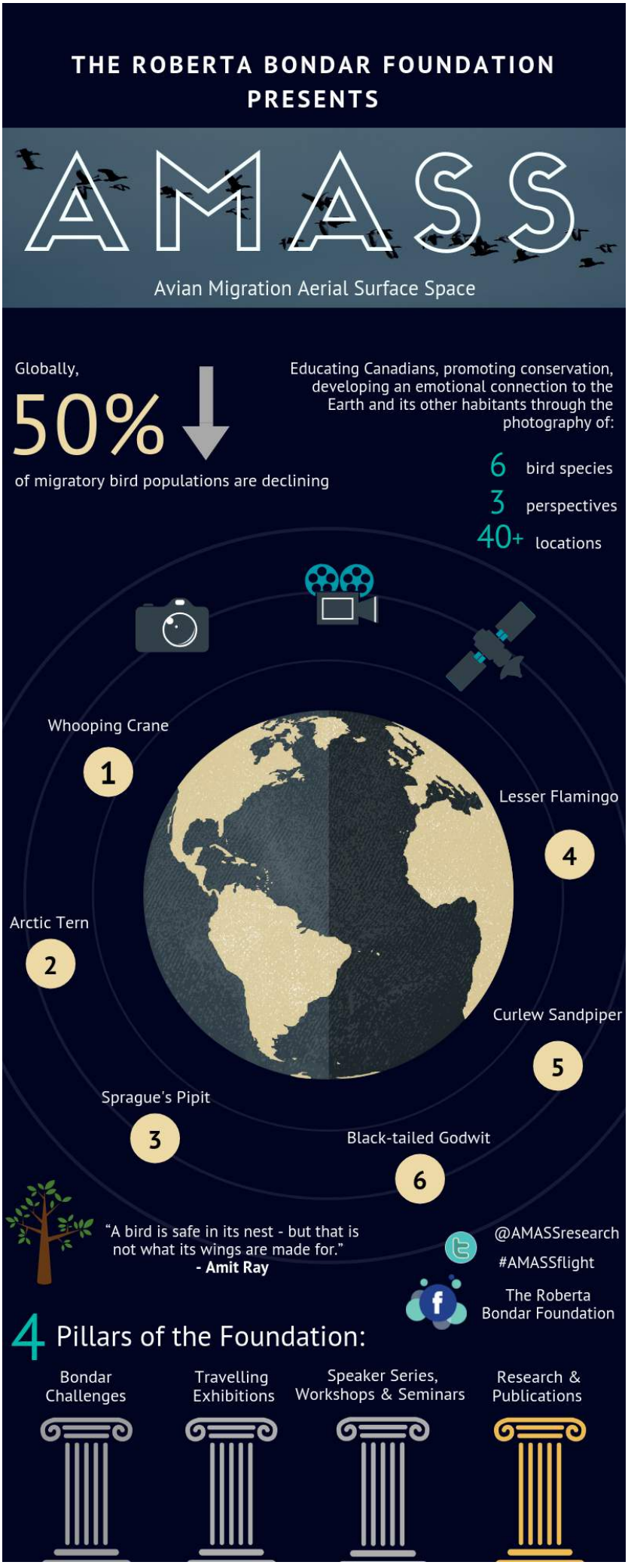
AMASS

Summer 2018 report



PREAMBLE

This document will provide insight into the most recent advances in the **AMASS** (**A**vian **M**igration **A**erial **S**urface **S**pace) project. This document is prepared for our partners, donors and supporters. We outline the project's objectives, evolving research and The Roberta Bondar Foundation's current activities.

BACKGROUND

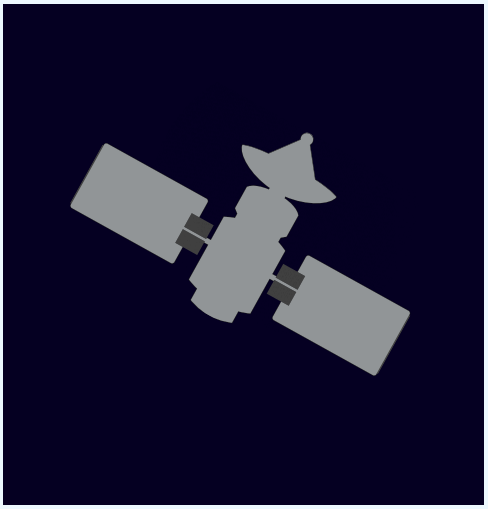
AMASS is The Roberta Bondar Foundation's newest project, inspired by the natural phenomena of avian migration coupled with Dr. Bondar's lifelong passion for flight and her view of Earth. It stems from the Foundation's fourth pillar, *Research & Publications*, which was implemented to increase awareness, educate and contribute to the world knowledge of biodiversity, its challenges and its needs for continuous support. This interdisciplinary project supports the foundation's mandate: fusing environmental science, biology and dynamic imagery through photography of the natural world to generate engagement, creativity and ethical responsibility for the natural environment.

The ROBERTA BONDAR FOUNDATION™

OBJECTIVES

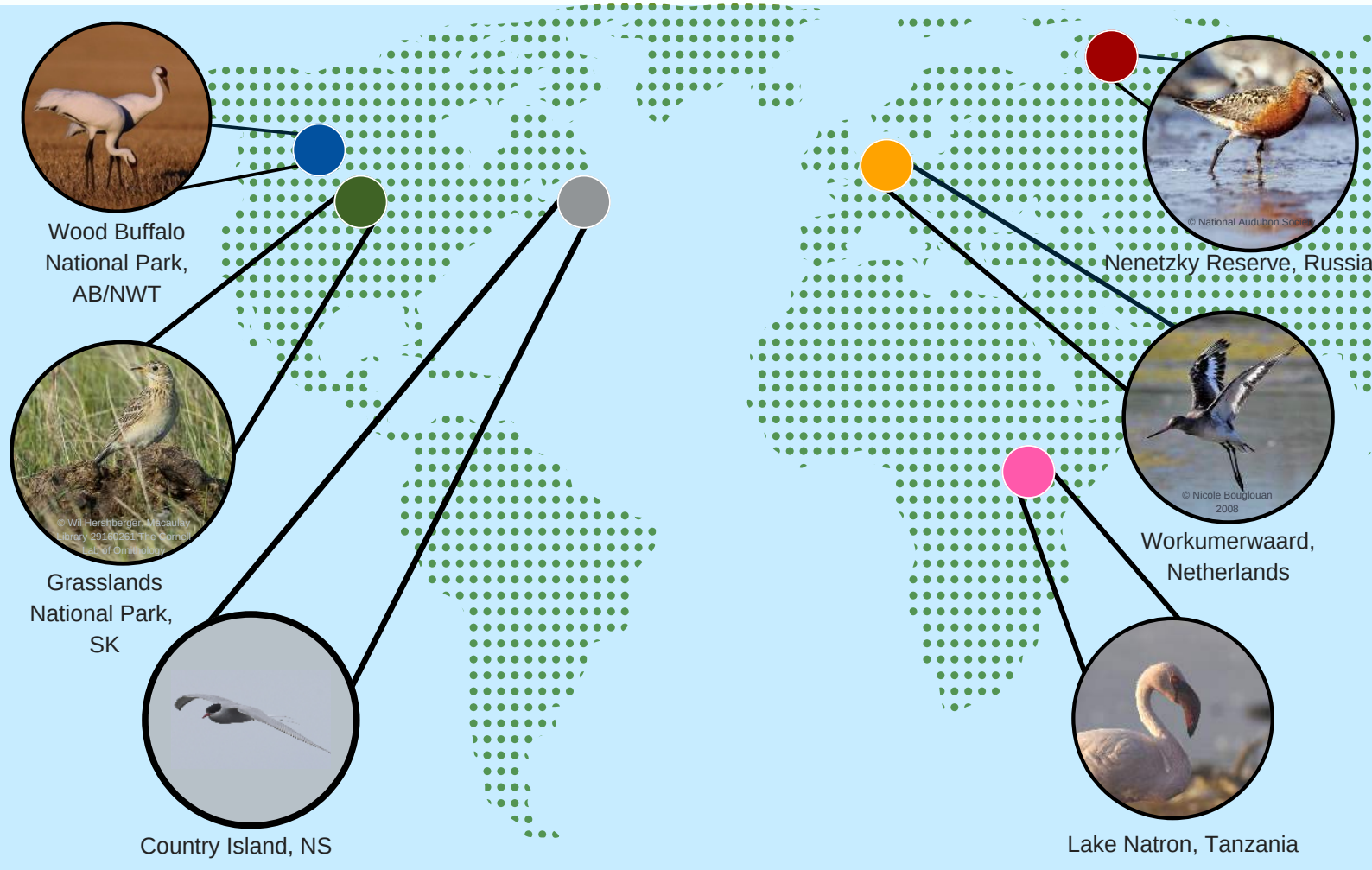
A. Compile a list of coordinates of nesting areas, stopover areas and favoured seasonal habitats for photography of each species in North America and Europe-Asia-Africa

B. Compile an electronic binder containing information on the six species



C. Develop a virtual fly-over video using satellite imagery for the Whooping Crane and one African species

▼ Achieving Objective A requires the Foundation to travel to breeding sites of each of our six species. Starting with the Whooping Crane (top-left corner and going counterclockwise), we are photographing the Sprague's Pipit, the Arctic Tern, the Lesser Flamingo, the Black-tailed Godwit and the Curlew Sandpiper.



HIGHLIGHTS

- Since **May 2018**, we have added three more partners to the project: the Secretariat of the Convention on Biological Diversity-UN Environment Programme, the Fish Wildlife and Lands Branch (Ministry of Environment, Government of Saskatchewan) and the Royal Canadian Geographical Society.
- In **June 2018**, we hired a research assistant to work specifically on AMASS.
- In **July 2018**, Dr. Bondar was a Keynote speaker at the Subsidiary Body on Implementation-UNEP conference in Montreal, CA.
- In **August 2018**, we completed an expedition to Wood Buffalo National Park to obtain aerial photography of the Whooping Crane with the help of the Royal Canadian Geographical Society.

▼ **Picture 1.** Clip from video taken over Wood Buffalo National Park wetlands

WHOOPING CRANE *Expedition*

Grus americana

- **August 2018**: The RBF completed an expedition to Wood Buffalo National Park (WBNP) to obtain aerial photography and 4K videography of the Whooping Crane nesting and breeding grounds.
- WBNP is the second largest conservation area in the world. There is limited ground accessibility to this remote habitat.
- The RBF partnered with Parks Canada, researchers at WBNP and the Canadian Wildlife Service (CWS) to accompany a fire monitoring flight and several Whooping Crane survey flights.
- To avoid disturbing the Whooping Cranes in their breeding grounds, surface photography (including portraits) was not taken.

▲ **Picture 2.** Meeting with (starting from the left, going clockwise around the table): Cam Zimmer, Tim Gauthier, Dr. Bondar, Jean Morin and Lori Parker

▲ **Picture 3.** Flying with helicopter pilot Sarah Blancher

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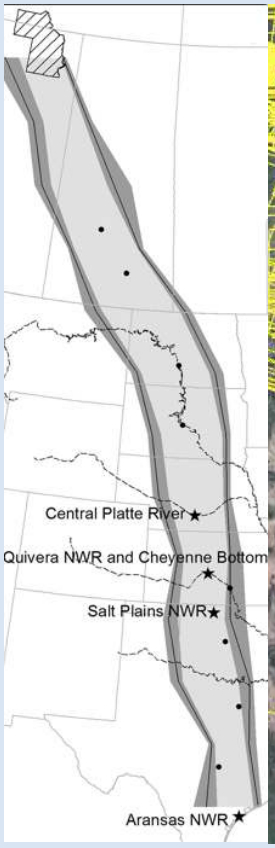
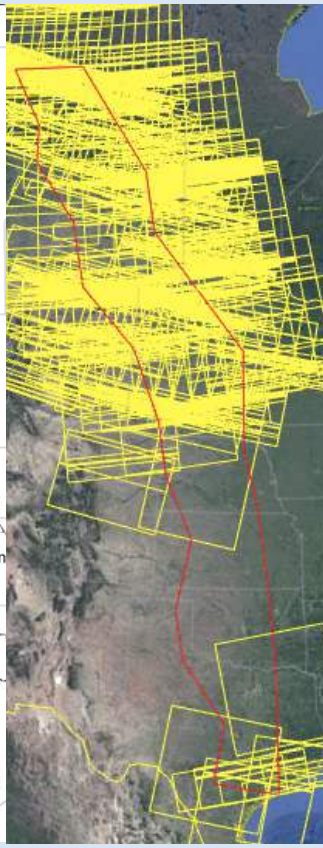
WHOOPING CRANE *Video fly-over*

- **September 2018:** We presented the AMASS project to members of the Canadian Space Agency at the headquarters in Saint-Hubert, Québec.
- After presenting AMASS and the Foundation's vision for the project in detail, there was an opportunity for both parties to ask questions and clarify aspects of both AMASS and the CSA's Earth from Space project.
- Creating a flyover (Objective C) requires the Foundation to use coordinates of the Whooping Crane migratory corridor delineated in the Pearse *et al.* 2018 study entitled "Delineating and identifying long-term changes in the Whooping Crane (Grus americana) migration corridor". We defined the corridor using telemetry monitoring data and opportunistic sightings data (Refer to Fig. 1).
- The Canadian Space Agency added these coordinates into their database to search for images that were previously taken over the whooping crane corridor with both RADARSAT-1 and RADARSAT-2 satellites (Refer to Figure 2).
- For a portion of the Whooping Crane corridor going through the midwestern states, there was no RADARSAT-2 imagery previously taken with our preferred beam mode. The RADARSAT office offered to acquire these images for the AMASS project.

- Using the corridor coordinates and the publicly available Canadian mosaic we started the process of creating a test fly-over video using talent at the ESRS/ARES team at NASA.
- Initial plans for Dr. Bondar to meet the team in January for further discussion regarding the video are in the works.





▲ **Figure 1.** Pearse *et al.* (2018) were able to define the migratory corridor; the map above delineates 95% of the core migratory area with 95% confidence bands.

Figure 2. A polygon was created on Google Earth representing the corridor in Figure 1. The yellow boxes represent RADARSAT-2 imagery in the CSA's database, taken using the ScanSAR Wide beam mode (having a nominal swath width of 500 km).

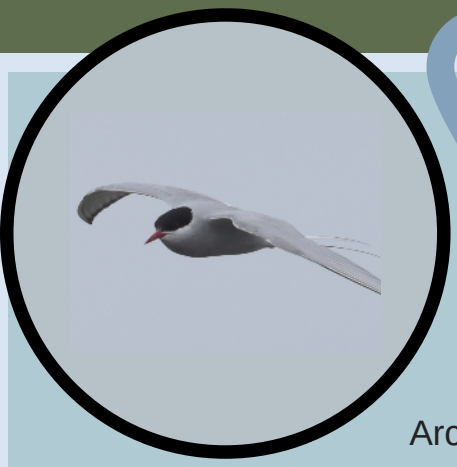
◄ **Picture 4.** AMASS Research Assistant. Rachel Godinho, presenting on behalf of The Roberta Bondar Foundation.

◄ **Picture 5.** The Canadian Space Agency Headquarters

SPRAGUE'S PIPIT

Anthus spragueii

- We have located a breeding area (Grasslands National Park) and two seasonal areas (Aransas NWR and Attwater Prairie Chicken NWR) to photograph the Sprague's Pipit. However, identifying a stopover area has proven to be an arduous task.
- The pipit is a small and elusive bird and it is difficult to photograph them en route to their wintering habitats.
- Unlike the Whooping Crane, there are no traditional migratory stopovers areas.
- One of our contacts, the Saskatchewan representative of both the Mississippi and Central Flyway Non Game Migratory Bird Technical Committees, sent a mass email explaining the Foundation's predicament.
- We ultimately received word of a migratory stopover site in New Mexico. This is interesting because New Mexico is typically not part of the migratory corridor on published range maps.



ARCTIC TERN

Sterna paradisaea

- In July 2017, Dr. Bondar and Prof. Bonnie Patterson embarked on a journey to Country Island, Guysborough, NS to photograph the Arctic Tern from the surface perspective.
- To photograph migrating terns, we have explored the idea of photographing them near one of their pelagic stopover sites, e.g. the Benguela Current, off the coast of Namibia.
- As for photographing the terns in their non-breeding seasonal area, we know there is a concentration of Arctic terns that overwinter in Antarctica, specifically around the Weddell Sea.
- However, the typical Antarctic expedition does not have the Weddell Sea on the itinerary, therefore the Foundation is reviewing alternatives including focusing on another coastal species and reserving the Arctic Tern for a supplementary story.
- Communication via email and teleconferences with the Canadian Wildlife Service and the High Arctic Research Gull Group have been extremely helpful: sharing information and answering our questions on the Arctic Tern, their migratory patterns and their behaviours.

▲ **Picture 6.** Dr. Bondar looking out her binoculars for terns on Country Island, NS on a windy day. The Canadian Wildlife Service and the Canadian Coast Guard assisted the Foundation for this fieldwork.

LESSER FLAMINGO

Phoeniconaias minor

- In Summer 2015, the Foundation travelled to Kenya and Tanzania to photograph the birds of the East African Rift Valley.
- On this trip, we took surface photography, including portraits of the the Lesser Flamingo.
- If we can successfully create a video fly-over for the Whooping Crane, we would like to create a video fly-over following the Lesser Flamingo inter-lake migration route, along the Eastern African rift valley.
- Lesser Flamingo populations are easily threatened by pollution and development. In addition, flooding and/or human activity, such as the salt extraction industry, can easily trigger degradation of lake salinity. This can possibly cause a collapse of their food source, therefore, it is critical to protect their breeding grounds.

CURLEW SANDPIPER

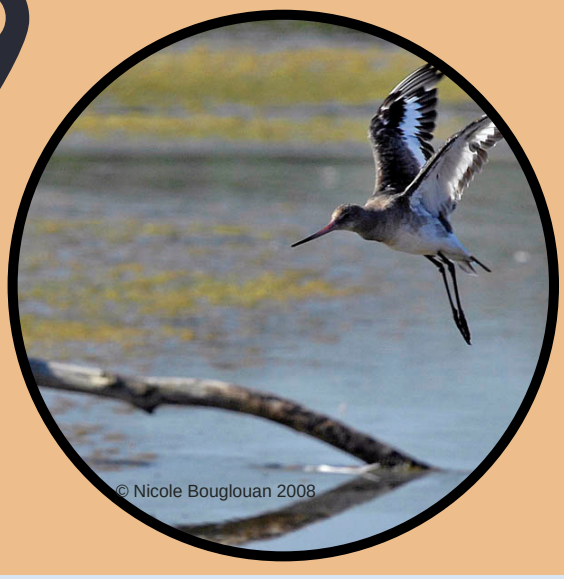
Calidris ferruginea

- With the help of our partners at the United Nations Environment Programme and through our own research efforts, we have successfully located many of the Curlew Sandpiper's breeding, migratory and wintering locations in the west-central Siberia, Eastern Europe and Africa, respectively.
- These coastal waders currently have a decreasing population trend, as such it is important to raise awareness by bringing attention to these sites.
- Several of these sites are areas of political conflict. However, taking satellite imagery and photos of these areas from space is possible thanks to RADARSAT and astronaut Dr. David Saint-Jacques.

BLACK-TAILED GODWIT

Limosa limosa

- For the purpose of this project, AMASS will focus on the nominate subspecies *Limosa limosa limosa.*
- The Black-tailed Godwit is not to be confused with the Bar-tailed Godwit, another migratory bird in peril.
- We have identified several sites where the godwits breed, migrate and overwinter in the Netherlands, Iberia, and Africa, respectively.
- Similarly to the Curlew Sandpiper, visiting some of these areas may not be possible due to political conflict.



WHAT'S TO COME IN FALL 2018

- **October 2018:** An expedition to southern Saskatchewan to photograph the Whooping Crane migrating through their first Canadian stop-over site.
- **November 2018:** An expedition to Kenya and Tanzania to obtain surface photography of the Lesser Flamingo at Lake Natron (Tanzania), Lake Elementeita (Kenya) and Lake Bogoria (Kenya). Aerial work will be done over Lake Bogoria.
- The Foundation will be sending coordinates of nesting areas, stopover areas and favored seasonal habitats in North America and Europe-Asia-Africa to NASA for uploading to the ISS and to the CSA to obtain RADARSAT-1 & 2 imagery.
- The launch of AMASS social media: an AMASS twitter, an AMASS page on The Roberta Bondar Foundation website and blog posts written by the AMASS research assistant.