeding season, 2) create a geo-database of anthropogenic risks to coastal seabirds, and 3) overlay species distribution data with anthropogenic risk to identify and prioritize top threats and key spatial areas in need of conservation action. This project is important because it offers an assessment of cumulative effects of multiple-stressors, ultimately, leading to mitigation of threats for the prevention of the loss of seabird biodiversity in the Atlantic Canada.

Specific to Nova Scotia, where coastlines support a diverse and abundant community of both breeding seabirds and human activities, our approach was to use data on colony locations, colony size, and seabird foraging ranges, to determine the spatial "footprint" of seabird colonies in Atlantic Canada. Concurrently, we also compiled compiling geographic data on human activities to assess overlap and risk to seabird distributions during the breeding season. Background research identified that there were key gaps for particular species and regional representation of tracking data. One important gap was for Black Guillemots; although the species is widely distributed in coastal Atlantic Canada, it was under-represented in the seabird colony and tracking database, which is a concern given that the guillemot is particularly sensitive to coastal oil, and relevant to offshore oil and tanker safety issues. We set out to study the movements of Black Guillemot colonies in Nova Scotia to identify important foraging habitats for marine birds,

and incorporate these data into a broad-scale risk-assessment which will identify top threats and key areas in need of conservation action.

In 2015, with federal funding from the Atlantic Ecosystems Initiative, Bird Studies Canada initiated a 3-year project investigating risk to breeding seabirds in New Brunswick, Nova Scotia, and Newfoundland. During phase 1, we began species distribution modeling and the collation of anthropogenic risk layers. Species distribution models are based on colony locations, weighted by colony size, and use of tracking data to estimate the spatial footprint of colonies. After collating tracking data from partner institutions, **data gaps identified included a lack of information on Black Guillemot** which included data from only 3 individuals tracked at one colony, Country Island. **In 2016, funding from the Nova Scotia Habitat Conservation Fund was used to implement new tracking work on Black Guillemots in Nova Scotia**. Obtaining these new data was needed provide a more robust sample size for species distribution modeling and greater representation of New Brunswick colonies. This will increase the accuracy and relevance of our results to risk assessment and conservation efforts.

Project goal and objectives

Our broader project aims to combine information on seabird distributions during the breeding season and anthropogenic risks in coastal Atlantic Canada, in order to better understand and prioritize threats and spatial areas in need of conservation action in the region. This aim requires attention to several components, including filling key gaps for species important in coastal Nova Scotia. Our NS HCF project helped fill a gap on Black Guillemots, from one of the species' larger colonies on Country Island, Nova Scotia. Our project objectives were to:

1. Obtain tracking data for Black Guillemots from colonies in Nova Scotia. This will increase our knowledge of their local habitat use and foraging ranges.
2. Create distribution models for these species for all colonies in the Maritimes. This will identify the spatial "footprint" of Black Guillemots.
3. Incorporate these data into an Atlantic-wide analysis of threats to breeding seabirds. We will compare relative risk levels within regions and among provinces; this will identify, rank and prioritize areas of high conservation concern, or risk hotspots.

Objectives 1 and 2 were fully met and are reported on in the accompanying scientific report (see Appendix 1). Data for Black Guillemots is now incorporated into a tracking database, and the resulting analyses will be incorporated into Objective 3; Objective 3 is a larger task (from a data processing perspective) and will be met during the completion of the larger Atlantic Ecosystems Initiatives project in 2018.

Outline of the work completed

- May 2016 – fieldwork planning and hiring field technician
- June/July 2016 – fieldwork completed, with technicians carrying out research on Black Guillemots on Country Island, N.S. Five tracking devices were deployed on breeding guillemots on Country Island.

- October 2016 – March 2017: Data cleaning and compilation (of guillemot and other seabird data), statistical analyses, seabird distribution modelling; report writing; financial information compiled.
- Final report submitted April 2017.

Results

We successfully deployed tracking devices on Black Guillemots on Country Island in 2016. Despite some technical difficulties with the GPS units impeding data collection, we successfully collected data from 2 tracking units, resulting in 6 tracking-days and 147 new tracking locations for the database. This, combined with matching data collected in New Brunswick (Kent Island) and some existing data, significantly improves the representation of this species in the tracking database (see Table 1 in attached technical report). As well, this approach provided an innovative, practical, and high-precision means to quantify habitat use by guillemots in coastal areas.

Using this data, we created species a distribution model for Black Guillemots for the entire coast of NB and NS, which highlights not only the important colonies, but the key foraging areas surrounding these colonies (see Figures in attached technical report). This information has helped outline important areas of use in coastal areas of Nova Scotia.

2016-17 Project Activities, Objectives, Achievements

Activities	Objectives	Achievements
Tracking of Black Guillemots in Nova Scotia (Country Island)	- tracking of guillemot foraging trips during the breeding season - identify the proportion of time spent in different habitat types - quantify foraging ranges including maximum and typical distances from the colony	- 5 tags deployed in 2016 on Country Island; due to technical difficulties, only data from 2 tags was successfully retrieved. -6 tracking days and 147 GPS locations to describe foraging trips - foraging ranges described (maximum 11.6 km from colony and 4.8 km from any shoreline); this information fills a key gap in our understanding of guillemot habitat use along Atlantic coastline.
Compilation and data analysis	- data compilation and analysis	- guillemot tracking data cleaned and compiled -guillemot data compiled into our larger seabird tracking database -species distribution modelled for Atlantic coastline (see Figures in attached technical report). -Risk hotspot analyses is ongoing (will be completed in 2017-18)

Recommendations for follow-up steps to the project

Future steps that will be a natural continuation of this project:

- quantify and publish (eg. in peer-reviewed journal) the foraging ranges for a suite of species in Atlantic Canada.
- complete our risk hotspot analysis, for this species and the other seabird groups that are included in our seabird tracking database.
- for each species, and also for the suite of species combined, Identify specific risks and colonies where conservation measures can be improved, to mitigate threats to breeding seabirds
- connect key colonies with the Important Bird Area (IBA) caretaker network where possible.