



Memo

To: Drought Readiness Council
From: Water Supply Availability Committee
Date: June 16, 2016
Subject: Update on Water Supply Conditions

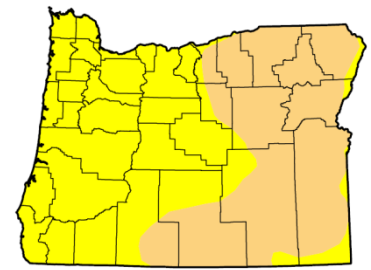
The Water Supply Availability Committee (WSAC) held its regular monthly meeting on June 14, 2016. Water supply conditions across the state have changed considerably since its previous meeting. Warm temperatures in mid-April resulted in an extreme melt-off of snowpack, two to six weeks earlier than normal.

Some key highlights from the June 14 WSAC Meeting:

- **Precipitation for May and June has been below normal for much of the state.** Although all basins have received near average amounts of precipitation for the year so far, May was the second month in a row to be drier than usual for much of the state. The only areas seeing appreciable amounts of precipitation in May were the eastern part of the Klamath basin, and the Goose & Summer Lake basin. Even still, the amount of precipitation in these areas was not enough to offset the early loss of snowpack. June precipitation will play a critical role in water supply demand and summer streamflow.
- **High temperatures have led to rapid and extreme snowmelt.** While Oregon's snowpack reached its peak in early April, warm temperatures in mid-April resulted in an extreme melt-off, two to five weeks earlier than normal. Areas that rely on low-elevation snowpack are in rapid decline. Only high elevation SNOTEL sites in the Willamette, Grande Ronde, and Powder / Burnt River Basins show any observable snowpack. Temperatures during the month of May were one to two degrees above average in many parts of the state, with temperatures in June around four degrees above average. While temperatures have been cooler in recent days, warmer conditions are expected again in mid-to-late June, lasting through August.
- **Several streamflow sites are now approaching record lows for this time of year.** Most streams and rivers throughout the state reached their snowmelt-driven streamflow peak earlier than usual. Basins that are now most heavily stressed are coastal basins (with 38 to 44 percent of average streamflow), the Umpqua (44 percent), and the Umatilla (26 percent). Streamflows in these basins are at a record low, even below measurements taken this time last year. Refer to Attachment 1 for hydrographs of the Nehalem and the Umatilla Rivers, and Attachment 2 for a bar graph displaying all of Oregon's basins. Attachment 3 includes a map with the same information. This rapid run-off may have resulted in lower recharge rates to groundwater as well.

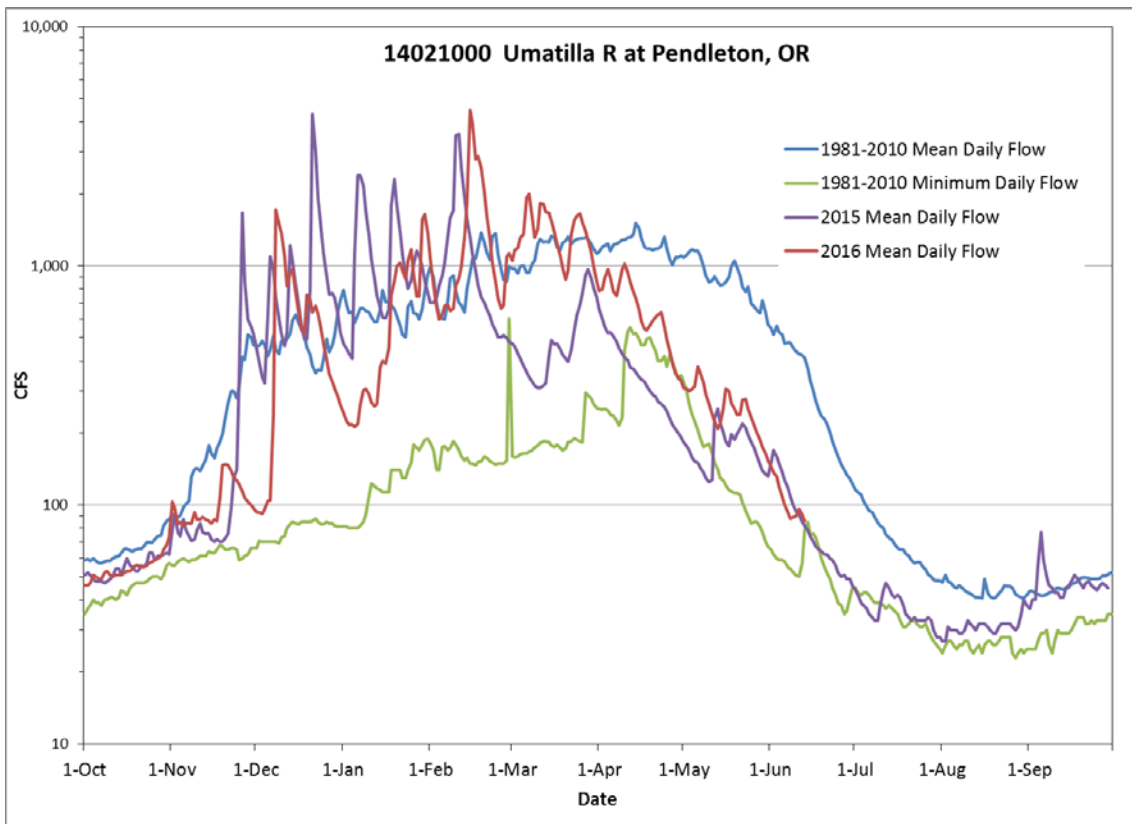
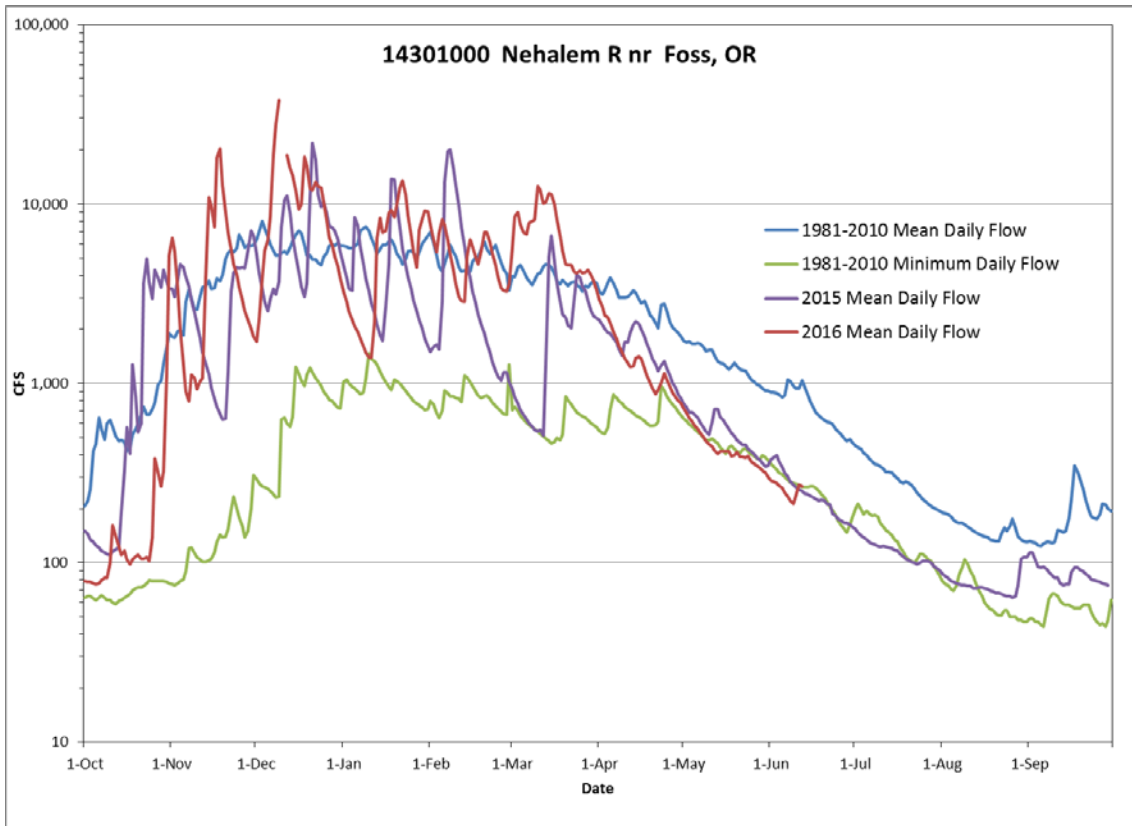
- **Streamflow forecasts for April through September have declined significantly.** In the past two months, streamflows have dropped far below average, resulting in streamflow forecasts that are also normal to well below normal for the June through September period. Sites in northwest and western central Oregon are forecast for below normal streamflow conditions throughout the summer; these are among the lowest volumes in the forecast.
- **Reservoir levels have improved since last year, but are beginning to drop quickly.** Reservoir storage levels across the state are much higher compared to this time last year, as they were able to capture the springtime run-off. Rivers that are fed by reservoirs are in better shape than those that are not; water shortages are possible this summer in locations without access to storage. However, all reservoirs are now in draw-down, supplying irrigation and municipal water, as well as instream flows for fisheries. By the end of the summer, reservoir levels will likely mirror 2015 levels.

- **The Drought Monitor shows 100 percent of the state abnormally dry.** As of June 14, the entire state is in the D0 category (abnormally dry). Stretching from North Central Oregon to eastern Klamath County and eastward, more than 40 percent of the state is also listed in the D1 category (moderate drought). See accompanying graphic.

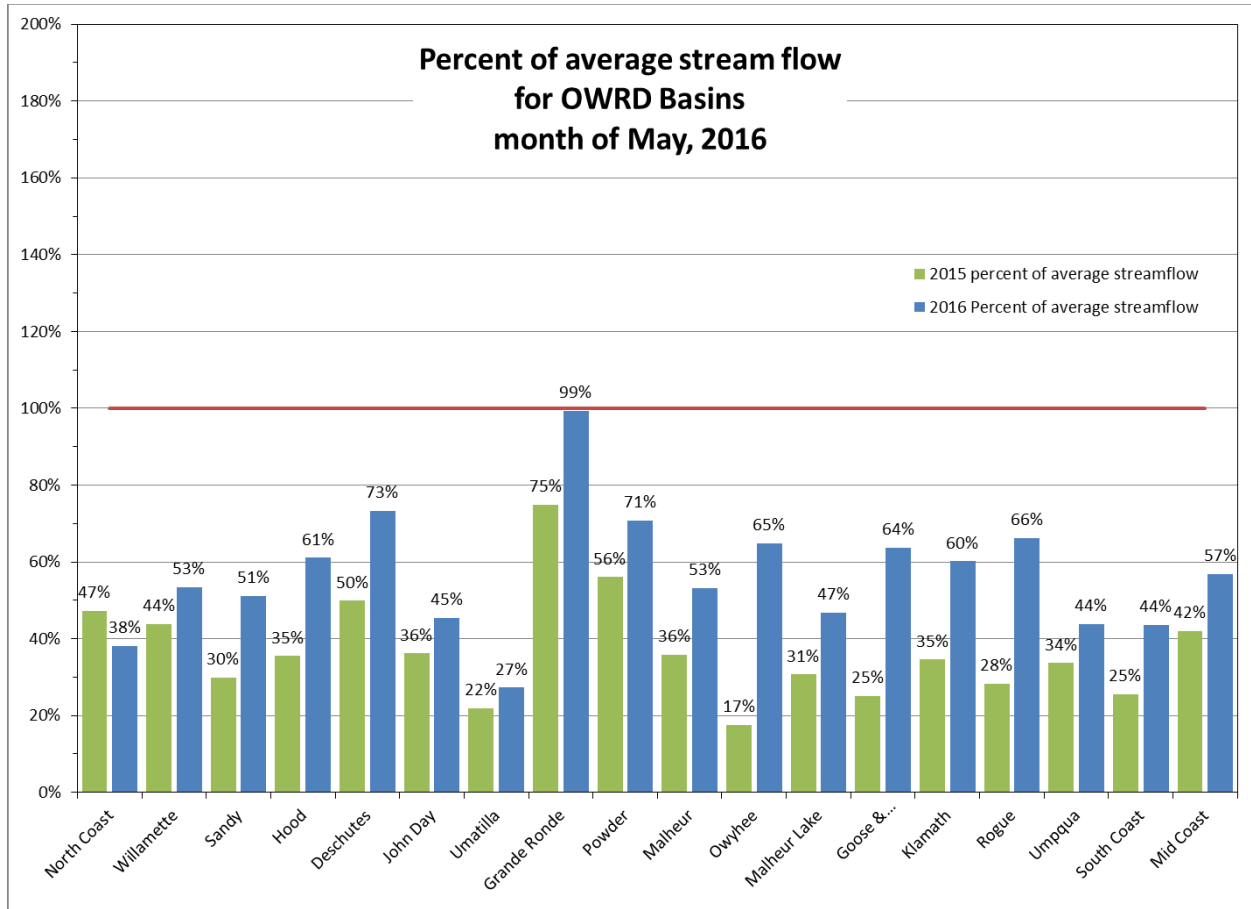


- **Temperature Outlook calling for above normal temperatures through August.** Currently, NOAA’s Climate Prediction Center is calling for above normal temperatures through the August outlook period. Climate conditions are favorable for the development of La Niña—typically bringing cooler and wetter conditions—this fall and winter in the Pacific Northwest.
- **Fire Outlook for the Northwest is normal.** The National Interagency Fire Center’s (NIFC) monthly outlook is currently predicting a normal fire season through the forecast period of August 2016. Conditions are driest in the southwest part of the state. In June, we will likely see the onset of a typical fire season. Another monthly outlook will be released on July 1, 2016.

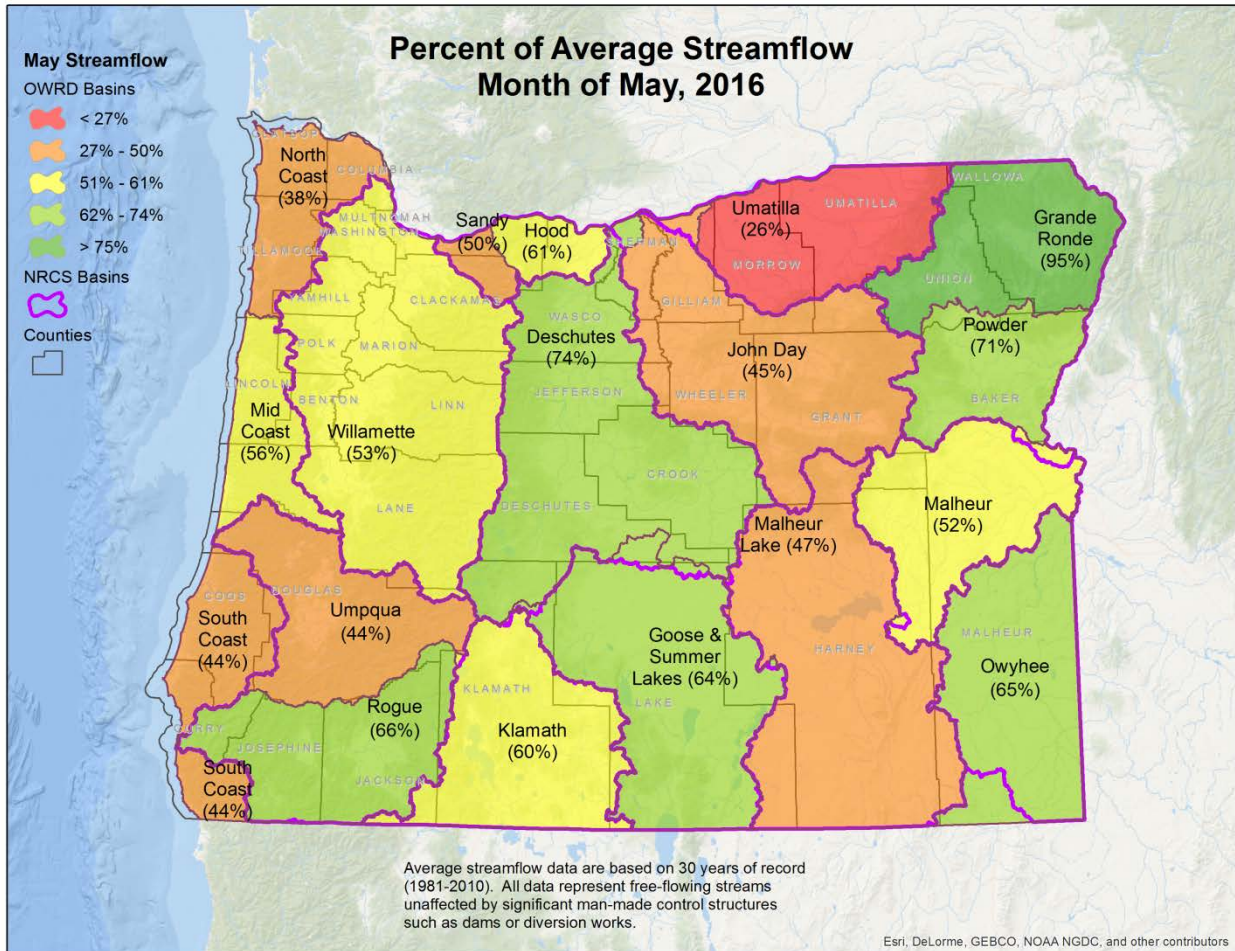
Attachment 1: Hydrographs — Examples of Mean Daily Flow



Attachment 2: Bar Graph — Percent of Average Streamflow



Attachment 3: Map — Percent of Average Streamflow



Water Supply Availability Committee
At Anderson Readiness Center
Oregon Office of Emergency Management
June 14, 2016

Ken Stahr, Chair
Eric Rau, OEM
Scott Oviatt, NRCS
Brenda Bateman, WRD
Nick Yonker, ODF
Marc Stewart, USGS
Mary Karen Scullion, USACE
Lauri Aunan, GNRO (by phone)
Basil Williams, GNRO (by phone)
Andy Bryant, NOAA NWS (by phone)

1. Agenda Check (conditions, work session on decision support, and memo to DRC, next meetings)
2. Update on Water Conditions
 - a. Scott Oviatt, NRCS. Mid April's warm temperatures resulted in extreme melt off.
 - i. SNOTEL, mountain precip to date (April 1) majority of state was well above avg.
 1. Harney County was at normal
 2. As of today, 90-100% throughout most of the state (esp. E of Cascades)
 3. Select basins with snowpack range (final graphs for the year). Will, Grande Ronde, Burnt still show sites with snowpack. For the most part, completely melted.
 4. **Snow.** First snow in Feb. again snowed, for April 1 peak.
 5. **Temperature.** Mid April warm temps resulted in extreme melt off (2 – 6 weeks earlier).
 - ii. Water supply forecasts. Reduced in percent.
 1. Decreased due to operations (note: USACE reservoirs in the Willamette, bring up averages)
 2. Rapid melt of snow and streamflows reduced
 - iii. SWSI map, close to normal. Reduced by 0.5 to 1 on scale of 1 to 4.
 1. 5-month running average, which dampens reduction.
 2. Anticipate drop throughout the summer.
 - iv. Ochoco and Prineville reservoirs. Limited inflow translates to limited supply.
 - v. June 1 summary report, page 2. Quote it.
 - b. Marc Stewart, USGS. Looking at daily average discharge / streamflow.
 - i. Coast – Chetco. 2 years of data. On the coast, now close to 2015 water levels. Had more run off early in the year, compared to this time last year. Same for other coastal sites: Wilson, Siletz.
 - ii. On East side – Owyhee. Had a little more run off during the course of the year. And still higher than this time last year. Black line is real data. Shaded colors are 90 percentile, over 20 to 40 years of data.
 - iii. Umpqua and Rogue. Currently higher than last year, but dropping fast. Lower-than-average flows. Steamboat Creek near Glide showing record lows today.

- iv. Crater Lake (Annie Springs). Not quite melted out yet. Still feeding the Klamath System. Williamson River, while better than last year, dropping fast, low flows.
 - v. Clackamas, dropping fast.
 - vi. Bull Run near Multnomah Falls. No signal from snow.
 - vii. **Streamflow.** Heaviest stresses in Coast, Umpqua/Rogue, Mt. Hood, Deschutes. Better than last year, but still below average.
 - viii. **Those streams relying on low elevation snowpack are in rapid decline.**
- c. Ken Stahr, WRD. Streamflow Conditions
- i. Great December (percent of **average stream flow**). March, also big streamflow (due to extreme and rapid snowmelt). March = 147% avg monthly streamflow. Past two months have dropped far below 100% of average. Marked Contrast to last year, in all basins.
 - ii. Umatilla currently to 27%, vs. GRonde 96%. **Umatilla Streamflow:** Willow Creek and lower end of Umatilla River are bottoming out, and dry. Will have rough, late summer. Will see new lows by mid to late July.
 - iii. **Temperature.** Saving grace, currently, is cooler weather.
 - iv. For 30-pd of record (1980-2010). Lake County is on the down slope, but has been worse, by comparison.
 - v. **Reservoir / Storage.** Owyhee will likely finish where we were last year, with regard to streamflow. But, the flows that came through this spring, WERE captured and are now in storage. Those with storage capacity have improved their lot.
 - vi. Snowpack / Storage. Difference compared to last year (2015?) SNOWPACK.
 - vii. **Re Northcoast Streamflow:** concerned. Below record low, including way below 2015. Predicted to remain at record lows, through the season. All are precipitation driven. Recharge is so important, and they're not getting it.
 - viii. See May Streamflow map for visual summary.
 - ix. See State of Washington for another type of example. 6th field HUCs. They use a scale of three: low, med, high. Haven't declared any droughts yet, but they're meeting on July 7. Recommend getting on Jeff Marti's list out of Washington.
- d. Andy Bryant
- i. **Temp.** Far above average in May (1 – 2 degrees above average), and June (around 4 degrees above average). Daily reading, averaged then compared against 30-year historic period (1981-2010). WMO follows this period.
 - ii. Observed precip early in the year. Relatively good.
 - iii. Three-month standardized precip index. Lack of spring precip, combined with high temps = low recharge to groundwater.
 - iv. **Water supply volume forecasts.** Baseline = April through Sept. low percent of avg for westside (35-70% of average). Higher in Rogue. Lots of variability in the Klamath. The NW and West Central are in single digits. These are among lowest volumes in the forecast, compared to what we've seen historically in that basin. If this came true, they'd be the lowest on record.
 - v. Since the beginning of the water year, the forecast has improved in certainty. Less observed precip that we would normally see. 64% of avg for Willamette at Salem. Rogue at 90% of average. John Day at 57% of avg. Owyhee is 57% of average, with stored water in the reservoir. Good shape for irrigation delivery through the growing season.

- vi. Temps. Short term expectations. Summer outlook: **Temps**, have been in a cool and wet pattern in recent weeks. Will be moving out of that, getting back to season temps and dry, starting this weekend. June-Aug, above avg temps. Not much in the way of precipitation. Will not assist water supply. Could get summer thunderstorms, but none forecast currently.
 - vii. 2016-2017 La Nina conditions (weak to moderate) watch for this fall and winter. Cooler and wetter conditions for the Pacific Northwest, relative to average.
- e. Nick Yonkers, ODF, Fire Potential
- i. Cool weather has brought NW back into green conditions (low, significant fire potential). Higher humidity too. Thunderstorms wetted the East side.
 - ii. **Fire Outlook.** 1000 hour fuel moisture is in low to mid-teens in southwest. Low 20s on the west side / North Coast, Willamette Valley and Cascades (normal). When dipped below 10, you're in severe conditions. Had a lot of that last year. 1000-hr fuels are branches 3-8 inches. The largest fuels, creating the most intense fires (compared to grasses, etc.). The bigger the number, the bigger the piece of fuel.
 - iii. **Fire Season, Normal.** Keep these conditions from the NIFC.
- f. Mary Karen S., reservoirs
- i. Willamette. Middle Fork, drafting. Good mainstem flows/ able to meet NMFS' and NOAA's requirements. Detroit may start to see receding conditions during July. Need to deepen marinas! Get a permit to do this! Open to using conservation pools.
 - ii. Rogue doing well
 - iii. Lost Creek drafting according to plan.
 - iv. Applegate filled.
 - v. Little Willow creek filled, drafting for irrigation.
 - vi. **Reservoirs.** Rivers fed by reservoirs are in pretty good shape. Definitely better than last year. However, all are in draw-down. Will be approaching 2015 conditions by end of the summer, especially where we have to deliver irrigation supply AND instream flows for fisheries.

DRC Memo: Happy with structure?

Will send draft to you all this afternoon for review. Please return by mid-morning.

Move temps through August.

Build in new drought monitor, which will come out Thursday morning.

Outlook will come out early Thursday morning as well!

Use Ken Stahr's streamflow map.

Feature two hydrographs with areas of emerging concern. USGS can help if we need it.

Combine ppts in the future!

Add bar graph (re each basin).

Don't include federal declarations. Strike it.

Worksession re decision-tool. Discussion:

Look at streamflow map.

Lauri: are streams being fed by reservoir system?

Looking at streams not heavily impacted by use or regulation. Ok, could you put that in a footnote.

Ken Stahr. Re unregulated streamflow, snowpack, temps, reservoirs, how do we combine that and create a visual map? Late season streamflow map is useful, but early in the season needs to show more attributes. (Note: make sure all basins on the streamflow map are correctly labeled.) How do we incorporate temperature “departure” and normalize it?

Eric Rau. Are we comfortable overlaying temp on the streamflow map? Too squirrely? Yes, don't go there.

Andy. Streamflow and water supply forecast already integrates temp and other factors. At water supply forecast, you have (in each basin) the numeric forecast table (June 1 median forecast) from Scott.

Scott. That table is the average value of all the forecast points in the basin, for the forecast median, June thru Sept. volumetric streamflow. There's also forecast text that accompanies this table, pointed at each basin. Make sure you differentiate between Rogue and Umpqua (Ken, put basin names in the correct colors). Do you want to use the drought monitor map as an underlay?

Andy B. Could use weather service updates, which keep referring to an April – Sept. period.

Lauri. Re map with Klamath in yellow, vs. forecast. Is the difference between live stream flow, vs. what we know about available storage releases.

Re Meeting Materials:

Please post all notes and ppts to the website.

Additional Questions:

- 1) Why is there federal drought declaration in Lake County, compared to all others. Some anticipation of dropping streamflow. Remembering 2015 drought. Contiguous to CA counties who have also been declared. Where streamflow is fully allocated, in below-average years, there's not enough.
- 2) Any local governments leaning toward drought declaration? Only Yamhill talked about it, and isn't considering it. Invited RM and Watermaster to come speak to July SWCD. Gillam County is talking about it due to dry conditions. Eric will call emergency manager.

The meeting adjourned 11:15.