

Planning for a Healthy & Resilient Future: Incorporating Climate and Protection into County Land & Water Planning

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Land & Water Conservation Board Meeting

October 7, 2025



Why integrate climate and protection into LWRM

KEY CLIMATE TAKEAWAYS

Wisconsin is 3° Warmer

On average, Wisconsin has become approximately 3° Fahrenheit warmer since the 1950s.

SETTING RECORDS

The last two decades have been the warmest on record, and the past decade has been the wettest.

17% INCREASE IN PRECIPITATION

Wisconsin has become wetter – average precipitation has increased 17% (about 5 inches) since 1950.



Southern Wisconsin has experienced the highest increase in precipitation



Warming is happening fastest in the winter and at night.

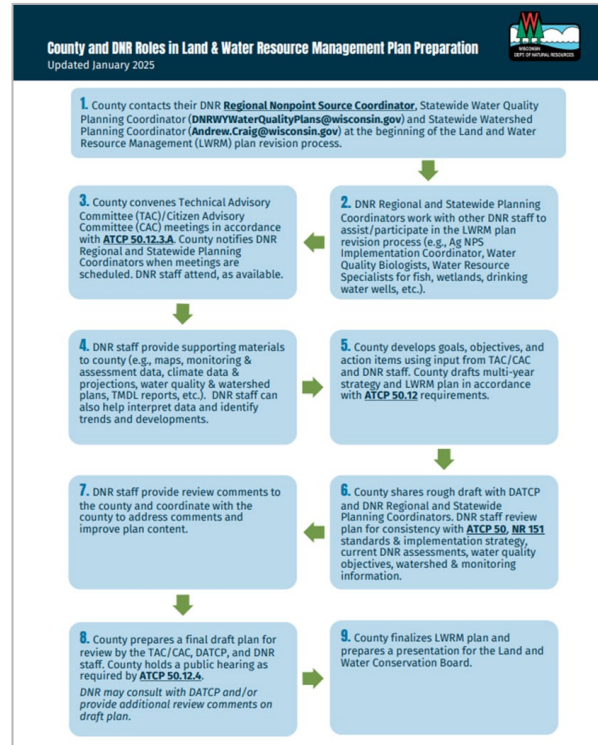
Extreme Events

are causing immense impacts across the state, and the frequency of those events will generally increase.

DNR Involvement in County LWRM Plan

- DNR staff involved in data sharing, review of plan updates
- Factsheet updated January 2026 in collaboration with DATCP
 - Process for DNR involvement in plan updates
 - Key contacts, data and information resources to consult in update process and other planning work

Factsheet on DATCP website



County and DNR Roles in Land & Water Resource Management Plan Preparation	
DNR Staff Contacts	
Planning Coordinator	Andrew.Craig@wisconsin.gov
Coordinators	Refer to link to find county contact
Implementation Coordinator	Benjamin.Uvaas@wisconsin.gov
Planning Coordinator	DNRWYWaterQualityPlans@wisconsin.gov
IS Biologists	Refer to link to find county contact
Planning & Climate Resilience	Helena.Tiedmann1@wisconsin.gov
Protection Coordinator	Lauren.Haydon@wisconsin.gov
Resources for Land & Water Planning	
Information Tools: dnr.wisconsin.gov/topic/SurfaceWater/Models.html Agricultural land within a watershed that may be vulnerable to water erosion WEX Tool – Data visualization tool for water quality data and trends. PRESTO Tool to estimate lake and stream phosphorus loading dnr.wisconsin.gov/maps/ApplList – Water chemistry, physical, and biological data Protection Viewer – Current restoration plans and watershed protection results WIL – Database of current and previous impaired waters, as well as listing for attaining standards, waters in restoration, and impaired waters Nonpoint Pollution (NPS) – Environmental Impacts, NR 151 Ag performance technical strategies, financial assistance, reporting and spills, feedlot runoff, and the Notice of Discharge Program (TMDL) – Approved TMDLs, status map, and implementation resources Planning – Watershed planning resources and existing EPA approved Quality Waters – Statewide water resources protection action plan, modeling data, maps, and lists of assessed high-quality waters ion on science, impacts, and solutions. Statewide climate data and an and through the Wisconsin Initiative on Climate Change Impacts (WICCI) side action plan and identifies conservation opportunities plan and public/private forestland resources Outdoor Recreation – Statewide comprehensive outdoor recreation plan Regional Master Planning – Summarizes public use and resource management on DNR property Planning & Implementation Grants: dnr.wisconsin.gov/aid/Grants.html Surface Water Grants Targeted Runoff Management Grants Urban Nonpoint Source & Storm Water Management Grants Knowles-Nelson Stewardship Grants	

Engagement on Climate Resilience & Protection

- Beginning in 2023 -2024, new DNR staff brought on to provide technical assistance to counties, regional planning communities (RPCs), municipal utilities.
- Focus on incorporating climate resilience and watershed protection into water quality programmatic work done by DNR and our partners.

Helena Tiedmann : Water Quality Planning Coordinator

Lauren Haydon : Watershed Protection Coordinator

Ezra Meyer : Climate Resilience Outreach Specialist

Engagement on Climate Resilience & Protection

1. Kick-off meeting with counties

2. Coordinate with Watershed Planning Coordinator, Regional Nonpoint Coordinator, Regional WQ Biologists

3. Provide summary packet describing county climate (Helena) and watershed protection information (Lauren)

4. Help inform goals and objectives

5. Attend and present at TAC/CAC meetings as requested

6. Review plan draft and provide feedback on clarity, accuracy

Climate Summary Packet

January 24, 2025

Adams County Climate Information

Description of Included Figures

Climate Summary:

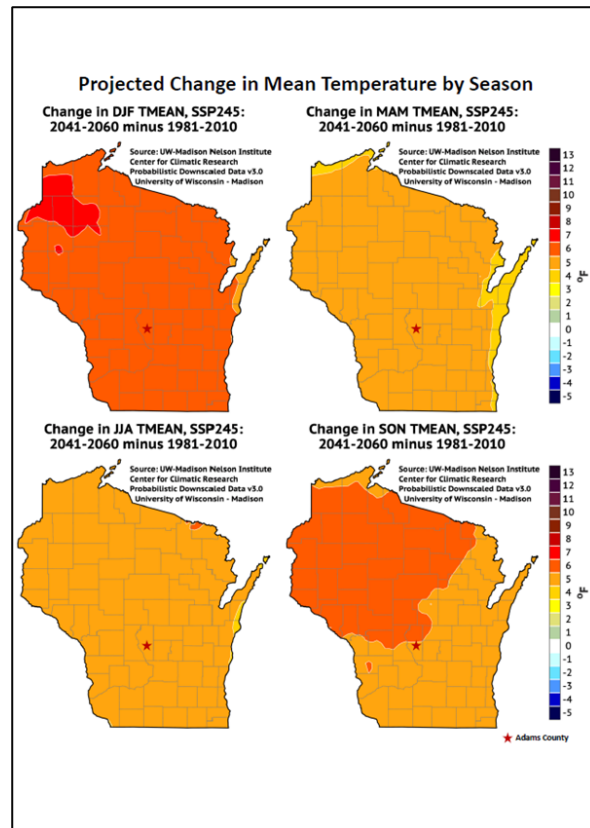
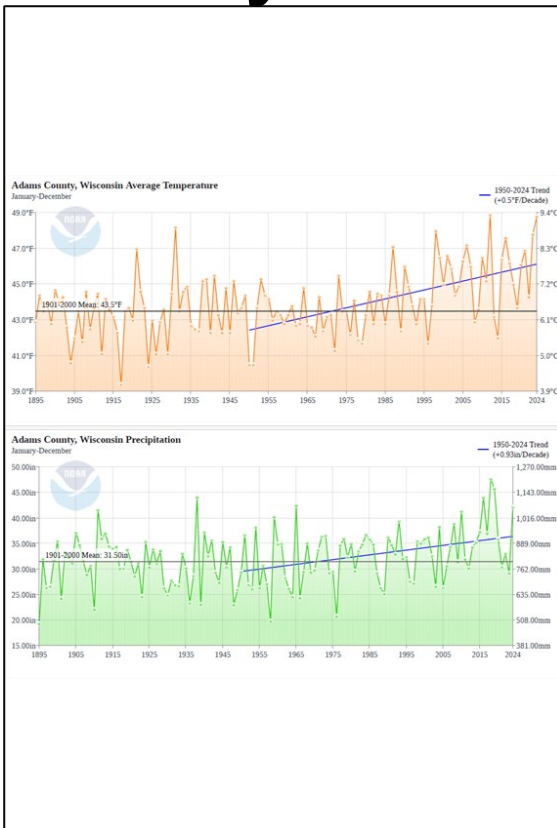
- Climate normals for Friendship, Adams County, WI, 1991-2020. Climate normals are 30-year averages which provide a baseline for understanding a location's typical conditions. Climate normals for Adams County show that it experiences significant seasonal variability, with warm summers and very cold winters. Image source: Wisconsin State Climatology Office. <https://climatology.nelson.wisc.edu/wisconsin-historic-climate-data/climate-normals-by-location/>

Historical Trends:

- Annual average temperature for Adams County, WI, 1895-2024. Long-term temperature records show that Adams County is becoming warmer, with average annual temperatures increasing by approximately 3° F since 1950. Much of this warming has occurred in winter, with average winter temperatures increasing by 6° F, compared to 3° F in spring and fall and 2° F in summer. Image source: NOAA Climate at a Glance. https://www.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/WI-001?map/12/12/1895-2024?base_prd=true&beginbaseyear=1901&endbaseyear=2000&trend=true&trend_base=10&beginyear=1950&endyear=2024 For seasonal breakdowns, see <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>
- Annual precipitation for Adams County, WI, 1895-2024. Long-term precipitation records show that Adams County is becoming wetter, with annual precipitation increasing by approximately 20% since 1950. Precipitation has increased significantly in all seasons, though slightly less in fall (+10%) compared to winter, spring, and summer (+20%). Image source: NOAA Climate at a Glance. https://www.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/WI-001?map/12/12/1895-2024?base_prd=true&beginbaseyear=1901&endbaseyear=2000&trend=true&trend_base=10&beginyear=1950&endyear=2024 For seasonal breakdowns, see <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>

Future Projections:

- Projected change in annual average temperature. Like most of Wisconsin, average annual temperatures in Adams County are expected to increase by approximately 5° F by the mid-21st century compared to recent historical averages (1981-2021). Image source: Wisconsin Initiative on Climate Change Impacts. <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>
- Projected change in the frequency of extreme precipitation events. Adams County is expected to see an increase in extreme precipitation events of all magnitudes. Top left shows the historical frequency of rainfall events with >2 inches per day of precipitation compared to future projections (top right). Bottom left shows the historical frequency of very extreme events (>5 inches per day) compared to future projections (bottom right). Image source: Wisconsin Initiative on Climate Change Impacts. <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>
- Projected change in average temperature by season (clockwise from top left: winter, spring, fall, summer). Historic temperatures trends (Figure 2) are expected to continue, with temperatures in Adams County increasing in all seasons, but most of all in winter. Image source: Wisconsin Initiative on Climate Change Impacts. <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>
- Projected change in the number of below-freezing nights per year. Adams county is expected to see warmer winters, with very cold temperatures occurring less frequently. For example, Adams County is projected to see 20-40 fewer nights below freezing per year by the mid-21st century (right) compared to the recent historical average (left). Image source: Wisconsin Initiative on Climate Change Impacts. <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>
- Projected change in precipitation by season (clockwise from top left: winter, spring, fall, summer). In Adams County, changes in precipitation are expected to vary by season. Winters are projected to see the largest increase in precipitation, followed by spring and fall. Summer projections are more uncertain, and models diverge on whether increases or decreases are expected. Though average summer precipitation amounts may not change significantly, greater extremes (e.g., more severe droughts and floods) are expected. Image source: Wisconsin Initiative on Climate Change Impacts. <https://wisc.wisc.edu/wisconsin-climate-trends-and-projections/>



Watershed Protection Summary Pack

HEALTHY WATERSHED


An area draining to a stream, lake or wetland where natural land cover supports the dynamic processes, habitat size and connectivity, and water quality conditions able to support healthy biological communities (adapted from EPA, epa.gov/hwp).

HIGH-QUALITY WATERS

Lakes, streams, and rivers with *at least two* of the following attributes:

- unique or rare resource,
- attaining state water quality standards,
- or good-to-excellent biotic integrity.

Also included are unique wetlands and those with least disturbed or reference conditions.



2021 High-Quality Waters: Lakes, Rivers, Streams

Rusk County - 21 High-Quality Waters Identified in 2021										
Data sorted by alphabetical county and alphabetical waterbody name										
OFFICIAL NAME	LOCAL NAME	WBIC	PRIORITY	COUNTY NAME (STREAM MOUTH & LAKE LOCATION)	HUC6	HUC12 CODE (STREAM MOUTH & LAKE LOCATION)	UNIQUE & RARE RESOURCES (COUNT)	Attaining WQS (COUNT)	IBIs (COUNT)	HQW CRITERIA (COUNT)
			WATERSHEDS HUCs • State = Both ***							
Alder Creek		2366700	**	Rusk	Chippewa	070500010701	6		4	2
Bass Lake		2090900	**	Rusk	Chippewa	070500070402	1	1		2
Becy Creek		2369600	**	Rusk	Chippewa	070500010702	4	1	3	3
Big Weirgor Creek	Weirgor	2370400	***	Rusk	Chippewa	070500010508	2	1	7	3
Clear Creek		2370100	**	Rusk	Chippewa	070500010702	2		4	2
Clear Lake		2350600		Rusk	Chippewa	070500010902	1	1		2
Deer Creek		2374200	***	Rusk	Chippewa	070500010508	4		3	2
Devils Creek		2366600	**	Rusk	Chippewa	070500010701	5	2	9	3
Flambeau River		2225000	***	Rusk	Chippewa	070500010904	7	4	10	3
Hackett Creek		2231400	***	Rusk	Chippewa	070500030304	3		1	2
Island Lake		2350200		Rusk	Chippewa	070500010902	2	1		2
Little Soft Maple Creek		2357300	**	Rusk	Chippewa	070500010703	1	1	1	3
Little Weirgor Creek	Weirgor	2370500	***	Rusk	Chippewa	070500010508	4		5	2
Louler Creek		2111000	**	Rusk	Chippewa	070500070104	2		1	2
Main Creek		2217100		Rusk	Chippewa	070500040305	1		5	2
Middle Fk Main Creek		2219700		Rusk	Chippewa	070500040302	2		1	2
Soft Maple Creek		2356600	**	Rusk	Chippewa	070500010703	6		4	2
South Fork Flambeau River		2231200	***	Rusk	Chippewa	070500020607	5		8	2
South Fork Main Creek		2218000		Rusk	Chippewa	070500040304	4	4	11	3
Spring Creek		2374100	***	Rusk	Chippewa	070500010508	2	1	2	3
Thornapple River		2360800	***	Rusk	Chippewa	070500010607	1	2	6	3



2021 High-Quality Waters: Healthy Wetlands

Rusk County - 2 Healthy Wetlands identified in 2021

Data sorted by alphabetical county and increasing Healthy Wetland ID

WETLAND ID	SITE NAME	SITE ID	PRIORITY WATERSHEDS HUC6 + State + Both	COUNTY NAME	HUC6	HUC12 CODE	DISTURBANCE RANK	PLANT COMMUNITY CONDITION	LAT	LONG
Healthy_351	NLF-340	NL355		Rusk	Chippewa	070500040305	2	2	45.394192	-91.026016
Healthy_354	NLF-341	NL356	**	Rusk	Chippewa	070500010704	3	2	45.431812	-91.235283

Watershed Protection Summary Pack

C. Healthy Watersheds, High Quality Waters (DNR)

Background & General Overview

In 2022, the DNR's Water Quality Program launched the Healthy Watersheds, High-Quality Waters (HWHQW) initiative. This new focus on the "already healthy" waterbodies and watersheds – or land area draining to a lake, stream or wetland – is intended to celebrate these treasures and draw attention to the ecological, financial and societal benefits of protecting clean water.

This initiative utilized the US EPA Watershed Recovery Potential Screening Tool to model watershed health at the HUC12 scale throughout the state. The DNR also identified individual high-quality lakes, streams, rivers, and wetlands utilizing existing monitoring data and resource classifications. The modeled watersheds (HUC12 scale) can be sorted statewide and by major drainage basin (HUC6). The 30% healthiest watersheds in the state and within each major drainage basin are the geographic protection priorities for this statewide plan. As outlined in the Healthy Watersheds, High-Quality Waters Action Plan, the statewide goal is to keep 100% of the watershed protection priorities and high-quality waters within them healthy through 2030. The HWHQW website features an accompanying technical report, action plan for how to use this data, and ready-made maps and information dashboards.

Historically, much of the DNR's emphasis has been to restore polluted waters as required by the federal Clean Water Act. Evidence is mounting, however, that actively protecting healthy water resources is a wise public investment, and the shift towards protection efforts is growing nationally. Within Vilas County where there is vast forested watersheds and limited agricultural and urban development compared to other parts of the state, adopting a watershed scale approach to protection is essential for high-quality waters to thrive. Identifying watershed protection priorities also serves to expand funding opportunities as more agencies, such as the EPA, promote the use of watershed planning monies for protection efforts.

Modeling Watershed Vulnerability, Opportunities, & Protection Potential

In addition to modeling watershed health, the HWHQW modeling team worked in collaboration with US EPA to customize the Recovery Potential Screening (RPS) tool to create additional indices to model watershed stressors (hurdles to long-term protection) and opportunities for protection. These indices are referred to respectively as the Vulnerability Index and Opportunity Index. A list of the metrics used to inform these indices can be found below. Ultimately, the watershed health, vulnerability, and opportunity index scores for a given watershed can be used to calculate a Protection Potential Index (PPI). The PPI was developed based on feedback from partners to prioritize the healthiest watersheds first, and secondly consider the likely greatest potential for protection

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An area draining to a stream, lake or wetland where natural land cover supports the dynamic processes, habitat size and connectivity, and water quality conditions able to support healthy biological communities (adapted from EPA, epa.gov/hwp).

HIGH-QUALITY WATERS

Lakes, streams, and rivers with at least two of the following attributes:

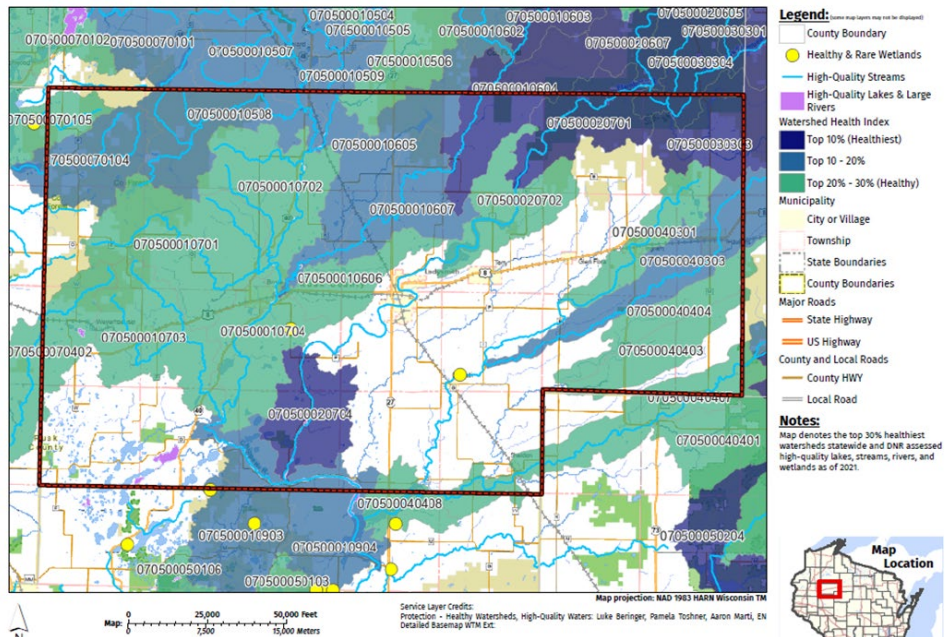
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Also included are unique wetlands and those with least disturbed or reference conditions.



WISCONSIN
DEPARTMENT OF
NATURAL RESOURCES

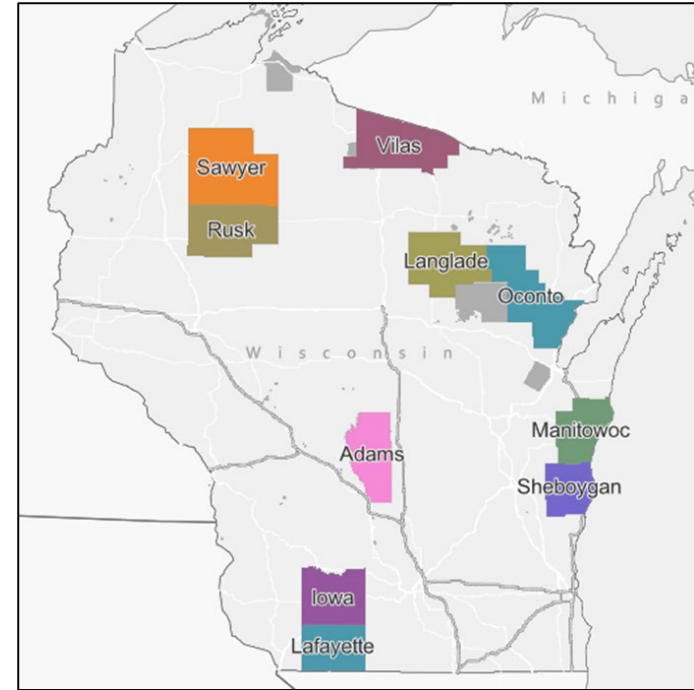
Statewide Watershed Protection Priorities (Top 30%) - Rusk County Healthy Watersheds, High-Quality Waters (WI DNR 2021)



How's It Going So Far?

Counties Engaged to Date

- Positive reception from counties
 - Spectrum of engagement and interest
 - Specific interest in data, funding, implementation
- How can we further help counties find this information and incorporate climate and protection in their planning work?



CONSERVATION AS A CLIMATE SOLUTION

Conservation is one of our best tools to adapt to and mitigate the effects of climate change. Not only do conservation practices draw carbon dioxide from the atmosphere, they also offer numerous co-benefits such as ecological restoration, water quality enhancement, and wildlife habitat protection.

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- County's are already doing this work
- Adaptation supports county land and water goals and objectives



BUILDING RESILIENCE

With extreme weather events on the rise, building resilience is an essential component of any climate action planning. Climate resilience is the ability to prepare for, recover from, and adapt to the impacts of these weather events (c2es). Local-level conservation planning is at the forefront of reducing a community's vulnerability while preventing impacts from growing worse.

NATURE-BASED SOLUTIONS

Conservation efforts serve as the foundation for nature-based solutions, which involve conserving, restoring, or better managing ecosystems to remove carbon dioxide from the atmosphere (AU). Examples include promoting the adoption of soil health-building agricultural practices, restoring wetlands, and preserving forests. Such practices serve to prevent greenhouse gas emissions and/or actively remove carbon dioxide from the atmosphere. Conservation practices offer a wide variety of opportunities to make a significant, measurable contribution to climate change mitigation, ultimately reducing the impacts on the environment and our local communities.

RESOURCE ASSESSMENT

Historic, Current, and Future Climate Trends
*WICCI, NOAA, State Climatology Office,
National Database Tools*

RESOURCE CONCERNS

Potential Impacts, Vulnerabilities, and
Adaptive Capacity of Systems
Prompting Question to Identify Opportunities

GOALS, OBJECTIVES & ACTIONS

Selecting Adaptations
Prompting Question to Identify Actions

DATA COLLECTION & INTERPRETATION



IDENTIFYING IMPACTS & OPPORTUNITIES



TAKING ACTION

Tips for Success



Apply to your existing planning work

- 10-year Land & Water Resource Management Plan updates
- 5-year plan reviews
- Annual work plans
- Conservation project planning



Work with a team

Complete the planning workbook with your:

- Project Team
- Technical/Local Advisory Committee
- Conservation Department Staff

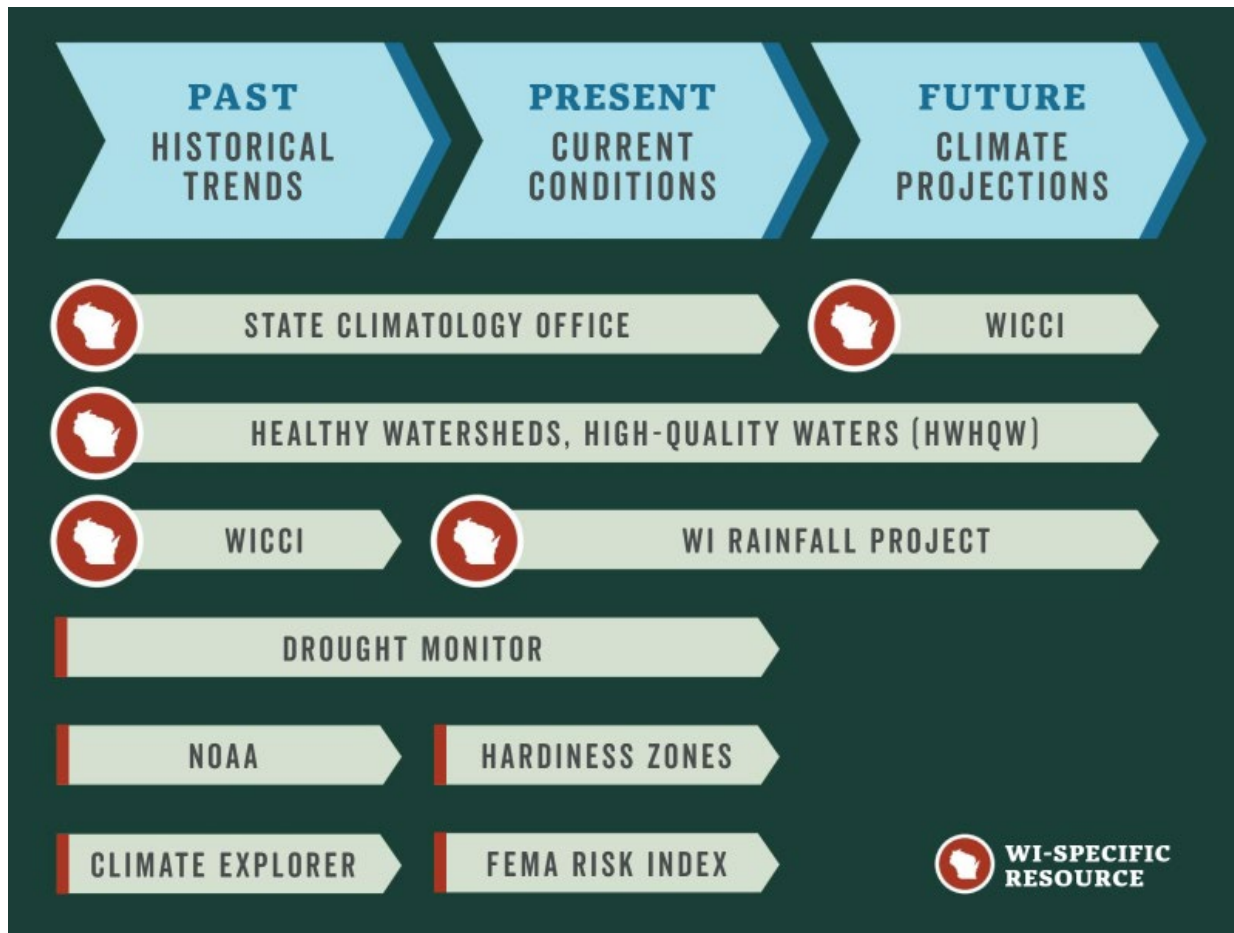


There's no "one size fits all" to climate resilience

- The climate resilience solutions and strategies will vary by location, project type, resource concerns, and stakeholder priorities
- Work with your team to identify the solution(s) that make the most sense for your planning context

Resource Assessment

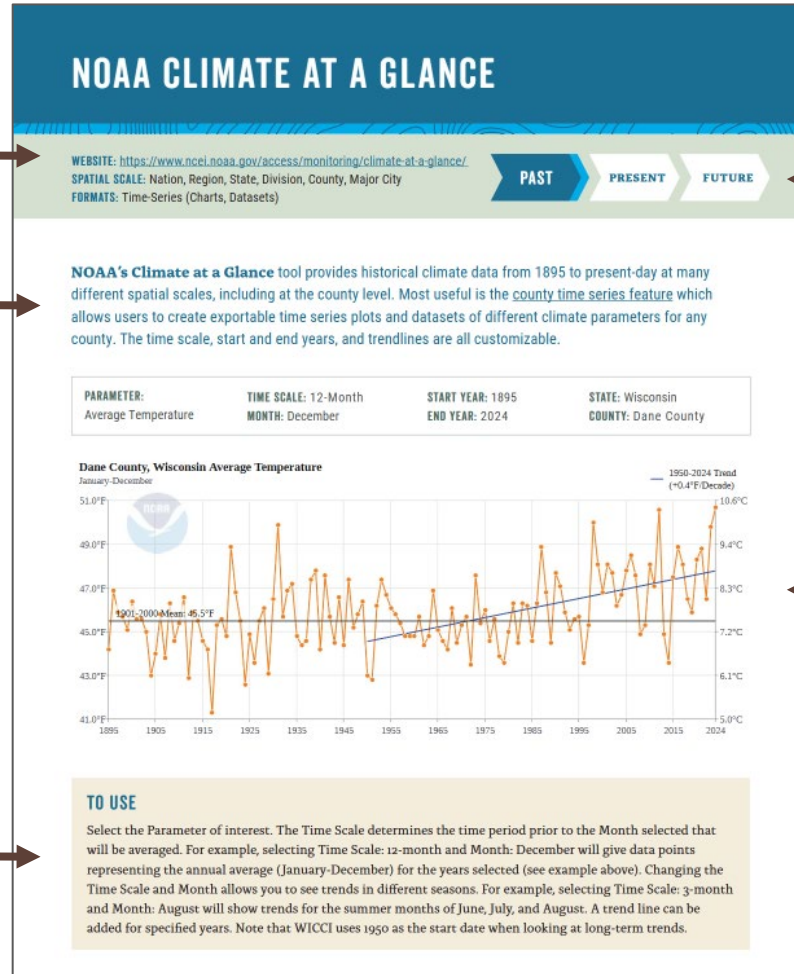
- Characterize past, present, and future climate conditions
- Identify climate trends or concerns that might impact your resource management objectives



Where to access
Available scale(s)
Available format(s)

Brief description of
tool/resource

Instructions or
helpful tips for
using the
tool/generating
data outputs

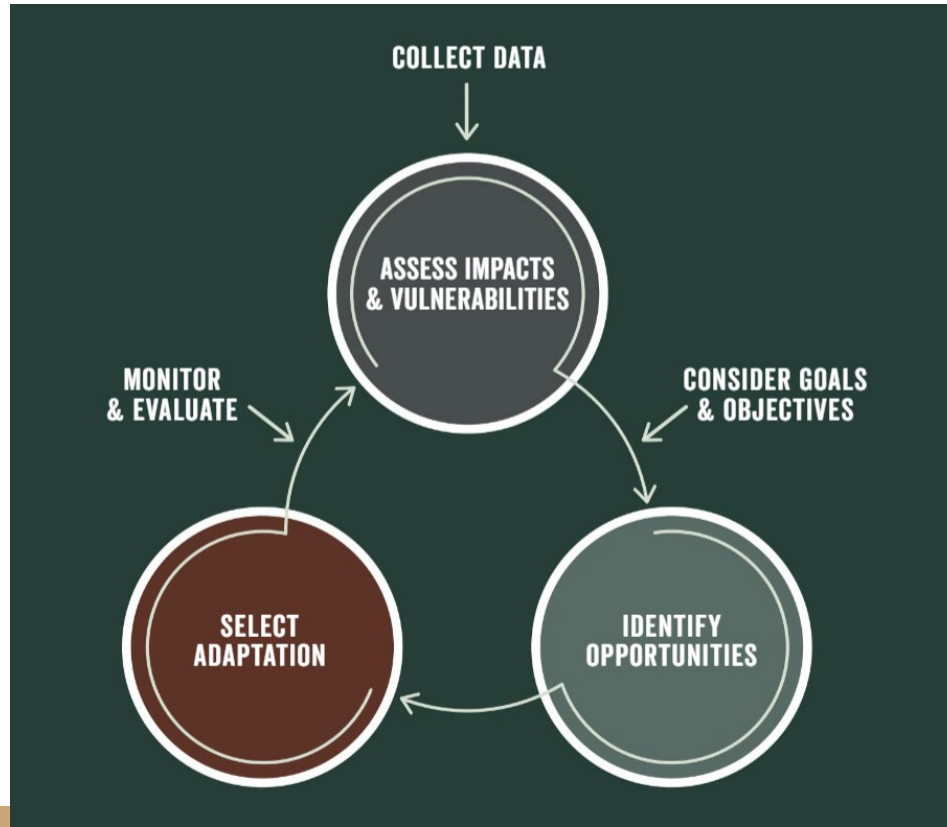


Time period(s)
data describes

Example of the
data/tool outputs

Example Resource

Climate Planning Framework



STEP
1

ASSESS CLIMATE IMPACTS AND VULNERABILITIES

GOAL

Identify how climate change may uniquely affect your county's natural resources and communities.

WORKBOOK QUESTIONS

1. What climate impacts are you most concerned about in your county? *Identify priorities*
2. How specifically might these affect local resources?

Climate Impact	Local Impact
<input type="radio"/> Shorter, warmer winters <input type="radio"/> Warmer temperatures and extreme heat <input type="radio"/> Longer growing season <input type="radio"/> Increased winter and spring precipitation <input type="radio"/> More frequent heavy precipitation events <input type="radio"/> Reduced soil moisture or drought <input type="radio"/> Increased risk of wildfire <input type="radio"/> Altered stream flows <input type="radio"/> Changes in species ranges or assemblages (plant or animal) <input type="radio"/> Damage from insect pests or pathogens <input type="radio"/> Increases in nonnative plant species <input type="radio"/> Coastal hazards and shoreline erosion <input type="radio"/> Other:	

Resources: Refer to *Future Climate Projections* section for a comprehensive list of tools

Impacts

What climate impacts are you most concerned about in your county?

How specifically might these affect local resources?

GOAL

Define clear management objectives that align with projected climate impacts and community needs.

WORKBOOK QUESTIONS

1. What are the focus areas and land and water management goals and objectives in your plan?
2. What opportunities exist for incorporating climate resilience into these elements?

LWRM Goals and Objectives	Climate Resilience Opportunities

Opportunities

What are the focus areas and land and water management goals/objectives in your plan?

How might climate change make it challenging to achieve these goals?

What opportunities exist for incorporating climate resilience?

GOAL

Develop a list of prioritized actions to address vulnerabilities and enhance climate resilience.

WORKBOOK QUESTIONS

1. Are your current management practices enough to overcome the challenges and meet your management goals and objectives?
2. What actions can you take to address these climate impacts in your county?

Goal/Objective	Action/Strategy	Considerations: Benefits, Drawbacks, Feasibility, Barriers, Resources, Timeline

Resources: Refer to *Adaptations* section for comprehensive lists of actions and strategies

Actions

What actions can you take to address these climate impacts in your county while meeting management goals?

Counties are taking action!

Example Goals from Recent LWRMPs:

- Monitor road/stream crossings to ensure hydrologic integrity
- Work with the County Highway Department to promote erosion control and culvert sizing
- Protect the top 30% healthiest watersheds in the County
- Evaluate implementation of a wetland preservation/restoration program
- Develop a lake classification system around vulnerability/resilience to shifts in climate
- Improve fisheries habitat to increase climate resiliency for gamefish
- Evaluate strategies for wildlife plantings to adapt to climate change
- Develop a County Conservation Natural Hazards Mitigation Plan
- Promote sustainable agriculture and plan for climate change
- Increase promotion of no -till, cover crops, and nutrient management programs
- Improve soil health, carbon storage & water infiltration
- Promote land practices to enhance resiliency to fluctuations in precipitation, temperature and seasonal variances

Concluding Thoughts

County's and others are already doing this work

Making adjustments based on a range of future projections to support broader conservation efforts.

Centered around counties' expertise

Many tools available to support informing decisions, but no tool replaces local knowledge.

We're here to help

We are available to support counties throughout their plan updates and other conservation planning efforts.

We'd love to hear your thoughts!



Questions?

Jenny Pethan, WI Land & Water: Jenny@wisconsinlandwater.org

Climate Program Manager



Helena Tiedmann, WI DNR: Helena.Tiedmann1@wisconsin.gov

Water Quality Planning Coordinator

