

THE COLORADO DROUGHT MITIGATION AND RESPONSE PLAN



Bill OWENS
GOVERNOR
JANUARY 2001
(Updated 2002)

THE COLORADO DROUGHT MITIGATION & RESPONSE PLAN

January 2001

ANNEX VIII to the State Emergency Operations Plan
Drought Annex to the State All Hazards Mitigation Plan

Colorado
Department of Local Affairs
Division of Local Government
Office of Emergency Management
Department of Natural Resources

Original document developed by J. Truby, L. Boulas 1981

Revised by J. Truby, L. Boulas, R. Kistner in 1986 & 1990.

Revised by J. Brislawn, M. Gally, L. Boulas, J. Truby, T. Grier,
P. White, M. Koleis in 2000 - 2001.

Funding for this production of this document provided by the State of Colorado
and the Federal Emergency Management Agency (FEMA).

EXECUTIVE SUMMARY

Drought is a natural yet unpredictable occurrence in Colorado. Colorado weather does not provide for a consistent, dependable water supply throughout the year across the state. With Colorado's semiarid and variable climate there will always be concern for water availability within the state.

The Colorado Drought Mitigation and Response Plan was developed to provide an effective and systematic means for the State of Colorado to reduce the impacts of water shortages over the short or long term. The plan outlines a mechanism for coordinated drought monitoring, impact assessment, response to emergency drought problems, and mitigation of long term drought impacts. The plan does not create a new government entity to deal with drought, but provides a means for coordinating the efforts of public and private entities that would be called upon to deal with drought impacts.

There are four components of the plan: Monitoring, Assessment, Response, and Mitigation. Monitoring is ongoing and accomplished by quarterly meetings of the Water Availability Task Force (WATF). This task force is comprised of Colorado's water supply specialists from state, local and federal governments, as well as experts in climatology and weather forecasting. This task force monitors snowpack, precipitation, reservoir storage, and streamflow and provides a forum for synthesizing and interpreting water availability information. When the WATF determines drought conditions are reaching significant levels, the Governor's staff and cabinet notifies the Governor and recommends activation of the plan.

When the plan is activated, the first step is impact assessment. Assessment begins with activation of the relevant Impact Task Forces (ITFs). These task forces convene to determine impacts within specific sectors which effect the environment and economy. Impact Task Forces include Municipal Water, Wildfire Protection, Agricultural Industry, Tourism, Wildlife, Economic Impacts, Energy Loss, and Health.

Assessment coordination is handled by the Review and Reporting Task Force (R&RTF). This task force is comprised of directors from DNR and DoLA, and chairpersons of the WATF and the Impact Task Forces. They review reports from the WATF and ITFs, aggregate assessments and projections, evaluate overall conditions, develop recommendations for drought response, and make timely reports to leadership, the media, the response agencies, and others.

The response process consists of several lead state agencies and an Interagency Coordinating Group (ICG). The plan designates lead agencies depending on the situation. The ICG is comprised of senior management representatives from lead response agencies. The ICG ensures the coordination of drought response activities. Additionally, the ICG reviews unmet needs identified by task forces and lead agencies, and identifies and recommends the means to meet those needs. The ICG coordinates with the Executive Branch and the State Legislature and determines when its own deactivation should occur.

Drought mitigation is an ongoing activity in Colorado through emergency preparedness planning and evolving water resources policy and management. The Colorado Natural Hazards Mitigation Council addresses mitigation actions and opportunities through working committees comprised of volunteers and professionals. The Drought Mitigation Committee includes members of the Water Availability Task Force (WATF), the chairpersons of the Impact Task Forces, and other interested parties and serves as a forum to address drought issues on an ongoing basis, *before droughts occur*. The plan lists additional recommendations, with associated lead agencies, to mitigate drought impacts.

The plan is organized into two chapters: one that addresses the background and need for drought planning in Colorado and another that describes the plan process and long-term drought mitigation. Responsibilities of the Impact Task Forces and the response lead agencies are described. Appendices compile references to existing drought relief programs, Internet resources, local-level drought plans, and contacts for local government outreach and feedback.

Table of Contents

1.0 The Colorado Situation

1.1 Purpose 5
 1.2 The Nature of Drought in Colorado 5
 1.3 The Problem With Drought 5
 1.4 A Brief History of Drought 5
 Conclusions from Past Drought Efforts 6
 Drought Planning Begins 6
 History of Plan Activations 7
 2000 - A Close Call 7

2.0 Colorado’s Plan

2.1 Purpose 10
 2.2 Organization 10
 Government Roles 11
 Monitoring 12
 Impact Assessment 12
 Response 16
 2.3 Long Term Drought Mitigation 18
 Colorado Natural Hazards Mitigation Council 18
 Drought Mitigation Committee 18
 State Drought Mitigation Recommendations 19
 Ten Steps To Drought Mitigation: A Colorado Summary 20
 State Level Actions - Administration Plan 21
 Local Government Outreach and Feedback 21
 2.4 Sustainability Issues 21
 Local Government Planning 21
 2.5 Action Plan Summary 22
 2.6 Public Information / Awareness / Education 23

 Bibliography 23

Appendices

A Catalog of Drought Assistance and Related Programs 24
 B Actions Taken to Reduce Drought Impacts by Colorado
 in Previous Droughts 27
 C Drought Impact Checklist: Historical, Current, & Potential 28
 D Local Government Drought and Water Plan Status 29
 E Sample Documents
 Governor’s Memorandum to Activate Plan 31
 Disaster Proclamation 32
 F Regional / Field Contacts 33
 G Drought Internet Resources 34

1.0 - The Colorado Situation

1.1 Purpose

The purpose of the plan is to provide an effective and systematic means for the State of Colorado to reduce the impacts of water shortages over the short-term or long-term.

1.2 The Nature of Drought in Colorado

Drought is an ambiguous hazard that defies a universal definition. Typically, drought is a shortage of water associated with a deficiency of precipitation. However, water shortages can also be induced by humans. Perhaps it is easier to think of drought as being a function of supply versus demand. Drought occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities.

Drought is a frequent visitor to our semiarid state. Annual average precipitation in Colorado is near seventeen inches and yet varies from approximately seven inches in the San Luis Valley to over fifty inches in small areas of the higher mountains in the southern and northern parts of the state (McKee, Doesken and Kleist, 1999). Due to the natural variations in climate and precipitation sources, it is rare for all of Colorado to be deficient in moisture at the same time. However, single season droughts over some portion of the state are quite common (McKee, Doesken and Kleist, 1999).

1.3 The Problem with Drought

There are several obvious problems with drought, but the initial one is recognizing it. Drying trends tend to be associated with "good" weather. The irony is that too much "good" weather can wreak havoc on the environment, create serious water shortages, and delay or stop business and industry. When droughts occur, the state is impacted with a variety of ambiguous and complex problems, which, if identified and evaluated, can be dealt with in a well-organized and cost-efficient way. The most significant impacts which typically confront the state are related to such water intensive activities as: agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. A reduction of electric power generation and water quality deterioration are also potential problems. Appendix C contains a checklist of the multitude of drought impacts on the economy, environment, and society.

1.4 A Brief History of Drought

Several times throughout this century Colorado has experienced conditions of drought. The most dramatic drought periods occurred in the 1930s and 1950s, when many states, Colorado included, were affected for several years at a time. With the understanding that conditions throughout the state vary widely, Figure 1.1 shows five multi-year droughts experienced in Colorado since 1893.

Figure 1.1 Colorado's Historical Dry and Wet Periods

DATE	DRY	WET	DURATION (Years)
1893-1905	X		12
1905-1931		X	26
1931-1941	X		10
1941-1951		X	10
1951-1957	X		6
1957-1959		X	2
1963-1965	X		2
1965-1975		X	10
1975-1978	X		3
1979-1996		X	17

Source: McKee, Doesken and Kleist, 1999

The Colorado Drought Mitigation And Response Plan

The agricultural business suffered severely during the drought of the 1930s. The situation was exacerbated by poor farming techniques, low market prices, and a depressed economy which caused many to migrate away from farming. At the same time, progress was made toward improving the situation: better agricultural management; establishment of insurance programs; liberalization of credit; and diversification of the regional economy. Other improvements included irrigation; the planting of trees for wind breaks to mitigate soil erosion; and air conditioned tractors to keep dust from the operator. These adjustments moderated the drought in the early 1950s. Impacts were much less severe, although climatological conditions were not that different from those of the dust bowl era.

The drought of 1976-77 was essentially a winter event and was not long in duration. However, it was the driest winter in recorded history for much of Colorado's high country and western slope, and had serious consequences for the ski industry. Another drought that began in the fall of 1980 and lasted until the summer of 1981 also generated costly impacts on the ski industry and initiated a huge investment in snow making equipment (Mckee, Doesken, and Kleist, 1999). This was the last severe and widespread drought to affect Colorado.

Since 1981, Colorado has seen a sustained overall wet period. A few localized exceptions include a significant, but brief drought in southwest Colorado from 1989 to 1990; a growing season drought in 1994 in northeast Colorado; and a localized drought in southwest Colorado from late 1995 into 1996. La Niña influenced weather patterns in the winter of 1999, leaving the statewide snowpack abnormally low in the spring. While many parts of the country were experiencing drought conditions, abundant moisture in the second half of 1999 resulted in wet conditions over almost all of Colorado (Colorado State University, Colorado Climate Center, 1999).

Conclusions From Past Drought Efforts

In the 1976-77 drought, Colorado's government assumed a lead role in coordinating federal, state, and local government response, and promoted statewide public conservation practices. Conclusions from that effort include:

- the diversity, complexity, and ambiguity of drought impacts blurred identification of alternative actions available to decision makers;
- a systematic definition of problem areas and potential solutions was essential to effective government response, so "under" and "over" reactions could be minimized;

- both physical and social impact data were needed;
- knowledge of the location, kind, and degree of water shortage provides better identification of impacts;
- timely and accurate data on impact development was crucial to effective response;
- impact identification provides the framework for governmental and public adjustments;
- integration of response by private, public, and governmental entities was needed;
- as the drought intensifies, the maintenance of established channels of responsibility, with emphasis on water conservation and planning, becomes increasingly important;
- as impact problems and local needs become more serious, better management and integration of effort also intensifies; and
- should drought intensify to the point where impacts exceed the state's response capabilities, an effective state program will help facilitate a request for federal assistance.

Reference Appendix B for additional impacts, actions, and lessons learned from previous droughts.

Drought Planning Begins...

Governor Lamm took action in February 1981 to deal with potential drought situations. His memorandum of February 5 required the accomplishment of the following tasks:

- (1). Develop and activate a data collection and assessment system which will identify the potential impacts of a drought and track their occurrence and intensity. At some point, this assessment process may result in a recommendation that a drought emergency be proclaimed.
- (2). Develop a drought emergency response plan which would be activated by a drought emergency decision. This task includes cataloguing existing state and federal response and relief programs and authorities, and developing recommendations to meet additional needs.

The initial Colorado Drought Response Plan was completed in 1981, and revised in 1986, 1990, and 2001. In 1981, it was one of three state drought plans in the nation. Since that time, the plan has been widely distributed and received interest both nationally and internationally. It has served as a model for other states.

History of Plan Activations

Portions of the Drought Response Plan have been activated since its initial development.

1989 - 1990

As conditions worsened, Governor Romer activated the Impact Task Forces and the Review and Reporting Task Force. Eastern plains dryland farming, including the bean, hay, and alfalfa crops took the biggest hit. Twenty Colorado counties declared drought disasters due to loss of winter wheat and hay for cattle. Estimated losses to the agricultural community were as high as one billion dollars. Emergency water hauling took place for a subdivision in La Plata County and the Towaoc Indian reservation. Wildfires were more prevalent over most of the state, including the devastating Boulder Canyon fire.

Much activity was stimulated in the state's drought response system during this time period. This included an increase in funding for drought preparedness activities and other mitigation efforts, including public information brochures and an update of the Drought Response Plan.

1994

In response to extremely arid conditions, the Governor activated, by memorandum on August 1, several Task Forces to assess impacts: Agriculture-blowing soils, Wildlife, Wildfire, Commerce-Tourism, and Review and Reporting. Significant impacts reported included an increase in wildfires statewide, loss to the winter wheat crops, difficulties with livestock feeding, and impacts to the state's fisheries.

1996

July 29, the Governor issued an Executive Order (D000996) proclaiming a Drought Disaster Emergency Declaration. Fifteen counties were included in a request for USDA assistance. The Directive activated the Water Availability, Agriculture, Wildfire, Tourism, Municipal Water, and Review and Reporting Task Forces to review task force responsibilities under the plan, monitor the situation, and evaluate impacts to potable water supplies in the southwest and northwest portions of the state. The State Drought Review and Reporting Task Force provided a Drought Status Report to the Governor's Office. The situation called for continued monitoring by the Water Availability Task Force. Fall and winter precipitation alleviated concerns.

2000 - A Close Call

Water year 2000 (October 1999 - September 2000) was influenced by a strong La Nina condition that led to the majority of months to be below average in precipitation and above average in temperature. The Water Availability Task Force met monthly to monitor the situation as the statewide snowpack started out well below average but recovered to near average with March precipitation. A windy and warm April/May quickly melted the snowpack, leading to low stream flows. By June, drought conditions were beginning to affect most of the state. Most dry were the northeastern plains, the Rio Grande, and San Juan/Dolores basins. Wildfire conditions were extreme, contributing to several fires statewide including the damaging Bobcat and Hi Meadows fires. Agriculture was suffering not only from the dry conditions, but also due to a late freeze in May. Dryland farming and ranching took the worst hit. Irrigated crops benefitted from surplus reservoir storage, but agricultural reservoirs were drawn down significantly during the summer, leaving many dependent on at least an average snowpack in the upcoming winter to refill reservoirs. Municipal reservoir storage remained sufficient, but some six communities that relied on stream flows enforced water conservation measures. Pinewood Springs in Larimer County had to haul water to meet the needs of its residents.

In June, the Drought Task Force recommended activation of the Wildfire and Agriculture Task Forces of the Colorado Drought Response Plan. Governor Owens encouraged stepping up the State's drought preparedness efforts as an alternative to activating the plan.

The Colorado Department of Agriculture and the Governor's office pursued aid for farmers and ranchers through federal drought relief programs from the U.S. Department of Agriculture and the Small Business Administration. As of October 20, 2000, seventeen Colorado counties and twenty-nine contiguous counties were eligible for assistance as a result of a USDA Secretarial Disaster Designation (see map and list of declared counties on the following pages). Pacific equatorial sea surface temperatures returned to average by September, and a return of more normal weather patterns, with average precipitation and below average temperatures, followed into December 2000.

Drought Declarations and the 2000 Situation

There are three different types of federal disaster declarations that apply to drought: Presidential Disaster Declarations, Secretarial Disaster Designations from the United States Department of Agriculture (USDA), and Small Business Administration (SBA) Administrative Declarations.

The Colorado Drought Mitigation And Response Plan

All declaration requests must come from the Governor or authorized representative.

Presidential Disaster Declaration

A governor may request a presidential disaster declaration if the state determines the severity of the damages justify a request. There were no requests from the State of Colorado in 2000.

SBA Administrative Declarations

A governor may request an SBA declaration from the SBA administrator. Conditions under which the SBA can make an economic injury disaster declaration are as follows:

- (1) A governor certifies at least five small businesses in a disaster area have suffered substantial economic injury as a result of the disaster and are in need of financial assistance not otherwise available on reasonable terms.

- (2) The Secretary of Agriculture designated an area for an agricultural disaster. The SBA can provide working capital assistance to nonfarm (ranch) small businesses which are dependent upon farm or ranch production.
- (3) The Secretary of Commerce makes a commercial fishery or fishery resource disaster under Section 308(b) of the Interjurisdictional Fisheries Act of 1986.

Droughts can have widespread economic, environmental, and social impacts that can span years or even decades.

SBA Administrative Declarations open as of January 22, 2001

SBA Declaration #9K24 - Drought
Baca, Bent, Delta, Montrose, Ouray

SBA Declaration #9J99 - Drought, Excessive Heat, and Dry Winds
Cheyenne, Kiowa, Kit Carson, Prowers

SBA Declaration #9J84 - Excessive Heat and Drought
Baca

SBA Declaration #9J65 - Wildfire, Drought, and Dangerous Fire Conditions
Jackson, Larimer, Moffat, Routt, Weld

SBA Declaration #9J61 - Drought
Alamosa, Costilla, Hinsdale, Huerfano, Jackson, Mineral, Rio Blanco, Rio Grande, Routt, Saguache

SBA Declaration #9J61 - Drought
Chaffee, Conejos, Custer, Eagle, Fremont, Garfield, Gunnison, Las Animas, Ouray, Pueblo, San Juan

SBA Declaration #9J24 - Drought
Archuleta, Dolores, La Plata, Montezuma, San Miguel, Alamosa, Conejos, Costilla, Eagle,

Garfield, Hinsdale, Lake, Mesa, Mineral, Montrose, Ouray, Pitkin, Rio Grande, San Juan, and Summit

SBA Declaration #9J07 - Severe Drought, Excessive Heat
Logan, Sedgwick

SBA Declaration #9I58 - Drought - 14 counties

SBA Declaration #9H93 - Drought
Adams, Arapahoe, Kit Carson, Lincoln, Logan, Morgan, Phillips, Sedgwick, Washington, Weld, Yuma

SBA Declaration #9H90 - Excessive Heat, Drought
Logan, Phillips, Sedgwick, Weld

SBA Declaration #9H72 - Drought
Archuleta, La Plata, Montezuma

SBA Declaration #9H66 - Excessive Heat, Drought
Phillips, Yuma

USDA Secretarial Disaster Designations

The USDA has programs to aid farmers and ranchers. The Secretary of the USDA has the authority to designate an area for an agricultural disaster. Once designated, assistance is available through USDA and Small Business Administration Programs (SBA). As of October 20, 2000, seventeen Colorado counties and twenty-nine contiguous counties received drought disaster designations.

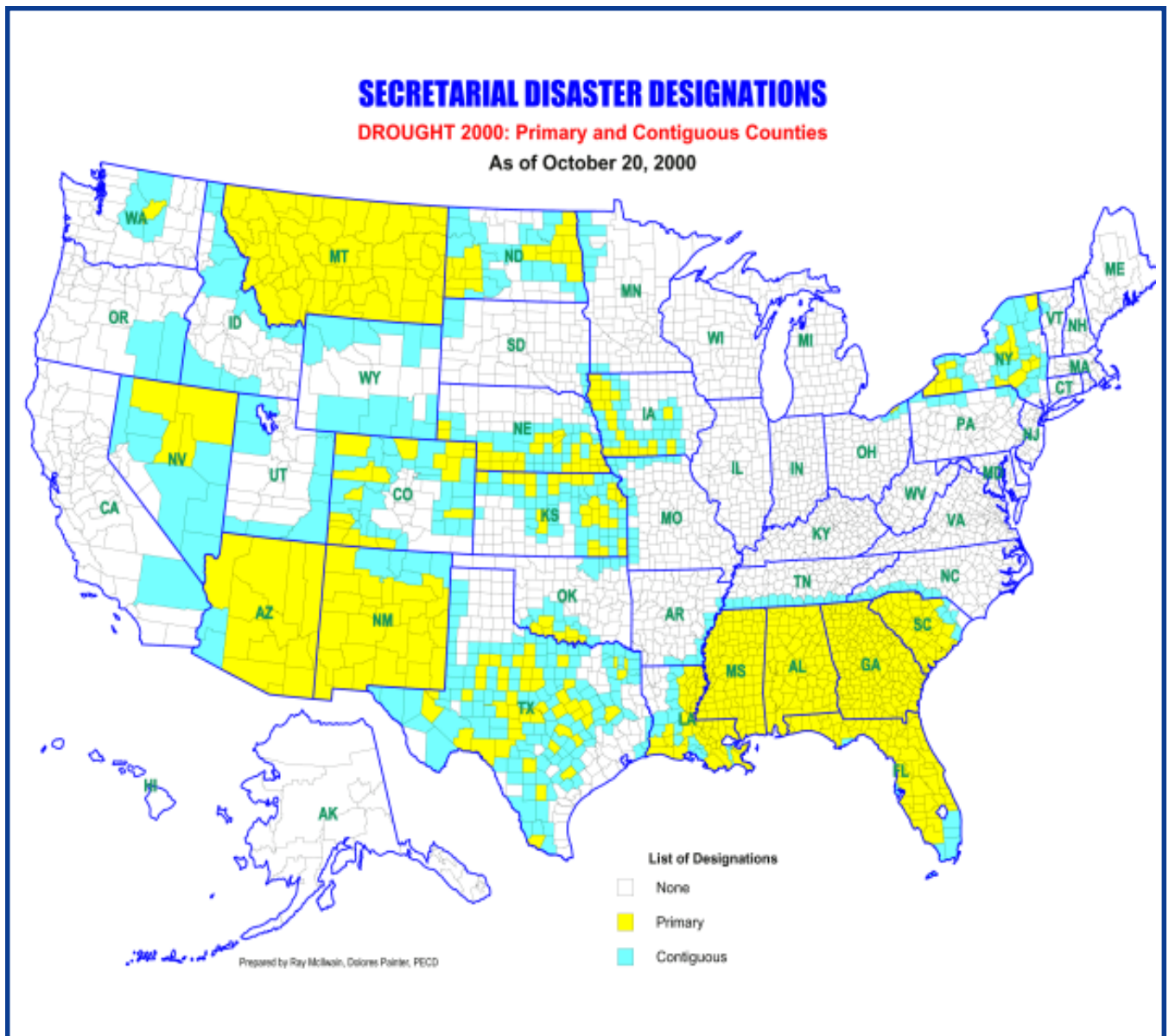
Contiguous Counties

Otero, Bent, Prowers, Crowley, Lincoln, Kit Carson, Cheyenne, Yuma, Weld, Adams, Arapahoe, Boulder, Grand, Jackson, Routt, Rio Blanco, Summit, Mesa, Montrose, Gunnison, Lake, Pitkin, Ouray, San Juan, Hinsdale, Mineral, Rio Grande, Alamosa, Costilla
 For more information on declarations and eligibility for assistance, refer to the USDA website, www.usda.gov, and the SBA website, www.sba.gov.

Primary Declared Counties

Archuleta, Conejos, Delta, Dolores, Eagle, Garfield, Kiowa, La Plata, Larimer, Logan, Moffat, Montezuma, Morgan, Phillips, San Miguel, Sedgwick, Washington

As of October 20, 2000, seventeen Colorado counties and twenty-nine contiguous counties were eligible for assistance as a result of a USDA Secretarial Disaster Designation.



2.0 - Colorado's Plan

2.1 Purpose

The purpose of Colorado's plan is to provide an effective and systematic means for the state to reduce the impacts of water shortages over the short-term or the long-term.

2.2 Organization

The plan consists of four components: monitoring, assessment, mitigation, and response. These four actions are designed to work within the existing framework of government, pulling together key personnel from both federal and state levels.

Impact Task Forces (ITFs) and the Interagency Coordinating Group (ICG) are discussed under Monitoring, Impact Assessment, and Response on the following pages.

The general sequence of actions to be carried out will be in accordance with Figures 2.1 and 2.2. Expenses to support activities are subject to normal fiscal constraints of respective agencies. Requests for special funding will be forwarded through the appropriate lead agency, the Review and Reporting Task Force (R&RTF), or the ICG, to the Governor.

Figure 2.1 shows how the components of the plan work together.

Task Force Roles

Specialized Impact Task Forces are activated as needed to coordinate the assessment of drought impacts as well as appropriate response and mitigation actions. Figures 2.3 and 2.5 describe the Impact Task Forces and their membership and responsibilities. *The Energy and Health Task Forces are not included due to a lack of information on membership and tasking at the time of publication of the plan.*

Figure 2.1 Drought Monitoring, Assessment, Mitigation, and Response Structure

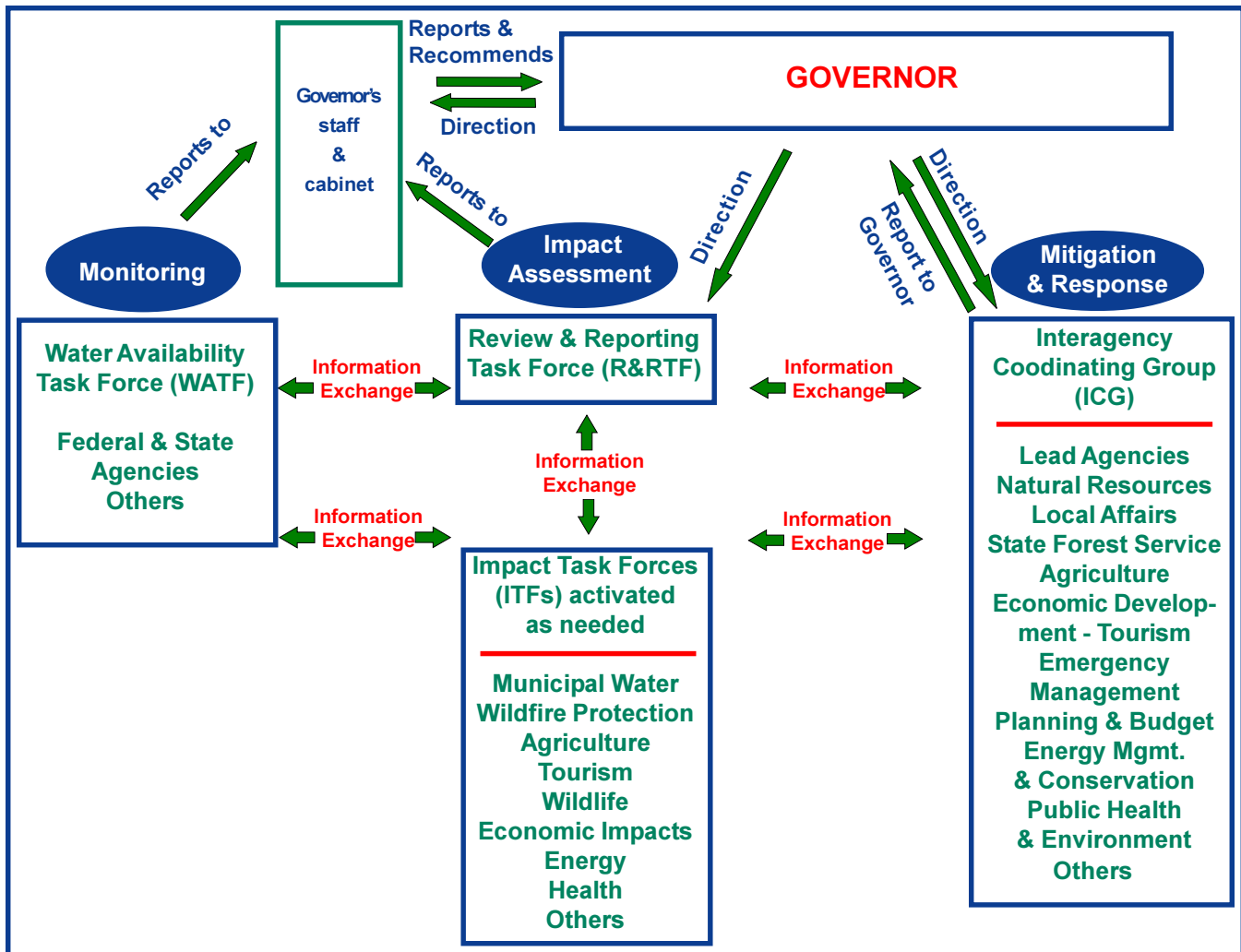
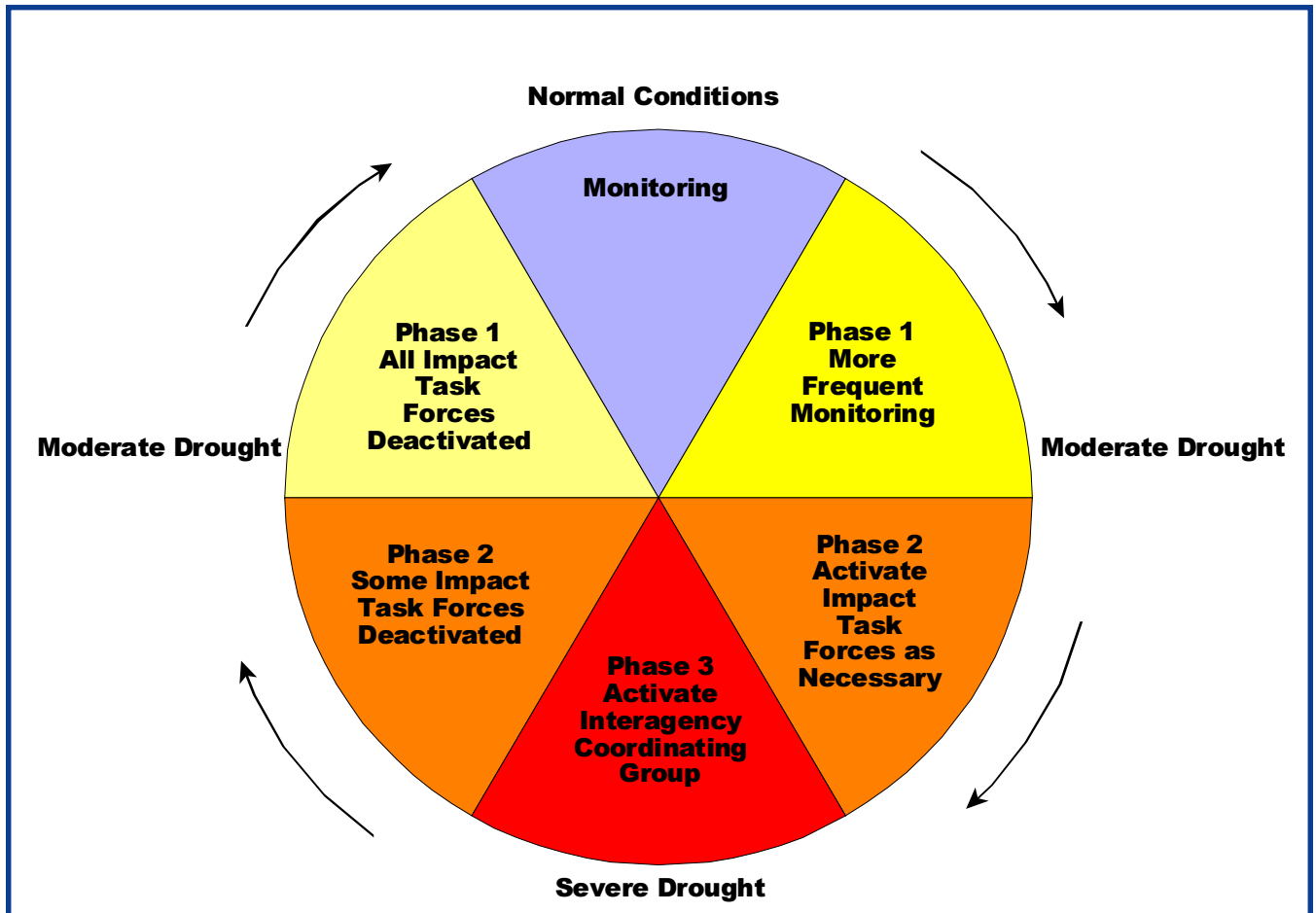


Figure 2.2 Drought Plan Implementation Cycle



Government Roles

Federal Government

- Provides technical assistance as needed.
- Collects and distributes data as needed.
- Provides financial assistance when possible.

State Government

State agencies take on important roles in the process. They commit resources to:

- Designate a Drought Coordinator
- Provide personnel and resources to Drought Task Forces
- Monitor precipitation, temperature, reservoir storage, snowpack and stream levels
- Provide technical assistance to locals
- Coordinate the activation and implementation of the plan and the distribution of information to the media and the public
- Determine impacts and develop response strategies
- Broker regional and federal resources when appropriate

Local Governments

- Designate a Drought Coordinator.
- Identify areas of concern and report findings through emergency management channels and appropriate state agencies. See state agency contact list in Appendix D.

The plan consists of four components: monitoring, assessment, mitigation and response.

Monitoring

Throughout the water year (October through September), the Water Availability Task Force (WATF) collects data on snowpack, soil moisture, reservoir levels, stream flow, precipitation and temperatures. The members meet quarterly, or monthly during dry periods, to share the information, discuss projections, and assess the water situation. Chairs of the Impact Task Forces comment on any observed or potential impacts within their area of responsibility. The group then recommends what actions, if any, should be taken. The chair of the WATF relays this information to the Office of the Governor. Upon recommendation, the Governor may elect to issue a memorandum ordering an assessment of impacts.

Figure 2.3

Water Availability Task Force (WATF)
Monitors conditions.

Members
 Colorado Water Conservation Board (Chair)
 Colorado Office of Emergency Management
 Office of the State Climatologist
 Colorado Division of Water Resources
 National Weather Service
 Natural Resources Conservation Service (USDA)
 United States Geological Survey
 Bureau of Land Management
 Bureau of Reclamation
 Private Parties

Tasks

- Monitor drought forecasts and climate conditions
- Make projections by basin on:
 - Snowpack
 - Soil Moisture
 - Stream flow
 - Reservoir levels
 - Ground water levels
 - Precipitation
 - Temperatures
 - SWSI
 - SPI
 - Palmer indexes
- Determine requirements for routine and special reports.
- Provide other task forces with this information.
- Identify resource information gaps and make recommendations to address them.
- Coordinate and respond to special data requirements of the other Task Forces.

Data Sources:
 Monthly water supply report, monthly climate report, modified Palmer Index, monthly Standardized Precipitation Index (SPI), Surface Water Supply Index (SWSI), historical norms, weather forecasts, reservoir levels, stream flow data, rain gauge sites, snow course sites.

Colorado Drought Indicators

Drought indicators synthesize complex water availability data for planners and decision-makers. Since drought is not easily assessed by a single indicator, Colorado utilizes three indicators: the Standardized Precipitation Index (SPI), the Surface Water Supply Index (SWSI), and the Palmer Drought Index (PDI). A brief description of these indicators follows.

Standardized Precipitation Index (SPI)

The SPI measures the precipitation deviation from the average for a particular location. The SPI can quantify the precipitation deficit over multiple time scales—typically three, six, twelve, and twenty four month periods. Developed in Colorado by the Colorado Climate Center (McKee et al. 1993), the SPI provides an early warning of drought and an intensity level for each month in which the drought occurs.

Surface Water Supply Index (SWSI)

The SWSI is an indicator of surface water conditions for each major river basin in the state. The index summarizes snowpack, streamflow, precipitation, and reservoir storage for a particular month. The weighting factors change from winter to summer as follows:

November-April SWSI - observed reservoir storage + precipitation + snowpack + Apr-Jul streamflow forecast (USDA-NRCS calculation)

May-October SWSI - observed reservoir storage + precipitation + streamflow (CO DWR calculation)

Palmer Drought Index (PDI)

The Palmer Index is widely used across the United States primarily to gauge impacts on agriculture. It is based on precipitation and temperature data and the local available water content of the soil. Since this index was developed for areas of the country with more homogeneous climates, the Colorado Climate Center has adapted the index by separating the state into twenty-five climatically similar regions. Thus, we have the Colorado Modified Palmer Drought Index.

Figure 2.4 SPI, SWSI, PDI Classification and Comparison

SPI	SWSI, PDI	Drought Category
2.0 +	4.0+	extremely moist
1.5 to 1.99	3.0 to 3.9	very moist
1.0 to 1.49	2.0 to 2.9	unusually moist
0.99 to 0.99	1.9 to 1.9	near normal
-1.0 to -1.49	-2.0 to -2.9	moderate drought
-1.5 to -1.99	-3.0 to -3.9	severe drought
-2 and less	-4.0 and less	extreme drought

Impact Assessment

Impact Task Forces (ITFs) may be activated to assess drought impact. They are:

- Water Availability
- Municipal Water
- Wildfire Protection
- Agricultural Industry
- Tourism
- Wildlife
- Economic Impacts
- Energy Loss
- Health
- Review and Reporting

When the plan is activated, these task forces can be mobilized to determine drought impact. They utilize a broad range of information sources to gather and evaluate data when the impact of drought is beyond local capabilities to cope with it.

Figure 2.1 shows how they work within the drought monitoring, assessment, mitigation, and response structure; and figures 2.3 and 2.5 describe task force membership and their responsibilities.

Tasks for all Task Forces are:

- Identify the drought related problems.
- Define and assess societal impacts, severity, loss and costs; evaluate state and local capacity for response; determine residual needs; report findings and action plans.

Figure 2.5 Drought Impact Task Forces

Drought Impact Task Forces

Data collection, evaluation, and reporting is a responsibility of each task force. They meet at the discretion of the chair agency and/or the Governor.

Municipal Water Task Force (MWTF)

Assesses municipal impact.

Members

- Colorado Division of Local Government (Co-chair)
- Colorado Water Conservation Board (Co-chair)
- Colorado Office of Emergency Management
- Colorado Department of Public Health & Environment - WQCD
- Colorado Division of Water Resources
- Colorado Division of Fire Safety
- Colorado Municipal League
- Colorado Counties, Inc.
- Special District Association
- USDA - Rural Development
- US Army Corps of Engineers
- Colorado Rural Water Association

- Department of Fire Science Technology (RRCC)
- Colorado Water Utility Council
- Fire Chief's Association
- Fire Marshall's Association
- Economic Development Administration
- Water Resources and Power Development Authority
- Other agencies as needed

Tasks

- Assess & prioritize impact of drought conditions on municipalities and report to the R & RTF and appropriate response and funding agencies.
- Develop and implement a follow-up process to determine actions where impact is identified.
- Develop and assign reporting responsibilities where appropriate.
- Develop a method for periodic contact with the more critical areas noted in the list of municipalities.
- The Division of Local Government will review the water availability data to prepare appropriate response to an emergency situation.
- Co-chairs will work directly with municipalities / governments impacted by drought on their options.

Wildfire Protection Task Force (WPTF)

Assesses wildfire risk.

Members

- Colorado State Forest Service (Lead agency and chair)
- Colorado Division of Wildlife
- Colorado Office of Emergency Management
- Colorado Army National Guard
- Colorado Division of Fire Safety
- USDA Forest Service
- Bureau of Land Management
- Bureau of Indian Affairs
- National Park Service
- National Weather Service
- Others as needed:

- Special District Association (fire)
- Division of Parks & Recreation
- Colorado Counties, Inc.
- Colorado Sheriff's Association
- Colorado Fire Chief's Association

This task force augments wildfire coordination activities and is not involved in suppression operations. It is an assessment, planning, and preparedness group for wildfire impact projections as they relate to drought conditions. Findings will be assimilated into the overall drought assessment.

Activation of this task force is based on the following criteria:

- Above normal or unseasonal size of wildfires.
- Winter cumulative precipitation less than 75 percent of normal by January 10 for large regions of Colorado.
- May-September monthly precipitation less than 75% of normal in any single month for multi-county region(s)
- Appointment of a Drought Coordinator (departmental).
- Special request of the Governor.

Figure 2.5 Drought Impact Task Forces (Continued)

Wildfire Protection Task Force (WPTF) cont.

Tasks

- Activated by Memorandum of the Governor based on the drought severity indicators and sequence of action chart.
- Review guidelines and procedures - update / revise.
- Assess current and potential severity of impacts.
- Make projections for several scenarios; analyze wildfire threat for each.
- Analyze barriers and needs to meet projected threats.
- Identify sources of assistance and recommend response levels and activities.
- Inventory possible fire protection resources, availability, cost estimate, and identify procedures to activate.
- Identify key contact points for support service agencies.
- Identify and describe key wildfire policy and authority issues.
- Make recommendations and identify costs on how major impact problems can be solved.
- Evaluate effectiveness of wildfire protection activities.
- Devise a wildfire danger warning system for coordinated public warnings/messages.
- Develop procedures for a coordinated system of fire restrictions and declarations by local, state, and other officials.
- Maintain supporting data and record of activities.

Data Sources:

Fire weather/danger station networks, Wildland Fire Assessment System, local fire departments, county sheriffs, state and federal wildfire agencies, Colorado Wildfire Coordination Group, fire behavior specialists, State Climatologist, Water Availability Task Force

- Subnormal precipitation in mountains, resulting in inadequate irrigation prospects based on drought severity indicators.
- Request of the Governor.

Tasks

- Provide coordination and liaison with USDA agencies, state agencies, local government, and agricultural industry groups.
- Review guidelines and procedures.
- Collect and evaluate impact data.
- Assess current and potential severity of impacts.
- Make projections for several scenarios.
- Analyze barriers and needs to meet projected threats.
- Identify sources of assistance.
- Recommend response levels and activities.
- Estimate and report on costs of needed augmentation activities.
- Maintain supporting data and records of activities.
- Review drought reporting in relationship to current and / or potential threats.
- Inventory additional or special resource availability, costs, and procedures for activation.
- Identify key contact points with support service agencies and agricultural industries.
- Identify and describe response actions that are available.
- Project impacts of drought to agricultural economy.
- Recommend response to drought impacts.
- Identify procedure for coordination with other task forces.
- Make requests and recommendations on the use of Governor's Agricultural Emergency Fund.

Data Sources

Natural Disaster Damage Assessment Report (USDA), USDA Flash Situation Report (Dept. of Agriculture), Economic Outlook Reports, Regional Outlook (Western Livestock Roundup), Pest reports (grasshoppers), Agricultural & Economic Outlook Reports, Colorado Ag Update, Crop Progress report, Colorado Agricultural Statistics.

These reports are available from Colorado Agricultural Statistics 303-236-2300 or Toll-Free at 1-800-392-3202. Online report sources are www.nass.usda.gov/co/, www.nass.usda.gov/, and www.ers.usda.gov/.

Agricultural Industry Task Force (AITF)

Assesses soil erosion, crop/livestock loss, and insect/pest issues.

Members

Colorado Department of Agriculture (Chair)
 U. S. Department of Agriculture (USDA)
 Natural Resources Conservation Service
 Farm Services Agency
 Colorado Division of Water Resources
 State Soil Conservation Board
 State and Federal Extension Services
 Agricultural Industry Groups
 Cattle, grain, and dairy associations
 Colorado Counties, Inc.
 Colorado Municipal League
 Others as needed

Activation of this task force is based on the following criteria:

- Subnormal precipitation in summer / fall in a major agricultural area resulting in loss of ground cover for wheat and pasture land.
- Indication soil moisture conditions may create dust blowing/storms in certain critical areas.

Tourism Task Force (TTF)

Assesses the impact of drought upon tourism.

Members

Colorado Office of Economic Development and International Trade - Office of Tourism (Chair)
 State tourism agency
 Colorado Division of Parks and Outdoor Recreation
 Colorado Department of Agriculture
 Colorado Department of Local Affairs
 Colorado Division of Wildlife

Figure 2.5 Drought Impact Task Forces (Continued)

<p>Tourism Task Force (TTF) <i>cont.</i></p> <p>Farm Services Agency Bureau of Land Management National Park Service U.S. Forest Service Colorado Ski Country U.S.A. Colorado Hotel/Motel Association U.S. Department of Labor C.U. School of Business Others as needed</p> <p>Tasks</p> <ul style="list-style-type: none"> • Review operational procedures and update as required. • Synthesize data gather for R&RTF. • Coordinate public information releases. • Identify major commercial and industrial problem areas. <p>Data Sources</p> <p>Relies on local assessment measures to include (1) visitation data, (2) sales tax revenues, (3) employment reduction and (4) lodging receipts, as well as other reports from other agencies, chambers of commerce and others.</p>	<p>Economic Impact Task Force (EITF) Assesses drought impact on economy.</p> <p>Members</p> <p>Colorado Office of State Planning and Budgeting (Chair) Colorado Department of Revenue Colorado Department of Labor and Employment Colorado Department of Agriculture U.S. Department of Labor Colorado School of Mines Others as needed</p> <p>Tasks</p> <ul style="list-style-type: none"> • Estimate state's economic impact using OSPB's economic model. • Review regional economic indicators. • Develop assessment and report to R&RTF. <p>Data Sources</p> <p>Using the OSPB'S economic model, the impacts of drought on the economy can be estimated by "shocking" the model with changes in farm income. The Dept. of Agriculture's statistician provides information on the dollar amount of farm income lost on various crops. These are filtered through the model and final impacts of the drought levels and total state income are estimated. Regional indicators such as sales tax collections, employment data, and tourist and skiing activities are also reviewed.</p>
<p>Wildlife Task Force (WTF) Assesses the impacts of the drought upon wildlife (fish, game & non-game)</p>	<p>Review & Reporting Task Force (R & RTF) Reviews all task force assessments and recommends overall drought response.</p>
<p>Members</p> <p>Colorado Dept. of Natural Resources - Div. of Wildlife (Chair) U.S. Forest Service Bureau of Land Management U.S. Fish and Wildlife Service Trout Unlimited Others as needed</p> <p>Tasks</p> <ul style="list-style-type: none"> • Identify potential / existent drought-related wildlife impacts. • Estimate potential short-term wildlife losses and long-term projections for losses over the assessment periods. Emphasis is placed on wildlife losses on division controlled properties and public lands; fish hatcheries, reservoirs, streams, terrestrial wildlife habitats and associated recreational areas. • Recommend measures to prevent or mitigate wildlife losses. • Establish contact with appropriate federal and state agencies to solicit input and assistance. • Evaluate impact on Division held water rights; reservoirs, streams, hatcheries, etc. • Coordinate public information releases regarding assessment of drought conditions • Synthesize assessment data for the R & RTF <p>Data Sources</p> <p>Division of Wildlife's regional office reports and information provided by other task force agencies.</p>	<p>Members</p> <p>Directors from DNR & DoLA - Chairpersons Chair of the Municipal Water Impact Task Force Chair of the Wildfire Protection Impact Task Force Chair of the Agricultural Industry Impact Task Force Chair of the Tourism Impact Task Force Chair of the Wildlife Impact Task Force Chair of the Economic Impact Task Force Chair of the Energy Loss Impact Task Force Chair of the Health Impact Task Force</p> <p>Tasks</p> <ul style="list-style-type: none"> • Review the assessments of the Impact Task Forces and summarize the findings for a report to the Governor. • Recommend actions to mitigate drought impact. • Make recommendation for activation of the Interagency Coordinating Group (ICG). • Solicit input from Impact Task Force chairs for situation reports for the Governor. • Develop media talking points.

Response

State action is taken when local government capabilities cannot cope with existing or growing needs from drought impacts. Response consists of any action taken to solve a given drought problem, from media announcements to funding or reallocation of resources. The agencies of state government which may be called upon to carry out response functions are shown in Figure 2.6 below. The department or agency most concerned is assigned to act as lead agency and enlist others to address immediate drought response needs. Figure 2.7 outlines the general tasking of the response functions.

If drought conditions worsen, agencies become overburdened, and emergency conditions threaten, an Inter-agency Coordinating Group (ICG) may be activated by proclamation of the Governor upon recommendation by the Review and Reporting Task Force (R&RTF).

The chair of the ICG is appointed by the Governor. Representatives may be pulled from the agencies listed in Figure 2.6, those listed in Figure 2.5 (Drought Impact

Task Forces), and any other organization, agency, association, or resource as deemed necessary to address drought response.

This group will have the authority to take the appropriate actions to mitigate the impact of drought and will report directly to the Governor's office. It will develop, coordinate, and recommend solutions to impact problems involving:

- Executive Branch actions, to include interdepartmental or outside support (possible federal declaration).
- State Legislative actions, including requests for funding.
- Program implementation, monitoring, and approval.

Appendix A lists state and federal assistance programs to which the ICG can refer to provide relief from drought impacts. Appendix B contains a chart of actions taken to reduce drought impacts during previous droughts in Colorado.

Figure 2.6 Response Agencies

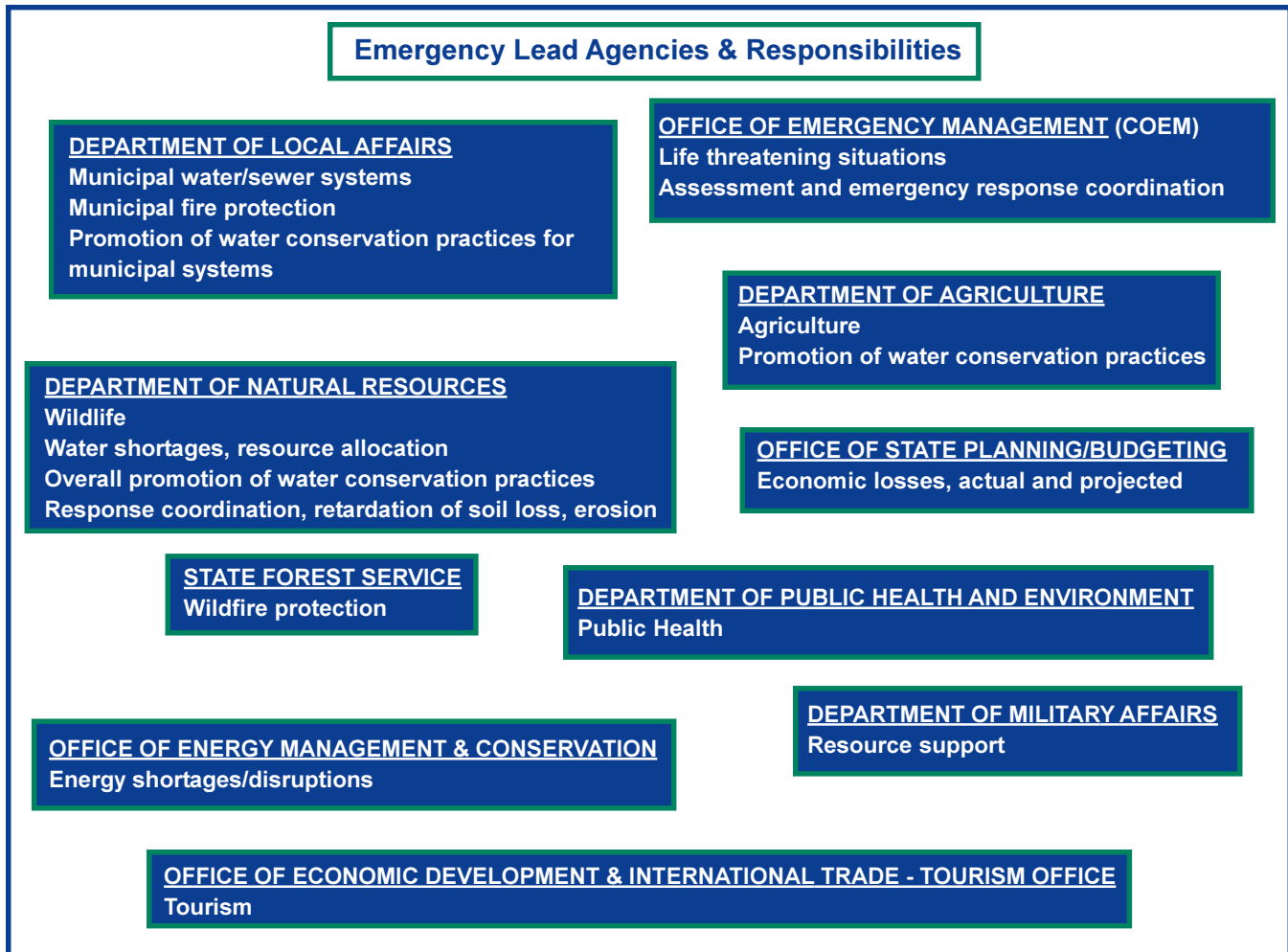


Figure 2.7 - General Tasking: Response

<p>Local Governments</p>	<ul style="list-style-type: none"> • Respond to drought impacts when possible, in accordance with local needs; report unmet needs and request assistance through appropriate agencies (to include task forces) of state government when needs cannot be met locally.
<p>All Departments of State Government</p>	<ul style="list-style-type: none"> • Address drought related problems through normally established program activities; cooperate with lead response agencies upon their designation. • Act as lead drought response agency when designated, and take action within assigned sectors of responsibility. • Consider and recommend water conservation practices to lead agencies.
<p>Lead Agencies</p>	<ul style="list-style-type: none"> • Provide direction and integration of effort to all agencies concerned with drought response within assigned sector or responsibility, utilizing normal programs and resources available. • Provide a senior level manager to the Interagency Coordinating Group (ICG) when activated. • Identify to leadership, and to the ICG when activated, unmet needs resulting from drought impacts and responses.
<p>The Interagency Coordinating Group (ICG) - when activated by gubernatorial proclamation</p>	<ul style="list-style-type: none"> • Review impact task force statements of unmet needs to recognize and identify alternate choices for response. • Develop, coordinate, and recommend solutions to impact problems involving: • Executive Branch actions, to include inter-departmental or outside support (possible Federal Declaration). This could also include recommending the appointment of a departmental staff position(s) or field representative(s). • State legislative actions, to include requests for funding. • Program implementation, monitoring and approval. • Ensure Interagency coordination (e.g. media releases). Determine when drought intensity has receded to the point that there is no longer a need for the IACG to function.

2.3 Long-term Drought Mitigation

Drought planning and monitoring is one way to mitigate potential drought impacts. Evolving water resource policy and management is another ongoing drought mitigation activity in Colorado. One challenge with drought and water management is that the duration of the drought event is unknown. Long-term drought (4-6 years) is entirely possible, and will probably occur again in the west. Over the past twenty years, Colorado has experienced unusually wet conditions; the Colorado Climate Center's research indicates that the last multi-year drought ended in the late 1970's (McKee, Doesken, and Kleist, 1999). Climate indicators preserved in tree rings, some dating back as far as 2000 years, indicate that droughts spanning decades have occurred (Woodhouse, 2000). Colorado is currently addressing long-term drought preparedness and developing ways to mitigate drought impacts as drought emerges.

The Colorado Natural Hazards Mitigation Council

Colorado's rugged landscape is the result of a multitude of natural forces at work. Along with Colorado's scenic beauty come a variety of hazards that have shaped the landscape—landslides, floods, wildfires, severe weather and even earthquakes. Growth in Colorado has put more people and structures at risk to these natural hazards. Recognizing these issues, the Governor signed an executive order establishing the Colorado Natural Hazards Mitigation Council (CNHMC) in 1989. The council was created as an interdisciplinary forum for exchanging information and promoting ways to reduce and manage impacts from natural hazards.

The role of the Council is to:

- respond to hazard mitigation opportunities in a systematic manner that maximizes efficient use of resources;
- coordinate the efforts of policy-makers and practitioners from different jurisdictions and disciplines;
- integrate the various complementary strategies into a unified approach; and
- promote mitigation projects.

The Council has the following working committees: Drought Mitigation, Flood Hazard Mitigation, Fire Management and Mitigation, Geologic Hazards, Dam Safety and Warning, Severe Weather, GIS and Mapping, Building Codes, and Public Affairs. Geologic Hazards has two subcommittees: Earthquake and Landslide. Since its inception, over one hundred mitigation projects have been supported through the dedication and collaboration of the many professionals who participate as members.

Drought Mitigation Committee

The CNHMC adopted the existing Drought Task Force, which includes members of the Water Availability Task Force (WATF), chairpersons of the Impact Task Forces, and other interested parties, as the Drought Mitigation Committee. The committee serves as a forum to address drought concerns and impacts on an ongoing basis, *before droughts occur*. Its mission is to provide an awareness of the nature and potential impacts of drought so government, industry, and the general public can make informed decisions concerning mitigation. This extends the Drought Task Force's role beyond monitoring and warning. At meetings, water availability issues are discussed followed by mitigation and policy issues, and current drought-related events. It is also a forum for information exchange and presentations on recent advancements in research and technology.

As part of the long-term mitigation strategy in the 1990s, the Drought Task Force identified a need to study wet and dry periods in Colorado's history.

Colorado's rugged landscape is the result of a multitude of natural forces at work.

The task force determined a funding mechanism for the project and the necessary participants. The Department of Atmospheric Science at Colorado State University published a report in 1999, titled *Historical Dry and Wet Periods In Colorado*. This study identified that three droughts, with a duration of at least four years, have occurred during the past century and significance and impacts tend to increase with duration. It also showed that 93% of the time at least 5% of the state is experiencing drought at the 3, 6, 12, or 24 month time scale. The December 1999 Colorado Water Resources Research Institute report, *Water in the Balance "A History of Drought in Colorado - Lessons Learned and What Lies Ahead,"* summarizes the study and gives an overview of Colorado's climate.

Activities and accomplishments of the Drought Mitigation Committee include:

- Technical assistance to CSU History Department to do a study of historical drought impacts in Colorado from a societal perspective.
- Coordination with the Colorado Water Resources and Research Institute in pursuing drought related research.
- Assistance for the development of the Standardized Precipitation Index.
- Assistance to other states in the development of their drought plans.
- Assistance to the Denver Water Board in running a drought exercise.
- Members were instrumental in the developing and implementing the Western Drought Coordination Council and assisted in the development of many of the council's products;

- Members continue to provide input and recommendations to the National Drought Policy Commission (NDPC) as the commission formulates policy on drought response and preparedness at the national level.

- Improve monitoring
- Augment water supplies
- Increase public awareness and education
- Facilitate watershed and local planning
- Reduce water demand / encourage conservation
- Reduce impact

State Drought Mitigation Recommendations

The following recommendations represent additional steps Colorado can take to reduce the impacts of drought. Many of these recommendations came from special interest breakout sessions at the Governor’s Flood and Drought Conference in December 1999. Recommendations are organized by six specific goals:

Some of the recommendations are long-term goals, while others are short-term. Some are ongoing. The recommendations are a starting point which can be built upon in the future.

Figure 2.8 Recommended Drought Mitigation Actions for Colorado

Recommendation	LEAD/ partner agencies	Year
Goal: Improve Water Availability Monitoring		
Secure funding for stream gage improvements.	USGS/CWCB	2001
Augment real time monitoring of ground water data with additional wells statewide.	USGS	2001
Develop a “Colorado Drought Status” strategy that communicates current drought conditions to the public and decision makers.	Drought Task Force/CWCB	2002
Goal: Increase Public Awareness and Education		
Develop an internet site for Colorado drought information.	CWCB/COEM	2001
Update the “About Drought” informational brochure.	CWCB/COEM	2003
Implement a “Drought Awareness Week”.	CWCB/COEM	2003
Goal: Augment water supply		
Develop public/private partnerships to augment local water supplies such as using pits from gravel extraction for water storage and recreation.	local govt’s/DoLA/CWCB	
Further research of weather modification programs.	CWCB	
Explore feasibility of water supply banking technologies: high altitude floodwater diversion storage; aquifer recharge; snow banking technologies.	CWCB/SEO	
Provide funding for water system improvements to local governments and local water utilities.	DoLA	
Goal: Facilitate watershed and local planning		
Develop risk-based assessments of water systems by basin.	CWCB	2000-01
Conduct workshops on developing local drought plans.	CWCB	2000-01
Encourage “Project Impact” (PI) communities to become “drought resistant communities”.	COEM/FEMA/PI Communities	2001
Goal: Reduce water demand / encourage conservation		
Support local development of conservation programs.	CWCB	Ongoing
Establish stronger economic incentives for private investment in water conservation.	DNR	
Develop additional computer-aided decision support systems for river basins to facilitate water conservation decision-making (modeled after the Colorado River Decision Support System).	SEO/CSU	
Goal: Impact reduction		
Conduct workshops on crop survival during drought.	Coop extension/Dept of Ag.	Ongoing
Conduct workshops on livestock management during drought.	Coop extension/Dept of Ag.	Ongoing
Resolve emerging water use conflicts.	SEO/DNR	Ongoing

Figure 2.9 Ten Steps to Drought Preparedness in Colorado

TEN STEPS TO DROUGHT MITIGATION: A COLORADO SUMMARY	
Recommended Step	Colorado
1. Appoint a drought task force.	Colorado Natural Hazards Mitigation Council, Drought Mitigation Committee, State Drought Impact Task Forces
2. Develop drought policy and define the purpose and objectives of the drought plan.	This is a continuous process. Current drought policy was reviewed at the Governor's Conference on Flood and Drought, December 2 & 3, 1999. The plan will continue to be updated periodically.
3. Anticipate and resolve conflicts between different water users.	Major water users have been identified. Water compacts are in place among neighboring states. Specialized task forces will determine impacts.
4. Identify natural, human and biological resources, as well as financial and legal constraints.	Resources, such as reservoirs, have been identified and water levels are monitored. Stream levels and snowpack levels are monitored. Volunteer efforts, such as assistance from local bottling plants, have been utilized. Some local jurisdictions have developed drought plans. Constraints will be reviewed by task forces. Colorado water law is governed by the Appropriation Doctrine.
5. Establish mitigation procedures - monitoring, impact assessment and response.	Mitigation procedures established and continue to be implemented.
6. Identify research and institutional needs.	Needs are identified by the Drought Mitigation Committee/Impact Task Forces.
7. Integrate science and policy perspectives.	Scientists and policy-makers have input into the plan and members of these communities are involved with task forces.
8. Announce and test drought plan.	Prior editions and updates to the plan have been published and made available and parts of the plan have been implemented.
9. Teach the general public and the media about drought and water supply.	Public awareness campaigns are ongoing. Examples: Governor's Conference on Flood and Drought, December 1999 and the Climatology newsletter named <i>Colorado Climate</i> . The 2001 update of the Colorado Drought Mitigation and Response Plan is available in hard copy and on the Internet. Public information brochures have been developed, including "About Drought."
10. Keep the drought plan up to date and evaluate it after the droughts.	The drought plan has been updated. The most recent version is 2001.

Adapted from the University of Nebraska National Drought Mitigation Center, 1996.

State Level Actions - Administration plan for mitigating the effects of long term droughts

Early phase

Solutions to any drought problem should address the long-term aspect without reliance on an early end. Long-term mitigation measures should be started in the early stages of drought. The National Drought Mitigation Center may be consulted as an excellent mitigation resource. Preparing for a “worst case scenario” will be useful in identifying key strategies to produce enormous long-term savings.

Middle Phase

As drought conditions worsen, pressures intensify rapidly in a variety of sectors and success is largely dependent on lively and continuous interactions among agencies. Publicity and explanations required to motivate public drought response may appear to oppose other local and state strategies like tourism, but careful, cooperative efforts can usually overcome these problems.

As a general rule, state actions should be assigned to existing “lead” agencies, similar to those that exist with the current assessment and response organization with coordination through the Interagency Coordinating Group. This group is charged with developing long-term strategies and recommendations for action should be strongly solicited from all public and private sectors. These recommendations should be formulated in terms of specific projects which can be assigned to responsible agencies.

Later Phase

This plan designates DNR & DoLA to take the lead in the early “emergency” phase. Later, as water supplies decrease and water rights trade-offs become contentious, the DNR assumes the lead in drought management.

Local Government Outreach and Feedback

State government’s role is to assist local governments as impacts exceed local capabilities. Therefore, it is particularly important local governments respond to inquiries from Impact Task Forces and coordinate their own response through a local point of contact, such as the existing emergency management system.

Appendix F identifies key contacts for outreach and should be used to facilitate information exchange between the local and state governments during short and long term droughts. It contains points of contact with regional Councils of Governments (CoGs - Planning and Management Regions), Colorado Office of Emergency Management, and Department of Local Affairs field representatives.

These points of contact will be essential to alert the ICG to local needs and also to serve as local points of contact. If either a geographic area or political subdivision of the state develops a need for day-to-day coordination between a variety of programs, then local governments may appoint drought coordinators to work with state response agencies.

2.4 Sustainability Issues

Colorado has experienced tremendous growth in the past ten years, stressing infrastructure. The impacts on surface and ground water reserves remain to be seen, since Colorado has experienced an overall abundance of moisture during the past twenty years. When - not if - the drought comes, it will likely have more severe impacts as water demands increase with growth.

Water shortages leading to drought can develop because of significant changes in expected

Colorado has experienced tremendous growth in the past ten years, stressing infrastructure.

conditions of supply and demand. Since Colorado’s population and water usage in key activities are continuing to grow, demand for water is increasing. Available supplies have also increased over the years through a variety of structural (dams) and non-structural (cloud seeding, conservation) means, but the state’s ability to create new levels of supply is marginal. In recent years, demands have been increasing faster than supplies, so the tolerance to deal with water shortages is diminishing. As climate and conservation practice fluctuate, the balance between supply and demand is likely to be disrupted more frequently.

Local Government Planning

Growth management in Colorado is primarily a local issue. State government’s role has been to provide technical assistance and guidance, and provide incentives for regional collaboration among local governments. Local comprehensive planning should consider environmental constraints, such as natural hazards and water supply.

Some local governments have developed local drought or water plans to address their water needs and plan for shortages. The Colorado Water Conservation Board encourages these plans and can provide technical assistance. CWCB conducted a survey in January 2000 of local water and drought plans. The results of this survey can be referenced in Appendix D.

2.5 Action Plan Summary

Figure 2.10 Drought Severity Indicators and Sequence of Action

Note: Further data analysis may be required to fully understand impacts of abnormally dry or wet conditions suggested by the indicators.

Severity Indicators: Palmer or SWSI, SPI	Drought Response	Actions to be Considered
-1 to positive indices in all river basins -0.5 to positive SPI (six month)	Normal Conditions Monitoring	1. CWCB/WATF monitors situation on quarterly basis, discusses trends with NWS, State Climatologist, State Engineer, NRCS, and others as appropriate, Data reviewed for drought emergence.
-1.0 to -2.0 in any river basin -0.6 to -1.0 SPI (six month)	Phase 1 More frequent monitoring	1. WATF discusses trend on monthly basis. Water availability information is generated each month. 2. CWCB/WATF provides media with situational information.
Less than -2.0 in any river basin Less than -1.0 SPI (six month)	Phase 2 Impact Task Forces are activated.	1. DNR/DoLA brief the Governor and prepare Governor's Memorandum of potential drought emergency based on recommendations. 2. Governor's Memorandum activates necessary Impact Task Forces. 3. CWCB meets with activated Task Forces' chairs to outline Phase 2 activity. 4. Activated Task Forces make an initial assessment of impact on the affected area. 5. The Review & Reporting Task Force (R&RTF) make periodic reports to the Governor. 6. Task Force chairs interface with media for their area of concern. 7. Lead agencies undertake response actions with their normal programs with available resources. 8. The R&RTF delineates any unmet needs which cannot be handled through normal channels.
Lowest reading at -2.0 to -3.9 in any river basin Less than -1.0 to -1.99 SPI (six month)	Phase 3 Drought Emergency is declared by Proclamation of the Governor.	1. R&RTF briefs Governor and prepares a Governor's Proclamation of drought emergency. 2. Governor's Proclamation activates the ICG. 3. Activated Task Forces continue to assess and report. 4. Unmet needs are passed to the ICG. 5. ICG determines which needs can be met by reallocation of existing resources. Those which cannot be forwarded to the Governor with recommendations. 6. ICG assembles data needed to support a request by the Governor for a Presidential Drought Declaration. 7. Governor requests a Presidential Declaration. 8. If approved, Federal-State Agreement establishes COEM Director as State Coordinating Officer (SCO).
	Late Phase 3 Drought impacts are reduced by increased precipitation.	1. ICG determines all requirements for assistance are being met within ICG channels. 2. ICG briefs Governor and prepares Proclamation to end drought emergency. 3. ICG issues final report and is deactivated.
Lowest reading at -1.6 in any river basin -0.8 SPI (six month)	Return to Phase 2 Return to Phase 1.	1. Impact Task Forces and R&RTF continue assessments. 2. Impact Task Forces and R&RTF issue final report and deactivate.
Lowest reading at -1.0 in any river basin -0.5 SPI (six month)	Return to normal conditions.	1. CWCB/WATF resume normal monitoring.

2.6 Public Information/Awareness/Education

Public information and awareness is essential to encourage drought impact mitigation. The Governor's Office is the lead agency in any state emergency situation, with the Colorado Office of Emergency Management taking a secondary role.

In a drought situation, a Joint Information System will be established, where local, state, and federal agencies coordinate the release of information during emergencies to reduce inaccuracies and misinformation.

The Review and Reporting Task Force will act as the Joint Information System, coordinating news releases, public meetings, public service announcements, etc. with the Governor's Office.

Task Force chairs and lead response agency representatives may respond to questions from the media, or issue news releases concerning their specific areas of responsibility.

Bibliography

- Colorado Division of Disaster Emergency Services, About Drought, 1989.
- McKee, Thomas B., Nolan J. Doesken, John Kleist, Historical Dry and Wet Periods In Colorado, Climatology Report No. 99-1 A, Part B: Appendices, Dept of Atmospheric Science, Colorado State University; 1999.
- McKee, Thomas B., Nolan J. Doesken, John Kleist, with Catherine J. Shrier and William P. Stanton, "A History of Drought in Colorado: Lessons Learned and What Lies Ahead" Water in the Balance No. 9, December 1999, Colorado Water Resources Research Institute, Colorado State University, 1999.
- Stanton, W.P., Luckie, K., and Busto, J., Survey of Drought Planning in Colorado, Colorado Water Conservation Board, Dept of Natural Resources, Denver, CO, 2000.
- University of Nebraska-Lincoln, National Drought Mitigation Center, Basics of Drought Planning, 1996.
- Western Drought Coordination Council. "Recently Impacted States Historical Drought Information" Western Drought Coordination Council Drought Response Working Group, 1999.
- Woodhouse, Connie A., "A Tree Ring Reconstruction of Stream Flow for the Colorado Front Range," Journal of the American Water Resources Association (in review 2000).
- Knutson, Cody, Hayes, Mike, Phillips, Tom. How to Reduce Drought Risk. Western Drought Coordination Council, 1998.

Appendix A - Catalog of Drought Assistance and Related Programs

Introduction

This appendix provides a list of state and federal assistance programs applicable to drought. These will be reviewed and updated whenever this plan is implemented. For specific program details, contact the state or federal agency directly. Program descriptions and authorities for state and federal programs are available for review at State Emergency Operations Center, including the Western Drought Coordination Council's Catalog of Federal Assistance Programs (March 1998).

Drought Relief Programs

All programs are dependent on annual funding appropriations. As drought conditions intensify, appropriations may be increased or initiatives may be established for new legislation. Normally, the President does not approve major disaster emergency declarations with follow-on relief programs for drought. When extremely serious events occur which are associated with drought, and which clearly overextend the state's capacity for social relief, then new congressional action may be undertaken. Also, when drought occurs over a multi-state region the possibilities for new legislation are significantly enhanced.

State Programs

(Category Definitions: Mitigation (M), Response (R), Monitoring & Prediction (MAP), Communications (C))

Customers	Program Title	Category	Description	Statute	Agencies
Affected State Agencies/ Local Governments	Disaster Emergency Fund	R	Governor can authorize expenditures for response & recovery in declared disasters	CS 24-32- 2106	Office of the Governor, COEM, A.G.'s Office
General Public, State and Local Governments	Emergency Authority	R	Governor can suspend statutes, rules, and regulations and create law in declared disasters	CS-24-32- 2104	Office of the Governor, COEM, A.G.'s Office
General Public, State/ Local Governments, Private Business	State Emergency Operations Plan/ Drought Mitigation & Response Plan Annex	R MAP M C	When activated by Governor has the force and effect of law. Covers monitoring and response to drought events and public information	CS-24-32- 2105	CWCB/COEM, Office of the Governor
State/Local Governments	National Guard	R	Governor can activate resources of the State National Guard	CS-28-3- 104	Co. Dept. of Military Affairs, Governor, COEM
Local Governments	State Emergency Fire Suppression Fund	R	Trust fund managed by State Forest Service can be used to offset the cost of fire suppression	CS 24 33.5- 1207.6	Co. State Forest Service, Colorado Sheriffs' Assoc.
General Public, State/ Local Governments, Private Business	Natural Hazards Mitigation Council	M	Council established by Governor's Executive Order to address issue of Natural Hazards Mitigation.	Executive Order BO44-89	Dept. of Natural Resources - COEM
General Public State/ Local Governments, Federal Land Managers	Fire Bans	R	Authorization by Governor of bans on open burning in designated areas	CS 23-30- 308	Co. State Forest Service, COEM, Governor, Co. Sheriffs' Ass.
State/Local Governments	Emergency Preparedness Program	C R	Provides for the organizational structure through which preparedness and response activities are conducted at the State/Local levels of Government	CS 24-32 Part 21	COEM, All State and Local Government Agencies
Local Government Water Utilities	Water Conservation Program	C M	Provides voluntary guidelines for use by water utilities and funding for water conservation projects for those who have a plan	CS 37-60	Colorado Water Conservation Board (303) 866-3314

The Colorado Drought Mitigation And Response Plan

Customers	Program Title	Category	Description	Statute	Agencies
Local Government Water Utilities	Water Needs List	M C R	Program provides for a review and prioritization of water utility projects based on need and hazard criteria		Dept. of Local Affairs, Dept. of Public Health & Environment
Hunters, Fishermen, Recreationalists	Wildlife Cash Fund	R M	Can be used to fund both response and mitigation actions affecting wildlife during drought periods	CS 33-1-112	Division of Wildlife. COEM, Dept. of Natural Resources, Governor
General Public, Local Governments, State Agencies	Construction Proj. Trust Fund	M	Funds projects dealing with water resources, in-stream flows, etc.	CS-37-60-121	Co. Water Conservation Board, Dept. Natural Resources, Division of Wildlife
General Public, State/ Local Agencies Private Businesses, others	Climatology	MAP	Provides funding for the Office of the State Climatologist at CSU who in turn produces climatological information for monitoring droughts, and does drought climatological research		CSU, COEM, Department of Natural Resources
Agricultural Community	Colorado Ag. Extension Service. Public information technical assistance	MAP C	Program provides for dissemination in a timely manner to the agriculture community of drought related information and provision of technical assistance to deal with drought impacts	CS-22-34-101	CSU, COEM, Department of Agriculture, State Soil Conservation Board, others
Water resources community, Policy Makers at state/local gov't, Fed. Agencies	Colorado Water Resources Research Institute.	MAP C	Program provides for funding of water resources related research finding including drought, and dissemination of research findings, as well as dissemination of information of a water policy nature	CS-23-35-101	CSU, COEM, Department of Natural Resources
Water Resources Community	Water Resources	MAP	Reservoir, stream flow, and water resources data collection - dissemination. Real time satellite - stream gauge system: river basin simulation models - production of surface water supply index	CS-37-80 CS-24-1-124 CS-24-33-104	Div. of Water Resources, Natural Resources, Natural Resources Conservation Service, USGS, other State/Federal Agencies
Gov't Agencies state/local	Drinking Water Revolving Fund	M	Loans - if the project will help the water system maintain compliance with drinking water standards, or will further the health protection goals of the Safe Drinking Water Act	CS-37-95-107.8	Colorado Water Resources and Power Development Authority (grant recipient) Colorado Department of Public Health and Environment - Water Quality Control Division Colorado Department of Local Affairs - Division of Local Government

The Colorado Drought Mitigation And Response Plan

Federal Programs

Type of assistance	Agency	
Farm	Conservation Reserve Program- Emergency Haying and Grazing	Farm Services Agency USDA
	Agricultural Marketing Transition Act Program	Farm Services Agency USDA
	Noninsured Crop Disaster Assistance Program	Farm Services Agency USDA
	Wetlands Reserve Program	Natural Resources Conservation Service USDA
	Emergency Conservation Program	Farm Services Agency USDA
	Environmental Quality Incentives Program	NRCS-USDA
	Federal Crop Insurance	Risk Management Agency-USDA
	Emergency Loans	Farm Services Agency USDA
	Farm Ownership Loans	Farm Services Agency USDA
	Farm Operating Loans	Farm Services Agency USDA
Water/ Sewer	Emergency Water Supply/Drought Assistance Programs	U.S. Army Corps of Engineers
	Emergency Community Water Assistance Grants	Rural Development, Rural Utilities Service USDA
	Resource Conservation and Development	NRCS-USDA
	Watershed Planning River Basin Surveys and Investigations (River Basin Program)	NRCS-USDA
	National Stream gaging Program	U.S. Geological Survey USDO
	Emergency Watershed Protection Program	NRCS-USDA
	Water and Waste Disposal Loans and Grants	Rural Development, Rural Utilities Service USDA
	Community Development Block Grants	U.S. Department of Housing and Urban Development (DOLA administered)
	Reclamation States Emergency Drought Relief Act of 1991	Bureau of Reclamation USDO
Housing	Farm Labor Housing Loans and Grants	Rural Development, Rural Housing Service USDA
	Home Ownership Loans	Rural Development, Rural Housing Service USDA
	Rural Rental Housing Loans	Rural Development, Rural Housing Service USDA
	Rural Housing Site Loan	Rural Development, Rural Housing Service USDA
Job	Job Training Partnership Act	Employment and Training Administration Dept of Labor
	Disaster Unemployment Assistance	Employment and Training Administration Dept of Labor
	Migrant and Seasonal Farm Workers	Employment and Training Administration Dept of Labor
Business	Economic Adjustment (Title IX) Program	Economic Development Administration US Department of Commerce
	Economic Injury Disaster Loan	U.S. Small Business Administration
	Business and Industrial Loan Program	Rural Development, Rural Business-Cooperative Service, USDA
Food	Emergency Food Assistance	Food and Consumer Service USDA
Other	Disaster Relief and Emergency Assistance Program	Federal Emergency Management Agency

Appendix B - Actions taken to reduce drought impacts by Colorado in previous droughts

From "Recently Impacted States Historical Drought Information" Western Drought Coordination Council Drought Response Working Group, 1999. Highlights of Colorado's responses to the survey are as follows:

SECTOR	SECTION	IMPACT	STATE RESPONSE / ACTION TAKEN
Agriculture	Economic	Increase cost of cattle production (feed, shipping, lease)	Offset cost of feed to rancher - Setup 800# to locate feed - Ship cattle to areas with feed - Reduce size of herds - Reserve stocks
		Loss of livestock production	- Emergency Farm Loans - Livestock Indemnity Program - Emergency Conservation Program - Water conservation and enhancement measures including wells, springs, pipelines, troughs, etc.
Water Resources	Economic	Competing interests could require suspension of current water rights system	Emergency water proclamation drafted to suspend statutes and rules regulating distribution of water in the state
		Assessing downturn in tourism industry	Financial analysis of impacts on local government tax revenues, analysis of credit needs of resort areas
		Need for public information dissemination	Conduct workshops in affected areas
		Lack of funding for municipal and wildlife related drought mitigation activities	Provide assistance in accessing grants & other resources
		Need for technical assistance to site new municipal wells	Technical assistance from universities
	Environmental	Greater reliance on water from wastewater treatment plant discharges	Administration of "effluent bank"
		Need for "water bank" to help water users buy water supplies and improve protection of fish and wildlife	Administration of water bank, increase public awareness
		Agricultural contamination of groundwater	Development of new database to focus on groundwater quality
		Possible water and wastewater treatment plant noncompliance due to increased salinity caused by inadequate stream flows	Additional Water Quality Control Division enforcement activity
	Social	In rural communities, municipal water restrictions resulting from 1956 drought caused many schools to close	Information on state response not available
		Need ground and surface water management for drought protection	Conjunctive use management
		Need to maximize supplies and minimize effects of drought on water users	Aid in local water resources planning
		Need for enhanced monitoring of water availability, blowing soils & agriculture, wildlife and tourism	Activation of state coordination team
Transportation hazards - highway visibility reduced to ten feet at times			
Wildfire-Forest Health	Economic	Catastrophic fires	Increased preparedness for fire suppression
	Social	Loss of fire fighters	Research and improved fire fighting equipment and tactics
		Fear of losing one's home	- Information on what one can do to protect their homes from wildfire - Urban wildland interface programs for targeted high risk areas

Appendix C - Drought Impact Checklist: Historical, Current, & Potential Drought Impacts

Source: National Drought Mitigation Center

This checklist of drought's effects can help planners anticipate problems that might arise in future droughts. Many planners find it useful to identify the "drought of record," that is, the worst ever recorded, examine its actual effects, and project what the effects would be if the same drought were to occur under current conditions and in the future. It would also be useful to conduct impact studies based on common droughts, extreme drought(s), and the "drought of record" for your region. This would yield a range of impacts related to different degrees of severity.

H = Historical Drought, C = Current Drought, P = Potential Drought

H C P Economic

- Costs and losses to agricultural producers
 - Annual and perennial crop losses
 - Damage to crop quality
 - Income loss for farmers due to reduced crop yields
 - Reduced productivity of cropland (wind erosion, long-term loss of organic matter, etc.)
 - Insect infestation
 - Plant disease
 - Wildlife damage to crops
 - Increased irrigation costs
 - Cost of new or supplemental water resource development (wells, dams, pipelines)
- 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)
 - Increased predation
 - Range fires
- Loss from timber production
 - Wildland fires
 - Tree disease
 - Insect infestation
 - Impaired productivity of forest land
 - Direct loss of trees, especially young ones
- Loss from fishery production
 - Damage to fish habitat
 - Loss of fish and other aquatic organisms due to decreased flows
- General economic effects
 - Loss to industries directly dependent on agricultural production (e.g., machinery and fertilizer manufacturers, food processors, dairies, etc.)
 - Unemployment from drought-related declines in production
 - Strain on financial institutions (foreclosures, more credit risk, capital shortfalls)
 - Revenue losses to federal, state, and local governments (from reduced tax base)
 - Reduction of economic development
 - Fewer agricultural producers (due to bankruptcies, new occupations)

- Rural population loss
- Loss to recreation and tourism industry
 - Loss to manufacturers and sellers of recreational equipment
 - Losses related to curtailed activities: hunting, fishing, bird watching, boating, etc.
- Energy-related effects
 - Increased energy demand and reduced supply due to drought-related power curtailments
 - Costs to energy industry and consumers associated with substituting more expensive fuels (oil) for hydroelectric power
- Water Suppliers
 - Revenue shortfalls and/or windfall profits
 - Cost of water transport or transfer
 - Cost of new or supplemental water resource development
- Transportation Industry
 - Loss from impaired navigability of streams, rivers and canals
- Decline in food production/disrupted food supply
 - Increase in food prices
 - Increased importation of food (higher costs)

H C P Environmental

- Damage to animal species
 - Reduction and degradation of fish and wildlife habitat
 - Lack of feed and drinking water
 - Greater mortality due to increased contact with agricultural producers, as animals seek food from farms and producers are less tolerant
 - Disease
 - Increased vulnerability to predation (from species concentrated near water)
 - Migration and concentration (loss of wildlife in some areas, too many in others)
 - Increased stress to endangered species
 - Loss of biodiversity
- Hydrological effects
 - Lower water levels in reservoirs, lakes and ponds
 - Reduced flow from springs
 - Reduced streamflow
 - Loss of wetlands
 - Estuarine impacts (e.g., changes in salinity levels)
 - Increased ground water depletion, land
- Loss of cultural sites
 - Increased data/information needs, coordination of dissemination activities
 - Recognition of institutional restraints on water use

Appendix D - Local Government Drought and Water Plan Status

Source: "Survey of Drought Planning in Colorado", Stanton, W.P., Luckie, K, and Busto, J. Conservation Planning Section, Colorado Water Conservation Board, Department of Natural Resources. Denver, Colorado. February 2000.

Municipal Drought Plans February 2000

no.	Entity	Treated Water prod. (Acre-feet)	Water Protection Source	Master Water Supply Plan	Drought Hydrology Study	Drought Response Plan	Water Conservation Plan	Water Cons. Ordinance
1	Alamosa	2,356	WCP	Y	Y	Y	Y	N
2	Arvada	20,445	S	Y	Y	Y	Y	Y
3	Aspen Water Department	4,508	WCP	Y	N	N	Y	Y
4	Aurora	123,000	WCP	Y	Y	Y	Y	Y
5	Bancroft-Clover Water & Sanitation District		S	Y	N	N	N	Y
6	Boulder	22,474	WCP	N	N	N	Y	Y
7	Brighton	3,600	S	N	N	N	Y	N
8	Broomfield	5,824	WCP	N	Y	N	Y	Y
9	Cañon City	30,000	S	Y	N	N	Y	N
10	Castle Rock	2,687	WCP	Y	N	N	Y	Y
11	Centennial Water & Sanitation District	15,000	S	Y	N	N	Y	N
12	Cherokee Metropolitan District	2,926	WCP	N	N	N	Y	Y
13	Clifton Water District	3,165	S	Y	N	Y	Y	Y
14	Colorado Springs	80,000	WCP	Y	N	Y	Y	Y
15	Consolidated Mutual Water Company	3,082	WCP	N	Y	N	Y	N
16	Cortez	2,989	WCP	N	N	N	Y	N
17	Craig	2,983	WCP	Y	N	N	Y	N
18	Crestview Water & Sanitation District	2,562	S	N	N	N	Y	N
19	Denver Water Department	238,000	AR	Y	Y	Y	Y	Y
20	Durango	4,880	S	Y	N	Y	N	N
21	East Cherry Creek Water & Sanitation District	4,400	S	N	N	N	Y	N
22	East Larimer County Water District	3,069	S	Y	Y	N	Y	Y
23	Englewood	8,784	WCP	N	N	Y	Y	Y
24	Estes Park	1,500	S	N	N	Y	N	N
25	Federal Heights	1,656	S	N	N	N	N	N
26	Fort Collins	28,694	S	Y	Y	Y	Y	Y
27	Fort Collins - Loveland Water District	5,000	S	N	Y	N	Y	N
28	Fort Lupton	3,068	S	N	N	N	Y	N
29	Fort Morgan	4,603	S	N	N	N	Y	N
30	Fountain	2,128	WCP	Y	Y	N	N	N
31	Glenwood Springs	5,601	WCP	Y	N	N	Y	Y
32	Golden	4,398	WCP	Y	N	N	Y	N
33	Grand Junction	6,162	S	Y	Y	Y	Y	N
34	Greeley	24,615	S	Y	Y	Y	Y	Y
35	Green Mountain Water & Sanitation District	3,069	WCP	N	N	N	Y	N
36	Gunnison	1,380	S	Y	N	N	N	Y
37	Ken-Caryl Water & Sanitation District	2,826	WCP	N	N	N	Y	Y
38	La Junta	3,000	S	N	N	N	Y	Y
39	Lafayette	3,802	S	N	N	N	Y	Y
40	Lakehurst Water & Sanitation District	2,760	S	N	N	N	N	N
41	Lamar	2,772	WCP	N	N	N	N	Y
42	Lefthand Water District	3,986	S	Y	Y	N	Y	N
43	Little Thompson Water District	3,800	S	Y	N	N	Y	N
44	Longmont	14,110	WCP	Y	Y	N	Y	N
45	Louisville	4,520		Y	Y	N	Y	N
46	Loveland	9,000	S	Y	Y	N	Y	Y
47	Monte Vista	2,031	S	N	Y	N	Y	N
48	Montrose	3,376	S	Y	N	N	Y	N
49	North Washington Street W&S District	2,930	S	Y	N	Y	Y	Y
50	North Weld Water	3,876	WCP	N	N	N	Y	N
51	Northglenn	11,230	S	Y	Y	N	N	N
52	Parker W & S District	3,680	S	Y	Y	N	N	Y
53	Project 7			N	N	N	N	N
54	Pueblo Board of Water Works	28,602	WCP	Y	N	N	Y	Y
55	Security Water & Sanitation District	3,646	S	Y	N	Y	Y	N
56	South Adams County W&S District	5,021	WCP	N	N	N	Y	Y

The Colorado Drought Mitigation And Response Plan

Municipal Drought Plans February 2000 (cont.)

57	Sterling	4,145	WCP	N	N	N	Y	N
58	Thornton	18,650	S	Y	N	Y	N	N
59	Tri-County Water Conservancy District	2,083	S	N	N	N	Y	N
60	Upper Eagle Regional Water Authority	2,881	S	N	N	N	Y	N
61	Vail Valley Consolidated Water District	3,367	WCP	N	N	N	Y	N
62	Westminster	20,181	S	Y	Y	N	Y	Y
63	Wheat Ridge Water District	2,502	S	N	Y	N	Y	N
64	Widefield Homes Water & Wastewater Company	3,000	WCP	N	N	N	Y	N
65	Willow Brook Water & Sanitation District	1,350	S	N	N	N	N	N
66	Willows Water District	6,000	S	Y	N	N	Y	N
67	Windsor	1,519	S	Y	N	Y	N	N

S = reported in survey 1999-2000 WCP = from 1996 Water Conservation Plan AR = Annual Report Y = Yes, N = No

Agricultural Drought Plans February 2000

No.	Entity	Master Water Supply Plan	Drought Hydrology Study	Drought Response Plan	Water Conservation Plan	Water Cons. Ordinance
1	Colorado River Water Conservation District	N	Y	Y	N	N
2	Rio Grande Water Conservation District	N	N	N	N	N
3	Southwestern Water Conservation District	N	N	N	N	N
4	Animas-La Plata Water Conservancy District	N	N	N	Y	N
5	Arkansas River Water Conservancy District	N	N	N	N	N
6	Badger Beaver Water Conservancy District	N	N	N	N	N
7	Basalt Water Conservancy District	N	N	N	N	N
8	Battlement Mesa Water Conservancy District	N	N	N	N	N
9	Bluestone Water Conservancy District	N	N	N	N	N
10	Bostwick Park Water Conservancy District	N	N	N	N	N
11	Central Water Conservancy District	Y	N	Y	Y	N
12	Collbran Conservancy District	N	N	N	Y	Y
13	Crawford Water Conservancy District	N	N	N	N	N
14	Conejos Water Conservancy District	N	N	N	N	N
15	Costilla County Conservancy District	N	N	N	N	N
16	Dolores Water Conservancy District	Y	Y	Y	Y	N
17	Florida Water Conservancy District	Y	N	N	N	N
18	Fruitland Mesa Water Conservancy District	N	N	N	N	N
19	Grand Mesa Water Conservancy District	N	N	N	N	N
20	Great Northern Water Conservancy District	N	N	N	N	N
21	Huerfano County Water Conservancy District	N	N	N	Y	N
22	Jackson County Water Conservancy District	N	N	N	N	N
23	Juniper Water Conservancy District	Y	Y	N	Y	N
24	La Plata Water Conservancy District	N	N	N	N	N
25	Lower South Platte Water Conservancy District	N	Y	N	N	N
26	Mancos Water Conservancy District	N	N	N	Y	N
27	Michigan River Water Conservancy District	N	N	N	N	N
28	Middle Park Water Conservancy District	N	N	N	N	N
29	North Fork Water Conservancy District	N	N	N	N	N
30	North La Junta Water Conservancy District	N	N	N	N	N
31	Northern Colorado Water Conservancy District	Y	Y	N	Y	N
32	Purgatoire River Water Conservancy District	N	N	N	N	N
33	Rio Blanco Water Conservancy District	N	N	N	N	N
34	Saint Vrain & Laft Hand Water Conservancy District	Y	Y	N	N	Y
35	San Luis Valley Water Conservancy District	N	N	N	N	N
36	San Miguel Water Conservancy District	N	Y	N	N	N
37	Silt Water Conservancy District	Y	N	N	Y	N
38	Southeastern Colorado Water Conservancy District	N	N	N	Y	Y
39	Tri-County Water Conservancy District	Y	N	N	Y	N
40	Trinchera Water Conservancy District	N	N	N	N	N
41	Upper Arkansas Water Conservancy District	N	N	N	N	N
42	Upper Gunnison River Water Conservancy District	N	N	N	N	N
43	Upper South Platte Water Conservancy District	N	N	N	N	N
44	Upper Yampa Water Conservancy District	N	N	N	N	N
45	Ute Water Conservancy District	N	N	Y	Y	N
46	West Divide Water Conservancy District	N	N	N	N	N
47	Yellow Jacket Water Conservancy District	N	N	N	N	N

Y = Yes, N = No

Appendix E - Sample Documents

**Sample Governor's Memorandum
Potential Drought Emergency**

TO: Executive Directors, Departments of State Government

FROM: (), Governor, State of Colorado

RE: Activation of The Colorado Drought Mitigation and Response Plan

DATE:

Drought conditions have developed along the () and () River Basin(s) to the degree that counties in the () and () are likely to receive severe impacts to their environments and to the various sectors of their economy. If present trends continue, other river basins and sectors of the entire state's economy may soon be affected.

Under these circumstances, and based on a recommendation from the WATF and directors from the Departments of Natural Resources and Local Affairs, I have decided to activate the State's Drought Mitigation and Response Plan so that specific impacts may be identified, and expeditious and effective remedial action may be taken.

As of the date of this memorandum, the Colorado Drought Mitigation and Response Plan is in effect; the following actions, as specified in the plan will be taken:

- (1) The Review and Reporting Task Force will be activated under chairmanship of directors from the Departments of Natural Resources and Local Affairs. The first meeting of the Task Force will be held within five days of receipt of this memorandum.
- (2) The following Impact Task Forces (ITF) will be activated: municipal, wildfire, (), (), and (). The ITF chairpersons will call their first meeting as soon as possible after the Review and Reporting Task Force meeting.
- (3) All addressees will assign: (1) A senior level manager who can commit the resources of the department to act as a drought coordinator and (2) Task Force chairpersons and participants as indicated in Figures 2.3 and 2.5, "Drought Impact Task Forces" of the Colorado Drought Mitigation and Response Plan.
- (4) Lead agencies will be prepared to take action for drought response and to mitigate drought impacts as appropriate.

Executive Order

Proclamation

Disaster Emergency

WHEREAS, during the period (day) (month) (year) through (day) (month) (year), increasingly severe conditions of drought have impacted the State of Colorado; and

WHEREAS, the normal system of State Government is not able to cope adequately with the situation; and

WHEREAS, there is every indication that the present drought conditions will not abate in the near future; and

WHEREAS, these conditions may in fact become more severe; and

WHEREAS, extraordinary measures are necessary to protect public health, ensure public safety and welfare and render relief for those most severely impacted; and

WHEREAS, the aforementioned conditions constitute a threat to the safety and welfare of the State, and create an emergency disaster situation within the meaning of the Disaster Emergency Act, 24-33.5-705(2) C.R.S.

NOW THEREFORE, under powers vested in me by section 24-33.5-704 of the Disaster Emergency Act of 1973, and the other enabling provisions, I, Bill Owens, Governor of the State of Colorado, do hereby declare a State of Drought Emergency to exist. I further declare that based on this State Drought Disaster Emergency, the Interagency Coordinating Group (ICG) called for in the Colorado Drought Mitigation and Response Plan shall be activated with full power to address those unmet needs brought about by the drought and to take those actions within their authority to address such needs or to recommend for my action or that of the legislature those items that are beyond the authority of ICG to resolve.

This Executive Order shall expire thirty (30) days from the date hereof unless further extended by Executive Order.

GIVEN under my hand and the Executive Seal of the State of Colorado; this (___) day of (_____), A.D., 20__.

Bill Owens
Governor

Appendix F - Regional / Field Contacts

DoLA Field Manager Regions

The Denver office is located at:
1313 Sherman St., Rm. 521
Denver, CO 80203
(303) 866-2156, (303) 866-2251 Fax
(303) 866-5300 TDD

NORTHEASTERN

Kent Gumina
Campus Box C194, Walker Hall, Rm. 21
100 College Drive
Sterling, CO 80751
(970) 522-6600 ext. 6714
(970) 522-4225 Fax
kgumina@ria.net

NORTHWESTERN

Tim Sarmo
222 S. 6th St., Rm. 409
Grand Junction, CO 81501
(970) 248-7310, (970) 248-7371 Fax
tim.sarmo@state.co.us

SOUTHEASTERN

Mark Lowrey
132 West "B" St., Ste. 260
Pueblo, CO 81003
(719) 544-6577, (719) 545-1876 Fax
m_lowrey@sni.net

NORTHERN MOUNTAINS

Cathy Shipley
191 Blue River Pkwy., #206
P.O. Box 2778
Silverthorne, CO 80498
(970) 468-2183, (970) 468-2175 Fax
cshipley@sni.net

SOUTH CENTRAL

Debra Downs
260 Adams Street
P.O. Box 127 Monte Vista, CO 81144
(719) 852-9429, (719) 852-9433 Fax
d downs@bbs.slv.org

NORTH CENTRAL

Don Sandoval
150 E. 29th St., Ste. 215
Loveland, CO 80538
(970) 679-4501, (970) 679-7717 Fax
dsand@sni.net

SOUTHWESTERN

Ken Charles
Fort Lewis College
1000 Rim Dr.
Durango, CO 81302
(970) 247-7311, (970) 247-7032 Fax
Charles_K@fortlewis.edu

CENTRAL

Jack Kirtland
1313 Sherman St., Rm 521
Denver, CO 80203
(303) 866-3688, (303) 866-2251 Fax
jack.kirtland@state.co.us

COEM-Local Services Field Liaisons

NORTHWEST

Steve Denney
222 S. Sixth Avenue, Suite 409
Grand Junction CO 81501
(970) 248-7308, (970) 248-7317 Fax

NORTHEAST

Kevin Kuretich
150 E. 29th Street, #215
Loveland CO 80538
(970) 679-4503, (970) 669-7717 Fax

SOUTHWEST

Patricia Gavelda
1000 Rim Drive, Ft. Lewis College
Durango CO 81301
(970) 247-7674, (970) 247-7032 Fax

SOUTHEAST

Bill Cordova
130 W. B Street, #260
Pueblo CO 81003
(719) 544-6563, (719) 544-1876 Fax

CENTRAL

Bob Wold - Chief of Local Services
15075 S. Golden Rd
Golden, CO 80303
(303) 273 -1778, (303) 273 -1795 Fax

Colorado Department of Natural Resources (DNR) - (303) 866-3311
<http://www.dnr.state.co.us/>

Planning & Management Regions

Constituent Counties & Related Associations of Governments

REGION 1: Logan, Morgan, Phillips, Sedgwick, Washington, Yuma
Northeastern Colorado Association of Local Governments
231 Main Street, Suite 211
Fort Morgan, CO 80701

REGION 2: Larimer, Weld

REGION 3: Adams, Arapahoe, Boulder, Clear Creek, Gilpin, Denver, Douglas, Jefferson
Denver Regional Council of Governments
2480 W. 26th Avenue, Denver, CO 80211

REGION 4: El Paso, Park, Teller
Pikes Peak Area Council of Governments
15 S. 7th Street
Colorado Springs, CO 80905

REGION 5: Cheyenne, Elbert, Kit Carson, Lincoln
East Central Council of Governments
128 Colorado, Stratton, CO 80836

REGION 6: Baca, Bent, Crowley, Kiowa, Otero, Prowers
Southeast Colorado Enterprise Development, Inc
804 S. Main, Lamar, CO 81052

REGION 7: Pueblo

REGION 8: Alamosa, Conejos, Costilla, Mineral, Rio Grande, Saguache
San Luis Valley Development Resources Group
Box 300, 626 Fourth Street
Alamosa, CO 81101

REGION 9: Archuleta, Dolores, La Plata, Montezuma, San Juan
Region 9 Economic Development District of Southwest Colorado
295 A Girard Street, Durango, CO 81301

REGION 10: Delta, Gunnison, Hinsdale, Montrose, Ouray, San Miguel
Region 10 League for Economic Assistance and Planning, Inc.
300 N. Cascade, P.O. Box 849
Montrose, CO 81402

REGION 11: Garfield, Mesa Moffat, Rio Blanco, Routt
Associated Governments of Northwest Colorado
P.O. Box 351, 202 Railroad Avenue, Rifle, CO 81650

REGION 12: Eagle, Grand, Jackson, Pitkin, Summit
Northwest Colorado Council of Gov't
249 Warren Avenue
Silverthorne, CO 80498

REGION 13: Chaffee, Custer Fremont, Lake
Upper Arkansas Area Council of Governments
831 Royal Gorge Blvd., Suite 126, Canon City, CO 81215

REGION 14: Huerfano, Las Animas
South Central Council of Governments, Room 201 Courthouse Building
200 E. First Street
Trinidad, CO 81082

Appendix G - Drought Internet Resources

State Agencies

State of Colorado
<http://www.state.co.us>

Colorado Department of Agriculture
700 Kipling Street, Room 4000
Lakewood, CO 80215
303.239.4100
<http://www.ag.state.co.us/>

Soil Conservation Board
1313 Sherman, Room 219
Denver, CO 80203
303.866.3351
<http://www.ag.state.co.us/soils/soils.html>

Colorado Department of Higher Education
Colorado State University
Fort Collins, CO 80523-1371

Colorado Climate Center
Atmospheric Science Department
Colorado State University
Fort Collins, CO 80523-1371
970.491-8545
<http://ccc.atmos.colostate.edu/Welcome.html>

Colorado State Forest Service
Colorado State University
Fort Collins, Colorado 80523
970.491-6303
<http://www.colostate.edu/Depts/CSFS/>

Colorado Water Resources Research Institute
Colorado State University
E102 Engineering
Fort Collins, CO 80523-2033
970.491.6308
<http://cwrri.colostate.edu/>

Cooperative Extension
1 Administration Building
Colorado State University
Fort Collins, CO 80523-4040
970.491.6281
http://dare.agsci.colostate.edu/index_extension.html

Colorado Department of Local Affairs
1313 Sherman, Room 521
Denver, CO 80203
303.866.2771
<http://www.dola.state.co.us/>

Division of Local Government/Field Services
1313 Sherman, Room 521
Denver, CO 80203
303.866.2156
<http://www.dola.state.co.us/dlg.htm>

Office of Emergency Management
15075 S. Golden Road, Building 120
Golden, CO 80401
303.273.1622
<http://www.dola.state.co.us/oem/oemindex.htm>

Colorado Department of Natural Resources
1313 Sherman, Room 718
Denver, CO 80203
303.866.3311
www.dnr.state.co.us

Colorado Water Conservation Board
1313 Sherman, Room 721
Denver, CO 80203
303.866.3441
www.cwcb.state.co.us

Division of Water Resources
1313 Sherman, Room 818
Denver, CO 80203
303.866.3581
<http://water.state.co.us>

Division of Wildlife
6060 Broadway
Denver, CO 80216
303.297.1192
<http://wildlife.state.co.us/>

Colorado Department of Public Health and Environment
4300 Cherry Creek Drive S.
Denver, CO 80246-1530
303.692.2000
<http://www.cdphe.state.co.us/cdphehom.asp>

Water Quality Control Division
4300 Cherry Creek Drive S.
Denver, CO 80246-1530
303.692.3500
<http://www.cdphe.state.co.us/wq/wqhom.asp>

Federal Agencies

Small Business Administration
Denver District Office
303.844.2607
www.sba.gov

U. S. Department of Agriculture (USDA)
<http://www.usda.gov/>

Drought Information Page
<http://drought.fsa.usda.gov>

Farm Services Agency
303.236.2866
<http://www.fsa.usda.gov>

Federal Agencies (Continued)

U. S. Forest Service
303.275.5350 - Rocky Mountain Regional Office
<http://www.fs.fed.us/>

National Agricultural Statistics Services
<http://www.usda.gov/nass/>

Natural Resources Conservation Service
303.236.2886 - State Office
Check local listings for field offices
<http://www.nrcs.usda.gov/>

U. S. Department of the Interior
<http://www.doi.gov/indexj.html>

Bureau of Indian Affairs
<http://www.doi.gov/bureau-indian-affairs.html>

Bureau of Land Management
303.239.3600 - Colorado State Office
<http://www.blm.gov/nhp/index.htm>

Bureau of Reclamation
Check local listings for area offices
<http://www.usbr.gov/main/index.html>

U. S. Geological Survey
303.236.5900
<http://www.usgs.gov/>

Federal Emergency Management Agency
303.235.4800
<http://www.fema.gov/>

United States Department of Commerce

National Oceanographic and Atmospheric Administration (NOAA)
<http://www.noaa.gov/>

National Weather Service
<http://www.nws.noaa.gov/>

Denver-Boulder Office
303.494.3210
www.crh.noaa.gov/den

Goodland Office
785.899.7119
www.crh.noaa.gov/gld

Grand Junction Office
970.243.7007
www.crh.noaa.gov/gjt

Pueblo Office
719.948.3371 (Pueblo area)
719.573.6846 (Colorado Springs area)
719.589.3232 (Alamosa area)
www.crh.noaa.gov/pub

NOAA Drought Information and Forecast Page
<http://www.drought.noaa.gov>

NOAA Links To Other Drought Websites
<http://websites.noaa.gov/guide/sciences/atmo/drought.html>

USDA Drought Information Page
<http://drought.fsa.usda.gov>

Natural Resources Conservation Service
<http://www.co.nrcs.usda.gov/ssps.htm>

National Weather Service
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring

NOAA Drought Information and forecast page
<http://www.drought.noaa.gov>

Farm Services Agency
<http://www.fsa.usda.gov/pas/default.asp>

Federal Emergency Management Agency
<http://www.fema.gov>

National Agriculture Statistics Service (NASS)
<http://www.usda.gov/nass>

U.S. Geological Survey
<http://www.usgs.gov>

National Drought Mitigation Center
<http://enso.unl.edu/ndmc>

Western Drought Coordination Council
<http://enso.unl.edu/wdcc>

Western Regional Climate Center
<http://www.wrcc.sage.dri.edu>

Colorado Water Resources Research Institute
<http://cwrri.colostate.edu>

National Drought Policy Commission
<http://www.fsa.usda.gov/drought>

Western Governor's Association
<http://www.westgov.org>

NOAA links to drought websites
<http://websites.noaa.gov/guide/sciences/atmo/drought.html>

U.S. Drought Monitor
<http://enso.unl.edu/monitor/monitor.html>

Climate Prediction Center (long term monthly and seasonal forecasts)
<http://www.cpc.noaa.gov/products/forecasts>

Rocky Mountain Coordination Center (wildfire weather and information)
<http://www.fs.fed.us/r2/fire/rmacc.html>