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The Multiple Benefits of Floodplain Easements

An Assessment of Demand for Floodplain
Easements in the Upper Mississippi River Basin

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An Assessment of Demand for Floodplain Easements in the Upper Mississippi River Basin

Description: Floodplain easements are a land-management strategy that compensates landowners for permanently conserving flood-prone land. Floodplain easements provide multiple benefits, including storage of floodwater on the land, wildlife habitat, improved water quality and more. This report reviews the unmet demand for floodplain easements in the Upper Mississippi River Basin and makes a case for annual appropriations via a new or reformed U.S. Department of Agriculture floodplain easement program.

This report updates American Rivers' 2011 report *Multiple Benefits of Floodplain Easements: An Assessment of American Recovery and Reinvestment Act Funded Emergency Watershed Protection Program Floodplain Easements in the Upper Mississippi River Basin*.

American Rivers would like to thank the Walton Family and Lumpkin Family Foundations for their generous support of this report.



PHOTO: CHRIS YOUNG

Land Acknowledgement

We respectfully acknowledge that we are working on the traditional and ancestral lands of many Indigenous People who have called this land home since the beginning, those who continue to call the area home and the Indigenous leaders yet to be born.

This report discusses land in the states of Illinois, Iowa, Minnesota, Missouri and Wisconsin. These lands include the following sovereign Indigenous nations and communities: Red Lake, Grand Portage, Bois Forte, Leech Lake, White Earth, Fond du Lac, Mille Lacs, Prairie Island, Shakopee Mdewakanton Sioux, Red Cliff, Bad River, Lac du Flambeau, Lac Courte Oreilles, St. Croix Chippewa, Potawatomi, Sokaogon Chippewa, Menominee, Stockbridge Munsee, Oneida, Ho-Chunk, and Sac and Fox.

This report focuses on agricultural disasters in the states of Illinois, Iowa, Minnesota, Missouri and Wisconsin. Maize is the primary crop grown in the region, and is the foundation of the economy in the study area. As such, we amplify the history and agricultural ingenuity of the Indigenous Peoples of the Americas for the cultivation of maize.

We acknowledge colonization’s legacy and the errors, omissions or erasures our acknowledgement may manifest.

Learn more about Indigenous territories and land acknowledgement at www.Native-Land.ca.

To the best of our knowledge, prior to colonization, this land was part of the following Indigenous nations:

- Očhéthi Šakówinj
- Quapaw
- Myaamia
- Menominee
- ᏍᏏᏉᏍᏏ ᏊᏚᏚᏉ ᏌᏉᏚᏉ ᏞᏚᏚᏚᏚᏚᏚ (Osage)
- Iowa
- Kaskaskia
- Kiikaapoi (Kickapoo)
- Peoria
- Sauk and Meskwaki
- Bodéwadmikiwen (Potawatomi)
- Waazija (Ho-Chunk/Winnebago)
- Wahpeton

Introduction

The purpose of this report is to review the need to expand access to U.S. Department of Agriculture (USDA) floodplain easements. Currently, USDA floodplain easements and flood damage-reduction investments are made through the Emergency Watershed Protection (EWP) Program, the EWP Program – Floodplain Easement Program (EWPP-FPE) and the Watershed Protection and Flood Prevention Program (WFPO) of the Natural Resources Conservation Service (NRCS).

Under the EWP and WFPO, NRCS provides disaster-recovery assistance to communities and landowners to protect infrastructure and land. The floodplain easement (EWPP-FPE) option is unique in that it funds permanent conservation easements that alleviate threats to life or property, as well as slowing runoff and preventing soil erosion. These programs are critical to landowners in the Upper Mississippi River Basin (UMRB) because flood and excess rain/moisture are the most widespread and frequent cause of crop losses in the region. Flood and excess moisture losses occur more frequently and impact more acres than drought, which is often considered the primary agricultural threat in the area.

The demand for flood assistance is very high, but these programs do not receive consistent, annual funding. Many years, Congress makes no funds available in the UMRB for flood damage-reduction projects of any kind, despite the recurring costs of

damages from flood and excess rain/moisture. The cost of damages from flood and excess rain/moisture ranks second only to drought in the UMRB, and these damages are escalating due to climate change.

The NRCS is uniquely situated to serve a critical role in reducing flood risks and flood damages in the UMRB. Floodplain easements can help landowners avoid future losses through restoration of natural conditions that can store and safely convey floodwater.

Our report reviews cause-of-loss data for flooding and excess rain/moisture, and makes a case for Congress to invest more in pre-disaster mitigation programs for farmers. In particular, we recommend reforming the EWPP-FPE to enroll acres annually. This would provide the NRCS with a better tool that uses the natural ability of floodplains to store, slow and filter waters to protect property and people, while enhancing natural resources for multiple benefits.

Easements through the NRCS can directly reduce future flood losses in the agricultural sector without requiring property acquisition. The restoration and reconnection of natural floodplains to accommodate flooding will have the added benefits of increased water quality, low-maintenance wildlife habitat and marketable recreational opportunities for landowners, tourism economies and adjacent communities.



PHOTO: ROY PLASSCHERT AND LIGHTHAWK

What are Floodplains?

Floodplains and Wetlands as Ecosystems:

Floodplains and wetlands are often indistinguishable to the layperson. However, they are different landscape features and ecosystems.

Floodplains are areas of land that become inundated with water during or following precipitation events and are adjacent to a permanent or ephemeral water body, like a river, stream, lake or pond. Floodplains are the transition zone between the aquatic and terrestrial ecosystems.

In contrast, wetlands are areas of land with hydric soils, water-loving plants and the presence of water just below or above ground level. Wetlands are a common feature in a floodplain. However, floodplains often have areas that lack the three requisite wetland features.

The Multiple Benefits of Functional Floodplains:

One of the goals of the EWPP-FPE is to restore floodplain lands to their natural, functioning condition. A “functional floodplain” is a floodplain that can perform the natural processes that produce goods and services. The four key attributes (Loos and Shader 2016) necessary for a floodplain to be functional are:

- 1. Connectivity:** The floodplain is physically accessible by water from its adjacent river or stream to allow an exchange of water, nutrients, sediment and organisms.
- 2. Variable Flow:** The connected river can produce flows with magnitudes large enough to inundate the floodplain. These flows must occur with the necessary timing, duration, magnitude and frequency to support native, local biota.
- 3. Scale:** The floodplain must have the space to accommodate inundation and the resulting habitat and landscape-forming processes.
- 4. Habitat and Structural Diversity:** The floodplain must have diverse sediment-erosion and -deposition conditions, gradients of hydrologic connectivity, ecological succession and naturally accumulated debris to generate habitat supportive of terrestrial and aquatic organisms.

Investing in functional floodplain restoration and protection projects yields significant returns. Ecologically, floodplains rank second only to estuaries in their value to society per acre. Though

PHOTO: CRYSTAL DOROTHY



they represent less than 2 percent of Earth’s terrestrial land surface, “floodplains provide approximately 25 percent of all terrestrial ecosystem service benefits” (Opperman, et al. 2010).

Ecosystem services are the multiple benefits people obtain from a healthy environment. A functional floodplain can provide an array of benefits. These benefits produce economic gains related to floodwater conveyance, erosion management, water-quality improvements, groundwater recharge, biological productivity, fish and wildlife habitat, carbon storage, and improved quality of life through associated benefits related to recreation and culture (Task Force On The Natural And Beneficial Functions Of The Floodplain 2002) (Seavy, et al. 2009) (Kusler 2016).

Flooding versus Flood Damage:

Flooding is a natural process that supports healthy river, riparian and wetland ecosystems. However, when property in flood-prone areas is developed, flooding can cause economic damages and threats to human health and safety.

In the Midwest, flooding is often characterized in two ways. Most frequently, flooding is thought of as overbank flow from a river or other water body. Flooding that is not due to overbank flow happens when the amount of precipitation or snowmelt exceeds the capacity of soil or stormwater infrastructure to absorb and/or convey the water. This second type of flood event is labeled by the USDA as “excessive moisture/precipitation/rain” or by the Federal Emergency Management Agency (FEMA) as “surface water runoff.” This type of flooding is often due to factors such as soil saturation, broken tile or stormwater infrastructure, or

other physical limitations at a site that prevent water from being conveyed to the local stream or river.

The USDA differentiates between these two types of flooding. However, in this report, we consider both events as “flooding” for several reasons:

1. In Illinois, over 90 percent of flood-damage claims were outside the mapped floodplain between 2007 and 2014 (Winters 2015). This indicates that floodplain maps, which outline areas where overbank flow is likely to occur, only represent a fraction of the actual flood-prone land.
2. Climate change is driving significant and rapid changes in the areas subject to flooding due to both overbank flow and excess rain. A report for FEMA’s National Flood Insurance Program (NFIP) found that land areas subject to the one percent annual chance of an exceedance flood event will expand an average of 45 percent across the nation. In the UMRB states, this expansion of floodplain land will be even more pronounced, with land areas in parts of these states expected to double in size by 2100 under the most likely climate-change scenarios (Crowell, Rhodes and Divoky 2013).
3. Restricting the definition of flooding can result in projects that do not address the full range of flood scenarios. Failure to consider all of the flood “types” that can occur at a site (i.e. overbank versus ponding) will inevitably fail to provide the best outcomes for people suffering from the economic and health consequences of flooding (see example).

Example: Yazoo Pumps, a costly pumping project that was proposed along the Mississippi River, was vetoed under the Clean Water Act. If the project had moved forward, it would have only provided very limited and delayed relief during “backwater” flood events and would have been ineffective during “headwater” flood events. The failure of land and water managers to consider solutions that would address both types of flood events drives wasteful investments that do not address the full range of needs in the community.

4. Awareness of the consequences of limiting the definition of “flooding” has led FEMA to reform the NFIP rating system. NFIP rates will no longer be based on whether a property is in or out of the mapped floodplain (though mortgages will still require flood insurance if the structure is inside the

mapped floodplain). As of 2022, rates will be based on other factors, like how close a property is to a source of overbank flooding and flood history data (FEMA 2022).

5. Many counties that report frequent flood losses also report frequent excessive rain/moisture losses. For a recent report by the Environmental Working Group, crop insurance “hot spots” were mapped throughout the Mississippi River Critical Conservation Area. Results show that many counties that report frequent losses due to “flood” are also reporting losses due to “excess moisture” (Schechinger 2022).
6. The landscape has been so significantly modified in the UMRB that it is hard to say where rivers and streams were located prior to cultivation or development (see Table 1). As such, an area may no longer appear to be an actual river, but may still be a low point that conveys water during rain events. Many floodplains along small water bodies that have long since been drained will still convey water during flood events.

TABLE 1: Protected Natural Areas as a Percent of Land.
The vast majority of land in the UMRB states has been modified for agriculture and/or urban development
 (Natureserve 2022).

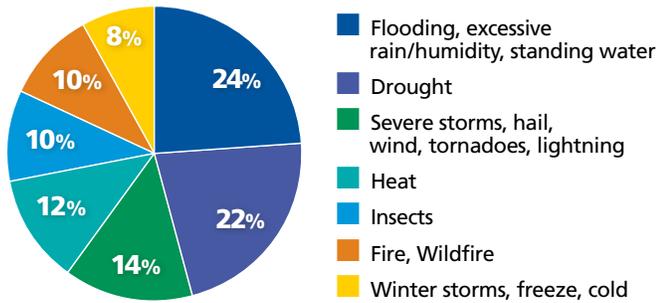
Illinois	2.20 %
Iowa	1.46 %
Minnesota	10.34 %
Missouri	6.28 %
Wisconsin	9.90 %

Because of these reasons, it is difficult to understand whether any type of flood event is truly an “overbank” event, due to shortcomings of natural and/or human-made drainage infrastructure or some combination of both. As such, for the purposes of this report, we review the information and data about flooding in all of its manifestations in order to better understand how precipitation with climate change is impacting farmers and the agricultural economy

Floodplain & Wetland Easements as Risk Reduction Tools:

In the agricultural landscape, both floodplains and wetlands can be subject to extreme and recurring inundation to the extent that such land cannot be productive. Easements offer landowners a means to take marginal, flood-prone land out of production and conserve it in a more natural state. Under

FIGURE 1: Flooding is the most frequent and widespread agricultural disaster in the Midwest. Twenty four percent of all county-level disasters declared by the USDA between 2012 and 2021 included flood or excessive water damages (USDA Farm Service Agency 2022).



where funds are released during a presidentially declared disaster, pursuant to the Stafford Act.

In the UMRB, EWPP-FPE funds have only been available to farmers in the fiscal years 2009 and 2019. By comparison, the Secretary of Agriculture has declared agricultural disasters due to flooding and excess rain/moisture in UMRB counties 2,512 times between 2012 and 2021 (see Figure 1). Over this 10-year period, these flood events have impacted a cumulative 62 million acres and have cost farmers and taxpayers over \$8 billion (consumer price index (CPI)-adjusted using U.S. Bureau of Labor Statistics CPI Inflation Calculator to reflect buying power as of February 2022).

NRCS conservation programs, wetlands are eligible for the Wetland Reserve Easements, and other frequently inundated land that does not meet the three wetland criteria are eligible for EWPP-FPE.

When an easement is purchased by the USDA Natural Resources Conservation Service, landowners still retain ownership rights and rights of use. However, certain uses are limited through the duration of the easement. Both wetland and floodplain easements are subject to restoration projects to rehabilitate lost ecosystem functionality and habitat that are compatible with each site.

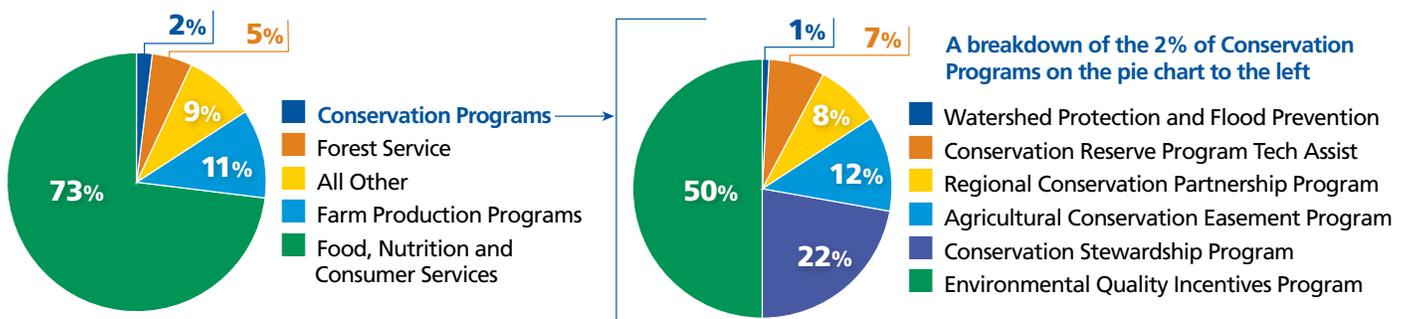
Despite their similar role in restoring marginal flood-prone land, federal funds for wetland and floodplain easement programs are appropriated differently. The Wetland Reserve Program receives annual appropriations to allow the USDA to enroll acres into easements yearly. However, EWPP-FPEs are only funded through supplemental disaster appropriations. Floodplain easements are only offered by the NRCS when and

USDA Floodplain Investments:

USDA natural resource conservation programs make investments that “reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters” (USDA n.d.). Conservation programs and easements are a miniscule portion of the USDA budget.

In fiscal year 2022, the USDA received \$198 billion to administer its farm- and food-related authorities. The conservation programs received \$5 billion, or just 2 percent of the total USDA budget. Of that \$5 billion, only \$225 million was put towards the NRCS’s primary flood-management programs, though none of this funding will be used to enroll floodplain easements in the UMRB. Between 2002 and 2020, conservation programs received over \$74 billion, and of that amount, only \$3.4 billion (or 4.5 percent) was put into the EWPP. Among other activities, these funds allowed NRCS to enroll 482,678 floodplain acres into the EWPP-FPE, or roughly 0.06 percent of the conservation acres that were administered by the NRCS (USDA 2020).

FIGURE 2: USDA fiscal year 2022 budget (left) and the conservation programs budget on the right (USDA 2022).



Key Findings

We found that there is a substantial unmet demand for investing in floodplain easements in the UMRB. Floodplain easements funded through the EWP Program are markedly underutilized, and there is significant need to enroll more acres to reduce flood damages. Floodplain easements have many benefits, ranging from protecting people from the impacts of climate change to promoting resilient economies. These reasons illustrate the need for a floodplain-specific easement-reserve program that is open to annual enrollment to enhance the NRCS agricultural conservation programs.

Need to protect people and the economy from climate change impacts

According to FEMA, flooding is the most frequent severe-weather threat and the costliest natural disaster facing the nation. Ninety percent of all natural disasters in the United States involve flooding (FEMA 2017). Across the nation, flooding has caused \$59.2 billion (CPI-adjusted) in damages over the last decade (NOAA National Centers for Environmental Information 2022). Over that same period, farmers enrolled in the Federal Crop Insurance Program (FCIP) reported \$29 billion in damages (CPI-adjusted) caused by floods and excess moisture, with the UMRB states representing 34 percent of those damages

(USDA Risk Management Agency 2022). The cost of flooding impacts on the nation and in the UMRB is rising as precipitation increases, and damages are expected to continue to escalate as climate-change impacts intensify (see Figures 4-6, page 9).

In addition to the fact that flood-related crop damages are the most frequent and widespread cause of agricultural disasters, most of those damages have been subsidized through public funding, with UMRB states as top recipients (see Table 2). Unfortunately, these damages are entirely predictable. In Iowa alone, a recent study found that farmers have 450,000 acres of crops in the “two-year floodplain,” meaning there is a 50 percent chance of crop damage due to flooding every year (Yildirim and Demir 2022). The combined effects of planting crops in frequently flooded areas and worsening flooding due to climate change are causing an overall increase in the number of acres flooded and disaster-aid spending that far outpaces producer-paid premiums.

But despite the significant and escalating amount of flood damage to crops on a regular basis, the EWPP and WFPO are only sporadically funded in the UMRB. Between 2011 and 2020, the USDA only invested \$267 million (CPI-adjusted) into these two flood damage-reduction programs in the UMRB, while agricultural flood and excess rain/moisture damages exceeded \$8 billion (CPI-adjusted) (see Tables 3 and 4, pages 10 and 11).

TABLE 2: The UMRB sees more damages from flooding and excess rain/moisture than most other states for farmers enrolled in the Federal Crop Insurance program (USDA Risk Management Agency 2022).

10-Year Total Acres Damaged by Flood and Excess Rain/Moisture (millions of acres).		10-Year Total Flood & Excess Rain/Moisture Damage Subsidies (Indemnities minus Producer Paid Premium). Adjusted for Inflation.	
1. North Dakota	16.6	1. North Dakota	\$2.8 Billion
2. Minnesota	16.2	2. Minnesota	\$2.5 Billion
3. Illinois	16.6	3. South Dakota	\$1.7 Billion
4. Missouri	13.8	4. Iowa	\$1.7 Billion
5. Iowa	12.2	5. Missouri	\$1.5 Billion
...		6. Illinois	\$1.5 Billion
15. Wisconsin	4.1	14. Wisconsin	\$688 Million

FIGURE 4: UMRB annual precipitation anomalies (inches of rain above or below the annual average rainfall of 32.62 inches) (NOAA National Centers for Environmental Information 2022).

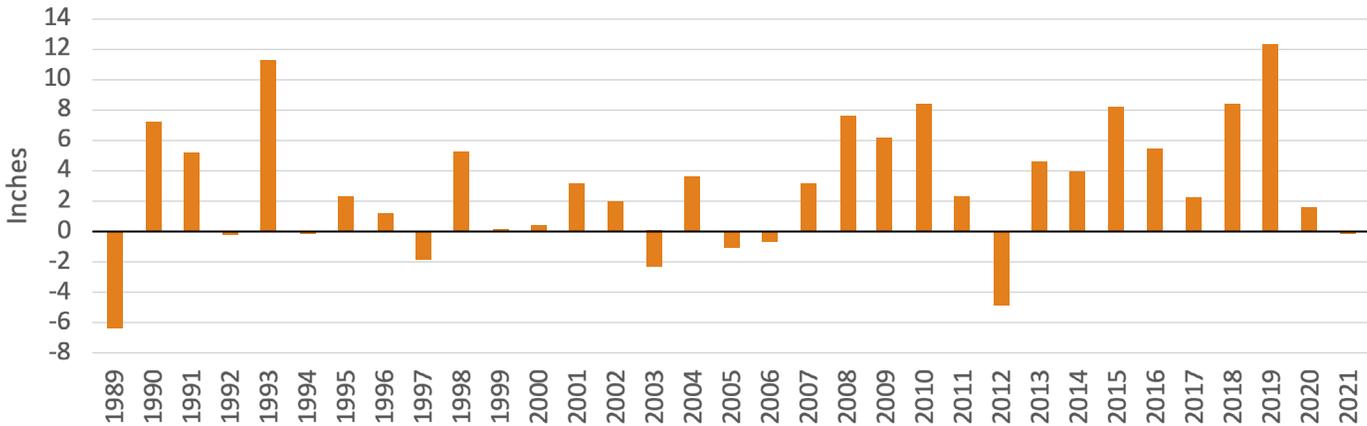


FIGURE 5: The number of acres damaged in the UMRB due to “flood” and “excess rain/moisture” as a percent of total acres planted under the FCIP. The steady upward trend indicates that the increase in flooded and wet acres is not due to the overall increase in acreage enrolled in the FCIP. While the number of farmers enrolling more planted acres in the program has generally increased, flood and excess moisture damages are escalating due to other factors (USDA Risk Management Agency 2022).

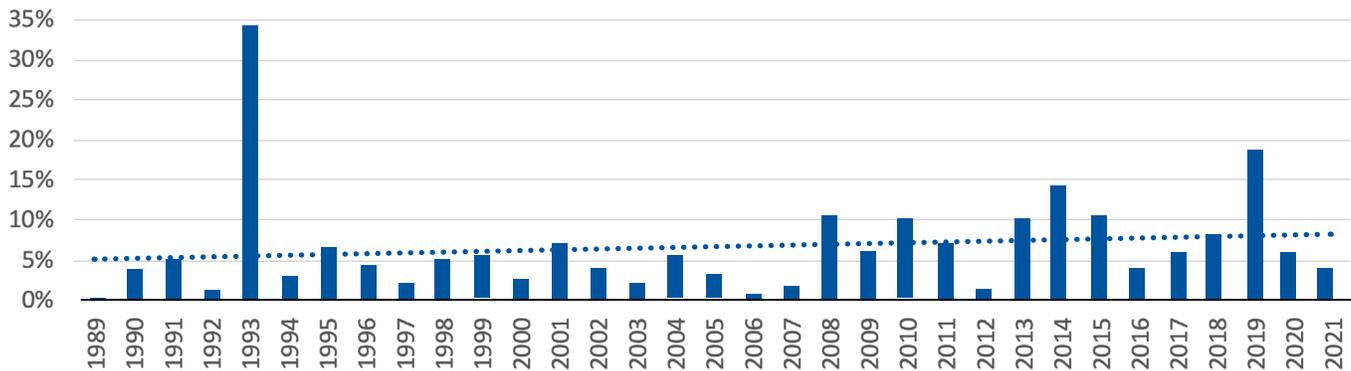


FIGURE 6: Average subsidy per acre planted under the FCIP for flood and excess rain damages in the UMRB. Adjusted for inflation. Subsidy is calculated by subtracting total indemnities from producer-paid premiums. This shows that the public is paying substantially more in disaster aid to farmers than in previous years, as flood and wet-weather events are becoming more frequent (USDA Risk Management Agency 2022).

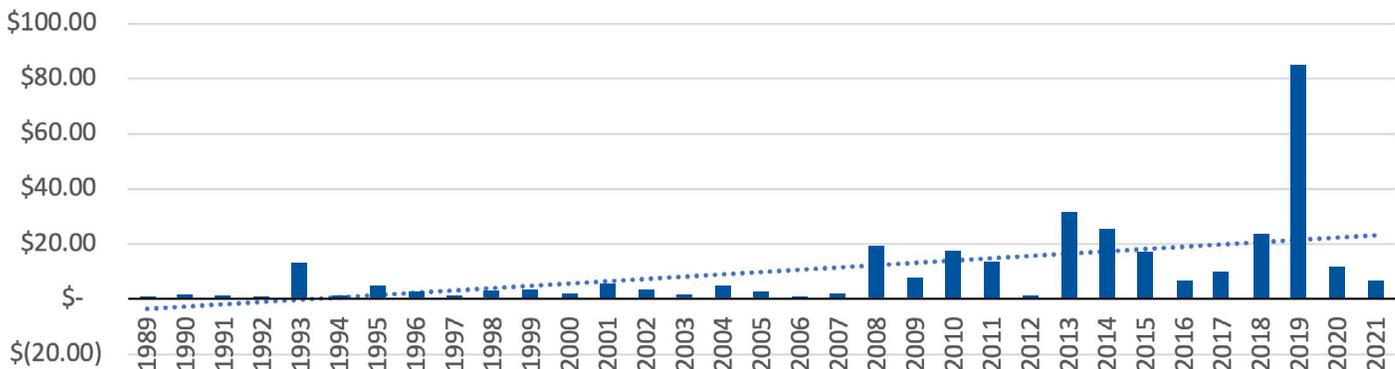


TABLE 3: NRCS Watershed Protection and Flood Prevention program (WFPO), Emergency Watershed Protection program (EWP), total obligations, and percent of budget spent of flood mitigation by fiscal year. Includes technical and financial assistance and reimbursable fund types. In thousands of dollars. Not adjusted for inflation. Source: NRCS Soil and Water Resources Conservation Act data.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Illinois																
WFPO	\$1,333	\$3,465	\$75	\$1,702	\$753	\$1,000	\$0	—	—	—	—	—	—	—	—	—
EWP	\$(90)	\$61	—	\$172	\$3,692	\$4,247	—	—	\$15	—	\$5	\$148	\$(1)	\$275	\$61	\$7,380
Total	\$70,183	\$60,060	\$59,562	\$61,133	\$59,507	\$74,776	\$73,700	\$77,710	\$74,571	\$73,749	\$81,294	\$84,453	\$96,715	\$89,162	\$93,740	\$151,581
% spent on Flood Prevention	2%	6%	0%	3%	7%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%
Iowa																
WFPO	\$8,911	\$8,592	\$1,272	\$2,258	\$3,312	\$3,888	\$941	\$221	\$40	—	—	\$10	\$17	\$9	—	\$806
EWP	\$1	\$171	\$77	\$3,908	\$38,261	\$50,829	\$2,365	\$(287)	\$315	\$(3)	\$526	\$15	—	\$102	\$27	\$17,514
Total	\$110,314	\$102,484	\$104,731	\$114,701	\$142,235	\$170,796	\$159,225	\$151,861	\$148,678	\$137,725	\$114,010	\$115,370	\$126,696	\$127,296	\$147,905	\$169,856
% spent on Flood Prevention	8%	9%	1%	5%	29%	32%	2%	0%	0%	0%	0%	0%	0%	0%	0%	11%
Minnesota																
WFPO	\$877	\$209	\$198	\$195	\$610	\$396	\$1,062	\$517	\$33	\$(1)	—	—	—	—	—	\$1
EWP	\$389	—	\$846	\$832	\$1,722	\$525	\$142	\$694	\$103	\$610	\$5	\$197	\$36	—	—	\$106
Total	\$85,017	\$81,298	\$75,642	\$98,013	\$104,237	\$108,793	\$137,163	\$152,579	\$143,025	\$36,082	\$135,638	\$148,213	\$136,541	\$144,629	\$122,571	\$232,369
% spent on Flood Prevention	1%	0%	1%	1%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Missouri																
WFPO	\$9,816	\$11,327	\$5,568	\$4,264	\$2,424	\$5,527	\$357	\$4	\$5,116	\$14	\$5,593	\$5,692	\$5,603	\$25,739	\$5,119	\$17,317
EWP	\$138	\$(2)	\$148	\$4,045	\$44,806	\$25,561	\$7,061	\$31,720	\$7,271	\$660	\$1,439	\$9,284	\$959	\$22,086	\$2,773	\$36,503
Total	\$96,937	\$93,864	\$112,228	\$102,681	\$136,106	\$162,698	\$143,523	\$165,342	\$141,521	\$117,906	\$108,586	\$116,796	\$128,767	\$174,145	\$157,017	\$199,265
% spent on Flood Prevention	10%	12%	5%	8%	35%	19%	5%	19%	9%	1%	6%	13%	5%	27%	5%	27%
Wisconsin																
WFPO	\$376	\$113	\$23	\$(2)	—	—	—	—	—	—	—	—	—	—	—	\$1,987
EWP	\$57	\$23	\$243	\$891	\$22,414	\$5,408	\$243	\$6	\$1,559	\$69	\$289	\$83	\$23	\$156	\$286	\$636
Total	\$66,794	\$53,081	\$50,682	\$63,019	\$98,099	\$76,546	\$69,915	\$78,239	\$83,424	\$72,904	\$73,946	\$70,969	\$84,895	\$94,127	\$113,768	\$134,253
% spent on Flood Prevention	1%	0%	1%	1%	23%	7%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%

TABLE 4: Flooding or excess rain/moisture has been among the most expensive causes of loss each year in the UMRB.

*Adjusted for inflation. (USDA Risk Management Agency 2022)

Cause of Loss	Total Indemnities (millions of dollars)*	Subsidy (Indemnity minus Producer Paid Premium) (millions of dollars)*	Acres Impacted (millions of acres)
10-Year Total: Flood/Excess Rain	\$ 8,285.6	\$ 6,933.9	61.6
10-Year Total: Drought	\$ 9,978.8	\$ 8,967.9	50.6
2021			
1. Drought	\$ 553.9	\$ 467.6	4.1
2. Flood/Excess Rain	\$ 300.7	\$ 171.6	2.2
3. Severe Storms	\$ 50.4	\$ 36.6	0.3
2020			
1. Severe Storms	\$ 443.4	\$ 377.8	2.0
2. Flood/Excess Rain	\$ 404.9	\$ 326.7	4.4
3. Drought	\$ 320.7	\$ 264.3	3.7
2019			
1. Flood/Excess Rain	\$ 2,117.3	\$ 1,854	14.1
2. Cold/Freeze	\$ 213.5	\$ 193.9	1.1
3. Severe Storms	\$ 69.6	\$ 61.5	0.6
2018			
1. Flood/Excess Rain	\$ 620.5	\$ 519.5	6.3
2. Drought	\$ 292.9	\$ 245.5	2.7
3. Revenue Losses	\$ 137.6	\$ 91.5	2.8
2017			
1. Flood/Excess Rain	\$ 330.6	\$ 219.2	4.4
2. Drought	\$ 225.0	\$ 184.5	2.2
3. Severe Storms	\$ 61.0	\$ 50.4	0.6
2016			
1. Flood/Excess Rain	\$ 257.2	\$ 192.9	2.9
2. Severe Storms	\$ 47.1	\$ 39.3	0.4
3. Revenue Losses	\$ 23.4	\$ 14.1	0.4
2015			
1. Flood/Excess Rain	\$ 1,077.7	\$ 927.3	7.9
2. Revenue Losses	\$ 88.3	\$ 57.4	1.4
3. Cold/Freeze	\$ 46.6	\$ 39.4	0.3
2014			
1. Flood/Excess Rain	\$ 1,472.6	\$ 1,273.4	10.7
2. Revenue Losses	\$ 1,426.3	\$ 1,141.3	15.3
3. Cold/Freeze	\$ 229.2	\$ 197.2	1.7
2013			
1. Drought	\$ 1,859.3	\$ 1,594.0	12.1
2. Flood/Excess Rain	\$ 1,600.8	\$ 1,412.4	7.6
3. Revenue Losses	\$ 1,272.0	\$ 979.8	11.3
2012			
1. Drought	\$ 6,473.0	\$ 5,999.2	23.5
2. Revenue Losses	\$ 611.2	\$ 548.5	1.5
3. Heat/Excess Sun	\$ 234.6	\$ 214.6	0.9
4. Flood/Excess Rain	\$ 74.9	\$ 36.3	1.1

Need to promote resilient local economies:

Once established, natural floodplains provide many economic benefits, including a reduction in post-disaster spending, higher property-tax revenues and increased investment from businesses. Many economic benefits are derived simply from the desire of people to live and work in areas that are rich in natural resources, have beautiful landscapes and offer easy access to outdoor spaces for recreation. While these outcomes may seem aesthetic and unessential, they have proven and real economic benefits that can bring substantial amounts of jobs and revenue to local communities (Parsons, et al. 2020). As such, conservation easements enhance community resources and have many economic benefits for local communities. By providing payment to local landowners, floodplain easements can address one of the factors limiting the extent and services of natural floodplains.

Case Studies:

- A study of the La Grange Reach of the Illinois River evaluated the feasibility of naturalizing large areas of the floodplain. The study found that restoring connectivity to as little as 14 percent of the floodplain along the La Grange Reach of the Illinois River could provide 100-year flood protection to an additional 44 percent of the floodplain, thereby reducing flood damages in downstream communities. However, the study reported that the local economic impact of converting agriculture to floodplain was a key obstacle to restoring floodwater storage in floodplain areas (Sparks and Braden 2007).
- The Wetlands Initiative has estimated that restoring 3 million acres of wetlands and floodplains that were converted to agriculture in the UMRB could store more than 40 million acre-feet of floodwater while providing habitat for wildlife and reducing flood damages downstream (Hey, et al. 2004).
- A study in Waterbury, Vermont, found that a proposed floodplain restoration project would reduce annual building damages from flooding by approximately 20 percent (Schiff, et al. 2015).
- In Napa County, California, the Napa River Food Protection Program has invested \$550 million to protect and restore over 1,000 acres of wetland and riparian habitats, reducing property damage by \$1 billion over the life of the project (Kershner and Gregg 2021).

Need to increase conservation opportunities in floodplains:

Floodplain easements expand the effectiveness of NRCS conservation programs by “filling in the gaps” between existing conservation areas. Floodplain acres cannot compete within the Conservation and Wetland Reserve Easement Programs because current program guidelines discourage restoration investments that are at risk of being damaged by flooding.

While the EWPP-FPE can purchase easements on land that is largely ineligible for other conservation programs, the EWPP is a post-disaster recovery program. Congress only releases easement funds in the wake of disaster declarations under the Stafford Act, which so narrowly defines what constitutes a disaster that it severely limits the ability of farmers to set aside unproductive, flood-prone land. Since the EWPP-FPE was established, it has only been open for enrollment twice in the UMRB, despite the annual occurrence of agricultural disasters due to flooding (USDA Farm Service Agency 2022). Both times the EWPP-FPE was open for enrollment, the NRCS was able to combine the floodplain easements with adjacent land that did qualify for wetland easements to create large contiguous conservation areas that restored critical riparian habitat.

Example: In Illinois, farmers in Alexander County lost their levee along the Mississippi River during flooding that occurred in 2015-16. EWPP-FPE funds were not released until the 2019 Flood, forcing farmers to wait in limbo for years on land that could not be accessed or farmed. These farmers also could not compete for funding under the Conservation and Wetland Reserve Easement Programs.



PHOTO: OLIVIA DOROTHY

Farmers in the UMRB need more investments and opportunities for pre-disaster hazard mitigation, especially as climate change is driving an expansion in land areas prone to recurring flood damages (Crowell, Rhodes and Divoky 2013). Acres that may not have flooded in the past will be susceptible to frequent flooding now and in the future. Reforming the EWPP-FPE to receive annual appropriations for enrollment would give farmers more options.

Need to increase flood water storage:

As discussed, the UMRB has seen an increase in spring rainfall over the past 30 years. Experts anticipate further increases in rainfall, with swift transitions from flood to drought conditions (USGCRP 2018).

Floodplain easements have the potential to provide significant flood storage. Floodplains provide space for floodwaters to safely spread out, slowing in velocity and reducing flood peaks, and enhancing the effectiveness of flood risk-management structures that protect people and property. Healthy, ecologically functional floodplains have the capacity to hold tremendous quantities of water.

Wetlands, an ecosystem feature commonly found in floodplains, can store 1 to 1.5 million gallons of floodwater per acre (USEPA 2001). Floodplains are also recharge zones for aquifers, which means that during flood events, they allow water to infiltrate into groundwater reservoirs (Maples, Fogg and Maxwell 2019). This function is important to lower flood stages and store water in the underground aquifer system, where it can be tapped during future periods of drought.

Need to reduce nitrogen and phosphorus in the Mississippi River:

Excess nitrogen and phosphorus loading in the Mississippi River causes toxic algal blooms in local water bodies and the Gulf of Mexico. Phosphorus and nitrogen pollution can also contaminate drinking water and devastate aquatic ecosystems. But despite the establishment of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force in 2008, the region is not reaching its pollution-reduction goals (USEPA 2021).

Floodplain restoration is an effective downstream nutrient-removal tool. Studies show that floodplain restoration may be more effective than wetlands, and other best management practices, in removing nitrogen, and can also remove both

nitrogen and phosphorus from the water column (Gordon, Dorothy and Lenhart 2020). Enrolling more acres into floodplain easements will help reduce nutrient pollution loads in the Mississippi River and Gulf of Mexico.

Need to prevent extinction of species:

We are in the midst of a massive extinction event, with the rate of species extinction at 1,000 times the background rate (Pimm, et al. 2014). In response, President Biden committed to conserve 30 percent of the nation's land and water resources by 2030 in order to mitigate and adapt to climate change and protect biodiversity (Biden 2021). The UMRB states have an important role in land and water conservation because they are part of the Mississippi River corridor, which supports 780 species of wildlife—38 percent of all animal species in North America (Mississippi River Network n.d.).

Freshwater species are the most at-risk species per unit area on earth (Wilson 2016). The main causes of freshwater species extinction are habitat loss/degradation, water pollution and over-exploitation. Degradation of aquatic habits is the most common of these drivers, and is caused by agriculture, urbanization, infrastructure (dams and levees) and logging (Collen, et al. 2017). All medium to large U.S. rivers, including the Mississippi, Missouri, Ohio and Illinois Rivers, rank in the highest categories of concentrations of imperiled biodiversity in the nation (Hamilton, et al. 2021) (FAO 2020).

Functional floodplains are essential habitats for freshwater species because they are highly dynamic and productive (Kusler 2016). Floodplain easements would help the U.S. meet not only its goals to adapt to climate change that are discussed elsewhere in this report, but also its goals to conserve land and water resources to protect biodiversity.

Need to expand use of permanent easements:

Permanent easements, such as the EWPP-Floodplain Easement Program, increase the overall efficiency of the program because by doing so it allows for the minimization of a long-term federal role and provides the greatest benefits to the watershed and the communities living downstream. As these floodplains are repeatedly flooded in the future, post-disaster spending will be reduced, and the floodplains will establish high-quality habitat for wildlife and provide other human and environmental benefits.

Need to meet demand for floodplain easements in the UMRB:

Not only will the expanded use of floodplain easement provide many economic and environmental benefits, but farmers also want the program. Throughout the UMRB, an unmet demand exists for funding to invest in floodplain easements.

Since the EWP Program was established, NRCS in the UMRB has received 2,210 applications, but less than 10 percent of total applications and 16 percent of flood prone acres have been enrolled. Clearly, many farmers are interested in putting marginal, flood-prone acres into permanent easements. Expanding and reforming the EWPP-FPE Program to enroll acres annually would help meet this demand.

State	Total Applicants	Total Offered Acres	Awarded Applicants	Awarded Acres
IA	1,127	115,635	76	9,101
IL	362	10,829	30	4,685
MN	44	3,376	7	4,846
MO	325	45,010	45	6,717
WI	352	24,193	54	6,365
UMRB Total	2,210	199,043	212	31,714

* Data provided by NRCS from each state.

Discussion

Expanding the use of floodplain easements would address the above identified needs in the UMRB. The program is underutilized and there is a demand to enroll flood-prone acres into easement programs. Floodplain easements have many benefits that range from protecting people from flood damages to promoting economic wealth.

Family farmers are some of the best land conservationists, but they have very few to zero resources to properly conserve floodplain land in a way that maximizes benefits for society. Floodplains ecosystems are among the most important ecosystems in the world and more floodplain restoration is needed to address the converging threats of climate change and the extinction crisis.

But there are few, if any, resources for farmers to conserve floodplains, which keeps farmers stuck in an endless cycle of planting on flood-prone lands at the expense of federal and state taxpayers. And it is getting worse as climate change causes more extreme flood and precipitation events in the UMRB region.

By promoting restoration of floodplains in recognition of their critical infrastructure services, federal agencies can play a huge

role in reducing risk to communities through restoring the natural floodplain condition, functions, and value, which in turn will improve water quality and wildlife habitat, among other benefits.

Expenditures on floodplain easements in agricultural areas can directly reduce flood damages incurred in that sector by reducing risky practices in flood prone areas. The Upper Mississippi River Basin holds a significant opportunity to retire sensitive agricultural lands subject to frequent flooding and flood damages. Through the conservation and restoration of floodplains, NRCS can expand the definition of “working lands” and play a significant role in providing flood protection to communities downstream.

Whatever the accounting method, there is little dispute that hazard mitigation through floodplain restoration and removal of structures in high-risk areas is the most economically efficient and guaranteed form of flood damage reduction. Indeed, every \$1 spent on flood mitigation yields a return of \$5 to \$8 in avoided losses (Multi-Hazard Mitigation Council 2019). As such, floodplain easements are a highly efficient, “bright green” flood damage reduction strategy.

Key Recommendations

Given the multiple benefits of investing in floodplain easements and the substantial unmet demand in the UMRB, we make seven key recommendations that will provide guidance on how to continue investments in floodplain easements to increase flood storage, reduce flood damages, and provide multiple beneficial services to communities and wildlife in the region.

1. Congress should fund flood damage-reduction and floodplain easements annually.

These data illustrate that the UMRB states have both a need for flood-damage reduction and a sufficient number of willing landowners to enter into voluntary easements that exceeds the current disaster declaration-dependent funding structure for floodplain easements. These findings merit the establishment of a permanent, open-enrollment program that annually invests in the increased coverage of floodplain easements to benefit agricultural producers, increase resiliency to floods, increase safety of downstream communities and reduce taxpayer burden for repetitive damages.

2. The NRCS should establish and implement a tracking system for floodplain easements. This tracking system would document flood levels and damage reductions; ensure establishment of a resilient, flood-adapted natural community; and provide landowner guidance for managing easement lands for floods as well as other compatible uses. The existing Conservation Effects Assessment Project (CEAP) offers one important opportunity to conduct an evaluation of floodplain easements. This effort would be particularly useful as a component of an intergovernmental initiative to inventory and track data related to the protection and restoration of functional floodplains.

3. The NRCS and USDA should collaborate with universities, the U.S. Geological Survey and independent experts on economic research that evaluates the total ecosystem services associated with retiring cropland within the areas of land that have a 1 percent annual chance of flooding (100-year flood zone). This research should include evaluation of alternative funding sources for floodplain easements based on their provision of marketable ecosystem services. Transactions for watershed services and water-quality trading in the U.S. from roughly 1992 through 2008 amounted to \$9.75 billion (Stanton, et al. 2010).

4. Congress should remove the land-tenure requirements that generate unnecessary paperwork for landowners and NRCS staff. Requiring property owners to prove, and the NRCS to verify, that a particular owner has held a piece of property for more than seven years adds an illogical eligibility barrier and creates another layer of paperwork for all parties. The requirement for property owners to have held a property for seven years prior to the installation of a conservation measure or easement ignores the increasing frequency of severe floods and the rising recurrence of flood damages in agricultural areas. Properties incur damages regardless of owner or date of purchase.

5. The USDA should work with FEMA and the U.S. Army Corps of Engineers (USACE) to track properties with recurring claims due to flooding, and prioritize those properties for enrollment. In 2012, when the UMRB was experiencing the most extreme drought event ever, flood and excess rain/moisture was still reported on 1.1 million acres (USDA Risk Management Agency 2022). The USDA needs to track where flood and excess rain/moisture damages are being reported within the FCIP, and through programs administered by FEMA and the USACE. This would identify properties that are at the most at risk of flooding, and help prioritize investments.

6. The USDA should identify and make recommendations to farmers with flood-prone properties on flood-compatible farming practices that avoid repetitive losses. As flooding becomes more frequent in the UMRB, the USDA needs to develop recommendations to help farmers reduce losses during flood events. These recommendations could include flood-compatible recreational uses like hunting and fishing, crop modifications that are flood-tolerant, and alternative land uses like grazing. These recommendations need to be developed across all programs to prevent losses on acres in production, husbandry and conservation.



PHOTO: ROY PLASSCHEART AND LIGHTHAWK

7. The NRCS should develop science-based guidance for state engineers regarding partial versus full removal of levees on properties with easements. Several UMRB states have reported that a portion of current and past floodplain and other easement projects did not fully remove agricultural dikes or levees from properties. The reasoning for leaving these structures in place included a desire to limit the amount of earth disturbance or tree removal that full structure removal would cause, the added cost of necessary

engineering studies, a desire to maintain some hydrologic control, concerns of adjacent property owners, scour protection and other factors. While each of these issues may be a valid concern at any given site, the NRCS must provide guidance to its field staff to ensure that the impacts associated with accommodating these issues are balanced against maximizing the services of floodplain storage and reducing long-term intervention needs.

Conclusion

There is a high demand for floodplain easements by landowners of marginal, flood-prone land, but current funding is unable to meet this demand and support floodplain easements as a flood damage-reduction approach.

And yet, the nation has spent over \$8 billion in the UMRB over the last decade on what is arguably preventable flood damage. As climate change drives more frequent, severe flood events in the UMRB, floodplain easements can help landowners avoid future losses through restoration of natural conditions that can store and safely convey floodwater.

Payments provided to landowners will also allow them to put their land to work to provide flood storage. If landowners are

reimbursed for flood storage-compatible uses of the flood-prone areas of their property, flood damages will be reduced.

The NRCS is uniquely situated to serve a critical role in reducing flood risks and flood damages in the UMRB. Easements through the NRCS can directly reduce future flood losses in the agricultural sector without requiring property acquisition.

The restoration and reconnection of natural floodplains to accommodate flooding will also have the added benefits of improved water quality, low-maintenance wildlife habitat and marketable recreational opportunities for landowners, tourism economies and adjacent communities.

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