

Northwest River Forecast Center



Introduction to NWRFC Services

Columbia Basin Leadership Training
MSU, Portland – August 29, 2019

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Northwest River Forecast Center



Overview of NWRFC Services

Lower Columbia Forecast Services

2019 Columbia Minimum Stage *Outlook*

2018 Columbia Minimum Stage *Verification*



NOAA/NWS/RFC Missions



NOAA Mission: To understand and predict changes in the Earth's environment ... to meet our Nation's economic, social, and environmental needs



NWS Mission: The NWS provides weather, hydrologic, and climate forecasts and warnings ... for the protection of life and property and the enhancement of the national economy



RFC Role: The River Forecast Centers carries out the NOAA and NWS missions by providing streamflow forecasts and information datasets for the well being of the public



13 NWS River Forecast Centers

Northwest RFC:

- Includes portions of 8 States and British Columbia
- Basin Area = 326,127 square miles
- Entire Columbia River Basin
- Coastal Rivers of Oregon and Washington

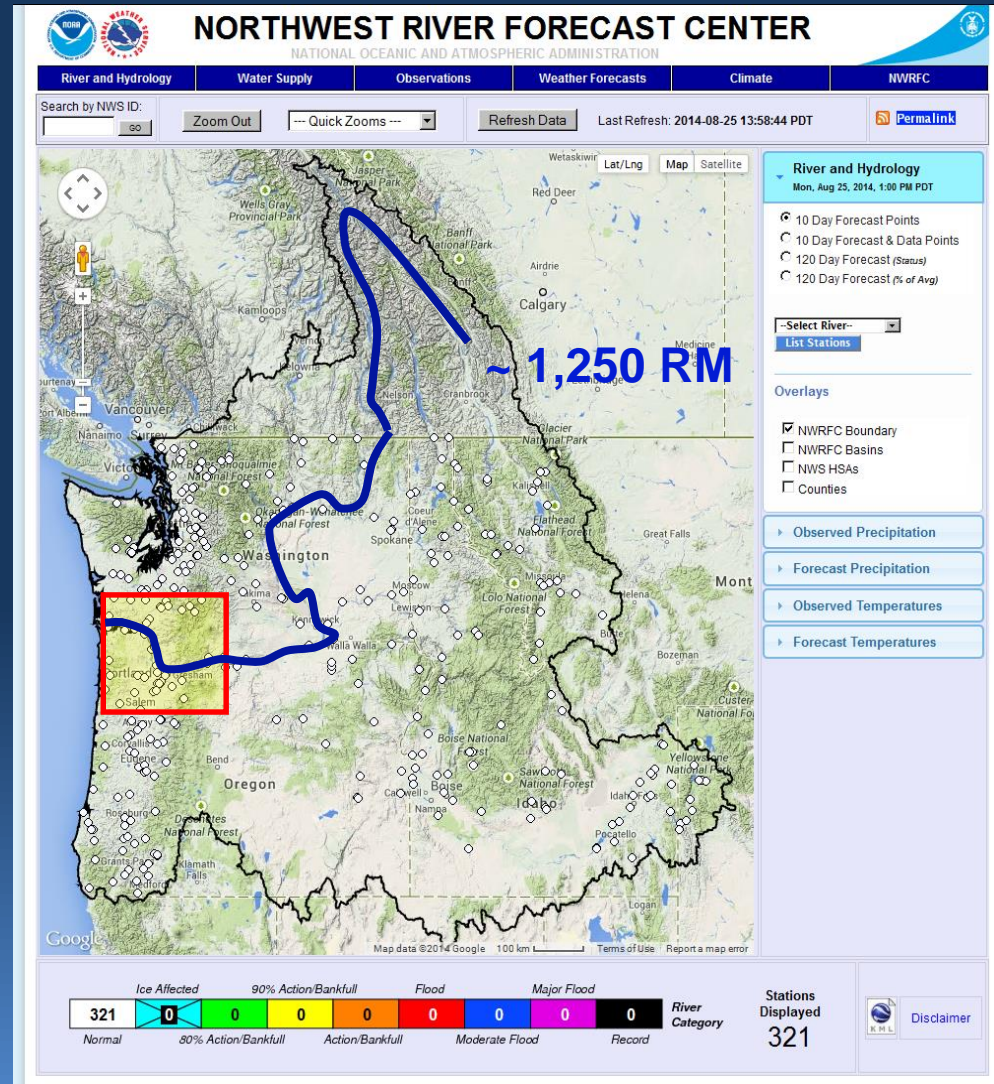




NWRFC Domain and Forecast Services



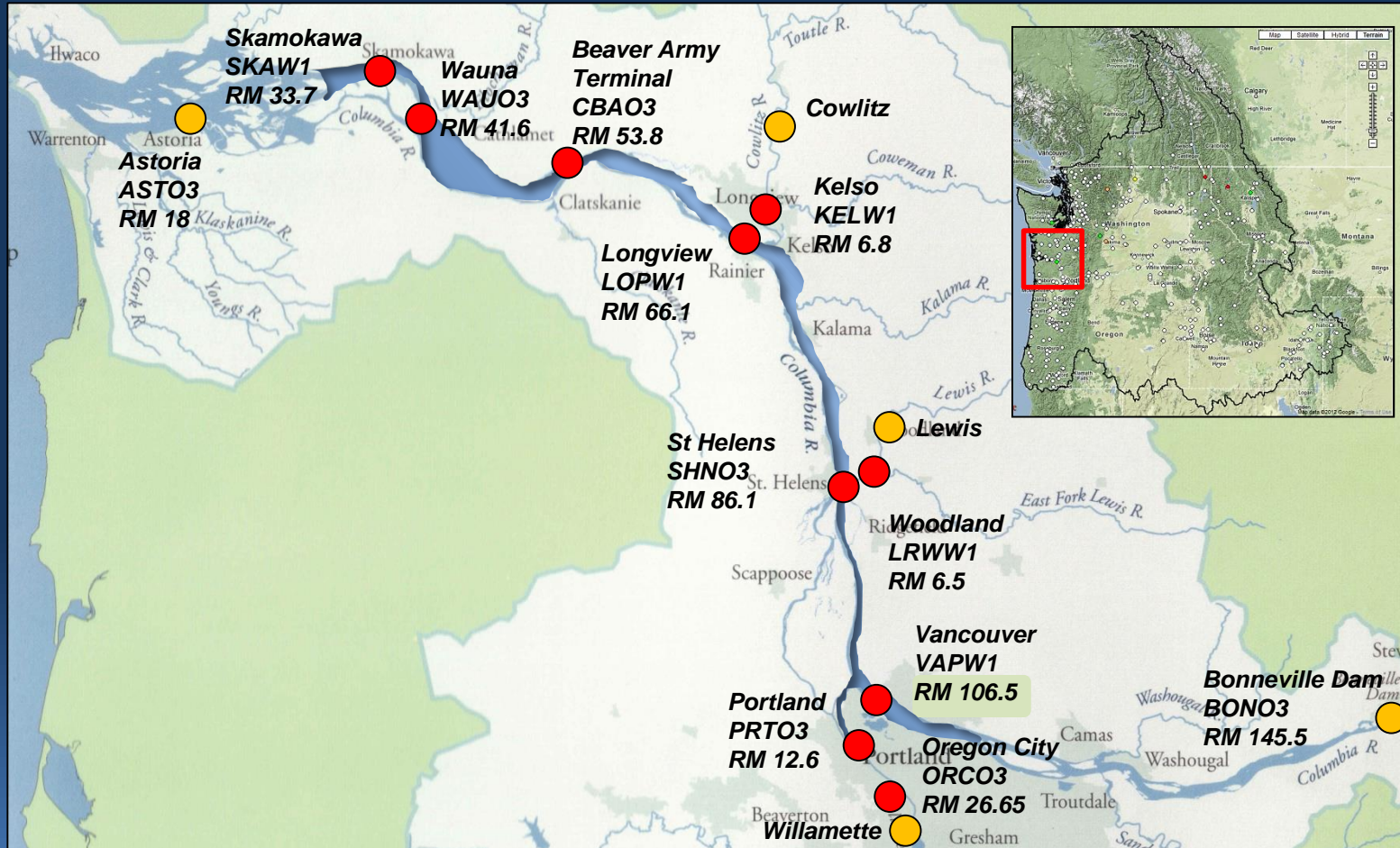
- 10-day deterministic forecasts
 - Issued twice daily
 - Updated as needed
- Seasonal probabilistic forecasts
- ~350 locations
- Use conceptual hydrologic modeling
- Coordinate with USACE on streamflow regulation



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Lower Columbia Forecast Services



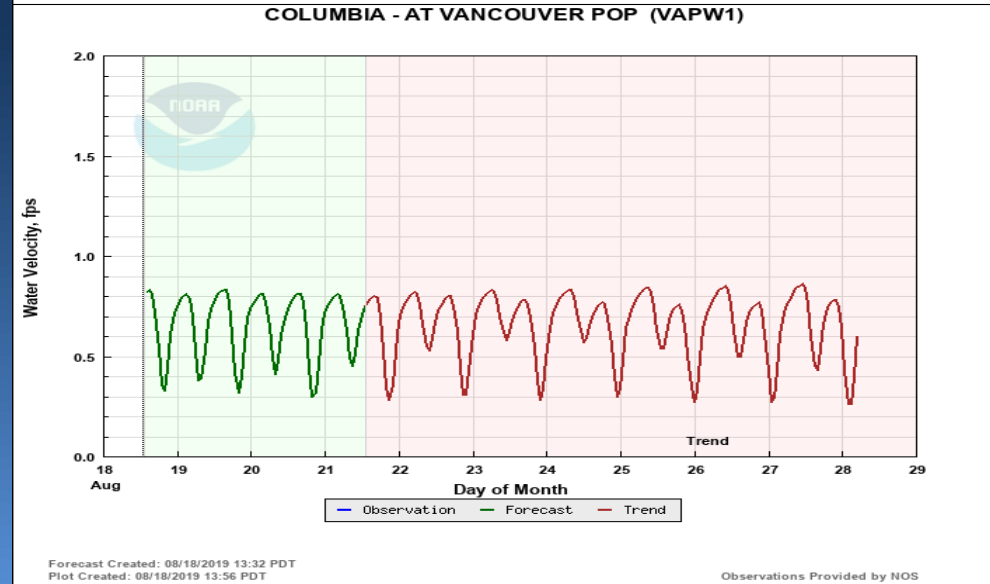
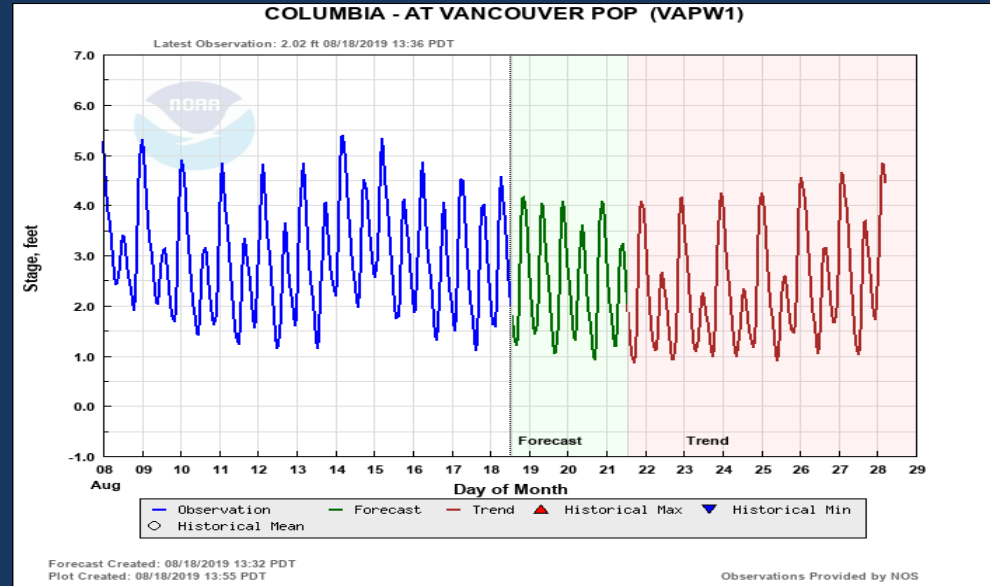
- 10 Forecast Locations for Stage & Velocity
- 5 Boundary Conditions



Lower Columbia Forecast Services



- Stage and velocity forecasts
- 10-day forecast, hourly time step
- Issued twice daily, updated as needed
- Available on NWRFC Web
- Input to LOADMAX program
- Annual minimum stage outlook





2018 Minimum Stage Outlook

Columbia River at Vancouver



- Long-term stage outlook issued in **June (usually)**
- Identification of potential low stages at the Vancouver gage (VAPW1)
- Potential dates of occurrence
- Refer to 10 day forecast for short-term guidance during low flow season

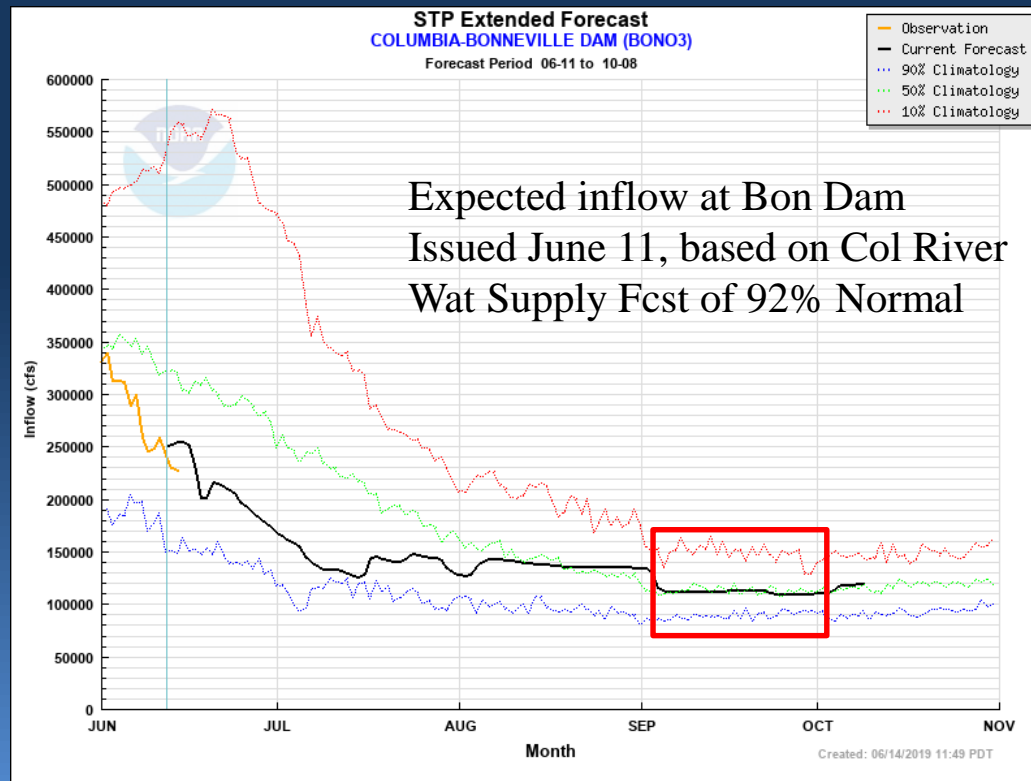


2019 Minimum Stage Outlook

Forecasting Assumptions #1 and #2:



1. Upstream project flows are typically maintained at or near historical minimum targets during late summer and early fall.
2. Minimum Bonneville Dam releases typically occur on **weekends** (lower power demand).



SOURCE: [HTTP://WWW.NWRFC.NOAA.GOV/STP](http://www.nwrfc.noaa.gov/stp)

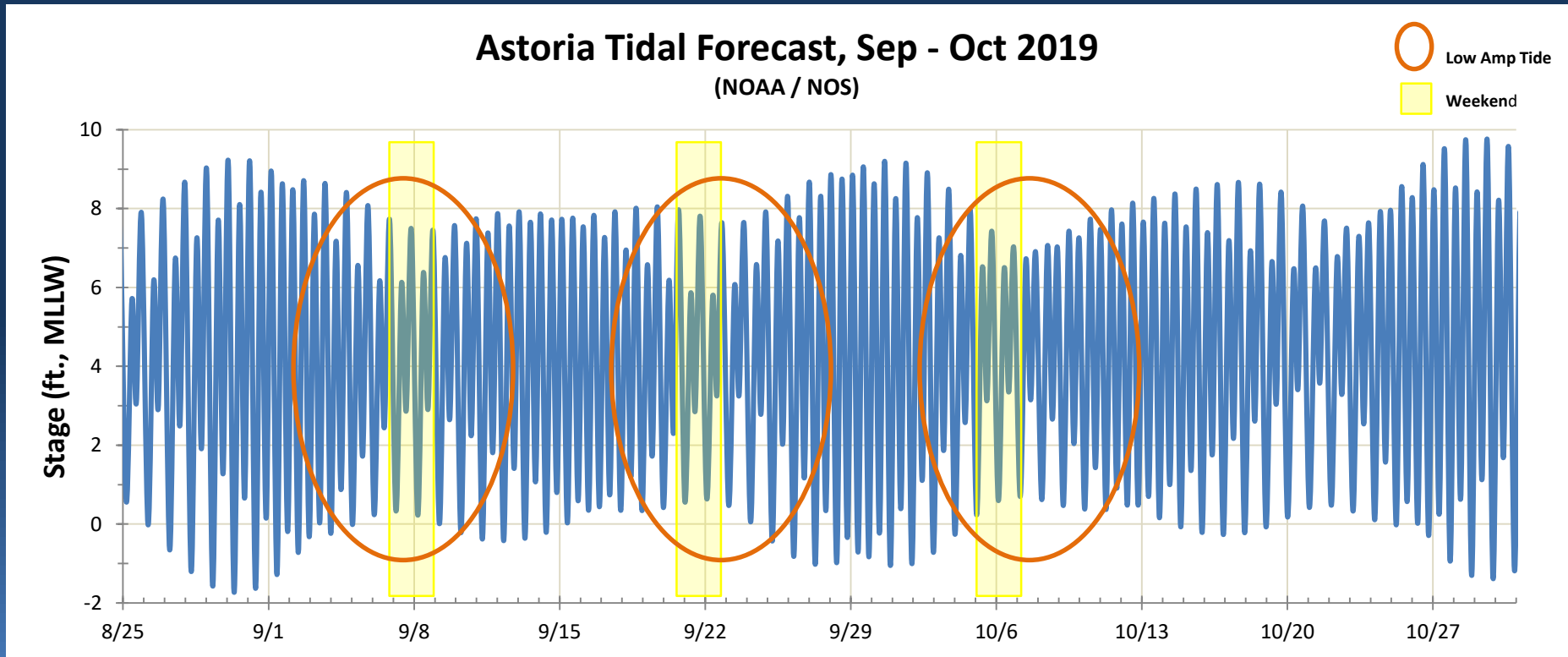


2019 Minimum Stage Outlook

Forecasting Assumption #3:



3. Lowest stages tend to occur during a low-amplitude tidal sequence at Astoria





2019 Columbia River Minimum Stage

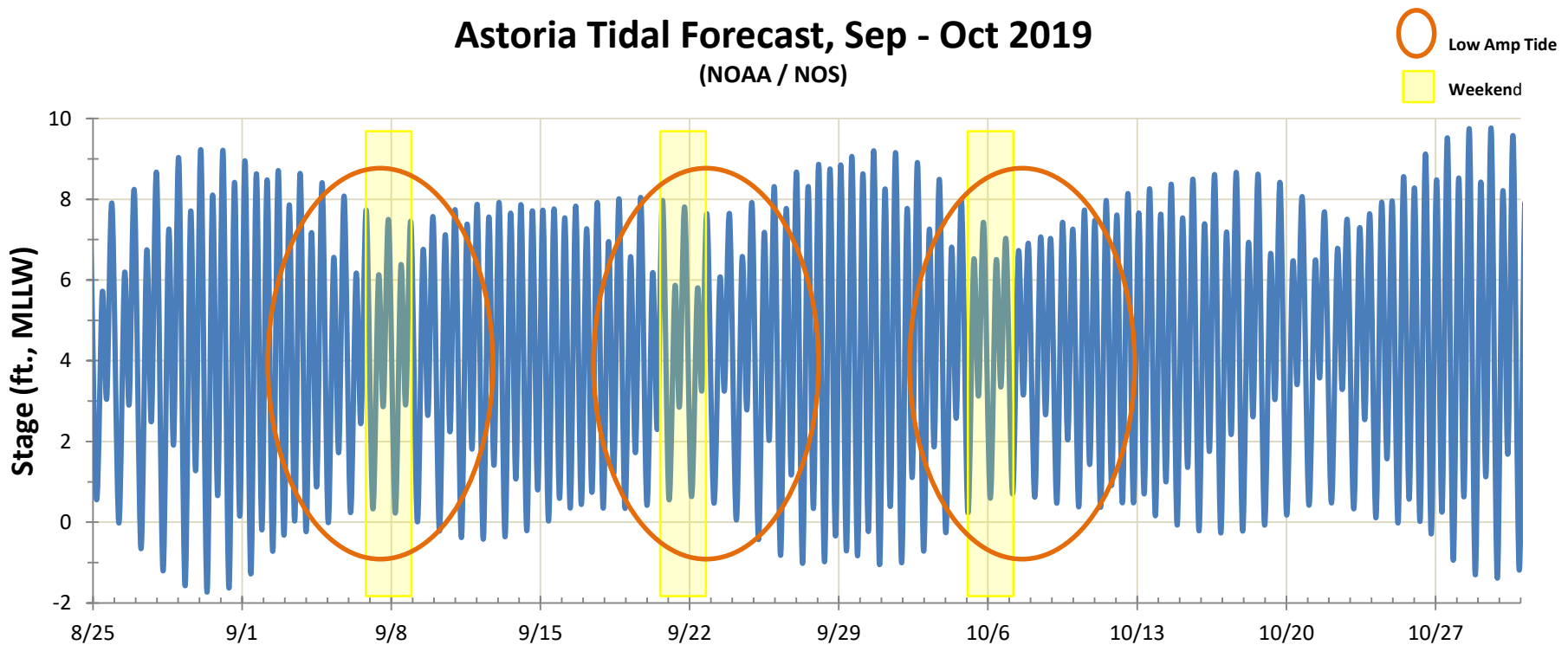
Impact of Tidal Influence



NOS Tide Predictions for **Astoria** are used to identify the timing of low amplitude tidal sequences expected during the Columbia River low flow period:

Two potential tidal sequences were identified during September and October.

Astoria Tidal Forecast, Sep - Oct 2019
(NOAA / NOS)



Low amplitude tide sequences that are coincidental with weekends are likely candidates for minimum stages.

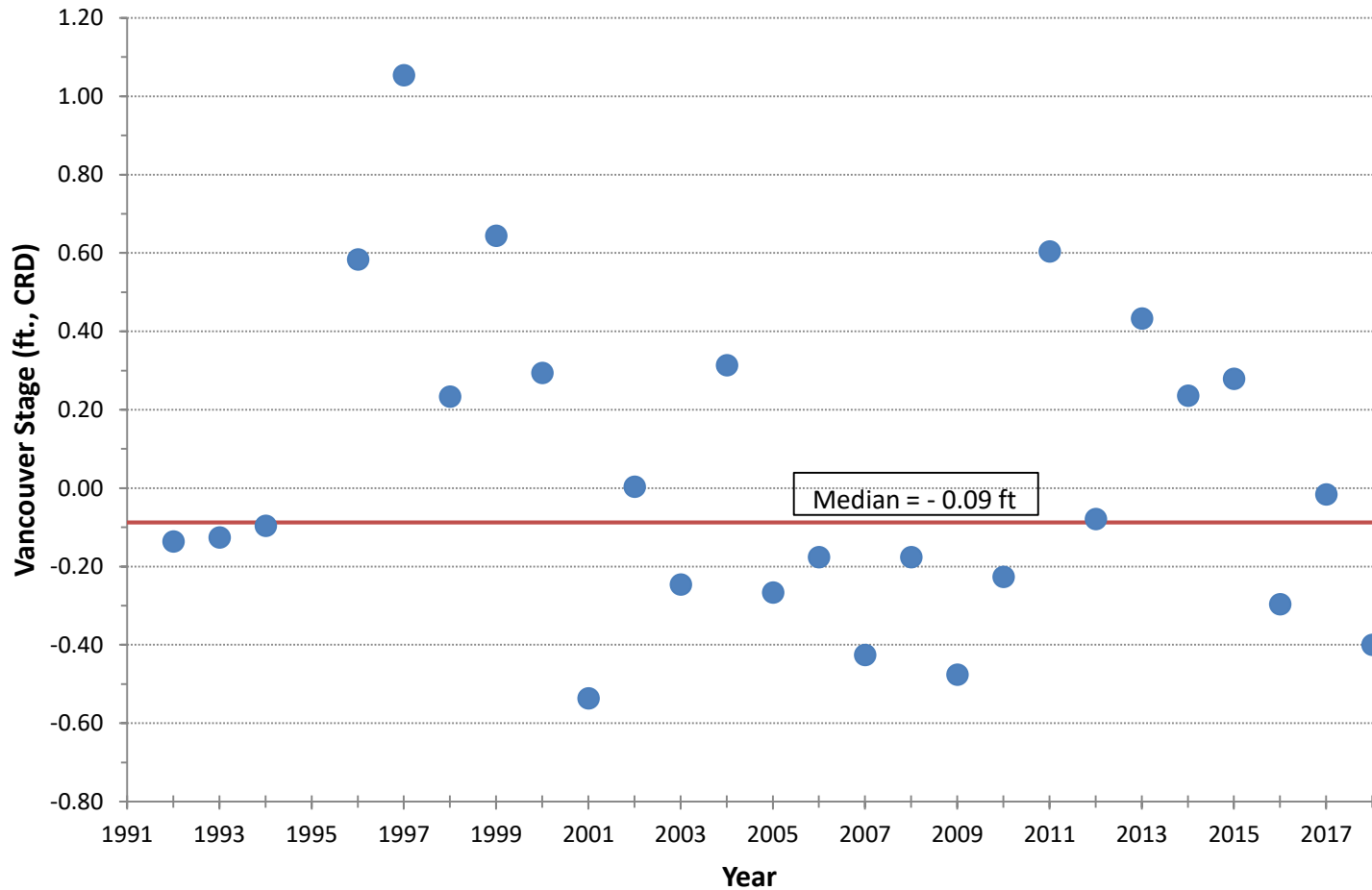


2019 Minimum Stage Outlook

Historical Minimum Stage



Columbia R. at Vancouver
Annual Minimum Stage: 1992-2018





2019 Minimum Stage Outlook Summary



The minimum stage outlook for the Columbia River at Vancouver is most likely to occur:

- **October 5 – 6, 2019** and range between **-0.4 to +0.1 feet (CRD)**.

Other dates of potential minimum or near-minimum stage include:

- **September 7 – 8, 2019**
- **September 21 – 22, 2019**

Minimum stages are most likely to occur when low amplitude ocean tidal sequences are in phase with periods of low flow in the Columbia River.

Heavy late summer or early fall rain can mitigate minimum stages, but are not considered in this outlook.

Minimum stages for the Willamette River at Portland are typically within 0.2 feet of the Columbia River at Vancouver gage and can be expected to occur at the same time.

The lowest observed stage for the Columbia River at Vancouver was recorded July 2001 and September 1973 (-0.54 ft). *Source: COE Portland-Vancouver Harbor Information Package.*



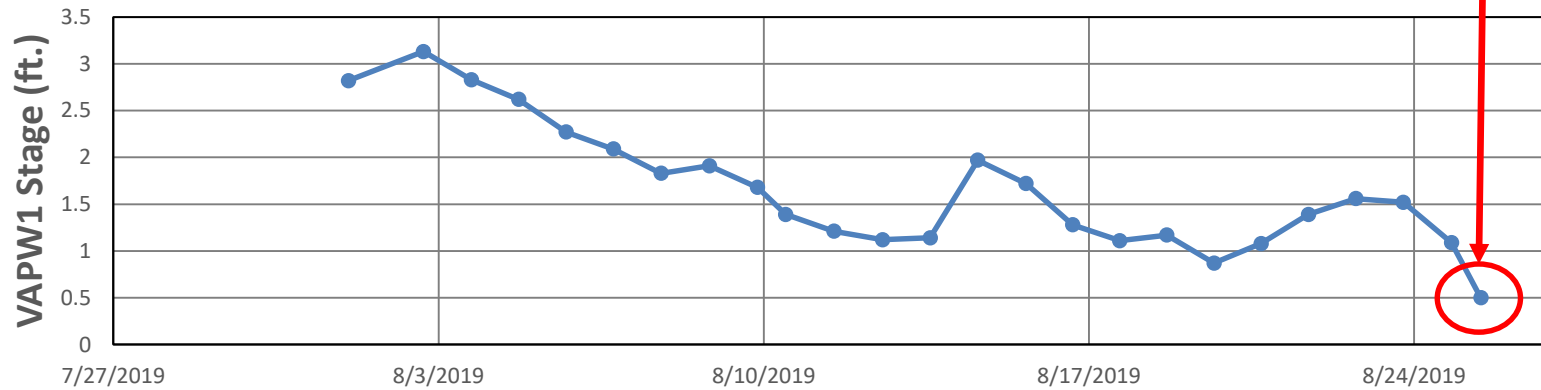
2019 Minimum Stage Outlook

Observed so far ...

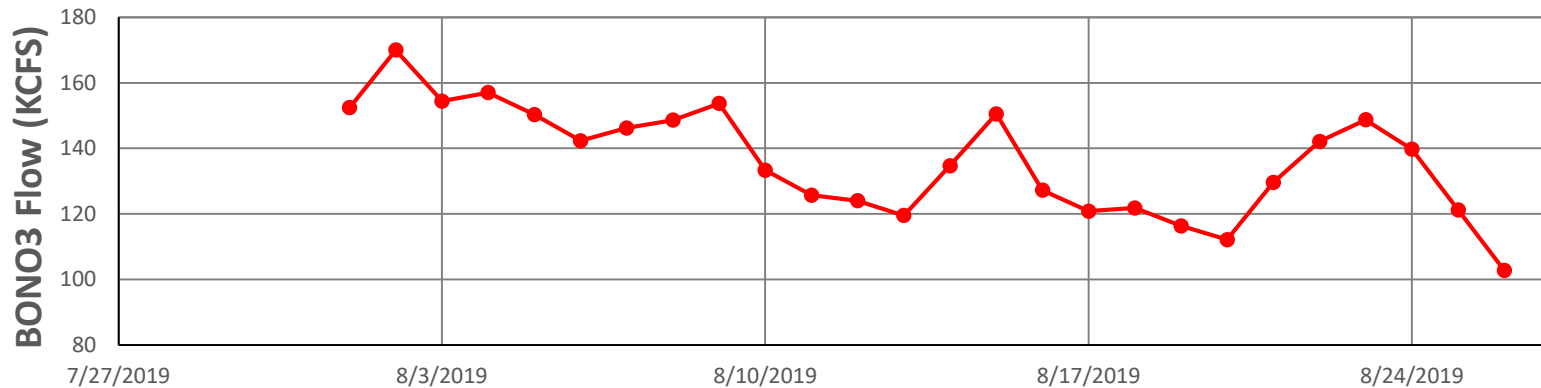


Columbia River at Vancouver Daily Minimum Stage: Aug, 2019

0.32 ft @ 11:24 am,
Monday, Aug. 28th



Columbia River at Bonneville Dam Daily Mean Flow: Aug, 2019





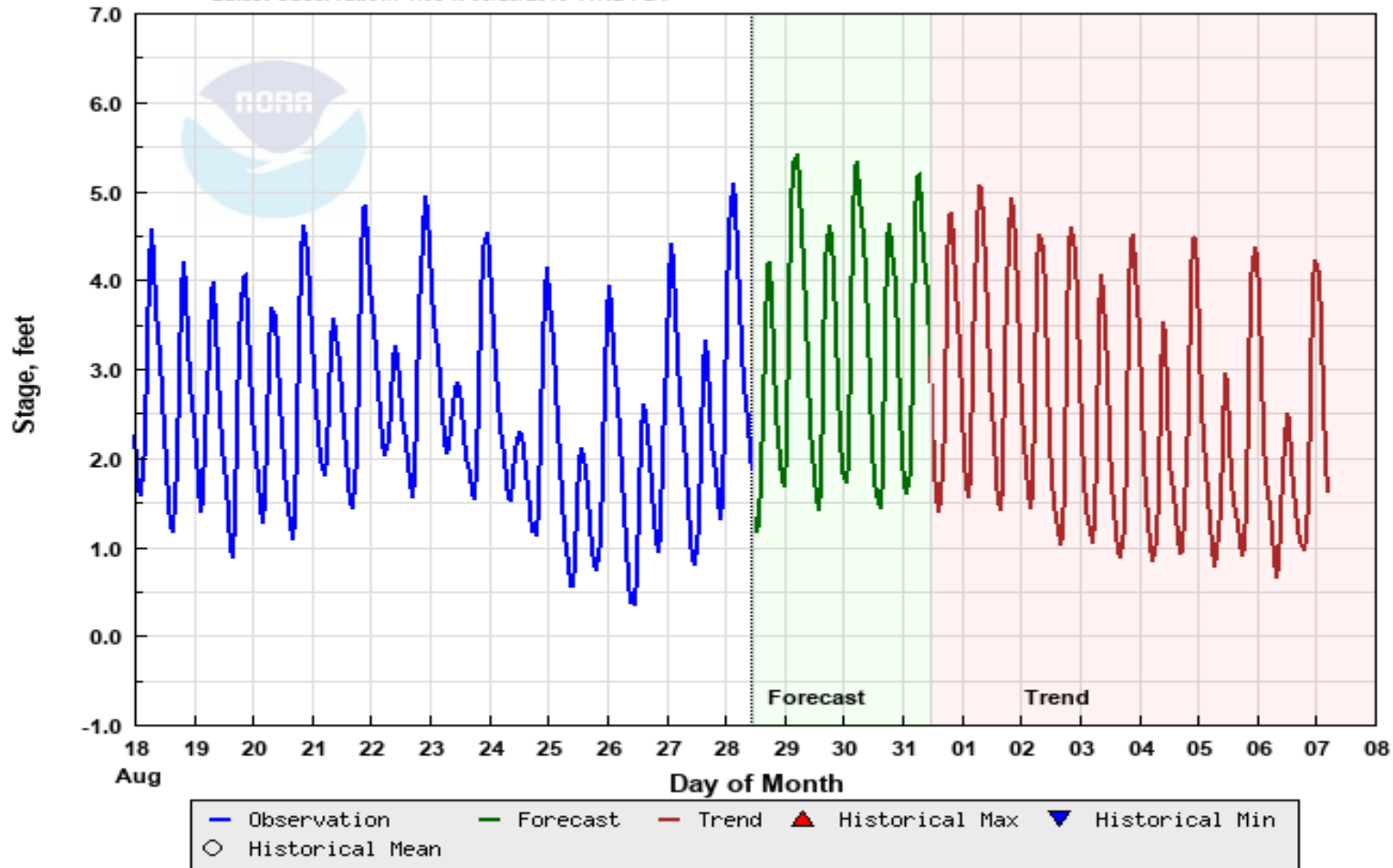
2019 Minimum Stage Outlook

Wednesday's Forecast ...



COLUMBIA - AT VANCOUVER POP (VAPW1)

Latest Observation: 1.88 ft 08/28/2019 11:12 PDT



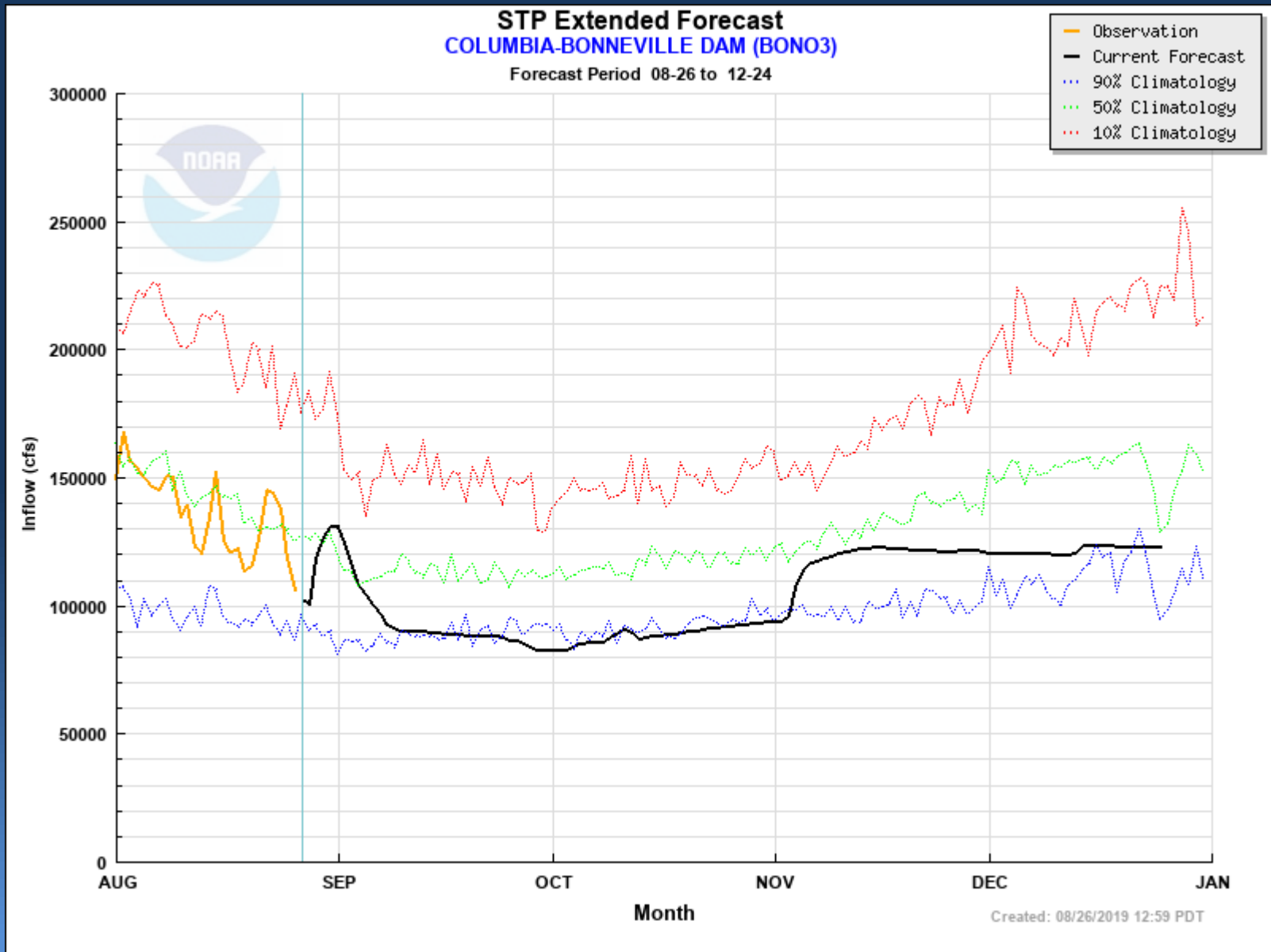
Forecast Created: 08/28/2019 11:37 PDT
Plot Created: 08/28/2019 11:57 PDT

Observations Provided by NOS



2019 Minimum Stage Outlook

Bonneville Dam inflow projections ...





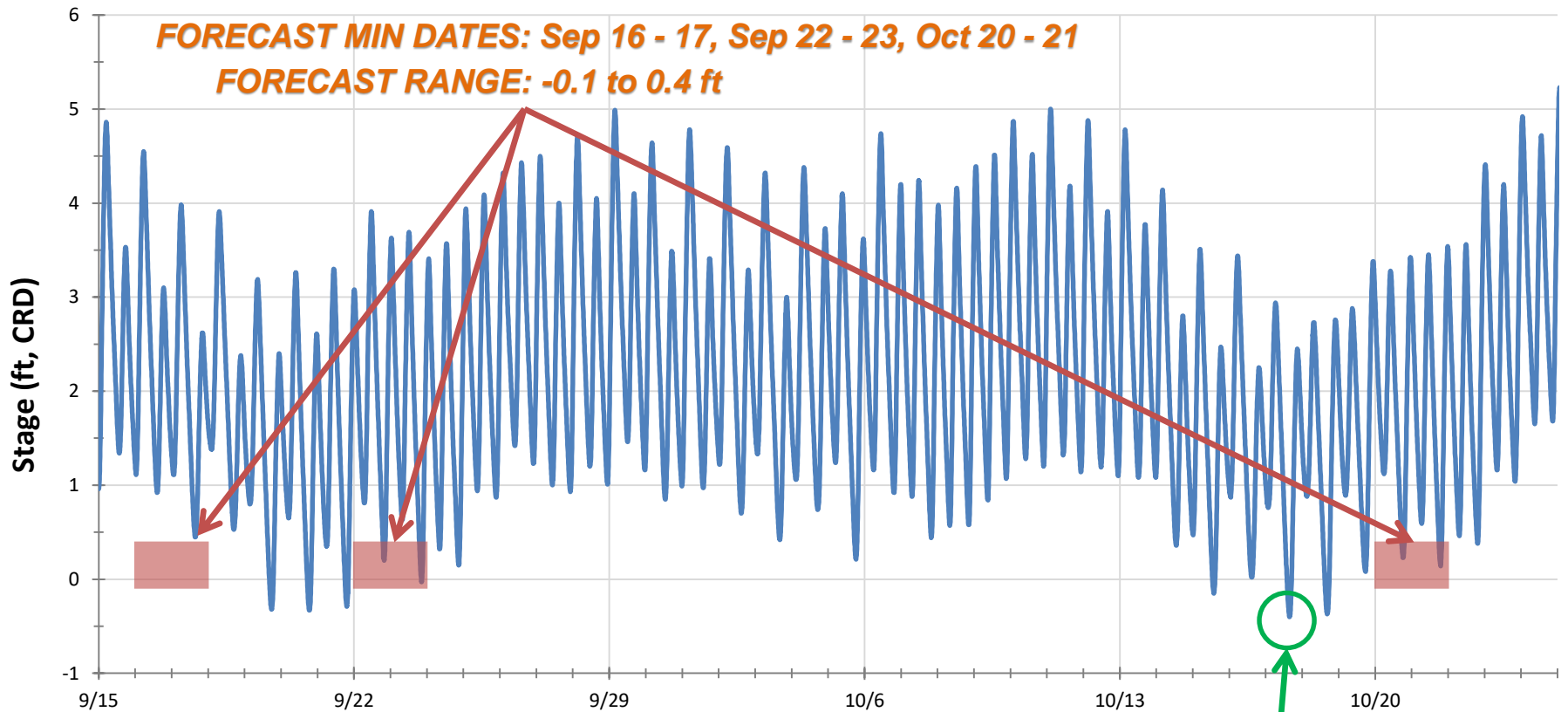
2018 Minimum Stage Verification



2018 Minimum Stage Verification

Columbia River at Vancouver (VAPW1)

Columbia River at Vancouver (VAPW1) - 2018

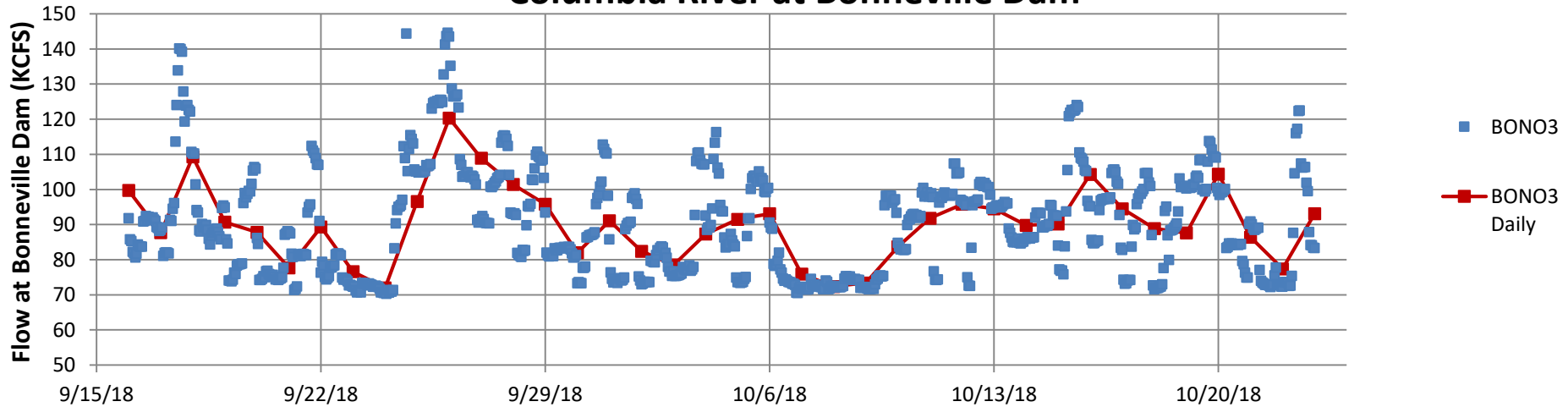




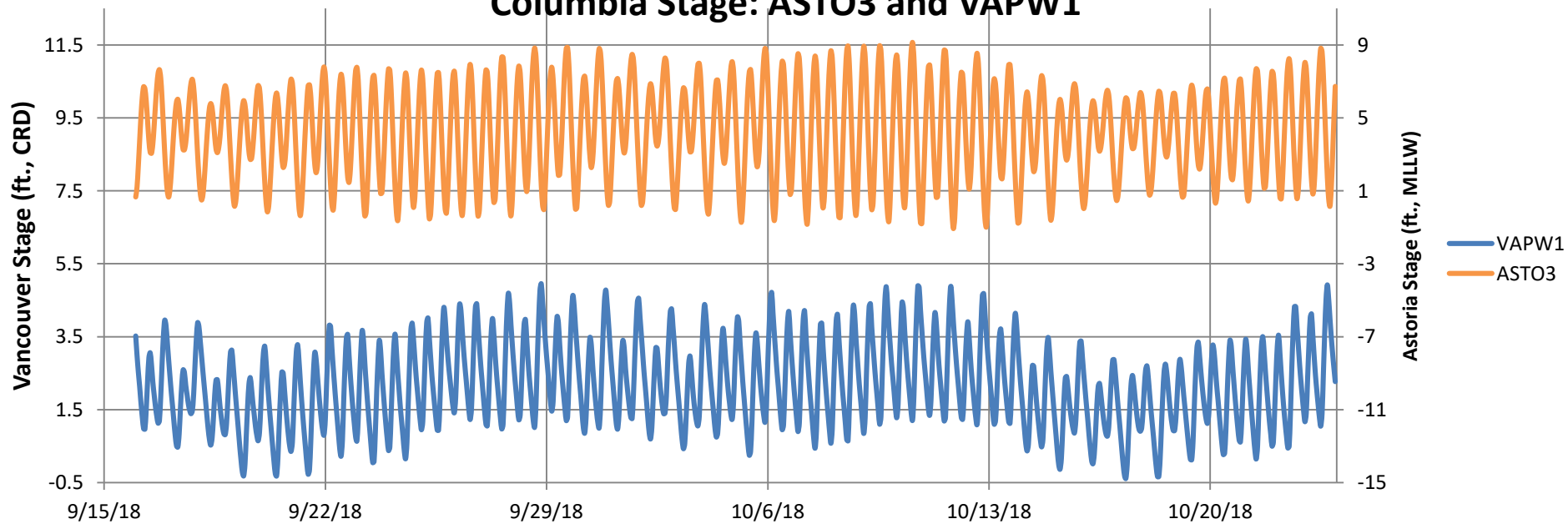
2018 Minimum Stage Verification Columbia River at Vancouver (VAPW1)



Columbia River at Bonneville Dam



Columbia Stage: ASTO3 and VAPW1





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Southside Government Island Looking East From I-205
Vancouver Gage (VAPW1) at ~0 feet (CRD)

Source: PDX WFO