

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 sparse 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 Galbraith¹, Stephen Brown¹,
David W. DesRochers², J. Michael Reed³

¹Manomet Center for Conservation Sciences

²Dalton State College

³Tufts University

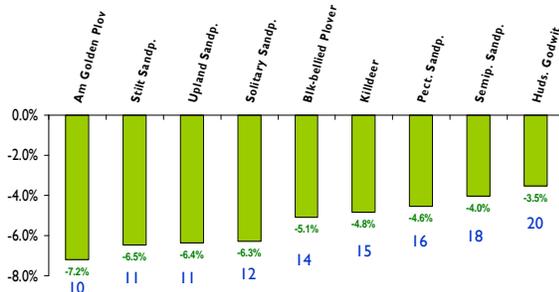
Objectives

- ◆ 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/it.cfm>

MAIN QUESTIONS 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.wildlifeaware.com/2008/09/>

Application

- ◆ Evaluated 49 species of shorebird breeding in North American north of Mexico
- ◆ For each factor, included confidence level
- ◆ 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.sevaas.org/index.php?page=baabp&id=genrep462>

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/sci/MigratoryBirds/Featured_photo/photographer.cfm?photographer=Gorhard_Hofmann

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
