



Examining species vulnerability to climate change in Pennsylvania

NatureServe's Climate Change Vulnerability Index

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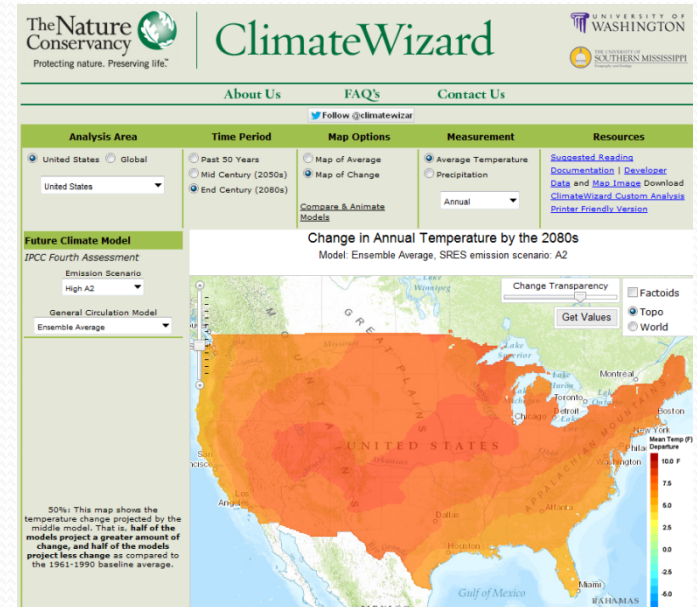
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What is the CCVI?

- A rapid assessment tool for examining species vulnerability to climate change
- Predicts whether a species will decline, remain stable, or increase in abundance or distribution
- Identifies factors contributing to vulnerability

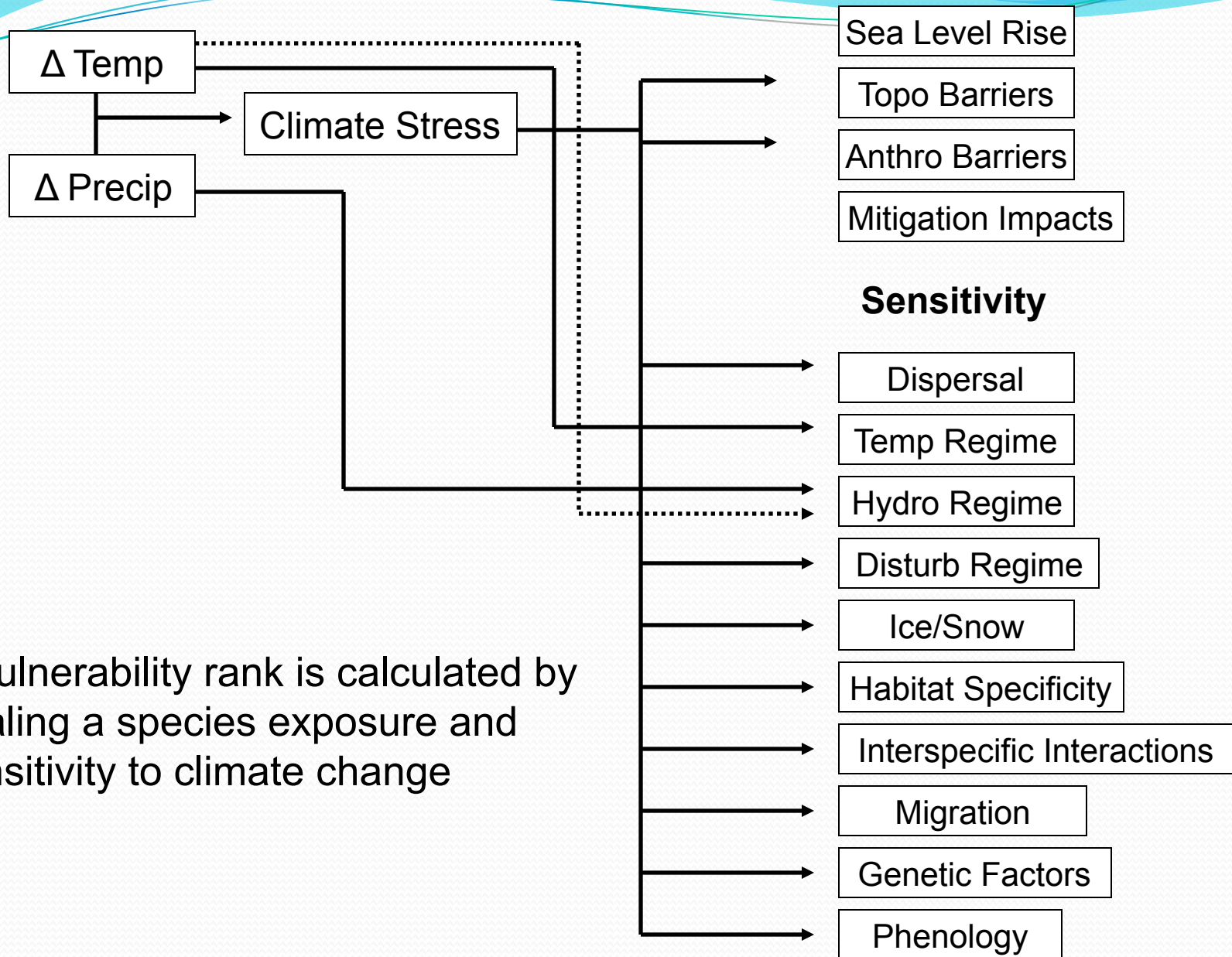
What's Needed ?

- Knowledge about current distributions and natural histories of species
- Downscaled climate predictions



Direct Climate Exposure

Indirect Climate Exposure



A vulnerability rank is calculated by totaling a species exposure and sensitivity to climate change

Index Score

- **Extremely Vulnerable:** Abundance and/or range within PA extremely likely to substantially decrease or disappear by 2050
- **Highly Vulnerable:** Abundance and/or range likely to decrease significantly by 2050
- **Moderately Vulnerable:** Abundance and/or range likely to decrease by 2050
- **Not Vulnerable/Presumed Stable:** Available evidence does not suggest that abundance and/or range will change substantially by 2050
- **Not Vulnerable/Increase Likely:** Available evidence suggests that abundance and/or range is likely to increase by 2050

CCVI Results – Birds

- Ability to move long distances
- Not overly temp. sensitive
- Less specific food & habitat requirements



Group	Species	Common Name	CCVI Score	S-rank	G-rank
Bird	<i>Cygnus columbianus</i>	Tundra Swan	Increase likely	S3	G5
Bird	<i>Dendroica cerulea</i>	Cerulean Warbler	Presumed stable	S4	G4
Bird	<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Presumed stable	S4	G4
Bird	<i>Helmitheros vermivorus</i>	Worm-eating Warbler	Presumed stable	S4	G5
Bird	<i>Vermivora pinus</i>	Blue-winged Warbler	Presumed stable	S4	G5
Bird	<i>Seiurus motacilla</i>	Louisiana Waterthrush	Moderately vulnerable	S5	G5
Bird	<i>Hylocichla mustelina</i>	Wood Thrush	Presumed stable	S5	G5
Bird	<i>Piranga olivacea</i>	Scarlet Tanager	Presumed stable	S5	G5
Bird	<i>Ammodramus henslowii</i>	Henslow's Sparrow	Increase likely	S4	G4

CCVI Results _ Mussels

- Inability to move
- Sensitivity to temperature and precipitation
- Specific habitat requirements
- Dependence on other species for propagule dispersal



Group	Species	Common Name	CCVI Score	S-rank	G-rank
Mussel	<i>Alasmidonta heterodon</i>	Dwarf Wedgemussel	Extremely vulnerable	S1	G1G2
Mussel	<i>Pleurobema clava</i>	Clubshell	Extremely vulnerable	S1	G2
Mussel	<i>Villosa fabalis</i>	Rayed Bean	Extremely vulnerable	S1	G2
Mussel	<i>Margaritifera margaritifera</i>	Eastern Pearlshell	Extremely vulnerable	S1	G4
Mussel	<i>Epioblasma torulosa rangiana</i>	Northern Riffleshell	Extremely vulnerable	S2	G2
Mussel	<i>Lampsilis cariosa</i>	Yellow Lampmussel	Extremely vulnerable	S3S4	G3G4

What's Been Evaluated So Far?

- Water Birds – Audubon
- Plants – Carnegie Museum & Western PA Conservancy
- Land snails – Carnegie Museum
- Songbirds – IUP & Western PA Conservancy
- Lepidoptera - IUP & Western PA Conservancy
- Cave Inverts - Western PA Conservancy
- Herps - Western PA Conservancy
- Mammals - Western PA Conservancy
- Insects - Western PA Conservancy



Quick Links



PLANT
COMMUNITIES



COUNTY
INVENTORIES



COUNTY INVENTORY
INTERACTIVE MAP



SPECIES LISTS



VERNAL POOLS



AQUATIC
COMMUNITIES



CLIMATE CHANGE
VULNERABILITY INDEX



PNDI ENVIRONMENTAL
REVIEW TOOL

Climate Change Vulnerability Index

Climate change vulnerability assessments were conducted for 85 species in Pennsylvania using the Climate Change Vulnerability Index (CCVI v2.0) developed by NatureServe. The CCVI allows the user to examine the exposure and sensitivity of a species to a series of risk factors associated with climate change. Presented below are the results of the vulnerability assessments along with the S and G-ranks for each species. The S and G-ranks provide demographic information not contained in the CCVI that should be used in concert with the CCVI scores when interpreting overall results. Definitions for the CCVI scores are provided at the end of the table and each species is linked to a summary sheet that describes the factors contributing most to their climate change vulnerability. Additional information is available in the final report. Definitions of the state and global rank codes can be found [here](#).

Group	Species	Common Name	CCVI Score	S-rank	G-rank
Amphibian	<i>Cryptobranchus alleganiensis</i>	Eastern hellbender	Extremely vulnerable	S3	G3G4
Amphibian	<i>Scaphiopus holbrookii</i>	Spadefoot toad	Extremely vulnerable	S1	G5
Amphibian	<i>Ambystoma jeffersonianum</i>	Jefferson salamander	Highly vulnerable	S4	G4
Amphibian	<i>Pseudacris brachyphona</i>	Mountain chorus frog	Highly vulnerable	S1	G5
Bird	<i>Dendroica cerulean</i>	Cerulean warbler	Presumed stable	S4	G4
Bird	<i>Helminthos vermivorus</i>	Worm-eating warbler	Presumed stable	S4	G5
Bird	<i>Vermivora chrysoptera</i>	Golden-winged warbler	Increase likely	S4	G4
Bird	<i>Ammodramus henslowii</i>	Henslow's sparrow	Increase likely	S4	G4
Bird	<i>Cygnus columbianus</i>	Tundra swan	Increase likely	S3	G5
Bird	<i>Vermivora pinus</i>	Blue-winged warbler	Increase likely	S4	G5
Bird	<i>Hylocichla mustelina</i>	Wood thrush	Increase likely	S5	G5
Bird	<i>Paranga olivacea</i>	Scarlet tanager	Increase likely	S5	G5