

Drought & FERC Licensed Projects

Flow 2018

**Robert H. Deibel
Fishery Biologist
April 24, 2018
Ft Collins, CO**

Definition

Merriam Webster:

A period of dryness especially when prolonged

USGS – North Dakota Water Science Center:

Hydrologic Drought = defined in terms of reduction of streamflow, reduction of lake or reservoir storage and lowering of ground-water.

California Water Science Center:

Meteorological Drought = lack of precipitation

Hydrologic Drought = reduced streamflow or groundwater levels

Considerations

- What does it mean for you and the proceeding you are participating?
 - Hydrologic based?
 - Resource based/responses?
- Employ/Memorialize definition of or means to calculate Drought
- Set the table to respond quickly to Administrative Determinations of when a Drought exists

USGS IFIM¹

- Testing Alternatives - Effectiveness, Feasibility, & Risk
- Effectiveness is a measure of how well an alternative meets a resource objective.
- Feasibility determines whether an alternative can actually be implemented.
- *Risk Analyses are conducted to determine how often and under what circumstances an alternative will fail.*

1

Bovee et al. 1998. Stream Habitat Analysis Using the Instream Flow Incremental Methodology. USGS/BRD/ITR—1998-0004

Direct Application

- Yuba Bear – Drum Spaulding Hydroelectric Project (FERC P-2310)
- Developed 6 Water Year Types
- Extremely Critically Dry, Critically Dry, Dry, Below Normal, Above Normal, Wet
- Water Year f(Unimpaired Runoff in Yuba River)

Water Year Classification

- Memorialized via Incorporating water year definition into the License
- Based on California Department of Water Resources (DWR) water year forecast of unimpaired runoff for the Yuba River at Smartville, CA.
- Cited DWR's Bulletin 120 "Water Year Conditions in California"

Scope of Effort

- Yuba Bear – Drum Spaulding Project
- 6 bypass Reaches
- 6 Water Year Types
- 12 Monthly flows
- Do the math ... 432 individual flow values!

FERC License Administration

Subject: FERC assistance during the 2014 California drought To the Entities Addressed:1

February 6, 2014

As you are aware, the State of California is experiencing a severe drought. According to the January 30, 2014 U.S. Drought Monitor map (produced by the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture, and the National Drought Mitigation Center),² approximately 9 percent of the state is experiencing an exceptional drought, and two-thirds of the state is in an extreme drought. Snow pack near Donner Summit in the Sierra Mountains is at eight inches, the lowest at this time of year since January 1946, and the Drought Monitor suggests that the drought is a short- to long-term condition.

In order to assist the licensees of hydropower projects in responding to the drought conditions, staff of the Federal Energy Regulatory Commission is prepared to act swiftly to review requests to amend licenses on a temporary or longer-term basis, as appropriate, in order to conserve water resources at FERC-licensed hydroelectric projects.

Licensees interested in implementing new water conservation measures may wish to review their licenses to determine which license requirements may be temporarily modified in order to retain more water in project reservoirs for future use during the drought. Licensees interested in proposing such measures should promptly begin to consult with state and federal natural resource agencies, Native American Tribes and other appropriate entities to determine whether, and to what extent, to modify flow release requirements.

FERC Order Approving Flow Variance

February 7, 2014

- **Yuba Project (FERC P-2246)**

The licensee is requesting a temporary variance of the minimum flow requirements at the project due to extremely dry water conditions in the Yuba River watershed. Approval of the licensee's request would reduce flows in the Yuba River downstream of Englebright Dam from 673 cfs, to 500 cfs through March 31, 2014.

Review of the February 4, 2014 U.S. drought monitor illustrates a period of "extreme drought" for the watershed. Given the current conditions, the forecast for little relief in the near future, and the support from the resource agencies, a temporary variance of the minimum flow requirements should be approved. U.S. Drought Monitor <http://droughtmonitor.unl.edu/MapsAndData>, last accessed Thursday, February 6, 2014.

FERC Summary Agency Input

Concerning aquatic resources in the Yuba River, it is apparent from the FWS' letter, that there is a possibility of stranding Chinook salmon fry with the flow reduction. The flow reduction would also occur during a period when migrating steelhead are beginning to arrive in the Yuba River. We agree with FWS' concerns for potential Chinook salmon fry stranding and estimate that the 70 percent of the prior day's average per 24-hour ramp down requirement of article 33(d) would result in flow reaching 500 cfs in approximately one day. However, the licensee has agreed to ramp down flows over the course of 3 days, which should minimize the potential for stranding. Further, the licensee has agreed to monitor redds for any potential dewatering or fry stranding in conjunction with the Yuba River Management Team.

Where Are Decisions Made?



IFIM Application

- Effectiveness, Feasibility, and Risk
- “If it isn’t in the record, it doesn’t count..”
- Keep good records of studies, results, interpretation, supporting documents filed in a given proceeding – typically a license proceeding
- Clarity, brevity, persuasiveness matter!
- Licensees want certainty – 40 – 50 years licenses
- Can your or your group’s approach stand the test of time spanning 2 – 3 staff careers?
- Consistency of application/interpretation or, if lucky, can have monitoring and adaptive mgt incorporated into a license to improve on basis for future decisions

Role and Responsibility

- What did you (group) consider and use to justify an outcome – data, assumptions, interpretations
- Robust analyses to address unusual circumstances such as a severe drought
- Pre-filing licensing studies typically 1 – 2 years with 2+ years of negotiation
- How fast did FERC move in soliciting flow variances?

Projected Climate Change Effects

- Smaller snowpacks that melt sooner have translated to increasing drought frequency and severity¹
- Reduced snowpack and precipitation is decreasing the amount of cold groundwater flowing into streams and slowing the velocity at which streams flow, thereby increasing temperatures (Forest Service RMRS Science You Can Use: **Climate Change, Crowd-Sourcing, and Conserving Aquatic Biotas in the Rocky Mountains This Century July/August 2014 Issue 12**)

1

Rieman, Bruce E.; Isaak, Daniel J. 2010. **Climate change, aquatic ecosystems, and fishes in the Rocky Mountain West: implications and alternatives for management**. Gen. Tech. Rep. RMRS-GTR-250. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 46 p.

California Salmonids²

- Fish spp. that require cold water more adversely affected²
- UC Davis study concluded that ALL native CA salmonids rated as critically or highly vulnerable to climate change²
- ²Moyle,PB, Kiernan JD, Crain PK, Quinones RM. 2013. Climate Change Vulnerability of Native and Alien Freshwater Fishes of California: A systematic Assessment Approach: PLoS One 8(5):e63883

Opportunities(?)

- Assume the instream flow problem relates to some development or proposed development that will alter the master variable of flow
- Key to integrate flow and water quality – especially water temperature
- In other words, it's not a simple physical habitat modeling problem

Options

- Install/retro-fit flow temperature/oxygen control devices on dams
- Very Expensive (\$100's millions)
 - Pelton – Round Butte – Portland General Electric – Deschutes River Oregon - \$110 million
 - Shasta Dam – Sacramento River (BUREC) – 1998 \$80 million (2017 ~ \$120 million)
- “Going to need a bigger bucket!”

Future?

- Typically drought (severity, frequency, and duration f(past hydrologic records))
- Forecasting – incorporate climate change models (DOE 9505 study, others?)
- Expertise – must increase capacity to address interaction of physical habitat with water quality (not just a simple PHABSIM problem)