

North Shore Fisheries in a Changing Climate

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OVERVIEW

- I. North Shore Fisheries
- II. Vulnerability Assessment
- III. Scenario Planning
- IV. Our Response

NORTH SHORE



FISH COMMUNITY

Pre-settlement

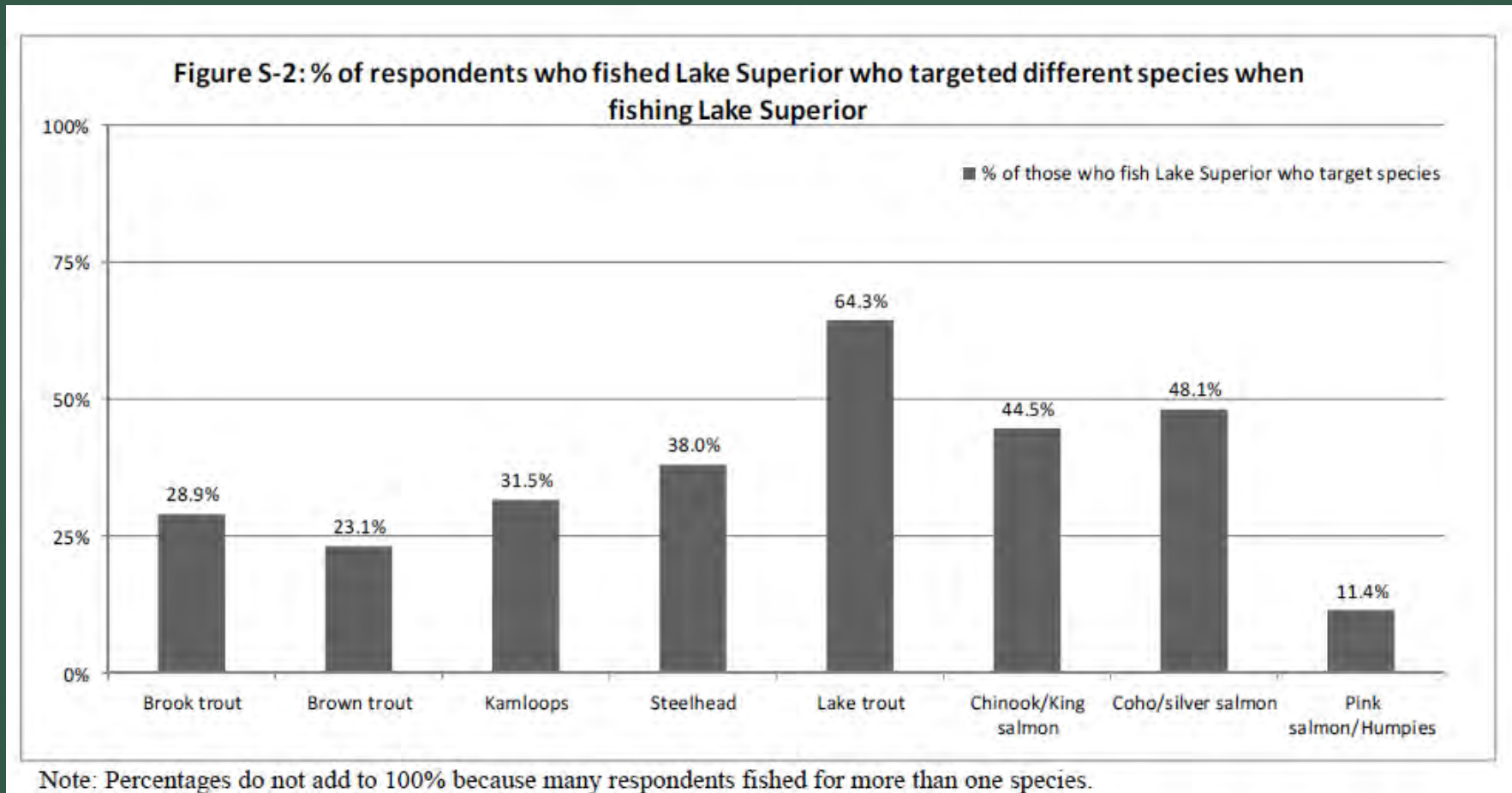


Today



FISHING INTERESTS

- ▶ 31% (26,177) of trout anglers fish Lake Superior and its tributaries



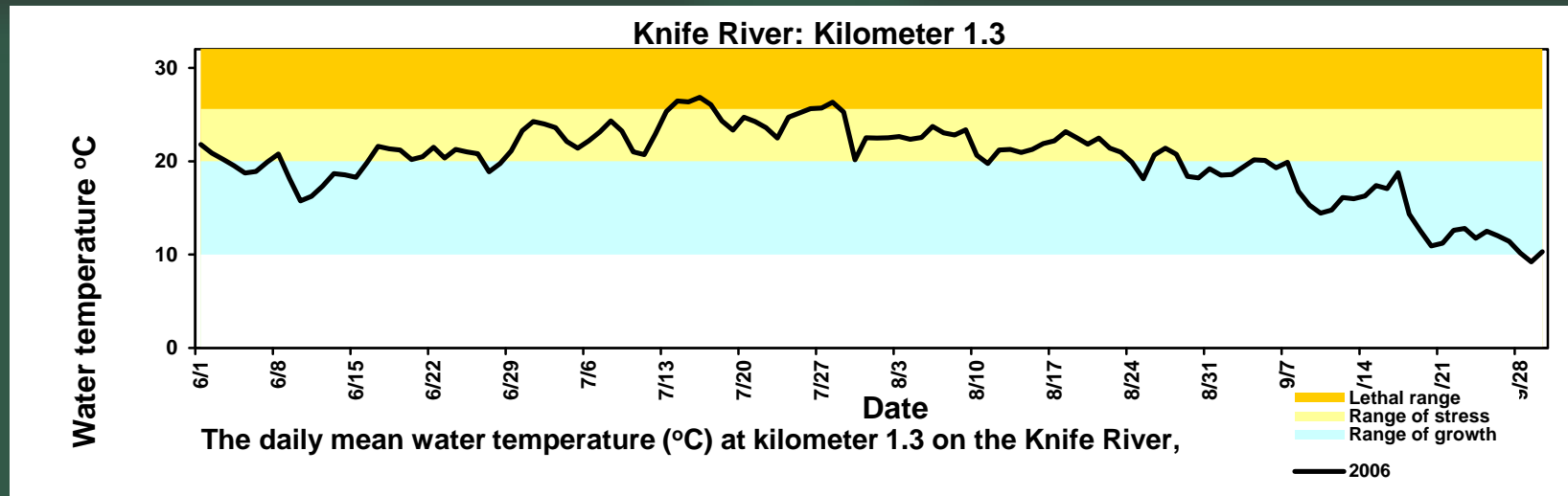
LIMITING FACTORS

- ▶ Stream Flow: summer and winter
- ▶ Stream Temperature: lack of groundwater



B. Evarts

STREAM TEMPERATURE

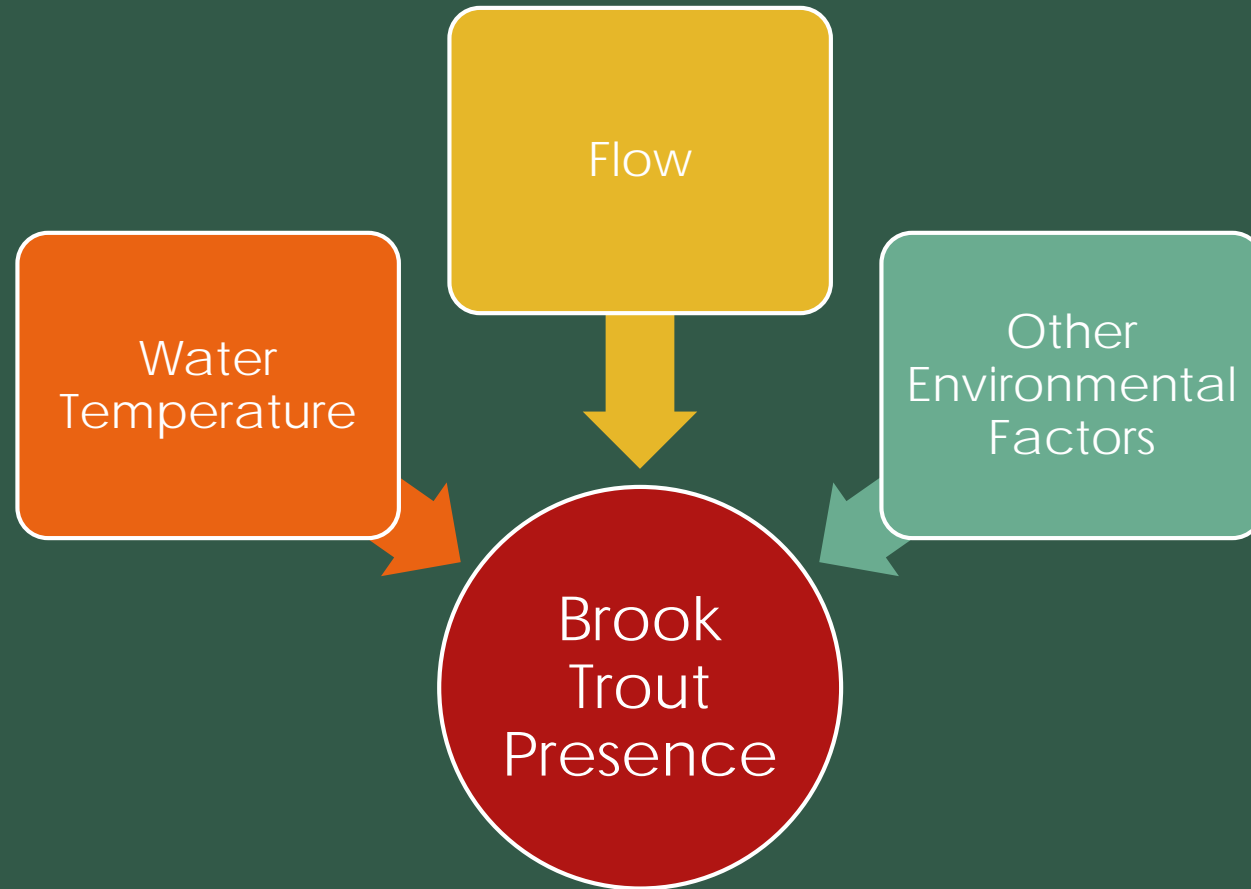


CHANGES IN MINNESOTA

- ▶ Warm winters and higher minimum temperatures
- ▶ More frequent dew points >70 degrees or higher
- ▶ Increase in rainfall, especially heavy rainfall and storm events

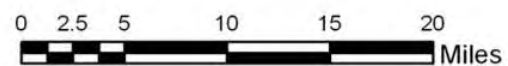
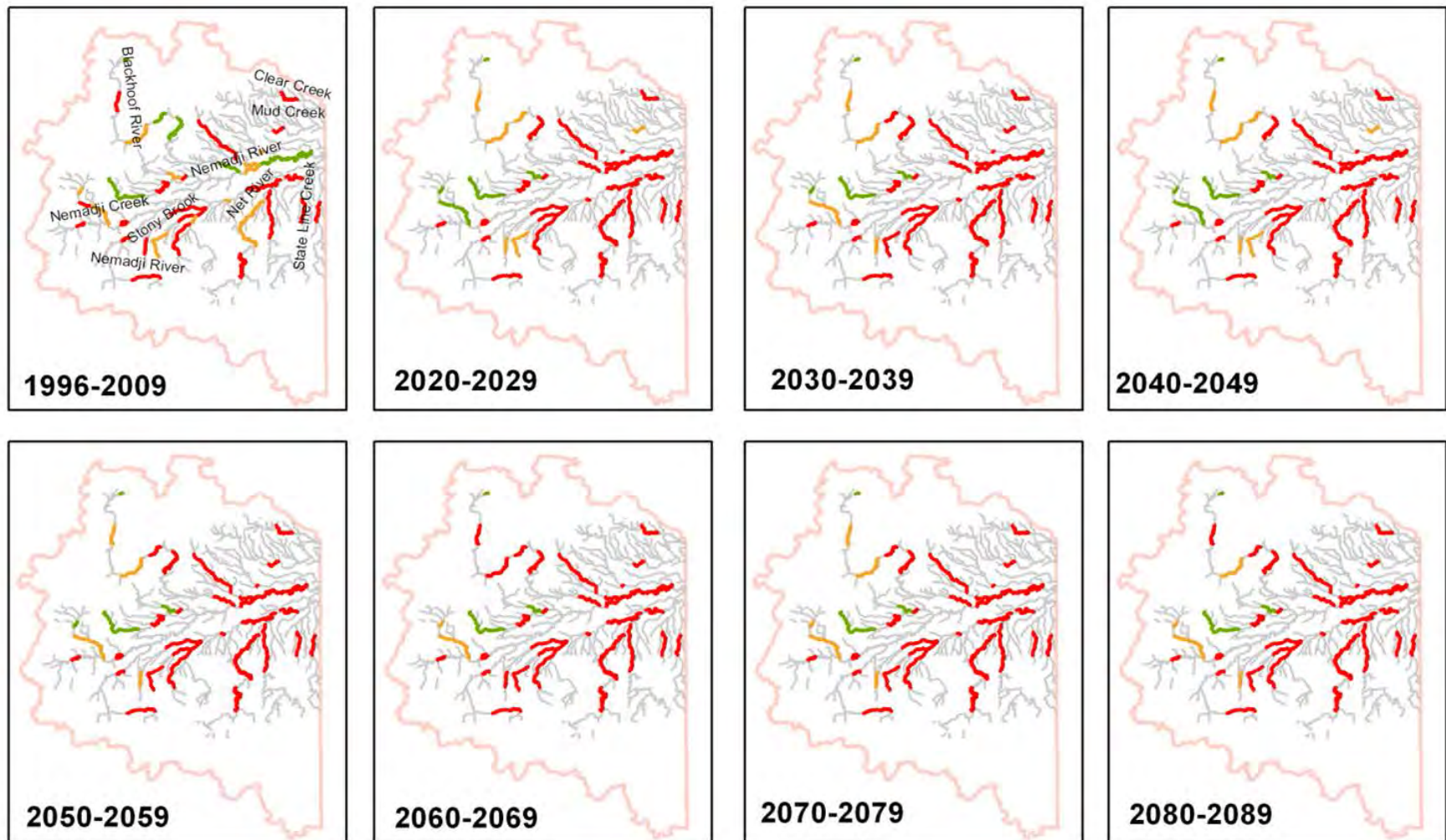


VULNERABILITY ASSESSMENT



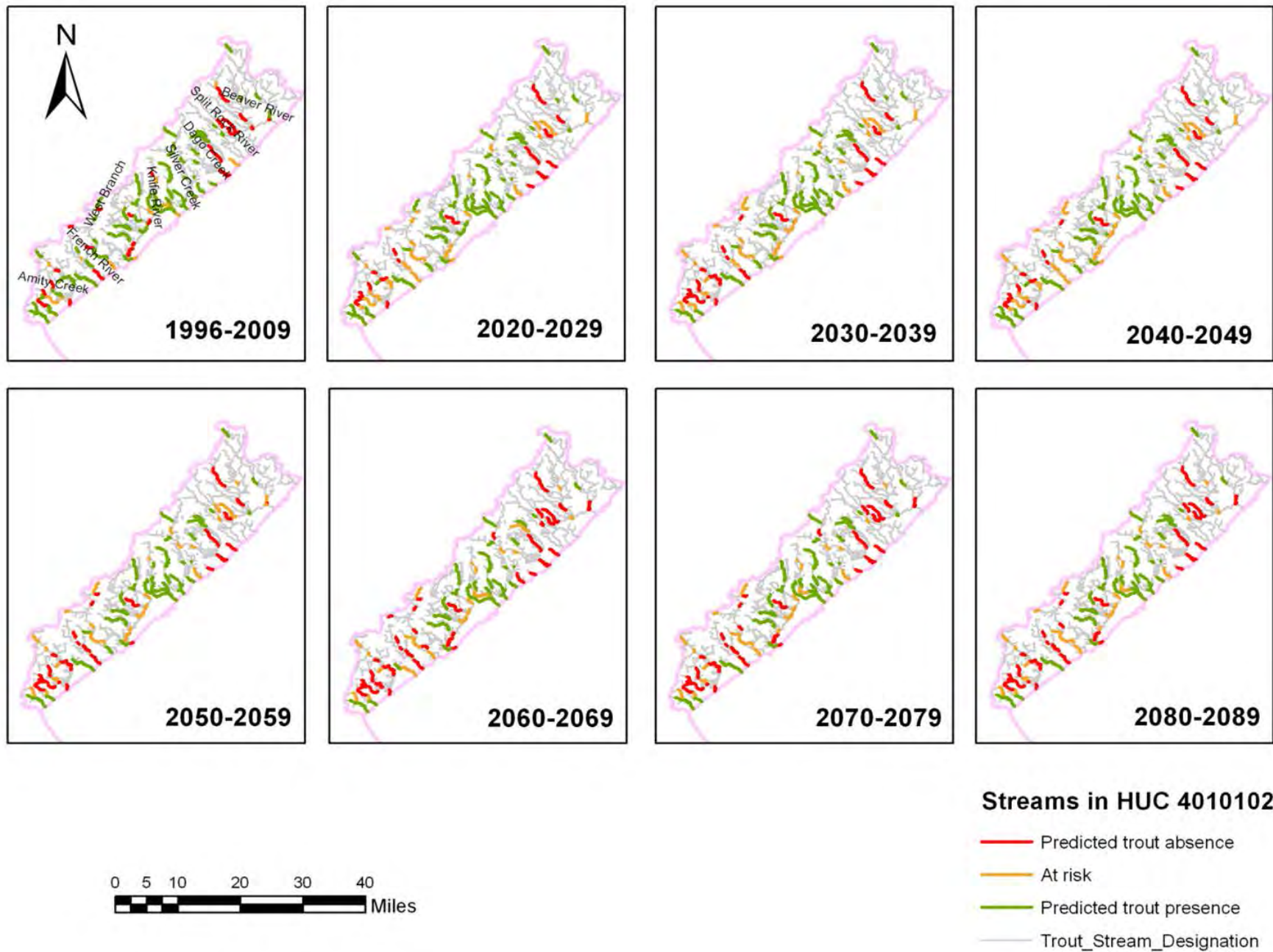
At risk: July Mean Water Temperature >65°F

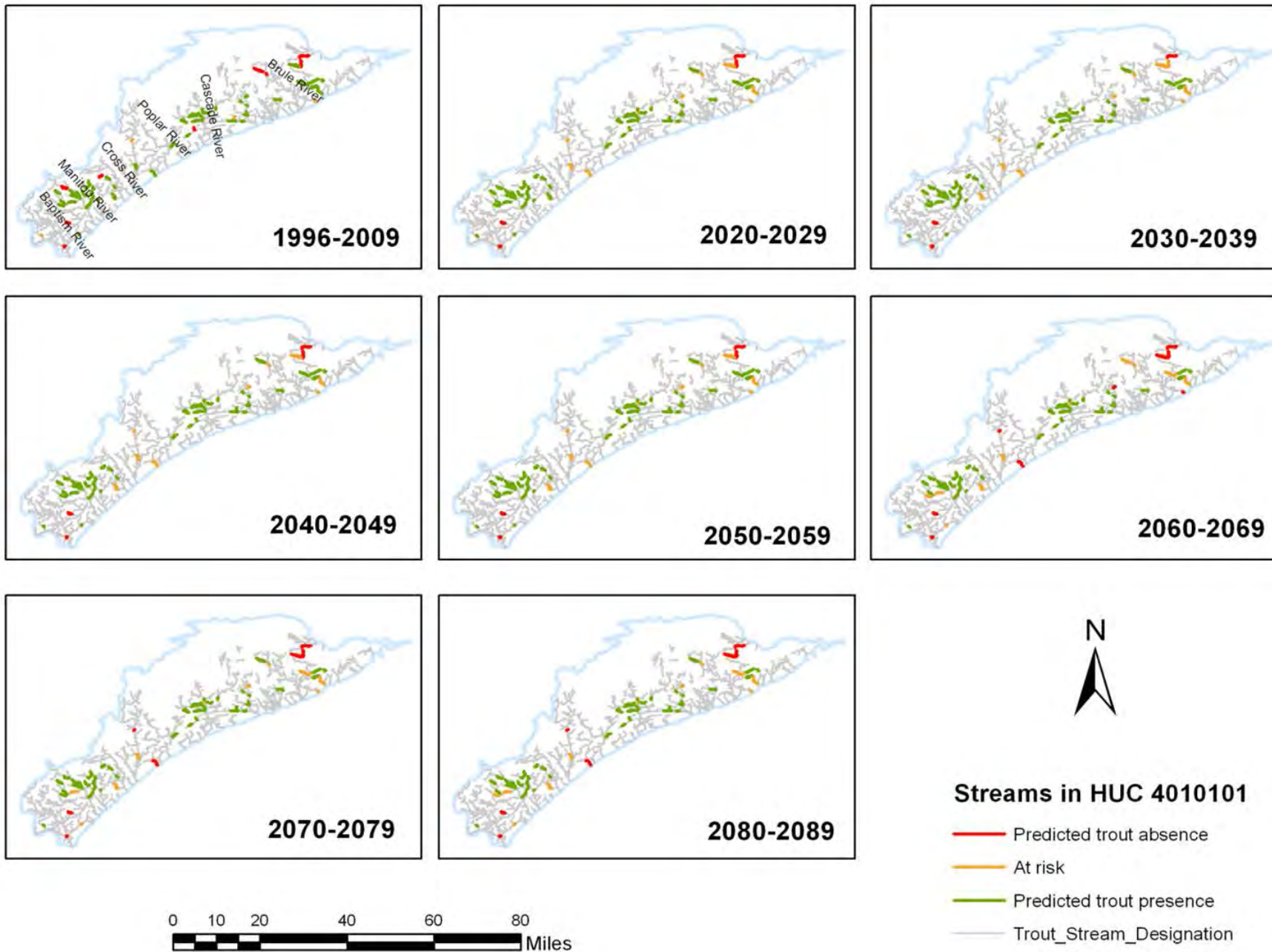
Absent: July Mean Water Temperature >68°F



Streams in HUC 4010301

- Predicted trout absence
- At risk
- Predicted trout presence
- Trout_Stream_Designation





SUMMARY

- ▶ Shore-wide: some streams are more resilient than others
- ▶ Lower Shore: most streams will no longer support trout in the near future
- ▶ Upper Shore: some streams may support trout under projected changes in climate
- ▶ Current actions may reflect short-term investments





D. Kraker

“Science can only ascertain what is, but not what should be, and outside of its domain value judgments of all kinds remain necessary” Albert Einstein

SCENARIO PLANNING

What is it?

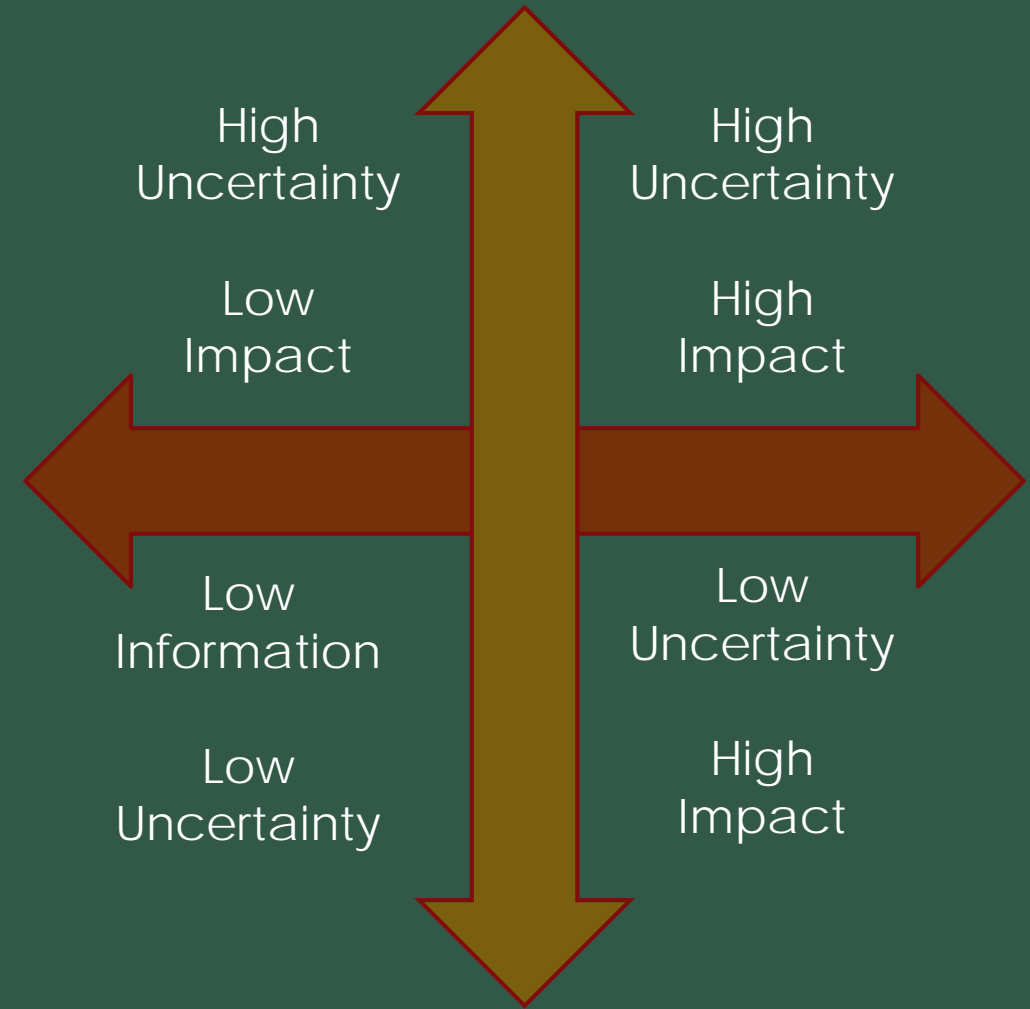
A tool to consider possible futures and identify strategic decisions.

What is the process?

1. Identify and analyze the critical factors, trends, and uncertainties
2. Develop plausible scenarios
3. Review scenarios (2-5) and consider management options

SCENARIO PLANNING: PART I

- ▶ Workshop to identify key drivers and uncertainties
 - Conceptual network
 - PEST+ analysis
 - Quadrant mapping



SCENARIO PLANNING: PART II

Created 5 narratives based on part 1:

- ▶ Disease outbreak
- ▶ Mega drought
- ▶ High timber harvest
- ▶ Shift to clean water/non-angling interests
- ▶ Best possible future

The Minnesota
VOLUNTEER
January-February 1989

How the 1988 Drought Hurt Minnesota's Natural Resources

Farmers and city dwellers alike suffered as last year's drought killed crops, endangered livestock, dried up wells, and raised conflicts over water use. Not so well-known is the toll taken on the state's forests, fish, and wildlife



S. Stoner

ACTION ITEM

Develop North Shore Streams Management Plan

What?

- Priority streams for management

How?

- Partner with stakeholders
- Use best available science
- Consider multiple interests
- Include relevant issues



ACTION ITEM

Fill Data Gaps

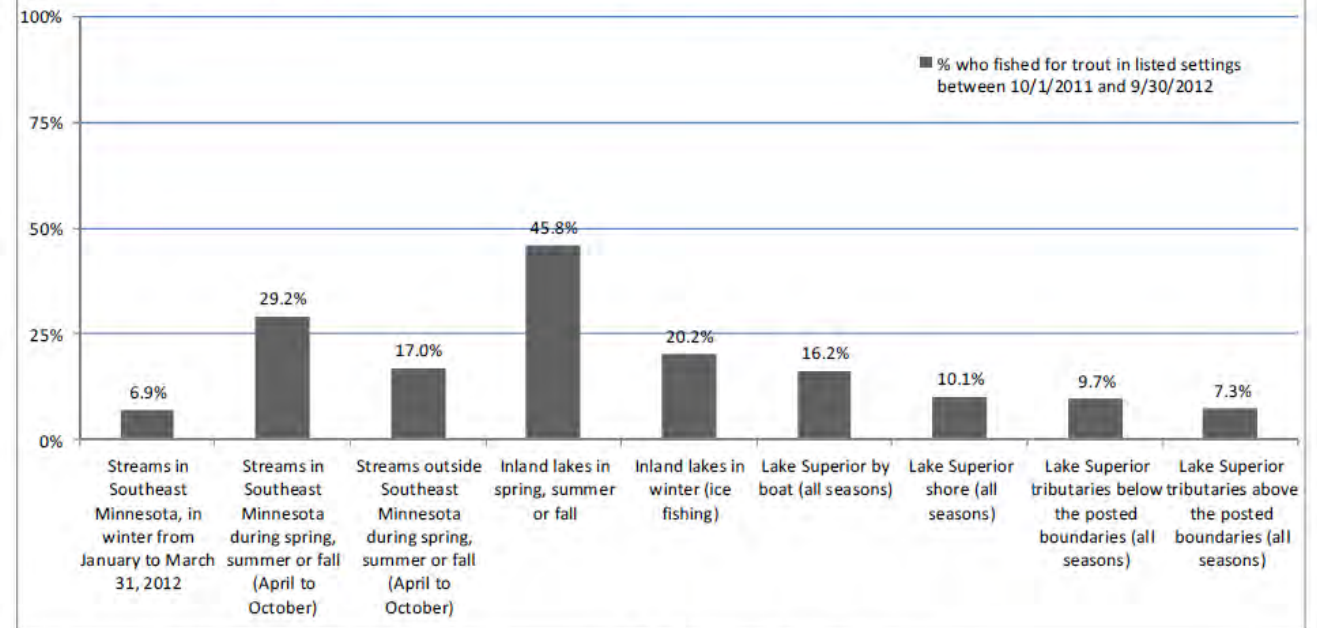
Culvert inventory

Creel surveys on inland trout lakes

Temperature/oxygen on inland lakes

Temperature monitoring network

Figure S-1: % of respondents who fished for trout in different MN settings.



Note: Percentages do not add to 100% because many respondents fished in more than one setting.

ACTION ITEM

Increase Staff Training

Timber management

Certification guidelines



ACTION ITEM

Prepare Emergency Plans

Invasive species

Disease infestation



ACTION ITEM

Reduce Risk

Ban felt-soled waders



Missouri DOC

INVESTING IN THE FUTURE

- ▶ Identify durable stream systems on the North Shore
- ▶ Manage streams systems and watersheds to increase long-term benefit
- ▶ Prepare for potential problems
- ▶ Engage with partners, anglers, decision-makers, and the public

ACTING NOW

"Some effects are already upon us, and others are coming soon. Proactive (planned in advance) adaptation is usually more effective, and less expensive, than reactive adaptation (responding after change has occurred)."



USDA

GOAL

Resilient habitats...

- ▶ can adapt to stressors
- ▶ continue to support fish, wildlife, plants, and people
- ▶ are flexible into the future



P. Sorenson

Questions/Discussion

