Best Practices for Climate Change Adaptation: Spotlight on Michigan Coastal Wetlands

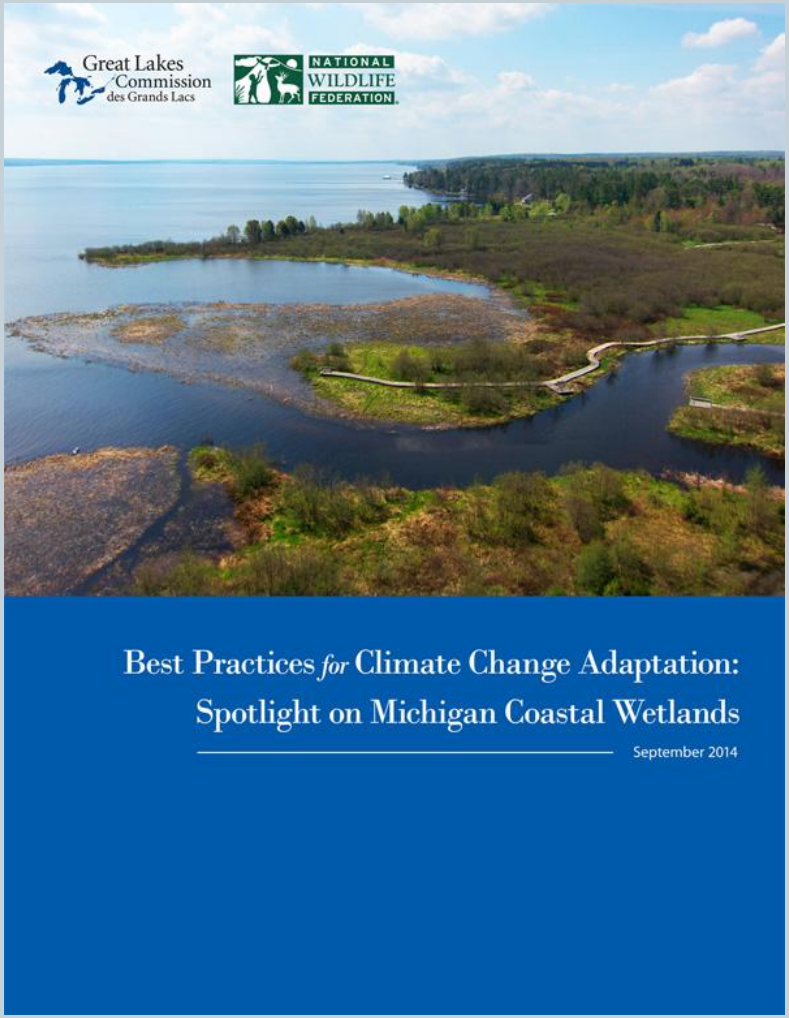
SEPTEMBER 2014

GREAT LAKES COMMISSION &

NATIONAL WILDLIFE FEDERATION

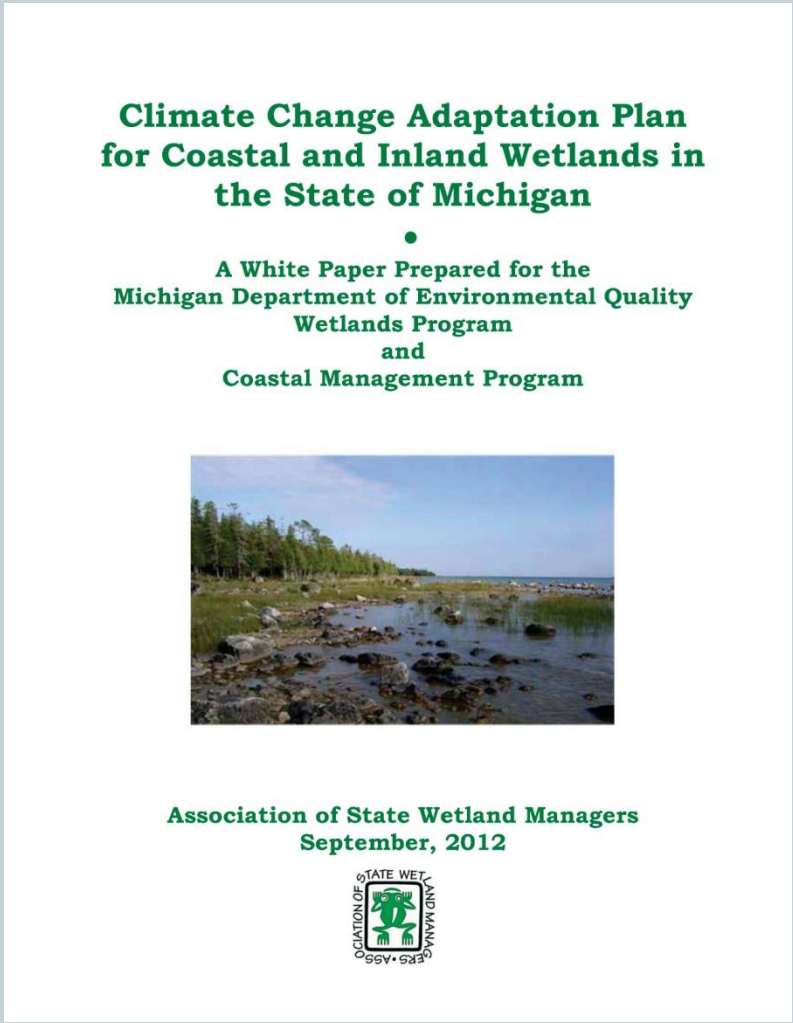
WEBINAR OUTLINE

- **Building the Best Practices Toolkit**
- **Examples of Best Practices**
- **Next steps**



WHY A BEST PRACTICES TOOLKIT?

Michigan DEQ wanted input to improve implementation of their 2012 Coastal Wetlands Adaptation Plan



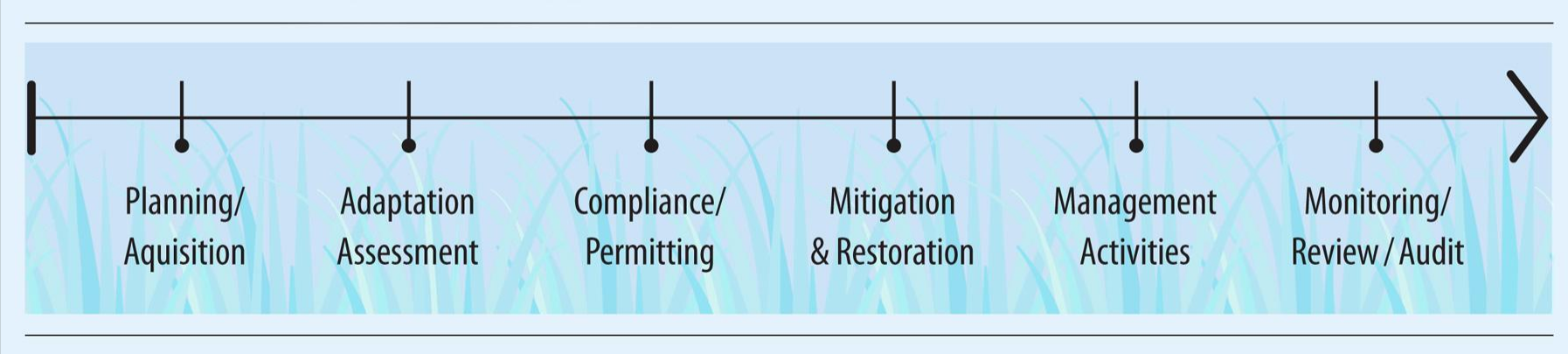
WHAT ARE THE MAIN STEPS?

1. Create a Project Review Committee (PRC)
2. Develop Best Practice Evaluation Criteria
3. Identify Candidate Best Practices
4. Evaluate, Rank, and Refine Best Practices
5. Design the Toolkit
6. Conduct Outreach

PROJECT REVIEW COMMITTEE

- David Bidwell, GLISA
- Kathy Evans, WMSRDC
- Anne Garwood, MI DEQ
- Elizabeth Gibbons, Graham Sustainability Institute – University of Michigan
- Patty Glick, NWF
- Alisa Gonzales, Mi DEQ
- Kimberly Hall, TNC
- Phyllis Higman, MNFI
- Jason Hill, Ducks Unlimited
- Jennie Hoffman, Consultant
- Jason Lewis, USFWS
- Michael Murray, NWF
- Sarah Opfer, NOAA
- Steve Rice, Cardno JFNew
- Brent Schleck, NOAA
- Heather Stirratt, NOAA
- Lynn Vaccaro, Michigan Sea Grant

STAGES OF WETLAND MANAGEMENT



THE APPROACH

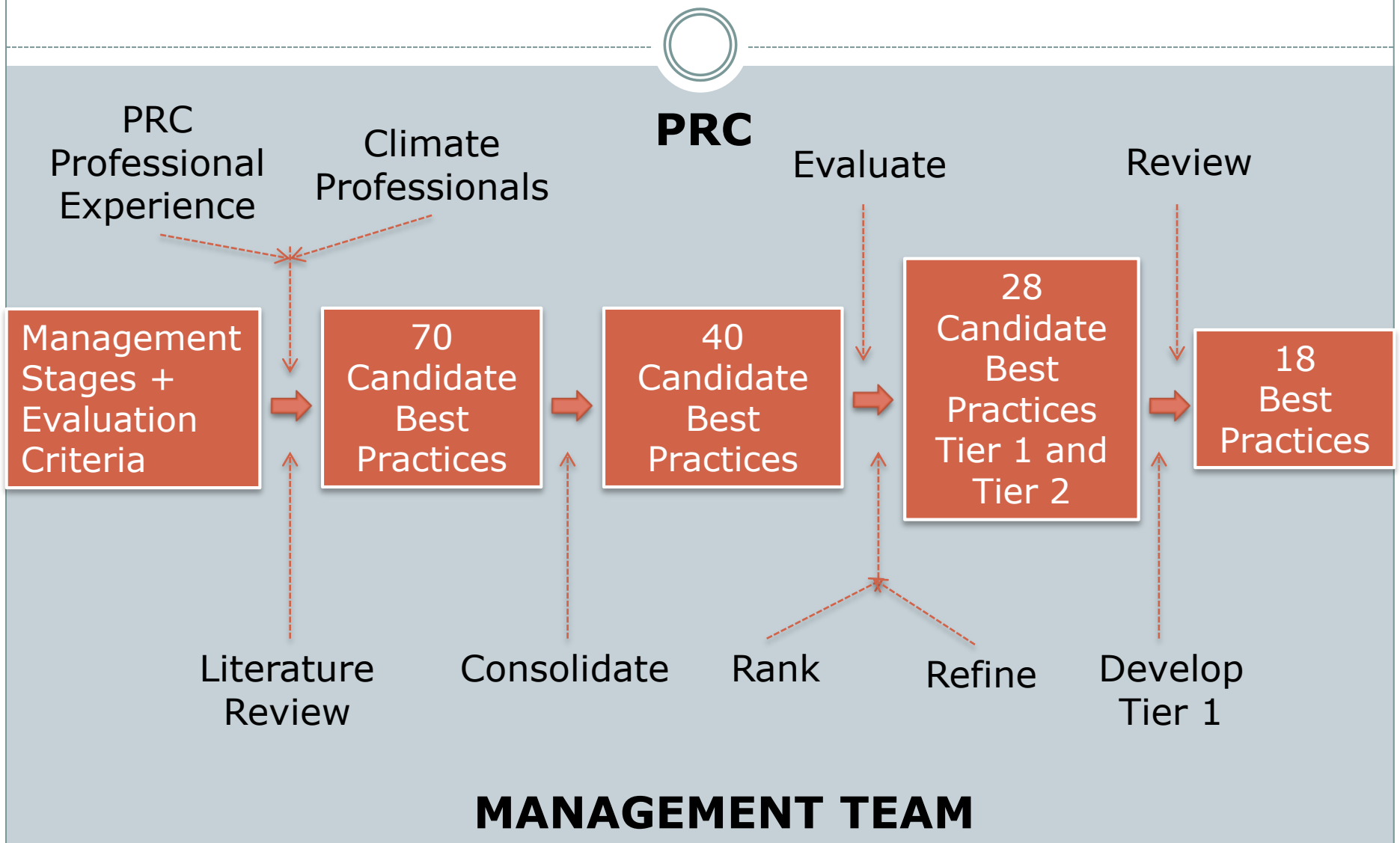
2 levels

Institutional level

Project level

What is a Best Practice?

BUILDING THE TOOLKIT



BEST PRACTICES TOOLKIT

Wetland Adaptation Forums

Conduct periodic public wetland symposiums/forums to advance adaptation knowledge

In rapidly evolving fields like climate change adaptation, regular opportunities for practitioners and key thinkers in the field to come together to exchange experiences and ideas are essential. Small focused invitational workshops are helpful, but there should also be a regional symposium or forum every 1-3 years. This could be open to all interested parties focused either specifically on wetland conservation and restoration in a changing climate or more generally on climate change adaptation. Unrestricted attendance broadens the adaptation network and provides more opportunity for new voices to participate and emerge.

The format can be more directed, for example, built around a set of invited speakers and workshops put together by the organizers, or more participant-driven, with open submission of proposals for presentations, posters or workshops. In either case, the schedule should include ample time for informal interaction and networking, which are an essential component of the empowerment and internalization of climate-smart thinking that are such an important outcome of this sort of forum. Webinars may also be considered to reach more people.

The outcomes of wetland adaptation forums are two-fold. There should be a set of written outputs in the form of proceedings, synthesis reports or overview essays. These may be disseminated via websites and blogs, published reports, or a collection of papers published in a peer-reviewed journal. No less important, however, is the creation of partnerships, project ideas and general inspiration to act; forum organizers and participants should consider ways in which these latter outcomes can be fostered.

Case Example | Coastal Habitat Conservation in a Changing Climate workshop

In September 2011, the National Wildlife Federation and the National Oceanographic and Atmospheric Administration hosted a two-and-a-half day workshop titled "Coastal Habitat Conservation in a Changing Climate: Strategies and Tools for the Great Lakes Region." The meeting began with a series of presentations giving an overview of regional climatic variability, longer-term changes and impacts. Presenters addressed questions such as how particular climatic changes might affect species, ecosystems, water quality and economies; possibilities for ecological adaptations; and how to integrate climate information into coastal conservation and management despite uncertainties. These presentations provided a common understanding of the state of knowledge for meeting participants.

The second day consisted of breakout sessions built around issues of regional importance, including fish passage, Areas of Concern, invasive species management, agricultural watersheds, and conservation and acquisition. There was also a Tools Café introducing participants to a range of tools supporting regional conservation and restoration work. The breakout format provided an opportunity for extensive interaction and sharing among meeting participants. The second day concluded with field trips to ground participants in the reality of Great Lakes coastal habitat management and restoration work. The third day included another set of breakout sessions as well as an overview of ongoing efforts and next steps.

In evaluations, workshop participants commented on the value of the workshop in providing a diversity of new information and developing new collaborations and partnerships.

Challenges and Benefits

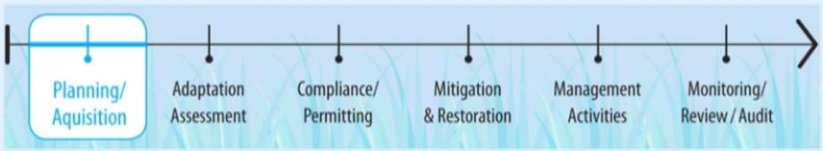
Organizing and implementing regional meetings is not a small task, requiring a host of logistical considerations including venue, catering, registration, and corralling the necessary staff and volunteers to support speakers, posters and workshop faculty. Attendance can also pose a challenge. Agency staff and other natural resource practitioners typically have their plates full meeting their day-to-day responsibilities, and securing the time and funding (if travel is required) to attend meetings not directly linked to project work can be difficult. Webinars are another option that reduce travel expenses. Webinars have the benefit of reaching more dispersed audiences but are limited to those with Internet technology. Also, they don't provide the same level of interaction that in-person meetings do.

The potential benefits of wetland adaptation forums make dealing with these challenges worthwhile. They allow the sharing of experiences and ideas among a broad audience in a short period of time, and provide an opportunity for back-and-forth discussion and brainstorming that webinars or presentations do not. They can also limit the frequency with which people "reinvent the wheel," meaning more resources can go toward on-the-ground action than toward searching for solutions that already exist.

Who should implement the practice?

Symposia or forums should be organized by teams made up of a diversity of players, including federal, state, local or tribal government agencies, intergovernmental groups, non-profits, academic institutions, and businesses engaged in wetland conservation and restoration. Groups charged with supporting regional adaptation outreach and capacity-building, such as Landscape Conservation Cooperatives or NOAA climate hubs, are particularly well-suited to these sorts of efforts.

When should this practice happen?



Tools and Resources

National Adaptation Forum | Not wetlands-focused, but this biennial forum is one of the largest gatherings of adaptation professionals, and materials from previous NAFs can serve as models for a wetlands-focused forum. | www.nationaladaptationforum.org

The Climate Adaptation Knowledge Exchange | CAKE's calendar of adaptation events can help you see when and where related events are happening, and you can use its georeferenced search capability to find potential partners. | www.cakex.org

Michigan Wetlands Association | The annual meetings are not all adaptation-focused, but typically there are opportunities through one or more sessions to address adaptation issues. | www.miwetlands.org

INSTITUTIONAL LEVEL BEST PRACTICES

1. Wetland Adaptation Forums
2. Adaptation-Informed Funding
3. Update State Planning Documents
4. Continuing Education of Practitioners
5. Climate Screening of Wetland-Related Policies
6. Climate-informed Buffer Ordinance Language
7. Processes for Information Access
8. Climate in Wetland Permitting

PROJECT LEVEL BEST PRACTICES

9. Partner with Experts
10. Engage Stakeholders
11. Data Use and Trend Analysis to Inform Planning
12. Incorporate Climate Change in Land Protection Decisions
13. Lessons Learned Reports
14. Climate Vulnerability Assessments
15. Consider Multiple Climate Scenarios
16. Adaptation Performance Indicators
17. On-going Coastal Wetland Monitoring
18. Consider Climate in Wetland & Shoreline Restoration

Recommendations from Climate Change Adaptation Plan for Coastal and Inland Wetlands (2012) Compared with Best Practices

Category	Recommendation	Best Practice
Advanced Strategic Planning	Host a workshop or series of workshops with experts to evaluate the feasibility of possible responses to climate change under different management scenarios	1, 15
	Continue to address issues of GL coastal management in light of uncertain future conditions	15
	Develop new model approaches to management of shoreline during a period of change and uncertainty	8, 12, 15, 18
	Revise Michigan's AIS Management Plan to anticipate climate change related migration of species from southern biomes	3
Monitoring and Assessment	Identify sources of continually updated information about climate and related status and trends that can be used to measure changes in climate in the state of Michigan	7, 11
	Establish long-term desired outcomes and metrics to identify progress, to measure progress adapting to climate change	16
	Conduct literature review and interview wetland managers and scientists to establish a list of the wetland types as well as individual flora and fauna most threatened by climate change	14
	Adapt existing wetland monitoring programs to document changes in wetland communities over time	9, 17
	Incorporate the most up-to-date climate change information into Michigan's plans to guide State agencies in program and policy decisions	3, 5
	Document and communicate success or failures of implementation of wetland protection, restoration and management actions to adapt to climate change in an annual report	13
	Consider the use of data collected through ongoing coastal wetland monitoring to establish a clear baseline for coastal wetland condition	11

Category	Recommendation	Best Practice
Voluntary Restoration, Conservation and Management	Develop a state GIS database that provides the ability to do multiple analyses for leveraging wetland restoration, management and protection to provide ecosystem services and mitigate the impacts of climate change	7, 11
	Identify opportunities for land management and conservation programs to promote protection of coastal wetlands as lake levels change	10
	Incorporate appropriate preservation, restoration and similar climate change adaptation measures for coastal wetlands into state's plans	3
	Give continuing education credit to local governments for getting training in climate change adaptation	4
Regulation	Revision of current regulatory process to integrate climate change adaptations into the wetland dredge and fill permitting, enforcement and mitigation decision making process	6, 8
	Consider changes to 404 Program to integrate climate change concerns	5, 8
	Train staff, wetland consultants and other professionals on how to incorporate climate change measures into wetland regulatory processes including permitting, enforcement and mitigation	2, 6, 8
	Integrate wetland protection and restoration into state flood hazard and climate change initiative	3
	Identify climate change adaptation measures for coastal wetlands and encourage coastal communities to incorporate these measures into local plans and ordinances	6, 8
Integration with Other Water Programs	Provide greater incentives for adopting strategies that provide multiple beenfits over single purpose projects	2
	Identify adaptation actions that will maintain or expand overall biodiversity, increase connectivity of coastal wetland areas, and improve water management to address multiple natural resource goals and priorities	18

BEST PRACTICES FEATURED TODAY

7. Processes for Information Access
8. Climate in Wetland Permitting
11. Data Use and Trend Analysis to Inform Planning
12. Incorporate Climate Change in Land Protection Decisions
13. Lessons Learned Reports
14. Climate Vulnerability Assessments
15. Consider Multiple Climate Scenarios
16. Adaptation Performance Indicators
18. Consider Climate in Wetland and Shoreline Restoration

7. PROCESSES FOR INFORMATION ACCESS

Create a process to enable managers to evaluate regional climate models, reports and relevant websites

- Climate information can be difficult to interpret and apply
- Encourage sustained collaboration between scientists and practitioners

Sources

- Professional Collaboratives
- Adaptation web hubs

7. PROCESSES FOR INFORMATION ACCESS

Challenges

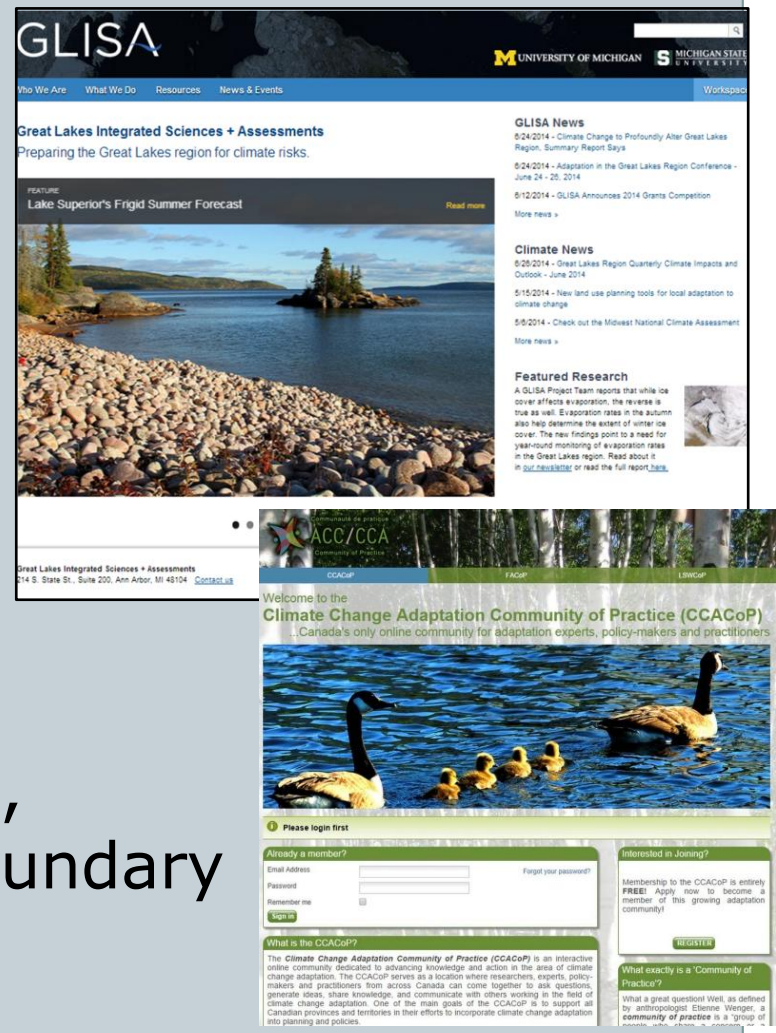
- Requires sustained funding
- Time commitment

Benefits

- Climate considerations more likely to be applied
- Restoration success long-term

Implementer

- Collaboration between scientists, managers and practitioners, “boundary organization”



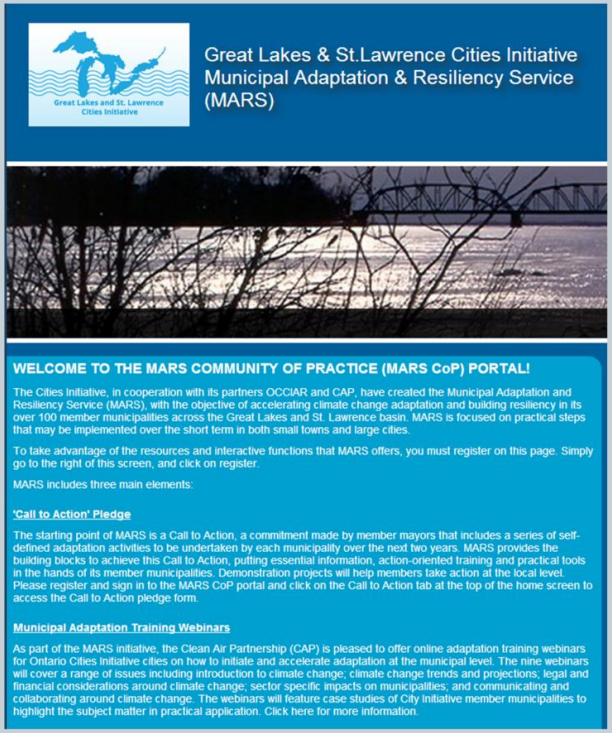
7. PROCESSES FOR INFORMATION ACCESS

Case study

Great Lakes & St. Lawrence Cities Initiative Municipal Adaptation & Resiliency Service (MARS)

Tools /Resources

- http://www.glslcities.org/mars.cfm
- Climate Change Adaptation Community of Practice
- The Georgetown Climate Center's Adaptation Clearinghouse



8. CLIMATE IN WETLAND PERMITTING

Evaluate wetland permit requirements and modify if necessary to incorporate climate adaptation considerations

- Permit review facilitates project evaluation
- Minimize unintended consequences

Approaches

- Permit applications should require consideration of climate adaptation
- Applicants should be evaluated based on climate adaptation considerations
- Modify DEQ Project Review Reports

8. CLIMATE IN WETLAND PERMITTING

Challenges

- Requires revisions to statute or rules for permit applications
- Requires applicants to understand adaptation elements

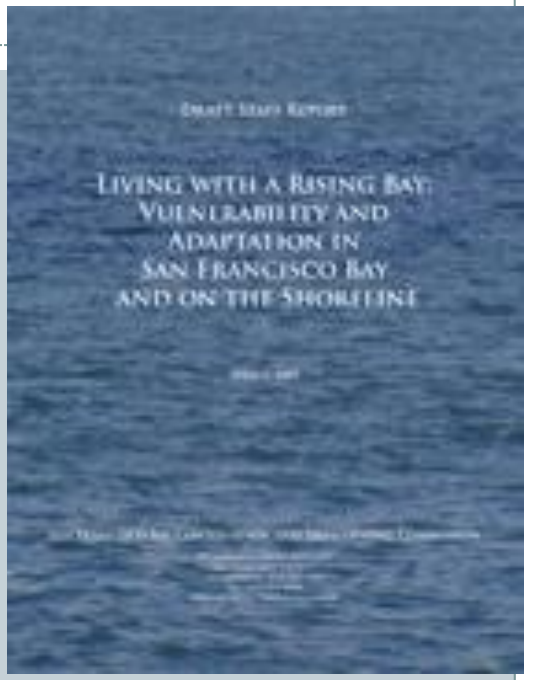
Benefits

- Promotes long-term success of coastal wetland restoration

Implementer

- Permit issuing agencies

8. CLIMATE IN WETLAND PERMITTING



Case Study

San Francisco Bay Plan Implementation: San Francisco Bay Conservation and Development Commission

Tools/Resources

- Michigan Natural Resources and Environmental Protection Act (Act 451) of 1994, Section 30311 Project Review Report
- San Francisco Bay Conservation and Development Commission (BCDC)

11. DATA USE AND TREND ANALYSIS

Use land cover, land-use data and spatiotemporal trend analyses to help inform wetland planning

- Understanding the patterns underlying past changes can help prepare for the future
- Identify key drivers of wetland extent and condition and potential information sources
- Multiple information sources available

Outputs

- Maps of past change
- Correlative models that generate projections of possible future changes

11. DATA USE AND TREND ANALYSIS

Challenges

- Model output as good as data and assumptions
- Expert analysis can be expensive
- The future cannot be predicted

Benefits

- Models highlight need to plan for climate change
- Enable analysis of past events to anticipate and prepare for potential future changes
- Even a qualitative approach can facilitate visualization of future options

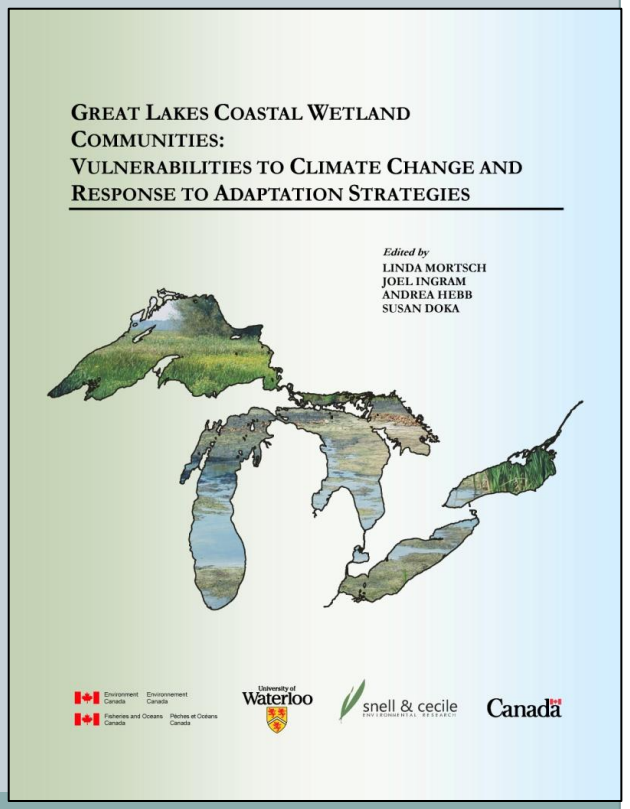
Implementer

- Planners and managers

11. DATA USE AND TREND ANALYSIS

Case Study

Canadian Great Lakes Coastal Wetlands Communities: Vulnerabilities to Climate Change and Response to Adaptation Strategies



Tools/Resources

- National Oceanic and Atmospheric Administration – Coastal County Snapshots
- Michigan wetlands map viewer
- National Wetlands Status and Trends – U.S. Fish and Wildlife Service

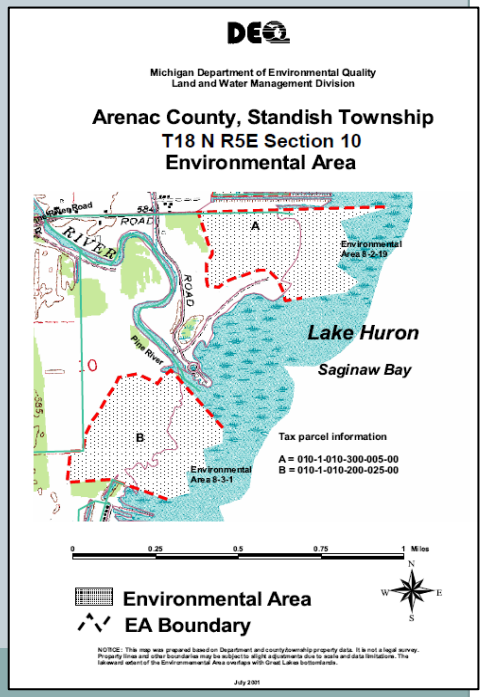
12.CLIMATE CHANGE IN LAND PROTECTION

As lake levels fluctuate, use acquisition, conservation easements and other tools to preserve and conserve

- Land protection can be used to accommodate the effects of lake level fluctuation
- Submerged lands should be considered
- Regulatory framework governing land/water interface can be complex

Novel Options

- Environmental Areas in Michigan
- Rolling Easements



12.CLIMATE CHANGE IN LAND PROTECTION

Challenges

- Land in private ownership may not be for sale
- Acquisition is expensive
- Long-term management is expensive

Benefits

- Coastal wetlands can migrate and adapt
- Easements may be more affordable
- Protection can provide ecological connectivity

Implementer

- Agencies, NGOs

12.CLIMATE CHANGE IN LAND PROTECTION

Case Study

Ducks Unlimited Southwest Lake Erie Land Protection Strategy

Tools/Resources

- NOAA– Coastal Change Analysis Program
- U.S. EPA – Rolling Easements
- Michigan Environmental Area Program

13. LESSONS LEARNED REPORTS

Document success or failures of implemented principles for protection, restoration and actions

- Help inform adaptive management
- Need systematic approach

Reports

- Use template
- Help guide next steps
- Available to others

USFWS

13. LESSONS LEARNED REPORTS

Challenges

- Time commitment
- Ensuring wide readership
- Objective assessments

Benefits

- Facilitate active learning, adaptive management

Implementer

- Agency, NGO, academic group

Ducks Unlimited, USFWS

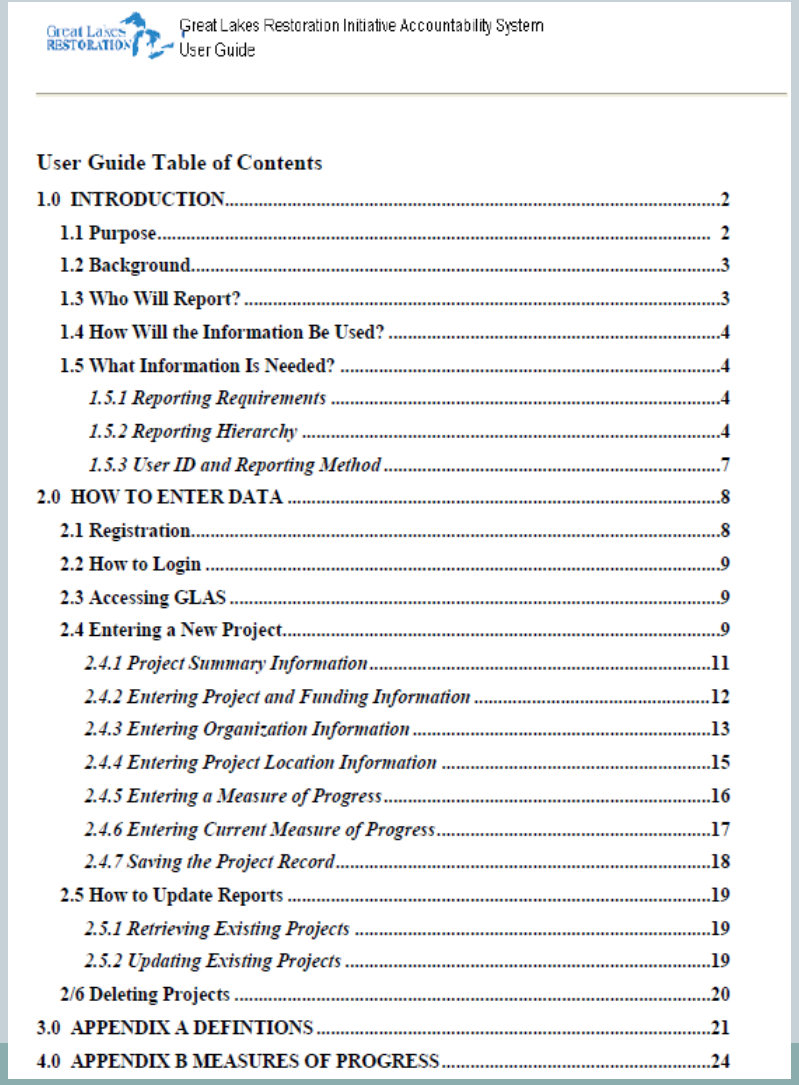
13. LESSONS LEARNED REPORTS

Case Studies

- Great Lakes Restoration Initiative, Great Lakes Accountability System
- Mitigation reports

Tools/Resources

- U.S. EPA, *Great Lakes Accountability System User Guide*
- Koslow et al., 2014. *Restoring the Great Lakes' Coastal Future*



Great Lakes RESTORATION

Great Lakes Restoration Initiative Accountability System
User Guide

User Guide Table of Contents

14.CLIMATE VULNERABILITY ASSESSMENTS

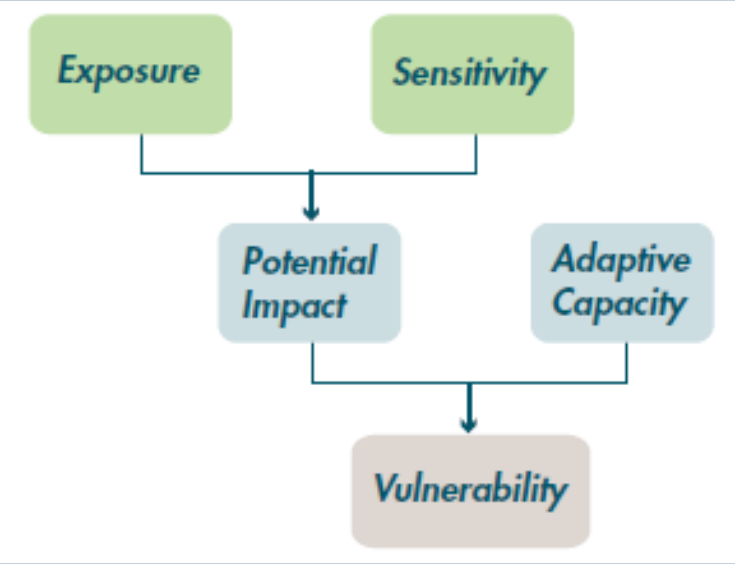
Conduct climate change vulnerability assessments to inform selection of appropriate response plan(s)

Methods and focus

- Varies widely based on goals and intended use

Output types

- Vulnerability scores
- Vulnerability maps
- Detailed narrative descriptions



Glick et al. 2011

14.CLIMATE VULNERABILITY ASSESSMENTS

Challenges

- May lose focus on taking actions to increase resilience
- In spite of time commitment, ID as key component

Benefits

- Increase efficiency of projects
- Help focus adaptation actions
- Partnerships and collaboration

Implementer

- Any entity engaged in restoration

Murray

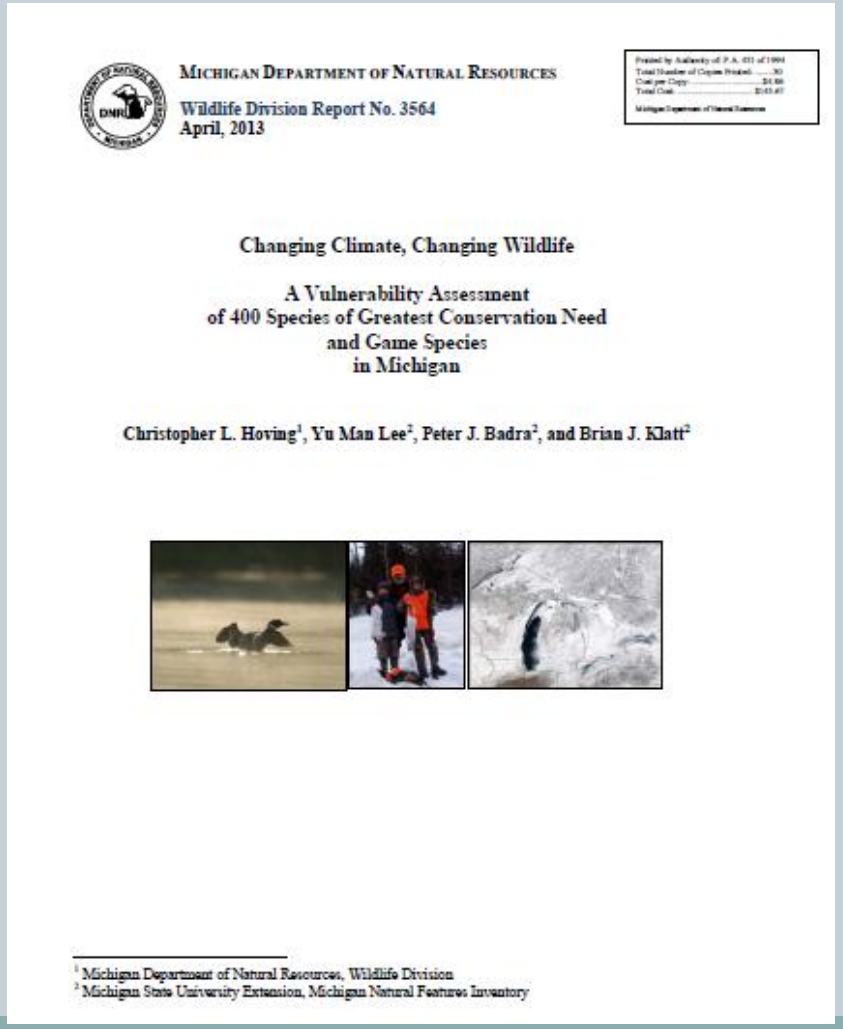
14.CLIMATE VULNERABILITY ASSESSMENTS

Case Studies

- NWF/EcoAdapt Great Lakes guidance document
- Environment Canada coastal wetlands report

Tools/Resources

- Mortsch et al. 2006. *Great Lakes Coastal Wetland Communities*
- Koslow et al. 2014.
- Hoving et al. 2013 (at right)



MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Wildlife Division Report No. 3564
April, 2013

Changing Climate, Changing Wildlife

A Vulnerability Assessment
of 400 Species of Greatest Conservation Need
and Game Species
in Michigan

Christopher L. Hoving[1], Yu Man Lee[2], Peter J. Badra[2], and Brian J. Klatt[2]

[1] Michigan Department of Natural Resources, Wildlife Division
[2] Michigan State University Extension, Michigan Natural Features Inventory

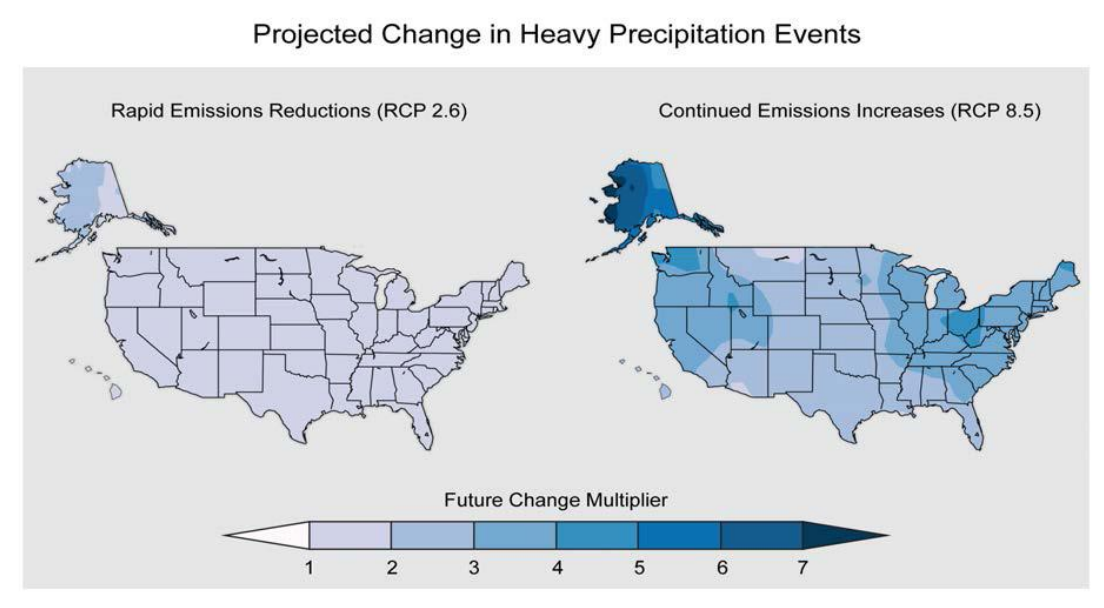
15. CONSIDER MULTIPLE SCENARIOS

Evaluate climate scenarios before choosing a technique to help ensure actions take potential future conditions into account

- Scenarios can be qualitative, quantitative or a mix
- Process may vary according to resources

Outputs

- Increase capacity for decision making under uncertainty



Pryor et al. 2014

15. CONSIDER MULTIPLE SCENARIOS

Challenges

- Potential subjectivity; ensure using best science
- Need adequate expertise, resources

Benefits

- Consider range of future possibilities
- Facilitate adaptive management

Implementer

- Any entity – may need to bring in outside expertise, facilitator

USFWS, NCTC

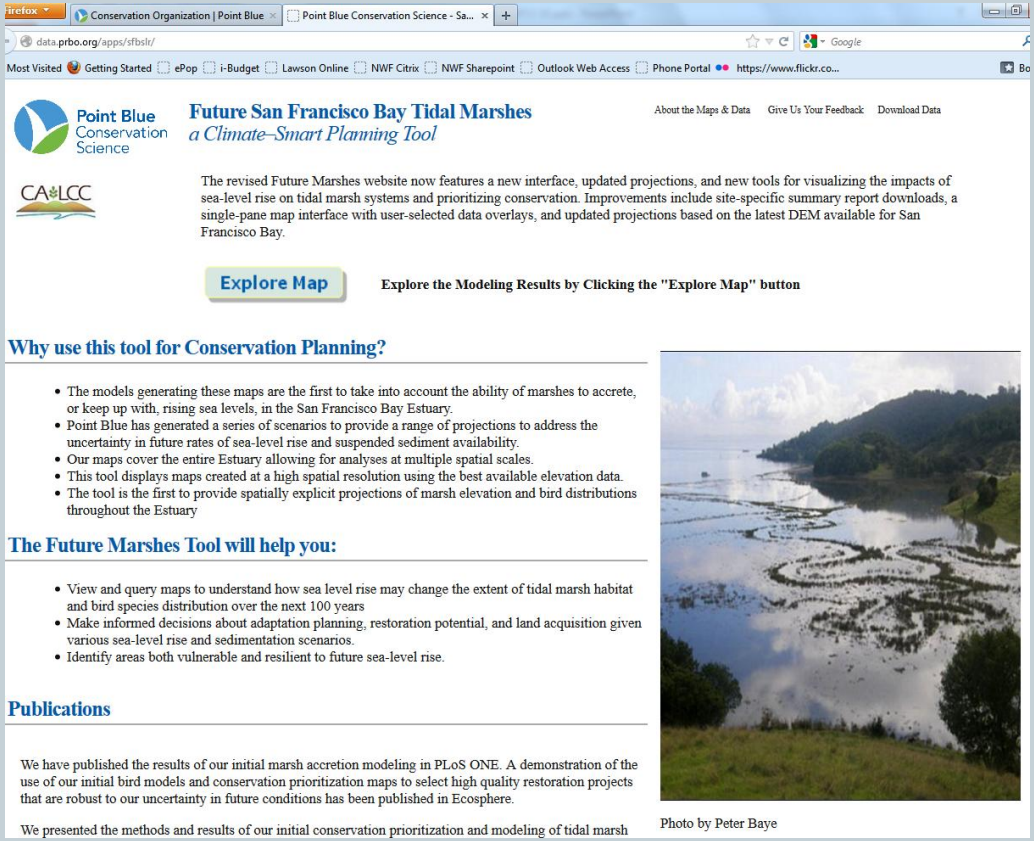
15. CONSIDER MULTIPLE SCENARIOS

Case Study

- Prioritizing wetland restoration in San Francisco Bay

Tools/Resources

- Veloz et al. 2013. *Modeling Climate Change Impacts on Coastal Marsh Birds*
- Moore et al. 2013. *Using Scenario Planning for Climate Change Adaptation*

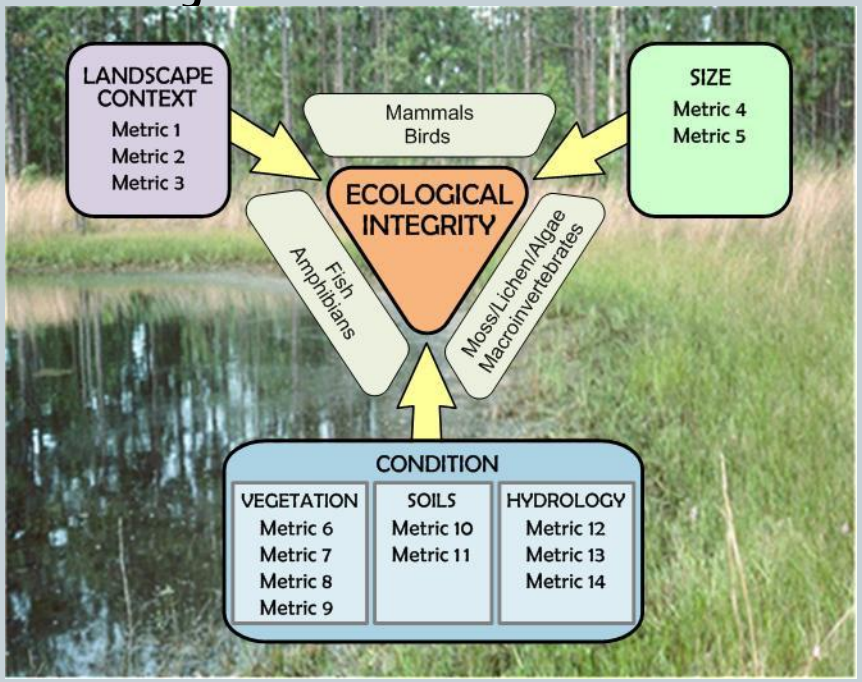


16.ADAPTATION PERFORMANCE INDICATORS

Establish indicators for climate change adaptation to measure performance

- Challenge w/ long-term responses to climatic changes
- Need short and medium-term objectives
- Include regular reporting

- Indicators: ecological, socioeconomic, institutional



USEPA 2012

16.ADAPTATION PERFORMANCE INDICATORS

Challenges

- Develop practicable but informative indicators
- Ensure monitoring plans are adequate for long term

Benefits

- Support adaptive management (& evidence-based adaptation)

Implementer

- Agencies, others involved in restoration

Murray

16.ADAPTATION PERFORMANCE INDICATORS

Case Study

- No good examples available in region
- Draw on SOLEC, IJC indicator efforts
- GL Coastal Wetlands Consortium work can inform

Tools/Resources

- Janetos et al. 2012. *National Climate Assessment Indicators*.
- International Joint Commission, *Indicators Assessment of Progress*
- UK Climate Impacts Program/Sea Change effort

Murray

18.CONSIDER CLIMATE IN RESTORATION

Consider water quantity management needs when designing coastal wetland and shoreline restorations

- Coastal wetlands have been heavily impacted
- Water management infrastructure can be used to emulate natural wetland conditions
- Controversial

Design Approaches

- Evaluate alternatives based on ability to maintain desired conditions
- Infrastructure may go unused until necessary

18.CONSIDER CLIMATE IN RESTORATION

Challenges

- High installation and maintenance costs
- Regulatory challenges
- Requires active management

Benefits

- Can emulate natural wetland conditions to achieve ecological objectives
- Prepares for water level uncertainty

Implementer

- Agency and NGO wetland managers

Leonetti

18.CONSIDER CLIMATE IN RESTORATION

Case study

Erie Marsh Wetland Restoration

Tools/Resources

- Permits for Voluntary Wetland Restoration: Association of State Wetland Managers (2013)
- The Nature Conservancy, Erie Marsh Preserve: Major Restoration Project Brings Back Fish and Birds to Healthier Habitats

NEXT STEPS

RELEASE DATE: SEPTEMBER 29!

- **Best Practices toolkit will be published online**

Great Lakes Commission des Grands Lacs

www.glc.org

NATIONAL WILDLIFE FEDERATION

www.nwf.org

- **Webinars**

MI DEQ: September 12

Public webinar: September 24

ACKNOWLEDGEMENTS

QUESTIONS?