

Agenda Item 6e. Discussion of Drought Triggers and Response

In accordance with 31 TAC §§357.42 (c), the regions shall develop drought response recommendations for the management of existing surface and groundwater sources in the region. For the 2016 Region F Water Plan, the RWPG adopted an approach that utilized existing drought plans for surface water sources and the Palmer Drought indices to define drought triggers for run-of-river and groundwater sources.

This agenda item initiates the discussion on establishing drought triggers and corresponding responses for Region F water sources. The consultants will present the approach used in the 2016 plan, other approaches adopted by other regions, and seek additional input from the RWPG.

Attachment:

1. Excerpt from the 2016 Region F Water Plan, Chapter 7, *Drought Response Information, Activities and Recommendations*

7.5 Region Specific Drought Response Recommendations and Model Drought Contingency Plans

As required by the TWDB, the RWPG (Regional Water Planning Group) shall develop drought recommendations regarding the management of existing groundwater and surface water sources. These recommendations must include factors specific to each source as to when to initiate drought response and actions to be taken as part of the drought response. These actions should be specified for the manager of a water source and entities relying on the water source. The RWPG has defined the manager of water sources as the entity that controls the water production and distribution of the water supply from the source. For purposes of this assessment, a manager must also meet the TCEQ requirements for development of a Drought Contingency Plan. Entities that rely on the water sources include customers of the water source manager and direct users of the water sources, such as irrigators. A list of each surface water and groundwater source in Region F and the associated managers and users of the source is included in Table H-2 in Appendix H.

7.5.1 Drought Trigger Conditions for Surface Water Supply

Drought trigger conditions for surface water supply are customarily related to reservoir levels. Region F acknowledges that the Drought Contingency Plans for the suppliers who have surface water supplies are the best management tool for these water supplies. The RWPG recommends that the drought triggers and associated actions developed by the regional operator of the reservoirs are the Region F regional triggers for these sources. A summary of these triggers and actions for major Region F reservoirs follows as defined by each source manager. Triggers and actions for other reservoirs are included in Table H-3 in Appendix H. The region also recognizes any modification to these drought triggers that are adopted by the regional operator.

Lake Brownwood (Brown County WCID #1)

BCWID #1 adopted their current Drought Contingency Plan in June of 2014. The triggers and actions are related to the elevation of Lake Brownwood and are summarized below in Table 7-6.

Table 7-6
Lake Brownwood Triggers and Actions

Drought Stage	Trigger	Action
Mild	Elevation below 1420 ft. (76% capacity)	Advise customer of early conditions. Initiate Stage I of DCPs. Increase public education. Request voluntary conservation measures.
Moderate	Elevation below 1417 ft. (64% capacity)	Request decrease in water usage. Implement watering restrictions.
Severe	Elevation below 1414 ft. (52% capacity)	Request to severely reduce water usage. Watering restrictions. District may reduce water delivery in accordance with pro rata curtailment.
Exceptional	Elevation below 1411 ft. (43% capacity)	District may call an emergency meeting with customers. Completely restrict watering. District may evaluate the need to discontinue delivery of water for second crops and non-essential uses. May reduce water delivery in accordance with pro rata curtailment.
Emergency	Elevation below 1408 ft. (34% capacity)	Above. Any other necessary actions.

O.H. Ivie Reservoir (CRMWD)

The Board of Directors of CRMWD adopted their current Drought Contingency Plan in 2009. The triggers are associated with each reservoir’s elevation level. The actions for each reservoir are similar but also unique. The triggers and actions related to the elevation of O.H. Ivie are outlined below in Table 7-7.

Table 7-7
O.H. Ivie Drought Triggers and Actions

Drought Stage	Trigger	Action ^a
Mild	Elevation below 1,517.73 ft.	Request any customer that CRMWD finds to be dependent on this source to implement Stage 1 of their DCP.
Moderate	Elevation below 1,512.07 ft.	Request all customers that CRMWD finds to be dependent on this source to implement Stage 2 of their DCPs. Refrain from making any large-scale releases from Ivie Reservoir for water quality purposes.
Severe	Elevation below 1,504.46 ft.	Request all customers that CRMWD finds to be dependent on this source to implement Stage 3 of their DCP.

a. All stages include initiation of engineering studies to evaluate alternative actions if conditions worsen and the implementation of viable alternative water supplies.

E.V. Spence Reservoir (CRMWD)

The Board of Directors of CRMWD adopted their current Drought Contingency Plan in 2009. The triggers are associated with each reservoir’s elevation level. The actions for each reservoir are similar but also unique. The triggers and actions related to the elevation of E.V. Spence are outlined below in Table 7-8.

**Table 7-8
E.V. Spence Drought Triggers and Actions**

Drought Stage	Trigger	Action ^a
Mild	Elevation below 1,846.67 ft.	Request the Cities of Robert Lee and San Angelo and any other customers that CRMWD finds to be dependent on this source to implement Stage 1 of their DCP. Refrain from any large releases from Spence Reservoir for water quality purposes.
Moderate	Elevation below 1,842.18 ft.	Request the Cities of Robert Lee and San Angelo and any other customers that CRMWD finds to be dependent on this source to implement Stage 2 of their DCP.
Severe	Elevation below 1,836.52 ft.	Request the Cities of Robert Lee and San Angelo and any other customers that CRMWD finds to be dependent on this source to implement Stage 3 of their DCP. Refrain from transferring water from Spence Reservoir to any other source.

a. All stages include initiation of engineering studies to evaluate alternative actions if conditions worsen and the implementation of viable alternative water supplies.

J.B. Thomas Reservoir (CRMWD)

The Board of Directors of CRMWD adopted their current Drought Contingency Plan in 2009. The triggers are associated with each reservoir’s elevation level. The actions for each reservoir are similar but also unique. The triggers and actions related to the elevation of J.B. Thomas are outlined below in Table 7-9.

**Table 7-9
J.B. Thomas Drought Triggers and Actions**

Drought Stage	Trigger	Action ^a
Mild	Elevation below 2,216.32 ft.	Request the City of Snyder and any other customers that CRMWD finds to be dependent on this source to implement Stage 1 of their DCP. Discontinue pumping operations at the Big Spring/Odessa intake.
Moderate	Elevation below 2,213.90 ft.	Request the City of Snyder and any other customers that CRMWD finds to be dependent on this source to implement Stage 2 of their DCP. Begin operation of the Snyder Well Field.
Severe	Elevation below 2,211.10 ft.	Request the City of Snyder and any other customers that CRMWD finds to be dependent on this source to implement Stage 3 of their DCP. Begin “pump back” operation with water from Ivie or Spence Reservoirs, if available.

a. All stages include initiation of engineering studies to evaluate alternative actions if conditions worsen and the implementation of viable alternative water supplies.

O.C. Fisher, Twin Buttes, Nasworthy (San Angelo)

O.C. Fisher, Twin Buttes, and Nasworthy are all operated by the City of San Angelo. The City of San Angelo adopted their most recent Drought Contingency Plan in September of 2014. The triggers and actions for these reservoirs are based on combined storage and supply from all of the City’s sources (including non-reservoir sources). These are outlined in Table 7-10 below.

**Table 7-10
O.C Fisher, Twin Buttes and Nasworthy Drought Triggers and Actions**

Drought Stage	Trigger	Action
Mild	Less than 24-month supply	Water restrictions; water usage fee.
Moderate	Less than 18-month supply	Above.
Critical/Emergency	Less than 12-month supply	Above.

7.5.2 Drought Trigger Conditions for Run-of-River and Ground Water Supply

Both run-of-river and ground water supplies are more regional than reservoirs and typically there are many users of these sources. As noted in Section 7.2.1, some water providers will have developed Drought Contingency Plans that are specific to their water supplies. Other water users, such as agricultural or industrial users, may not have Drought Contingency Plans. To convey drought conditions to all users of these resources in Region F, the RWPG proposes to use the Drought Monitor. This information is easily accessible and updated regularly. It does not require a specific entity to monitor well water levels or stream gages. It is also geographically specific so that drought triggers can be identified on a sub-county level that is consistent with the location of use. Region F has adopted the same nomenclature for the Drought Monitor for corresponding Region F drought triggers. Table 7-11 shows the categories adopted by the U.S. Drought Monitor and the associated Palmer Drought Index.

**Table 7-11
Drought Severity Classification**

Category	Description	Possible Impacts	Palmer Drought Index
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less

U.S. Drought Monitor: <http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx>

For groundwater and run-of-river supplies, Region F recognizes that the initiation of drought response is the decision of the manager of the source and/or user of the source. Region F recommends the following actions based on each of the drought classifications listed above:

- Abnormally Dry – Entities should begin to review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage is necessary.
- Moderate Drought – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage is necessary.
- Severe Drought – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies may not be sufficient to meet reduced

demands the entity should begin considering alternative supplies.

- Extreme Drought – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies may not be sufficient to meet reduced demands the entity should consider alternative supplies.
- Exceptional Drought – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies are not sufficient to meet reduced demands the entity should implement alternative supplies.