

Drought Hazard Planning

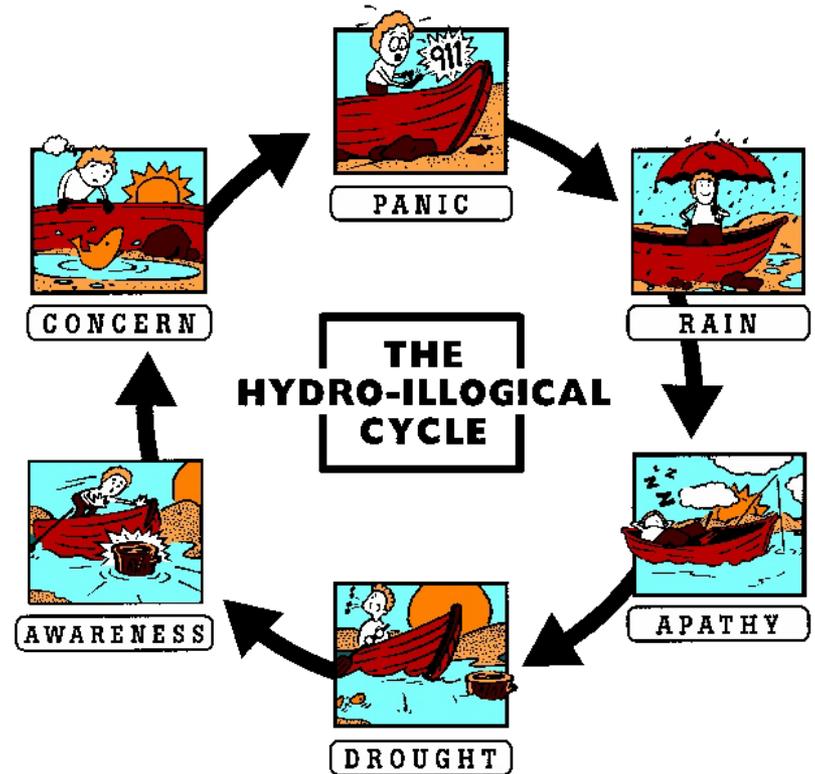
**Cody Knutson
National Drought Mitigation Center
School of Natural Resources
University of Nebraska-Lincoln**

Photo: Cimarron County, OK
(Gary McManus, Oklahoma
Climatological Survey, late
June, 2008)

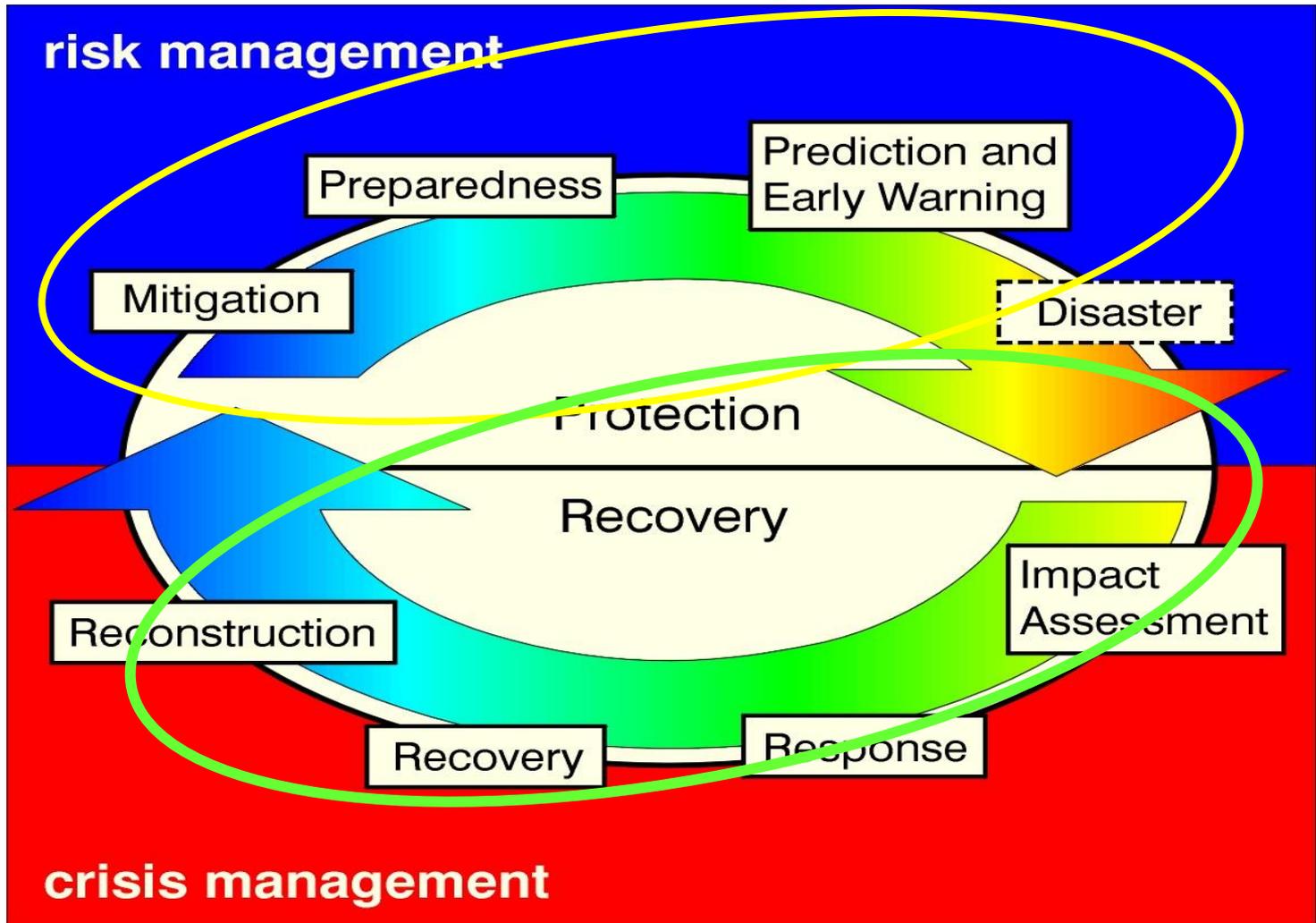
Ranch Planning Meeting, Lincoln, NE, September 29, 2009

The Crisis Management Approach

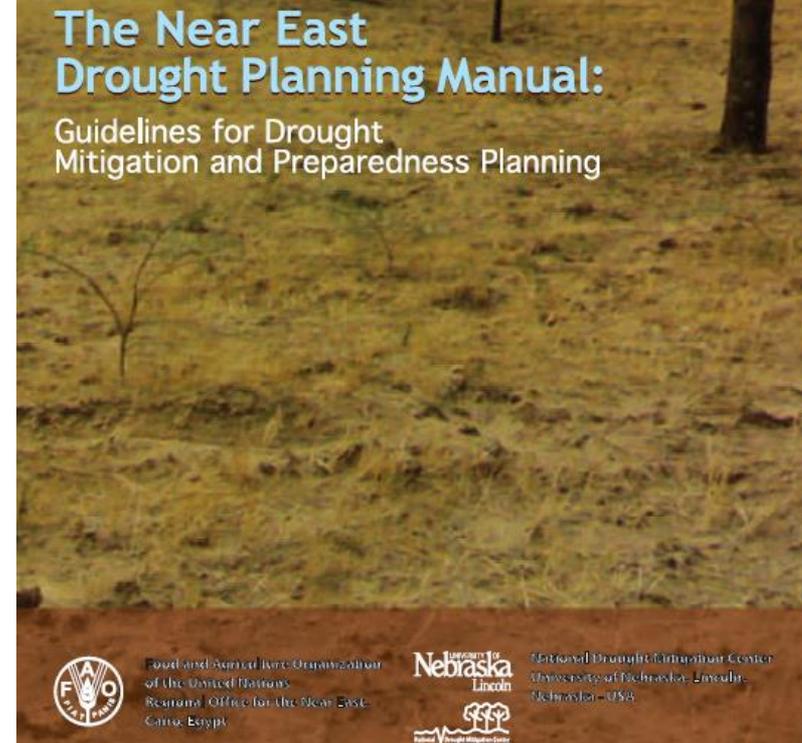
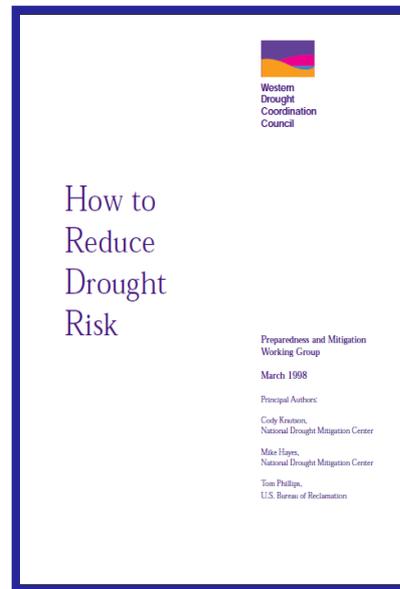
- Reactive, post-impact
- Poorly coordinated
- Untimely
- Poorly targeted
- Ineffective



Crisis management replaced by risk management



Drought Planning is defined as actions taken by individual citizens, industry, government, and others before drought occurs to mitigate impacts arising from drought.



How to Develop a Drought Plan

1. Build interest
2. Coordinate drought planning effort
3. Educate and communicate
4. Conduct inventory and develop monitoring system
5. Investigate drought risk
6. Identify risk management options
7. Develop an action plan
8. Implement the drought plan

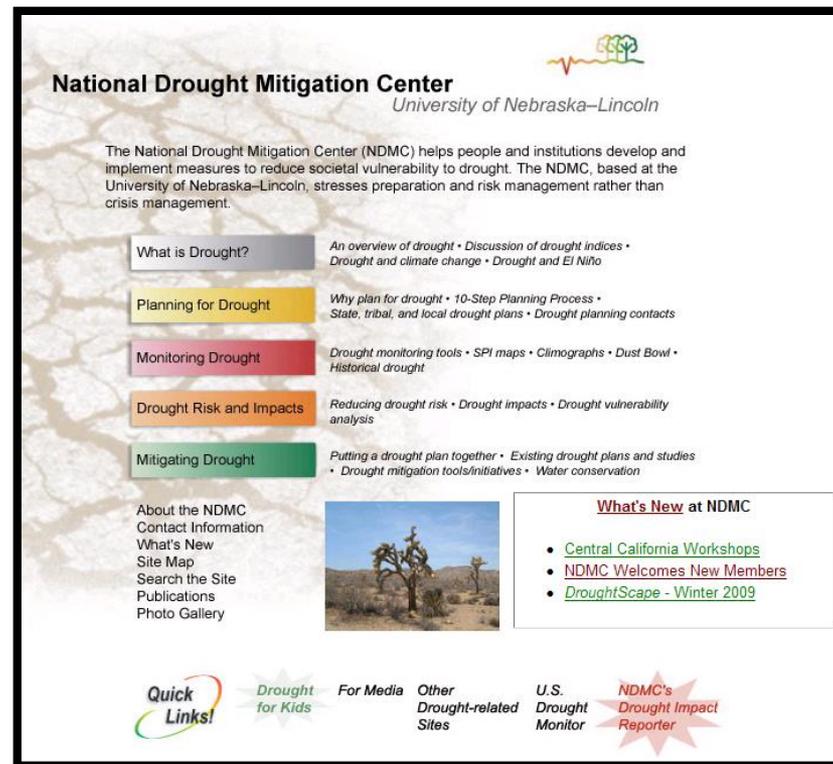
Steps 1-2: Getting started

- Bringing people together
- Determining planning objectives



Step 3. Educate and Communicate

- learn about drought and planning
- develop common understandings



The screenshot shows the homepage of the National Drought Mitigation Center (NDMC) website. The header includes the NDMC logo and the text "National Drought Mitigation Center University of Nebraska-Lincoln". Below the header is a paragraph describing the center's mission. The main content area features a navigation menu with five categories: "What is Drought?", "Planning for Drought", "Monitoring Drought", "Drought Risk and Impacts", and "Mitigating Drought". Each category has a list of sub-topics. To the right of the navigation menu is a "What's New at NDMC" section with a list of recent updates. At the bottom of the page are several logos and links, including "Quick Links!", "Drought for Kids", "For Media", "Other Drought-related Sites", "U.S. Drought Monitor", and "NDMC's Drought Impact Reporter".

National Drought Mitigation Center
University of Nebraska-Lincoln

The National Drought Mitigation Center (NDMC) 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.

- What is Drought?**
An overview of drought • Discussion of drought indices • Drought and climate change • Drought and El Niño
- Planning for Drought**
Why plan for drought • 10-Step Planning Process • State, tribal, and local drought plans • Drought planning contacts
- Monitoring Drought**
Drought monitoring tools • SPI maps • Climographs • Dust Bowl • Historical drought
- Drought Risk and Impacts**
Reducing drought risk • Drought impacts • Drought vulnerability analysis
- Mitigating Drought**
Putting a drought plan together • Existing drought plans and studies • Drought mitigation tools/initiatives • Water conservation

About the NDMC
Contact Information
What's New
Site Map
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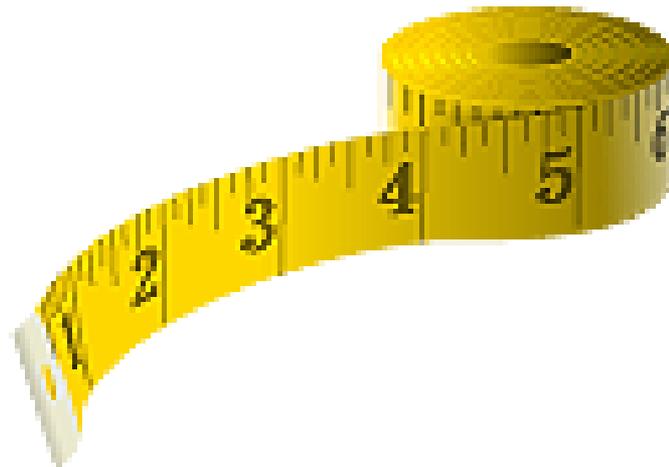
What's New at NDMC

- [Central California Workshops](#)
- [NDMC Welcomes New Members](#)
- [DroughtScope - Winter 2009](#)

Quick Links! **Drought for Kids** **For Media** **Other Drought-related Sites** **U.S. Drought Monitor** **NDMC's Drought Impact Reporter**

Step 4: Conduct Inventory and Develop Monitoring System

- establish management areas
- identify what to measure (e.g., rainfall, grass, etc.)
- develop a monitoring routine



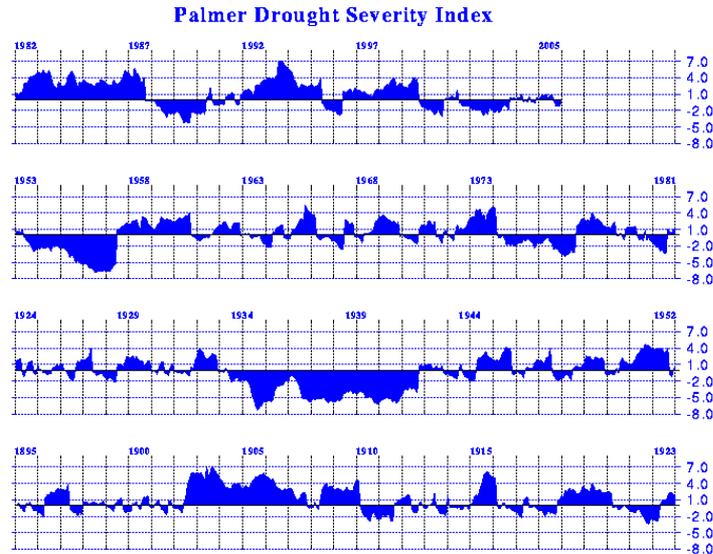
Step 5: Investigate Drought Risk

$$\text{Risk} = \text{Hazard} \times \text{Vulnerability}$$

1. Hazard assessment
 - likelihood of drought occurrence
2. Vulnerability assessment
 - susceptibility to harm
 - what is at risk and why

Hazard Assessment

- A. Assess historical drought conditions
 - frequency, timing, length, spatial extent
- B. Adopt a workable definition of drought
 - stages or critical dates



Nebraska - Division 06: 1895-2005 (Monthly Averages)

Vulnerability Assessment

- Conduct drought impact assessment

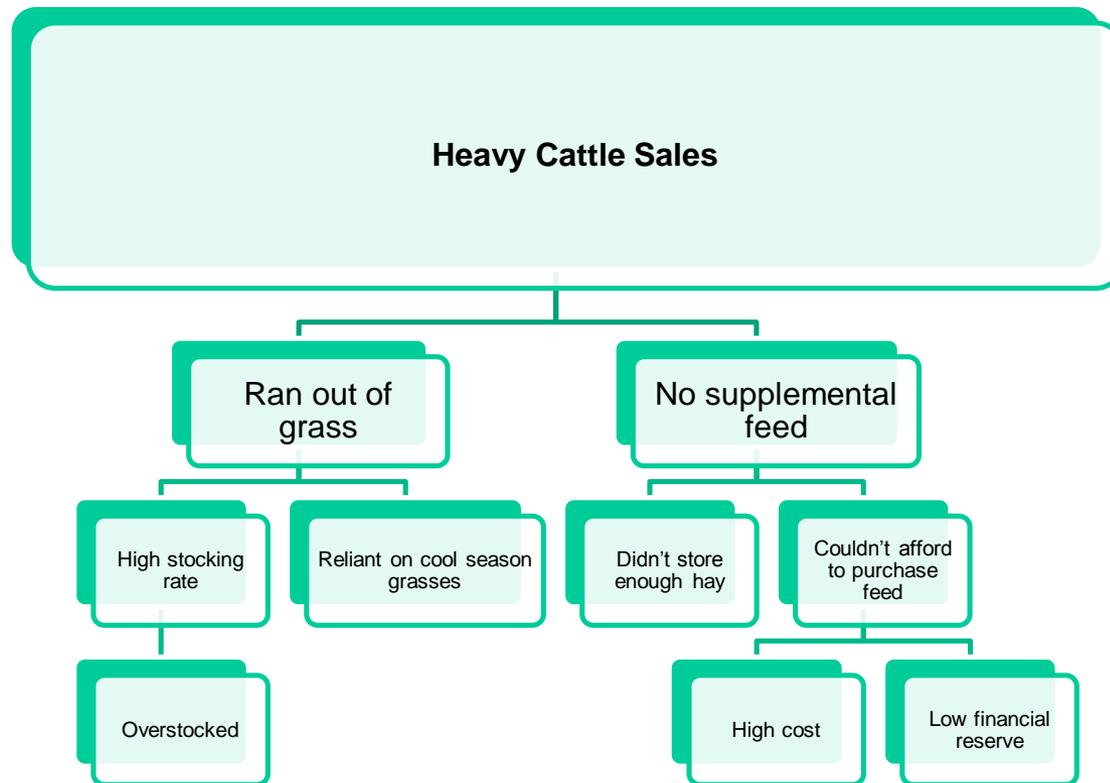
Costs and losses to livestock producers—

- Reduced productivity of rangeland
- Reduced milk production
- Forced reduction of foundation stock
- Closure/limitation of public lands to grazing
- High cost/unavailability of water for livestock
- Cost of new or supplemental water resource development (wells, dams, pipelines)
- High cost/unavailability of feed for livestock
- Increased feed transportation costs
- High livestock mortality rates
- Disruption of reproduction cycles (delayed breeding, more miscarriages)
- Decreased stock weights
- Increased predation
- Range fires

- Rank high priority impacts
- Conduct a vulnerability assessment
 - why impacts occur

Vulnerability assessment

- understand why impacts occur



Step 6: Select Risk Management Options

- Identify risk management options (long/short-term)

Impact of Drought	Underlying Causes of Vulnerability (Basal Causes of the Why Questions)	Possible Actions	Mitigation (M), Response (R), or Accepted Risk (AR)	Feasible?	Effective for impact reduction?	Benefit / Cost ?	Equitable?	To Do?
Income loss from crop failure	Variable climate	Weather modification	M					
		Weather monitoring	M					
	No irrigation	Haul water during a drought	R					
		Provide government assistance for projects	M					
	Expensive seeds	Subsidize seed sales	M					
	Farmer preferences to plant specific seeds	Conduct workshops	M					
		Conduct research	M					
		Enhance communication	M					
	Government incentives to plant specific crops	Lobby for new incentives	M					
	No drought warning	Provide weather monitoring	M					
		Identify "triggers"	M					
	High cost of crop insurance	Government subsidies	R					
	Lack of research as to the efficiency of drought relief efforts	Identify target groups and conflicting relief program criteria and goals	M					
	Lack of drought relief program coordination	Streamline relief application and funding	M					

- Prioritize risk management options

Ranch Goals

- Droughtproof the ranch as thoroughly as possible before it quits raining.
- Use the drought as a positive energy input into the ranch ecology.
- Be prepared for the next rain by leaving enough residues on the soil to facilitate infiltration and minimize runoff.
- Implement the drought management strategy quickly.
- Don't wait on or hope for rain.
- Don't second-guess your decisions and planning.
- Stay flexible.
- Stop worrying, follow the plan, do what you can, the ranch is prepared, the plants are strong, adapted to drought, and will survive. IT WILL RAIN.
- Work on more WOTES than WITS.
- If you have done all you can and there is nothing more to do, GO ON VACATION!!!

Average Annual Rainfall - 21 inches/year

Critical Dates - April 1, June 15, August 15, and Nov 1

April 1

- End of the winter dormant season and the beginning of the growing season for warm season grasses.
- <4" of moisture during the winter dormant season (killing frost or Nov 1 to April 1) no prescribed burns should be conducted unless there is a very specific reason.

June 15

- About half of the forage is produced by June 15.
- 75% of the annual average rainfall is received between Nov 1 and June 15.
- If the rainfall is <80% of the 75% then the stocking rate should be decreased 30% by weight.
- The 3 weeks following June 15th is very critical. By July 15 the destocking should be completed.
- If the rainfall is <60% of the 75% then the stocking rate should be decreased 40-50% by weight.
- Rest periods should be as long as possible by June 1 if any indicator of a drought is present.
- Grazing periods should be as long as possible to allow the other paddocks to rest for as long as possible.

August 15

- Length of grazing season: Based on the rainfall in July and August.
- If rainfall is <70% of the average 6" during July and August the grazing season should end by Sept 1.

November 1

- End of the growing season and the beginning of the winter drought (dormant season).
- <80% of the 21" average annual precipitation would indicate the beginning of a drought for the next growing season unless the winter is exceptionally wet.

Step 7: Develop the Action Plan

Linking stage triggers and actions

Determine when to implement specific actions

- **pre-drought**
 - best management practices
- **drought advisory (or critical date 1)**
 - assessment and voluntary actions
- **drought emergency (or critical date 2)**
 - crisis response actions
- **drought recovery**
 - rehabilitation actions

Step 8. Implement the Plan

- begin implementing action items
- seeking cost-share and technical assistance
- ongoing evaluation
- post-drought evaluation



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Goal is to plan and implement risk reduction actions before drought, so your region will be more resilient and prepared whenever drought occurs.

Thank You!

ACTIVITIES UNDER “EMERGENCY” DROUGHT CONDITIONS

Agency/Entity	Activities
Agriculture Program	<ul style="list-style-type: none"> *Oversight and Quarterly Monitoring of Storage Facilities. *Deliver non-potable water by hauling. Continue normal delivery. *Continue monthly reporting. Continue monthly meetings. Hold emergency meetings when necessary. *Continue monthly monitoring of utilization plots. *Implement supplemental feeding program. *Maintain stock of feed. *Haul water to catchments. Identify need for catchment construction. *Utilize trash pumps to fill tanks and trucks. *Implement emergency grazing plan. Move cattle to forage and/or reduce stocking rate.
BIA Forestry	<ul style="list-style-type: none"> *Continue water hauling; monitor water availabilities. •Enforce area and visitor restrictions. •Discontinue prescribed burning. •Continue monitoring of environmental conditions. •Continue coordination with outside agencies and internal departments. •Continue implementation of disease remediation plan. •Continue implementation of exotic vegetation control.
Tribal Forestry Program	<ul style="list-style-type: none"> •Provide BIA Forestry with personnel and equipment list. •Provide NEPA compliance for forest development.
Range Water	<ul style="list-style-type: none"> •Communicate storage conditions to HDNR Director on a weekly basis. •Assure availability of emergency response personnel. •Install new drinkers.
Grand Canyon Resort Corporation	<ul style="list-style-type: none"> * Distribute information to employees and visitors regarding drought conditions/water conservation/safety issues.

ACTIVITIES UNDER “NORMAL” CONDITIONS

Agency/Entity	Activities
Agriculture Program	<ul style="list-style-type: none">*Oversight and Quarterly Monitoring of Storage Facilities•Monitor utilization plots quarterly• Implement normal grazing plan.
BIA Forestry	<ul style="list-style-type: none">•Perform prescribed burns and mechanical fuel reduction activities, create fire breaks.•FMO announces levels of vulnerability quarterly.
Range Water Program	<ul style="list-style-type: none">•Update HDNR regarding conditions/problems.•Install new drinkers•Purchase trash pumps•Communicate storage conditions to HDNR Director on monthly basis.
Wildlife, Fisheries, and Parks Program	<ul style="list-style-type: none">•Seek funding for feral livestock removal; remove livestock where possible.•Prepare normal game harvest•Recommendations based on population surveys.

INDICATOR GROUP	INDICATORS	MEANS OF MONITORING
Those signaling changes in the environment	Rainfall	Rain gauges
	Water supplies (domestic, livestock)	Household surveys
	Vegetation cover/greenness	Satellite imagery (NDVI)
	Adequacy of grazing	Household surveys
Those signaling changes in the rural economy as well as changes in the environment	Livestock: flock sizes births & deaths sales & slaughter distribution animal condition milk production feed supplementation	Household surveys
	Domestic economy: expenditure on food expenditure on feed extent of borrowing /debt sale of assets	Household surveys
Those signaling changes in human welfare	household size births, deaths movements in/out nutrition & health (especially children)	Household surveys

Based on these indicators, a system of drought status classification was developed, which recognizes 4 stages of drought:

ADVISORY	Indicators remain generally within the expected seasonal ranges
ALERT	Marked negative changes in environmental indicators, cumulative rainfall <70% of mean, and/or an unusually low asset status due to previous losses
ALARM	Marked negative changes in environmental and rural economy indicators and/or cumulative rainfall <50 of mean
EMERGENCY	Strongly negative changes in environmental, economic, and human welfare indicators prevail