Supporting Tribal Climate Change Adaptation Planning through Participatory Scenario Development

Mike Dockry
Research Forester/Social Scientist
USFS Northern Research Station
Strategic Foresight Group
Saint Paul, MN

November 6, 2015
USFS First Friday Climate Change

College of Menominee Nation
Sustainable Development Institute

Center for First Americans Forestlands

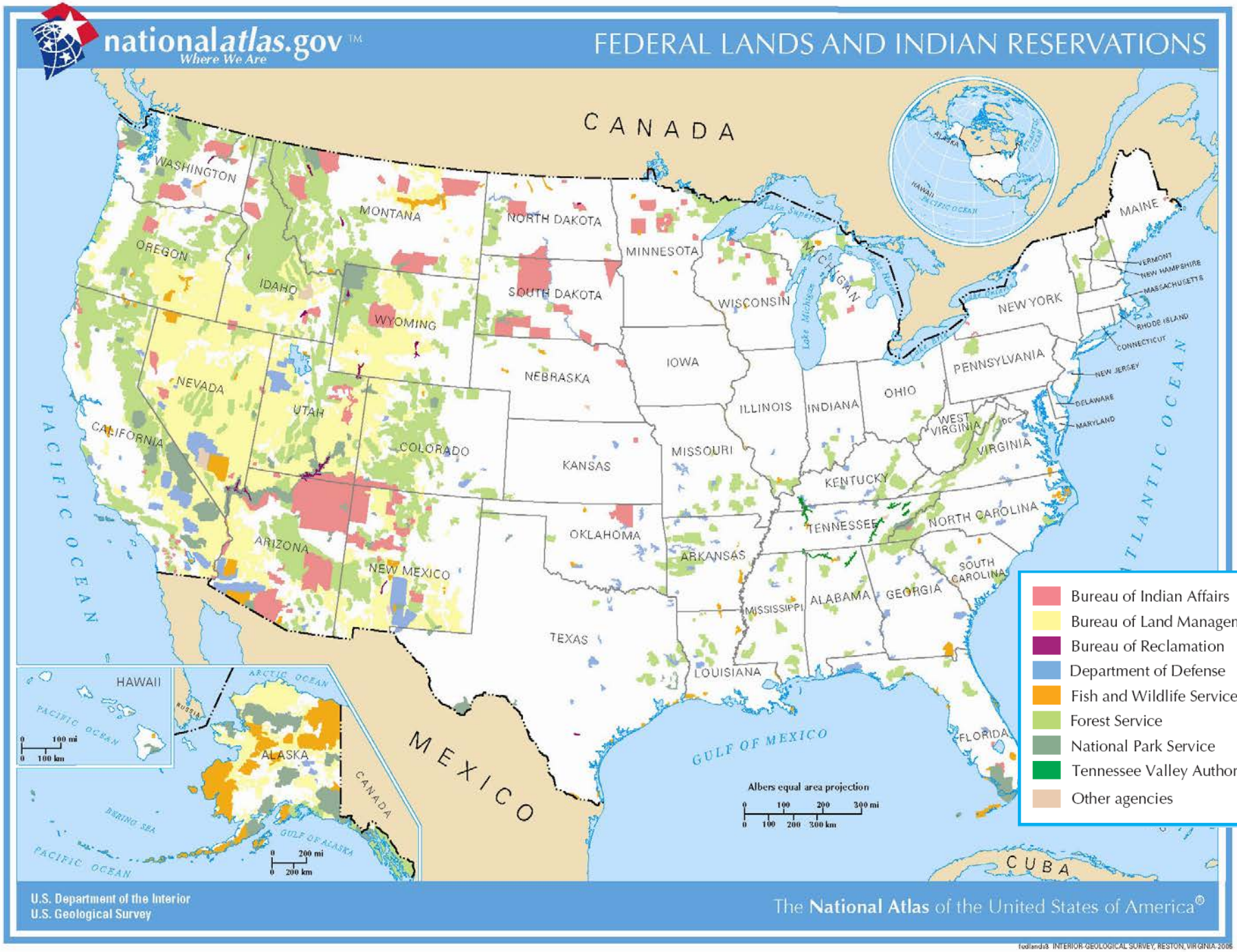
- Kyle Whyte, MSU – Co-PI
- Dean Fellman, CMN – Project Coordinator

Presentation Outline

1. Introduction – American Indian Forestry
2. Introduction – Scenario Planning
3. Research Questions
4. Methods and Data
5. Preliminary Conclusions

American Indian Forestry

- 566 Federally Recognized Tribes
- 302 have significant Forestlands
- 18 million acres (7.3 million ha)
- Tribes have managed their lands to meet many goals for generations
- Managed many changes
- All tribes are different: separate nations, cultures and history


nationalatlas.gov
Where We Are
FEDERAL LANDS AND INDIAN RESERVATIONS
CANADA
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
RHODE ISLAND
CONNECTICUT
NEW JERSEY
DELAWARE
MARYLAND
DC
Lake Superior
Lake Michigan
Lake Huron
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
MEXICO
CUBA
HAWAII
ALASKA
ARCTIC OCEAN
BERING SEA
GULF OF ALASKA
RUSSIA
CANADA
Albers equal area projection
0 100 200 300 mi
0 100 200 300 km
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Department of Defense
Fish and Wildlife Service
Forest Service
National Park Service
Tennessee Valley Authority
Other agencies
U.S. Department of the Interior
U.S. Geological Survey
The National Atlas of the United States of America®
fedlands3 INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA 2005

nationalatlas.gov™
Where We Are

MINNESOTA

FEDERAL LANDS AND INDIAN RESERVATIONS

- Bureau of Indian Affairs
- Department of Defense (includes Army Corps of Engineers lakes)
- Fish and Wildlife Service / Wilderness
- Forest Service / Wilderness
- National Park Service / Wilderness

Some small sites are not shown, especially in urban areas.

MILES
0 25 50 75 100

Albers equal area projection

Abbreviations

IR	Indian Reservation
NF	National Forest
NP	National Park
NWR	National Wildlife Refuge

MANITOBA
CANADA
ONTARIO
NORTH DAKOTA
SOUTH DAKOTA
WISCONSIN
MICHIGAN
Lake of the Woods
Lake Superior
Red River
Rainy R.
Upper Red Lake
Lower Red Lake
Vermilion Lakes
Minnesota River
Mississippi
St Croix
Red Lake IR
Agassiz NWR
Voyageurs NP
East Grand Forks
Bois Forte IR
Superior NF
Grand Portage IR
Rydell NWR
Chippewa NF
Vermilion Lake IR
Bemidji
Lake Winnibigoshish
Leech Lake IR
White Earth IR
Hibbing
Pokegama Lake
Leech Lake
Hamden Slough NWR
Tamarac NWR
Fond du Lac IR
Moorhead
Big Sandy Lake
Duluth
Cross Lake
Gull Lake
Brainerd
Rice Lake NWR
Fergus Falls
Mille Lacs Lake
Mille Lacs IR
Crane Meadows NWR
St Croix National Scenic Riverway
Lake Traverse
St Cloud
Sherburne NWR
Big Stone Lake NWR
Marsh Lake
Anoka
Lac qui Parle
Minneapolis
St Paul
Minnesota Valley NWR
Mississippi National River and Recreation Area
Upper Sioux IR
Prairie Island IR
Shakopee IR
Lower Sioux IR
Northfield
New Ulm
Mankato
Pipestone National Monument
Rochester
Upper Mississippi River Wildlife and Fish Refuge
Worthington
Austin

U.S. Department of the Interior
U.S. Geological Survey

The National Atlas of the United States of America®

pagefld_mnd.pdf INTERIOR-GEOLOGICAL SURVEY RESTON, VIRGINIA-2002

nationalatlas.gov™
Where We Are

WISCONSIN

FEDERAL LANDS AND INDIAN RESERVATIONS

- Bureau of Indian Affairs
- Department of Defense (includes Army Corps of Engineers lakes)
- Fish and Wildlife Service / Wilderness
- Forest Service / Wilderness
- National Park Service / Wilderness

Some small sites are not shown, especially in urban areas.

MILES
0 20 40 60 80

Albers equal area projection

Abbreviations

IR Indian Reservation
NWR National Wildlife Refuge

Lake Superior
MICHIGAN
MINNESOTA
IOWA
MI
Lake Michigan
Apostle Islands National Lakeshore
Red Cliff IR
Bayfield
Bad River Indian Reservation
Superior
Ashland
Hurley
Chequamegon National Forest
Saint Croix National Scenic Riverway
Hayward
Lac du Flambeau IR
Park Falls
Eagle River
Nicolet National Forest
Saint Croix Indian Reservation
Spooner
Lac Courte Oreilles IR
Rice Lake
St Croix Falls
Rhinelander
Pembine
Sokaogon Chippewa IR
Tomahawk
Potawatomi Indian Reservation
Menominee R.
Wolf R.
Chippewa R.
Merrill
Antigo
Marinette
Washington Island
Menomonie
Chippewa Falls
Eau Claire
Wausau
Menominee IR
Stockbridge IR
Shawano
Sturgeon Bay
Green Bay
Mississippi River
Marshfield
Stevens Point
Oneida IR
Green Bay
De Pere
Kewaunee
Black River
Black River Falls
Winnebago IR
Wisconsin Rapids
Appleton
Kaukauna
Two Rivers
Manitowoc
Upper Mississippi River Wildlife And Fish Refuge
Trempealeau NWR
Fort McCoy
Necedah National Wildlife Refuge
Oshkosh
Lake Winnebago
Camp Williams
La Crosse
Fond du Lac
Sheboygan
Fox River NWR
Wisconsin Dells
Horicon NWR
Viroqua
Portage
Beaver Dam
West Bend
Wisconsin R.
Badger Army Ammunition Plant
Watertown
Menomonee Falls
Wauwatosa
Prairie du Chien
Madison
Waukesha
Milwaukee
West Allis
Platteville
Janesville
Racine
Monroe
Beloit
Kenosha

U.S. Department of the Interior
U.S. Geological Survey

pagefed_wo5.pdf, INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA, 2003

nationalatlas.gov™
Where We Are

MICHIGAN

FEDERAL LANDS AND INDIAN RESERVATIONS

- Bureau of Indian Affairs
- Department of Defense (includes Army Corps of Engineers lakes)
- Fish and Wildlife Service / Wilderness
- Forest Service / Wilderness
- National Park Service / Wilderness

Some small sites are not shown, especially in urban areas.

MILES
0 25 50 75 100

Albers equal area projection

Abbreviations

IR	Indian Reservation
NF	National Forest
NWR	National Wildlife Refuge

MINNESOTA
WISCONSIN
IOWA
ILLINOIS
INDIANA
OHIO
CANADA
ONTARIO
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Georgian Bay
Isle Royale National Park
Ontonagon IR
Ottawa National Forest
Huron NWR
Ottawa NF
L'Anse IR
Grand Island NRA
Upper Peninsula Experimental Forest
K. I. Sawyer Air Force Base (Closed)
Hiawatha National Forest
Pictured Rocks National Lakeshore
Seney NWR
Hiawatha National Forest
Bay Mills IR
Harbor Island NWR
Hannahville IR
Michigan Islands NWR
Sleeping Bear Dunes National Lakeshore
Camp Grayling Military Reservation
Huron National Forest
Michigan Islands NWR
Wurtsmith Air Force Base (Closed)
Manistee National Forest
Isabella IR
Shiawassee NWR
Selfridge Air Force Base
Custer Reserve Forces Training Area
Houghton
Hancock
Ontonagon
Marquette
Manistique
Crystal Falls
Menominee
Washington Island
Mackinaw City
Cheboygan
Sault Ste Marie
Whitefish Pt
Gaylord
Alpena
Frankfort
Manistee
Cadillac
Tawas City
Standish
Ludington
Midland
Bay City
Saginaw
Muskegon
Flint
Burton
Port Huron
Wyoming
Grand Rapids
Kentwood
Holland
East Lansing
Lansing
Troy
Warren
Detroit
Livonia
Ann Arbor
Dearborn
Taylor
Battle Creek
Kalamazoo
Portage
St Joseph
Coldwater
Monroe
Manistee R
Muskegon R
Saginaw Bay

U.S. Department of the Interior
U.S. Geological Survey

The National Atlas of the United States of America®

pagelod_mis.pdf INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA 2003

Research Background

- Climate change is important for American Indian Communities
  - Shifting Seasons Report
  - Indigenous Peoples Climate Change Working Group
  - Rising Voices
- Culture, economy, communities, infrastructure, ecosystems are connected
- Tribes can’t relocate
- Climate Science Broad & Difficult to Integrate into management

Research Methods – Scenario Planning

Build Collective Narrative

Emerging issues, important “variables”

Shell Oil 1966 – Military – Long History

- Business as Usual
- Collapse
- Transformational
- Wildcard/Unexpected Future

Scenarios: narratives, collaborative, based on science/research but not predictions

Uncertainty

Track drivers of change and “variables”

Millennium Ecosystem Assessment

“Scenario development is a way to explore possibilities for the future that cannot be predicted by extrapolation of past and current trends.”

http://www.millenniumassessment.org/en/Scenarios.html

Goals of the Tribal Scenario Project

(1) Can strategic foresight processes be used to create viable tribal climate adaptation scenarios?

(2) Can foresight processes involving tribal leaders and natural resource garner broad tribal member involvement?

(2a) Can Scenarios reflect tribes' sovereignty, cultures, social situations, knowledge needs and resources, and jurisdictional and legal complexities?

Scenario Processes

Identify Interested Tribes

- Sault Ste. Marie – Michigan
- Oneida – Wisconsin
- Red Lake – Minnesota

Identified Decision-making entity w/in tribe

Early Engagement – Frequent Engagement

Other Goals

- Participatory – Departments, elected officials, community members
- Build upon work tribes were doing or wanting to do
- Not just endless meeting about trends
- Develop Usable Scenarios
- Identify Tribal Capacities

Designing the Processes

Climate Science Information - Localized

&

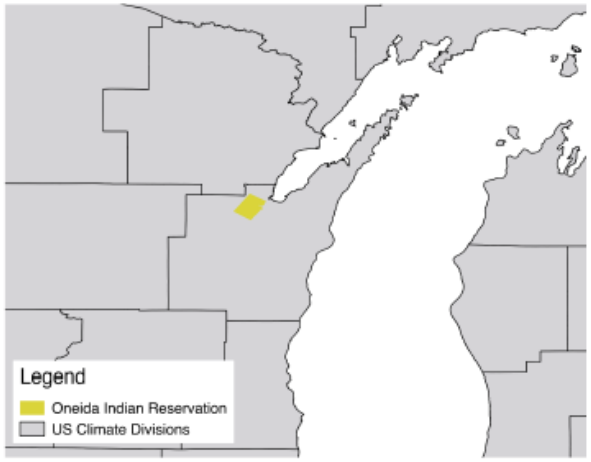
Identifying Issues and Drivers of Change

LOCALIZED CLIMATE INFORMATION
FOR THE ONEIDA LANDS

GLISA
GREAT LAKES INTEGRATED SCIENCES + ASSESSMENTS

Historical and projected future climate trends for the Oneida Nation of Wisconsin lands are summarized in this report. The Oneida Nation's lands are located in Wisconsin's East Central (ECW) climate division.

Oneida Indian Reservation



Regional and Local Climate Summary

The climate division in which the Oneida lands are contained has seen increases in annual air

cover (i.e. asphalt and concrete) due to increased storm water and surface runoff.

Lake Michigan water temperatures have risen during the summertime and lake ice levels have declined during the winter, though there is significant interannual variation.[1,2] Increased water temperatures and ice cover declines have the potential to alter the near-shore climate through increased evaporation and potential for increased lake effect snowfall. Though lake event snowfall is less common on the windward side of Lake Michigan.

Future climate information for ECW comes primarily from global and regional climate models (GCMs and RCMs). In the Midwest, the GCMs project a wider range of temperature and precipitation outcomes than the RCMs, so some of the values reported here are be beyond what is shown in the RCM-based maps later in this report. No model perfectly simulates the physics that govern global, regional, and local climate, so several models are consulted[3] to describe potential climate changes in the Midwest and the Oneida lands.

Project team developed paragraphs

Scenario 1: Unpredictable Seasons
Scenario 2: Changing Great Lakes
Scenario 3: Positive Transformation
Scenario 4: Wildcard

Sustainable Development Institute Model

Sustainable Development Depends on 6 Interactive Dynamic Dimensions

Land and Sovereignty
Natural Environment
Institutions
Technology
Economy
Human Perception, Activity & Behavior

Sustainability Science

Sustain Sci
DOI 10.1007/s11625-015-0304-x

SPECIAL FEATURE: ORIGINAL ARTICLE

Weaving Indigenous and Sustainability Sciences to Diversify Our Methods (WIS2DOM)

Sustainable development education, practice, and research: an indigenous model of sustainable development at the College of Menominee Nation, Keshena, WI, USA

Michael J. Dockry[1] · Katherine Hall[2] · William Van Lopik[2] · Christopher Caldwell[3]

Received: 2 October 2014 / Accepted: 10 April 2015
© The Author(s) 2015. This article is published with open access at Springerlink.com

PROOF


EXIT

NATURAL RESOURCES	SCENARIO 1: Unpredictable Seasons
Air quality	Possible negative impacts to air quality from increased forest fires.
Water Quality	Degraded as plant communities shift in riparian areas and within the aquatic environment.
Soil Quality	Soil quality will change with species shifts. Often soil quality could decrease especially if there is flooding
Black Ash	Threats may get worse
White-tailed Deer	Deer habitat could increase as plant communities shift. This could impact plant regeneration and impact restoration activities.

INSTITUTIONS	SCENARIO 1: Unpredictable Seasons
Tribal Enterprises	Shifting habitats could negatively impact tourism.
Ceremonies	Species may no longer be available within treaty or reservation lands.
Tribal DNR	Need to coordinate with tribal public. Need to collaborate with other agencies.
Tribal Dept. of Health	Increased stress on tribal community members as species shift out of normal ranges.

TECHNOLOGY	**Scenario 1: Unpredictable Seasons**
Fishing methods	Current technology may not be efficient in harvesting fish of the future or there may not be enough fish to harvest.
Birch bark canoe	Birch bark may not be available within the reservation or treaty territories.

Scenario 2

What are recent events related to this?

- changes in groundwater chemistry with water treatment
- Changes in weather, Storms - tornado in Freedom
- Concerns w/ Sludge/wastewater treatment behind casino
- Tribal bldgs & homes flooding
- ER Infrastructure repairs is constaint
  - # of buildings & homes
  - lack of maintenance
- Hwy 29 construction - heavy rains runoff to Duck Creek
- Economic downturn

Integration of all Scenarios

- Observations about all scenarios…
  - Similar discussions, different, matrix variables?
- How are the scenarios alike? Different
- Are some issues/matrix variables more difficult than others?
- Did we miss anything?

What caught your attention? Scenario 3

- Economic & Social transformation
- Tribal discussion on how to diversify
  promote Tribal economies - Recruit Business se
  Foreign trade zone Hub zone
- Economic Oppt. w/ longer growing season
- Break it up to Econ Govt & Cultural
  & Bring it back together for positive tran
- Sustainable Mangmt.
  - DN/Ent/Dept incorporate into daily lives
- Trees - product dev from well mgmt forcs
  - oppt. that's underutilized
- Made fossil fuel transition

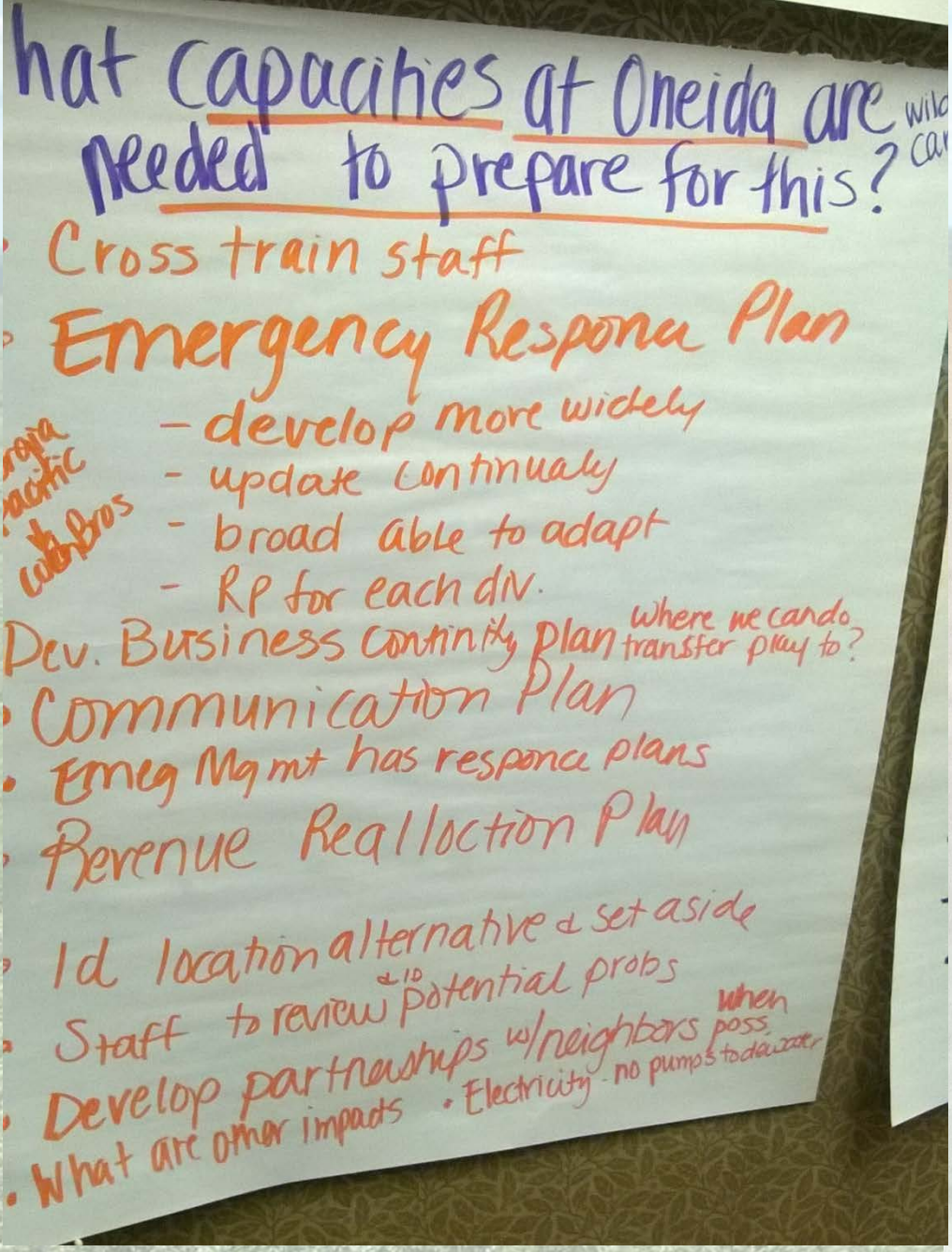
3 ideas about scenarios

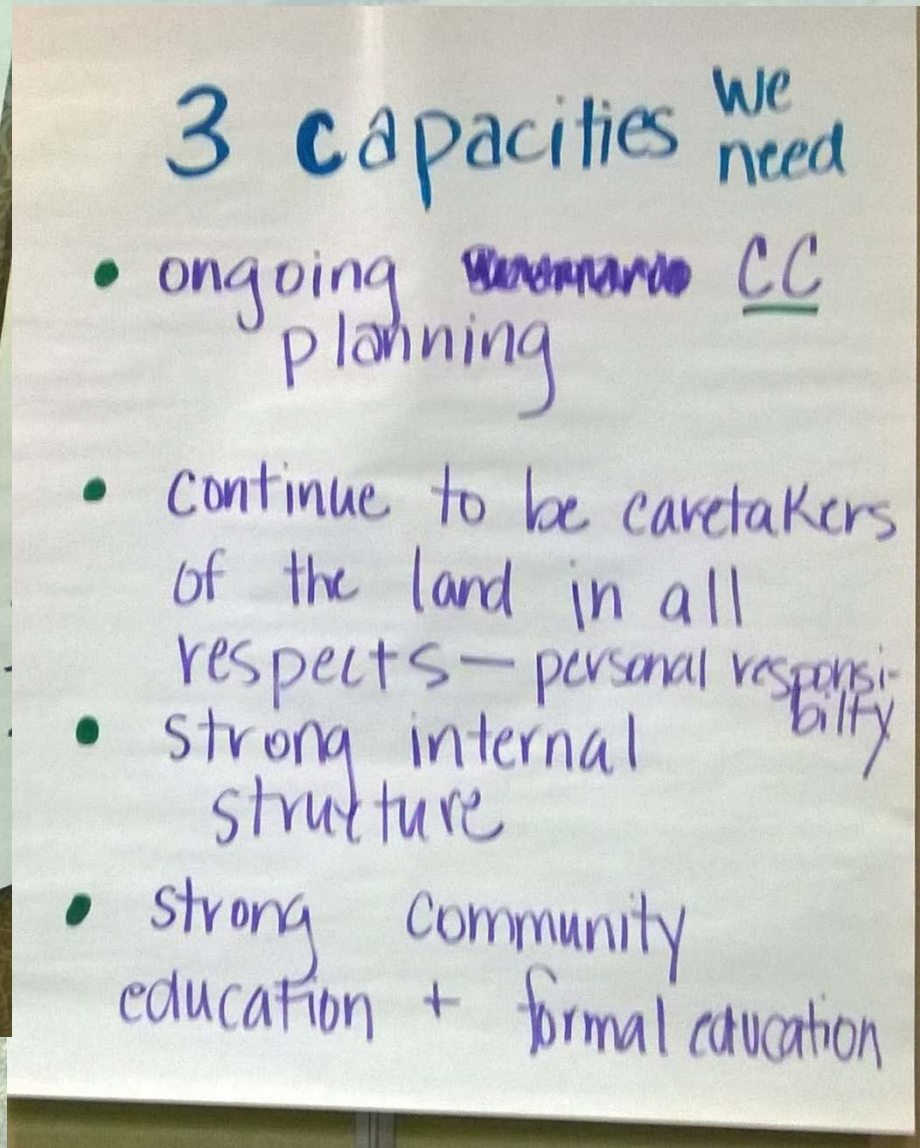
Similiar / different

- long/short planning *
- resources * * - anticipati
- education *
- communication key * *
- major economic consequences
- made you think & plan
- adaptation - need to or have we
- reactive/vs. long range planning
- economic change
- bureaucracy
- partnership * collaboration

Tribal Capacities

- What capacities does the tribe currently have to deal with multiple future scenarios?
- What capacities may be needed?
- Which capacities would be easiest to implement (cost and institutionally)?
- Which capacities may be needed but would be prohibitively difficult to develop?
- Other thoughts about where tribe could go?


hat capacities at Oneida are needed to prepare for this?
Cross train staff
Emergency Respona Plan
- develop more widely
- update continually
- broad able to adapt
- RP for each div.
Dev. Business Continity Plan
where we can do transfer play to?
Communication Plan
Emeg Mgmt has responca plans
Revenue Realloction Plan
Id location alternative & set aside
Staff to review & 10 potential probs
Develop partnerships w/neighbors
when poss.
What are other impacts
Electricity - no pumps to daycare


3 capacities we need
ongoing planning CC
Continue to be caretakers of the land in all respects — personal responsibilty
strong internal structure
strong community education + formal education


EXIT

Preliminary Conclusions

1. Translating global/regional climate models to Tribal scale
2. Institutions/communities within Tribe, shared knowledges and insights through storytelling-building narratives
3. Participatory approach was flexible to work with each Tribe distinctly

Preliminary Conclusions

4. “Possible” futures fostered open and respectful dialogue
5. Scenarios were realistic b/c based on the actual issues each tribe faces
6. Capacities discussions provide concrete next steps which climate science doesn’t always do
7. Other Tribes are interested

Final thoughts

- Tribes envision positive futures as strengthening sovereignty and self-determination
- Need to ensure continued accessible scientific resources and tools
- Intensive and iterative process - numerous meetings, follow-ups and check-ins

Final thoughts

- Scenario planning is more than a tool; it is a process
- A process of relationship building
- Applications beyond tribes

Thanks!

GLISA

GREAT LAKES INTEGRATED SCIENCES + ASSESSMENTS

Questions & Discussion

mdockry@fs.fed.us