

Drought Decision Tools, Planning, and Mitigation:

Challenges and Opportunities

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Drought differs from other natural hazards

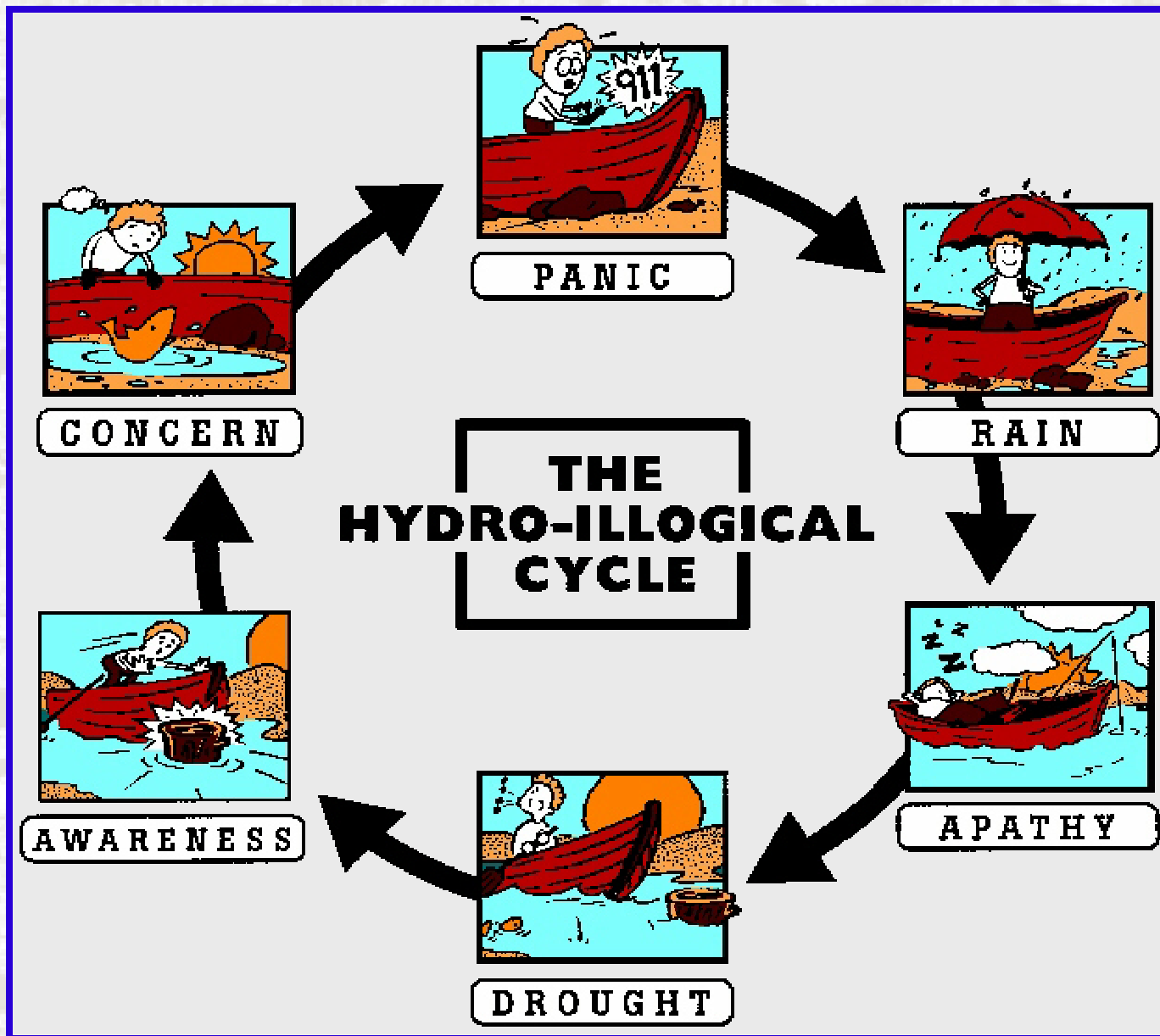
- Slow-onset, creeping phenomena (early warning systems, impact assessment, response)
- Absence of universal definition (leads to confusion and inaction)
- Severity is best described through multiple indicators and indices (early warning systems)
- Impacts are non-structural and spread over large areas (makes assessment and response difficult; mitigation actions less obvious)
- **RESULT**, progress on drought preparedness has been slow

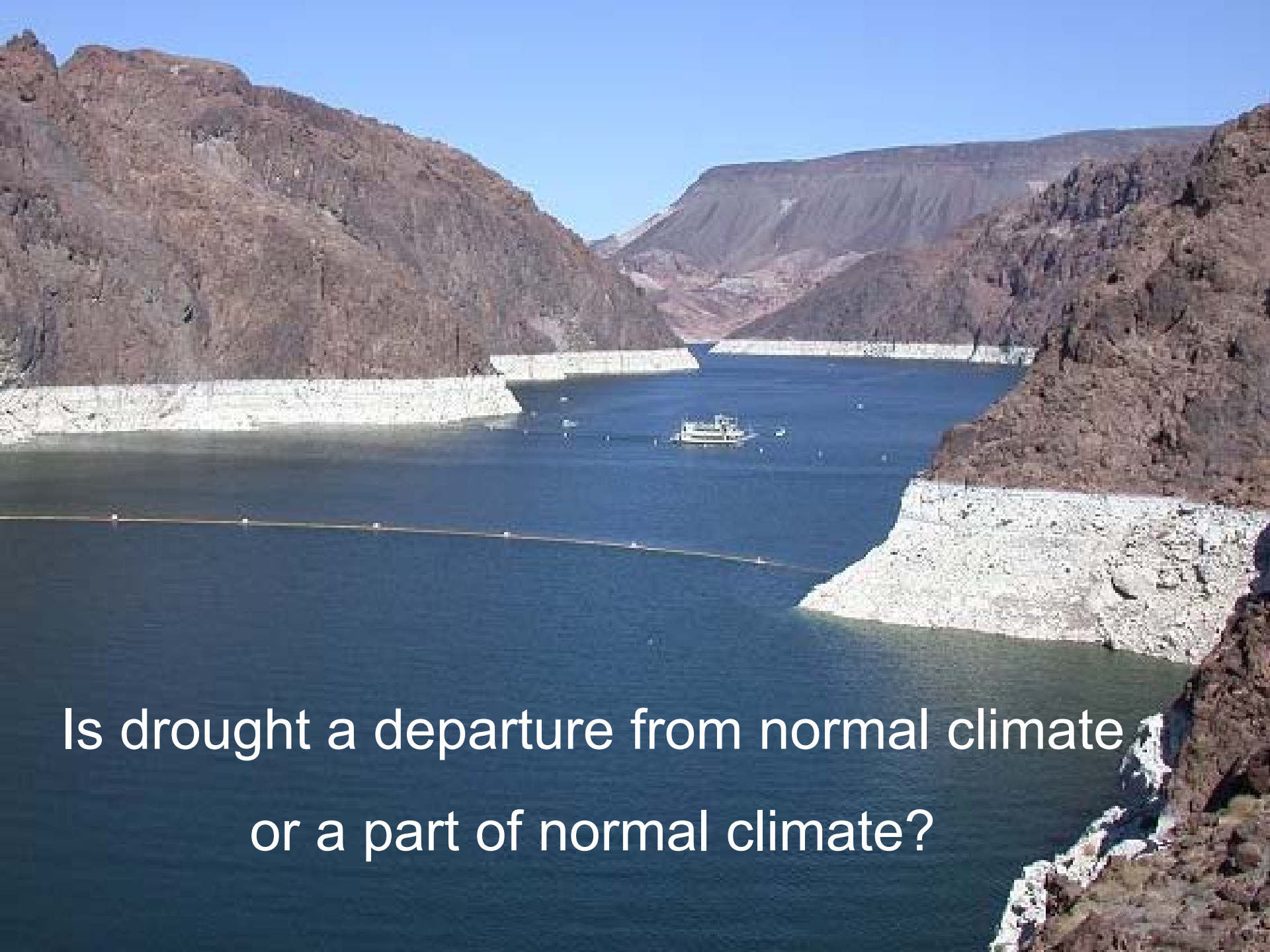
Drought: a deficiency of precipitation (**intensity**) from expected or “normal” that, when extended over a season or longer period of time (**duration**), is insufficient to meet the demands of human activities and the environment (**impacts**).

Risk = Hazard x Vulnerability

Why the Recent Global Interest in Drought?

- Single and **multi-year** severe droughts
 - Intensity and duration
 - Occurrence in arid to humid regions
- Spatial extent—e.g., 30 to 50% of U.S.
- Magnitude and complexity of impacts in both developing and developed countries
 - Agriculture, energy, transportation, urban water supply, recreation/tourism, fires, environmental, social
 - Conflicts between water users
 - Water restrictions (agricultural and urban)
- Increasing vulnerability in developing/developed countries
- Increasing capability to develop integrated drought early warning systems
- Experience with drought mitigation and preparedness planning—lessons learned

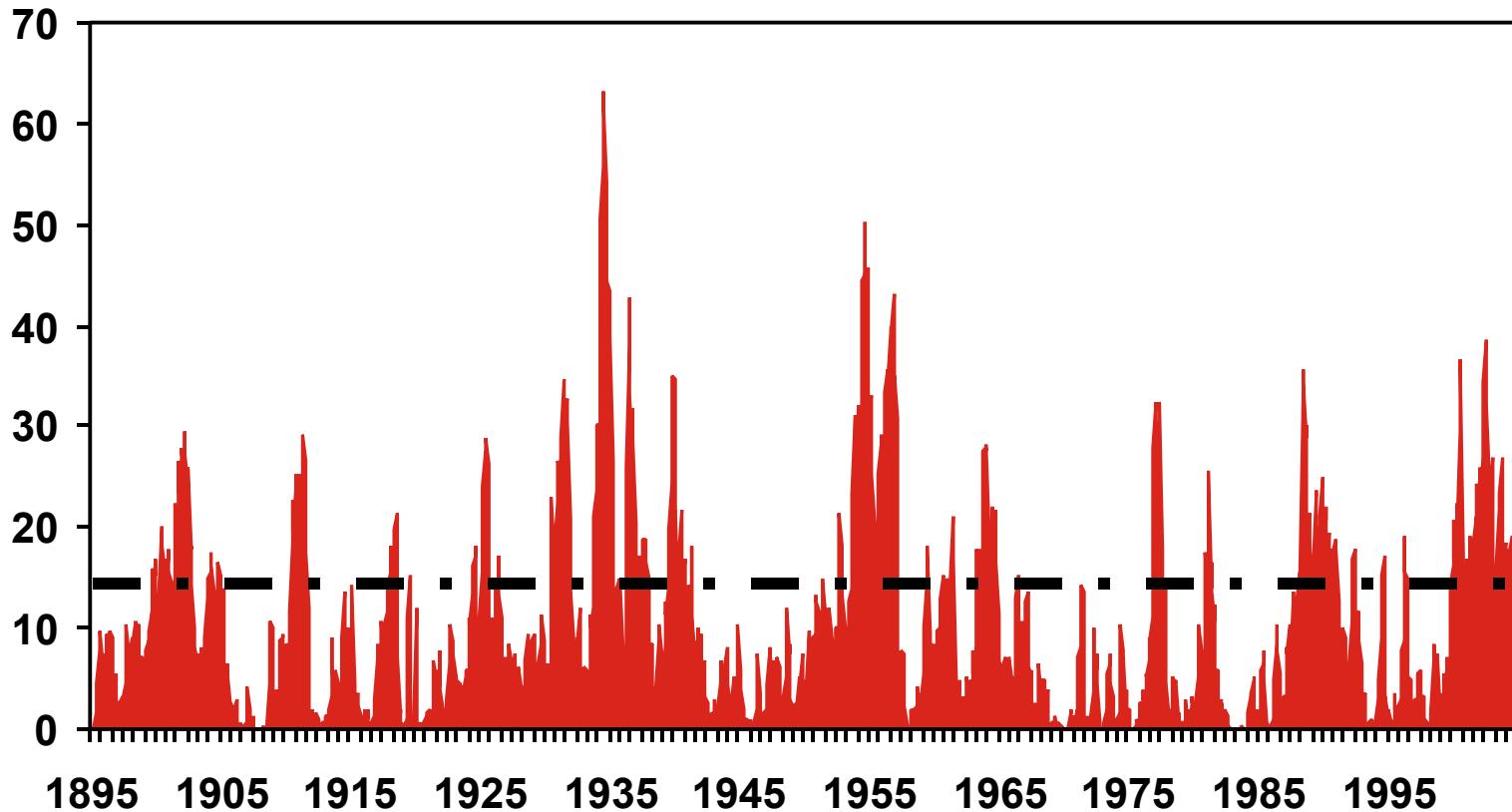




Is drought a departure from normal climate
or a part of normal climate?

Percent Area of the United States in Severe and Extreme Drought

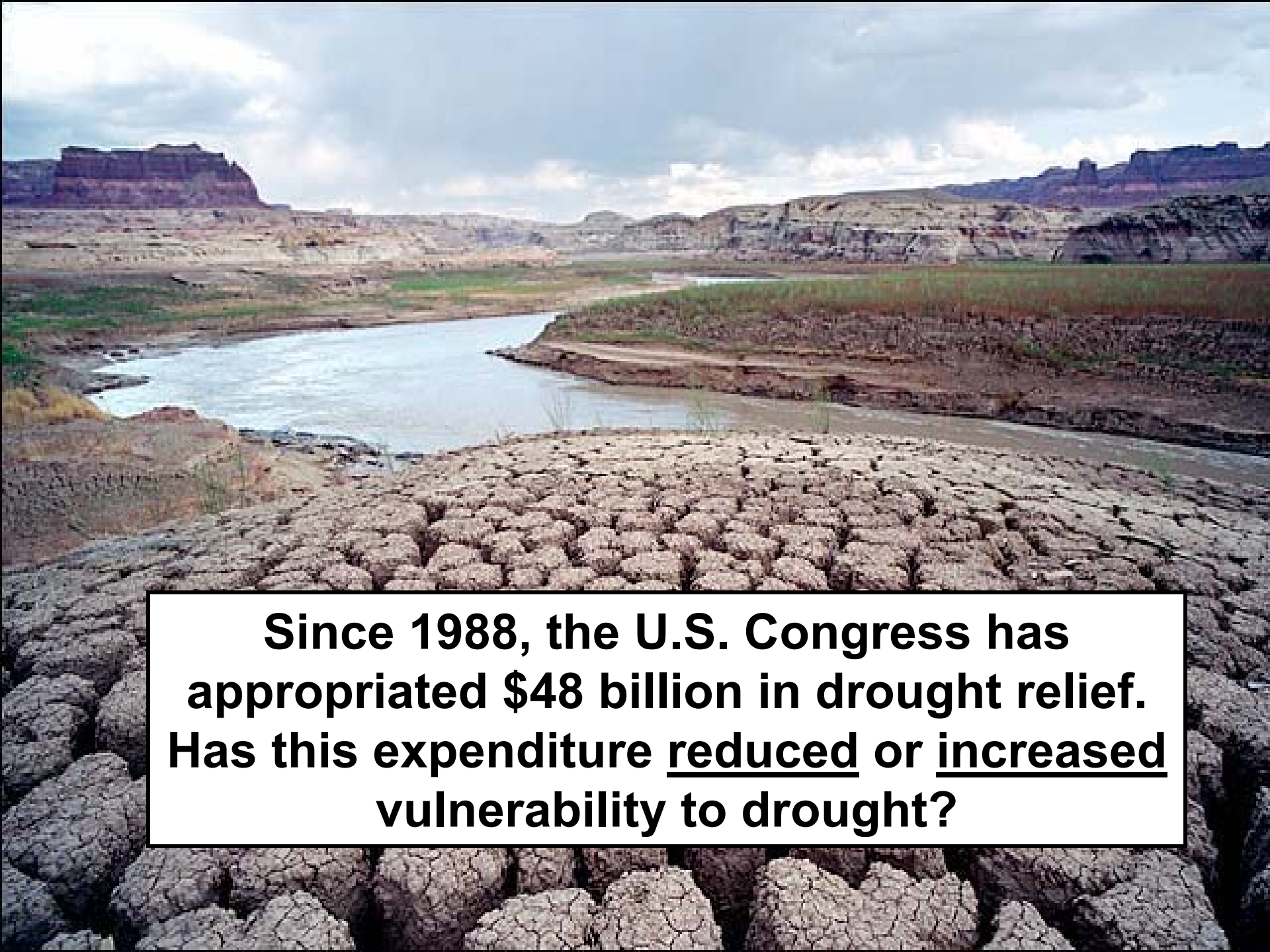
January 1895–November 2004



Based on data from the National Climatic Data Center/NOAA

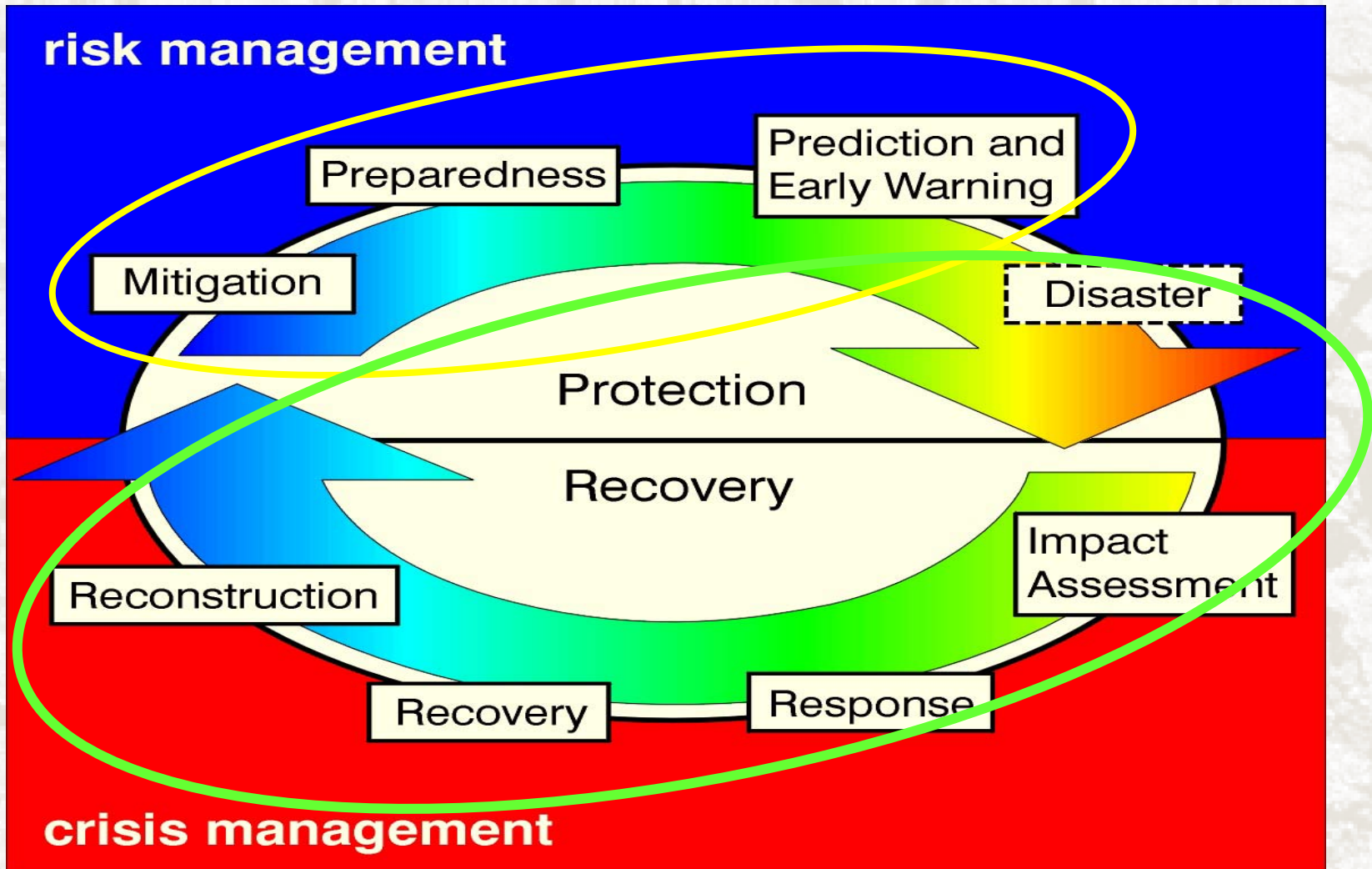
Lessons Learned—U.S.

- Federal assistance programs are numerous, poorly coordinated, and **reactive** (response/post-impact oriented)
- Relief increases vulnerability, no incentive to change resource management practices → **greater impacts, increased need for government assistance**
- Preparedness and mitigation reduces vulnerability, impacts, and the need for government intervention; **a good investment**
- Early warning is the foundation of effective drought planning and mitigation → **integrated early warning**
 - Improve monitoring networks and information delivery to end users to improve decision making → reduces risk and impacts
 - Comprehensive, integrated assessments



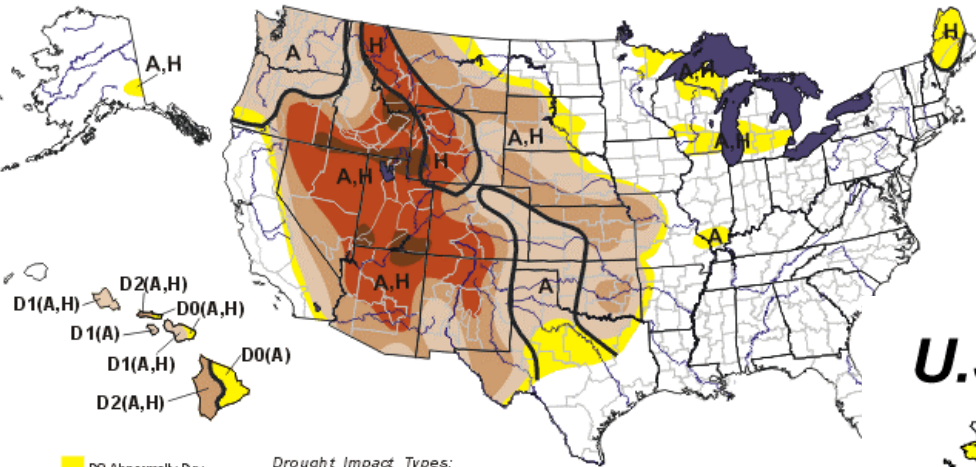
Since 1988, the U.S. Congress has appropriated \$48 billion in drought relief. Has this expenditure reduced or increased vulnerability to drought?

The Cycle of Disaster Management



Drought Severity and Spatial Extent, 2003-2004

U.S. Drought Monitor July 29, 2003 Valid 8 a.m. EDT



- Drought Impact Types:**
 A= Agricultural (crops, pastures, grasslands)
 H= Hydrological (water)
 No type = both impacts
 ~ Delineates dominant impacts

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

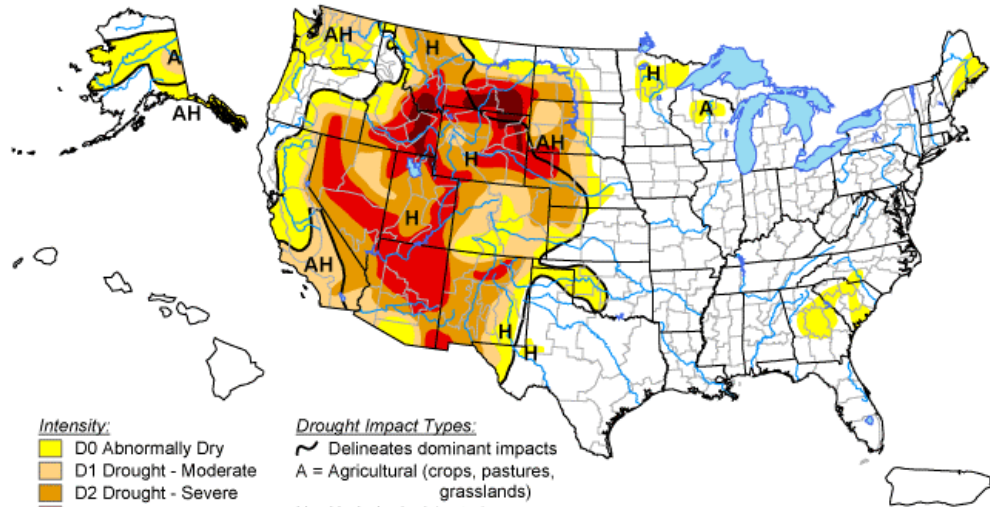
<http://drought.unl.edu/dm>



Released Thursday, July 31, 2003

Authors: David Miskus, NOAA/CPC/JJA1 and Brad Rippey, USDA/JAWF

U.S. Drought Monitor July 27, 2004 Valid 8 a.m. EDT



- Intensity:**
 Yellow: D0 Abnormally Dry
 Light Orange: D1 Drought - Moderate
 Dark Orange: D2 Drought - Severe
 Red: D3 Drought - Extreme
 Dark Red: D4 Drought - Exceptional
- Drought Impact Types:**
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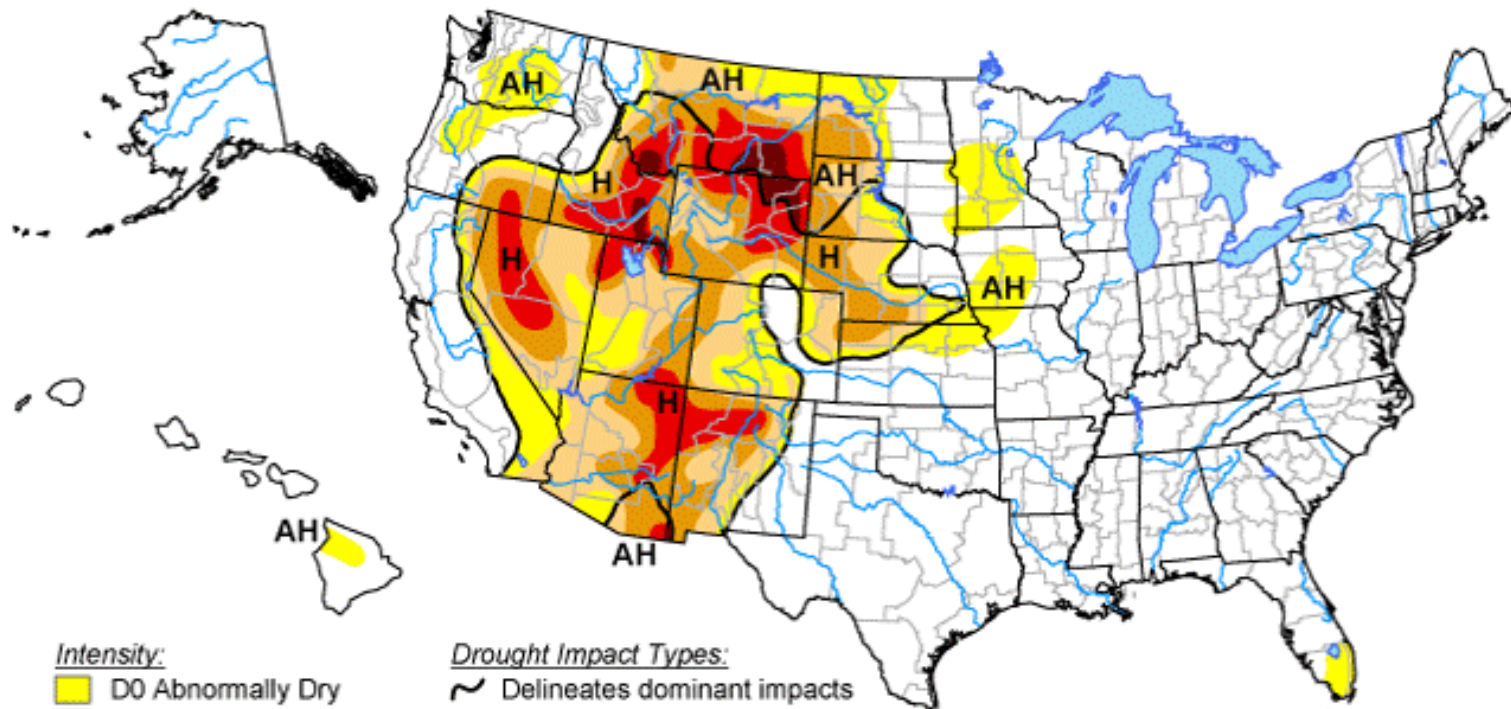


Released Thursday, July 29, 2004






Authors: Richard Heim/Candace Tankersley, NOAA/NCDC

U.S. Drought Monitor


January 4, 2005
Valid 7 a.m. EST



Intensity:

-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

Drought Impact Types:

-  Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- (No type = Both impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, January 6, 2005
Author: Mark Svoboda, NDMC



North American Drought Monitor

August 2004

Released: Wednesday, September 22, 2004

<http://www.ncdc.noaa.gov/nadm.html>

Analysts:

Canada - Ted O'Brien
Dwayne Chobanik
Mexico - Miguel Cortez
U.S.A. - Mark Svoboda*
Michael J. Hayes*
David Miskus*

(* Responsible for collecting analysts input & assembling the NA-DM map)

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

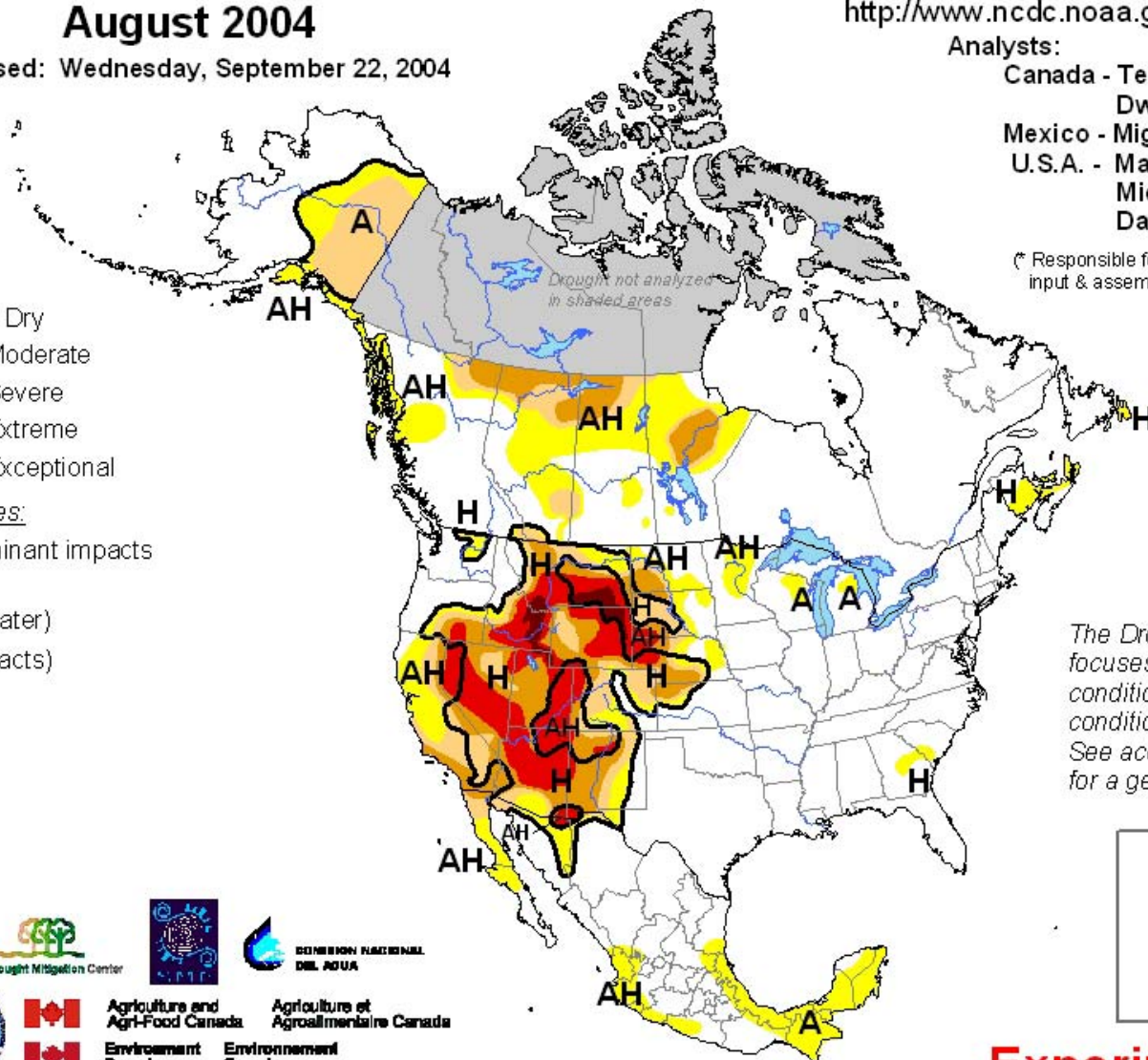
Drought Impact Types:

Delineates dominant impacts

A = Agriculture

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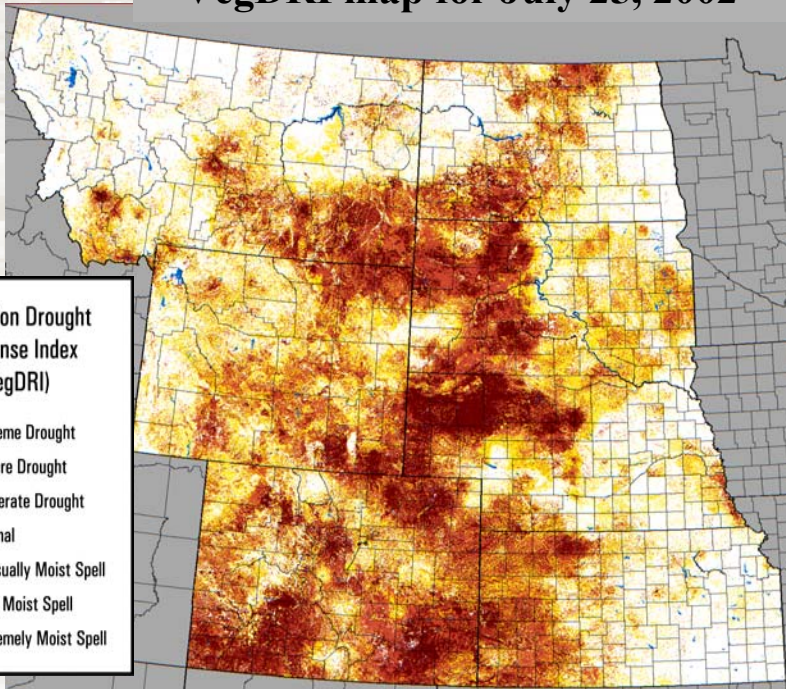
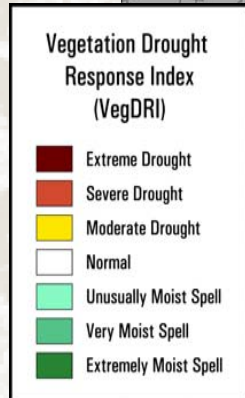


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Environnement Canada

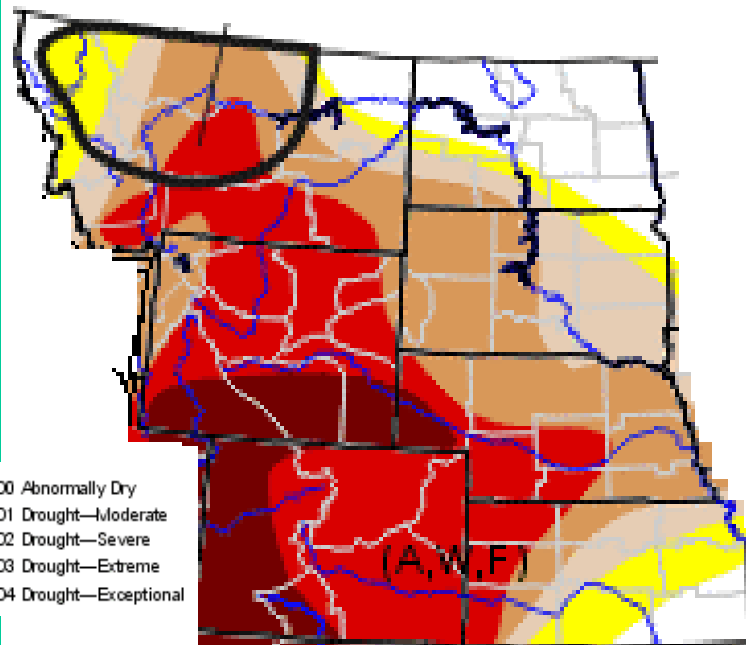
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Environnement Canada

Experimental

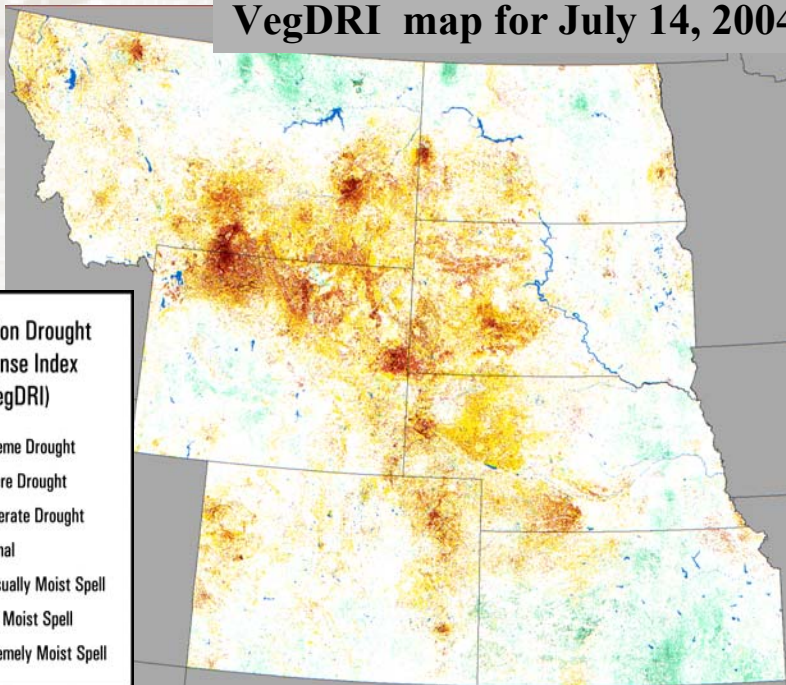
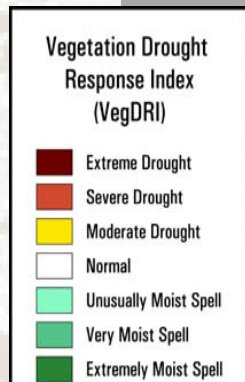
VegDRI map for July 25, 2002



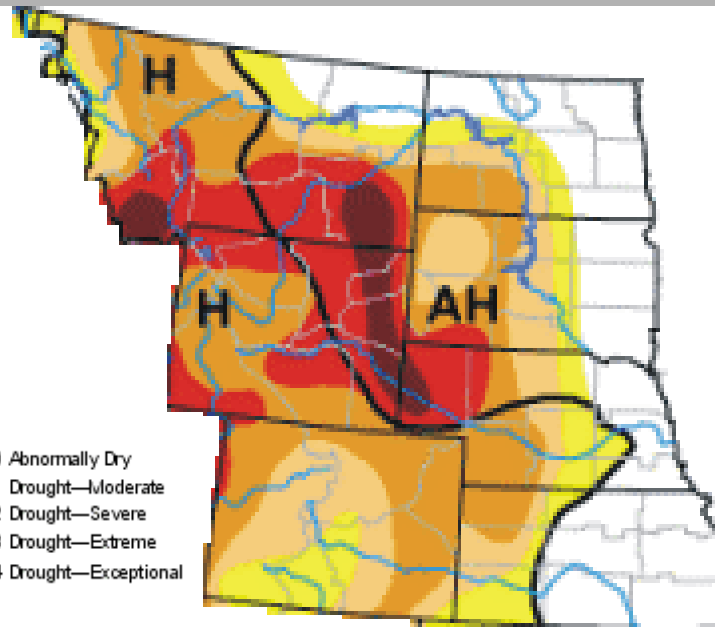
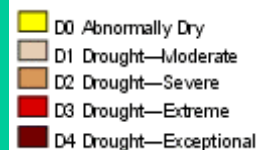
Drought Monitor map for July 23, 2002



VegDRI map for July 14, 2004



Drought Monitor map for July 13, 2004



Drought Monitoring - Microsoft Internet Explorer
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Address http://gisdata.usgs.gov/website/Drought_Monitoring/viewer.asp Go Links

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Drought Monitoring

Home Overview

Zoom
[Icons for zoom in, zoom out, pan, etc.]

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[Icons for query, info, etc.]

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[Icons for tools, print, etc.]

Docs
[Icons for documents, help, etc.]

Due to problems with the NOAA 16 satellite, we are not U.S. Department of the Interior
URL: <http://gisdata.usgs.gov/web>

Seasonal Gre
Most Recent Seasonal Gre

Map: -107.81 , 36.85 -- Image: 192 , 2

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Hayes County
Hitchcock Co
Rawlins Cou

Map: -100.64 , 39.7 -- Image: 210 , 296 --

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Home Overview Methods Data Links

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URL: http://gisdata.usgs.gov/website/Drought_Monitoring/

Map: -100.58 , 40.18 -- Image: 217 , 297 -- ScaleFactor: 0.00037937499547730896

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URL: http://gisdata.usgs.gov/website/Drought_Monitoring/ || Maintainer: webmapping@usgs.gov || Modified: April 15, 2003

Map: -100.58 , 40.18 -- Image: 217 , 297 -- ScaleFactor: 0.00037937499547730896

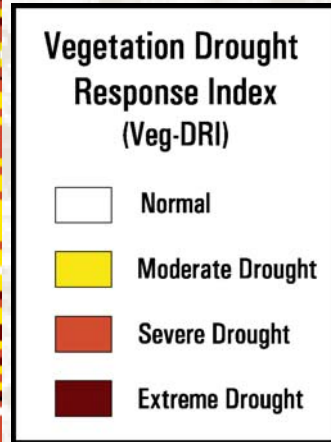
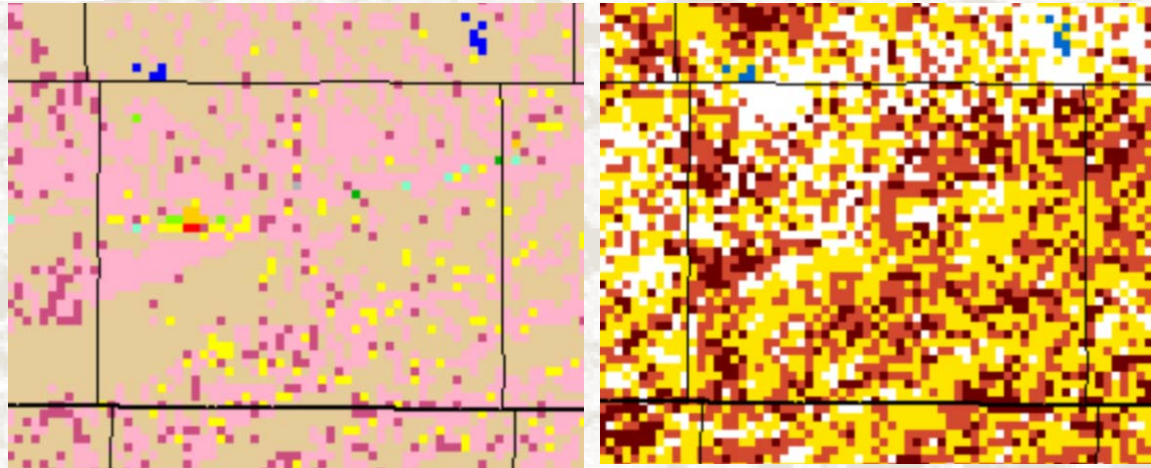
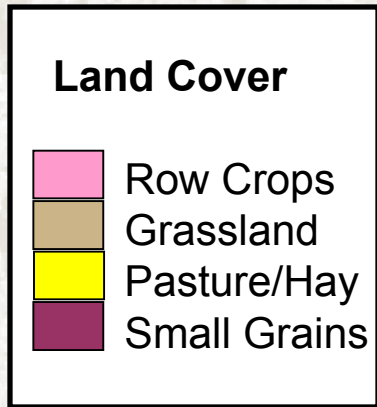
Scale Information
Out In
Scale ~ 1:162,430

Layers

- Places (Names)
 - GNIS Populated Places Labeled
 - GNIS Populated Places
 - GNIS Dams
 - National Atlas and USGS State Boundary Labels
 - USGS County Boundary Labels
- Boundaries
 - Climate Divisions
 - National Atlas and USGS State Boundaries
 - USGS County Boundaries
 - National Atlas



Red Willow County, Nebraska



July 25, 2002

168,000 acres of grassland affected by drought

(25% severe and extreme, 53% moderate)

376,000 acres of row crops affected by drought

(68% severe and extreme, 23% moderate)

41,800 acres of pasture/hay affected by drought

(40% severe and extreme, 40% moderate)



Creating a Drought Early Warning System for the 21st Century

*The National Integrated Drought Information System
(NIDIS)*

NIDIS Vision

A dynamic and accessible drought information system that provides users with the ability to determine potential drought impacts and associated risks and the decision support tools needed to better prepare for and mitigate the effects of drought.



N • I • D • I • S

NIDIS Recommendations

- Establish NIDIS (NOAA as lead agency)
- Integrate data and tools (identify and fill gaps)
- Develop an impact reporting/methodology tool
- Establish an integrated federal drought research program
- Facilitate drought preparedness programs
- Provide a framework for education and user feedback/interaction



N • I • D • I • S

Global Drought Preparedness Network

GOAL:

To help nations build greater institutional capacity to cope with drought by promoting risk management and sharing lessons learned on drought monitoring and prediction, mitigation, and preparedness.



Building a Network of Regional Networks
through Regional and Global Partnerships

Drought

Living With Risk:
An Integrated Approach to Reducing
Societal Vulnerability to Drought

ISDR Ad Hoc Discussion Group on Drought



www.unisdr.org



A Partnership

International Strategy
ISDR
for Disaster Reduction

Conclusions

Shifting to a New Drought Management Paradigm

We need to:

- Adopt new monitoring, risk assessment, and planning tools and methodologies
- Improve coordination within and between national, provincial, and local levels to improve information flow and decision making
- Pursue **Risk = Hazard x Vulnerability** approach
- Facilitate building institutional capacity by developing regional and global networks
- Acquire greater recognition of drought as hazard by disaster management community

Thanks!

**Visit the NDMC
drought.unl.edu
dwilHITE2@unl.edu**

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