Drought definitions in drought mitigation

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Introduction

- Drought Definitions
- Crisis Responses and Challenges
- Drought Mitigation Framework

Definitions of Drought

Specialized field of study

- **meteorologist, a period of abnormal dry weather**
- **hydrologist, a sufficient lack of water causing significant hydrologic imbalance in an area**
- **water resources engineer, a problem of supply and demand**
- **agriculturalist, a moisture function of the specific cultivated crop**
- **economist, important economic impacts**
- **sociologist, stresses in a given social structure**

Definitions of Drought

Traits of a given locale

- moisture amounts are less than a specified value in a certain time period
- moisture deviations from a normal or mean value
- if moisture conditions are not satisfying human needs and established practices

Definitions of Drought

- difficulty to modify existing drought terminology according to updated techniques and practices
- focused only on one of the various drought components

Definitions of Drought

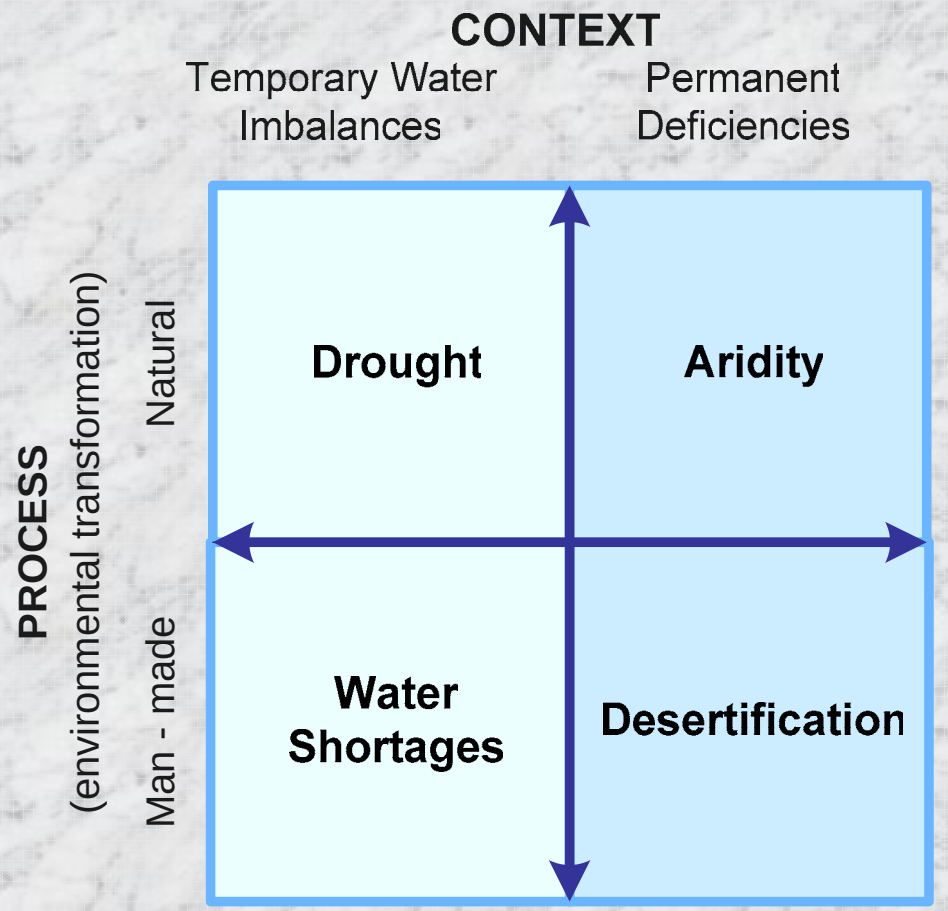
- Operational definitions attempt to demarcate the severity, onset and termination point of droughts
- Conceptual definitions attempt to identify the boundaries of the drought event

Causes of Drought

- Meteorological and hydrological factors
- Astrophysical factors
- General climatic shifts
- Human activities

Water Deficiencies

(adapted from Vlachos, E.C., 1983)



Drought

- a usually unexpected and unpredicted time period of abnormal dryness which affects water supply" (Grigg, N.S., 1988).
- A period when moisture availability falls below the water requirements in an area (Agnew and Anderson, 1992)
- The state of adverse and wide spread hydrological, environmental, social and economic impacts due to less than generally anticipated water quantities (Karavitis, 1992, 1999)

CRISIS & OPPORTUNITY [Pronounced "wēi - drōng - jī"]

"Opportunity in the Midst of Crisis" is the literal translation of this Chinese phrase. The Chinese word for "crisis" (危机) is comprised of two parts: "danger" (危) and "opportunity" (机 or 機), and the character " 中 " means "center". The ancient form for "danger" is " 危 " depicting a person on the edge of a precipice. The ancient form for "opportunity" is " 機 ". " 幺 " is believed to depict the cocoon – a symbol of transformation.

– Words and Calligraphy by Yunn Pann

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Crises

- Engineering Crisis

  Supply and Demand
- Ecological Crisis

  Water Quality and Environment
- Methodological Crisis

  Data & DSS, Information - Judgement
- Organizational Crisis

  Capacity Building, Institutional mobilization & Coordination
- Perceptual Crisis

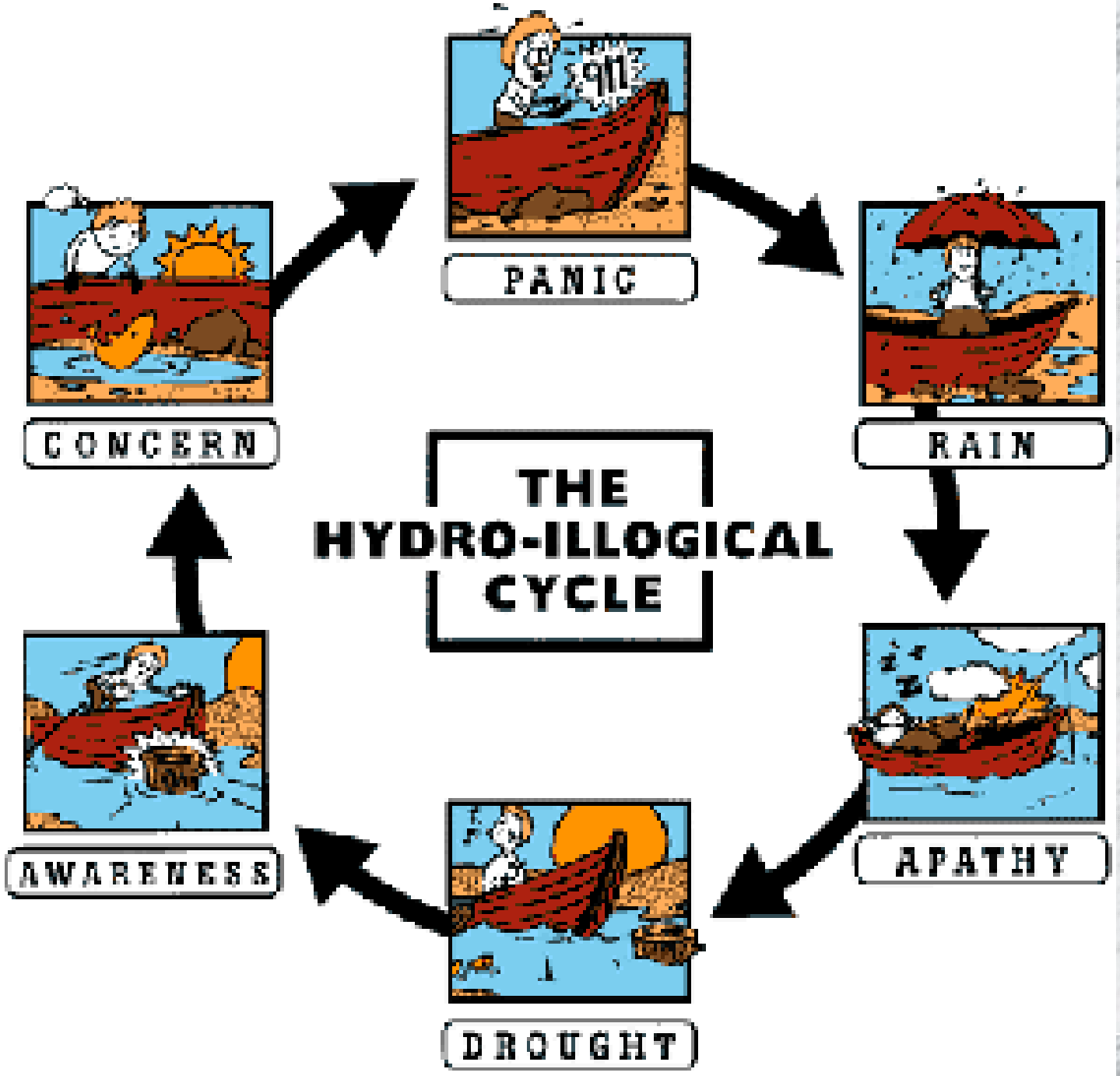
  Public Involvement & Participation, WFD

Crisis responses

- Why are Drought Response Strategies Needed?
- Natural Hazards Emergency Response Procedures
- Protocols for Process and Procedures

Challenges

- Significant Potential for Conflict
- Water Management is Multi-Jurisdictional (Local, Sectorial, National)
- Many Decision Influence Groups
- Difficult Trade-off Decisions
- Information Management is Crucial
- Difficult to Define When the Drought Begins and Ends (drought index)


PANIC
RAIN
APATHY
DROUGHT
AWARENESS
CONCERN
THE HYDRO-ILLOGICAL CYCLE

NDMC

Drought Research Methods

- according to the field of study (i.e., meteorology, agriculture, hydrology, economics, biology, sociology, etc.).
- centering on a specific drought physical variable (i.e., soil moisture, precipitation, evapotranspiration, streamflow, groundwater level, etc.)

Drought Research Methods

according to the method of data analysis

- drought index method
- empirical data method
- analytical method
- data generation method

focusing on the extent of the drought event

according to the drought characteristics

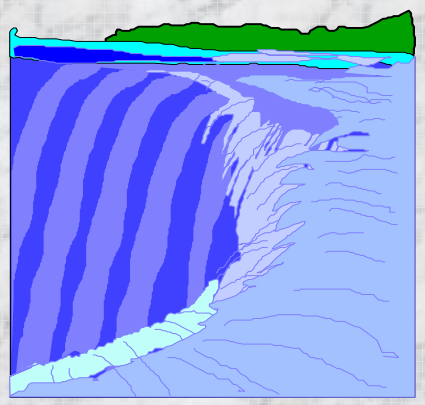
Integrated Drought Management Approach

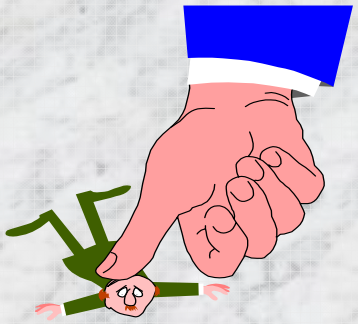
- drought forecasting
- risk assessment and impact assessment
- drought contingency planning

Integrated Drought Management Strategies

TACTICAL STRATEGIES-MANAGEMENT OPTIONS

- **SUPPLY ENHANCEMENT**
- **DEMAND MANAGEMENT**
- **IMPACT MINIMIZATION**





Drought Management Process

General 10-step Contingency Planning Process

1. Appoint a Drought Task Force
2. Define the Purpose and Objectives of the Drought Plan
3. Seek Stakeholder Participation and Resolve Conflict
4. Inventory Resources and Identify Groups at Risk
5. Develop Organizational Structure and Prepare Drought Plan
6. Integrate Science and Policy, Close Institutional Gaps
7. Publicize the Proposed Plan, Solicit Reaction
8. Implement the Plan
9. Develop Education Programs
10. Post-Drought Evaluation

National Drought Mitigation Center - Microsoft Internet Explorer

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Address http://enso.unl.edu/ndmc/ Go Links

National Drought Mitigation Center
University of Nebraska–Lincoln

The National Drought Mitigation Center helps people and institutions develop and implement measures to reduce societal vulnerability to drought. The NDMC, based at the University of Nebraska-Lincoln, stresses preparation and risk management rather than crisis management.

- **Quick Info for Media**
- **U.S. Drought Monitor**
- **Interim National Drought Council**

Drought Watch
SPI maps & current conditions

Drought Science
definitions, indices, etc.

What's New
news & site updates

Climatology
maps, charts, graphs

Impacts
effects of various droughts

NDMC
publications, about us

Drought Links
web resources

Mitigation
easing impacts

Network
drought planners nationwide

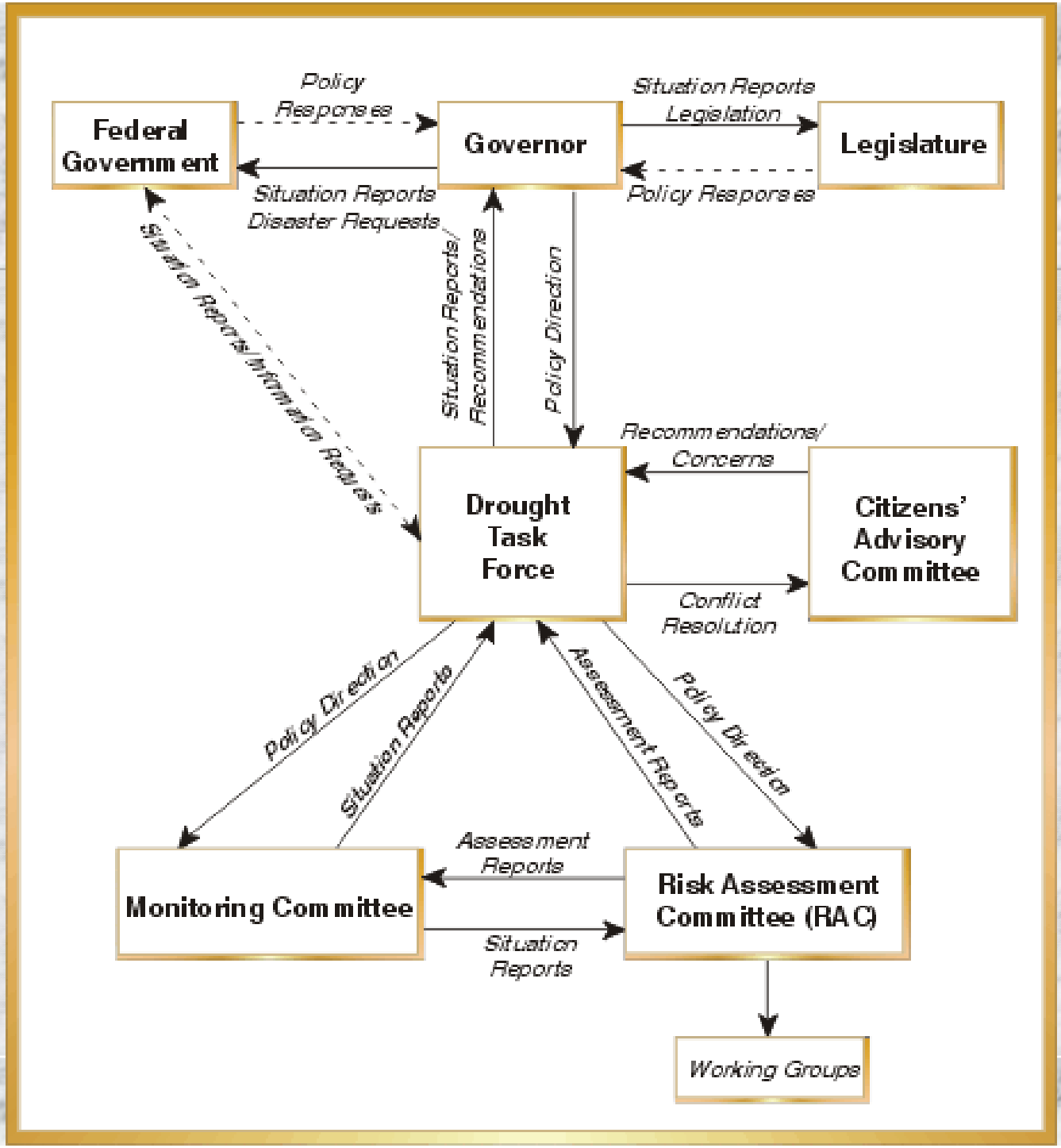
Search the Site
with Excite

Methodologies
build a drought plan

Why Plan?
intro for newcomers

Send e-mail to the NDMC | More detailed contact information | Awards

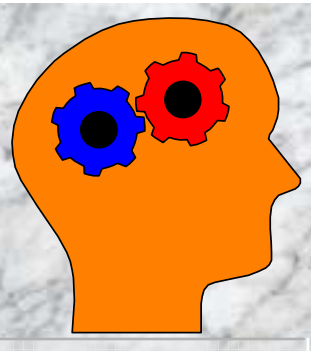
Internet


Federal Government
Policy Responses
Governor
Situation Reports Legislation
Legislature
Situation Reports Disaster Requests
Policy Responses
Situation Reports/ Information Requests
Situation Reports/ Recommendations
Policy Direction
Drought Task Force
Recommendations/ Concerns
Citizens' Advisory Committee
Conflict Resolution
Policy Direction
Situation Reports
Assessment Reports
Policy Direction
Monitoring Committee
Assessment Reports
Risk Assessment Committee (RAC)
Situation Reports
Working Groups

Drought Mitigation, by and for Federal, State and International Policy Makers

Source	Document	Description
U.S. Government		
Army Corps of Engineers, Institute for Water Resources	National Drought Study: • *National Study of Water Management During Drought* • *Lessons Learned from the California Drought (1987-1992)*	Contact William J. Werick, project leader, at COE's Institute for Water Resources, Casey Building, 7701 Telegraph Road, Alexandria, VA 22315-3868, 703/428-9055
	Computer Models for Water Resources Planning and Management	by Ralph A. Wurbs, Texas A&M University, Dept. of Civil Engineering, College Station, TX 77843-3136, for the USACE (refer to above contact info)
Bureau of Reclamation	Responses to drought	• Excerpts from Reclamation Drought Assistance Report, 2/91 • Reclamation States Emergency Drought Response Act of 1991 • Examples of Reclamation's early '90s drought mitigation projects

Suggestions



- Strive for Response Strategies That are Highly Structured *Yet* Flexible
- Practice with "Drought Drills" to Improve the Process
- Conduct the Post-Audits
- Regularly Update the Response Plan – Contingency Planning
- Interact With Other Agencies to Share Information

Team Members

- Must Have the Required Time
- Must Have the Required Resources
- Must Have the Authority to Commit Their Agencies

Conclusions

- “Appropriate” Drought Definition
- Drought Management has to Receive more Attention, Nationally and Internationally
- Few Countries Have Drought Contingency Plans
- Need to Continue to Share Information and Experiences

Questions