

Minnesota's waters, natural lands, and diverse fish and wildlife habitats are conserved and enhanced.

The Challenge

The cumulative effects of land use change, invasive species spread, pollution and a changing climate are combining in new ways to threaten the health of Minnesota's natural lands and waters.

Why is this important?

Complex interactions among these multiple threats create some of the greatest challenges we have ever faced. For example, under a changing climate we expect to see more severe storms, larger wildfires, accelerating spread of invasive species, outbreaks of pests and shifting wildlife populations. Recent events illustrate the unique challenges posed by these interactions and indicate the emergence of long-term trends that require action today.

Changing Land Use and Ownership Patterns:

Development and fragmentation of lands adjacent to public land is impeding natural resource management, restricting public recreational access and reducing habitat quality. Indicative of this, from 1989 to 2013, approximately 900,000 acres of Minnesota private forest land was sold.

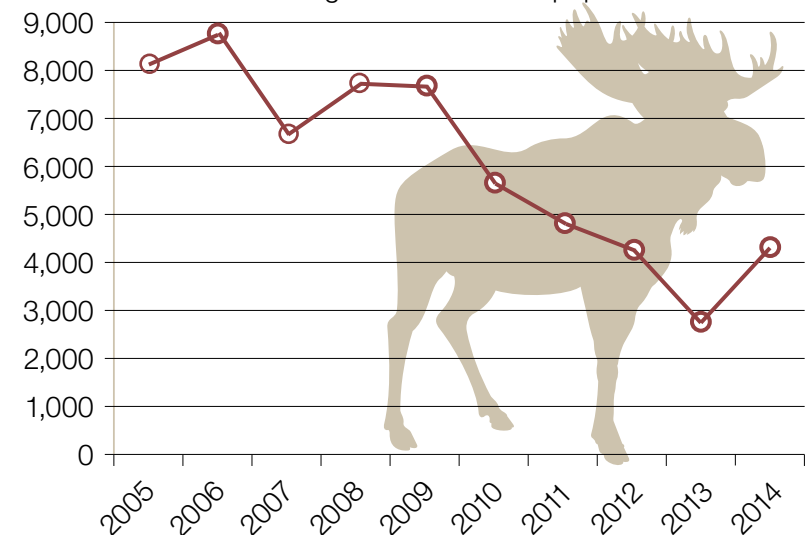
Expanding Forest Pests and Disease:

For example, eastern larch beetle—a native pest proliferating in a warmer climate—has caused extensive mortality to over 120,000 acres of the state's tamaracks since 2000.

Changing Wildlife Populations:

Northeastern Minnesota's moose population decreased about 50 percent in the past eight years. If this trend continues, moose could be almost gone from the state in the coming decades. Researchers suspect the decline is caused by a combination of factors, including increasing parasites, average warmer weather, predators and habitat change.

Estimated number of moose in northeastern Minnesota and long-term trend in the population



Northeastern Minnesota's moose population decreased about 50 percent in the past eight years.

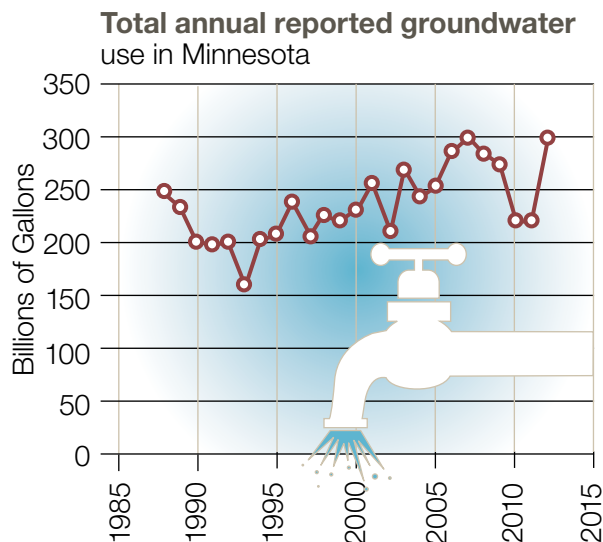
Four Key Trends next page

Trends

Four key trends illustrate this overarching conservation challenge:

Groundwater supplies are threatened

- Statewide, groundwater use has increased 35 percent over the past 25 years, an increase of about 3 billion gallons per year on average. Ground water is at risk of overuse and contamination in parts of the state.
- In some areas of the state, nitrate from agricultural production is showing up in ground water. For example, nitrate concentration in Park Rapids Well #4 increased by 347 percent from 1993 to 2009.
- Agricultural irrigation is increasing, with the number of permits being issued increasing from 65 in 2004 to 412 in 2013.

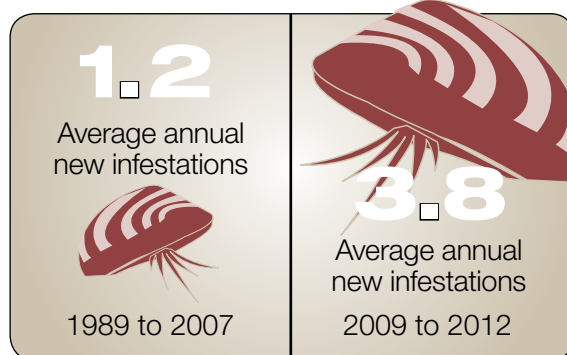


As population and domestic, industrial and agricultural demand for water grow, the DNR and partners must work to avoid conflicts over water use, depletion of aquifers and adverse impacts on surface waters.

Invasive species are spreading

- The emerald ash borer (EAB) has killed more than 50 million ash trees in a dozen states. First discovered in Minnesota in 2009, EAB threatens the state's 1 billion ash trees. A warming climate is expected to facilitate the spread of invasive species and make forests more vulnerable to pests and disease.
- Invasive carp pose an imminent threat to Minnesota's lakes and rivers as they advance up the Mississippi River.
- In four of Minnesota's largest lakes, infestations of the spiny waterflea are contributing to an estimated 40 to 60 percent loss of zooplankton biomass. Native zooplankton are a vital food source for fish.

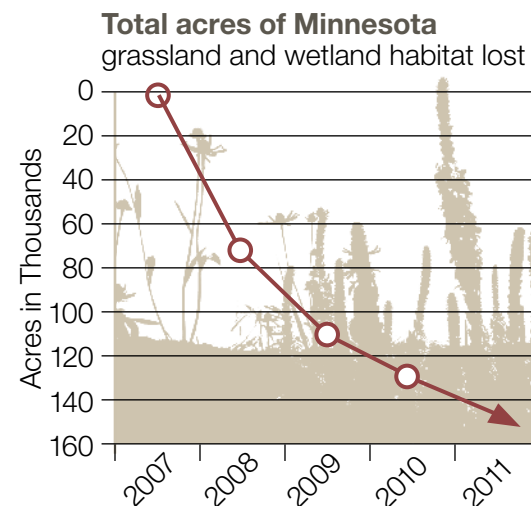
New infestations of zebra mussels



Invasive species harm ecosystems, disrupt economic activity and degrade the quality of recreation. Preventing the introduction of new invasive species into Minnesota buys us time to find long-term solutions.

Prairies, grasslands, and wetlands are declining

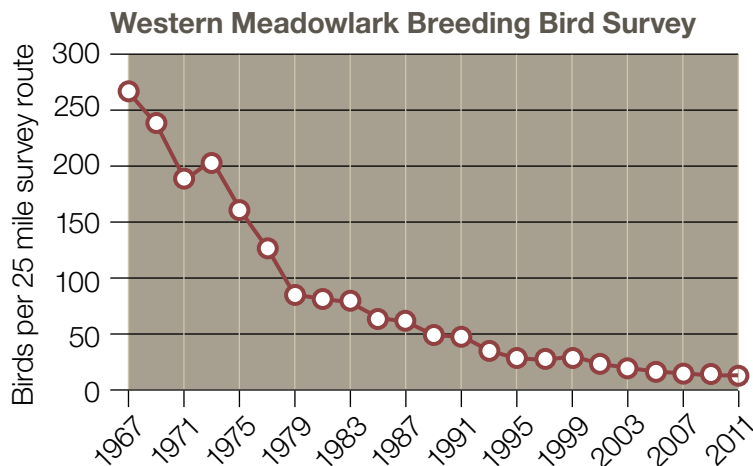
- Prairie once covered one-third of the state, but now less than 2 percent remains.
- Minnesota has lost more than 90 percent of its prairie wetlands.
- Between 2013 and 2016, contracts for nearly 400,000 acres of Conservation Reserve Program (CRP) land have expired or will expire. If landowners do not re-enroll in the program, CRP acres that provide critical wildlife habitat in Minnesota will decrease by 30 percent.



Native prairie, grasslands, and wetlands provide homes for fish, wildlife and native plants; protect soil and water; and support groundwater recharge. Conversion of these habitats to cropland reduces their ability to provide these critical benefits.

● Grassland bird populations are decreasing

- Loss and degradation of grassland habitat has led to declines of many grassland bird species. Between 1967 and 2011, the population index of 24 grassland birds declined nearly 40 percent.
- The western meadowlark has declined by more than 95 percent and the grasshopper sparrow has declined by 65 percent since 1967.
- The 2014 Minnesota pheasant index was 58 percent below the 10-year average and 71 percent below the long-term average, primarily due to habitat loss.



The grassland-dependent western meadowlark, an indicator of habitat quality for many grassland species, is threatened by habitat loss and degradation. The long-term population decline is exacerbated by a recent accelerated loss of grassland and wetland habitat.

Strategies

The following core strategies provide the fundamental steps needed to respond to these pressing conservation trends and guide targeted management actions.

Identify

Identify lands and waters at greatest risk from pressures such as land use change, pollution, climate change and invasive species. Set priorities for protecting and managing resources under greatest threat.

Manage

Manage lands and waters in ways that foster healthy habitats and boost the ability of fish and wildlife to cope with change.

Conserve

Conserve remaining natural areas and working lands containing important habitats — especially habitats in jeopardy, such as native prairies, wetlands, shallow lakes and shorelines. Connect fragments of high-quality habitat. Conserve endangered, threatened, rare, declining and vulnerable species.

Restore

Restore the health of degraded lakes, wetlands, rivers, grasslands and forests. Enroll marginal cropland in long-term habitat conservation programs. Reduce invasive species.

Monitor

Monitor and fine-tune management to improve the effectiveness of our conservation work.

Actions next page

Actions

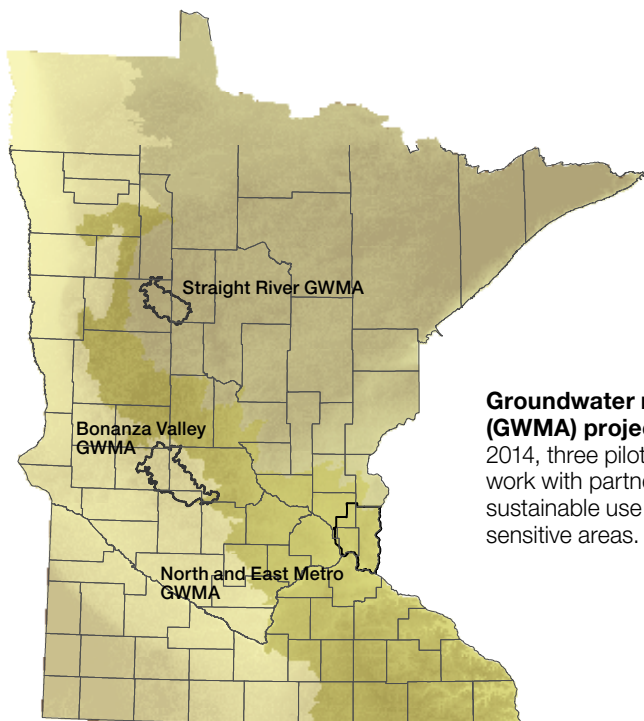
The following actions are examples of how we will carry out these strategies:

● Improve groundwater management

- Increase groundwater monitoring, education and compliance.
- Implement groundwater management area plans to help guide water appropriations and water quality improvements within designated areas.
- Accelerate water and habitat assessments to evaluate projects that might affect trout streams. Use permitting to ensure sustainable water use and reduce habitat impacts.

Example performance measure

Number of counties with a county geologic atlas or a regional hydrogeological assessment



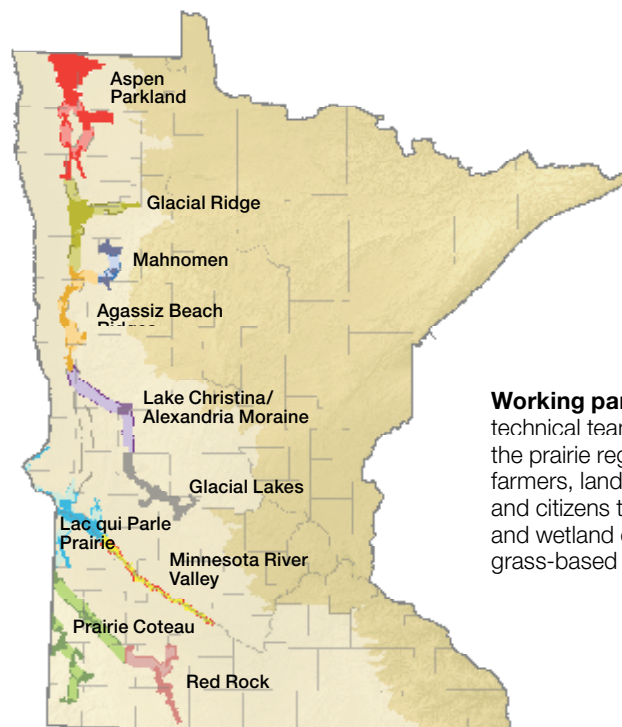
Groundwater management area (GWMA) projects. Initiated in 2014, three pilot projects coordinate work with partners to ensure sustainable use of groundwater in sensitive areas.

● Conserve prairies, grasslands, and wetlands

- Work with conservation organizations and agricultural communities to implement the Minnesota prairie conservation plan.
- Conserve public and private prairies, grasslands and wetlands through incentives, acquisition, restoration and enhancement using active management tools such as prescribed fire, conservation grazing and invasive species control.

Example performance measure

Number of prairie stewardship plans and management projects



Working partnerships. Ten local technical teams stretching across the prairie region are working with farmers, landowners, local officials and citizens to promote grassland and wetland conservation and grass-based agriculture.

● Prevent and curb the spread of invasive species

- Protect habitat and increase connectivity for native fish species while preventing and curbing the spread of invasive species by installing fish barriers and carrying out other deterrent measures at key sites.
- Expand the recreation-focused outreach campaign PlayCleanGo: Stop Invasive Species in Your Tracks, and build on the sister campaign WorkCleanGo for public employees to engage Minnesota residents in simple action steps designed to prevent the spread of terrestrial invasive species.
- Work with University of Minnesota Aquatic Invasive Species Research Center to develop better invasive species control technologies.



Example performance measure

Number of water bodies infested with Eurasian water milfoil



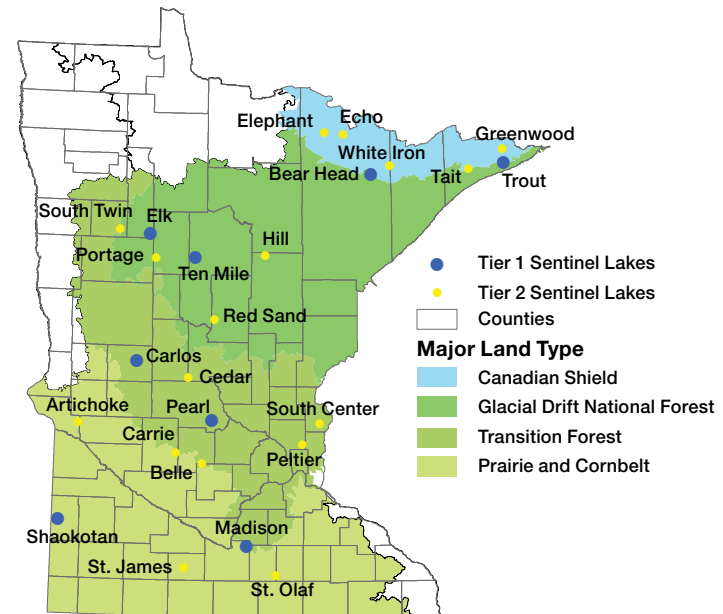
The DNR will increase public understanding of invasive species laws, roadside compliance checks and use of zebra mussel-detecting dogs.

● Monitor natural lands, waters, and species

- Accelerate inventory and monitoring for sound decision-making with emphasis on 1) forest, grassland and wetland vegetation; 2) rare species and habitats; 3) fish and wildlife populations; 4) groundwater quality and quantity; and 5) lake and river health.
- Develop cooperative approaches for land management such as the vegetation monitoring initiative, which shares data and best management practices among state and local governments and private landowners.
- Improve data management and science-based decisions by ensuring that DNR data are reliable, usable and accessible to staff and the public.

Example performance measures

Number of counties with completed Minnesota biological surveys; acres of DNR forest lands re-inventoried; walleye population levels



Sentinel lakes program. The DNR and the Minnesota Pollution Control Agency are collecting climate, lake habitat and fish population data on 25 Minnesota lakes. This will help us detect how lakes are changing in response to climate change, watershed development and invasive species and provide a solid foundation for future management.

Source: MN DNR and MPCA