# Upper Platte Basin Drought Contingency Plan

Drought Task Force Meeting #3

May 23, 2023















# Safety Moment



- Emergency exits
- Tornado shelter
- 911 caller
- CPR
- Restrooms















# Supply Check

- Nametag
- Pen/Pencil
- Reference Packet
- Photo Release Form
  - If you haven't already, sign and return to NeDNR or HDR staff
  - If you don't want your face visible in a photo, grab a "No Photo" sticker and wear it on the front of your shirt

















# Today's Agenda

- Welcome and Introductions
- Review of Vulnerabilities, Priorities, and Monitoring Data
- Discussion of Mitigation and Response Actions by Sector
- Drought Tabletop Exercise
  - Single-Year Drought Scenario
  - Multi-Year Drought Scenario
- Next Steps















# Introductions

#### Tell us who you are! (Name, Role, Organization)















# Review

#### What have we discussed so far?















### **Vulnerabilities and Priorities**

- Drought Task Force members helped identify different drought vulnerabilities, by sector
- Members also helped identify which sector vulnerabilities needed to be prioritized















































































































## **Monitoring Data**

# Based on feedback from previous meetings, the following indicators and indices were determined to be the most beneficial

- Crop Yields/Net Irrigation Requirements: EDDI or SPEI (1to 6-months)
- Energy Demands/Cooling Degree Days: EDDI or SPEI (1- to 4-months)
- Filling of Reservoir Storage\*: PDSI, SPEI, North Platte Snowpack
- Summer River flows\*: PDSI, Snowpack

\* A preferred method is linking Missouri Basin River Forecast Center stream flow ensembles with reservoir/water supply Modeling, such as USBR's North Platte River Basin Annual Operating Plans















# **Monitoring Data**

Monitoring Element	Timing
System Reservoir Water Storage	Year-round
Drought Indices (PDSI, EDDI, SPI)	Year-round
River Flows	Year-round
Snowpack	February – May
Water Delivery/Runoff Forecasts (BOR, etc.)	February-April
Aquifer Levels	Spring and Fall
Allocation Status (Where Applicable)	Spring/Summer















# Mitigation & Response Actions















### Agriculture



Action Type	Action	Vulnerability Addressed
Mitigation	Crop Variety and Seed Spacing	Crop Yield Reduction
Mitigation	Groundwater Recharge Projects	Groundwater/Aquifer Depletion
Mitigation	Irrigation Efficiency	Groundwater/Aquifer Depletion
Mitigation	Rangeland Health (rotational grazing, etc.)	Livestock Feed Shortage, Soil Health
Mitigation	Soil Health (conservation tillage, cover crops, etc.)	Crop Yield Reduction, Soil Health, Erosion
Mitigation	Erosion Conservation Measures	Erosion, Soil Health
Mitigation	Commingled Irrigation	Crop Yield Reduction















# Agriculture



Action Type	Action	Vulnerability Addressed
Response	Livestock Protection, Shade, and Water	Livestock Water Shortage/Health
Response	Irrigation Scheduling	Groundwater/Aquifer Depletion
Response	Emergency Hay/Forage (FSA programs, etc.)	Livestock Feed Shortage















# Energy



Action Type	Action	Vulnerability Addressed
Mitigation	Increase Groundwater Available for Cooling Water	Insufficient Cooling Water
Mitigation	Protect Power Infrastructure from Fire Threats (like wildfires, etc.)	Power Infrastructure Stress and Maintenance
Mitigation	Improvements to Power Infrastructure to Reduce Potential Fire Cause	Power Infrastructure Stress and Maintenance, Fire Threat
Mitigation	Improve efficiency of Water Delivery	Decreased Hydropower, Insufficient Cooling Water















# Energy



Action Type	Action	Vulnerability Addressed
Response	Load and Peak Demand Management	Increased Energy Demand and Power Costs















# Municipal/Industrial/Domestic



Action Type	Action	Vulnerability Addressed
Mitigation	Develop Emergency Action Plans for Water Shortage	Decreased Source Water Quantity, Fire/Emergency Threats
Mitigation/ Response	Drill Deeper Production Wells/Replace Older Infrastructure	Decreased Source Water Quantity, Infrastructure Stress and Maintenance, Decreased Revenue
Mitigation/ Response	Increase Groundwater Quantity Monitoring	Decreased Source Water Quantity
Mitigation (# of monitoring wells)/ Response (increased frequency)	Increase Groundwater Quality Monitoring	Decreased Source Water Quality















### Municipal/Industrial/Domestic



Action Type	Action	Vulnerability Addressed
Response	Water Use Restrictions - Voluntary and Mandatory (Lawn Irrigation)	Decreased Source Water Quantity
Response	Emergency/ Fire Water Storage and/or Access	Fire/Emergency Threats
Response	Emergency Potable Water	Fire/Emergency Threats















### Environmental



Action Type	Action	Vulnerability Addressed
Mitigation	Increased habitat/biodiversity ("Corners for Wildlife" for example)	Ecosystem Function/ Biodiversity, T&E Critical Habitat
Mitigation	Increase Riparian Buffer Zones	Terrestrial and Aquatic Habitat, Surface Water Quality
Mitigation	Improve Drought Resilient Habitats (existing and new)	Ecosystem Function/ Biodiversity, T&E Critical Habitat
Mitigation	Controlled Burns	Fire Threat
Mitigation	Improve Wildlife Protection	Biodiversity, Aquatic Habitat, T&E Critical Habitat
Mitigation	Control Invasive and Monoculture Vegetation (Phragmites, Cedars, Russian Olive)	Fire Threat/Impact, Ecosystem Function, T&E Critical Habitat















### Environmental



Action Type	Action	Vulnerability Addressed
Response	Coordinate Wildfire Suppression	Fire Threat/Impact
Response	Habitat Recovery	Biodiversity, Aquatic Habitat, T&E Critical Habitat















#### Recreation



Action Type	Action	Vulnerability Addressed
Mitigation	Lake Dredging	Aquatic Recreation, Ecotourism
Mitigation	Watershed WQ Management	Aquatic Recreation, Game/Fish Disease, Ecotourism
Mitigation	Drought Resilient Water-Based Recreational Facilities	Aquatic Recreation, Ecotourism
Mitigation	Improve diversity of recreational activities	Ecotourism















#### Recreation



Action Type	Action	Vulnerability Addressed
Response	Fish and Game Regulations During Drought	Game/Fish Disease, Aquatic Recreation, Upland Game















### Socio-Economic



Action Type	Action	Vulnerability Addressed
Mitigation	Access to Different Mental Health Resources	Mental and Public Health
Mitigation	Public Outreach and Drought Education	Decreased Public Services, Economic Development
Mitigation	Prepare and Train for Disease Outbreaks	Public Health
Mitigation	Improve Communication About Available Financial Assistance	Inequity in Relief, Mental Health, Population Decline
Mitigation	Improve Drought Resilience of Public Services	Decreased Tax Revenue, Reduced Economy, Economic Development















#### Socio-Economic



Action Type	Action	Vulnerability Addressed
Response	Increase Drinking WQ Monitoring	Public Health
Response	Increase Air Quality Monitoring	Public Health
Response	Coordinate Disaster Relief	Inequity in Relief, Mental Health, Reduced Economy
Response	Emergency Response (Red Cross, National Guard, coordinate volunteer fire districts, etc.)	Public and Mental Health















# BREAK

#### We'll see you back here in about 15 minutes!















# **Drought Tabletop Exercise**















### **Drought Tabletop Exercise**

- Walking through two drought scenarios
- Looking at monitoring data
- Identifying triggers and applying mitigation and response actions
- Want to examine:
  - What should trigger each mitigation and response action
  - Potential benefits/complications of each action
  - What monitoring data are we missing, that may help with these scenarios?















## **Drought Tabletop Exercise**

- Breaking into small groups
- Packet of reference materials
  - Suggested Mitigation and Response Actions
  - Indicators and Indices Table
  - Discussion Questions
  - Monitoring References
  - Several Reference Articles on Agriculture, Energy, Water Supply

















# Single-Year Drought Scenario

**Tabletop Exercise** 















### Single-Year Drought Scenario

• Using 2012 as a historical reference















#### Historical Indicators (PDSI)




















# Historical Indicators & Indices (2012) Various Indices – August 2011





# Historical Indicators & Indices (2012) Snow, Reservoir Storage, Stream Flows – August 2011

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# Historical Indicators & Indices (2012) Various Indices – March 2012



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# Historical Indicators & Indices (2012) Snow, Reservoir Storage, Stream Flows – March 2012

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# Historical Indicators & Indices (2012) Various Indices – June 2012





# Historical Indicators & Indices (2012) Snow, Reservoir Storage, Stream Flows – June 2012

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# Historical Indicators & Indices (2012) Various Indices – October 2012





# Historical Indicators & Indices (2012) Snow, Reservoir Storage, Stream Flows – October 2012

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### Impacts of the 2012 Drought



Single-year Drought















# Impacts of the 2012 Drought

Groundwater-level Changes in Nebraska - Spring 2013 to Spring 2014







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# Impacts of the 2012 Drought (GW Levels)



# Multi-Year Drought Scenario

**Tabletop Exercise** 















# Multi-Year Drought Scenario

• Using 2003 - 2006 as a historical reference

















# Historical Indicators (PDSI)



















2002 - 2006 DROUGHT CYCLE



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#### Historical Indicators & Indices (2003-2006) Various Indices – October 2005



### Historical Indicators & Indices (2003-2006) Snow, Reservoir Storage, Stream Flows – October 2005

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Storage			River Flo	ws
Total			WY/NE Stateline	•
McConaughy			Roscoe	
Glendo			Overton	
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Pathfinder				
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#### Impacts of the 2003 – 2006 Drought

Groundwater-level Changes in Nebraska - Spring 2000 to Spring 2006



CONSERVATION AND SURVEY DIVISION (http://csd unl.edu) School of Natural Resources (http://snr.unl.edu) Institute of Agriculture and Natural Resources/College of Arts and Sciences University of Nebraska-Lincoln

U.S. Geological Survey Water Resources Division - Nebraska District

Nebraska Natural Resources Districts

Central Nebraska Public Power and Irrigation District

Mark Burbach, Water Levels Coordinator, CSD







Nebraska ]



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# Impacts of the 2003-2006 Drought





#### When April/May forecasts come out (spring)...

- What data are you paying close attention to?
  - Where are you accessing that data?
- What coordination activities need to take place?
- What mitigation actions should be considered?

SOUTH PLATTE

- What mitigation actions can individual organizations take to lessen the effects?
- What are the ripple effects of these actions? (Downstream, across NRDs, between communities and ag users, etc.)
- What policies, projects, and/or coordination activities are needed to make the mitigation actions work?
- How will these mitigation actions support or conflict with existing plans (NRD plans, City plans, etc.)?
- What are the specific triggers for each mitigation action?













#### When drought is starting (summer)...

- What data are you now paying close attention to?
  - Where are you accessing that data?
- What were the resulting effects of the mitigation actions taken following the spring forecasts?
- What response actions should be considered?
  - What response actions can individual organizations take to get through the next several weeks?
  - What are the ripple effects of these actions? (Downstream, across NRDs, between communities and ag users, etc.)
  - What policies, projects, and/or coordination activities are needed to make the response actions work?
  - How will these response actions support or conflict with existing plans (NRD plans, City plans, etc.)?
- What are the specific triggers for each response action?













#### Early in drought, following summer of Year 1 (fall)...

- What data are you now paying close attention to?
  - Where are you accessing that data?
  - What triggers are used to make decisions for the following year?
- What actions were taken during historic multi-year droughts?
- What additional coordination activities need to take place?
- What additional response actions should be considered?















#### When drought moves into multiple years...

- What data are you now paying close attention to?
  - Where are you accessing that data?
- What additional coordination activities need to take place?
- What additional response actions should be considered?
  - What policies projects, and/or coordination activities are needed to make additional response actions work?
  - How will these response actions support or conflict with existing plans (NRD plans, City plans, etc.)?
  - How will current conditions and needed response actions be communicated to the public?





SOUTH PLATTE









# For Consideration...

- Which of the mitigation and response actions from the scenario are things that can be implemented relatively easily?
- Which of the mitigation and response actions from the scenario may need additional time, resources, and/or funding?















# **Next Steps**















# **Next Steps**



#### Next Drought Task Force Meeting:

• June 27, 2023 - Take a Closer Look at the Draft Plan



#### **Draft Plan anticipated Summer 2023**














## Any Questions?















## THANK YOU!













