

## **Arctic Shorebirds in North America: A Decade of Monitoring.**

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Source: Arctic, Antarctic, and Alpine Research, 45(2) : 296-297

Published By: Institute of Arctic and Alpine Research (INSTAAR),  
University of Colorado

URL: <https://doi.org/10.1657/1938-4246-45.2.296>

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## Book Reviews

ARCTIC SHOREBIRDS IN NORTH AMERICA: A DECADE OF MONITORING. Edited by Jonathan Bart and Victoria Johnston. Berkeley, Los Angeles, London: University of California Press, 2012. 302 pp. \$80.00 (hardcover). ISBN: 9780520273108.

Over 10 years ago, biologists from Canada and the United States met to find a way to improve their understanding of shorebird populations given growing evidence that many of these species were declining throughout the world. ARCTIC SHOREBIRDS IN NORTH AMERICA: A DECADE OF MONITORING offers a 15-chapter report on the first 10 years of the ambitious Arctic component of the Program for International and Regional Shorebird Monitoring (PRISM).

Chapter 1 provides an overview of the book, set against the goals and objectives of the PRISM program and the three tiers of the Arctic PRISM program. Most of the book focuses on the goal of estimating the North American populations of 26 Arctic breeding shorebird species, while describing their distributions and coarse habitat relationships with a view toward doing repeat surveys to identify trends in populations. Chapter 2 provides a brief but sufficient description of the methods used to develop a sampling frame capable of meeting the quantified goal of detecting a 50% decline in each species' population over 20 years, with 80% power and at a significance level of 0.15. The method relies on double sampling at an optimal number of intensively surveyed areas in order to derive detection rates that can be used to calibrate the more numerous rapidly surveyed areas. Evident throughout parts of the book are how this method was developed through careful reassessment and continued adaptation of the methods to yield the best results, something all too rare in most monitoring programs and rarer still at such vast geographic scales.

Chapters 3–8 highlight regional reports. These reports have slight repetition of points not uncommon in multi-authored books, but the reports are mostly unique, providing different understandings of Arctic shorebirds as well as many other birds found in previously unsurveyed parts of the Arctic. These sections are full of tables with estimated densities, detection rates, and coarse habitat associations, as well as a number of regional distribution maps. No doubt this information will prove valuable when conducting environmental impact assessments for projects in the Arctic, as well as for others working in the Arctic or with an interest in Arctic birds. The species-by-species accounts highlight the scale of the contribution of this work, not just for shorebirds, but many Arctic birds. Several of the chapters note some of the regional limitations of these methods. For example, a few found habitat classifications were too coarse to confidently extrapolate densities at the regional scale, or to define finer-scale habitat associations. Further, within regions all suitable habitats were not sampled, a lack of access restricted the ability to survey completely randomly, survey timing could have biased results at individual plots, detection rates varied for some species, and some species were not uniformly distributed

across the habitat strata used, e.g. the semi-colonial ruddy turnstone. Some authors highlighted that many of these limitations at a regional level would likely be overcome by increased sampling, and most of these problems were thought to have been overcome at the overall geographic scale of the North American Arctic (Chapter 14).

Chapter 9 highlights the value of aerial surveys conducted while traveling between plots for all Arctic birds, and Chapter 10 highlights how aerial surveys can overcome the problems with overestimation of territorial whimbrel that tend to mob ground surveyors.

Chapter 11 highlights some of the fascinating demographic work that has been ongoing in Arctic breeding shorebirds (Tier 2 of the Arctic PRISM program). This is the kind of work that will be needed to uncover any links between changes in shorebird populations and changes in the Arctic environment, i.e. changes related to climate change and human activity. The study that indicated that nest survival was most related to densities of predators rather than either lemming abundance or weather fluctuations was perhaps the most surprising result of this chapter.

Chapter 12 provides a summary of the utility of bird presence-or-absence checklists in detecting some trends in common species, while chapter 13 evaluates the Arctic PRISM program to date and recommends the ideal sampling frame based on quantitative analyses. Chapter 14 provides a summary of results and highlights how the work so far has resulted in revised population estimates for 17 species of shorebirds, many of which are now believed to be more abundant than previously thought and which resulted in revised range maps in some cases. The final chapter highlights the priorities for future PRISM surveys including expanded coverage, increased sampling, additional data collection, and standardized aerial surveys, all of which allow for previously impossible density comparisons across time and space.

In an appendix, authors explain why a lack of representative and unbiased sampling in both demographic studies and non-breeding population counts currently conducted across North America result in less certainty regarding changes in shorebird populations than widespread double sampling across the North American Arctic. I agree with this point, assuming any problems of spatial and temporal heterogeneity in densities are overcome with surveys in the Arctic at the geographic scale. The authors indicate that certainty in population trends of Arctic breeding shorebirds will continue to remain too low in demographic or non-breeding surveys unless there are significant improvements in sampling. Huge increases in sample sizes and spatial representativeness for demographic studies are required, while in non-breeding habitats, sampling sufficient to account for possible movement away from areas being sampled, or changes in time spent at stopover sites, are needed. Perhaps as the authors point out at the end, the combination of threats to these birds and growing evidence that they are in trouble are sufficient reasons to invest in still more rigorous monitoring, inclusive of improved demographic and non-breeding surveys adequate both to uncover population trends as well as to identify a fuller set of potential drivers of any declines for more species.

DOI: <http://dx.doi.org/10.1657/1938-4246-45.2.296>

To conclude, 26 species of migratory shorebird were targeted in Tier one of the Arctic monitoring program, and improved population estimates were derived for 17 of those species. The incredible effort brought together a wealth of information on avian abundance and distribution on birds from areas in the Arctic not previously surveyed. So far the program has provided improved population estimates and range distributions for many of these birds. The program has also detailed the strengths and weaknesses of a double sampling method, and left little doubt that this program should provide improved population estimates and trends for up to 24 shorebird species breeding in North America's Arctic, albeit over relatively long time scales.

Unless this effort is repeated we will gain no information on apparent changes in population densities of these species in the Arctic in the next decade or two. Most agree that climate change will continue to change the Arctic environment, but without this program continuing it seems unlikely that a meaningful assessment of the impact of those changes on these species populations would be delivered at levels of certainty increasingly demanded. This book makes a good case for not only the continuation of this program but also for the expansion of the program to help test predicted densities in yet-to-be-surveyed areas, while also looking to discover if increased sampling, finer-scale habitat modeling, and improved timing of surveys may improve the precision of density estimates at regional scales.

ARCTIC SHOREBIRDS IN NORTH AMERICA: A DECADE OF MONITORING provides a solid overview of a huge contribution to our understanding of Arctic shorebird and other Arctic bird distributions. It will provide a useful resource with many good citations, figures, and maps for those conducting environmental assessments in the North American Arctic, for those at all interested in shorebird conservation, for those interested in monitoring especially for cryptic and widespread species, for those interested in Arctic ecosystems generally, and for those seeking an understanding of the history and best available methods for monitoring shorebird populations in the Arctic.

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HERSCHEL ISLAND—QIKIQTARYUK: A NATURAL AND CULTURAL HISTORY. Edited by Christopher R. Burn. Calgary: University of Calgary Press, 2013. 138 pp. \$51.95 (hardcover). ISBN 0988000903.

This book is a collection of essays and photos that document the natural and anthropological history of the westernmost island in the Canadian Arctic. Herschel Island, or *Qikiqtaryuk* as it is called in the Inuvialuit language, lies to the west of the Mackenzie Delta in the southeastern Beaufort Sea. Nominated as a UNESCO World Heritage site in 2004, the island has a complex history of

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aboriginal, European, American, and Canadian occupation that has been shaped by a unique natural setting. Prior to the book's publication in 2012, the only account of the island's integrated natural and cultural heritage was a published oral history. Just as Herschel Island is a place where natural and human history is inextricably linked, so are the chapters of the book.

As a self-described "northern story by northerners" (over half of the contributing 43 authors live north of 60°), the book is a multidisciplinary research collective that summarizes Herschel Island's geology, geography, climate, oceanography, flora, fauna, archeology, culture, governance, and historical conservation efforts. Structured like a short encyclopedia, each section of the book is written by experts specializing in a specific aspect of the island's physical, biological, or cultural history. Following the introduction, five chapters are divided into smaller subsections that focus on a particular topic. Chapter subsections are grouped together by color, lending to the overall organization and visual character of the book.

Following an introduction to the "Yukon's Arctic Island," place names, and the family for which the island was named, the next two chapters of the book describe the physical setting, flora, and fauna of Herschel Island. Herschel Island was formed during the last glaciation when the ice sheets of northern Canada advanced over the Yukon coast into the Beaufort Sea. The northern tip of the ice sheets pushed up a mass of frozen sediment from the continental shelf, creating the positive topography of the island and scouring a deep basin adjacent to the landmass. Upwelling of nutrient-rich water in a submarine canyon close to the island supports the primary productivity that in turn maintains large populations of seals and whales. On the island's surface, the abundance of summertime tussock cottongrass meadows has enabled large herds of caribou to flourish. Freshwater outflows from the Mackenzie River mix with Arctic seawater around the island, sustaining several species of anadromous and marine fish. The thriving coastal ecosystem and bountiful fish and game have attracted humans to Qikiqtaryuk for at least 800 years, the longest recorded Inuvialuit occupation yet found in the Canadian Arctic.

The abundance of whaling, fishing, and hunting stock attracted more than just aboriginal communities to Herschel Island. The position of the island between the Alaska North Slope and the Mackenzie Delta also made it a preferred moorage for Canadian, European, and American ships traveling the Arctic coast. The following two chapters of the book pick up the story of the island's history where humans began migrating to the island, and focus on the development of Qikiqtaryuk as a whaling and trade center. The physical setting of the island provided one of the only accessible safe harbors for ocean-going vessels in the Beaufort Sea, particularly during harsh winters. This also made it a convenient and accessible base for whaling operations beginning in the late 19th century. Word spread quickly to southern whaling operators that Herschel Island offered an ideal combination of safe over-wintering and Arctic waters teeming with whale stock. Once discovered, the island quickly became a boomtown of trade between the Inuvialuit and Euro-Americans. The buzz around Herschel Island led to immediate social and cultural change, resulting in the development of infrastructure, and the arrival of missionaries, police, and ultimately disease.

The last section of the book describes conservation efforts and modern governance of the island. Today, Qikiqtaryuk is recognized