HAZARD MITIGATION PROGRESS REPORT 2024

NORTH Dakota | Emergency Services
Be Legendary.

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By Kathleen Donahue, Katie Leitch, Hope Brighton
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Resilience in North Dakota: A Vision for Tomorrow

By Darin Hanson, Homeland Security Director

The North Dakota Department of Emergency Services extends its deepest gratitude to the State Hazard Mitigation Team for positioning North Dakota as a national leader in disaster resilience.

North Dakota earns its reputation through the hard work of the State Hazard Mitigation Team representing more than 100 public and private organizations. Our partners empower others by sharing their expertise, funding sources, and ideas. They motivate other states to emulate their innovative approaches to mitigation as my staff describes their achievements at regional and national conferences.

Opposite: Photo from NDDES Archives; 1997 Wahpeton

The latest accomplishment, the development of the 2024-2029 Enhanced Mitigation Mission Area Operations Plan (Enhanced Mitigation MAOP), reflects the State Hazard Mitigation Team's sustained commitment to ensure a safer North Dakota for today and future generations. Together, the State Hazard Mitigation Team retained the Enhanced Mitigation MAOP's national status as an enhanced mitigation plan, surpassing rigorous federal requirements. We celebrate their successes as we advance the mitigation plan's robust strategy for reducing the impacts of hazards and threats on our state's residents.

An Investment with Strong Dividends

Emergency management represents a continuous cycle of preparedness, response, recovery, and mitigation, the latter of which is sustained action to reduce the impacts of disaster on life and property. We make mitigation a priority in North Dakota because it pays big dividends for what matters most to us, the safety of our fellow citizens. If we save just one life, it's well worth the effort.

Financially, it makes sense to invest in mitigation before our next disaster. We can clearly articulate how many citizens will benefit from the investment for every mitigation project. The numbers speak volumes about the benefits of our efforts. Consider these facts:

- A national study by the National Institute of Building Sciences found that each $1 spent on hazard mitigation resulted in an estimated $6 saved in recovery (National Institute of Building Science, 2018).

- North Dakota surpasses the national average with an estimated $6.54 saved for every $1 spent on mitigation (Pew Charitable Trusts, 2019).

- Enhanced mitigation plan status increased the state's share of mitigation dollars for federally declared disasters to 20 percent. Since North Dakota achieved enhanced status in 2019 and then again in 2024, North Dakota's share of Hazard Mitigation Grant Program (HMGP) dollars increased to an impressive $36.1 million for the nine federally declared disasters that occurred between 2019 and 2023.

Our long-time mitigation partner, the North Dakota Department of Water Resources (DWR), reports its investments in flood protection and conveyance projects since 2019 are expected to accrue $361 million in benefits over the 50-year life of each project.

Bottom line, North Dakota has prevented more than $1.9 billion in disaster damages and more than $24 billion in disaster recovery assistance since 1993 (NDDES, 2023). The accompanying chart, Losses Avoided from Hazard Mitigation Funding (see page 10-11), provides a more detailed illustration of benefits and losses avoided through the Hazard Mitigation Assistance programs.

Building a Program of National Stature

"The Enhanced Mitigation MAOP demonstrates the State's fierce commitment to advancing a whole-of-government approach to mitigation planning and investments. Community-wide input and engagement were clearly a priority in the planning process as evidenced by the range of interdisciplinary partners at the table, and the comprehensive data and feedback incorporated throughout the plan."

Logan Sand, Community Planning Section Chief
Ariana Borrello, FEMA's Community Planner

An exemplary hazard mitigation program requires a roadmap that articulates a viable strategy for mitigating impacts and vulnerabilities to natural and technological hazards and adversarial threats. Our roadmap, the Enhanced Mitigation MAOP, reflects the keen insights of our State Hazard Mitigation Team, earning high praise from Logan Sand, Community Planning Section Chief, FEMA Region VIII, who also serves on our SHMT Technical Advisory Committee, and Ariana Borrello, FEMA's Community Planner who led the review of the state plan.

A solid foundation also requires a team willing to provide technical assistance to local and tribal planning teams with project development and mitigation plans that surpass federal requirements. The SHMT supports NDDES as one of the few Program Administration by States (PAS) participants in the nation in which FEMA delegated both program management and local plan review and approval to the state. Our SHMT provides technical assistance on hazard analysis specific to their area of expertise, and supports NDDES with plan developers meetings to guide teams through federal regulations and funding sources, and Community Coffees designed to elicit feedback from the public who share ideas for protecting their communities. "FEMA Region 8 thanks the NDDES team for setting the mitigation bar high, and for continuing to provide wide-ranging support and resources for local and tribal mitigation planning efforts to implement the highest quality mitigation planning program," Logan and Ariana wrote.

The article, "North Dakota's Journey to Resilience: State's Ongoing Efforts in Hazard Mitigation," (found on page 52), takes a deeper dive into North Dakota's current mitigation initiatives. Solid mitigation plans lead to thoughtful analysis of projects to build resiliency in communities, so the next disaster is not as impactful as the catastrophic ones we have experienced in previous years.

Future Conditions

We are hoping to mitigate ourselves out of disasters, as practical as possible given we can't predict when a tornado or train derailment will occur. But we do know the trajectory of hazards we can predict, such as flooding. We know what areas are at risk as we target mitigation projects to reduce flood impacts. We may not know where a tornado will strike, but we do know that shelters save lives, hence our emphasis on shelters in at-risk areas, whether they are in our local and state parks or mobile home communities.

We've already seen the work we've done in the Red River valley in lessening the impacts of floods whereas in previous years it would've been an issue. The collaborative approach taken by the North Dakota Department of Water Resource, the United States Army Corps of Engineers, and the Metro Flood Diversion Authority highlights the proactive approach needed to further resilience.

We want to lead in mitigation because we know it saves money in the long run and lessens the suffering of our citizens.

- With gratitude,

Darin Hanson

Darin Hanson and daughter matching at the 2023 'Bring Your Kid to Work Day'. Source: Darin Hanson

Hazard Mitigation Grant Program

DR-4444 2019 Spring Flood

	Approved Cost	Benefits	Losses Avoided
Stanley Lift Station	$ 122,827.23	$ 406.609.00	$ 283,781.77
Kulm Water Tower Generator	$ 37,443.00	$ 331,401.00	$ 293,958.00
NDDES Critical Facility Generators	$ 1,301,322.15	$ 1,689,280.00	$ 387,957.85
Totals	$ 1,461,592.38	$ 2,020,681.00	$ 559,088.62

DR-4475 2019 Fall Flood

	Approved Cost	Benefits	Losses Avoided
Cass County Buyout	$ 570,900.00	$ 2,444,898.00	$ 1,873,998.00
Cavalier Co Mt Carmel Dam Storm Shelter	$ 187,635.00	$ 335,993.00	$ 148,358.00
Bismarck Lift Station Generator	$ 236,250.00	$ 285,190.00	$ 48,940.00
Elgin Storm Shelter	$ 111,671.52	$ 237,038.00	$ 125,366.48
LaMoure County Storm Shelter	$ 94,197.00	$ 407,327.00	$ 313,130.00
Steele Co Golden Lake Storm Shelter	$ 172,830.00	$ 605,634.00	$ 432,804.00
Tri County WD Generators	$ 277,322.50	$ 791,107.00	$ 513,784.50
McIntosh Co Generators	$ 106,612.01	$ 126,868.00	$ 20,255.99
Bismarck FD Generator	$ 152,775.00	$ 168,501.00	$ 15,726.00
Totals	$ 1,910,193.03	$ 5,402,556.00	$ 3,492,362.97

DR-4509 COVID-19

	Approved Cost	Benefits	Losses Avoided
West Fargo Acquisition/Demolition	$ 1,665,573.00	$ 7,345,053.00	$ 5,679,480.00
Bismarck Public Health Generator	$ 155,989.18	$ 246,018.00	$ 90,028.82
Grand Forks Vail Circle Storm Sewer Project	$ 8,610,637.50	$ 17,825,913.00	$ 9,215,275.50
Totals	$ 10,432,199.68	$ 25,416,984.00	$ 14,984,784.32

DR-4553 2020 Spring Flood

	Approved Cost	Benefits	Losses Avoided
Milnor Water Supply Generator	$ 115,500.00	$ 136,109.00	$ 20,609.00
Steele Co Road 5 Bridge	$ 671,000.00	$ 803,976.00	$ 132,976.00
City-County Health Generator - Barnes	$ 98,752.50	$ 123,552.00	$ 24,799.50
Totals	$ 885,252.50	$ 1,063,637.00	$ 178,384.50

DR-4565 2020 Summer Flood

	Approved Cost	Benefits	Losses Avoided
Nelson Co Stump Lake Storm Shelter	$ 95,329.00	$ 373,743.00	$ 278,414.00
Harvey Water Treatment Plant	$ 148,413.76	$ 467,510.00	$ 319,096.24
Silver Lake Recreation Area Storm Shelter	$ 241,605.00	$ 1,606,667.00	$ 1,365,062.00
	$ 485,347.76	$ 2,447,920.00	$ 1,962,572.24

DR-4613: 2021 Summer Flood

	Approved Cost	Benefits	Losses Avoided
Grand Forks Co Acquisition	$ 471,660.00	$ 1,368,943.00	$ 897,283.00
Totals	$ 471,660.00	$ 1,368,943.00	$ 897,283.00

DR-4660 2022 Winter Storm and Flood

	Approved Cost	Benefits	Losses Avoided
Minnkota Power Bank Stabilization	$ 927,650.00	$ 1,308,374.00	$ 380,724.00
Mountrail Co Residential Storm Shelter	$ 9,012.15	$ 14,280.00	$ 5,267.85
Boom Lake Flood Mitigation	$ 3,124,090.00	$ 4,729,472.00	$ 1,605,382.00
Fargo Residential Strom Shelter	$ 9,955.00	$ 11,398.00	$ 1,443.00
Totals	$ 4,070,707.15	$ 6,063,524.00	$ 1,992,816.85

Pre-Disaster Mitigation Program

2018

	Approved Cost	Benefits	Losses Avoided
Fargo Pump Station Flood Mitigation	$ 4,753,290.00	$ 10,991,469.00	$ 6,238,179.00
Burleigh County U of Mary Slope Stabilization PH II	$ 5,286,955.80	$ 20,279,189.00	$ 14,992,233.20
City of Mandan Emergency Generators	$ 309,843.25	$ 1,343,968.00	$ 1,034,124.75
City of Jamestown James River Bank Restoration	$ 911,809.44	$ 1,418,925.00	$ 507,115.56
Mckenzie County Storm Shelters	$ 115,765.63	$ 154,822.00	$ 39,056.37
Beulah Storm Shelters	$ 94,966.13	$ 187,496.00	$ 92,529.87
City of Fargo Wastewater Treatment Plant Flood Protection	$ 4,906,390.00	$ 8,000,127.00	$ 3,093,737.00
Totals	$ 16,379,020.25	$ 42,375,996.00	$ 25,996,975.75

2019

	Approved Cost	Benefits	Losses Avoided
Beulah Floodway Property Remediation Project	$ 86,185.60	$ 276,000.00	$ 189,814.40
Walsh County United Medical Center Generator	$ 916,414.00	$ 1,429,537.00	$ 513,123.00
Walsh County Admin Bldg. Emergency Generator	$ 47,969.35	$ 78,695.00	$ 30,725.65
Totals	$ 1,050,568.95	$ 5,744,730.00	$ 4,694,161.05

Building Resilient Infrastructure and Communities

2020

	Approved Cost	Benefits	Losses Avoided
No construction projects	--	--	--

2021

	Approved Cost	Benefits	Losses Avoided
No construction projects	--	--	--

NORTH DAKOTA RECEIVES APPROVAL FOR ITS ROADMAP TO RESILIENCE

By Alison Vetter & Kathleen Donahue

The North Dakota State Hazard Mitigation Team (SHMT) achieved a major milestone this winter for its work on our state's roadmap for resilience.

The Enhanced Mitigation Mission Area Operations Plan (Enhanced Mitigation MAOP) received consecutive enhanced status from the Federal Emergency Management Agency (FEMA) on February 5, 2024.

The Enhanced Mitigation MAOP

"Here in North Dakota, a lot of our disaster events, like floods, occur year after year. No one wants to keep reliving and paying for the same crisis year after year. This plan shows the thoughtfulness within the emergency management cycle--prepare, respond, recover, mitigate--to make us resilient for the future,"

Darin Hanson, NDDES Homeland Security Director

tells the story of hazards and threats across our state, with strategies to mitigate the impacts. The plan establishes the framework for how 100-plus partners who comprise the SHMT work collaboratively toward a safer North Dakota. The release of this plan comes on the heels of the extreme weather disasters that have wracked the United States this year, 11 of which exceeded $1 billion in recovery cost, tying for the second-most number of extreme weather disasters on record.

The saving grace for the frequency and intensity of disasters in North Dakota is the effectiveness of the mitigation program.

FEMA requires all states to have a Hazard Mitigation Plan in place in order to receive mitigation grant funding. North Dakota was the first state in the region to achieve

an enhanced status in 2018 and has kept the status intact since, allowing the state to receive an additional 5% federal funding. Funding goes to projects to mitigate the risks of future disaster events which could range from water diversion projects to burying electrical lines.

"Since we achieved enhanced status, North Dakota's share of Hazard Mitigation Grant Program dollars increased to an impressive $53.6 million for the five federally declared disasters that occurred between 2019 and 2021," Justin Messner, NDDES-HLS Disaster Recovery and Mitigation Chief, said.

The Enhanced Mitigation MAOP is truly a living document, as evidenced by the Mitigation Action Update section of this report. Our partners are actively engaged in mitigation projects, refining the scope of projects and updating progress on implementation.

Logan Sand, Community Planning Section Chief, FEMA Region VIII, who joined the SHMT Technical Advisory Committee this year, and Ariana Borrello, FEMA's Community Planner who led review of the state plan, provided invaluable guidance to meet stringent federal requirements for enhanced plan status. "The North Dakota Department of Emergency Services (NDDES) and the SHMT continue to highlight, coordinate, and execute crucial mitigation project implementation, as described in key annual progress reports on mitigation project implementation," Logan and Ariana wrote recently in an email to NDDES. "The State clearly understands the importance of including socially vulnerable and underserved communities' considerations in the changing landscape of natural hazard risk, which is being amplified and exacerbated by climate change and other future conditions. FEMA Region 8 thanks the NDDES team for setting the mitigation bar so high, and for continuing to provide wide-ranging support and resources for local and tribal mitigation planning efforts to implement the highest quality mitigation planning program."

The SHMT was instrumental in positioning NDDES as a Program Administration by State Pilot Project participant with authority to manage the hazard mitigation program and to approve local mitigation plans. "NDDES continues to execute hazard mitigation application review, grant management, mitigation planning and other responsibilities of the highest caliber, which is why they are one of the few Program Administration by States (PAS) in the nation," Logan and Ariana Borrello wrote. "The NDDES staff conduct gold standard hazard mitigation plan reviews, lead mitigation plan development workshops, and are always looking for creative ways to elevate the State's mitigation planning program. It is always an absolute pleasure to work with this team!"

The plan can be found at the NDDES website, des.nd.gov.

Environmental Resiliency in the Face of Extreme Climate Variability –*Is This Possible?*

By Gregory Gust, Meteorologist and Climate Lead
N.D. Department of Emergency Services

Can you name the five states with the hottest recorded temperatures? California, Arizona, Nevada, New Mexico, and … North Dakota? That's right, North Dakota is tied for fifth in states with the highest recorded temperature (121°F), even beating Texas. Plus, it's tied for sixth place in states with the lowest recorded temperature (-60°F) – with no other state having both a record hotter and a record colder temperature!

North Dakota has the most extreme day-to-day, week-to-week, season-to-season, and year-to-year variability in temperature and precipitation of any US State.

Most notable is the state's extreme day-to-day, week-to-week, season-to-season, and year-to year variability in both temperature and precipitation - the most extreme of any U.S. state! It's written in our ancient "glacial" past and throughout our more recent "historical" past. In recent decades, North Dakotans have faced repeated onslaughts of drought, wildfire, flood, extreme summer storms, and extreme winter storms with local, tribal, state, and federal level disaster declarations having become commonplace.

This volatile and extremely variable weather and climate of the Northern Great Plains (NGP) as a whole, and North Dakota in particular, is especially challenging for all sectors and peoples. And, as discussed extensively in the new 2024-2029 ND Enhanced Mitigation Mission Area Operations Plan, future climate conditions could exacerbate this extreme variability and these challenges.

What, if anything, can North Dakotans do to mitigate the effects of or adapt to any potential large scale environmental impacts from our state's already extreme climate variability?

Dr. C. Thomas Shay, Professor Emeritus of the Department of Anthropology, University of Manitoba, in his most recent publication, Under Prairie Skies, the Plants and Peoples of the Northern Plains (Shay, 2022), provides a fascinating study of the interplay of native plants and peoples from the region's post-glaciated landscape to today's grasslands, wetlands, and woodlands. Shay's illustrated guide to our uncultivated landscape gives us a glimpse of what a naturally resilient biome might look like. Our modern challenge is to also consider what a resilient but fenced, cultivated, irrigated, drained, industrialized, urbanized, or otherwise sculpted North Dakota landscape may look like.

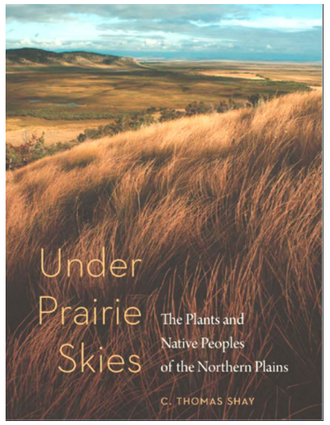

Figure 1. Under Prairie Skies. Source: Shay, 2022

For now, let's consider the state's grasslands, rangelands, wetlands, and just a few of the current climate resiliency issues they face.

Grassland Resiliency

The North Dakota Game and Fish Department classifies roughly 30 percent of the state as grassland or prairie, with an additional 1 percent as shrubland (NDGF, 2024). This landscape is typically dominated by a wide variety of cool-season grasses and forbs that are both nutritive and resilient to a highly variable climate (Toledo et al., 2014; 2023). However, Toledo (2023) argues that the recent protracted NGP wet-period from the 1990s through the 20-teens allowed Kentucky Bluegrass, a relatively shallow rooted and water intensive grass, to become a much more dominant and invasive grassland competitor. Most concerning is that current climate variability and future climate projections promote conditions where Kentucky Bluegrass infested pastures are generally less resilient, result in less biomass production, and produce lower quality feed under increasingly heat and/or water stressed conditions. See Figure 2., opposite.

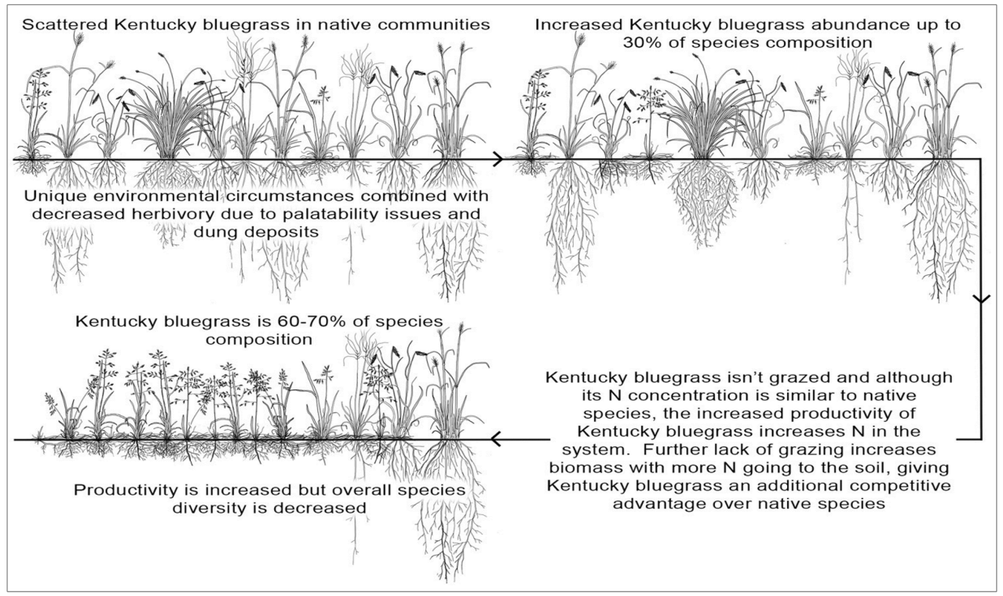

Figure 2. Relationship between Kentucky bluegrass spread and increasing soil nitrogen content.
Source: USDA/ARS; Toledo, 2014

During the summer of 2023, I had the opportunity to visit with Dr. David Toledo and some of his research colleagues and to take a tour of his grassland research plots located near the USDA Agricultural Research Station, southwest of Mandan, ND. And yes, that involved walking through various naturalized grassland plots, some of which had active grazing herds replete with fresh droppings.

During the tour, Dr. Toledo discussed how their research station was testing various climate and invasive species mitigation strategies, including both prescribed burns or pasture-controlled prairie fires, and intensive or "mob" grazing strategies. Toledo noted that these two methods were quite successful in controlling the spread

of Kentucky Bluegrass while promoting the regrowth of native, more deeply rooted, and more resilient grasses. He was quick to note that his research has repeatedly shown that mob-grazed pastures often took a year longer to recover than those which had been burned off. And even though it takes longer for recovery, ranchers seemed to prefer the mob-grazing over the controlled burn approach as more risk manageable.

Even though it takes longer for recovery, ranchers seem to prefer mob-grazing over controlled burn approach as more risk manageable.

Figure 3. Mob grazing herd at Mandan USDA-ARS. Source: Dr. David Toledo

In January of 2024, I was able to discuss this topic with Jerry Doan, a Burleigh County rancher, award winning environmental steward, N.D. Cowboy Hall of Fame and N.D. Agriculture Hall of Fame member. Doan was honored as the keynote speaker for the 41st Red River Basin Land and Water International Summit Conference held in West Fargo ND (Doan, 2024). Doan's main presentation focused on regenerative agriculture: demonstrating how these practices lead to improved soil and water resource health while mitigating the effects of climate change and perhaps even reversing them, holding promise for future generations of ranchers. He also provided his observations on the use of both mob-grazing and prescribed burns, confirming his preference for mob-grazing as opposed to the potentially devastating impacts of a planned fire gone awry.

Why is this important? Healthy and deep-rooted native grasslands have demonstrated the resiliency necessary for a highly variable and potentially more extreme climate future and will be most able to support a healthy and robust ranching eco-culture throughout this century and into the next. Something recognized and supported by both the regenerative rancher (Jerry Doan) and the grassland research scientist (David Toledo).

Ranchers and Researchers agree: deep-rooted native grasslands are the best bet for robust and resilient ranching eco-culture.

Figure 4. PhenoCam at the Northern Great Plains Laboratory Tower. Source: NEON

Wetland Resiliency

During the late spring of 2023, I had the opportunity to tour the USGS Northern Prairie Research Center, near Jamestown ND, and visit with USGS Research Ecologist, Dr. Owen McKenna. His research has focused on the hydrology and geochemistry of the Prairie Pothole region of the Northern Great Plains, which spans a large portion of North Dakota.

Figure 5. Scientists survey prairie potholes in Wells County, North Dakota. Source: Owen McKenna, USGS Northern Prairie Wildlife Research Center.

In addition to designing an improved Prairie Pothole hydrologic model (McKenna et al., 2017, 2018; Knapp et al., 2023), he has used this model to estimate future impacts of climate and land-use changes on the habitat of migratory waterfowl. Earlier hydrologic models had shown rather bleak prospects for wetland maintenance under steadily warming climates with potentially less reliable precipitation. As Dr. McKenna, explained, his higher resolution hydrologic modeling, when coupled with more recent and higher resolution climate modeling, helped he and his research colleagues to develop strategies to combat extremely variable and changing climate conditions, and to preserve wetlands and migratory bird breeding habitats during extreme drought conditions (McKenna et al., 2021; Mushet et al., 2022).

Figure 6. Piping plover sitting on a nest. Source: Dustin Toy, USGS.

A Piping Plover (Charadrius melodus) sitting on a nest. Piping Plovers breeding in the northern Great Plains, listed as Threatened since 1985, have been managed as a metapopulation consisting of four separate breeding groups with assumed infrequent movements among groups.

A fairly recent and recurrent problem in the state, Highly Pathogenic Avian Influenza (HPAI) can spread from certain migratory waterfowl to both domestic poultry flocks and dairy herds (NDDA, 2024). And Gilbert et al. (2008), suggests that expected warmer and either wetter or drier conditions will likely increase this risk. During a recent meeting of the ND Agricultural Disaster Response Group, led by the NDSU Agricultural Extension Service, State Veterinarian, Dr. Ethan Andress, provided an update on the latest HPAI conditions in the state (Meeting notes, 11 Jul 2024). Dr. Andress made a point of stating that existing wetlands in the state don't pose an appreciable threat of exposure to the disease. Instead, migratory waterfowl are much more likely to settle in farm fields and pastures along their migration path where they then increase the risk of contact with local flocks and herds.

According to the NDSU Ag Extension Service (2024) and the State Veterinarian's Office (NDDA, 2024) most in-state biosecurity measures encourage poultry and bird owners to keep their flocks and herds separated from any wild birds and their droppings, and to ensure that feed and water supplies are free of contamination.

Why is this important? Though wetlands comprise only about 5 percent of North Dakota's landscape (NDGF, 2024), they provide a critical ecological buffer by holding excess water during periods of heavy precipitation and flooding, even allowing for increased aquifer recharge, while retaining water to help support beneficial plant and animal life during times of drought (McKenna, 2018).

Figure 7. Northern Shovelers in flight in the Devils Lake area. Source: North Dakota

In summary, scientists and practitioners alike recognize the importance of an educated and integrated approach to developing real climate resiliency.

In the mitigation and adaptation examples cited above, there were North Dakota-based researchers, interfacing with North Dakota ranchers and farmers, and using

North Dakota-specific climate analytics plus the most recent downscaled climate change scenarios available to investigate and address real issues of local and regional resiliency - in the face of the state's extreme climate variability and potential climate change. Recent research not only supports this collaborative approach but emphatically demands that this must occur "if the goal is to address meaningful (rangeland adaptation) science" (Wilmer et al., 2024), rather than to simply produce academic or government reports.

Figure 8. Invasive annual brome grasses filling in trail. Source: Dr. Amy Symstad, Northern Prairie Research Center

Invasion by annual brome grasses (cheatgrass and Japanese brome) on a trail across native prairie into National Park Service units in the Northern Great Plains.

Wilmer's (2024), research article titled "Resilience is Not Enough", identifies certain essential Socio-Ecological Systems (SES) concepts, which include the very concepts of risk management and vulnerability analysis we often explore as part of state, local, and tribal hazard mitigation planning. Furthermore, the Stakeholder Teams and community outreach emergency managers develop and employ throughout the hazard mitigation planning process often resemble Wilmer's equivalent adaptation research teams… or they should.

In league with Wilmer (2024), I posit that in order to best address the challenges our future climate conditions may hold for North Dakotans, we must develop and employ the applied climate research skills of our many in-state and greater NGP focused research scientists and practitioners, and to integrate them into all of our Emergency Management planning processes. For now, let's consider the state's grasslands/rangelands and her wetlands, and just a few of the current climate resiliency issues they face.

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Buzzing into the Future:

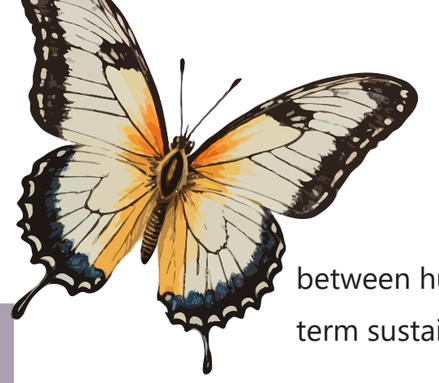
Enhancing Urban Resilience Through Nature-Based Mitigation Programs

By Katie Leitch and Carl Meyer

Nature-based mitigation is invaluable because it leverages the inherent capabilities of ecosystems to address environmental challenges. By preserving and restoring habitats such as forests, wetlands, and grasslands, we can significantly enhance biodiversity, support ecosystem services, and promote natural carbon sequestration. These ecosystems act as carbon sinks by absorbing CO2 from the atmosphere, thus playing a crucial role in mitigating climate change. Healthy ecosystems promote pollination, crucial for food production and natural pest control. Moreover, they provide essential services such as water filtration, flood control, and storm protection, which help in disaster risk reduction and improve overall environmental resilience. This not only supports wildlife but also benefits human communities by maintaining the natural balance required for sustainable living.

Purple Echinacea

Nature-based mitigation offers economic, social, and health benefits that engineered solutions often lack. Sustainable livelihoods can be supported through eco-tourism, sustainable agriculture, and fishing, which foster economic growth while maintaining ecological integrity and encouraging food sovereignty. Green spaces also contribute to mental and physical well-being, providing recreational opportunities and improving air quality. Involving local communities in these projects empowers them and strengthens their capacity to adapt to climate change impacts. The cultural and aesthetic value of natural landscapes enhances the quality of life and preserves cultural heritage. Nature-based solutions are not only cost-effective but also create a harmonious relationship



between humans and the environment, ensuring long-term sustainability and resilience.

North Dakota Game and Fish (NDGF) offers a free educational and hands-on opportunity for resiliency building through their Urban Pollinator Program (UPP). This program was created to assist educational organizations in developing and implementing pollinator gardens within elementary, middle, and high schools, special education schools, and educational clubs (ex. 4H). Each granted applicant receives a pollinator kit which includes a grade-appropriate lesson plan, a plant identification book, and information on the pollinators that depend on them. Educational materials on the native grasses, wildflowers, and weeds, with the addition of two grow trays of flowers for in the classroom (seed starting trays, flat trays, humidity domes, seeds, and soil) are also provided. Additionally, 100 plugs of wildflowers and grasses are delivered to the site of the garden, including a minimum of three grass species and six forb species all native to North Dakota. Applicants are required to have a minimum of 100 square feet for the garden and the schools will determine how the space is utilized and maintained. The requirement for the program is 1 year, but typically these gardens last much longer as participants see the benefit it brings.

This program supports nature-based mitigation implementing action alongside education. With the rapid loss of vital ecosystems and the decline in pollinator populations, native grasses are crucial for offering nectar, pollen, and nesting sites non-native species may not provide them. Many school grounds consist of large areas of asphalt, which is typically not fully conducive to the health and well-being of

students, communities, or the environment. These often-unshaded areas create hot surfaces which can be uncomfortable for students. Additionally, the loss of habitat and wildlife replaced with impermeable surfaces can lead to flooding, runoff, and other associated hazards. Native plants are typically more resilient to local climate conditions and pests, ensuring a stable and sustainable environment for pollinator populations. Bringing in a diversity of species through pollinator

Swamp Milkweed

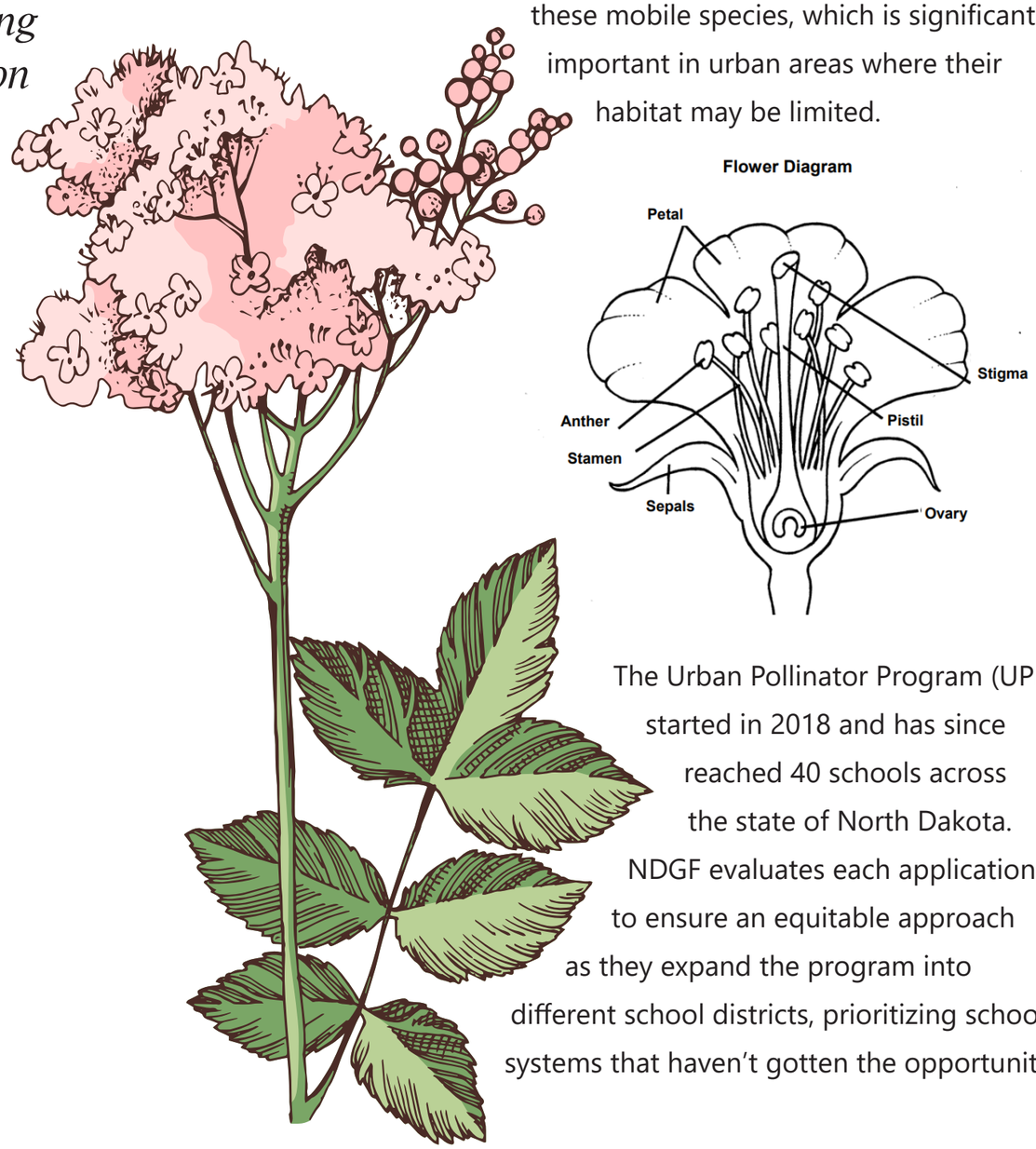
gardens acts as a natural pest control method, promotes biodiversity, can improve soil health, ensures ecosystem services, provides water management, etc.

Furthermore, North Dakota is a substantial agricultural state that has a diverse range of products, and the main dependency of crop production falls on animal pollination. "Pollinators play a vital role in biodiversity, providing services for over 80% of flowering plants. Additionally, 75% of the world's leading crops are dependent upon animal pollination" (North Dakota Game and Fish, 2019). Declining pollinator populations are detrimental to the agricultural industry and can create impacts such as decreased crop yields, loss of crop diversity, economic losses, nutritional deficiencies, impacts on livestock, and long-term sustainability. Pollinator gardens can provide patches of habitat for these mobile species, which is significantly important in urban areas where their habitat may be limited.

75% of the world's leading crops are dependent upon animal pollination.

Honey Bees. Source: Ryan Moehring, USFWS

North Dakota is the largest producer of honey in the nation.



Queen of the Prairie

The Urban Pollinator Program (UPP) started in 2018 and has since reached 40 schools across the state of North Dakota. NDGF evaluates each application to ensure an equitable approach as they expand the program into different school districts, prioritizing school systems that haven't gotten the opportunity

to participate before adding additional gardens in already participating districts. One of the goals was to bring these pocket prairies to schools that can't easily access funds to go on field trips, etc. Some of the schools interested in the program have existing space with vegetable gardens in place, but adding pollinator gardens into the mix additionally integrates and emphasizes the importance of pollinators for creating dependent food systems and health ecosystems while utilizing already existing space, states Elisha Mueller (NDGF Conservation Biologist). This program operates and is sponsored in conjunction with the Natural Resources Conservation Service's Plant Materials Center (NRCS) to grow and distribute all the plants locally.

Support is offered to teachers interested in participating in the program but want more knowledge and information. NDGF provides workshops to give interested teachers the materials and education to bring this information back into the schools. This workshop curriculum gives post educational credits to those who participate. NDGF will post on their social media (Facebook, Instagram, etc.), their website, and through news releases to outreach and connect to teachers through their curriculum staff. If you or someone you may know is interested in learning more about the application process, eligibility, the educational guide, the pollinator kit itself, or any additional information on this free program, check out the NDGF webpage at: https://gf.nd.gov/education/urban-pollinator-program.

Targeting and involving educators and students directly in the creation and maintenance of these habitats fosters resilient futures for individuals by cultivating a deep understanding and commitment to sustainable practices. Having abundant natural spaces to observe promotes early appreciation and understanding of the importance of biodiversity and conservation, ultimately contributing to the health and resilience of natural ecosystems and their communities. Being outdoors and working with plants supports children in schools directly by promoting physical and mental health improvements, cognitive development, environmental stewardship, social skills, sensory development/ enhancement, and nutritional awareness fostering growth at all ages.

Continuous Resilience Shown Through Electrical Providers: December 2023 Ice Storm

by Kate Leitch

Disasters in North Dakota are continuous, but that does not stop our communities from standing strong and remaining adaptable. Our electrical infrastructure across the state shows one example. Electricity and the components of these critical systems are the crux of our ever-moving society. Many hazards can impact our electrical infrastructure, notably, extreme winter weather. Winter weather can encompass many factors including severely damaging ice storms. Such disasters can be a detrimental experience, especially if power goes out with undeterminable restoration times. North Dakota Electric Cooperatives and the electrical sector have strengthened their resilience by hardening electrical infrastructure to withstand and mitigate impacts from hazards and risks posed upon them.

Efforts to ensure the safety and security of North Dakota citizens are always ongoing but was specifically shown during an extreme and variable weather event that occurred from December 25th to 27th, 2023, causing substantial damages. Several rounds of precipitation hit the state producing snow, rain, and freezing rain creating thick layers of ice accumulations on critical electrical infrastructure.

Line crews spent tireless hours and days working to respond nearly 5,000 downed powerlines and poles to restore power. Freeing these lines from such dense ice accumulations was time consuming for all responders bracing the cold. At least 175 electrical workers provided mutual aid during this event to ensure the safety and security of our citizens, as disasters don't follow jurisdictional boundaries.

These mutual aid efforts to support our communities were critical during the response, and even though disasters are not fully preventable, understanding and incorporating mitigation actions and preventative measures continue to help us reduce risks and work towards lessening those impacts on communities to build resiliency.

Through close collaboration with the North Dakota Department of Emergency Services (NDDES), electrical providers/partners conducted an Electrical Systems Resiliency study that was completed in 2023.

Nearly all North Dakota electric

cooperatives continue to implement mitigation activities based on need and feasibility. Impacts from emergencies and disasters, such as this one, highlight where our vulnerability exists.

North Dakota became the first state in the nation to prepare a robust evaluation of our electrical infrastructure from the emergency management perspective.

The Electrical Systems Resiliency study evaluated historical hazard data, risk mapping, network analysis, and overviews of North Dakota's most recent severe events. This study highlighted both ongoing actions and potential opportunities to address the risks that are posed on our critical infrastructure. Collaborative efforts such as these expand information sharing to put data into a larger perspective of what works and what could be improved to ensure reliability and the security of such important systems.

Continuing to root our actions through storied history, data, and collaborative learning supports resiliency. Disasters bring unique challenges and vulnerabilities, but mitigation creates opportunities for the stability of services. Electrical providers support these efforts evaluating the likelihood, hazards, and vulnerabilities of their systems to understand risks and where to implement mitigation actions that are the most effective with available resources. This study supports data-driven decision making to ensures the continued access to basic goods, communication, health, and safety across North Dakota.

Community Coffee

Seniors

New England, ND
Mott, ND
May 30, 2024

Daniel Schwartz of Nexus Planning and Consulting, and grandmother Rosie Schwartz at the Hettinger County Community Coffee. Source: Daniel Schwartz.

NDDES planners traveled to Hettinger County on May 30, 2024, and held two Community Coffees with New England and Mott seniors who shared their concerns about the hazards and threats, as well as their wisdom for mitigating their impacts.

"The thing I think about the most is the power grid. We could lose everything. I don't like being uncomfortable when it is freezing."

Local Resident

WINTER & ENERGY CONTINUITY

Winter poses the greatest threat. Seniors worry about being trapped in their homes by snow drifts and extended power outages.

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Emergency Manager Kyle DeMark pointed out that an EMP could also damage the electrical grid even if it occurs elsewhere given the interconnectivity of power systems. "We are vulnerable if we have no wood stoves or gas to power generators," he explained.

FLOODING

Riverine and overland flooding typically becomes a persistent spring problem in Mott. Cannonball River flooding has prompted property acquisitions in southwest Mott through the years. However, the levees protecting the town are under increasing strain after years of repeated flooding. Residents worry that the levee could collapse if not repaired soon.

While New England has a higher topography, overland flooding in lower elevation areas impedes access roads.

Hettinger County Community Coffee. Source: Daniel Schwartz.

SPACE WEATHER

Space weather seems like an outlier, but it managed to disrupt farming operations this spring. A New England pastor heard from farmers whose equipment became inoperable during planting operations.

Precision farm equipment such as planters and applicators that use global positioning system (GPS) navigation, would have likely experienced periods of decreased precision, as various GPS satellites were impacted, and perhaps even intermittent outages during periods of strongest geomagnetic storms.

FIRE

Urban fires pose another threat given the proximity of structures and the number of abandoned buildings. Mott has experienced several structural fires in its downtown area. It's a concern shared by New England seniors, one of whom said, "If this building (senior center) caught fire, the whole block would go up" since it would take time to mobilize the volunteer fire department.

"If this building caught fire, the whole block would go up."

Local Resident

HAZARDOUS MATERIALS

One New England resident who runs the city dump worries about illegal activity. Banned items that contain hazardous materials place wells and water tables at risk of contamination.

Seniors still remember one unfortunate incident in which an individual died in 1988 after a large anhydrous tank spill occurred in western Mott. The chemical killed area trees and vegetation.

CYBER ATTACKS

Seniors complain about the number of voice phishing calls asking them to wire money for supposed hospitalized relatives and jailed grandchildren in need of bail, prompting one pithy response from a Mott senior who told the caller to leave her granddaughter to rot in jail, knowing the child was safe. New England seniors depend on one of their own, a computer guru, to help them with cyber security.

TRANSPORTATION INCIDENTS

Low water crossings also concern seniors who told the story of how an Oklahoma couple drowned in 2022 when the Cannonball River swept their vehicle away. Another driver who lost her way during a blizzard was a few minutes from going into the river when she called the Hettinger County Sheriff's Office for help.

Acknowledgements
Thanks to Hettinger County Emergency Management, Nexus Planning, New England Senior Center, Cannonball Senior Center

NORTH DAKOTA'S JOURNEY TO RESILIENCE: STATE'S ONGOING EFFORTS IN HAZARD MITIGATION

by Todd Joersz & Carl Meyer

North Dakota is committed to enhancing resilience & preparedness through ongoing mitigation projects & comprehensive planning.

Spearheading these efforts is the State Hazard Mitigation Team (SHMT), dedicated to strengthening the state's resilience against potential hazards. The SHMT leverages federal funding from FEMA's Hazard Mitigation Assistance (HMA) grant programs, provide critical financial support that covers up to 75% of project costs. Notably, North Dakota supplements federal assistance by adding an extra 10% to HMGP grants, reducing the local share to just 15%.

PROJECT COST SHARE:

75% Federal
10% State
15% Local

FEMA's Hazard Mitigation Assistance grants:

- Building Resilient Infrastructure and Communities
- Flood Mitigation Assistance
- Hazard Mitigation Grant Program

This collaborative framework has consistently produced successful mitigation outcomes across the state.

University of Mary Slope Stabilization: Phase I has been completed, paving the way for Phase II, which stabilizes the hill housing the university and protects vital infrastructure.

ND Resilient Infrastructure Project – Fargo Pump Station Flood Mitigation: This ongoing project addresses critical gaps in flood protection near the Red River Pump Station to safeguard the water treatment plant and flood-prone areas in Fargo.

City of Fargo Wastewater Treatment Plant Flood Protection Plan: In progress, this project aims to create a permanent flood protection solution using earthen levees and floodwalls, replacing less effective temporary measures.

Hazard Mitigation Investment in N. Dakota

$313M @ **6:1 ROI** = **$1.9B**

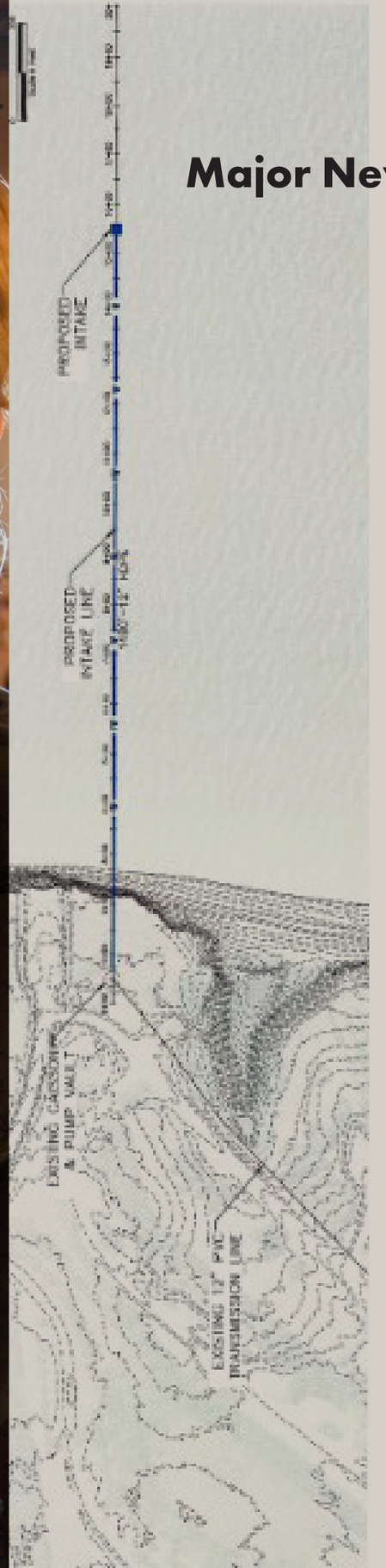
Invested in hazard mitigation in N. Dakota

Dollars saved in recovery per dollar spent in mitigation

Estimated saved in recovery in N. Dakota

Since 1997, North Dakota has invested over $313 million in hazard mitigation initiatives, yielding a remarkable 6:1 return on investment. This translates to savings exceeding $1.9 billion while enhancing safety across communities.

But the $6 figure only accounts for damages and clean up following disasters. When considering economic impact that disasters wreak across communities, that figure jumps to a staggering $13 saved per $1 spent.



Major New Initiatives

Garrison Raw Water Intake Project

Phase One of the recently awarded Garrison Raw Water Intake Project is underway, with 85% of the project's $935,000.00 being covered by HMGP (75%) and state (10%) funding. The project will replace the community's raw water intake system and install a new intake pipeline at the bottom of the Lake Sakakawea Reservoir (Missouri River). Along with the new pipeline, the project will include new pumps, upgrades to the existing caisson, a new at-grade pump house, and new controls. This new system will ensure access to water for the community and protect against lowering water levels. Phase Two of the project, which includes construction, will be awarded once the Phase One engineering and design is completed.

Major New Initiatives:

South Bismarck Flood Control Project

The recent South Bismarck Flood Control Project, funded through FEMA's Building Resilient Infrastructure and Communities (BRIC) program, aims to enhance flood protection in the area. This $78 million project, with $50 million in federal funding, focuses on improving public and critical infrastructure to mitigate flood risks. Upon completion, the project will adjust Flood Insurance Study maps, removing properties from the 100-year regulatory floodplain and potentially reducing flood insurance costs for homeowners. Phase One of the project has been awarded, with Phase Two being awarded upon Phase One completion.

Growing Resilience: Grant Funding Opportunities

The North Dakota Department of Emergency Services (NDDES) has announced grant funding availability through two HMA programs: Flood Mitigation Assistance (FMA) and Building Resilient Infrastructure and Communities (BRIC). The application period for 2024 is approaching, and interested parties are encouraged to engage actively.

As North Dakota continues its efforts in 2024, the State Hazard Mitigation Team remains dedicated to building a resilient and prepared future for all residents. Through strategic planning, community engagement, and vital infrastructure projects, the state demonstrates its commitment to safeguarding lives and property against future hazards.

For further information, please contact

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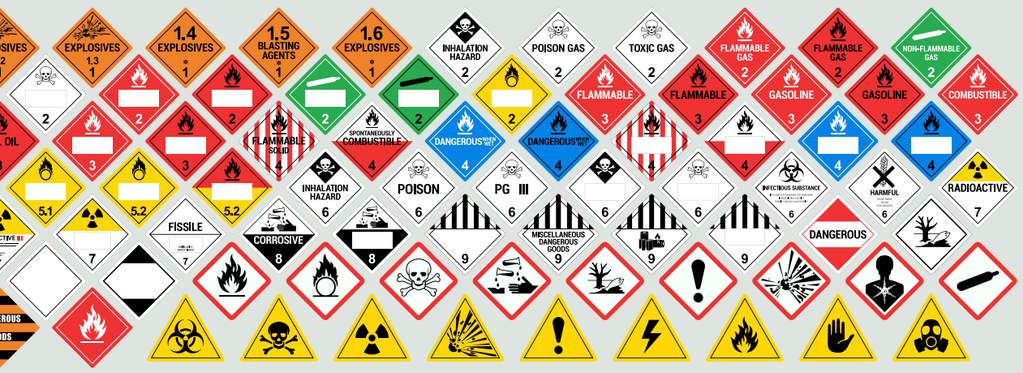
Hazard Mitigation Update

By Jeff Thompson & Randy Jacobson

Promote and enforce safe handling, storage, and disposal of hazardous materials daily.

-NORTH DAKOTA DEPARTMENT OF EMERGENCY SERVICES, HOMELAND SECURITY HAZARDOUS CHEMICALS SECTION



The Department of Homeland Security is the main contact for the Hazconnect system, a system used to report storage of hazardous chemicals in North Dakota while working side by side with industry partners to help them report and improve accuracy of information for first responders. Hazconnect also houses the state spill system, allowing us to coordinate and work with the ND Department of Environmental Quality, ND Industrial Commission, and the ND Department of Agriculture to ensure that all releases are reported and properly managed. We continue to seek additional state partners, such as the ND Department of Trust Lands, to help them gain access to information in the system that is valuable in accomplishing their mission.

The Hazardous Chemical Section conducts outreach and support for local and tribal emergency managers and fire departments. From July 1, 2023, to June 30, 2024, the Hazardous Chemical Section attended the Dunn County LEPC meeting on September 15th, 2023. The section also helped to facilitate the State Emergency Response Commission (SERC) meeting on December 6th, 2023, and gave updates on reporting and spills to the SERC which is comprised of both industry and state partners. NDDES Staff support the SERC continuously.

On March 12th, 2024, staff attended the northwest regional emergency manager meeting in Mohall to do a presentation on Hazconnect and answer questions about its usage. Later in the month, on March 19th staff was in Logan County for the local emergency planning committees (LEPC), meeting and to help get local fire departments into the Hazconnect system. On, April

18th Dickey County was assisted with questions on a new facility and gathering of information needed for the county to prepare for the size and chemicals that will be at the facility. In May, staff attended the Stark County LEPC with representatives from the Environmental Protection Agency (EPA), Region 8. Discussion was held on how the state coordinates with the EPA on releases and reviews statutes of authority assigned to the EPA. Staff also attended planning meetings and helped facilitate a tabletop exercise in Belcourt with the Turtle Mountain Band of the Chippewa Tribal Nation throughout May. Staff also assisted Divide County with the LEPC meeting and Hazconnect presentation on June 26th.

Supporting the safe handling, storage, and disposal of hazardous materials encourages local emergency managers, first responders, elected officials, and industry partners to accomplish goals while maintaining safety and building resilience. A new feature in the Hazconnect allows industry partners to view all releases for a company rather than restricting the view to the inputted spills of an individual user. This allows better management and follow-up of releases. Outreach and training will continue to be a priority as we look for new and better ways to accomplish our mission proactively. ✖

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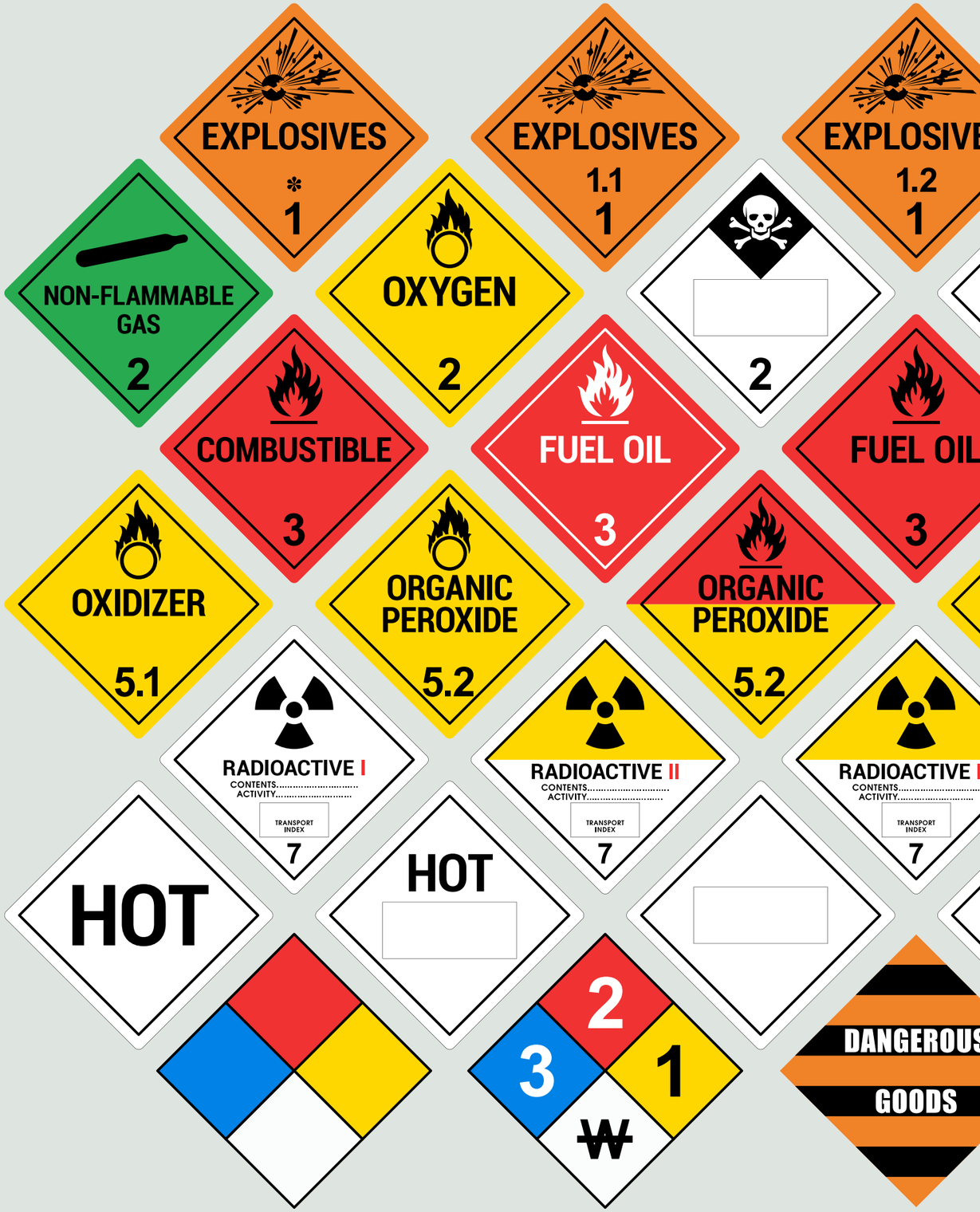


ND Watch Center & State Emergency Operations Center Ensures a Resilient North Dakota

By ND Watch Center

In keeping with its vision to provide a safe, secure, and resilient state, the North Dakota Department of Emergency Services (NDDES), Division of Homeland Security, collaborates with a broad base of public and private organizations to ensure all-hazards response readiness.

The 24/7 ND Watch Center is responsible for proactively monitoring incidents, emergencies, and events within the State of North Dakota, regionally and nationally that could require a state response and ensures operational readiness of the State Emergency Operations Center (SEOC). The center is responsible for engaging with stakeholders to provide 24/7 whole of government access to public safety and overseeing information collection, analysis, and dissemination to local, tribal, state, federal, voluntary, and private sector partners to aid in their response roles.

The ND Watch Center provides around-the-clock response coordination with its partners to ensure timely delivery of required resources and assets; compiles initial damage assessment information; evaluates information to determine the potential for state and federal declarations; and produces and distributes documents and reports useful to emergency and disaster operations.

ND Watch Center staff coordinated many responses between July 1, 2023, and June 30, 2024, including 1,019 hazardous materials incidents reported through the State's Unified Spill Reporting System (Hazconnect). NDDES staff also coordinated state response for wildland fires, hazardous materials spills,

potable water shortages, missing persons, Public Alerts, downed/ missing aircraft, train derailments, flooding, severe winter storms, tornadoes, power outages, hail, rain, and high-wind storms that produced significant property damage and threatened lives.

In addition to the December 25 – 27, 2023 Ice Storms which primarily impacted electrical infrastructure in the eastern and southeastern portions of ND; the ND Watch Center and NDDES coordinated a response to the Missouri River Ice Jam from February 28th to March 1st. On February 28, 2024, an ice jam began forming at the confluence of the Heart and Missouri Rivers between Bismarck and Mandan. Rapid rises in the level of the Missouri River threatened homes,

Above: Missouri River Ice Jam Near Fox Island Boat Ramp. Source: Staff Sgt. Samuel Kroll

Below: Missouri River Ice Jam Mission. Source: Sara Weigel Ness

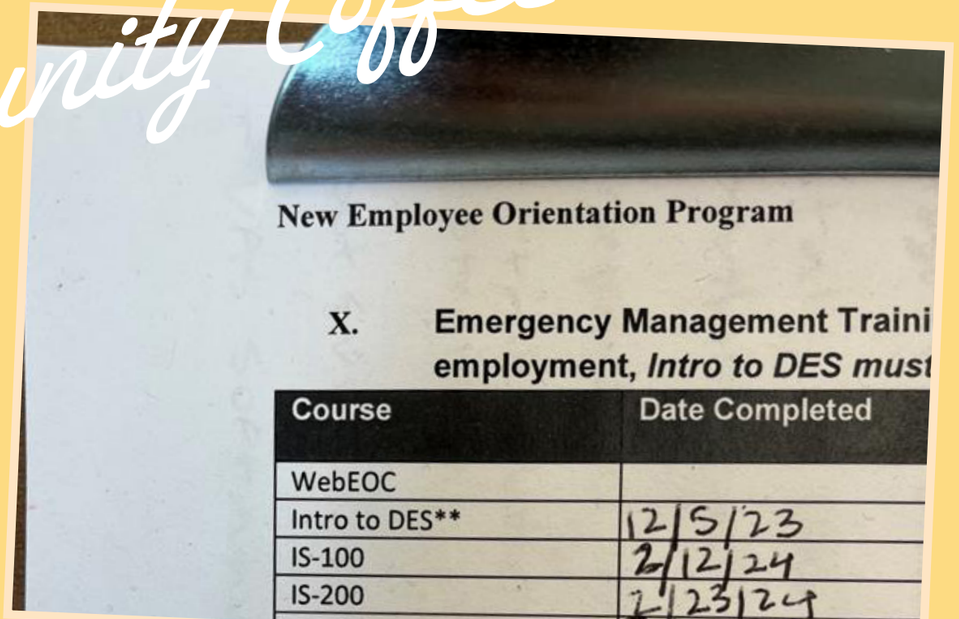
requiring a whole of government response and partial activation of the State Emergency Operations Center (SEOC). The ND National Guard used Blackhawks with Bambi buckets to drop water on the leading edge of the ice jam which eventually freed the jam and resulted in a decrease in river levels. The response took a coordinated effort that included various local, state, and federal partners including the City of Bismarck, Burleigh, and Morton County Emergency Management, the ND Department of Water Resources, ND Department of Transportation, ND Highway Patrol, ND National Guard, ND Department of Environmental Quality, ND Health and Human Services, ND State Radio, Governor's Office, National Weather Service, and the United States Army Corps of Engineers.

These two major responses required critical relationships to be built and used to address the issue at hand. Exercising relationships with technical experts such as those from NDDWR and NWS allows planners to look to the future of ice jams. Maintaining and expanding on proactive efforts to identify a matrix of potential solutions to provide just-in-time mitigation may create a sense of continuity according to the NDDWR State Engineer, John Paczkowski. Considering future environmental conditions, timeframe, cost, and long-term response actions are aspects of ice jams and other incidents that must be carefully considered. Gathering, analyzing, implementing, and distributing information requires a whole of government approach, as demonstrated by the successes of the 2024 response activities.

Community Coffee

Access & Functional Needs

FARGO, ND
June 24, 2024


New Employee Orientation Program

X. Emergency Management Traini
employment, *Intro to DES must*

Course	Date Completed
WebEOC	
Intro to DES**	12/5/23
IS-100	2/12/24
IS-200	2/23/24

Community Coffee, Fargo Public Library. Source: Alison Vetter

This community coffee was held to gather feedback on the threats and hazards from those experiencing access and functional needs. It was an open meeting with direct invites to organizations that serve various needs of the population including the food pantry, YWCA, new American and refugee resettlement, senior care, and low-income daycare.

LANGUAGE AND TRANSLATION

The first and largest theme that emerged was language and translation. When it comes to warning, how can we reach other languages more immediately? How can we prepare ourselves to reach other languages in times of crisis? Where can they find help and how do they know who to trust?

"In my daycare we have 17 different first languages... and they're not English and Spanish."

Things to Consider

New Americans present suggested building inroads with cultural groups and identify a trusted leader/ liaison within that group to aid in two-way communications

Consider having a bank of pre-translated materials ahead of upcoming seasonal threats and hazards, ie the difference between watch and warning. NOAA has some Spanish materials here.

Resources

ND has a contract (OMB #489) with NASPO ValuePoint that you can utilize for on-demand remote interpreting and document translation services.

Check out DeafLEAD for on demand ASL translation services, or utilize services through the ND School for the Deaf.

CLEAR AND DIRECT MESSAGES

“If it looks scary, it becomes scary.”

Another poignant perspective came from a representative of the YWCA, calling to mind the trauma residents have experienced in their lives, and the possibility for spiraling when receiving emergency alert messages. She encouraged plain language, concise, actionable, and ***very directive*** communications.

Community Coffee, Fargo Public Library.
Source: Alison Vetter

A research-backed alerting template:

[SOURCE]: [DESCRIPTION OF THREAT]. Those in [LOCATION] could experience [EFFECTS]. You should [TAKE THIS ACTION] by [TIME].

Thanks to the Fargo Library, Cass County Emergency Management, City of Fargo, KLJ, and NDDES

Hazard Mitigation Actions

Image: 2024 Missouri River Ice Jam, Bismarck