Approaches to Vulnerability Assessment

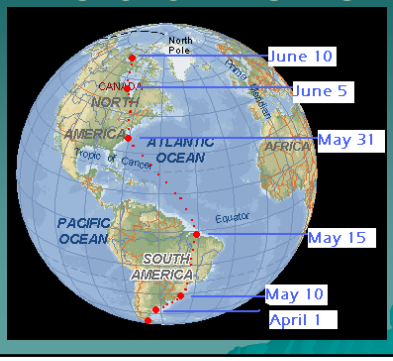
Scale

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

RED KNOT - SUPERMIGRANTS

RED KNOT MIGRATION AND STOPOVER SITES



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

Vulnerabilities of Shorebirds to Climate Change

Hector Galbraith[1], Stephen Brown[1],
David W. DesRochers[2], J. Michael Reed[3]

[1]Manomet Center for Conservation Sciences
[2]Dalton State College
[3]Tufts University

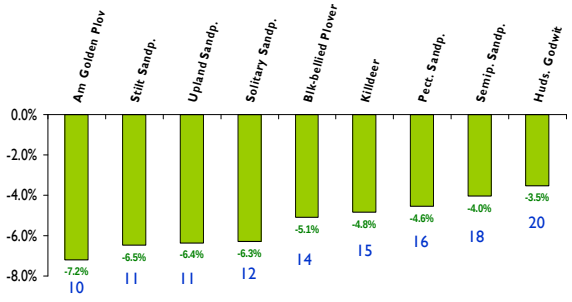
Objectives

- 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

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?

SHOREBIRDS ARE IN TROUBLE



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

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

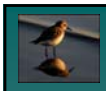
http://www.outdooralabama.com/watchable-wildlife/what/Birds/shorebirds/rt.cfm

MAIN QUESTIONE ASKED

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

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



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.wilddelaware.com/2008/05/

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	↓↓

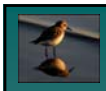
Note: risk could decrease

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

http://www.birdsireland.com/pages/rare_bird_news/2006/september_photos1.html



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'

http://www.wilddelaware.com/2008/05/

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

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.scvas.org/index.php?page=babp&id=glentepke2

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

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

Where from here?

- Species-specific risk assessmer
- 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.naturspesialisten.no/article.php?id=473&p=

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