

## MIGRATORY WILDLIFE VULNERABILITY ASSESSMENT

- ◆ Migratory wildlife introduce difficult challenges for VA:
  - Highly extravagant lifestyles
  - Where? Breeding range, wintering range, stopover sites, migration itself, all of above?
  - Synchronicity?
  - Data hard to come by from parts of range

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## RED KNOT - SUPERMIGRANTS



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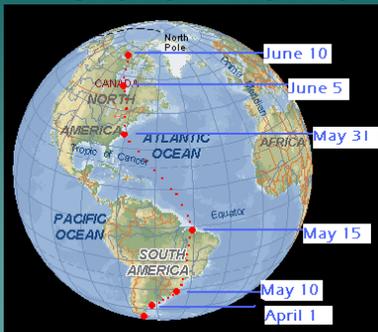
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## RED KNOT MIGRATION AND STOPOVER SITES



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## RED KNOT – WHERE ARE THE VULNERABILITIES?

- ◆ Tierra del Fuego?
- ◆ Argentina coast?
- ◆ Brazil?
- ◆ Mid-Atlantic states?
- ◆ Hudson's Bay?
- ◆ High Arctic?
- ◆ Fall or spring?
- ◆ Wind patterns?
- ◆ Synchronicities?

Comprehensive VA needed

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## Vulnerabilities of Shorebirds to Climate Change

Hector Galbraith<sup>1</sup>, Stephen Brown<sup>1</sup>,  
David W. DesRochers<sup>2</sup>, J. Michael Reed<sup>3</sup>

<sup>1</sup>Manomet Center for Conservation Sciences

<sup>2</sup>Dalton State College

<sup>3</sup>Tufts University

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## Objectives

- ◆ Evaluate potential change in extinction risk of North American shorebirds due to climate change
  - directly due to effects of climate change
  - not those due to changed human activities associated with climate change

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### Why Shorebirds?

- ◆ Reported widespread declines
- ◆ Proposed to be sentinels of global environmental change – particularly because of their hemispheric ecosystem use during life cycle (Brown et al. 2001; Piersma & Lindström 2004)
- ◆ Migratory aggregations of some species are a spectacular biological phenomenon
- ◆ Iconic species valued by public?

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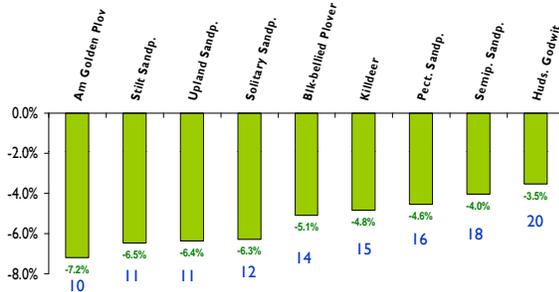
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### SHOREBIRDS ARE IN TROUBLE



Based on migration counts in eastern N.America; Bart et al 2007. J Av. Biol

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### Our Approach

- ◆ Evaluates threats to shorebirds by species
- ◆ Works within the context of the Partners-in-Flight & U.S. Shorebird Conservation Plan risk systems
  - based on population size & trend, breeding & non-breeding distributions, threats to breeding & non-breeding sites



<http://www.outdoorlabama.com/watchable-wildlife/what/Birds/Shorebirds/rt.cfm>

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## MAIN QUESTION ASKED

- ◆ How much does climate change move the needle on the existing vulnerability categories of USCP/PIF?

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## U.S. Shorebird Conservation Plan Risk Categories

- 1) Not at Risk
- 2) Low Concern
- 3) Moderate Concern
- 4) High Concern
- 5) Highly Imperiled
- 6) ~~Holy Smokes!~~ Really, highly imperiled  
Critical

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## Vulnerability Factors

	Score	Arrow
1) Loss/gain in breeding habitat under climate change	3	↑
2) Loss/gain in wintering habitat under climate change	5	↑↑
3) Loss/gain in migration habitat under climate change	3	↑
4) Degree of dependence on ecological synchronicities	5	↑↑
5) Migration distance	4	↑
6) Degree of breeding, wintering, or migration habitat specialization	4	↑↑

http://www.wildlifeaware.com/2008/09/

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### Risk Factors

1) Loss/gain in breeding habitat under climate change:

	Score	Arrow
Major loss (>50%)	5	↑↑
Moderate loss (10-50%)	3	↑
Limited or no loss (-10-10%)	0	0
Moderate increase (10-50%)	-1	↓
Major increase (>50%)	-2	↓↓

Note: risk could decrease

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### Example: Semipalmated Sandpiper



1) Loss/gain in breeding habitat under climate change:

	Score	Arrow
Moderate loss (10-50%)	3	↑

Yearlong rainfall predicted to ↑ throughout breeding range. May result in flooding & loss of much breeding habitat especially since the species prefers drier areas with access to water. Nesting habitats along shorelines also could ↓ as a result of increased rainfall.  
Confidence = low

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### Semipalmated Sandpiper

	Score	Arrow
1) Loss/gain in breeding habitat under climate change	3	↑
2) Loss/gain in wintering habitat under climate change	5	↑↑
3) Loss/gain in migration habitat under climate change	3	↑
4) Degree of dependence on ecological synchronicities	5	↑↑
5) Migration distance	4	↑
6) Degree of breeding, wintering, or migration habitat specialization	4	↑↑

Change in status from 'moderate concern' to 'highly imperiled'

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### Application

- ◆ Evaluated 49 species of shorebird breeding in North American north of Mexico
- ◆ For each factor, included confidence level
- ◆ Summed arrows
- ◆ Determined shifts in risk category

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### Results for 50 North Am. Shorebirds

- ◆ 43 species (86%) predicted to ↑ risk level due to climate change
  - 34 increased by 1 level
  - 9 increased by 2 levels
- ◆ 3 species at lower risk
  - ◆ Solitary sandpiper – more breeding habitat
  - ◆ Bristle-thighed curlew – more breeding & wintering habitat
  - ◆ White-rumped sandpiper – more wintering habitat



<http://www.sevaas.org/index.php?page=baabp&id=genrep462>

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### U.S. Shorebird Conservation Plan

Risk Category	Current	Expected with climate change
Not at risk	0	0
Low concern	7	2
Moderate concern	15	7
High concern	23	13
Highly imperiled	4	17
Critical	–	10

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**Species in New 'Critical' Category**

- ◆ **Snowy Plover**
- ◆ Wilson's Plover
- ◆ **Piping Plover**
- ◆ **Mountain Plover**
- ◆ **Am. Oystercatcher**
- ◆ Long-billed curlew
- ◆ Bar-tailed godwit
- ◆ Ruddy turnstone
- ◆ Sanderling
- ◆ Short-billed dowitcher



[http://nationalzoo.si.edu/scbi/MigratoryBirds/Featured\\_photo/photographer.cfm?photographer=Gerhard\\_Hofmann](http://nationalzoo.si.edu/scbi/MigratoryBirds/Featured_photo/photographer.cfm?photographer=Gerhard_Hofmann)

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**Where from here?**

- ◆ Species-specific risk assessment
- ◆ ID common risks as focus for management activity
  - e.g., shoreline habitat on migration routes & wintering areas
- ◆ Still reviewing the assessments & considering degree of threat to shift risk category
- ◆ We welcome feedback, things to consider, insights, information



<http://www.naturalspecialists.net/article.php?id=47339>

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**TAKE HOME MESSAGES**

- ◆ For complex spp. We need complex, comprehensive VA
- ◆ They are doable
- ◆ Build off of existing structures if possible (PIF, NAWP, etc.)
- ◆ Must be resilient to lack of data

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