

# Shorebird Population Estimates and Trends from the Arctic National Wildlife Refuge – PRISM surveys 2002 to 2022



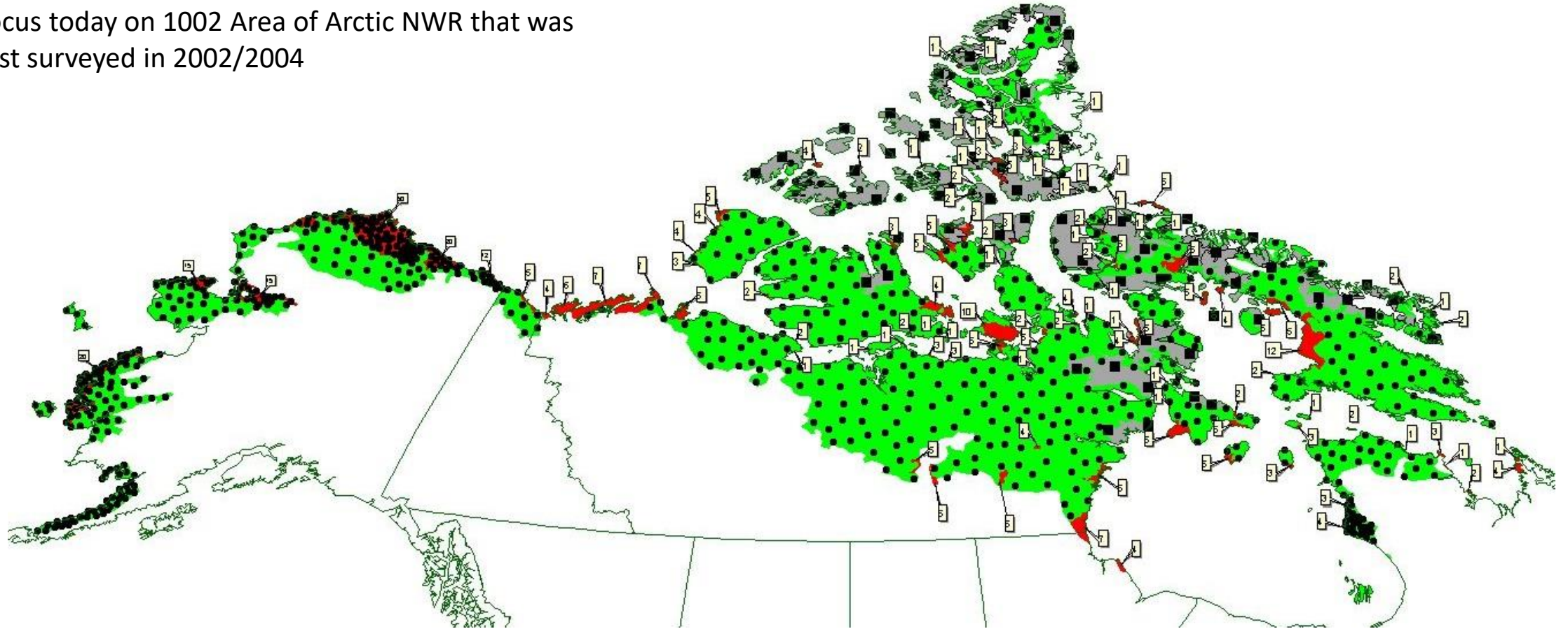
Rick Lanctot, Sarah Saalfeld, Chris Latty, (USFWS),  
Stephen Brown, Shiloh Schulte, Metta McGarvey (Manomet, Inc.),  
Jim Lyons (USGS), and Lindall Kidd (BirdLife Australia)

# Program for Regional and International Shorebird Monitoring

PRISM Goal: All Western Hemisphere shorebirds are monitored with precision high enough to measure trends at some point in their annual cycle. (Skagen et al. 2003)

Arctic PRISM: focused on arctic nesting birds

Focus today on 1002 Area of Arctic NWR that was first surveyed in 2002/2004





# Importance of the 1002 Area of the ANWR

- Area revered by environmentalist as one of the last pristine Arctic areas in the United States
- Provides important habitat for thousands of nesting and migrating shorebirds, waterfowl, and loons



# Potential Impacts to the 1002 Area of the ANWR

- Area is threatened by climate change
  - Predicted drying of tundra
  - Lower productivity due to trophic mismatch between bird arrival and invertebrate emergence





# Potential Impacts to 1002 Area of the ANWR

- oil and gas development
  - Authorized in 2017
  - First lease sale in January 2021
  - Oil and gas development suspended in 2021 until new EIS
  - Second lease sale planned for December 2024
  - New administration likely to push for more oil and gas development





# Objectives

- Determine contemporary distribution and abundance of shorebirds
- Determine shorebird population trends in ANWR
- Evaluate geographic change in distribution over time
- Contribute to range-wide population estimates of shorebirds





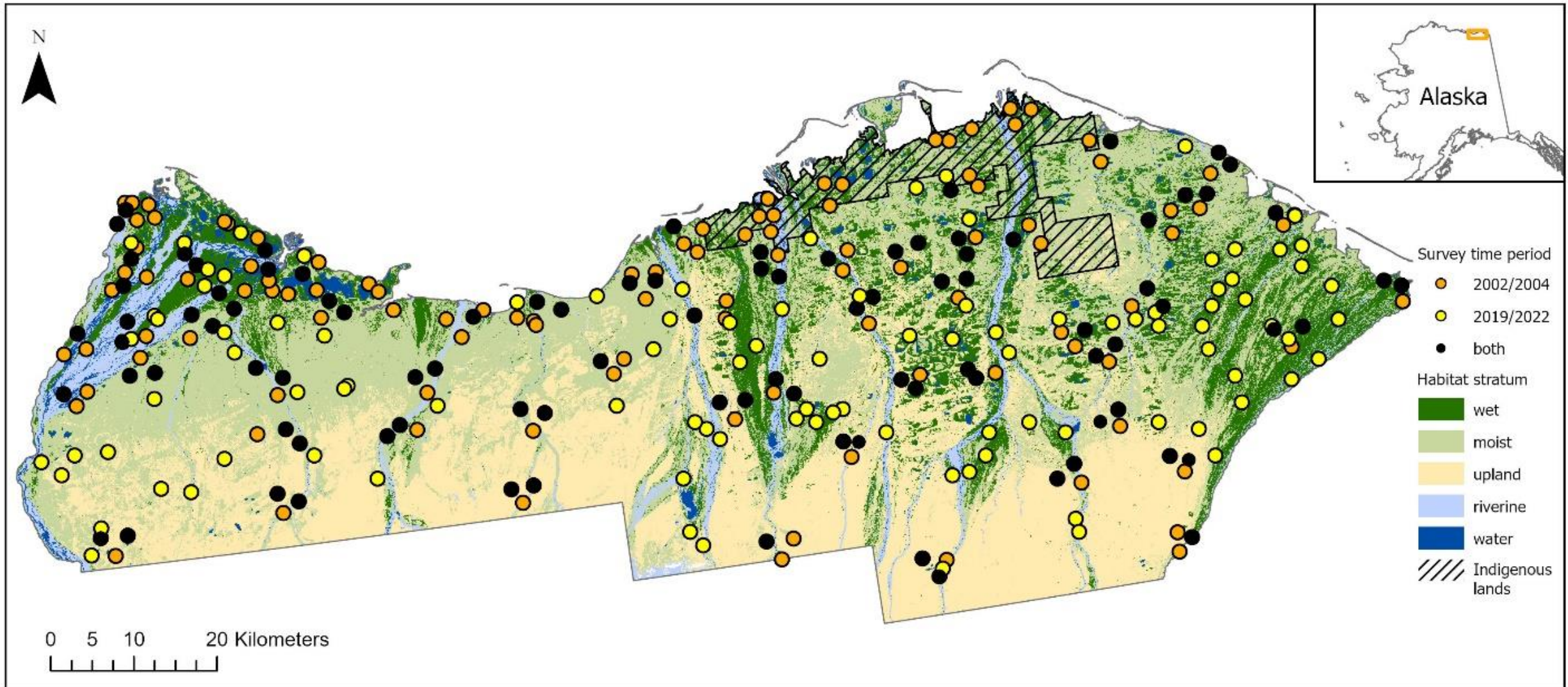
# Methods

- Selected 400 m<sup>2</sup> plots in 4 strata using a spatially balanced stratified random sampling approach
  - Strata: wetland, moist, riparian, upland
  - Restricted to federally managed lands
  - Re-surveyed a portion of plots sampled in 2002 and 2004





# Survey Plots in the Arctic Refuge 1002 Area, 2002/2004 and 2019/2022





# Methods

- Access plots with helicopter; “rapid survey” by ground-based single person for 96 minutes
- Record all birds, but with focus on waterfowl and shorebirds; use their behaviors and location on plot to estimate the number of breeding individuals on a plot
- Use detection ratio from rapid survey of intensively surveyed plots to correct density estimates
- Extrapolate refined species-specific densities to plots not visited





# Results: Contemporary numbers

- 2019: Surveyed 108 plots, 54 surveyed in 2002/2004
- 2022: Surveyed 88 plots, 41 surveyed in 2002/2004
- Detected 754 individuals of 16 species
- Estimate ca. 190,000 shorebirds





# Most Common Arctic Refuge Species





# Results

## Contemporary Distribution

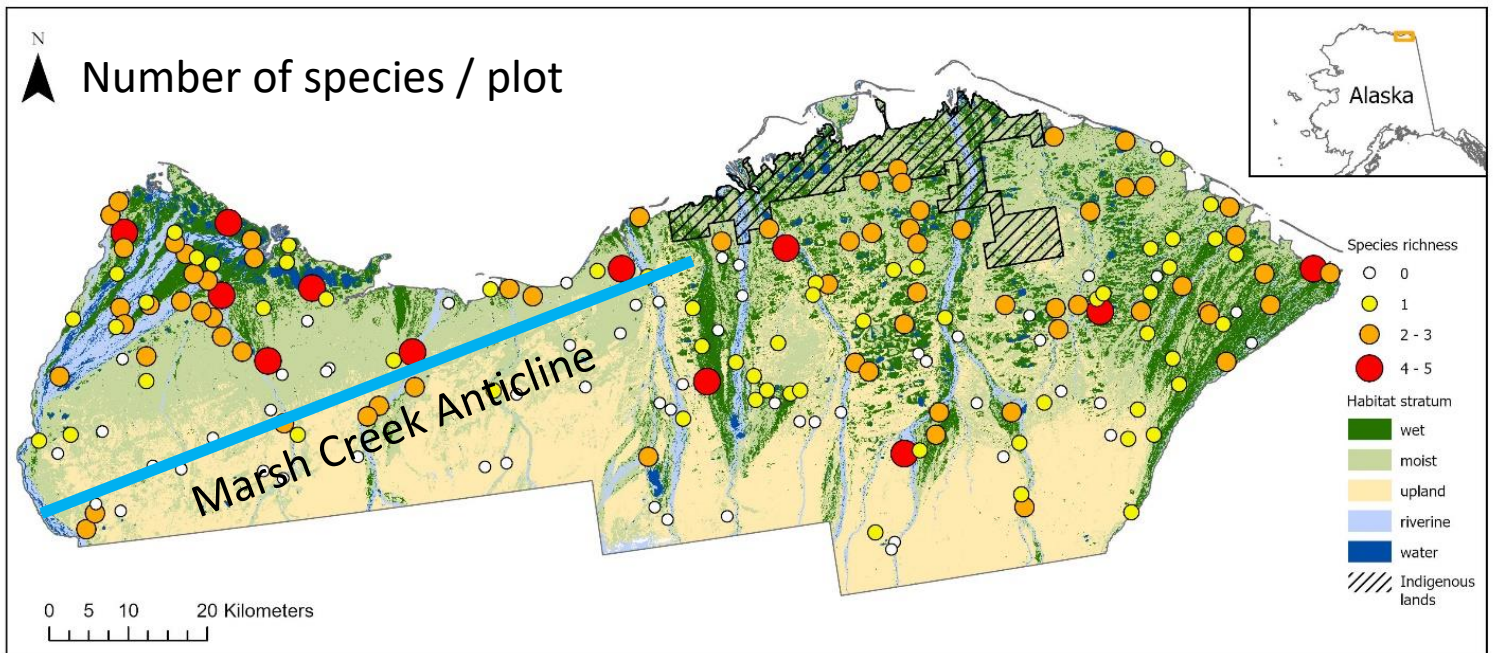
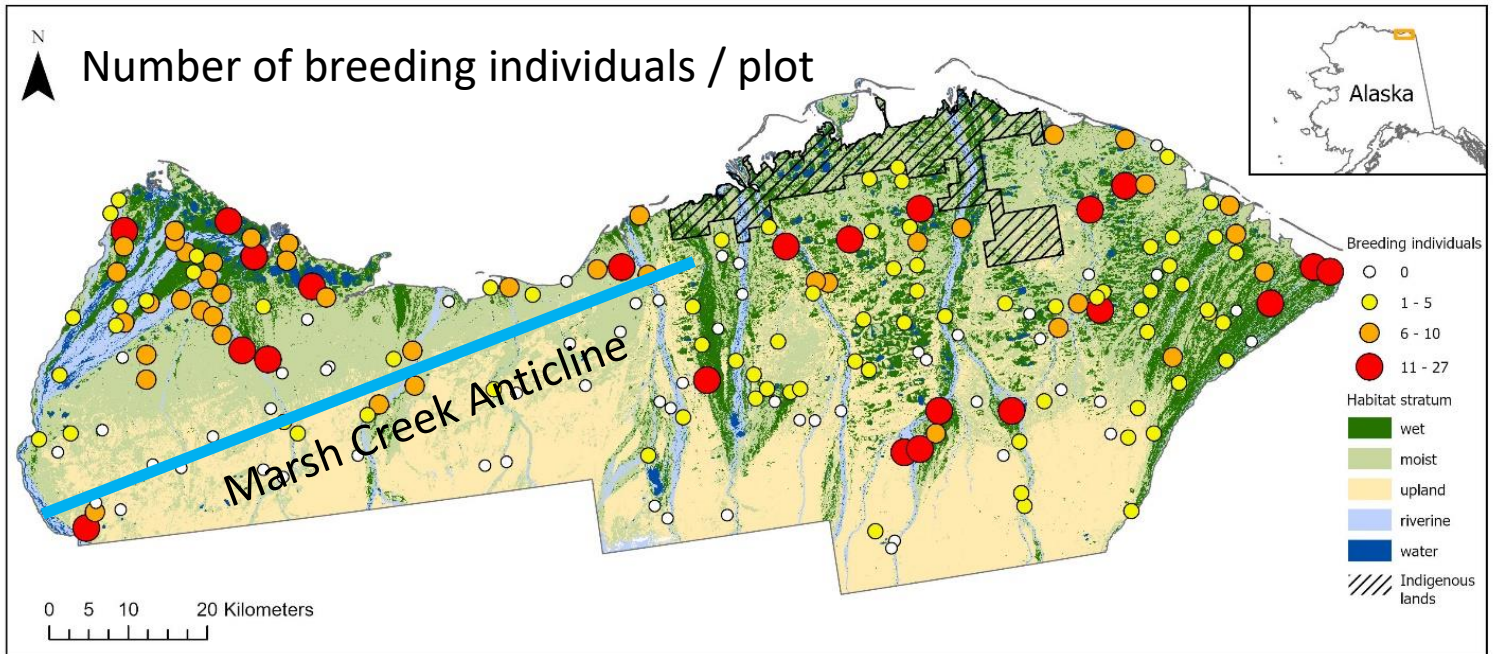
Red means high #

Orange moderate #

Yellow means few

white dots = zero

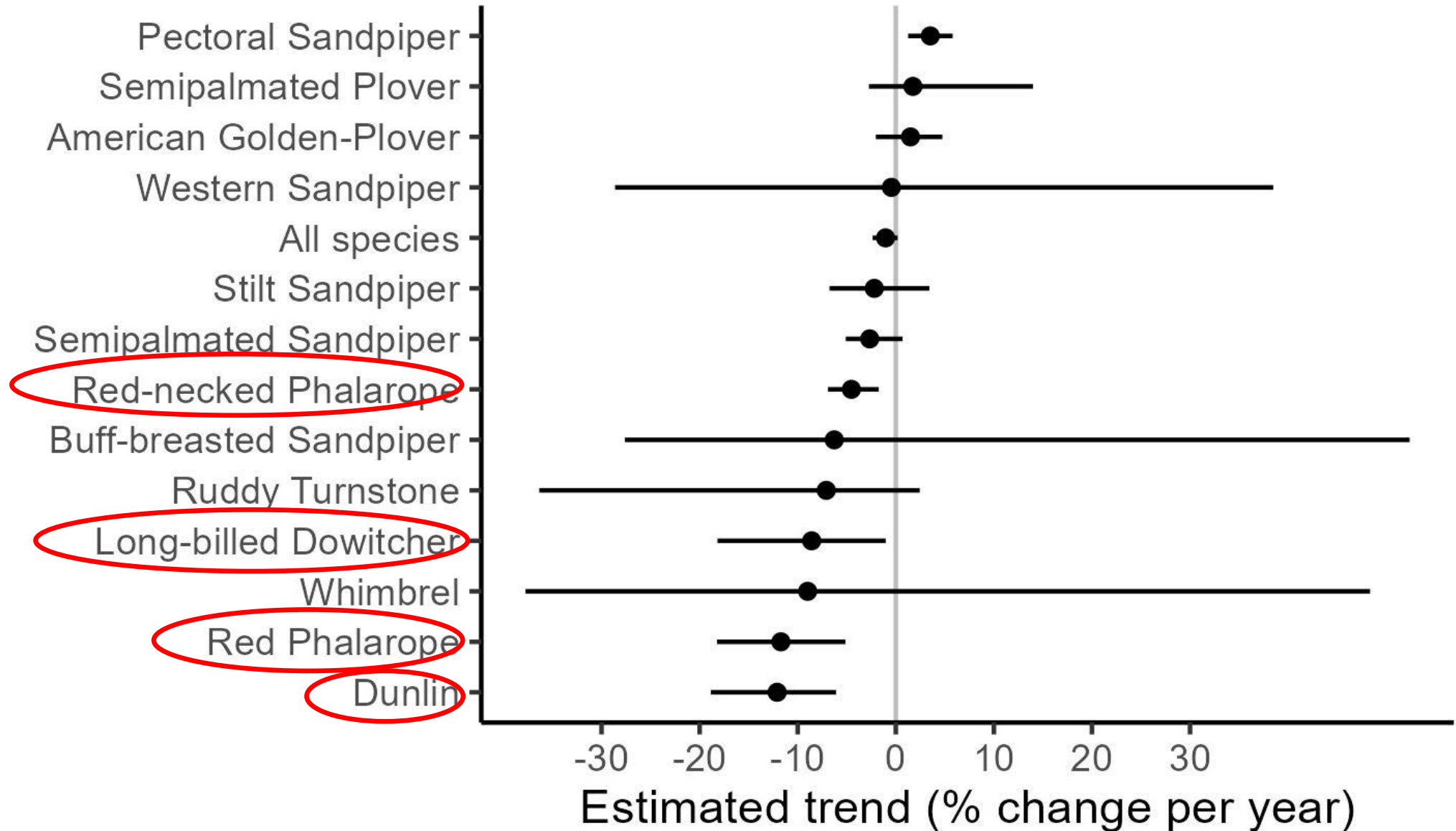
Overlap with  
likely oil  
development?





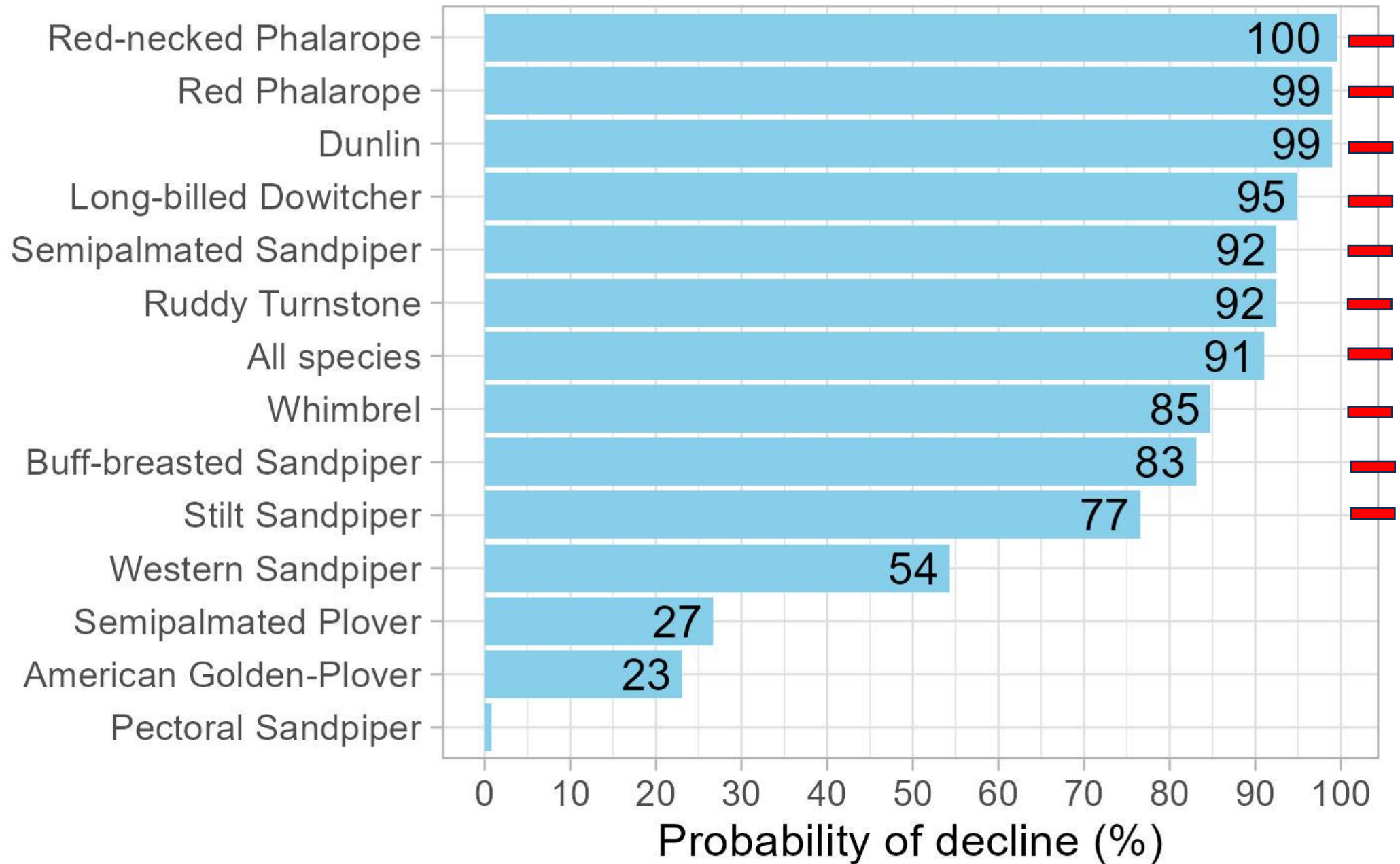
# Results: Species Population Trends

Error bars show 90% confidence interval





# Probability of Decline Since 2004



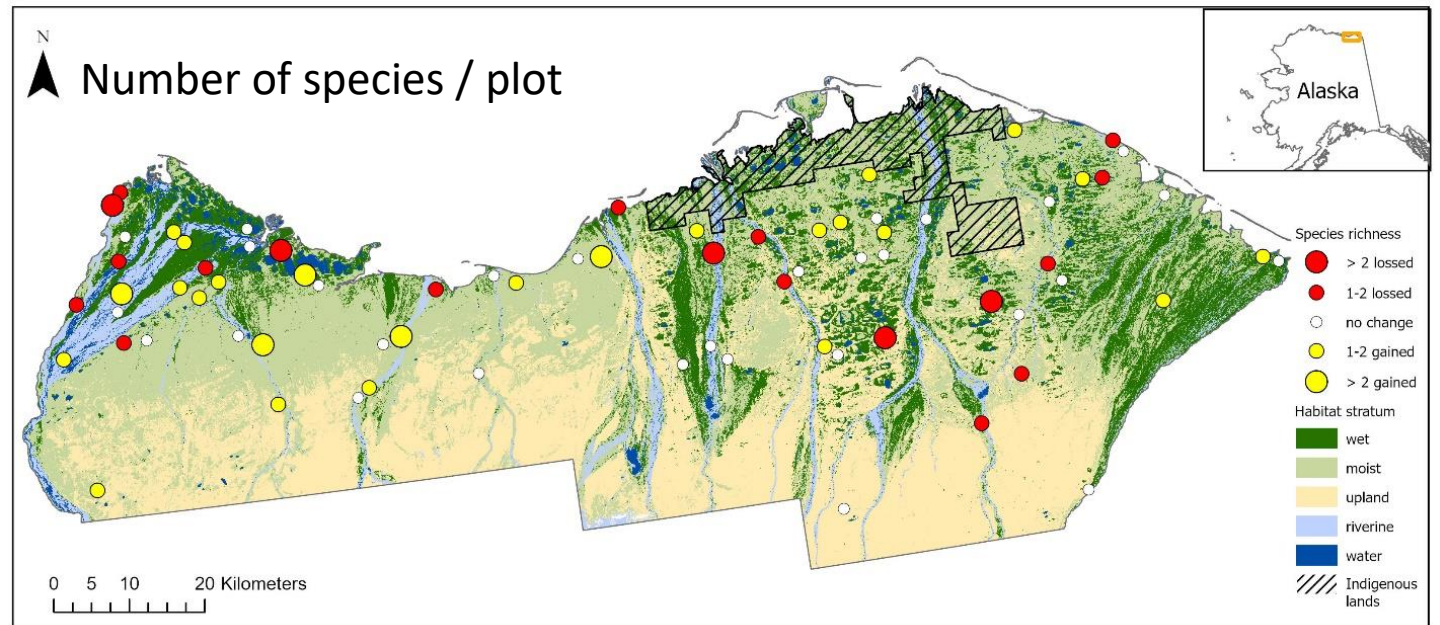
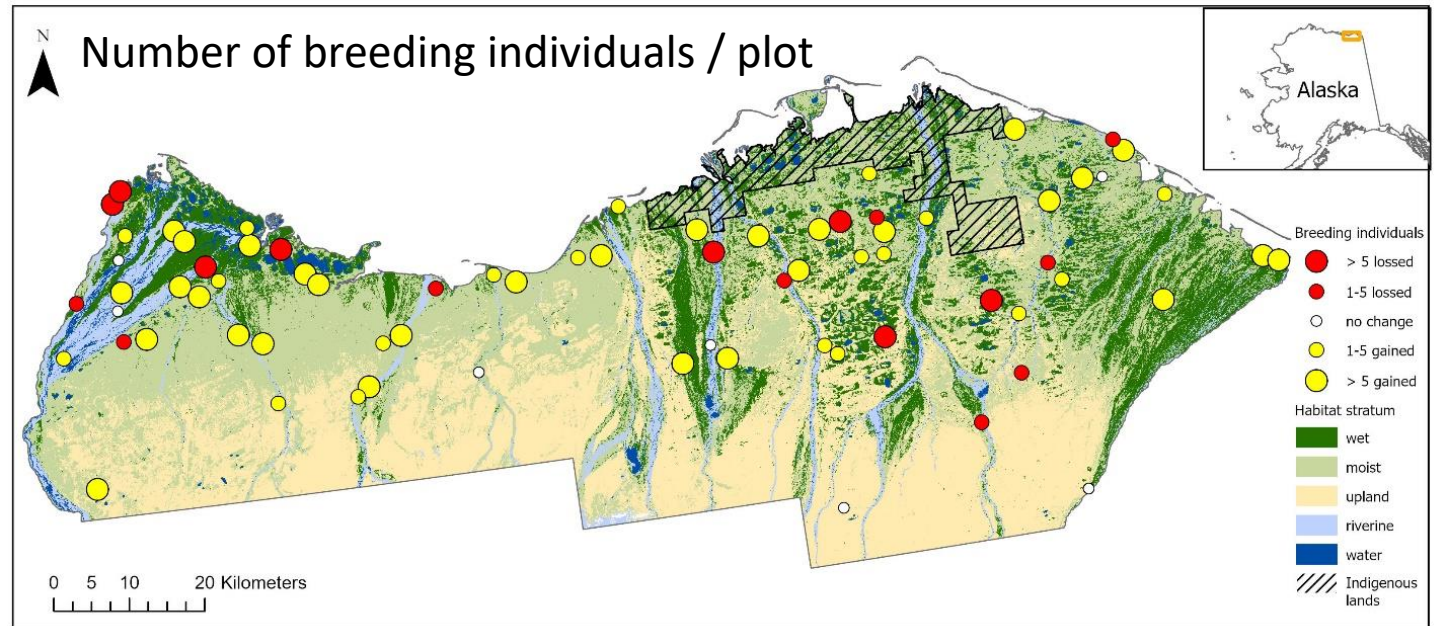


# Results: Geographic trends

## Change in number from 2002 to 2022

**Red means loss**  
white dots = no change  
**Yellow means gain**

Bigger dots mean greater  
loss or gain





# Conclusions

- Significant declines likely for many species
- 10 species showed a high probability of decline, >75%
- Pectoral Sandpiper increase and phalarope decreases are difficult to interpret given their nomadic and opportunistic breeding behavior
- For some species precision was low and other monitoring programs are needed to accurately determine trends, especially Whimbrel, Buff-breasted Sandpiper, Ruddy Turnstone
- Our trend estimates confirm in many cases declines seen during migration surveys

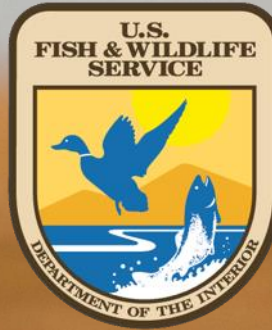


# Acknowledgments

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  - Metta McGarvey, Ethan Beal-Brown, Laura Benedict, Edward Hamlin
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  - Pollux Aviation
  - Quicksilver Aviation
- Photos
  - USFWS volunteers



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- Field surveyors

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Questions?

Contact: Rick Lanctot  
Richard\_Lanctot@fws.gov

