

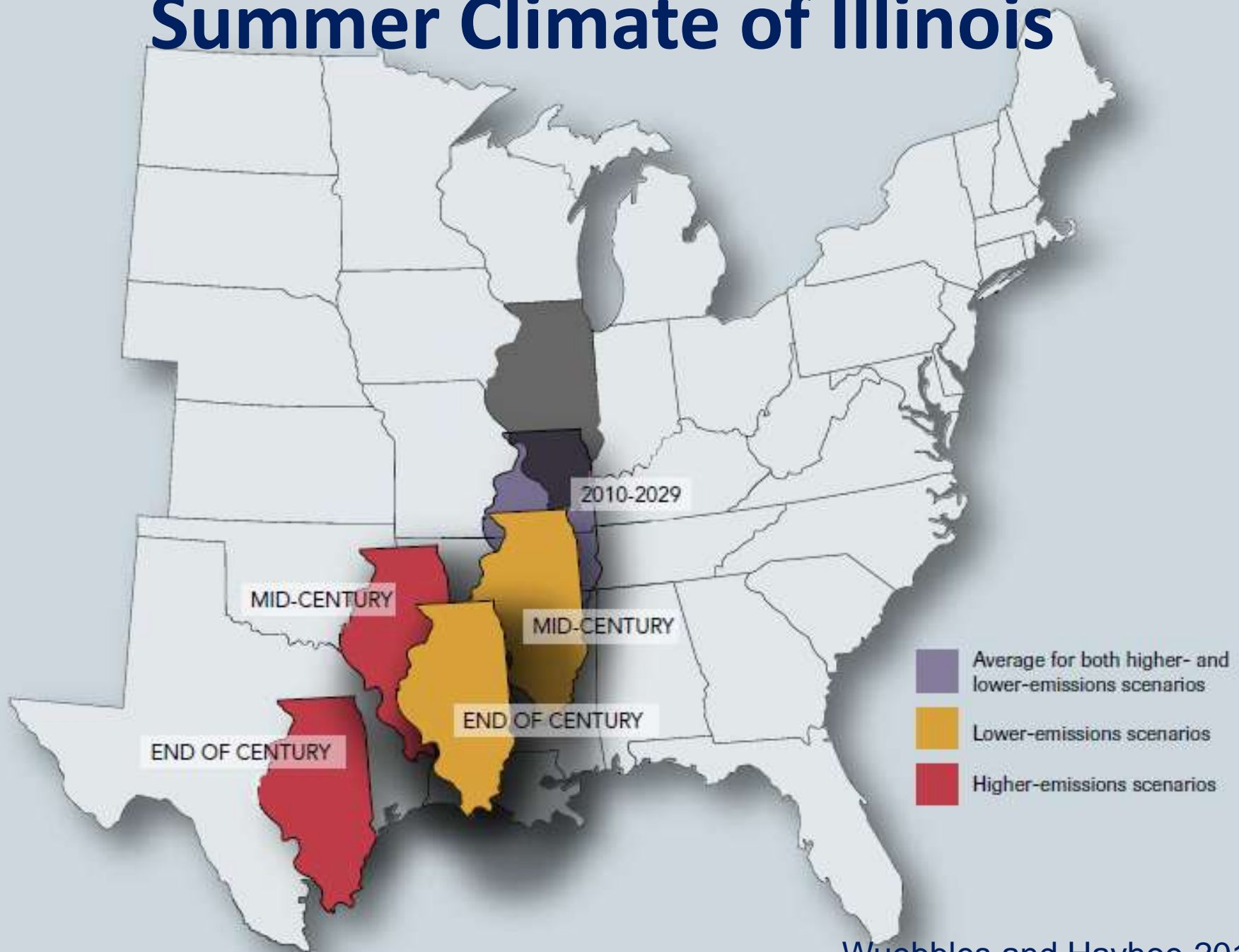
How Vulnerable are Species in Greatest Need of Conservation to Climate Change?

An Update to the Illinois Wildlife Action Plan

Jeff Walk, Aaron Lange, Sarah Hagen



Summer Climate of Illinois



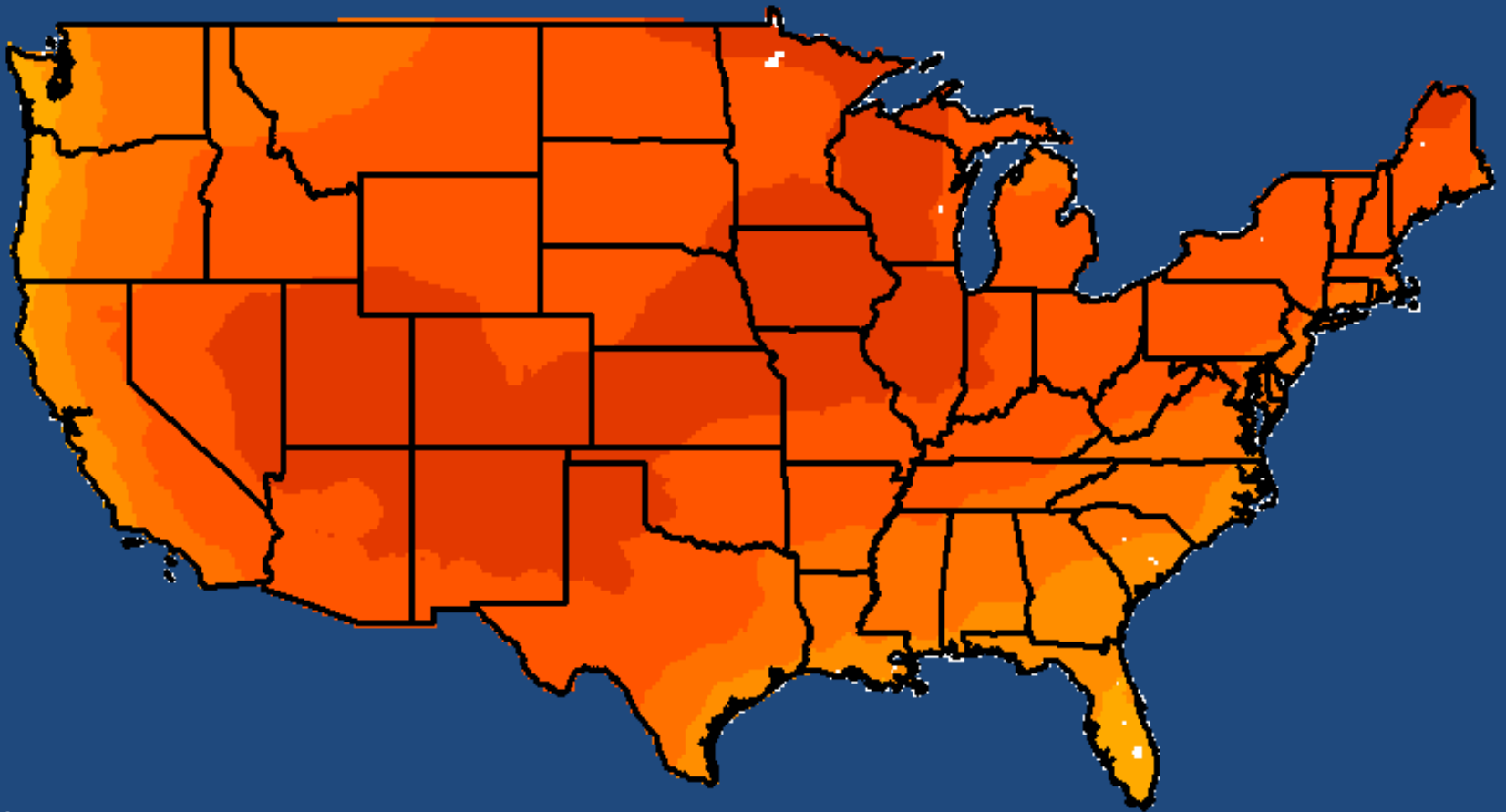
Average Temperature Change 2070-2099 Compared to 1961-1990

Change
(Degrees F)

+10

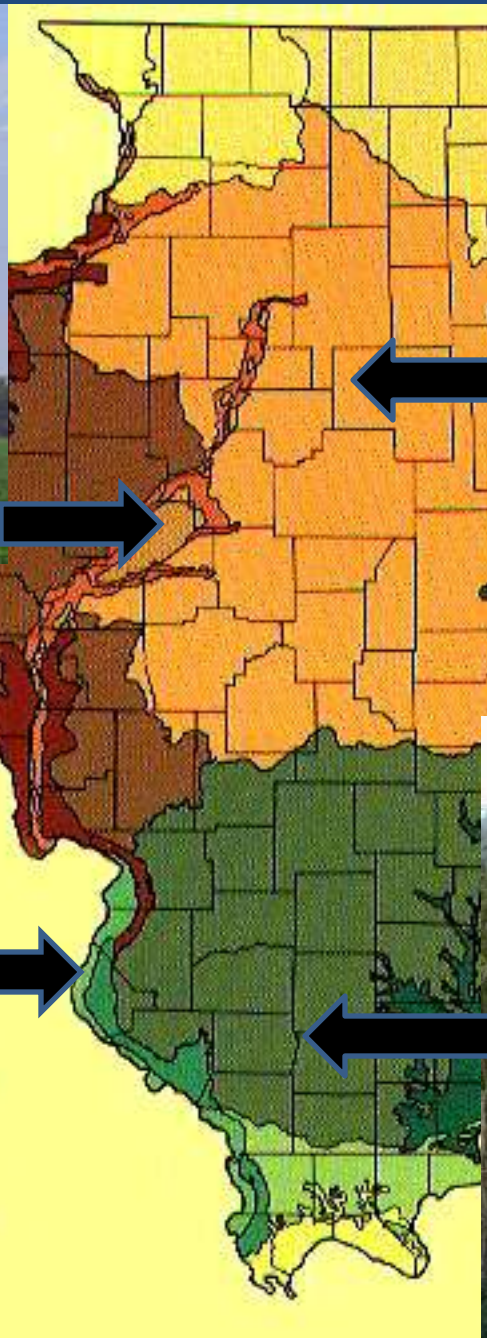
0

-10





- Wisconsin Driftless Division
- Rock River Hill Country Division
- Northeastern Morainal Division
- Grand Prairie Division
- Upper Mississippi River and Illinois River Bottomlands Division





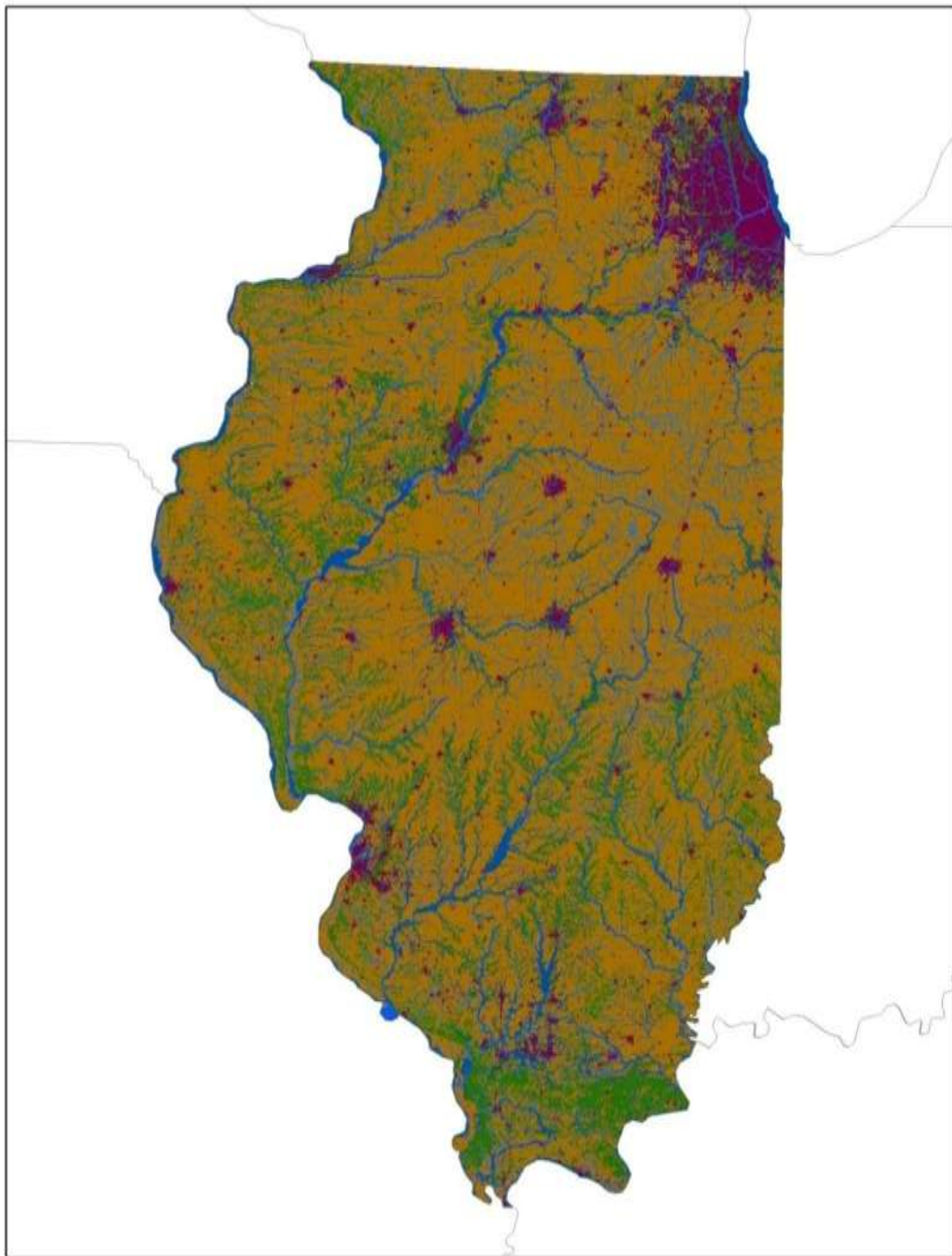
THE ILLINOIS WILDLIFE ACTION PLAN



DEFINING A VISION FOR CONSERVATION SUCCESS

ILLINOIS DEPARTMENT OF NATURAL RESOURCES





Action Campaigns

Habitat-Based

Streams

Wetlands

Forests

Farmland & Prairie

Green Cities

Cross-Cutting

Invasive Species

Land & Water

Stewardship

EXPOSURE

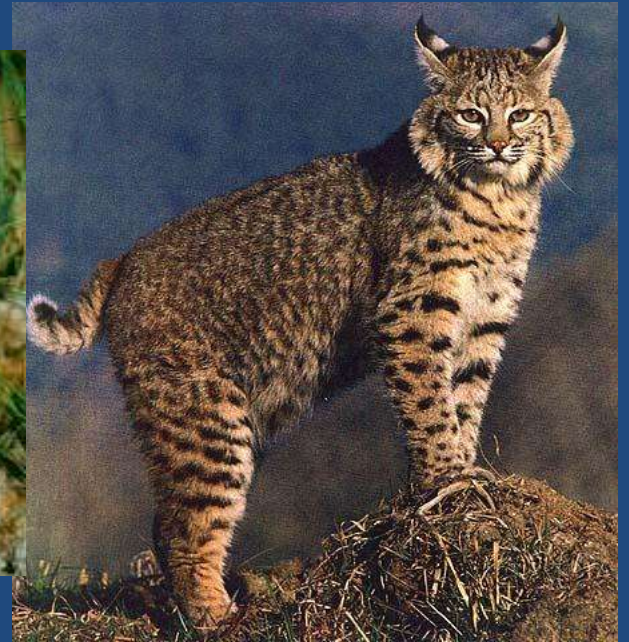
SENSITIVITY

ADAPTIVE CAPACITY




CLIMATE CHANGE VULNERABILITY

Adaptive Capacity



LOW

HIGH

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	The NatureServe Climate Change Vulnerability Index												 NatureServe		
2	Release 2.01 10 May 2010; Bruce Young, Elizabeth Byers, Kelly Gravuer, Kim Hall, Geoff Hammerson, Alan Redder														
3	With input from: Jay Cordeiro, Kristin Szabo														
4	Funding for Release 2.0 generously provided by the Duke Energy Corporation.														
5															
6	* = Required field														
7															
8	Geographic Area Assessed:				Wabash (Vermillion) Watershed				*		<div>Clear Form</div>				
9															
10	Assessor:				Sarah										
11															
12	Species Scientific Name:				Rhinichthys obtusus				*		English Name:		Western blacknose dace		
13															
14	Major Taxonomic Group:				Fish				*						
15															
16	Relation of Species' Range to Assessment Area:				Center of range				*		G-Rank:		G5		
17															
18	Check if species is an obligate of caves or groundwater aquatic systems:								(Must be marked with an "X" for accurate scoring of these species.)						
19															
20	Assessment Notes (to document special methods and data sources)														
21	EV 5%, HV 60%, MV 25%, PS 10%														
22															
23															
24															
25															
26	Section A: Exposure to Local Climate Change (Calculate for species' range within assessment area)														
27															
28	Temperature *														
29	Hamon AET:PET Moisture Metric *														

- Quantitative, objective input to Exposure to Local Climate Change
- Qualitative input ('Greatly Increase' to 'Decrease' vulnerability)
 - Indirect Exposure to Climate Change
 - Sensitivity
 - Documented or Modeled Response to Climate Change



ClimateWizard



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Analysis Area	Time Period	Map Options	Measurement	Resources
<input checked="" type="radio"/> United States <input type="radio"/> Global <div>United States</div>	<input type="radio"/> Past 50 Years <input type="radio"/> Mid Century (2050s) <input checked="" type="radio"/> End Century (2080s)	<input type="radio"/> Map of Average <input checked="" type="radio"/> Map of Change Compare & Animate Models	<input checked="" type="radio"/> Average Temperature <input type="radio"/> Precipitation <div>Annual</div>	Case Studies Documentation Data and Map Image Download ClimateWizard Custom Analysis Printer Friendly Version

Future Climate Model
IPCC Fourth Assessment

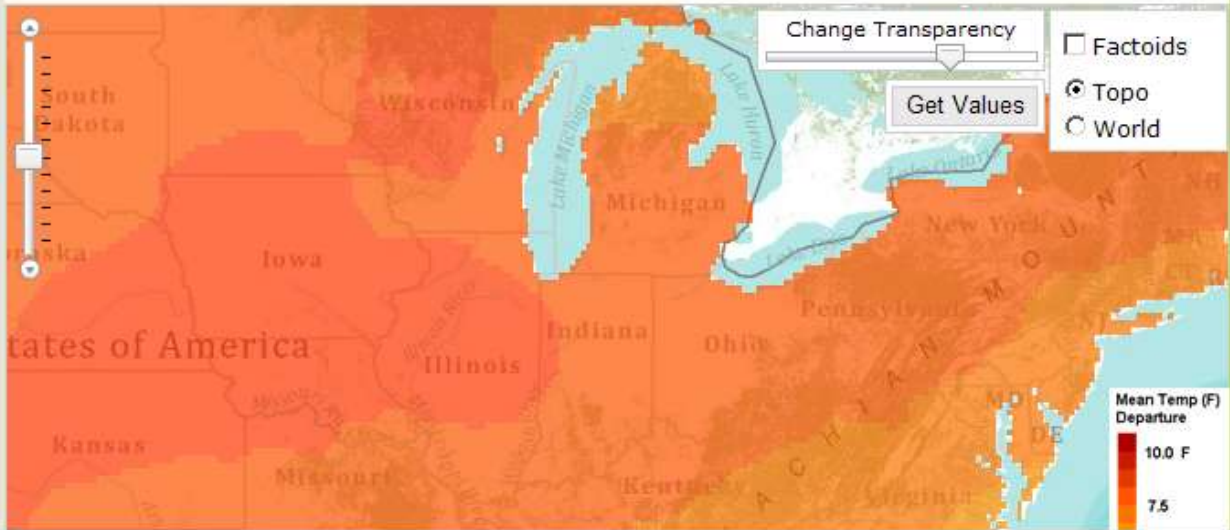
Emission Scenario

High A2

General Circulation Model

Ensemble Average

Change in Annual Temperature by the 2080s
Model: Ensemble Average, SRES emission scenario: A2





An Online Encyclopedia of Life

[Search](#) [About the Data](#) [About Us](#) [Contact Us](#) [Help](#)[Return To Search Results](#)[Change Criteria](#)[New Search](#)<< Previous | Next >> [View Glossary](#)***Moxostoma carinatum*** - (Cope, 1870)

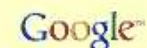
River Redhorse

Related ITIS Name(s): *Moxostoma carinatum* (Cope, 1870) (TSN 163936)

Unique Identifier: ELEMENT_GLOBAL 2.106031

Element Code: AFCJC10040

Informal Taxonomy: Animals, Vertebrates - Fishes - Bony Fishes - Suckers

[Search for Images on Google](#)

Kingdom	Phylum	Class	Order	Family	Genus
Animalia	Craniata	Actinopterygii	Cypriniformes	Catostomidae	Moxostoma

Genus Size: C - Small genus (6-20 species)

Check this box to expand all report sections: ☐

Concept Reference ?

Conservation Status ?

Distribution ?

Ecology & Life History ?

Economic Attributes

Not yet assessed ?

Management Summary ?

Climate Change Vulnerability Index

for *Rhinichthys obtusus* in Wabash (Vermillion) Watershed

Highly Vulnerable

Notes:

Confidence in Species
Information
Moderate

* Histogram below

Copy Data to
Results Table

Definitions of Index Values

Extremely Vulnerable (EV): Abundance and/or range extent within geographical area assessed extremely likely to substantially decrease or disappear by 2050.

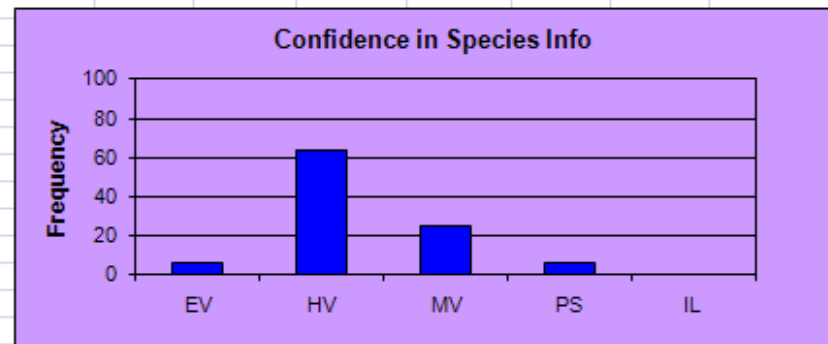
Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

Not Vulnerable/Increase Likely (IL): Available evidence suggests that abundance and/or range extent within geographical area assessed is likely to increase by 2050.

Insufficient Evidence (IE): Available information about a species' vulnerability is inadequate to calculate an Index score.



Results of a Monte Carlo simulation (1000 runs) of the data entered in the Index.

Overview of Results

- 584 assessments of 162 Species in Greatest Need of Conservation

Mammals

*Birds

Reptiles

Amphibians

*Fishes

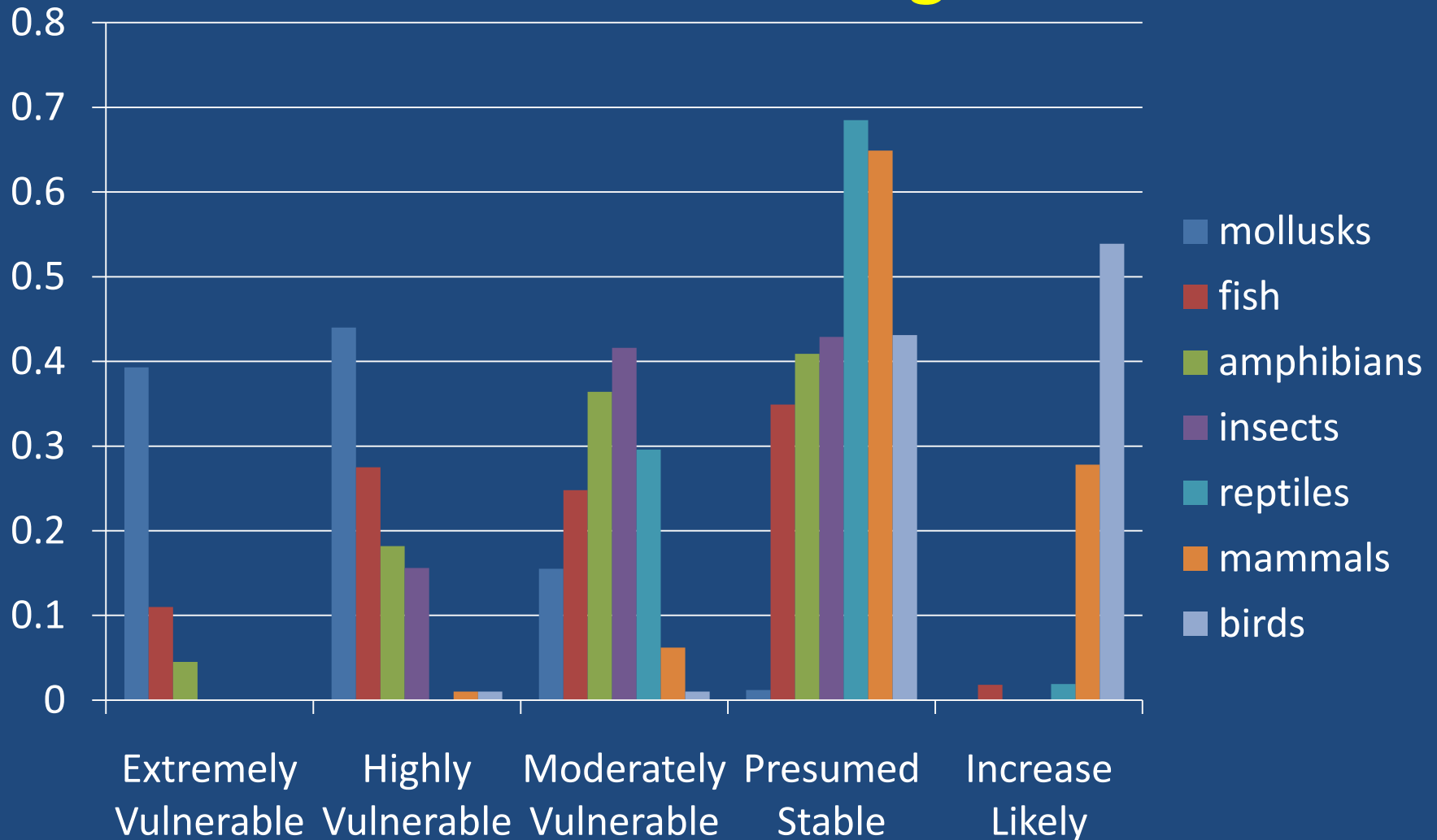
Crustaceans

*Insects

*Mollusks

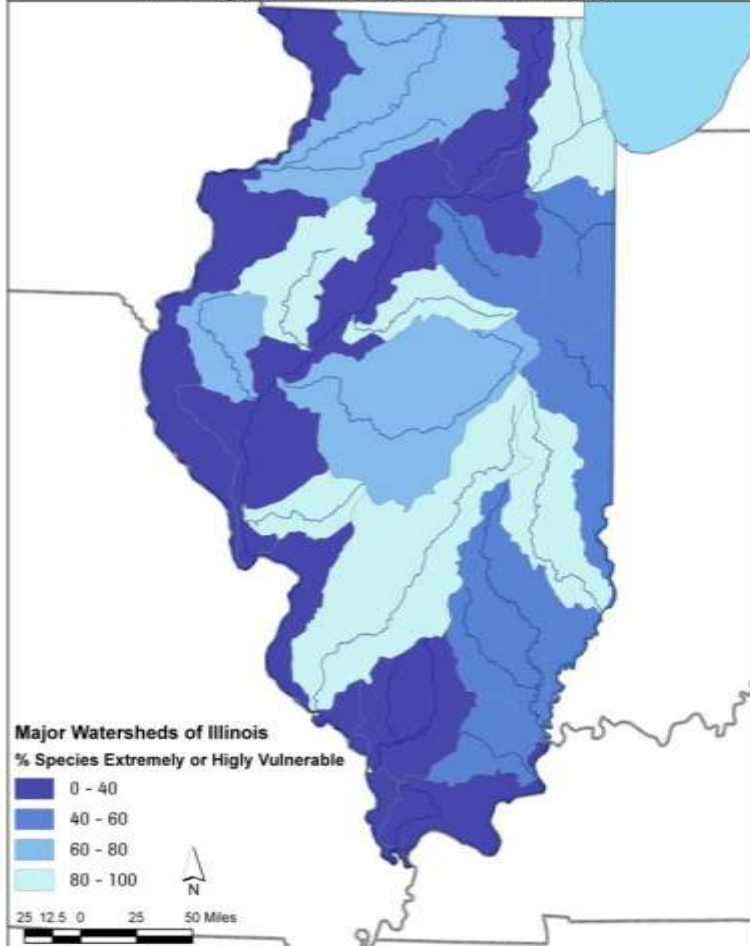
- 19 watersheds (aquatic), 14 natural divisions (terrestrial)
- High repeatability (98% w/in 1 rank)

Aquatic Wildlife Are More Vulnerable to Climate Change



Small Streams Are More Vulnerable Than Large Rivers

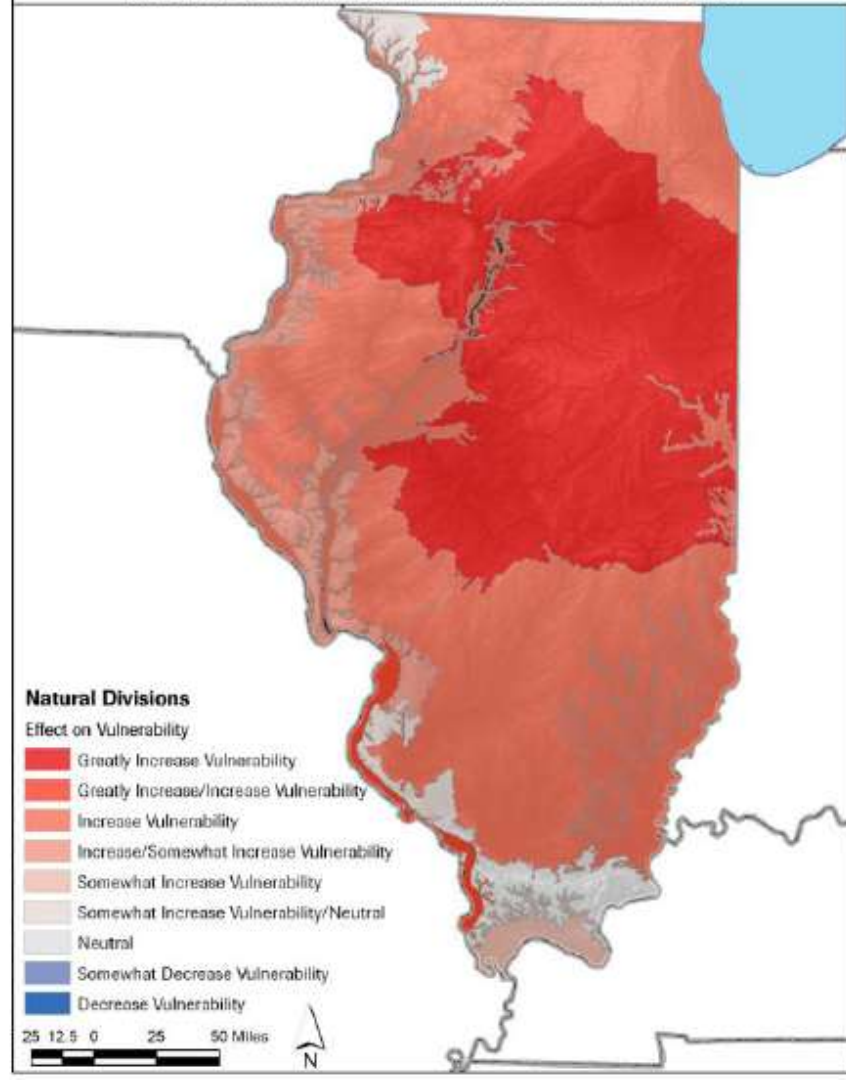
% SPECIES RATED EXTREMELY OR HIGHLY VULNERABLE
BY MAJOR WATERSHED IN ILLINOIS



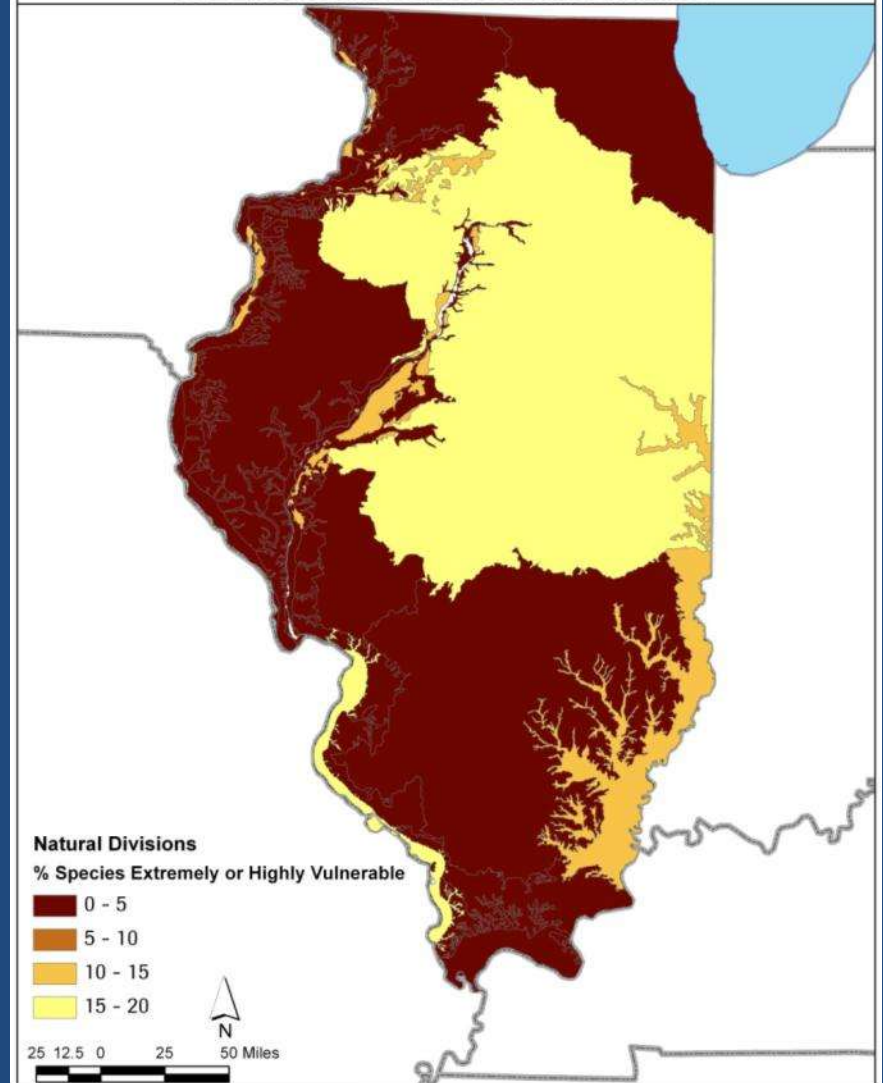
- Greater (and rapid) variability in flow, temperature, DO
- Coolwater/Coldwater species
- Dependent on clear or shallow water

Human-Created Barriers Contribute to Vulnerability

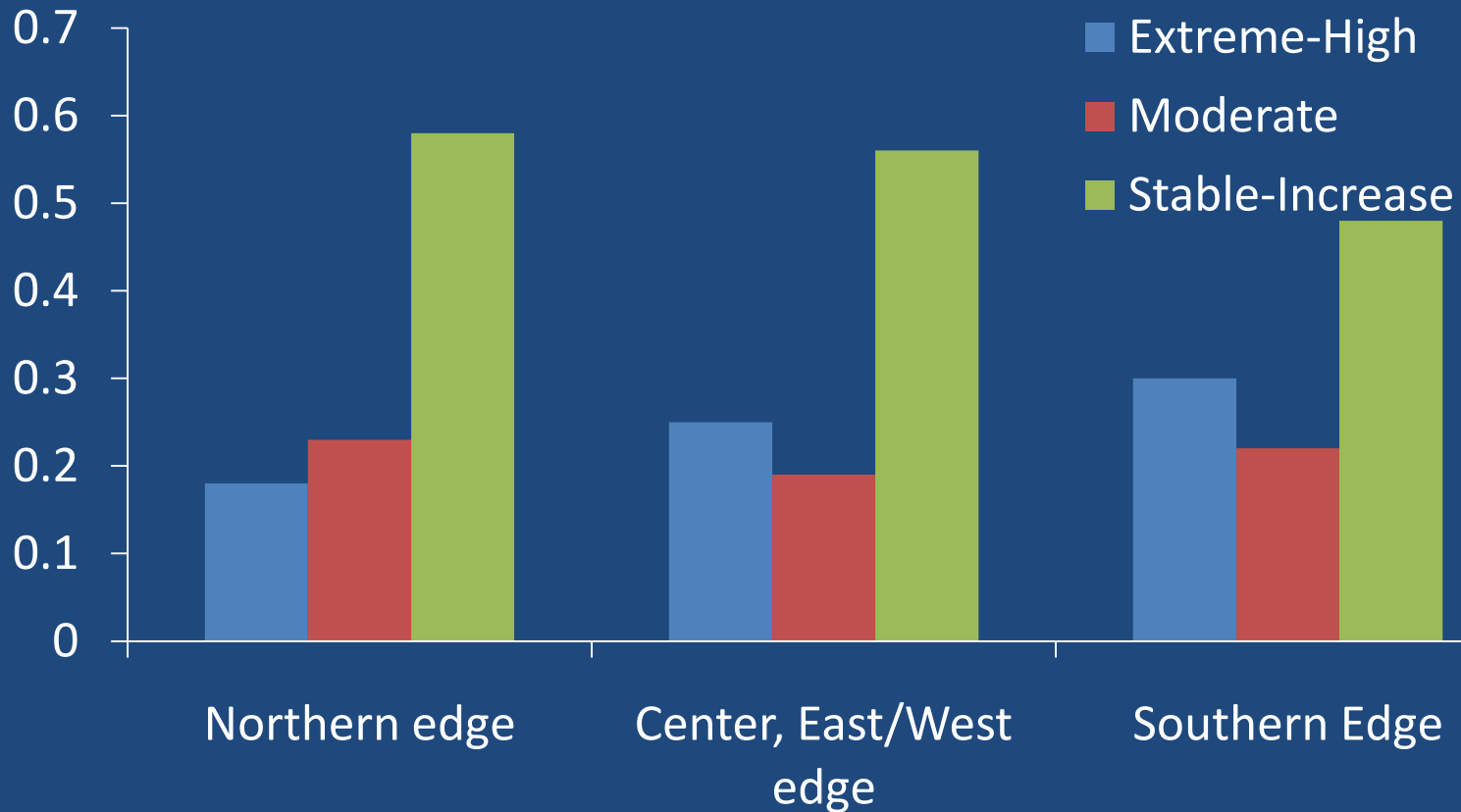
ANTHROPOGENIC BARRIERS TO DISPERSAL OF TERRESTRIAL SPECIES BY NATURAL DIVISION IN ILLINOIS



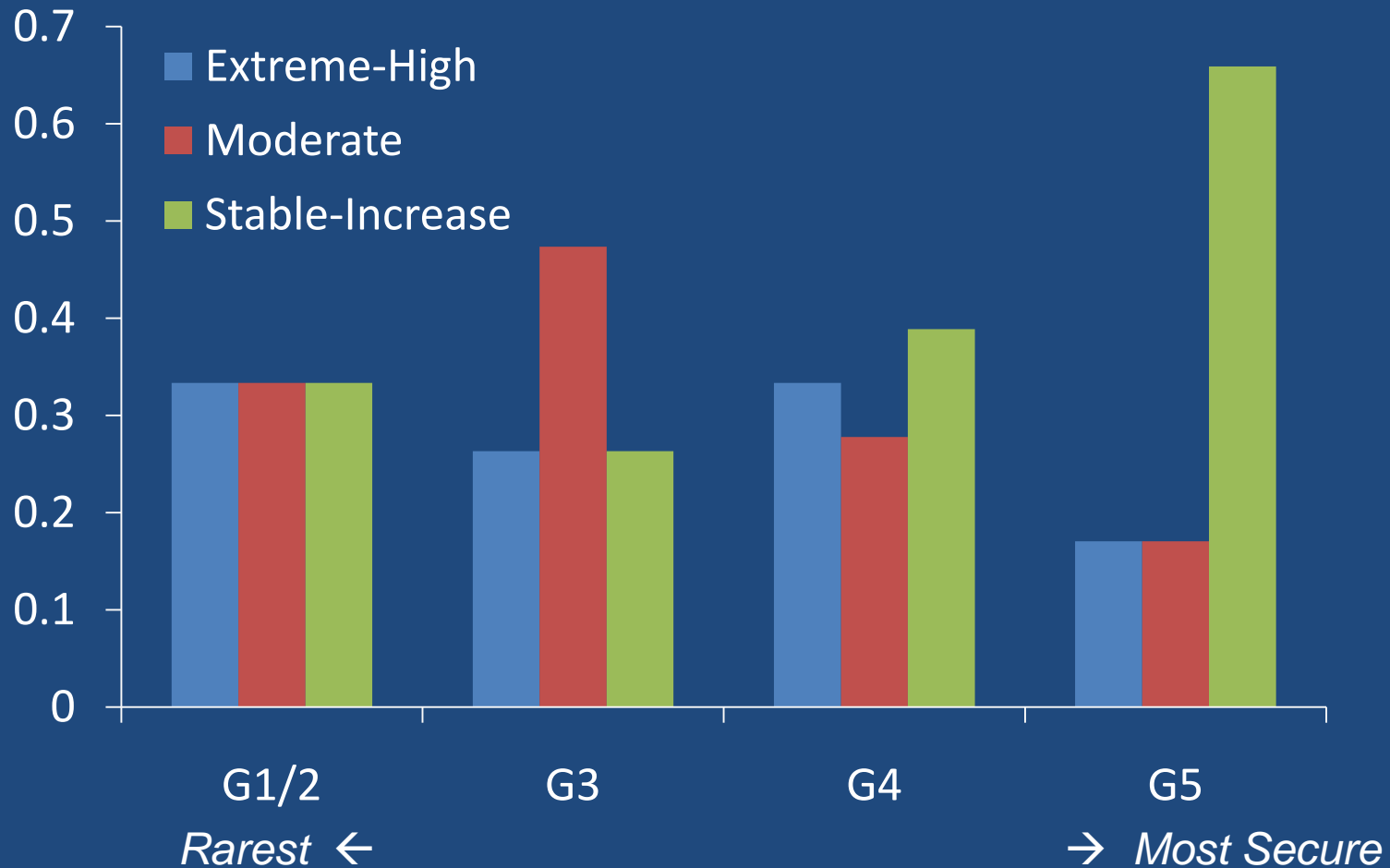
% SPECIES SCORED EXTREMELY OR HIGHLY VULNERABLE BY NATURAL DIVISION IN ILLINOIS

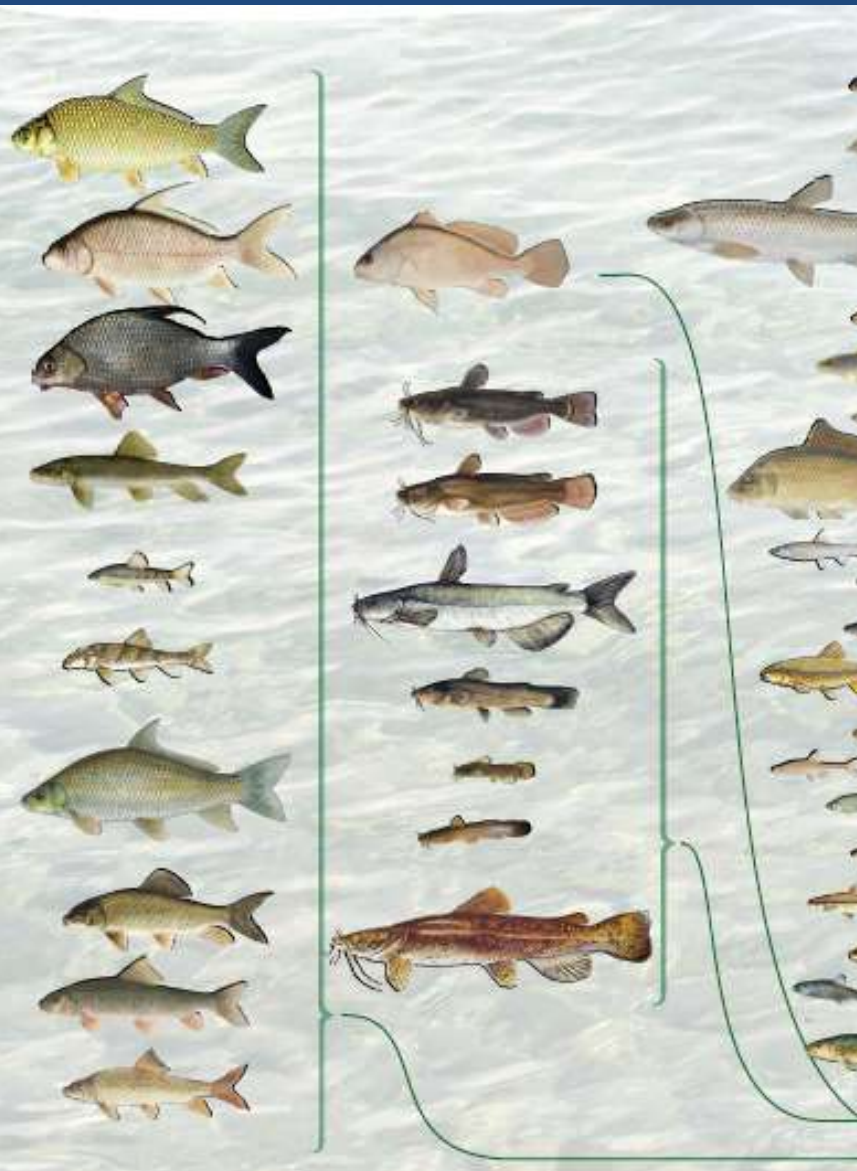


Range Position Does Not Strongly Affect Climate Change Vulnerability



Rare Species Tend To Be More Climate-Vulnerable



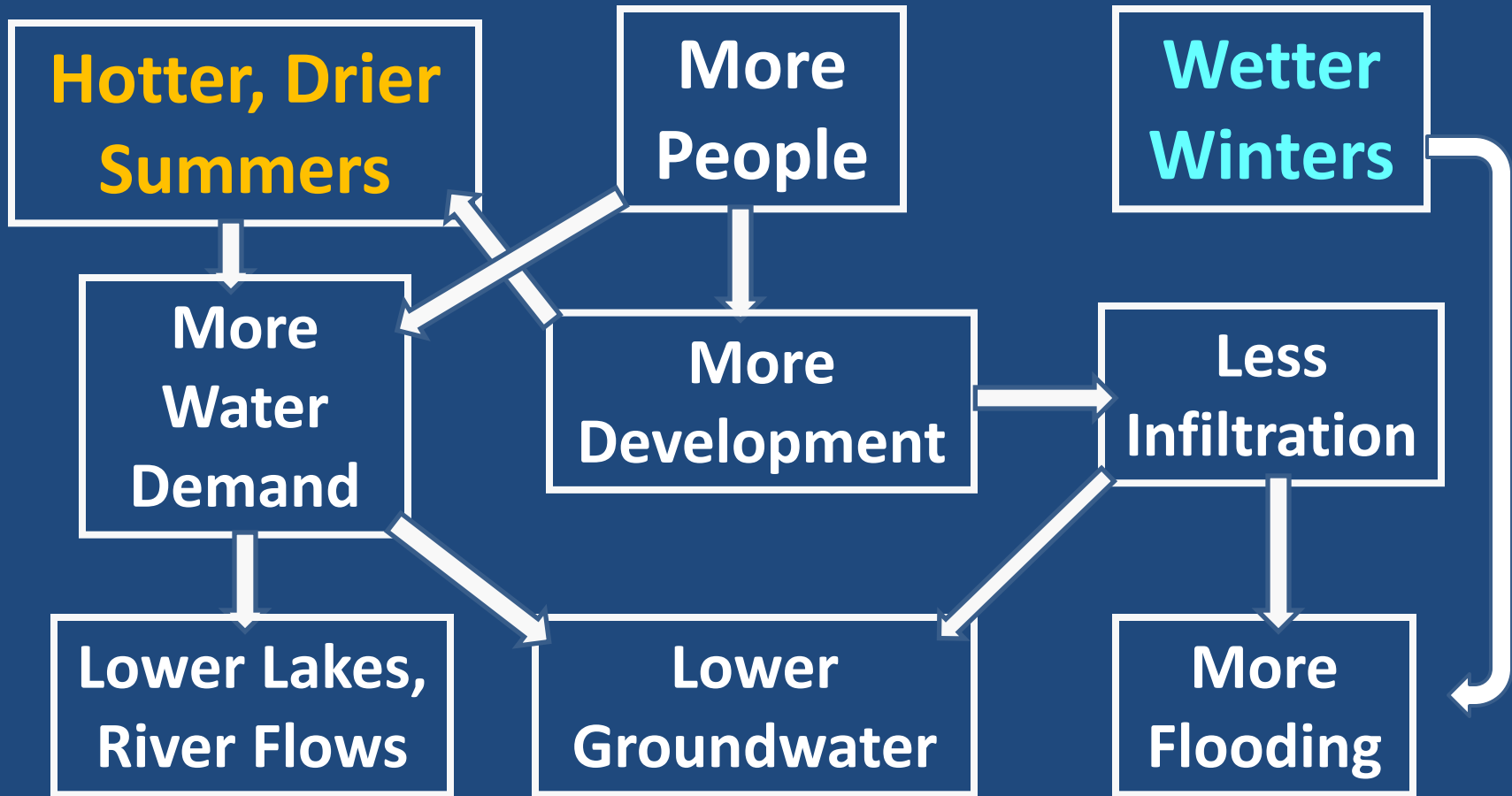


Friends of Kickapoo Creek



Tim Lindenbaum, TNC

Climate Change & Growth *Magnify Our Water Issues*



Nature-Based Strategies Benefit Wildlife and People

	Water Security	Water Quality	Less Flood Damage	Moderated Temperature
Wetland Restoration				
Floodplain Connection				
Riparian Buffers				
Reforestation				
Water & Energy Efficiency				

Conclusions

- Climate Change is a Threat Multiplier
 - *This index does NOT consider all threats!*
- Dispersal ability in naturally and artificially fragmented systems needs careful attention
- Aquatic species likely at greater risk than terrestrial species

Acknowledgements

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The Illinois Department of Natural Resources is not responsible regarding the form and content of data presented in this presentation

J. Cross, K. Hall, J. Herkert, L. Hinz, K. Kahl, Jim Renn, R. Panzer, J. Rogner

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