



February 1, 2023

SENT Via Email

Logan Johnson, Meteorologist-in-Charge
National Weather Service Forecast Office
7600 Sand Point Way NE
Seattle, WA 98115-6349
logan.johnson@noaa.gov

Joe Intermill, Hydrologist-in-Charge
NOAA/National Weather Service, NWRFC
5241 NE 122nd Avenue
Portland, OR 97230-1089
joe.intermill@noaa.gov

RE: Meeting To Discuss Chehalis Basin Forecasting Opportunities

Dear Mr. Johnson and Mr. Intermill:

The Chehalis River Basin has a long history of significant flooding. Over the past decade, the Chehalis River Basin Flood Authority (Flood Authority) has invested heavily in flood mitigation projects and a very successful flood warning system. The Flood Authority relies heavily upon National Weather Service (NWS) weather and river forecasts to do its job (i.e., protect people, property, and businesses from flooding). NWS forecasts are essential to protecting life and property, and integral to the Flood Authority's Flood Warning System (www.chehalisriverflood.com). That being said, current NWS forecasts have limitations that, if addressed, would resolve significant coverage gaps in the Basin.

We'd welcome the opportunity to meet with you to discuss several ideas we have for filling these gaps and improving Basin-wide forecasting, including:

1. Developing new forecast points below [Chehalis River at Porter](#), and including Grays Harbor estuary, that consider riverine flooding, storm surge, extreme tide events, compound flooding, and inflows from key tributaries.
2. Improving inflow forecasts to and outflow forecasts from the Skookumchuck Reservoir to produce river forecasts on the Skookumchuck River near the Town of Bucoda.

In support of this request (to meet with you), the following is provided for greater context and to underscore the opportunity presented for greater Basin-wide flood warning coverage.

A. Flood and Flood Risk Mitigation History

The Washington Department of Ecology notes that "Over the past few decades, peak seasonal flood levels have been rising -- with five of the Basin's largest historical floods occurring during the last 30 years. Besides the 125-mile-long Chehalis River which flows into the Grays Harbor estuary

on the Pacific Coast, the Chehalis Basin also includes the Black, Elk, Hoquiam, Humptulips, Johns, Newaukum, Satsop, Skookumchuck, Wishkah, and Wynoochee rivers, and their tributary streams (<https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Chehalis-Basin>).” The trend continued in January 2022 with record and near record flooding at many locations in the middle and lower Basin.

In the aftermath of the 2007 and 2009 Chehalis Basin floods, Washington Governor Christine Gregoire created the Chehalis River Basin Flood Authority (2010) to develop flood hazard mitigation measures throughout the Basin. Later, in 2016, the Washington State Legislature created the Washington State [Office of Chehalis Basin](#) (OCB) to aggressively pursue a Basin-wide integrated strategy to:

- Reduce long-term flood damage.
- Restore aquatic species.

The intense interest in mitigating flood risk and improving aquatic ecosystems in the Chehalis Basin has fostered millions of dollars of investment over the course of the past 15 years to meet these objectives. Resulting projects include levees, pump stations, improved channel conveyance, bank stabilization, critter pads, residential flood proofing, and improved flood forecast/warning systems, among others. In 2019, because of these and other significant floodplain management activities, the Flood Authority received the prestigious James Lee Witt Local Award for Excellence in Floodplain Management ([here](#)).

B. Chehalis River Basin Flood Warning System

In 2010 the Flood Authority authorized development of a flood warning system specific to the Chehalis Basin (www.chehalisriverflood.com). The system was developed and designed to:

- Be a web portal for flood information serving flood preparedness decisions by the Chehalis Basin communities.
- Provide improved data to support and leverage NWS river forecasts in the Basin.

In early-January 2022, record and near record flooding returned to the Chehalis Basin. By all measures the Flood Authority’s Flood Warning System was a resounding success. Among the most valuable features of the system were the high-water alerts and flood inundation maps. Currently, there are over 2,400 individuals signed-up to receive email high water alerts from 13 key river gages in the Basin. The email alerts provide subscribers with additional warning time to respond to rising water levels. [See Flood Authority’s Data Dashboard #1 [here](#) showing ever-increasing growth in usage of the Flood Warning System’s email alert program.]

During the January 2022 event, in the largely rural Basin with just 175,000 residents, more than 25,000 unique logins to the Flood Warning System website were recorded. The flood inundation

map pages received approximately 73,000 hits in two days, January 6-7. Social media posts about the website and inundation maps by a local newspaper (The Chronicle) and the Washington Emergency Management Department helped drive traffic to the website and inundation maps based on NWS forecasts. (See Figure 1.)

**Chehalis River Basin Flood Authority
Flood Warning System Website**

Website:

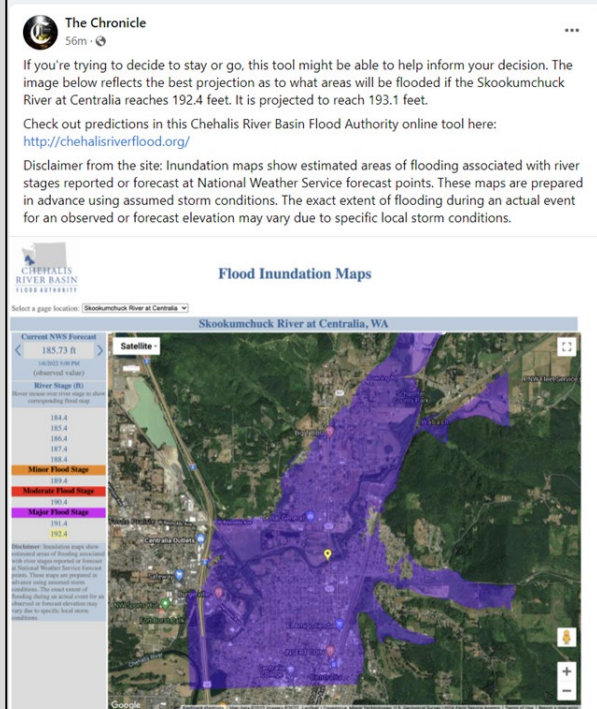
- 25,000 User logins – January 1-10, 2022

Inundation Map Pages:

- 73,000 hits January 6-7, 2022

Third party posts:

- The Chronicle
- WA Emergency Management



The image shows a social media post from 'The Chronicle' dated 56m ago. The post text reads: 'If you're trying to decide to stay or go, this tool might be able to help inform your decision. The image below reflects the best projection as to what areas will be flooded if the Skookumchuck River at Centralia reaches 192.4 feet. It is projected to reach 193.1 feet. Check out predictions in this Chehalis River Basin Flood Authority online tool here: <http://chehalisriverflood.org/> Disclaimer from the site: Inundation maps show estimated areas of flooding associated with river stages reported or forecast at National Weather Service forecast points. These maps are prepared in advance using assumed storm conditions. The exact extent of flooding during an actual event for an observed or forecast elevation may vary due to specific local storm conditions.'

The website screenshot is titled 'Flood Inundation Maps' and shows a map of the Skookumchuck River at Centralia, WA. The map displays various flood stages: Minor Flood Stage (189.0), Moderate Flood Stage (190.0), and Major Flood Stage (191.0, 192.4). A legend on the left side of the map provides details for these stages.

Figure 1: CRBFA Flood Warning System performance during January 2022

Investments in the flood warning system, improved flood plain management policy, and structural improvements made the Chehalis Basin communities better prepared for flooding than ever before. However, further improvements are needed, particularly in the lower Basin.

C. NWS River Forecasting Needs

A post-flood survey of flood warning system users conducted by the Flood Authority identified several areas for improvement. Two are related directly to NWS river forecasts. Survey respondents indicated that:

1. River forecasts are needed on the lower Chehalis River and tributaries between Porter and Grays Harbor.
2. Inflow forecasts to and outflow forecasts from Skookumchuck Reservoir above the town of Bucoda are needed.

D. Lower Basin River Forecasts

Currently, the NWS does not provide specific river forecasts in the lower Basin below Porter. The lower reaches of the Chehalis River are subject to compound flooding which includes riverine flooding from upstream areas combined with routine tidal influences, King Tides, and storm surges. It is our understanding that the current NWS river forecast procedures in the Chehalis River Basin are incapable of accurately accounting for these complex issues. It is also our understanding that the procedures needed to handle these issues exist within the NWS and are operational at other locations.

Improved river forecasts in the lower Basin are needed for several reasons:

1. Improved river forecasts reduce uncertainty and increase time available to complete damage reduction tasks.
2. Many structural investments made in the past decade require or are further enhanced with improved forecasts, including levee closures, pumpstation operations, residential flood proofing, and utilization of critter pads to protect ranch animals, feed stock, and equipment (Figure 2).
3. River stage forecasts in the lower Basin are needed for flood inundation mapping, the hugely popular and valuable tools currently in use in the upper Basin.
4. Climate change adaptation is a key need of the Chehalis Basin where improved forecasting is helpful in enabling residents to react to changes in the magnitude and frequency of flood producing storms coupled with sea level rise.
5. Accurate and timely lower Basin forecasting will substantially enhance management, operation, and ultimately success, of the North Shore Levee project designed to protect significant portions of Aberdeen and Hoquiam. [See recent article about this proposed significant Aberdeen-Hoquiam Flood Protection Project [here](#).]



Figure 2. Example Critter Pads for animals (left panel) and equipment (right panel)

E. Skookumchuck Reservoir

Skookumchuck Dam is a 190 ft high earth fill dam built in 1970 primarily for water supply and includes a small hydroelectric powerhouse. The dam and reservoir were not designed nor managed for flood control, but some flood control benefits are evident. For example, unusually low reservoir levels ahead of the 2007 flood reduced downstream flood damage that would otherwise have occurred.

The dam is located approximately 10 river miles upstream from the town of Bucoda. The timing and magnitude of potential flood producing reservoir outflows impacting Bucoda are highly uncertain and are significantly impacted by available reservoir storage. These uncertainties have a large impact on flood emergency response in the vicinity of Bucoda. Representatives from Bucoda requested forecast inundation maps like those developed for seven other locations within the flood warning system. However, the NWS does not currently provide river stage forecasts at Bucoda. The USGS operates a stream gage on the Skookumchuck River near Bucoda with data starting in 1967 which could be used to develop a river forecast point.

To further protect life and property in the vicinity of Bucoda, the Flood Authority sees a key need for improved inflow/outflow forecasts for Skookumchuck Reservoir and the development of river stage forecasts near the Town of Bucoda.

Thank you for your consideration of this request. We're confident that if we could meet, we could collectively find a way to incrementally improve forecasting and protection for even greater numbers of people and business in the Basin. Please contact Scott Boettcher (Flood Authority staff) at 360/480-6600, scottb@sbgh-partners.com with questions and to schedule a time to meet.

Sincerely,



Vickie Raines, Chair
Chehalis River Basin Flood Authority
Grays Harbor County Commissioner
360/590-4100
vraines@graysharbor.us



Edna Fund, Vice-Chair
Chehalis River Basin Flood Authority
Lewis County Representative
360/269-7515
dutch@localaccess.com

CC: Chehalis River Basin Flood Authority Members
Scott Boettcher, Staff -- Chehalis River Basin Flood Authority
Andrea McNamara Doyle, Director -- WA State Office of Chehalis Basin
Brent Bower, Senior Service Hydrologist -- National Weather Service
Dave Curtis, Senior Vice President -- WEST Consultants