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**BANNOCK COUNTY
EMERGENCY OPERATIONS PLAN
DROUGHT PLANNING GUIDE
VOLUME 6**



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Bannock County Drought Response Planning Guide

Drought is a natural hazard that differs from other hazards in that it has a slow onset, evolves over months or even years, affects a large spatial region, and causes little structural damage. Its onset and end are often difficult to determine, as is its severity. Like other hazards, the impacts of drought span economic, environmental, and social sectors and can be reduced through mitigation and preparedness. Because droughts are a normal part of climate variability for virtually all regions, it is important to develop drought preparedness plans to deal with these extended periods of water shortage in a timely, systematic manner as they evolve. To be effective, these plans must evaluate a region's exposure and vulnerability to the hazard and incorporate these elements in a way that evolves with societal changes.

Step 1	Appoint a drought task force
Step 2	State the purpose and objectives of the drought preparedness plan
Step 3	Seek stakeholder participation and resolve conflict
Step 4	Inventory resources and identify groups at risk
Step 5	Prepare/write the drought preparedness plan
Step 6	Identify research needs and fill institutional gaps
Step 7	Integrate science and policy
Step 8	Publicize the drought preparedness plan and build public awareness
Step 9	Develop education programs
Step 10	Evaluate and revise drought preparedness plan

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¹ Source Materials – Drought Preparedness Planning: Building Institutional Capacity, Donald A. Wilhite, Michael J. Haynes, and Cody L. Knutson, University of Nebraska, Lincoln, Nebraska

STEP 1: APPOINT A DROUGHT TASK FORCE

A key political leader initiates the drought planning process through appointment of a drought task force. Depending on the level of government developing the plan, this could be the president or prime minister, a provincial or state governor, or a mayor. The task force has two purposes. First, it supervises and coordinates development of the plan. Second, after the plan is developed and during times of drought when the plan is activated, the task force coordinates actions, implements mitigation and response programs, and makes policy recommendations to the appropriate political leader. The task force should reflect the multidisciplinary nature of drought and its impacts, and it should include appropriate representatives of government agencies (provincial, federal) and universities where appropriate expertise is available. If applicable, the governor's office should have a representative on the task force. Environmental and public interest groups and others from the private sector can be included (see Step 3), as appropriate. These groups would be involved to a considerable extent in the activities of the working groups associated with the Risk Assessment Committee discussed in Step 5.

The actual makeup of this task force would vary considerably, depending on the principal economic and other sectors affected, the political infrastructure, and other factors. The task force should include a public information official that is familiar with local media's needs and preferences and a public participation practitioner who can help establish a process that includes and accommodates both well-funded and disadvantaged stakeholder and interest groups.

Before the onset of drought, the task force should inventory all forms of assistance available from governmental and nongovernmental authorities during severe drought. The task force should evaluate these programs for their ability to address short-term emergency situations and long-term mitigation programs for their ability to reduce risk to drought. Assistance should be defined in a very broad way to include all forms of technical, mitigation, and relief programs available.

STEP 2: STATE THE PURPOSE AND OBJECTIVES OF THE DROUGHT PLAN

As its first official action, the drought task force should state the general purpose for the drought plan. Government officials should consider many questions as they define the purpose of the plan, such as the following:

- Purpose and role of government in drought mitigation and response efforts
- Scope of the plan
- Most drought-prone areas of the county or region
- Historical impacts of drought
- Historical response to drought
- Most vulnerable economic and social sectors
- Role of the plan in resolving conflict between water users and other vulnerable groups during periods of shortage
- Current trends (e.g., land and water use, population growth) that may increase or decrease vulnerability and conflicts in the future
- Resources (human and economic) the government is willing to commit to the planning process
- Legal and social implications of the plan
- Principal environmental concerns caused by drought

A generic statement of purpose for a plan is to reduce the impacts of drought by identifying principal activities, groups, or regions most at risk and developing mitigation actions and programs that alter these vulnerabilities. The plan is directed at providing government with an effective and systematic means of assessing drought conditions, developing mitigation actions and programs to reduce risk in advance of drought, and developing response options that minimize economic stress, environmental losses, and social hardships during drought.

The task force should then identify the specific objectives that support the purpose of the plan. Drought plan objectives will vary within and between areas in the County and individual cities and should reflect the unique physical, environmental, socioeconomic, and political characteristics.

STEP 3: SEEK STAKEHOLDER PARTICIPATION AND RESOLVE CONFLICT

Social, economic, and environmental values often clash as competition for scarce water resources intensifies. Therefore, it is essential for task force members to identify all citizen groups (stakeholders) that have a stake in drought planning and understand their interests. These groups must be involved early and continuously for fair representation and effective drought management and planning. Discussing concerns early in the process gives participants a chance to develop an understanding of one another's various viewpoints and generate collaborative solutions. Although the level of involvement of these groups will vary notably from location to location, the power of public interest groups in policy making is considerable. In fact, these groups are likely to impede progress in the development of plans if they are not included in the process. The task force should also protect the interests of stakeholders who may lack the financial resources to serve as their own advocates. One way to facilitate public participation is to establish a citizen's advisory council as a permanent feature of the drought plan, to help the task force keep information flowing and resolve conflicts between stakeholders.

The County or Cities need to consider if district or neighborhood advisory councils should be established. These councils could bring neighbors together to discuss their water use issues and problems and seek collaborative solutions.

STEP 4: INVENTORY RESOURCES AND IDENTIFY GROUPS AT RISK

An inventory of natural, biological, and human resources, including the identification of constraints that may impede the planning process, may need to be initiated by the task force. In many cases, various provincial and federal agencies already possess considerable information about natural and biological resources. It is important to determine the vulnerability of these resources to periods of water shortage that result from drought. The most obvious *natural resource* of importance is water: its location, accessibility, and quality.

Biological resources refer to the quantity and quality of grasslands or rangelands, forests, wildlife, and so forth.

Human resources include the labor needed to develop water resources, lay pipeline, haul water and livestock feed, process citizen complaints, provide technical assistance, and direct citizens to available services.

It is also imperative to identify constraints to the planning process and to the activation of the various elements of the plan as drought conditions develop. These constraints may be physical, financial, legal, or political. The costs associated with plan development must be weighed against the losses that will likely result if no plan is in place. The purpose of a drought plan is to reduce

risk and, therefore, economic, social, and environmental impacts. Legal constraints can include water rights, existing public trust laws, requirements for public water suppliers, liability issues, and so forth.

Drought is a natural event; it is important to define the exposure (i.e., frequency of drought of various intensities and durations) of various parts of the County or region to the drought hazard. Some areas are likely to be more at risk than others. Vulnerability, on the other hand, is affected by social factors such as population growth and migration trends, urbanization, changes in land use, government policies, water use trends, diversity of economic base, cultural composition, and so forth. The drought task force should address these issues early in the planning process so they can provide more direction to the committees and working groups that will be developed under Step 5 of the planning process.

STEP 5: ESTABLISH AND WRITE DROUGHT PLAN

This step describes the process of establishing relevant committees to develop and write the drought plan. The drought plan should have three primary components: (1) monitoring, early warning, and prediction; (2) risk and impact assessment; and (3) mitigation and response.

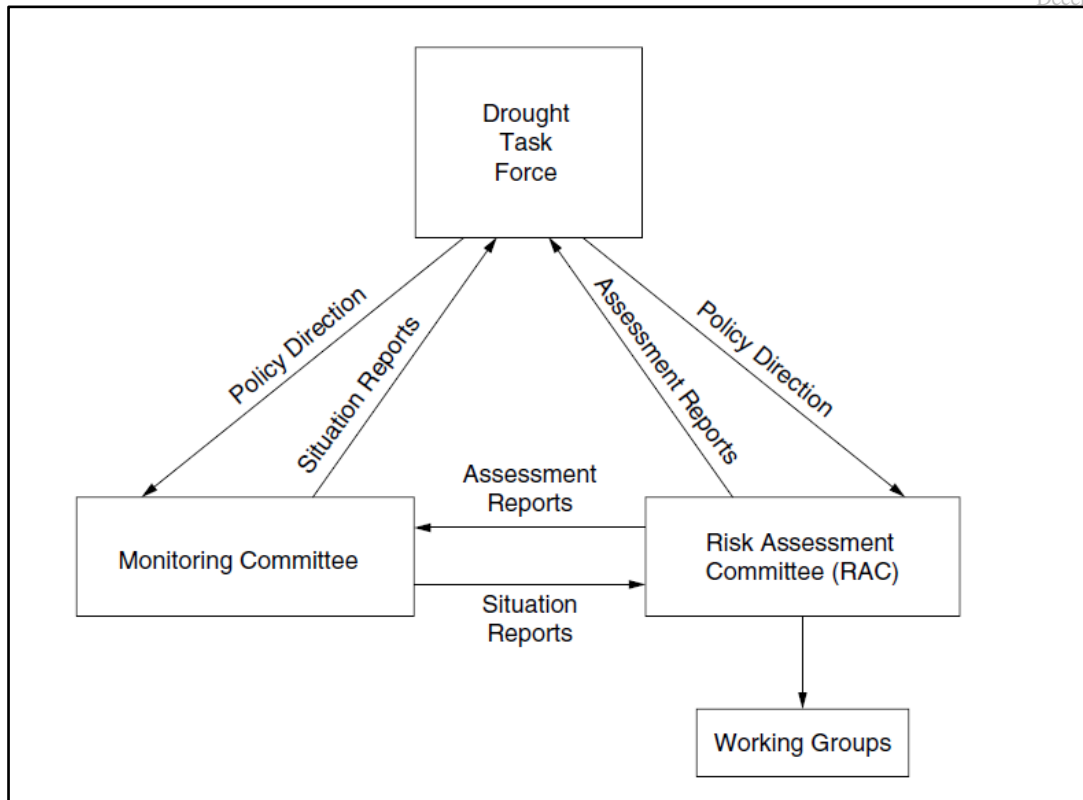
A. Monitoring, Early Warning, and Prediction Committee

A reliable assessment of water availability and its outlook for the near and long term is valuable information in both dry and wet periods. During drought, the value of this information increases markedly. The monitoring committee should include representatives from agencies with responsibilities for monitoring climate and water supply. Data and information on each of the applicable indicators (e.g., precipitation, temperature, evapotranspiration, seasonal climate forecasts, soil moisture, streamflow, groundwater levels, reservoir and lake levels, and snowpack) ought to be considered in the committee's evaluation of the water situation and outlook.

The monitoring committee should meet regularly, especially in advance of the peak demand season. Following each meeting, reports should be prepared and disseminated to the drought task force, relevant government agencies, and the media.

Note:

In drought planning, making the transition from crisis to risk management is difficult because, historically, little has been done to understand and address the risks associated with drought. To solve this problem, areas of high risk should be identified, as should actions that can be taken to reduce those risks before a drought occurs. Risk is defined by both the exposure of a location to the drought hazard and the vulnerability of that location to periods of drought-induced water shortages.



Source National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska

The chairperson of the monitoring committee should be a permanent member of the drought task force. If conditions warrant, the task force should brief the County Commissioners or the appropriate City officials about the contents of the report, including any recommendations for specific actions. The public must receive a balanced interpretation of changing conditions. The monitoring committee should work closely with public information specialists to keep the public well informed.

The primary objectives of the monitoring committee are to:

1. Adopt a workable definition of drought that could be used to phase in and phase out levels of local, state or federal actions in response to drought. The group may need to adopt more than one definition of drought in identifying impacts in various economic, social, and environmental sectors because no single definition of drought applies in all cases. It is helpful to establish a sequence of descriptive terms for water supply alert levels, such as “advisory,” “alert,” “emergency,” and “rationing”.

Review the terminology used by other entities (i.e., local utilities districts, city utilities, irrigation districts, river basin authorities) and choose terms that are consistent so as not to confuse the public with different terms in areas where there may be authorities with overlapping regional responsibilities.

In considering emergency measures such as rationing, remember that the impacts of drought may vary significantly from one area to the next, depending on the sources and uses of water and the degree of planning previously implemented. Imposing general emergency measures on people or communities without regard for their existing

vulnerability may result in political repercussions and loss of credibility. A related consideration is that some municipal water systems may be out of date or in poor operating condition, so that even moderate drought strains a community's ability to supply customers with water. Identifying inadequate (i.e., vulnerable) water supply systems and upgrading those systems should be part of a long-term drought mitigation program.

2. Establish drought management areas; that is, subdivide the County into more conveniently sized districts by political boundaries, shared hydrological characteristics, climatological characteristics, or other means such as drought probability or risk. These subdivisions may be useful in drought management because they may allow drought stages and mitigation and response options to be regionalized.
3. Develop a drought monitoring system. The quality of meteorological and hydrological networks is highly variable region to region and within countries. Responsibility for collecting, analyzing, and disseminating data is divided between many government authorities. The monitoring committee's challenge is to coordinate and integrate the analysis so decision makers and the public receive early warning of emerging drought conditions.
4. Maintain an observation data inventory from current observation networks. Many networks monitor key elements of the hydrologic system. Most of these networks are operated by federal or state agencies, but other networks also exist and may provide critical information for a portion of a region or specific county.

Meteorological data are important but represent only one part of a comprehensive monitoring system. These other physical indicators (soil moisture, streamflow, reservoir and groundwater levels) must be monitored to reflect impacts of drought on agriculture, households, industry, energy production, transportation, recreation and tourism, and other water users.

5. Determine the data needs of primary users. Developing new or modifying existing data collection systems is most effective when the people who will be using the data are consulted early and often. Soliciting input on expected new products or obtaining feedback on existing products is critical to ensuring that products meet the needs of primary users and, therefore, will be used in decision making. Training on how to use or apply products in routine decision making is also essential.
6. Develop or modify current data and information delivery systems. People need to be warned of drought as soon as it is detected, but often they are not. Information needs to reach people in time for them to use it in making decisions. In establishing information channels, the monitoring committee needs to consider when people need what kinds of information. These decision points can determine whether the information provided is used or ignored.

B. Risk Assessment Committee

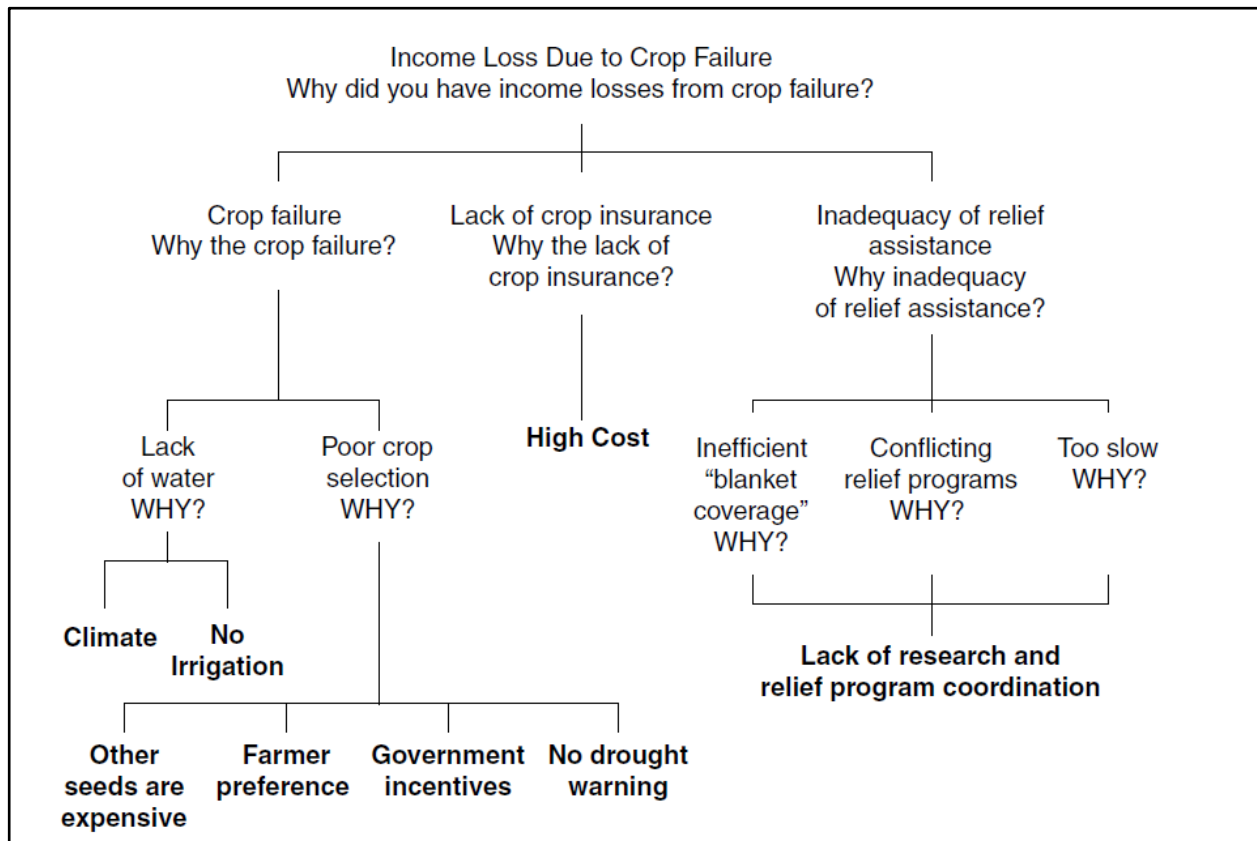
Risk is the product of exposure to the drought hazard (i.e., probability of occurrence) and societal vulnerability, represented by a combination of economic, environmental, and social factors. Therefore, to reduce vulnerability to drought, one must identify the most significant impacts and assess their underlying causes. Drought impacts cut across many sectors and across normal

divisions of government authority. The membership of the risk assessment committee should represent economic sectors, social groups, and ecosystems most at risk from drought. The committee's chairperson should be a member of the drought task force.

In drought management, making the transition from crisis to risk management is difficult because little has been done to understand and address the risks associated with drought. The risk assessment methodology focuses on identifying and ranking the priority of relevant drought impacts; examining the underlying environmental, economic, and social causes of these impacts; and then choosing actions that will address these underlying causes. What makes this methodology different and more helpful than previous methodologies is that it addresses the causes behind drought impacts. Previously, responses to drought have been reactions to impacts. Understanding why specific impacts occur provides the opportunity to lessen impacts in the future by addressing these vulnerabilities through the identification and adoption of specific mitigation actions. The risk assessment is divided into 6 specific actions:

1. **Assemble the Committee** - Membership as described above
2. **Conduct the Impact Assessment** - Impact assessment examines the consequences of a given event or change. Drought impact assessments begin by identifying direct consequences of the drought, such as reduced crop yields, livestock losses, and reservoir depletion. These direct outcomes can then be traced to secondary consequences (often social effects), such as the forced sale of household assets or land, dislocation, or physical and emotional stress. This initial assessment identifies drought impacts but does not identify the underlying reasons for these impacts. (See Attachment 1 for Impact Assessment Checklists)
3. **Rank Impacts** – After completing the Impact Assessment Checklists, omit those impacts that are not chosen. From this list, prioritize impacts according to what work group members consider to be the most important. To be effective and equitable, the ranking should consider concerns such as cost, areal extent, trends over time, public opinion, fairness, and the ability of the affected area to recover. Be aware that social and environmental impacts are often difficult, if not impossible, to quantify. From the list of prioritized impacts, the risk committee should decide which impacts should be addressed and which can be deferred.
4. **Vulnerability Assessment** - Vulnerability assessment provides a framework for identifying the social, economic, and environmental causes of drought impacts. It bridges the gap between impact assessment and policy formulation by directing policy attention to underlying causes of vulnerability rather than the result, the negative impacts, which follow triggering events such as drought.

For each of the identified prioritized impacts, begin asking why these impacts have occurred or might occur. It is important to realize that a combination of factors might produce a given impact. It might be beneficial to display these causal relationships in some form of a tree diagram. (See example below)



Source: National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska

5. **Take Action** - Mitigation is defined as actions taken in advance of or in the early stages of drought that reduce the impacts of the event. Once the group has set drought impact priorities and exposed the corresponding underlying causes of vulnerability, it can identify actions appropriate for reducing drought risk. The following sequence of questions may be helpful in identifying potential actions:
 - Can the root cause be mitigated (can it be modified before a drought)? If yes, then how?
 - Can the root cause be responded to (can it be modified during or after a drought)? If so, then how?
 - Is there some root cause, or aspect of the root cause, that cannot be modified and must be accepted as a drought-related risk for this activity or area?
6. **Develop a "To Do" List** - the impacts, causes, and relevant potential actions, the next step is to determine the sequence of actions to take as part of the risk reduction planning exercise. This selection should be based on such concerns as feasibility, effectiveness, cost, and equity additionally, it will be important to review the impact tree diagrams when considering which groups of actions need to be considered together. In choosing the appropriate actions, you may want to ask some of the following questions:

- What are the cost/benefit ratios for the actions identified?
- Which actions do the general public consider feasible and appropriate?
- Which actions are sensitive to the local environment (i.e., sustainable practices)?
- Do the actions address the right combination of causes to adequately reduce the relevant impact?
- Do the actions address short- and long-term solutions?
- Which actions would fairly represent the needs of affected individuals and groups?

C. Mitigation and Response Committee

Mitigation and response actions may be the responsibility of the drought task force or be assigned to a separate committee. It is recommended that the task force, working in cooperation with the monitoring and risk assessment committees, has the knowledge and experience to understand drought mitigation techniques, risk analysis (economic, environmental, and social aspects), and drought-related decision-making processes at all levels of government. The task force, as originally defined, is composed of senior policy makers from various government agencies and, possibly, key stakeholder groups. Therefore, it is in an excellent position to recommend or implement mitigation actions, request assistance through various state or federal programs, or make policy recommendations to a legislative body or political leader.

D. Writing the Plan

With input from each of the committees and working groups, the drought task force, with the assistance of professional writing specialists, will draft the drought plan. After completion of a working draft, public meetings or hearings should be held at several locations to explain the purpose, scope, and operational characteristics of the plan. Specific mitigation actions and response measures recommended in the plan should be discussed. A public information specialist for the drought task force can facilitate planning for the hearings and prepare news stories to announce the meetings and provide an overview of the plan.

STEP 6: IDENTIFY RESEARCH NEEDS AND FILL INSTITUTIONAL GAPS

As research needs and gaps in institutional responsibility become apparent during drought planning, the drought task force should compile a list of those deficiencies and make recommendations to the appropriate person or government body on how to remedy them.

STEP 7: INTEGRATE SCIENCE AND POLICY

An essential aspect of the planning process is integrating the science and policy of drought management. The policy maker's understanding of the scientific issues and technical constraints involved in addressing problems associated with drought is often limited. Likewise, scientists generally have a poor understanding of existing policy constraints for responding to the impacts of drought. In many cases, communication and understanding between the science and policy communities must be enhanced if the planning process is to be successful.

Good communication is required between the two groups in order to distinguish what is feasible from what is not achievable for a broad range of science and policy issues. Integration of science and policy during the planning process will also be useful in setting research priorities and

synthesizing current understanding. The drought task force should consider various alternatives to bring these groups together and maintain a strong working relationship.

STEP 8: PUBLICIZE THE DROUGHT PLAN—BUILD PUBLIC AWARENESS AND CONSENT

If you have communicated well with the public throughout the process of establishing a drought plan, there may already be better-than-normal awareness of drought and drought planning by the time you actually write the plan. Themes to emphasize in writing news stories during and after the drought planning process could include:

- How the drought plan is expected to relieve drought impacts in both the short and long term.
- What changes people might be asked to make in response to different degrees of drought, such as restricted lawn watering and car washing or not irrigating certain crops at certain

During drought, the task force should work with public information professionals to keep the public well informed of the status of water supplies, whether conditions are approaching “trigger points” that will lead to requests for voluntary or mandatory use restrictions, and how victims of drought can access assistance. Post all pertinent information on the drought task force’s website so that the public can get information directly from the task force without having to rely on mass media times.

STEP 9: DEVELOP EDUCATION PROGRAMS

A broad-based education program to raise awareness of short and long-term water supply issues will help ensure that people know how to respond to drought when it occurs and that drought planning does not lose ground during non-drought years. Try to tailor information to the needs of specific groups (e.g., elementary and secondary education, small business, industry, homeowners, and utilities).

STEP 10: EVALUATE AND REVISE DROUGHT PLAN

The final step in the planning process is to create a detailed set of procedures to ensure adequate plan evaluation. Periodic testing, evaluation, and updating of the drought plan are essential to keep the plan responsive to local, state, provincial, or national needs. To maximize the effectiveness of the system, you must include two modes of evaluation: ongoing and post-drought.

An ongoing or operational evaluation keeps track of how societal changes such as new technology, new research, new laws, and changes in political leadership may affect drought risk and the operational aspects of the drought plan. Drought risk may be evaluated quite frequently whereas the overall drought plan may be evaluated less often. A post-drought evaluation or audit documents and analyzes the assessment and response actions of government, nongovernmental organizations, and others and provides a mechanism to implement recommendations for improving the system. Without post-drought evaluations, it is difficult to learn from past successes and mistakes, as institutional memory fades.

Post-drought evaluations should include an analysis of the climatic and environmental aspects of the drought; its economic and social consequences; the extent to which pre-drought planning was useful in mitigating impacts, in facilitating relief or assistance to stricken areas, and in post-recovery; and any other weaknesses or problems caused by or not covered by the plan. Attention

must also be directed to situations in which drought-coping mechanisms worked and where communities exhibited resilience; evaluations should not focus only on those situations in which coping mechanisms failed.

Attachment 1

Checklist of Historical, Current, and Potential Drought Impacts

H = historical drought
C = current drought
P = potential drought

H	C	P	Economic Impacts
			Loss from crop production
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Annual and perennial crop losses
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Damage to crop quality
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reduced productivity of cropland (wind erosion, etc.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Insect infestation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Plant disease
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wildlife damage to crops
			Loss from dairy and livestock production
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reduced productivity of rangeland
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Forced reduction of foundation stock
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Closure/limitation of public lands to grazing
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High cost/unavailability of water for livestock
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High cost/unavailability of feed for livestock
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High livestock mortality rates
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Disruption of reproduction cycles (breeding delays or unfilled pregnancies)

- | | | | |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Decreased stock weights |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased predation |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Range fires |
| | | | Loss from timber production |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wildland fires |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Tree disease |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Impaired productivity of forest land |
| | | | Loss from fishery production |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Damage to fish habitat |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of young fish due to decreased flows |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Income loss for farmers and others directly affected |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of farmers through bankruptcy |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Unemployment from drought-related production declines |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss to recreational and tourism industry |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss to manufacturers and sellers of recreational equipment |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased energy demand and reduced supply because of drought-related power curtailments |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Costs to energy industry and consumers associated with substituting more expensive fuels (oil) for hydroelectric power |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss to industries directly dependent on agricultural production (e.g., machinery and fertilizer manufacturers, food processors, etc.) |
| | | | Decline in food production/disrupted food supply |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increase in food prices |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased importation of food (higher costs) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Disruption of water supplies |
| | | | Revenue to water supply firms |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Revenue shortfalls |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Windfall profits |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strain on financial institutions (foreclosures, greater credit risks, capital shortfalls, etc.) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Revenue losses to federal, state, and local governments (from reduced tax base) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss from impaired navigability of streams, rivers, and canals |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cost of water transport or transfer |

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cost of new or supplemental water resource development |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cost of increased groundwater depletion (mining), land subsidence |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reduction of economic development |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Decreased land prices |
| | | | Damage to animal species |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reduction and degradation of fish and wildlife habitat |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Lack of feed and drinking water |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Disease |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased vulnerability to predation (from species concentration near water) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Migration and concentration (loss of wildlife in some areas and too many in others) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased stress to endangered species |

H	C	P	Environmental Impacts
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- | | | | |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Damage to plant species |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased number and severity of fires |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of wetlands |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Estuarine impacts (e.g., changes in salinity levels) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased groundwater depletion, land subsidence |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of biodiversity |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wind and water erosion of soils |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reservoir and lake levels |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reduced flow from springs |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water quality effects (e.g., salt concentration, increased water temperature, pH, dissolved oxygen, turbidity) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Air quality effects (e.g., dust, pollutants) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Visual and landscape quality (e.g., dust, vegetative cover, etc.) |

H	C	P	Social Impacts
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- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Mental and physical stress (e.g., anxiety, depression, loss of security, domestic violence) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations, reduced firefighting capability, etc.) |

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reductions in nutrition (e.g., high-cost-food limitations, stress-related dietary deficiencies) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of human life (e.g., from heat stress, suicides) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Public safety from forest and range fires |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased respiratory ailments |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased disease caused by wildlife concentrations |
| | | | Increased conflicts |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water user conflicts |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Political conflicts |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Management conflicts |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Other social conflicts (e.g., scientific, media based) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Disruption of cultural belief systems (e.g., religious and scientific views of natural hazards) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reevaluation of social values (e.g., priorities, needs, rights) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reduction or modification of recreational activities |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Public dissatisfaction with government regarding drought response |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Inequity in the distribution of drought relief |
| | | | Inequity in drought impacts based on: |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Socioeconomic group |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Ethnicity |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Age |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Gender |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Seniority |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of cultural sites |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Loss of aesthetic values |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Recognition of institutional restraints on water use |
| | | | Reduced quality of life, changes in lifestyle |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | In rural areas |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | In specific urban areas |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased poverty in general |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Increased data/information needs, coordination of dissemination activities |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Population migrations (e.g., rural to urban areas, migrants into the United States) |