Species Vulnerability Indices

Alternatives to “DIY”

Species are Important!

USFWS

Peter La Tourrette
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Audubon

Vulnerability Indices can...

... save R & D time

... remind you about vulnerability factors

... compare apples and oranges

... promote transparency

Vulnerability Indices cannot...

... turn garbage into gold

... replace in-depth VAs of species

System for Assessing `Vulnerability of Species (SAVS) to Climate Change
(Forest Service)

Framework for categorizing the relative vulnerability of threatened & endangered species to climate change
(EPA)

Climate Change Vulnerability Index
(NatureServe)

Climate Change Sensitivity Index
(University of Washington and TNC)

All:

- are potentially rapid
- score individual factors
- produce categories of relative vulnerability
- address uncertainty

SAVS

www.fs.fed.us/rm/grassland-shrubland-desert/products/species-vulnerability

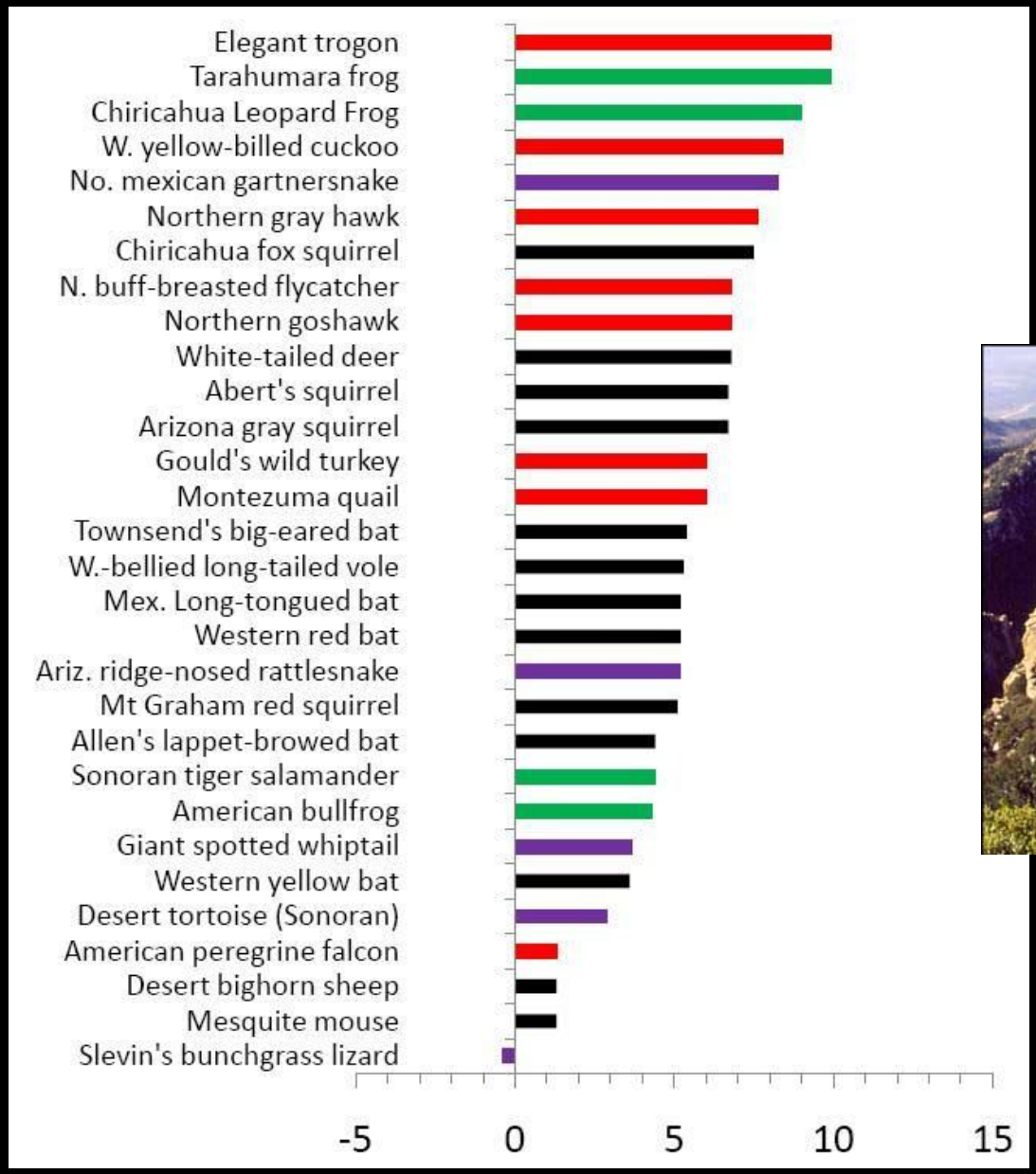
Terrestrial vertebrates

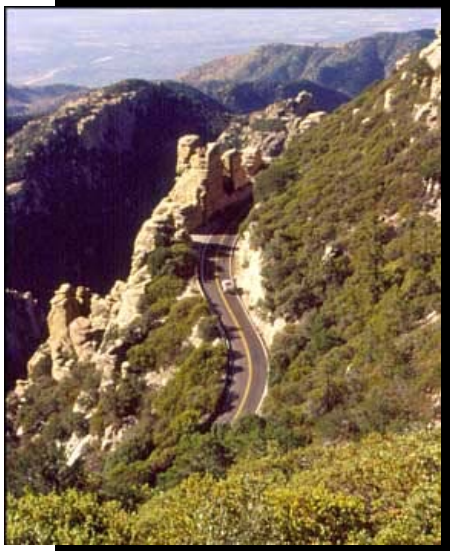
Questionnaire-based tool: Habitat, physiology, phenology, biotic interactions

Abundance, range, demographics considered implicitly

Scale: habitat/management area

Coronado National Forest





Coe et al. 2010

Less **Vulnerability** More

EPA

http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=203743

T&E Vertebrates Only

Baseline & climate change vulnerability

Abundance, range, demographics considered in baseline

Spatial Scale: any

NatureServe

www.natureserve.org/climatechange

Terrestrial/aquatic, plants/animals

Excludes conservation status factors – use in conjunction with G/S-ranks

Exposure and sensitivity sections

Scale: state or large conservation area

Microsoft Excel - Nevada_Index_Scores_10July09.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

NatureServe

				Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
1					Macro precip	Micro precip	Disturbance		Phys habitat	Other spp for hab	Diet	Pollinators	Other spp disp	Other mutualism	Migrations	Genetic var	Gen bottleneck	Phenol response	Doc response	Modeled change	Modeled overlap	Protected Areas		
2	Taxonomic	Species	English Name	C2aii	C2bi	C2bii	C2c	C2d	C3	C4a	C4b	C4c	C4d	C4e	C5	C6a	C6b	C7	D1	D2	D3	D4	Index	Confidence
3	Amphibian	*Rana sierrae*	Sierra Nevada yellow-legged frog	N	Inc-SI	GI	Inc	U	SD	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	EV	Mod
4	Amphibian	*Bufo nelsoni*	Amargosa toad	N	GI-Inc	GI	N	U	N	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	HV	Mod
5	Amphibian	*Rana pipiens*	northern leopard frog	N	SI	GI	N	U	N	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	MV	Low
6	Amphibian	*Rana luteiventris*	Columbia spotted frog (NE sub-pc	N	SI	GI	N	U	N-SD	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	MV	Mod
7	Amphibian	*Rana onca*	relict leopard frog	N	GI-Inc	GI	N	U	N	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	MV	Mod
8	Amphibian	*Rana luteiventris*	Columbia spotted frog (Toiyabe s	N	Inc-SI	GI	N	U	N-SD	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	MV	VH
9	Amphibian	*Bufo cognatus*	Great Plains toad	N	Inc-SI	Inc	N	U	N	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	PS	Mod
10	Amphibian	*Bufo microscaphus*	Arizona toad (southwestern toad)	N	SI	Inc	N	U	N-SD	N	N	N/A	U	U	SI	U	U	U	U	U	U	U	PS	VH
11	Bird	*Vireo bellii arizonae*	Arizona Bell's vireo	N	GI-Inc	GI	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	HV	Low
12	Bird	*Leucosticte atrata*	black rosy-finch	N	N	N	N	Inc-S	SI-N	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	HV	Mod
13	Bird	*Empidonax traillii extimus*	southwestern willow flycatcher	N	GI-Inc	GI	N	U	SD	SI	N	N/A	N	U	Dec	U	U	U	U	U	U	U	HV	VH
14	Bird	*Asio flammeus*	short-eared owl	N	Inc-SI	N	N	U	SD	N	SI-N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	Mod
15	Bird	*Gymnorhinus cyanocephalus*	pinyon jay	N	Inc-SI	N	N	U	SD	SI-N	N	N/A	N	U	N	U	U	U	U	U	U	U	IL	Mod
16	Bird	*Anas acuta*	northern pintail	N	Inc	Inc	N	U	SD	N	SD	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
17	Bird	*Lanius ludovicianus*	loggerhead shrike	N	Inc-SI	N	SI-N	U	SD	N	N	N/A	N	U	N	U	U	U	U	U	U	U	IL	VH
18	Bird	*Melanerpes lewis*	Lewis's woodpecker	N	SI	SI-N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
19	Bird	*Selasphorus rufus*	rufous hummingbird	N	Inc-SI	N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
20	Bird	*Sphyrapicus ruber*	red-breasted sapsucker	N	SI	SI	Inc	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
21	Bird	*Spizella atrogularis*	black-chinned sparrow	N	Inc-SI	N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
22	Bird	*Toxostoma bendirei*	Bendire's thrasher	N	Inc-SI	N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
23	Bird	*Vireo vicinior*	gray vireo	N	Inc-SI	N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	IL	VH
24	Bird	*Gavia immer*	common loon	N	Inc-SI	GI	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	High
25	Bird	*Centrocercus urophasianus*	greater sage-grouse	N	Inc-SI	N	SI	U	SD	GI-I	N	N/A	N	U	GI-Inc	U	U	U	U	U	U	U	MV	Low
26	Bird	*Coccyzus americanus occidenta*	western yellow-billed cuckoo	N	GI-Inc	GI	N	U	SD	SI-N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	Low
27	Bird	*Picoides albolarvatus*	white-headed woodpecker	N	GI-Inc	N	Inc-SI	U	SD	SI	N	N/A	N	U	SI	U	U	U	U	U	U	U	MV	Low
28	Bird	*Charadrius alexandrinus nivosus*	western snowy plover	N	Inc-SI	GI	SI	U	SI-N	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	Mod
29	Bird	*Dendragapus obscurus*	blue grouse	N	SI-N	N	SI	U	SD	SI-N	N	N/A	N	U	SI-N	U	U	U	U	U	U	U	MV	Mod
30	Bird	*Dendroica graciae*	Grace's warbler	N	Inc-SI	N	Inc-SI	U	SD	GI-I	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	Mod
31	Bird	*Dendroica occidentalis*	hermit warbler	N	SI	N	Inc-SI	U	SD	GI-I	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	Mod
32	Bird	*Empidonax traillii brewsteri*	mountain willow flycatcher	N	SI-N	GI	SI-N	U	SD	SI	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	Mod
33	Bird	*Rallus longirostris yumanensis*	Yuma clapper rail	N	GI-Inc	GI	N	U	N	SI-N	N	N/A	N	U	SI-N	U	U	U	U	U	U	U	MV	Mod
34	Bird	*Agelaius tricolor*	tricolored blackbird	N	GI	GI-Inc	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	VH
35	Bird	*Leucosticte tephrocotis*	gray-crowned rosy-finch	N	N-SD	N	N	Inc	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	VH
36	Bird	*Vermivora luciae*	Lucy's warbler	N	GI-Inc	GI	N	U	SD	SI-N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	MV	VH
37	Bird	*Pipilo aberti*	Abert's towhee	N	GI-Inc	N	N	U	SD	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	PS	High
38	Bird	*Strix occidentalis occidentalis*	California spotted owl	N	Inc-SI	N	Inc-SI	U	SD	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	PS	High
39	Bird	*Buteo regalis*	ferruginous hawk	N	Inc-SI	N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	PS	Low
40	Bird	*Buteo swainsoni*	Swainson's hawk	N	Inc-SI	N	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	PS	Low
41	Bird	*Chlidonias niger*	black tern	N	Inc-SI	GI	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	PS	Low
42	Bird	*Sayornis nigricans*	black phoebe	N	Inc-SI	SI-N	N	U	SI-N	N	N	N/A	N	U	N	U	U	U	U	U	U	U	PS	Low
43	Bird	*Anas cyanoptera*	cinnamon teal	N	SI	GI	N	U	SD	N	N	N/A	N	U	Dec	U	U	U	U	U	U	U	PS	Mod
44	Bird	*Carpodacus cassinii*	Cassin's finch	N	SI-N	N	Inc	U	SD	N	N	N/A	N	U	SI	U	U	U	U	U	U	U	PS	Mod

Raw Data / Vuln by Taxon / Factors / Confidence / Vuln by Srank

Ready

Duplicate Conservation Status Assessments?

	Extremely Vulnerable	Highly Vulnerable	Moderately Vulnerable	Presumed Stable	Increase Likely
G1					
G2					
G3					
G4					
G5					

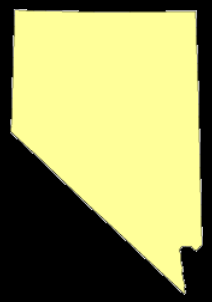
NatureServe

Duplicate Conservation Status Assessments?

	Extremely Vulnerable	Highly Vulnerable	Moderately Vulnerable	Presumed Stable	Increase Likely
G1					
G2					
G3					
G4					
G5					

NatureServe

209 spp



	Extremely Vulnerable	Highly Vulnerable	Moderately Vulnerable	Presumed Stable	Increase Likely
G1	10	11	25	9	0
G2	2	4	5	3	1
G3	0	4	3	11	1
G4	1	1	6	24	3
G5	0	2	7	61	15

$p<0.001$

NatureServe

Climate Change Sensitivity Index (University of Washington and TNC)

The Nature Conservancy
Protecting nature. Preserving life.™

Climate Change Sensitivity Database

Home | Browse Species | Browse Systems | Your Profile

Home Page

Welcome!

Welcome to the Sensitivity Database.

Climate changes poses a daunting challenge to natural resource managers and in response the University of Washington has partnered with key collaborators to conduct a climate change sensitivity assessment. This assessment is designed to evaluate the sensitivity of the species and ecological systems of the Pacific Northwest to climate change.

This digital database summarizes the inherent climate-change sensitivities for species and habitats of concern throughout the Pacific Northwest and will provide resource managers and decision makers with some of the most basic and most important information about how species and systems will likely respond to climate change.

Please come take a look!

Recent Updates

Rock Squirrel
Updated: *4 sec* ago
Elgaria coerulea principis
Updated: *4 days 18 hours* ago
Quercus garryana var. garryana
Updated: *2 weeks 5 days* ago
Pinus albicaulis
Updated: *2 weeks 6 days* ago
Red-tailed Chipmunk
Updated: *3 weeks 5 days* ago
Plethodon idahoensis
Updated: *3 weeks 5 days* ago
Martes pennanti
Updated: *3 weeks 5 days* ago
Vulpes macrotis - rlonsinger
Updated: *4 weeks 1 day* ago
Lynx canadensis

User login

Username: *

Password: *

Log in

Log in using OpenID

- Create new account
- Request new password

Aegolius funereus

View | Edit | Revisions | Track | Dev load | Dev render

Title: *

Aegolius funereus

Common Name:

Boreal Owl

Enter known common names, one name per line.

☐ This Species is Completed

- Taxonomy
- **Dispersal Ability**
- Disturbance Regimes
- Generalist/Specialist
- Physiology
- Life History Information
- Habitat
- Ecological Climate Effects
- Subjective ranking
- Menu settings
  Not in menu
- Revision information
  New revision
- Comment settings
  Read/Write
- URL path settings
  Alias: species/aegolius-funereus
- XML sitemap
  Inclusion: Default (included)
  Priority: Default (0.5)

Average annual dispersal distance:

- ○ N/A
- ○ >100 km
- ○ 75-100 km
- ○ 50-75 km
- ○ 25-50km
- ○ 5-25km
- ○ 1-5km
- ◉ <1km

Confidence in average annual dispersal distance:

2 Medium-Low

Do barriers to dispersal exist?:

2

Are there landscape elements that would prevent this species from moving in response to climate change? Some examples of such barriers are given in the checklist below.

Confidence in barriers to dispersal exists:

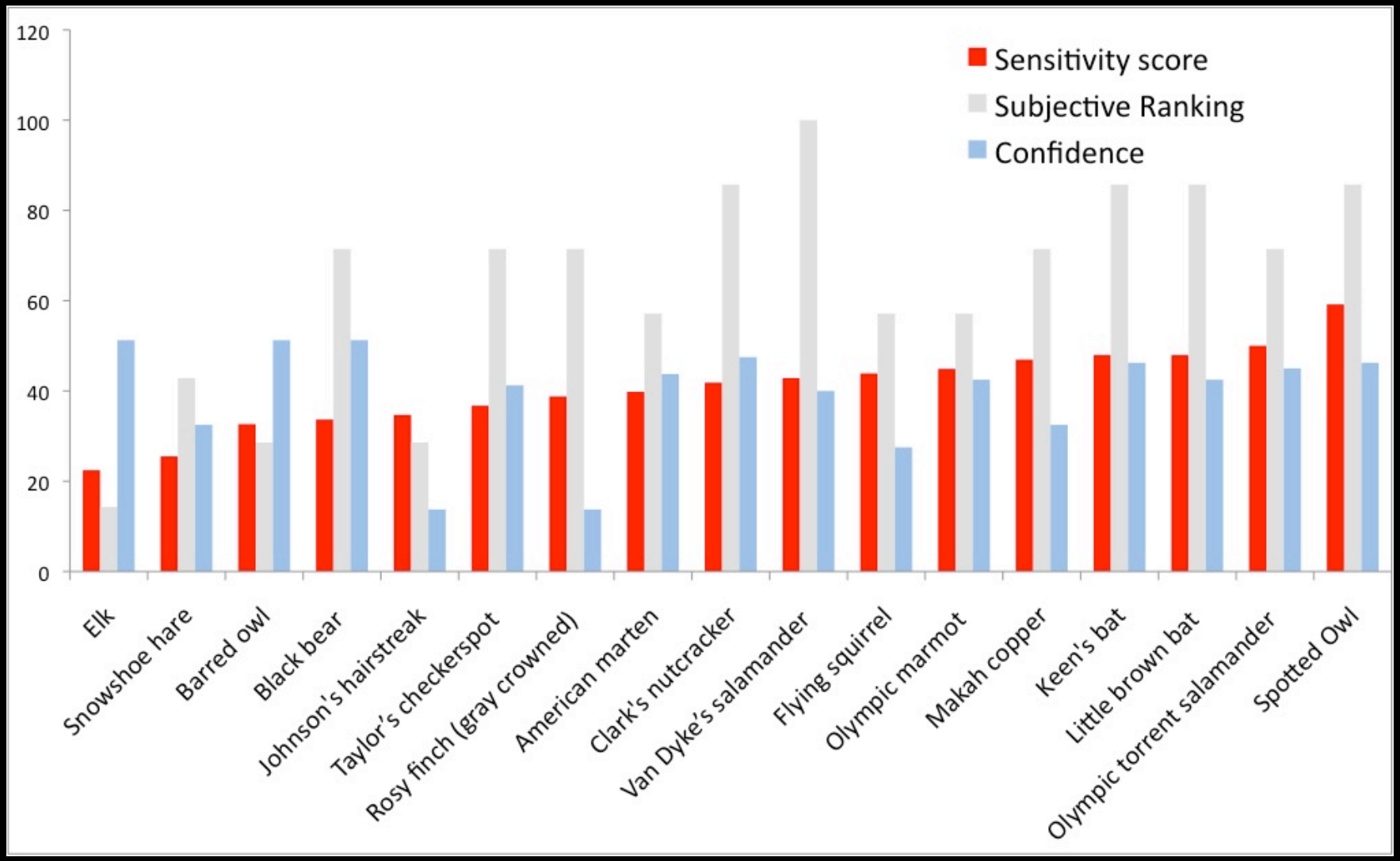
4 Medium-High

Specific dispersal distance, (if known) and dispersal type (juvenile, adult, etc.):

Please select all general types of barriers to dispersal that apply:

http://courses.washington.edu/ccdb/drupal

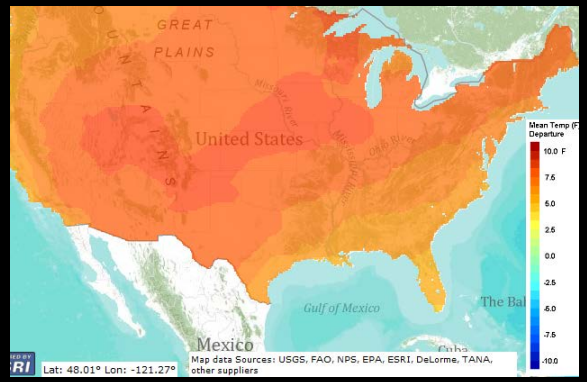
Climate Change Sensitivity Index (University of Washington and TNC)

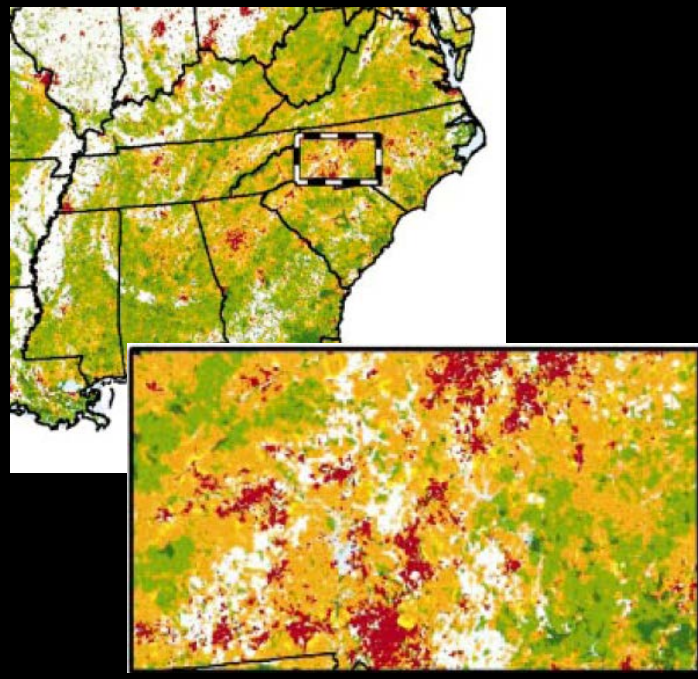


Finding data for the index

- **Exposure:** Climate Wizard; WorldClim
- **Sensitivity/adaptive capacity:** literature reviews and expert elicitation, existing web-based tools (ex: GAP, WUI)

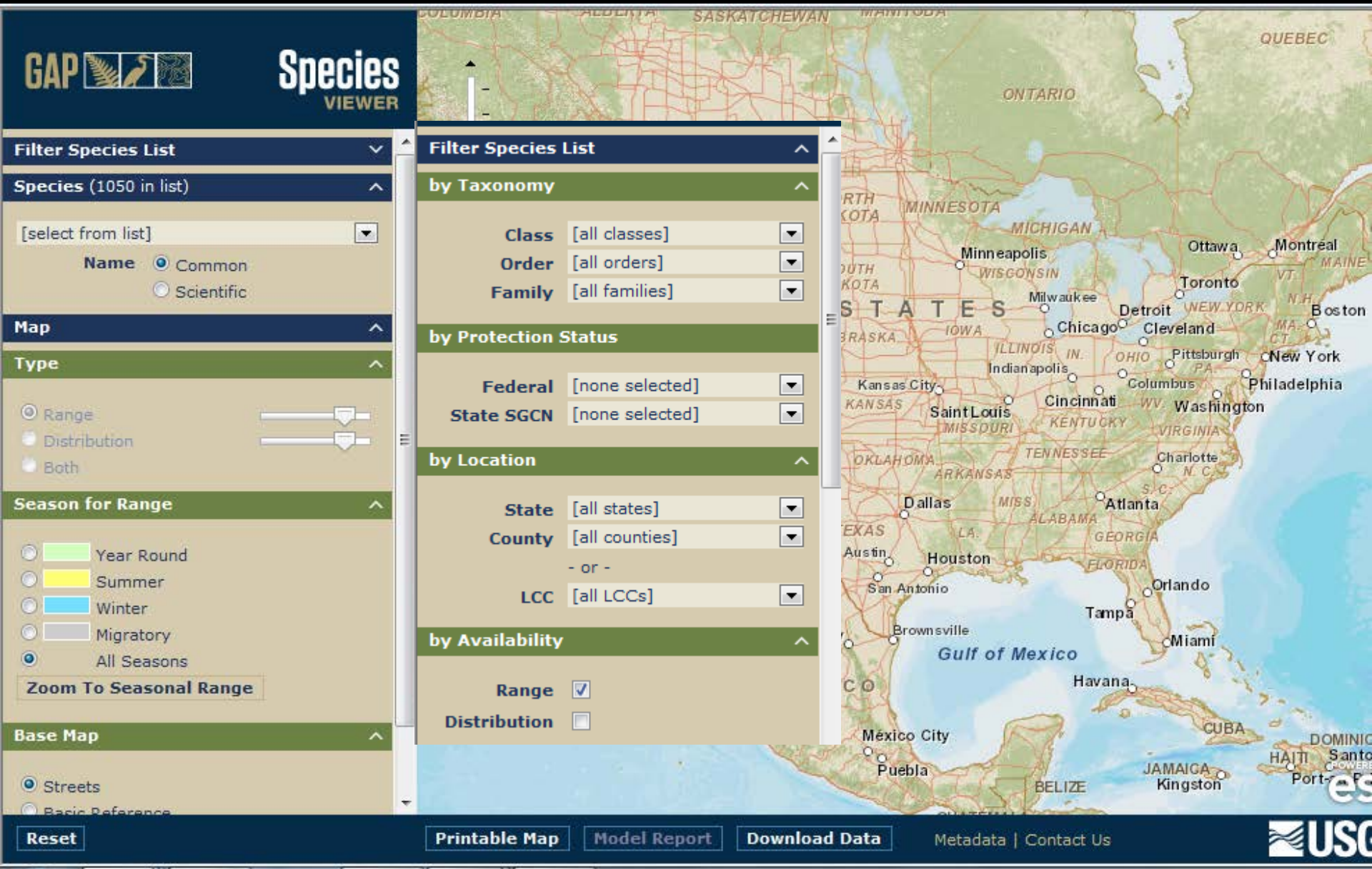
- Uncertainty
  - Explore various climate models
  - Can explicitly address during input by omitting responses or providing multiple responses



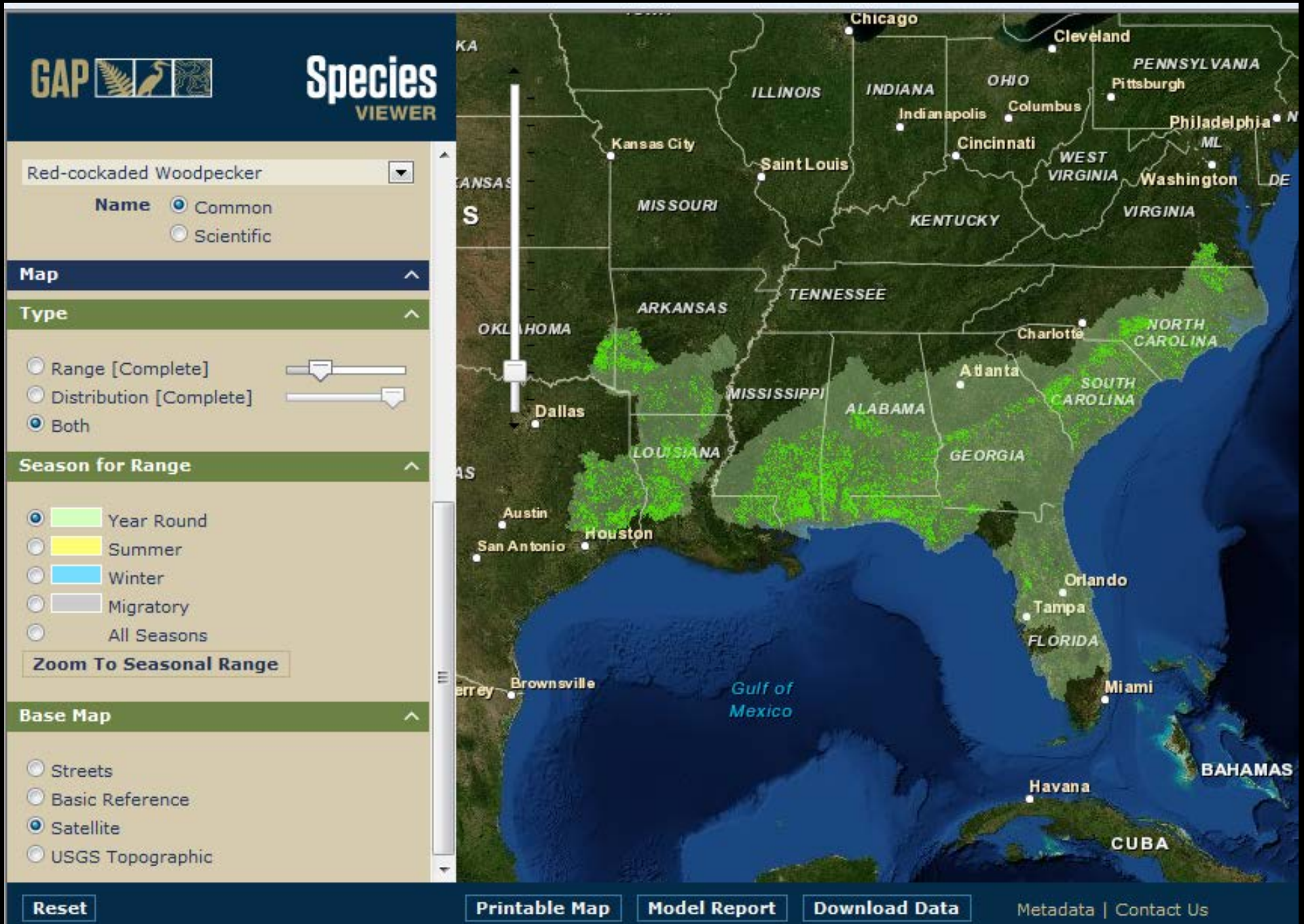


Wildland-Urban Interface
Silvus Lab, U of WI

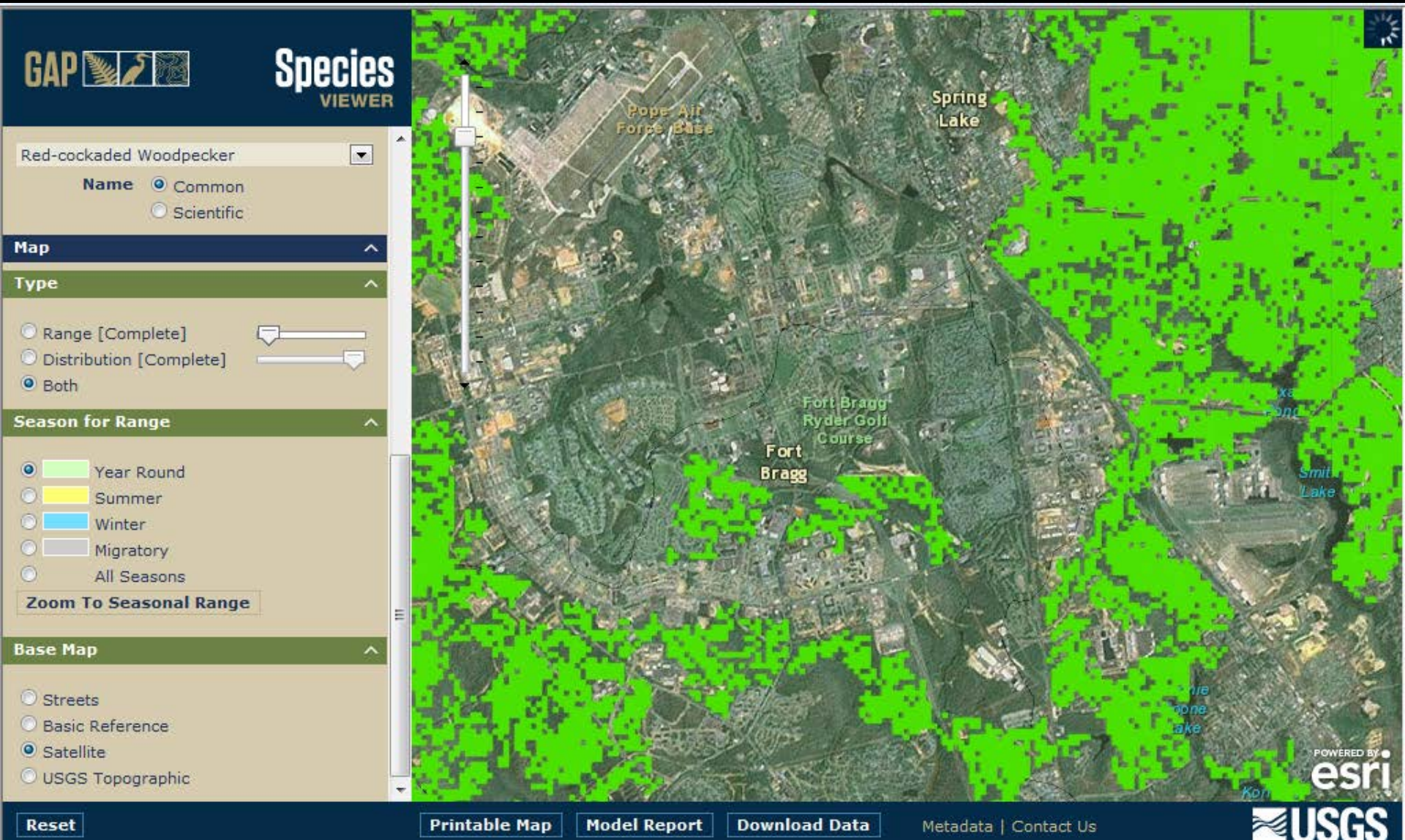
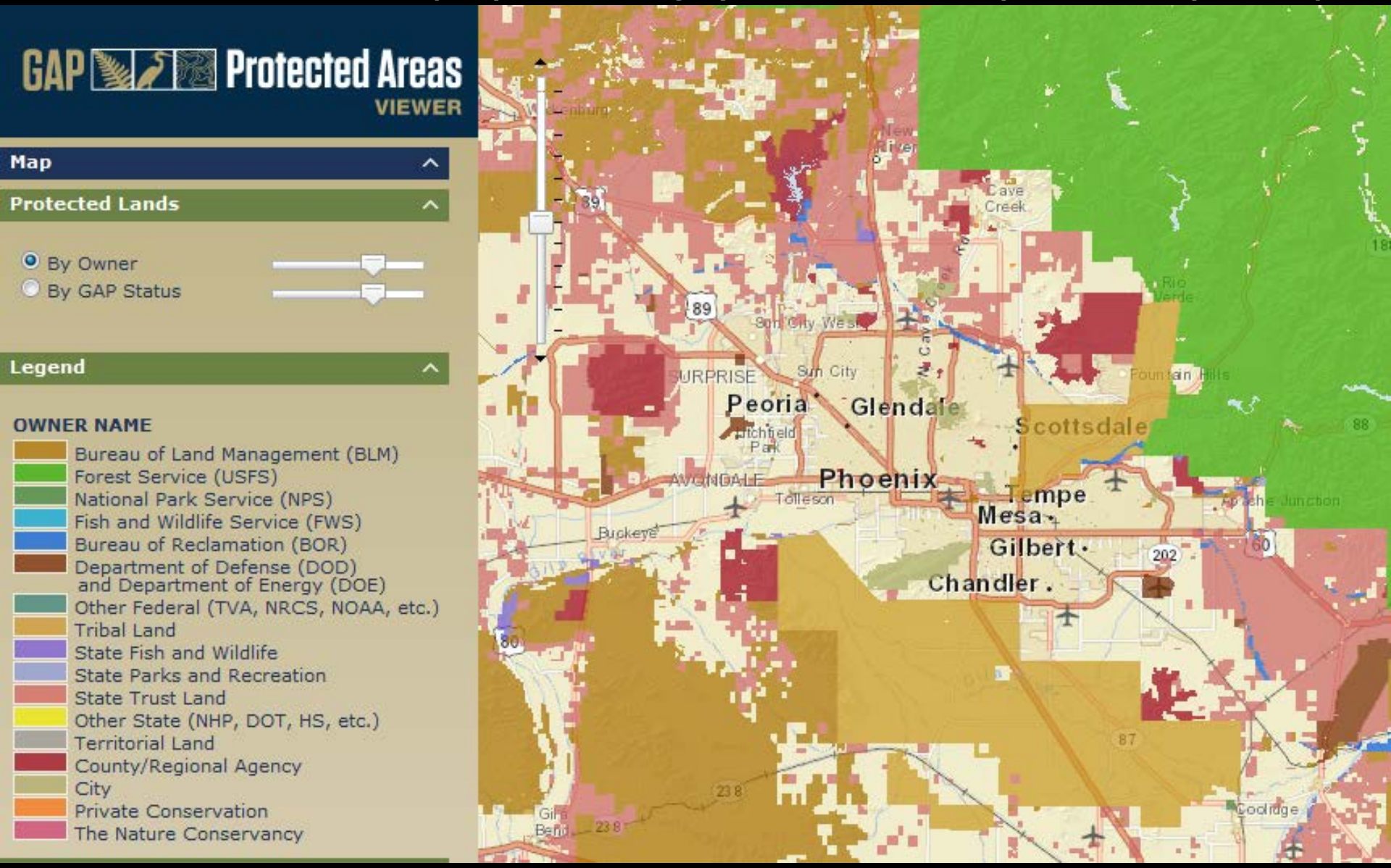
Sources of Species Distribution Data … GAP Species Viewer (http://www.gap.uidaho.edu/species_viewer.html)



Red-cockaded Woodpecker example (range and distribution



Fort Bragg, NC … Red-cockaded Woodpecker Modeled Distribution



Sources of Senstivity/Adaptive Capacity data
GAP PAD Viewer (http://www.gap.uidaho.edu/padusmap.html)