

UMRS Flood, Sediment/Channel Management, Drought PAS Report

Drought Issue Area

Chapter 3

[Two to three sentence blurb on importance of issue – e.g., we know sedimentation is increasing in most of the Upper Miss, emergency response is costly and often at the expense of ecological health. Systemic, integrated planning will allow for proactively managing the channel in ways that cost-effective and ultimately increase the perception of the navigation system’s reliability to the overall freight transportation network.]

Although drought has not garnered the same attention as other recent severe weather events, such as flooding, it remains a significant threat to the Upper Mississippi River Basin. Major or severe drought can have a substantial impact on both the economy and the environment. Historic pictures from the 1930’s “dust bowl” era show the effects of simultaneous and prolonged drought, mixed with poor land conditions. More recently, the drought of 2012-2013 saw greater than 50% of the nation experiencing drought at any given time, and portions of the Upper Mississippi River (UMR) Basin experienced moderate to extreme drought conditions, and sections of the Mississippi River were closed to commercial navigation due to low water levels. Several local, state, and federal agencies continue to advance our understanding of drought and its potential impacts, and more can still be done to gain a better understanding of how the Upper Mississippi River Basin can prepare for the impact of drought through integrated water resource planning.

Perspectives of Today

What is happening and how it became this way

[Note: This section will include 3-4 paragraphs describing the current problem statement (i.e., why is today’s situation not sustainable) and a concise summary of the policies and decision-making that resulted in today’s situation.]

The Upper Mississippi River Basin has traditionally been known for its abundance of water. Unlike other parts of the nation which struggle with proper water apportionment, this has traditionally not been an area of concern due to the basin’s abundant lakes, rivers, stream, and aquifers. Because of this, many water resources are designated for multiple uses, and rarely do these concurrent uses challenge each other for adequate supply or allocation. Uses include, but are not limited to water supply, agriculture, recreation, habitat, navigation, manufacturing/industrial, and power generation. Given the change in weather patterns over the last several decades and a greater understanding of drought, a problem with our traditional planning process starts to emerge. The historical abundance of water relied upon in the UMR may have been taken for granted, and less consideration has been given to what may happen to these potentially competing water uses if the historical quantities of water are no longer available due to a prolonged severe drought.

Traditional drought planning has been focused on changing the characteristics of physical infrastructure and response efforts have typically resulted in “just in time” actions. Examples of drought response activities have included: emergency dredging and rock removal to ensure navigation remains on-going,

extension of docks to ensure recreation remains, and identification and adjustment of intake and discharge elevations of existing infrastructure. Furthermore, these types of solutions and planning efforts, when compared to the types of actions taken to address flooding and sedimentation, have traditionally been less controversial and generally accepted. During the 2019 Open Space discussions held within the UMR basin with local stakeholders, residents, and community leaders, very few of the participants openly discussed drought, even though it was one of the primary issue areas these discussions were intended to address and the historic drought of 2012-2013 had significantly impacted the region.

Given the lack of open discussion specifically related to drought planning on the Upper Mississippi River Basin, it may appear that drought planning is less important than planning for other issues areas that affect the basin; however, when these discussions, along with comments received on the public webpage, are viewed through an integrated water resources point of view, many of the concerns with addressing drought are shared with the other issue areas. There were several discussions that addressed topics which will need to be considered when looking at actions that can be taken in advance to minimize the impacts of drought, especially when planning for a long-duration and systemic drought that will effect competing water uses. Some of the topics discussed included identifying trigger levels for drought actions, economic impacts, water quality concerns, effects of climate change, reasonable planning scenarios, land-use/water-use decisions, and the role of aquatic ecosystems. Many, if not all, of these discussion topics as they relate to addressing drought mitigation and planning currently lack regional consensus and remain worth studying further.

There are several state and federal agencies, along with emergency management professionals that have studied drought or continue to research drought and its potential impacts throughout the region. Some of the agencies currently involved with drought planning, response, and mitigation efforts for the UMR basin include:

- National Drought Mitigation Center at the University of Nebraska
- NOAA
- USDA
- National Integrated Drought Information System
- US Army Corps of Engineers
- State Departments of Natural Resources and State Regulatory Agencies
- State and Local Emergency Management Agencies

Non-governmental organizations currently involved with drought planning, response, and mitigation include:

- Agricultural Production Organizations at the national or state level, such as the Pork Producers, or the Corn Growers, etc.
- Public and Private Universities
- Environmental resource organizations, such as the Natural Heritage Foundation, etc.
- Water Rights Advocacy Groups
- Water Utility Organizations

These organizations have already produced several studies on drought or are currently conducting on-going studies. Information from these studies should be reviewed and incorporated into future planning efforts. Ongoing studies include:

Study Name	Date	Summary
Army Corps of Engineers Planning Assistance to States Study with the State of Missouri on Drought	2019?	
NIDIS	2020?	Partnering with Miss Rivers and Towns Initiative to address how drought currently affects towns. The study will look at impacts of drought and how we understand drought.
MN DNR		Minnesota low flow plan
RICA		Low water action plan that is performed in coordination with USCG. low flow forecast
State Drought Plans	??	State Drought Plans – in various forms – there should at least be a link to state plans available in this report

Known Opportunities

High leverage actions that enjoy regional consent

[Note: This section will include a bulleted listed of high leverage actions (i.e., the most important of those the issue teams identified) that do not need further study or consent-building among stakeholders.]

To address drought within the UMR basin, a team of regional stakeholders was convened to review information provided during the 2019 Open Space discussions and identify high leverage actions that enjoy regional consent. A summary of the Drought Area Team topics discussed at the Sep 30/Oct 1 meeting is delineated in the below figure. Note that this meeting took place shortly after the last of six Open Sessions. The following is summary of potential action items and topics discussed.

Communication	Development of Planning Scenarios	Triggers and Vulnerabilities	Other
<ul style="list-style-type: none"> •Developing a basin coordination process and creating a drought toolbox based on the Emergency Management Cycle •Formalizing communication amongst agencies and stakeholders and improving current plans for consistency amongst states and agencies •Creating a common definition for drought planning. •Develop a water control board for the UMR 	<ul style="list-style-type: none"> •Develop a low flow model based on prolonged drought. e.g. 2012 + 2012 + 2012. Define the event. •Identify potential conflicts (Shared water users) •Climate change and planning assumptions. •Is there a breakeven flow for Locks and Dams and Reservoirs. or can the current flows be adjusted. •Leveraging existing research and on drought impacts. 	<ul style="list-style-type: none"> •Identify drought triggers based on Level of severity, by sector, by location/region, by time of year •Identifying key triggers for taking drought action •Identify vulnerabilities. e.g. in takes, wastewater discharges, infrastructure, Ecosystems, water dependent economies. •Identifying stakeholders. 	<ul style="list-style-type: none"> •Expanding waterway action plans to include the entire basin •Identifying enhanced processes for reservoir releases. •Leveraging research on drought predictability.

Below is a list of high leverage actions (i.e., the most important identified by the Drought Issue Area Team) that do not need further study or consent-building among stakeholders. Also in this list is the name of the agency/organization who has committed in leading the effort and under what authority/funding mechanism. Specific activities were not mentioned in the listening sessions.

Priority	Subject	Agency/Organization	Authority/funding
1	Develop a common definition for drought. Currently drought means different things to different stakeholders (e.g. climatic, hydrologic, agricultural)	All	
??	Identify potential triggers for drought conditions. (this could be the US Drought Monitor, or a precipitation threshold, etc.)		
2	Identify a consistent planning scenario that will be used for long term drought planning. (What is the scale of the event?)		
3	Identify critical infrastructure that is dependent on a specific quantity of water, and identify any conflicts amongst those items.	States	
4	Identify existing tools that are available to assist with drought planning and look for ways to fill gaps and use these tools collectively and in a consistent manner.	NWS, NIDIS, States	
5	Develop a communication system for responsible agencies and stakeholders to communicate on a regional level.		



These priority actions further expand on the current activities that are already occurring within the basin, but provide a framework on how on-going actions can be coordinated in a consistent manner. They are built upon actions that have traditionally had regional consensus.

Defining The Future

Questions re watershed and floodplain inputs and long term management actions driving the future of the Upper Mississippi's navigation system

Fully addressing and planning for the consequences of drought will require defining how human manipulation of both waterways and landscapes impacts the hydraulic cycle and exacerbates the effects of drought. In order to begin addressing drought resiliency the questions of what contributes to drought consequences and why these effects are occurring must be answered. These questions align with the same considerations that must be addressed when planning for flood resiliency and sediment management. The long term goal is to find solutions that can address all three of these issues using integrated water management strategies. Drought related questions that do not have regional consensus and would align with a Section 729 study include how available water should be prioritized and allocated in a low flow situation and what potential long-term drought resiliency solutions exists (e.g. change in water and land use, development of reservoirs, creation of efficient ecosystems, etc.)

[Note: This section will include a bulleted list or brief summary of questions and issues needing further exploration. This will include questions to inform management as well as questions about the right approach to management – e.g., what is the right design of structural and nonstructural measures to provide for a predictable, desired approach for floods.]

Questions/Issues Needing Further Exploration:

Baseline Data	Lead Agency/Organization
Develop a better understanding of how water at low flows moves through the entire system. We can currently identify high priority areas and items right now through emergency planning that are vulnerable to low flows, but how well do we understand what might happen if a prolonged hydrological drought occurs. Think pollution, stagnant water. Back waters and sediment. Does a model exist that evaluates this?	
Could NWS River Forecast Center use historical weather data to produce a river flow level scenario that could then be used to discuss impacts to users?	NWS or USGS

Inventory of industries with intakes on the river and water level at which they are impacted – can we bring them into the discussion?	
Governance, Regulation, and Allocation	Lead Agency/Organization
When prioritization and allocation of water resources to competing interests is necessary, does a governing body need to exist that can balance the needs. Is there a need to identify UMR oversight entity (with the authority to make planning and funding decisions at the watershed level) Identify state agencies with responsibilities for these roles within each state – could be multiple agencies each with a small area of responsibility – might require “pre-coordination” within each state.	
In order to gain a predictable system, will each state agree to a common set of emergency response activities as it relates to interdependency of water resources.	
Funding	Lead Agency/Organization
Several organizations have a role in managing drought conditions, such as Corps with reservoir and states with aquifers, is funding available to address resiliency solutions. (e.g. Is funding available for land use changes that reduce the threat of drought?).	
Mitigation	Lead Agency/Organization
Could we prevent/reduce the consequences of systemic drought by changing current practices? (land use played a major role in the 1930’s)	