NATIONAL DROUGHT MITIGATION CENTER
UNIVERSITY OF NEBRASKA

Overview | Drought Planning | Types | Processes | Resources

Collaborative Drought Planning Using Scenario Exercises

https://drought.unl.edu/scenarioguide

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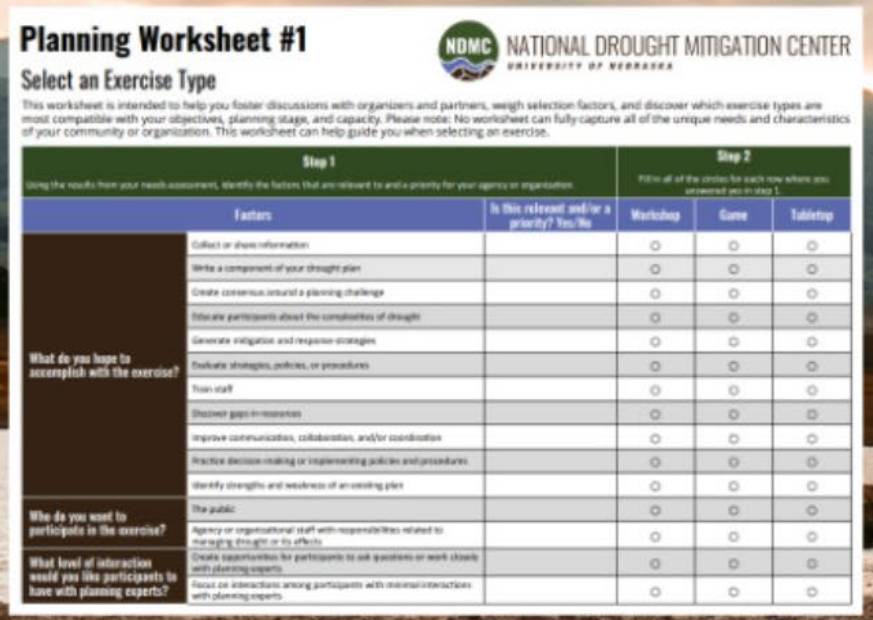
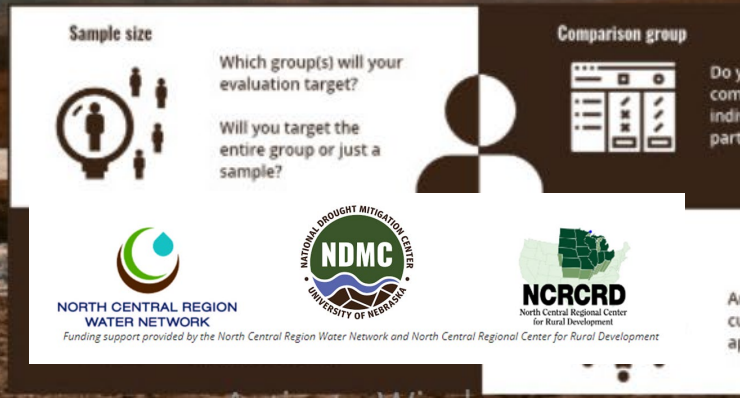
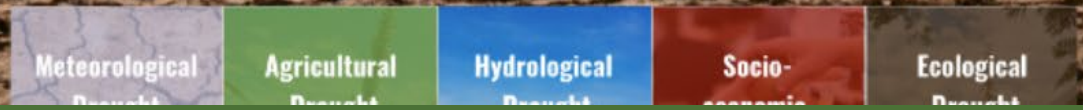
Nebraska State Climatologist







1 website

18 worksheets

10 case studies

5 publications

27 exercises

20 Years

10 states

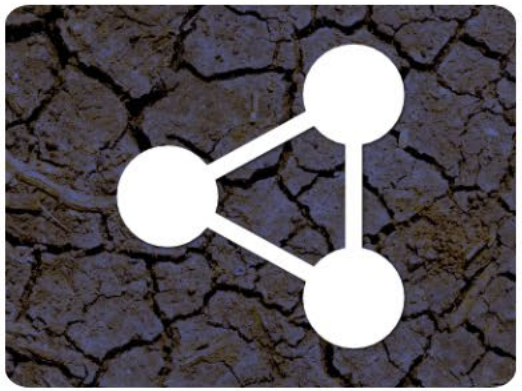
5 countries

30 years of drought planning

Drought Planning

Introduces drought planning and the role that scenario-based exercises play in preparedness.

Types



Describes the three forms of exercises and presents information to aid selection.

Process

Lays the groundwork for designing a successful drought scenario-based exercise.

Resources

Provides resources including case studies, research findings, a glossary, and references.

https://drought.unl.edu/scenarioguide

“The event group was friendly, energetic, helpful, knowledgeable, and passionate. This event was a great way to meet new people who are working in different fields, with different ideas and opinions. It was a great way to work together towards an end goal.”

https://drought.unl.edu/scenarioguide/Types.aspx

What are scenario exercises?

Activities used to plan & manage a hypothetical disaster

Bridgelyn

Challenge: During a drought, the demand for water is higher than usual. As the drought progresses, the water demand increases and leads to a pump failure in one of your municipal wells, which leads to a reduction of water supply to some communities. The pump repair will take 3 days. Ensure that people will have enough drinking water during those days.

Option A **Decrease water demand** Implement conservation practices and decrease demand on other pumps in the city.	Option B **Increase water supply** Bring more water into the area affected by pump failure.
MONITORING	**MONITORING**
Water use maps	Groundwater maps & Information about vulnerable populations
PUBLIC INFORMATION AND WARNING	**TRANSPORTATION**
Prepared public information messages OR Education on conservation practices	Water supply tanks

Drought

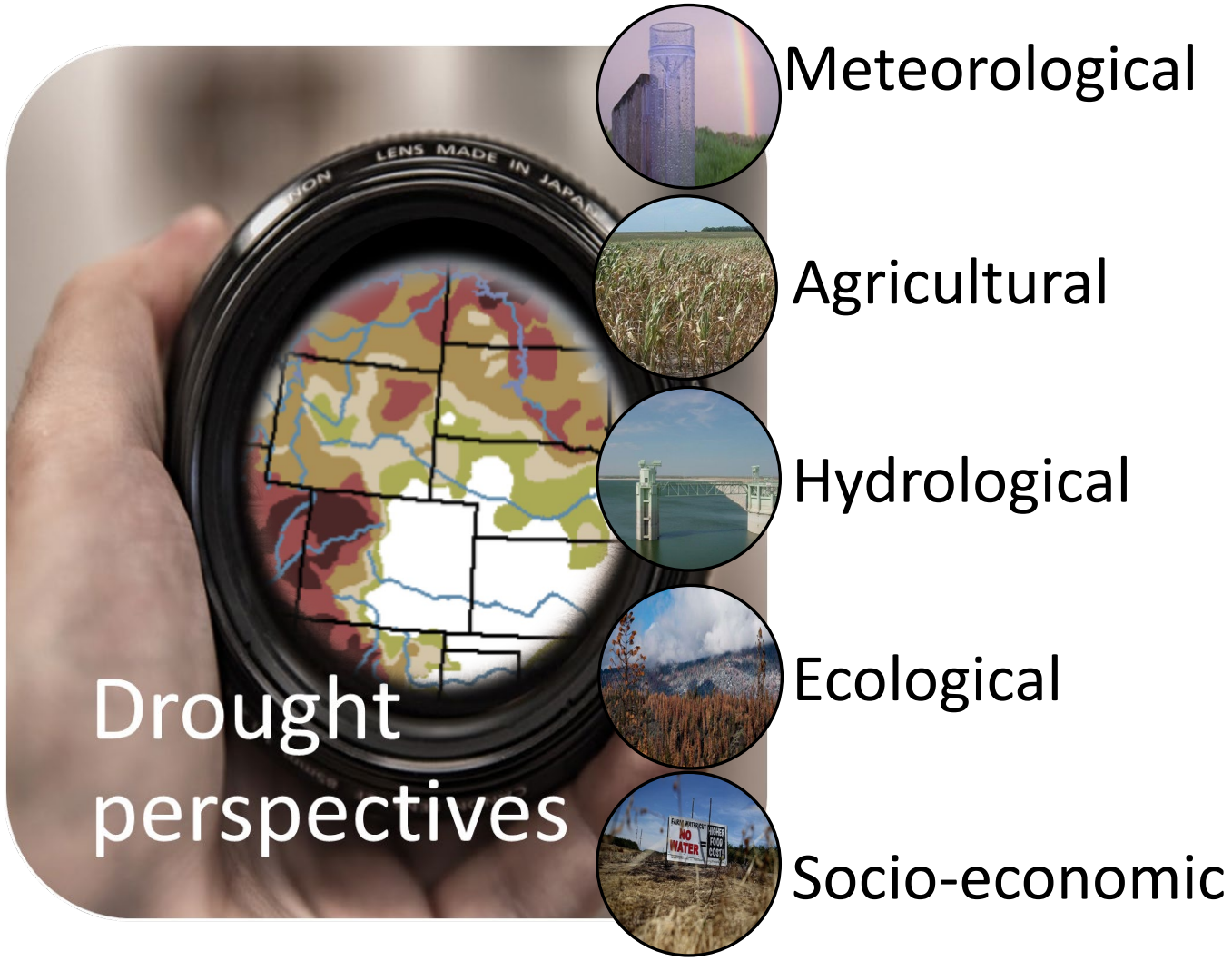
A period of drier-than-normal weather that lasts long enough to cause water shortages. It depends on:

Location

Season

User Needs

Drought means different things to different people



Drought Impacts

Prepare for impacts

Exercise activities

Drought Planning Process

Drought Management Plan

Scenario exercises can be used in any part of the planning process

Drought Planning Process

Where do I start?

No matter where you are in the drought planning process, scenario-based exercises can make a contribution. They can be used to kick off your community's drought planning efforts or to help revise an existing plan. **Click the icons below to find out.**

Scope, scale, and leadership

Start by building a leadership team that includes people who build community-wide involvement, coordinate plan development, and implement the plan in times of drought. The team will identify the developing plan's purpose, objectives, and geographic or political boundaries.

Engagement process

Involving the community can help you better understand the different ways that people think about drought and how it affects them.

Information gathering

Gathering information helps create a picture of past conditions and provides a foundation for developing a community-tailored plan.

Monitoring and early warning

Monitoring climate and water resources helps you recognize drought, alert the community to developing conditions, and trigger response to help avoid a crisis.

Mitigation and response actions

Mitigation can help your community lessen a drought's impacts before it arrives and developing response actions can help your community cope once a drought is taking place.

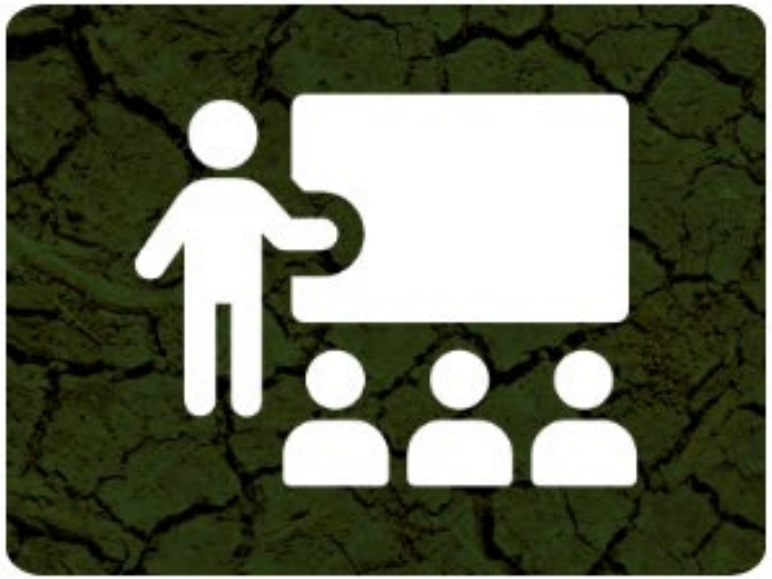
Writing the plan

Putting the pieces together into a formal document allows people to see what can be expected during a drought event, eliminating uncertainty.

Plan evaluation and modification

After a drought, it's important to ask, "How well did our plan work?" Updating your plan with lessons learned from past droughts helps keep it responsive to changing community needs and priorities.

Workshops



Informal discussions with presentations and breakout groups.

Games

Friendly competition with teams and interactive learning.

Tabletop Exercises

Low-stress walk-through of plan implementation.

Types of drought scenario exercises

Workshops

Objectives:

- ✓Create products or components of a drought plan
- ✓Share knowledge
- ✓Build consensus

Workshop: FEMA's Threat and Hazard Identification and Risk Assessment

CASE STUDY: WORKSHOP

North Platte River Basin Drought THIRA

Kearney, Nebraska • April 2017

NDMC NATIONAL DROUGHT MITIGATION CENTER UNIVERSITY OF NEBRASKA

TYPE	Workshop
DURATION	1 day
SCOPE	Sub-state, multi-sector
PARTICIPANTS	• Stakeholders and decision-makers in: natural resources energy, municipalities, emergency management, and recreation and tourism sectors • Facilitators • Coordinators • Developers
PARTICIPANT COUNT	40
PARTICIPANT ROLE	• Discussion group member • Facilitators • Drought experts
MATERIALS	• Hydrologic, climatic, and socio-economic data • GIS • Expert opinion • Flipcharts
DEVELOPMENT TEAM	• University of Nebraska Public Policy Center • National Drought Mitigation Center • High Plains Regional Climate Center
APPROXIMATE COST	$3,000 for catering, facilities, and staff travel. Excludes staff time for exercise development
FUNDING SOURCE	NOAA Sectoral Applications Research Program (SARP)

SCENARIO

The scenario was set in the North Platte River Basin with participants engaging in group discussions focused on 16 of the 32 core capabilities identified in the National Preparedness Goal.

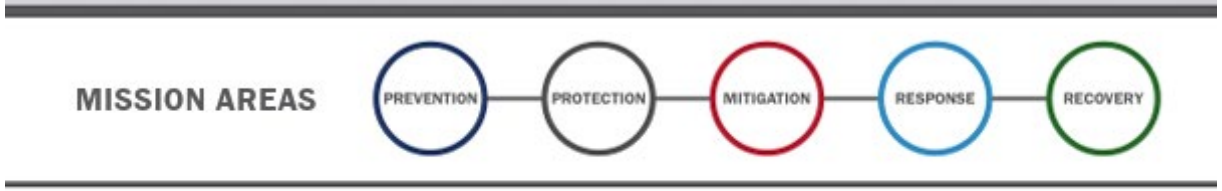
Participants could attend four groups, with each group focusing on a different core capability. Based on a scenario consisting of a 5-year drought with challenges such as wildfires, dust storms, West Nile, water supply and quality, decreased agricultural production, heatwaves, and power outages, participants identified desired preparedness, response, and recovery capabilities.

OBJECTIVES

- Determine the usefulness of the Department of Homeland Security's THIRA process for drought planning
- Educate participants on the multi-sector impacts of drought
- Identify drought preparedness capabilities and required resources
- Increase collaboration in the planning process

THIRA Core Capabilities

https://www.fema.gov/emergency-managers/national-preparedness/mission-core-capabilities



Prevention

1. Planning
2. Public Information and Warning
3. Operational Coordination
4. Intelligence and Information Sharing
5. Interdiction and Disruption
6. Screening, Search, and Detection
7. Forensics and Attribution

Protection

1. Planning
2. Public Information and Warning
3. Operational Coordination
4. Intelligence and Information Sharing
5. Interdiction and Disruption
6. Screening, Search, and Detection
7. Access Control and Identity Verification
8. Cybersecurity
9. Physical Protective Measures
10. Risk Management for Protection Programs and Activities
11. Supply Chain Integrity and Security

Mitigation

1. Planning
2. Public Information and Warning
3. Operational Coordination
4. Community Resilience
5. Long-Term Vulnerability Reduction
6. Risk and Disaster Resilience Assessment
7. Threats and Hazards Identification

Response

1. Planning
2. Public Information and Warning
3. Operational Coordination
4. Infrastructure Systems
5. Critical Transportation
6. Environmental Response/ Health and Safety
7. Fatality Management Services
8. Fire Management and Suppression
9. Logistics and Supply Chain Management
10. Mass Care Services
11. Mass Search and Rescue Operations
12. On-Scene Security, Protection, and Law Enforcement
13. Operational Communications
14. Public Health, Healthcare, and Emergency Medical Services
15. Situational Assessment

Recovery

1. Planning
2. Public Information and Warning
3. Operational Coordination
4. Infrastructure Systems
5. Economic Recovery
6. Health and Social Services
7. Housing
8. Natural and Cultural Resources

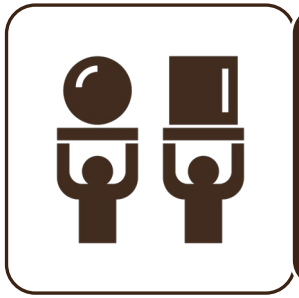
FEMA

To provide feedback on the Core Capability Development Sheets, please email us at FEMA-TARequest@fema.dhs.gov.

Updated: 08/10/2022

Goal: Address water supply shortage issues during drought, specifically concerning large animal operations; develop strategies and actions to mitigate and respond to drought.
Format: 3 breakouts at 1 hr each

What threats and hazards can affect our community?



What strategies or capabilities should we have to be prepared for those impacts?

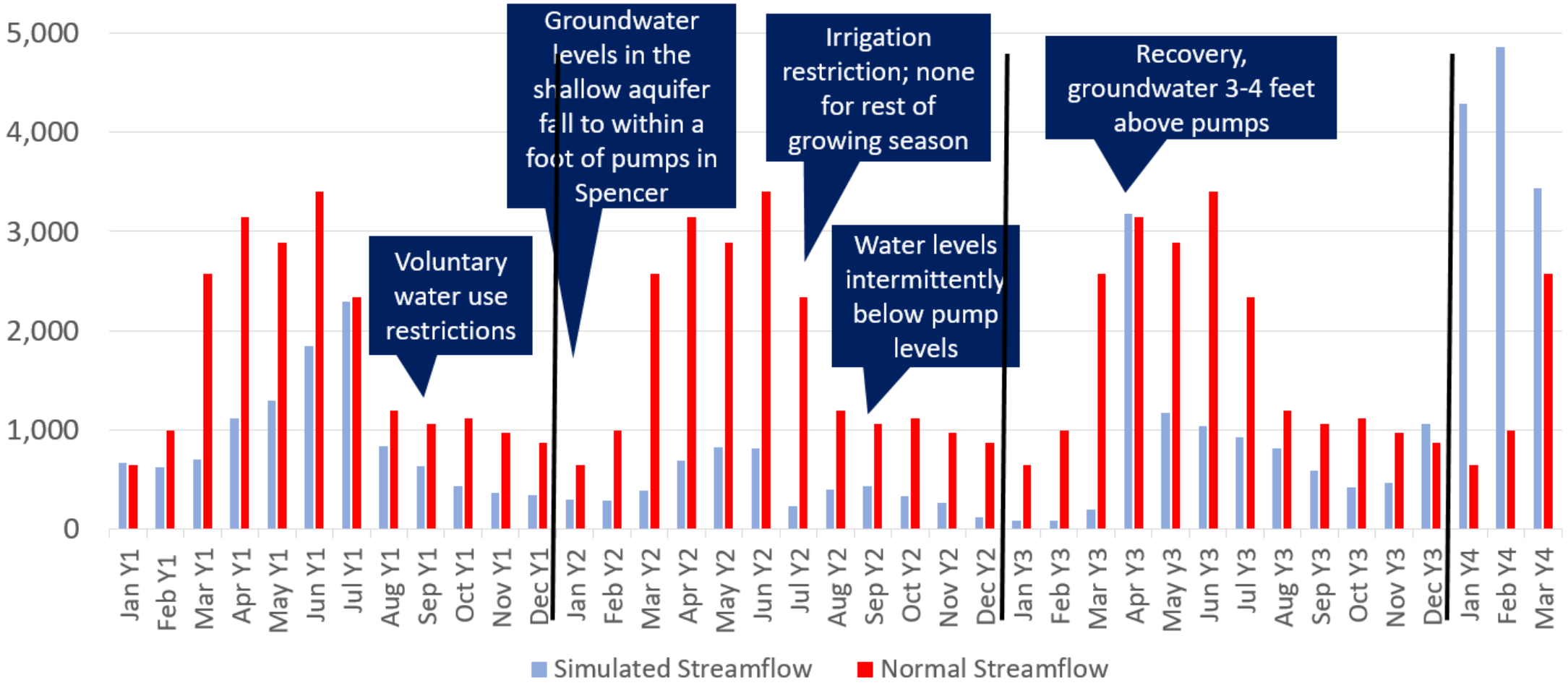
If they occurred, what impact would they have?

What resources do we have and/or need to build these capabilities?

Northwest Iowa Drought Workshop - 2020

Simplified THIRA

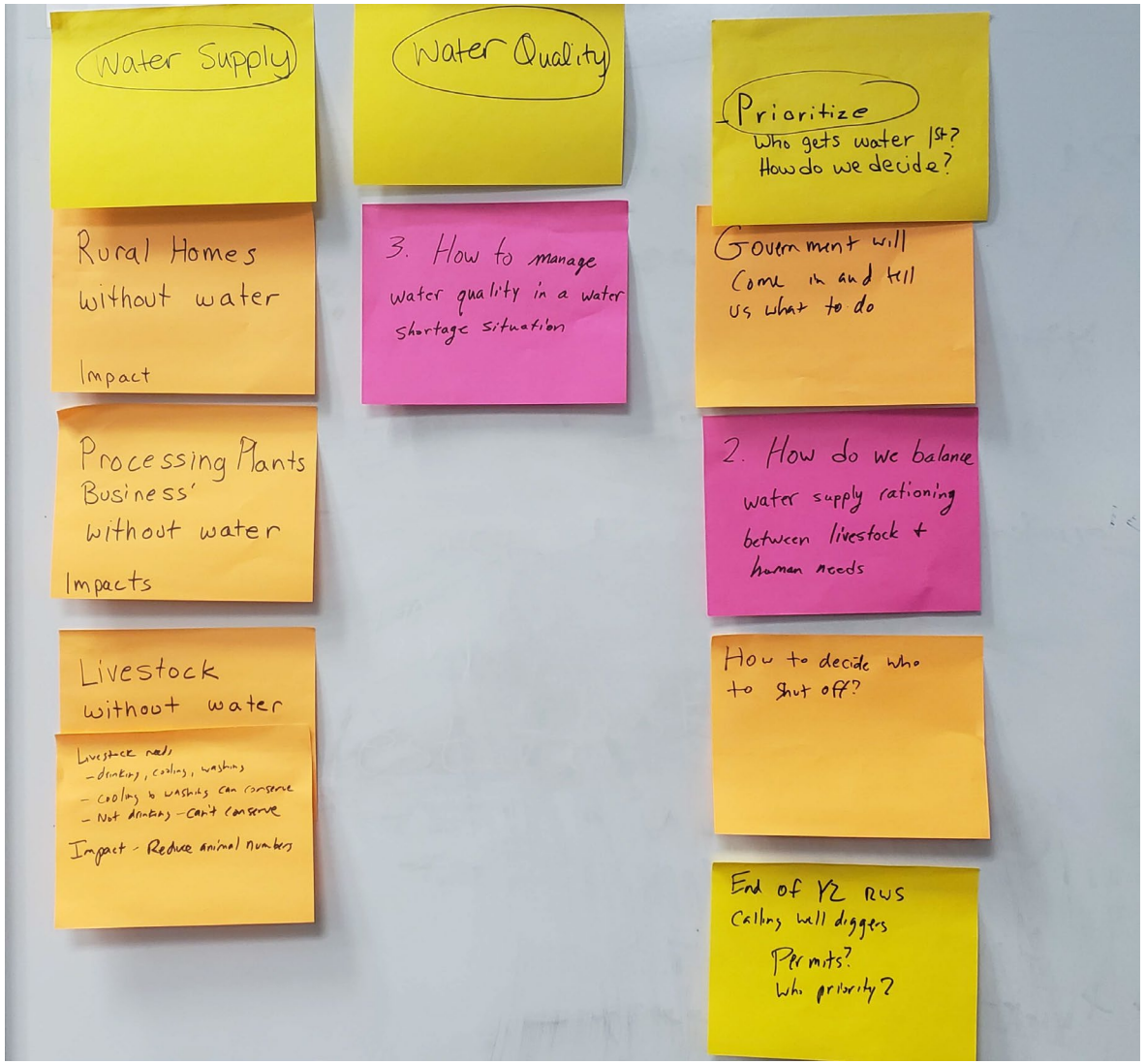
Streamflow
Little Sioux near Turin, IA



Example scenario

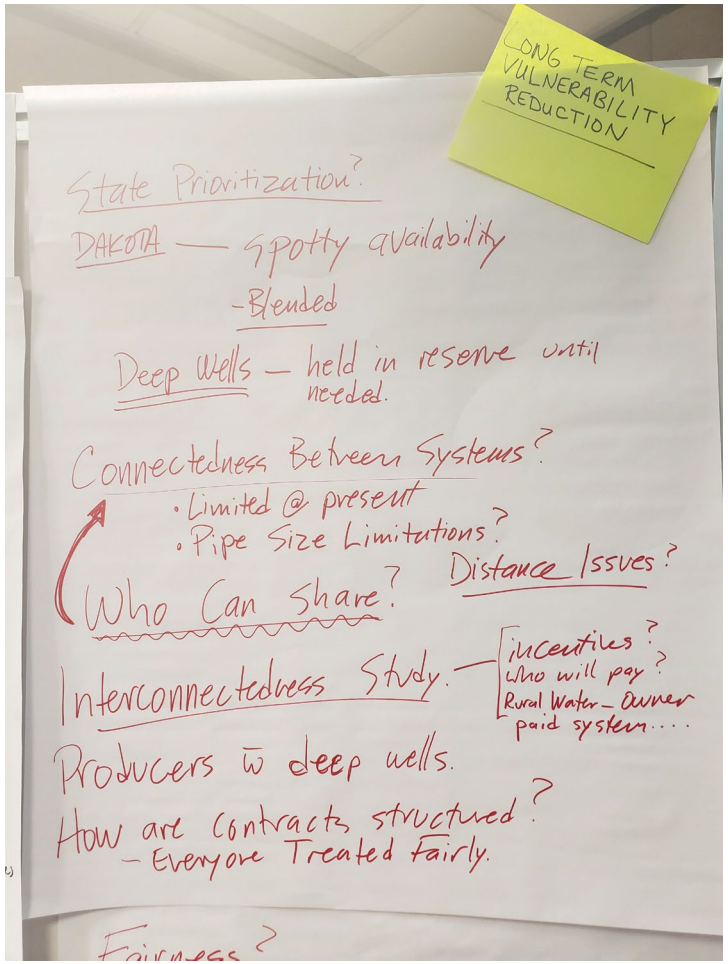
Breakout 1
Impacts & Vulnerabilities

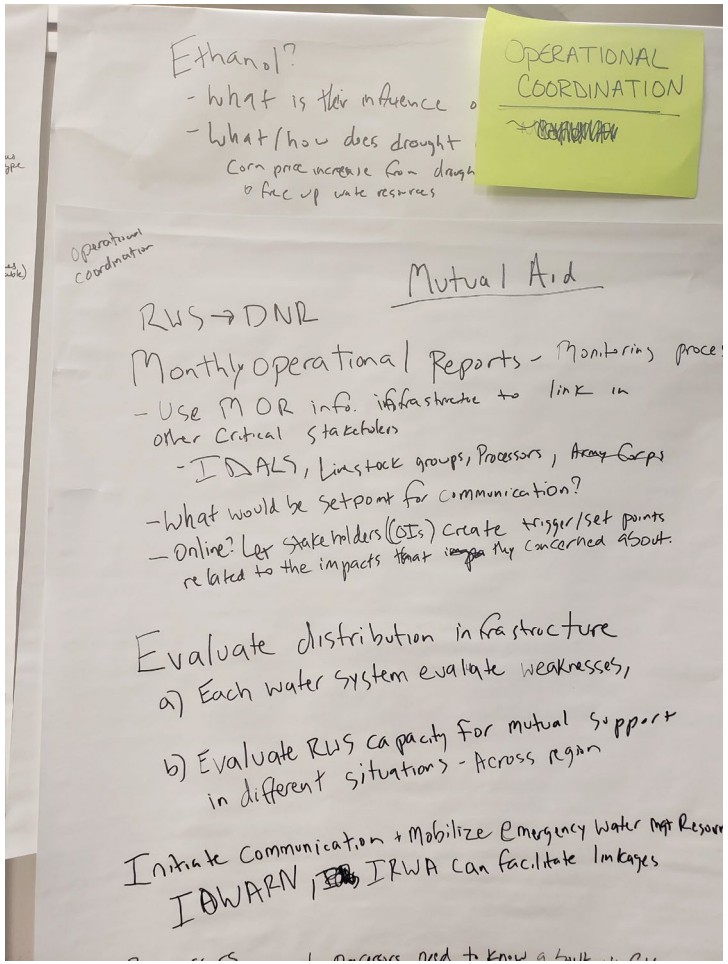
Given the drought scenario, what impacts and challenges would your community and/or operations face?

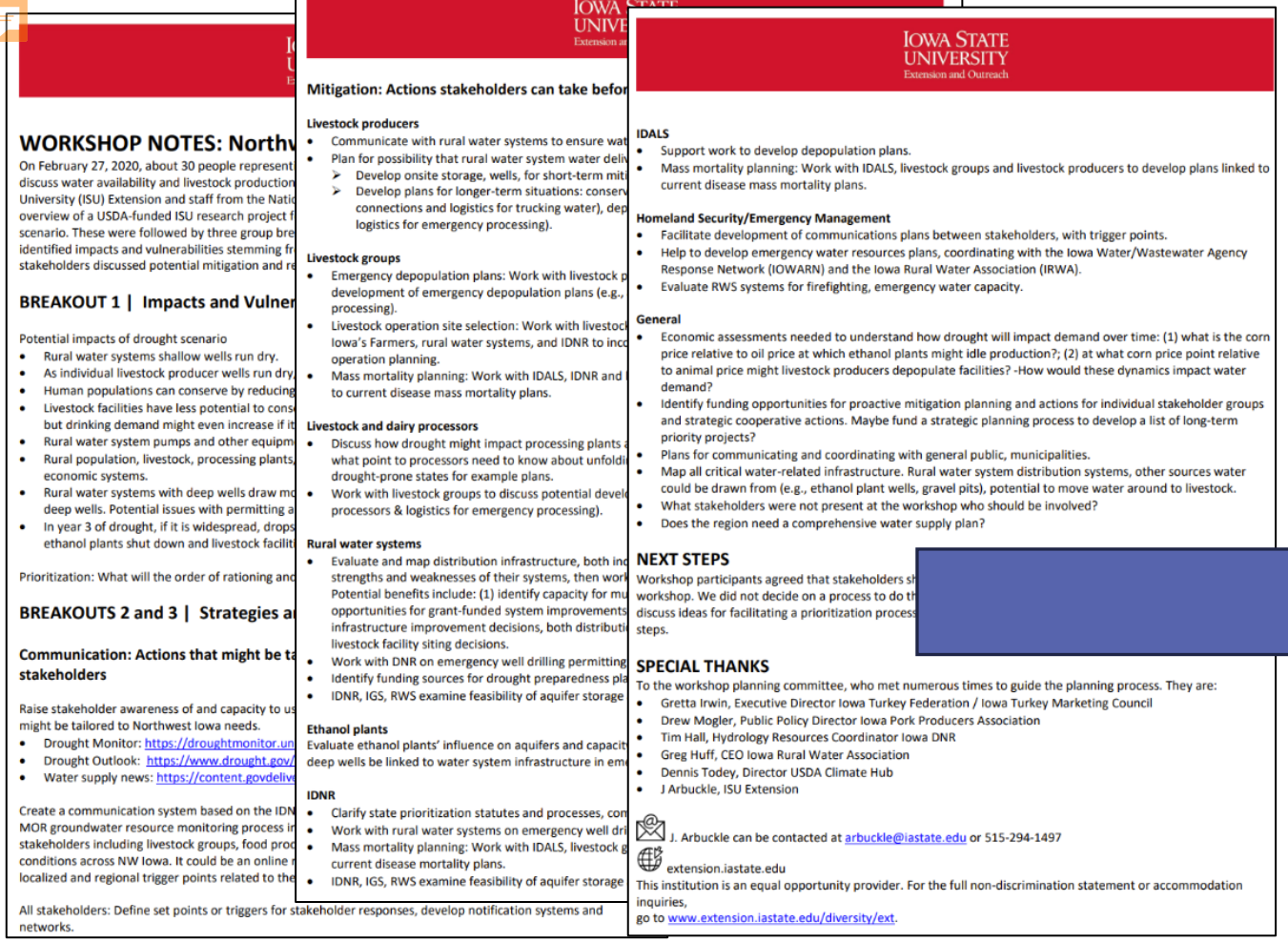


Breakout 2
Strategies & Capabilities

What strategies or capabilities should we have to be prepared for those impacts?







WORKSHOP NOTES: Northv

On February 27, 2020, about 30 people represent
discuss water availability and livestock production
University (ISU) Extension and staff from the Natio
overview of a USDA-funded ISU research project f
scenario. These were followed by three group bre
identified impacts and vulnerabilities stemming fr
stakeholders discussed potential mitigation and re

BREAKOUT 1 | Impacts and Vulner

Potential impacts of drought scenario

- Rural water systems shallow wells run dry.
- As individual livestock producer wells run dry,
- Human populations can conserve by reducing
- Livestock facilities have less potential to cons
  but drinking demand might even increase if it
- Rural water system pumps and other equipm
- Rural population, livestock, processing plants,
  economic systems.
- Rural water systems with deep wells draw mo
  deep wells. Potential issues with permitting a
- In year 3 of drought, if it is widespread, drops
  ethanol plants shut down and livestock facilit

Prioritization: What will the order of rationing and

BREAKOUTS 2 and 3 | Strategies a

Communication: Actions that might be ta stakeholders

Raise stakeholder awareness of and capacity to us
might be tailored to Northwest Iowa needs.

- Drought Monitor: https://droughtmonitor.un
- Drought Outlook: https://www.drought.gov/
- Water supply news: https://content.govdeliv

Create a communication system based on the IDN
MOR groundwater resource monitoring process ir
stakeholders including livestock groups, food proc
conditions across NW Iowa. It could be an online r
localized and regional trigger points related to the

All stakeholders: Define set points or triggers for stakeholder responses, develop notification systems and networks.

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Extension a

Mitigation: Actions stakeholders can take befor

Livestock producers

- Communicate with rural water systems to ensure wat
- Plan for possibility that rural water system water deliv
  - Develop onsite storage, wells, for short-term miti
  - Develop plans for longer-term situations: conserv
    connections and logistics for trucking water), dep
    logistics for emergency processing).

Livestock groups

- Emergency depopulation plans: Work with livestock p
  development of emergency depopulation plans (e.g.,
  processing).
- Livestock operation site selection: Work with livestock
  Iowa's Farmers, rural water systems, and IDNR to inco
  operation planning.
- Mass mortality planning: Work with IDALS, IDNR and I
  to current disease mass mortality plans.

Livestock and dairy processors

- Discuss how drought might impact processing plants a
  what point to processors need to know about unfoldi
  drought-prone states for example plans.
- Work with livestock groups to discuss potential develo
  processors & logistics for emergency processing).

Rural water systems

- Evaluate and map distribution infrastructure, both inc
  strengths and weaknesses of their systems, then work
  Potential benefits include: (1) identify capacity for mu
  opportunities for grant-funded system improvements
  infrastructure improvement decisions, both distributi
  livestock facility siting decisions.
- Work with DNR on emergency well drilling permitting
- Identify funding sources for drought preparedness pla
- IDNR, IGS, RWS examine feasibility of aquifer storage

Ethanol plants

Evaluate ethanol plants' influence on aquifers and capacit
deep wells be linked to water system infrastructure in em

IDNR

- Clarify state prioritization statutes and processes, con
- Work with rural water systems on emergency well dri
- Mass mortality planning: Work with IDALS, livestock g
  current disease mortality plans.
- IDNR, IGS, RWS examine feasibility of aquifer storage

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IDALS

- Support work to develop depopulation plans.
- Mass mortality planning: Work with IDALS, livestock groups and livestock producers to develop plans linked to current disease mass mortality plans.

Homeland Security/Emergency Management

- Facilitate development of communications plans between stakeholders, with trigger points.
- Help to develop emergency water resources plans, coordinating with the Iowa Water/Wastewater Agency Response Network (IOWARN) and the Iowa Rural Water Association (IRWA).
- Evaluate RWS systems for firefighting, emergency water capacity.

General

- Economic assessments needed to understand how drought will impact demand over time: (1) what is the corn price relative to oil price at which ethanol plants might idle production?; (2) at what corn price point relative to animal price might livestock producers depopulate facilities? -How would these dynamics impact water demand?
- Identify funding opportunities for proactive mitigation planning and actions for individual stakeholder groups and strategic cooperative actions. Maybe fund a strategic planning process to develop a list of long-term priority projects?
- Plans for communicating and coordinating with general public, municipalities.
- Map all critical water-related infrastructure. Rural water system distribution systems, other sources water could be drawn from (e.g., ethanol plant wells, gravel pits), potential to move water around to livestock.
- What stakeholders were not present at the workshop who should be involved?
- Does the region need a comprehensive water supply plan?

NEXT STEPS

Workshop participants agreed that stakeholders sh
workshop. We did not decide on a process to do th
discuss ideas for facilitating a prioritization proces
steps.

SPECIAL THANKS

To the workshop planning committee, who met numerous times to guide the planning process. They are:

- Gretta Irwin, Executive Director Iowa Turkey Federation / Iowa Turkey Marketing Council
- Drew Mogler, Public Policy Director Iowa Pork Producers Association
- Tim Hall, Hydrology Resources Coordinator Iowa DNR
- Greg Huff, CEO Iowa Rural Water Association
- Dennis Todey, Director USDA Climate Hub
- J Arbuckle, ISU Extension

J. Arbuckle can be contacted at arbuckle@iastate.edu or 515-294-1497

extension.iastate.edu

Iowa Drought Plan

DNR

IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

January 2023

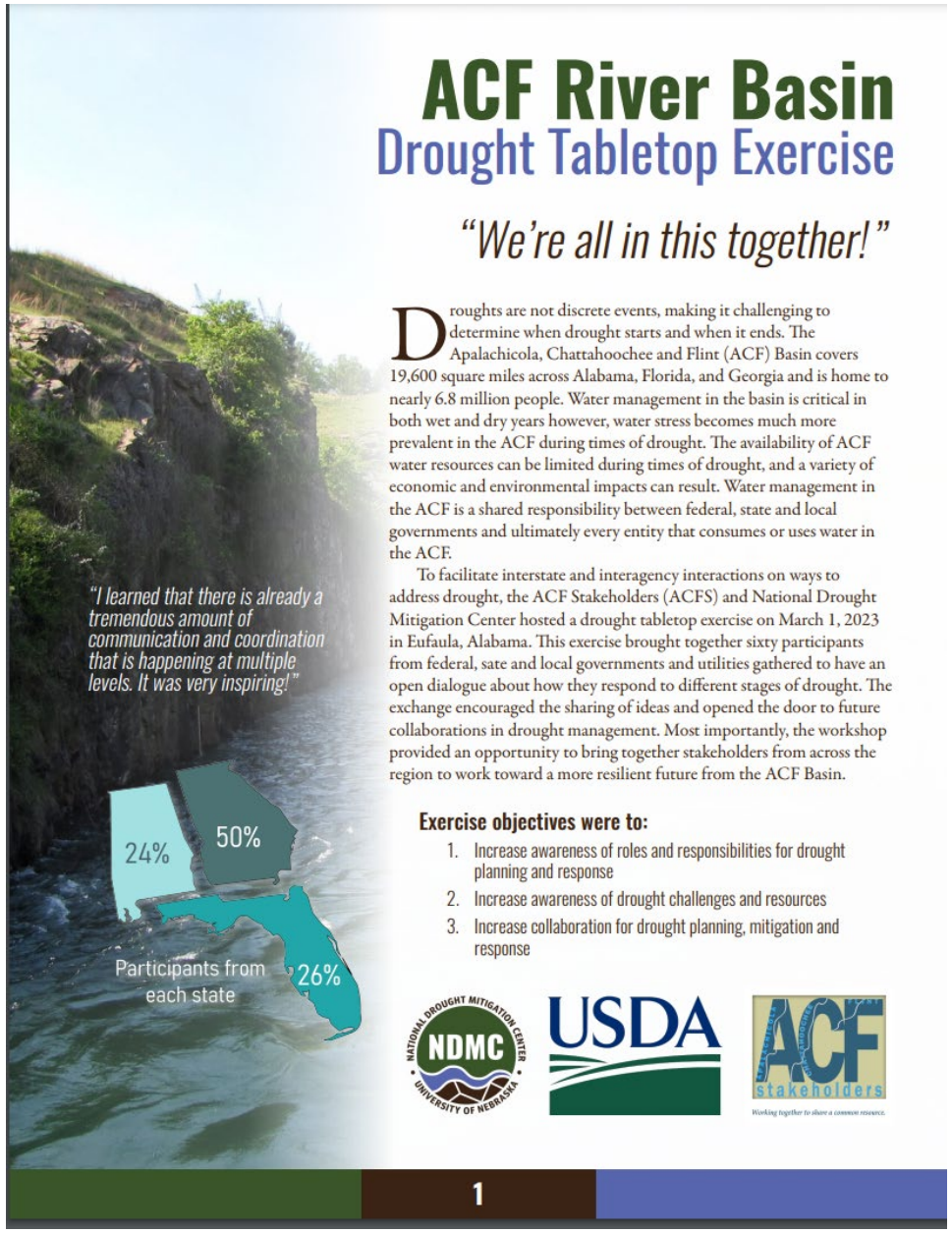
Authors:
Iowa Department of Natural Resources (DNR)
Iowa Department of Agriculture and Land Stewardship (IDALS)
Iowa Department of Homeland Security and Emergency Management (HSEMD)

Outcomes showed the need for a state drought plan

Tabletop Exercise

Objectives:

- ✓Familiarize staff with their roles and responsibilities during a drought
- ✓Improve coordination and resolve responsibilities among agencies
- ✓Evaluate plans, policies, and procedures
- ✓Discover gaps in resources or staff allocations.



Games

Objectives:

- ✓Provide an entertaining environment for learning about managing water resources and the decisions that need to be made during a drought
- ✓Create a risk-free environment for exploring drought management strategies and their consequences
- ✓Foster collaboration as participants work together to address the drought scenario

CASE STUDY: GAME

Iowa Multi-hazard Tournament

Cedar Rapids, Iowa • September 2016

NDMC NATIONAL DROUGHT MITIGATION CENTER UNIVERSITY OF NEBRASKA

TYPE	Game
DURATION	1 day
SCOPE	Sub-state, multi-sector
PARTICIPANTS	Representatives of: • Federal, state, and local governments • Non-governmental organizations • Farmers • Academics
PARTICIPANT COUNT	60
PARTICIPANT ROLE	• Multi-sector team player • Team facilitator • Announcer • Referee
MATERIALS	• Hydrologic, climatic, and drought impact data • Hydrologic model • Web based decision-support system • Expert knowledge • Play book • Computers and monitors
DEVELOPMENT TEAM	• U.S. Army Corps of Engineers Institute for Water Resources and Rock Island District • Iowa State University, University of Iowa, University of Nebraska, Lincoln • Natural Resources Conservation Service • USDA, NOAA, USGS • The City of Cedar Rapids • UNESCO HELP • The Nature Conservancy • Sandia Labs
APPROXIMATE COST	$200,000
FUNDING SOURCE	U.S. Army Corps of Engineers of City of Cedar Rapids, IA

SCENARIO

Participants worked within teams to select appropriate adaptation options for the scenarios under the constraints of time, budgets, state and municipal regulations, and technical aspects.

Game challenges took place over four rounds and included: (1) the selection of water management strategies and adaptation options for a 20-year planning period for a (2) flood, (3) drought, and (4) climate change. The scenario was set in the Cedar River Basin and was based upon hydrologic modeling and climate information.

OBJECTIVES

- Increase the participants' awareness of policies, strategies, and resources to reduce drought, flood, and water quality risks
- Evaluate the impacts of mitigation strategies for different climate conditions
- Build relationships and potential partnerships between stakeholders

	Workshop	Games	Tabletop Exercise
Needs	▪ Write a plan component ▪ Education or training ▪ Knowledge sharing ▪ Build consensus ▪ Improve collaboration and communication ▪ Generate mitigation and response strategies ▪ Identify resource needs	▪ Engage a wide variety of individuals in the planning process ▪ Education ▪ Knowledge sharing ▪ Build consensus ▪ Improve collaboration and communication ▪ Explore and evaluate mitigation and response strategies ▪ Practice resource and/or budget allocation	▪ Promote plan familiarity ▪ Training ▪ Information sharing ▪ Practice group problem solving and decision-making ▪ Evaluate mitigation and response strategies ▪ Identify gaps in resource or staff allocation
Format	Informal discussion with presentations and breakout groups	Friendly competition with teams and interactive learning	Low-stress walk through of plan implementation
Participants	Single- or multi-sector Stakeholder or agency	Multi-sector stakeholder	Anyone with a policy, planning or response role
Time	4 hours to multiple days	2–8 hours	1–4 hours
Planning stage	Developing or existing plan	Developing or existing plan	Existing plan

Sample outcomes

North Platte NRD Drought Tournament (2016)

- Led to the development of the 2017 North Platte NRD Community drought plan

Caribbean Virtual Drought Exercise (2022)

- Used NDMC research tying impacts to indicators to help establish response triggers in drought plans of individual nations

Platte River Basin Drought THIRA (2017)

- Informed the 2021 Nebraska state MHMP
- Led to the development of an online drought THIRA planning process for emergency managers

"WATER" you thinking about drought? (2022)

- Exposed Alaska residents to drought monitoring and management
- Informed the development of a protype

Northwest Iowa Drought Preparation Workshop (2020)

- Highlighted the need for and led to the development of the 2023 Iowa drought Plan

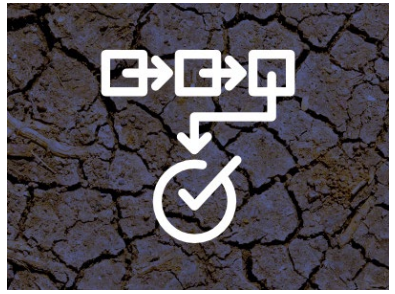
ACF River Basin Drought Tabletop Exercise (2023)

- 1st time the 3 states were in the same room since the 2021 Supreme Court ruling.

EXERCISE DEVELOPMENT PROCESS

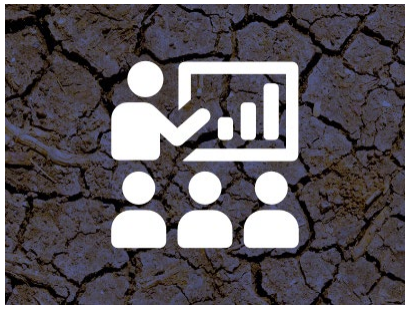
Foundation

Planning



Design

Implementation



Impact

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Overview | Drought Planning | Types | Process | Resources

RESOURCES

Resources

https://drought.unl.edu/scenarioguide

This section offers additional material to build your knowledge about drought planning and scenario exercises. Explore past exercises, case studies, a glossary of terms and a list of references used to create this guide.

Past Events

Worksheets

Glossary

References

Thank you!

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