Whatever your goals and values are for your watershed, the time is now to act, and to reduce risks from extreme precipitation events.

Forests and wetlands undeniably control water flow in your watershed. Natural features hold soil in place, and can reduce flood hazards to adjacent infrastructure. Begin integrating natural features into your plans today: diagnose your vulnerabilities and call us to get help with adaptation planning.

Let's work together!

Contact us for more info on this session:

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Wisconsin Wetlands Association

NIACS Northern Institute of Applied Climate Science

Adaptation planning tools - www.AdaptationWorkbook.org

The Adaptation Workbook is a structured process to consider the potential effects of climate change and design land management and conservation actions that can help prepare for changing conditions. The process is completely flexible to accommodate a wide variety of geographic locations, ownership types, ecosystems and land uses, management goals, and project sizes.

- The Workbook* is a planning tool that consists of 5 sections:
  1) Define goals and objectives, 2) Assess climate impacts and vulnerabilities, 3) Evaluate objectives considering climate impacts, 4) Identify adaptation approaches and tactics for implementation, 5) Monitor effectiveness of implemented actions **The workbook is free to use, created by the Northern Institute of Applied Climate Science (NIACS) and supported by the USDA Climate Hubs.*

Natural infrastructure can reduce flood and erosion risks

Wetlands and forests protect against "flashy" water pulses by managing water across the landscape by capturing, storing, and allowing for infiltration of snowmelt and rainwater. When wetland and forest storage decreases, the energy of water flows increase, causing even more erosion downstream. It's a strong negative feedback loop that renders the natural and built environments of the area less capable of handling rain and snowmelt with each passing storm.

*Tips for adapting systems to increased erosion and sedimentation – Protect floodplains and upstream areas at risk of gullying or headcutting. Manage areas to **slow the flow**! Diagnose "pinch points" that can channelize flow and disrupt floodplain access such as infrastructure that is aging, undersized or misaligned. Find ways to increase soil-water storage in headwaters, along streams and in floodplain areas by protecting forests and wetlands that promote deep rooted soils and infiltration.*

- Helpful Tools: Consider soil types when planning activities, particularly soils susceptible to erosion. The NRCS "Fragile Soils" index can help decipher soils vulnerable to degradation with a high susceptibility to erosion. Use NRCS Web Soil Survey tool to access the data and maps.
  https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Tips for adapting systems to more storm runoff volume and increased intensity – Plan ecosystem restorations to restore the functional hydrology at a watershed-scale. Plans that increase soil-water storage, reconnect upstream hydrology and connections to floodplains can increase the capacity of watersheds to route and absorb large volumes of water that can help reduce stress on downstream infrastructure. Additionally, infrastructure can be built to accommodate and endure changing hydrology, examples include: floodplain culverts, staged-release culverts, spillways - intentional dips in roads, etc. Ask us for additional resources!

Ecosystem change

The region's forests and plant communities will be affected by a changing climate during this century, but individual tree and plant species will respond uniquely to climate change, depending on their particular ecological tolerances. These resources summarize general climate change projections for tree species across several large landscapes in Wisconsin.

Tips: *Consider tree and plant vulnerability to a warmer, wetter future in watershed planning and when selecting species for planting. Evaluate headwater and riparian forest health and species compositions, and take into consideration site specific characteristics that may challenge growth or regeneration (such as longer periods of inundation in floodplains) or forest pests and invasive plants. Reduce impacts of roads to forest areas.*

- Lists of project future habitat suitability for individual tree species https://forestadaptation.org/northwoods_treehandouts
- Forest ecosystem vulnerability assessment for Wisconsin: https://forestadaptation.org/northwoods
- Tool to assess projected changes in plant Heat and Hardiness Zones: https://tinyurl.com/projected-hardiness
- Keep an eye out for invasive species – where are they now? https://www.eddmaps.org

Learn how wetlands reduce flood hazards

Read "Exploring the Relationship between Wetlands and Flood Hazards in the Lake Superior Basin" Wisconsin Wetlands report: bit.ly/floodingcasestudy

- Tools and data to gauge wetland losses –The Nature Conservancy http://www.wetlandsbydesign.org/
- Use field methodologies to assess stream stability and fluvial erosion hazards in vulnerability assessments
- Contact Wisconsin Wetlands Association to better understand available grant opportunities

Assessing change: Climate tools and resources:

- NOAA State Climate Summaries (observed and projected changes): https://statesummaries.ncics.org/wi
- Historical climate data – state, county, city: https://www.ncdc.noaa.gov/cag/statewide/time-series
- Projected climate impacts: https://forestadaptation.org/assess/explore-impacts
- Forests and Water impacts: www.fs.usda.gov/ccrc/topics/water-resources
- Learn Climate 101 basics with these free education modules: www.fs.usda.gov/ccrc/education

Education and outreach tools you can use!

- Guide that frames the broad adaptation process and integrates tips for partnership building from planning to monitoring. ICLEI Guide - http://www.icleicanada.org/resources/item/3-changing-climate-changing-communities.
- Resources to frame climate change in general outreach - https://climateoutreach.org/