

# Chehalis River Basin Flood Authority Flood Warning System

## A Decision Support Tool

Sarah Harvey, MGIS, GISP  
WEST Consultants, Inc.

Source: Washington Department of Transportation

# Acknowledgements

## David Curtis, PhD – a.k.a., Dr. Flood

- Concept Development, Former Project Manager, Current Technical Specialist (WEST)

## Jeff Budnick

- Current Project Manager, Gage Installation and Maintenance Lead (WEST)

## Scott Boetcher

- Project Manager for CRBFA (SBGH-Partners LLC)

## Peter Regan

- Staff Engineer, Web Content Manager and Scripter, Community Intake (WEST)

## Cheryl Vincent

- GIS Analyst (WA Department of Ecology)



# The Chehalis River Basin

- 2,660 square miles – 2<sup>nd</sup> largest in state
- It floods... **a lot**
- Greatest recent losses incurred during **2007**, 2009, and 2022 events
  - \$Millions in property damage in Chehalis and Centralia
  - Flood closures to I5, rail lines, and area highways
- Need to bring together stakeholders and experts to improve flood preparedness, response, and resiliency

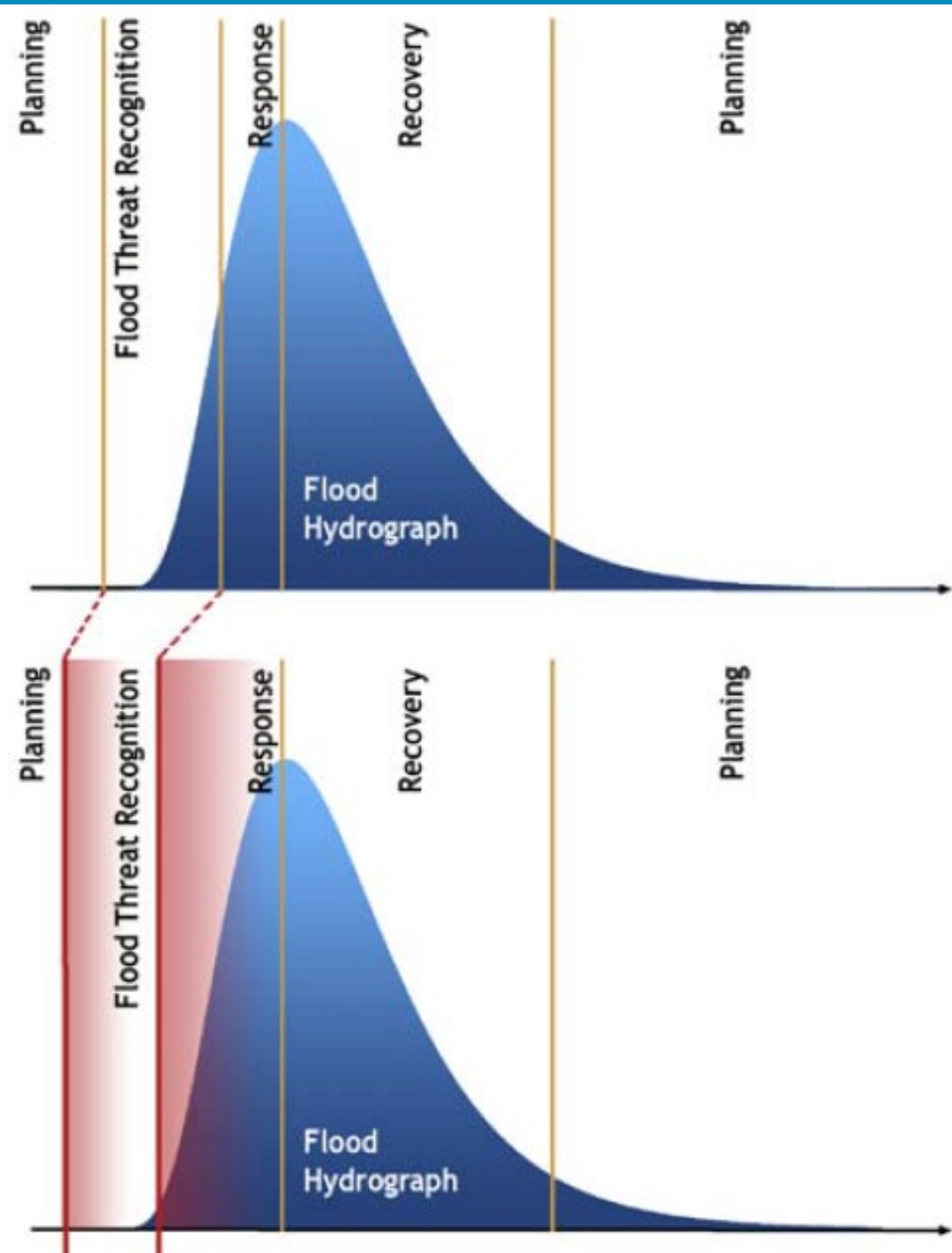


Source: Washington Department of Ecology

# Needs Assessment

## Mitigate Risk

- Reduce Recognition Time = Detect
  - Gaging, forecasting
- Increase Response Time = Inform
  - Alerts, inundation mapping



# Flood Preparedness



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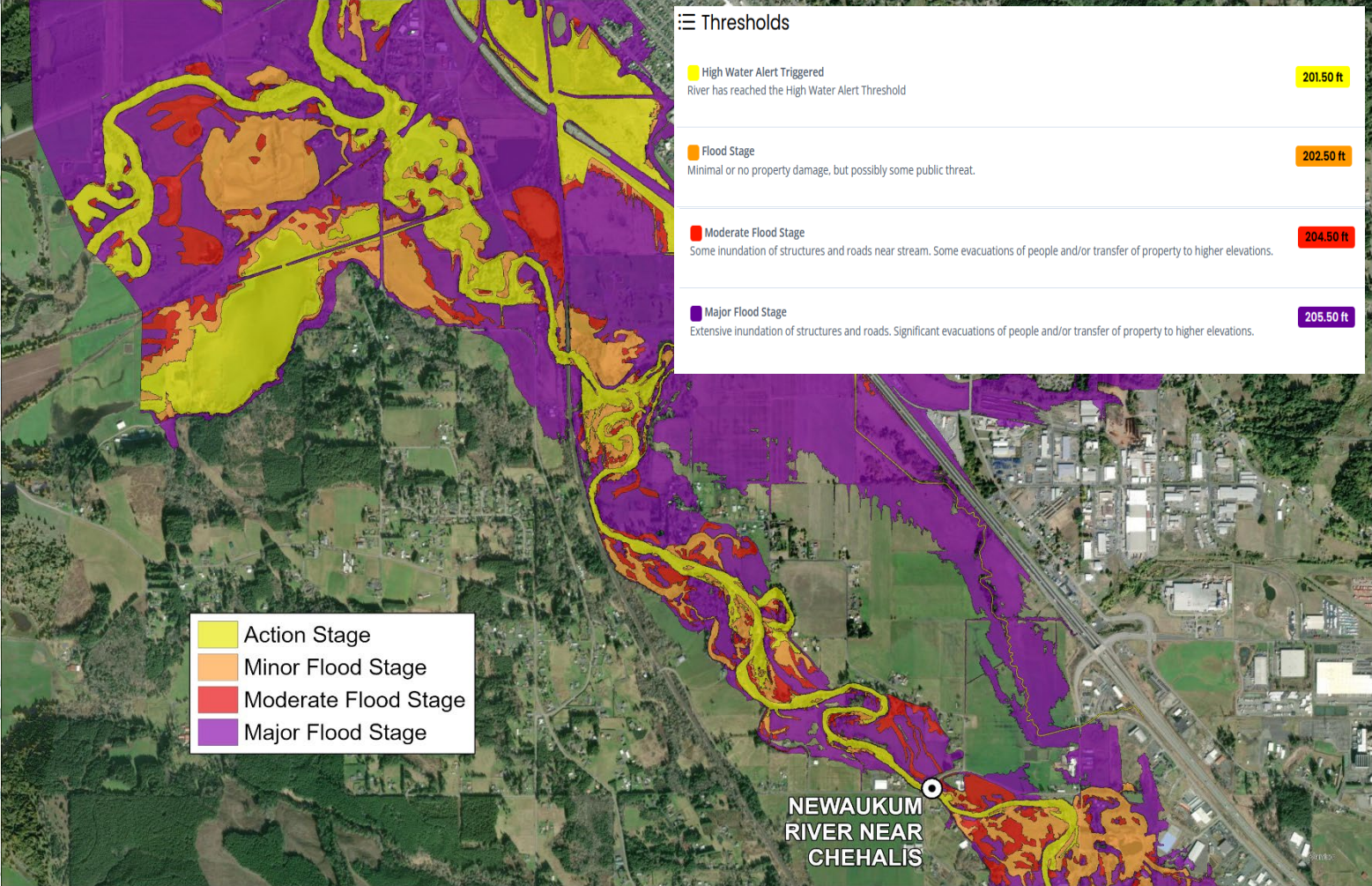
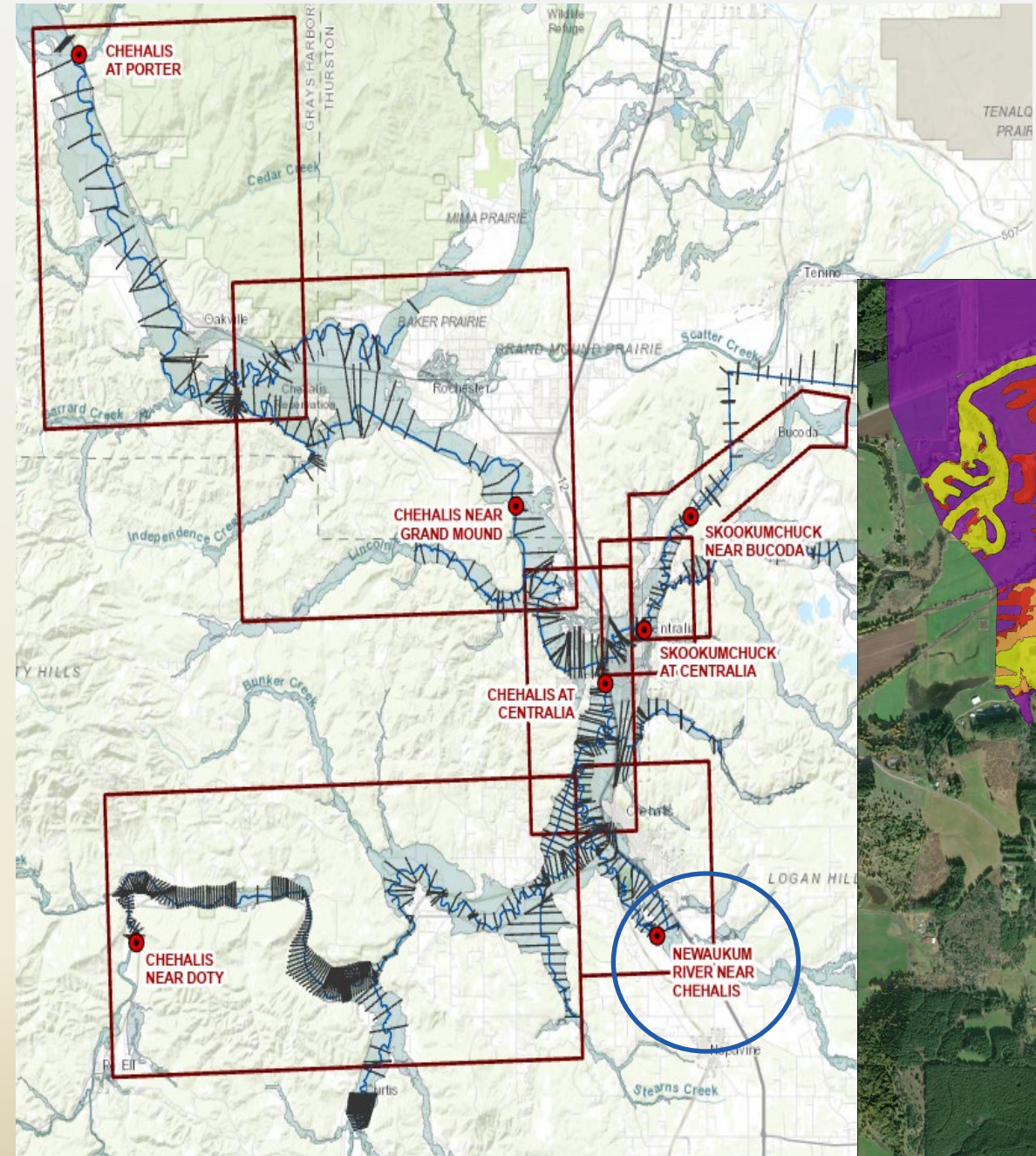
# A History of the Flood Warning System Program

- **2008** Chehalis River Basin Flood Authority (CRBFA) is formed, and WEST Consultants is brought on to identify weak points in flood forecasting and response
- **2010** Flood Warning System is proposed by WEST and authorized by CRBFA
- **2011** Flood Warning System is operational with OneRain website and inundation maps developed by WEST
- **2013** High Water Alert signups and Gage Program Esri Dashboard go live

Source: The Oregonian/Bruce Ely

# Inundation Mapping

## Newaukum River near Chehalis Forecast Location



An aerial photograph showing a wide, muddy river flowing through a rural landscape. The river is significantly swollen, with water reaching the tops of trees and flooding green fields. In the foreground, a farm with a large red barn and several smaller buildings is visible. The background shows rolling hills and dense forests under an overcast sky.

# Chehalis River Basin Flood Authority

**Website**  
**[chehalis.onerain.com](http://chehalis.onerain.com)**

# Esri Survey123 Email Alerts

## Home

### Welcome to the Chehalis River Basin Flood Warning System

Be Aware; Be Prepared: Flood Season is here!

\*\*\*The data on this website are from automated sensors and are provisional in nature. Use and interpretation of the data is the responsibility of the user. \*\*\*

*Sign Up Now to receive 2025-2026 email high water alerts* - The Chehalis Basin Flood Warning System sends automatic email alerts about rising floodwaters.

To sign up for email alerts, click the icon below:




Questions?

Contact Peter Regan at [pregan@westconsultants.com](mailto:pregan@westconsultants.com).

<https://survey123.arcgis.com/share/f5d1e90dc3fc4222973249966a0d883f>

# Gage Alert Program Esri Dashboard

 **Flood Warning System Gage Alert Program**  
Interactive Data Dashboard #1

Select Tool  
Click to select alert gages.

**About**  
This Data Dashboard provides information about the Flood Authority's Flood Alert Program, including tools to search, select, monitor, and sign-up for email flood alerts from select Chehalis Basin river gages.


**Select**  
Use the Select Tool (above far right corner) to select one or more flood alert gages. [Note: When a selection is made, the map automatically zooms to the selected gage(s).]

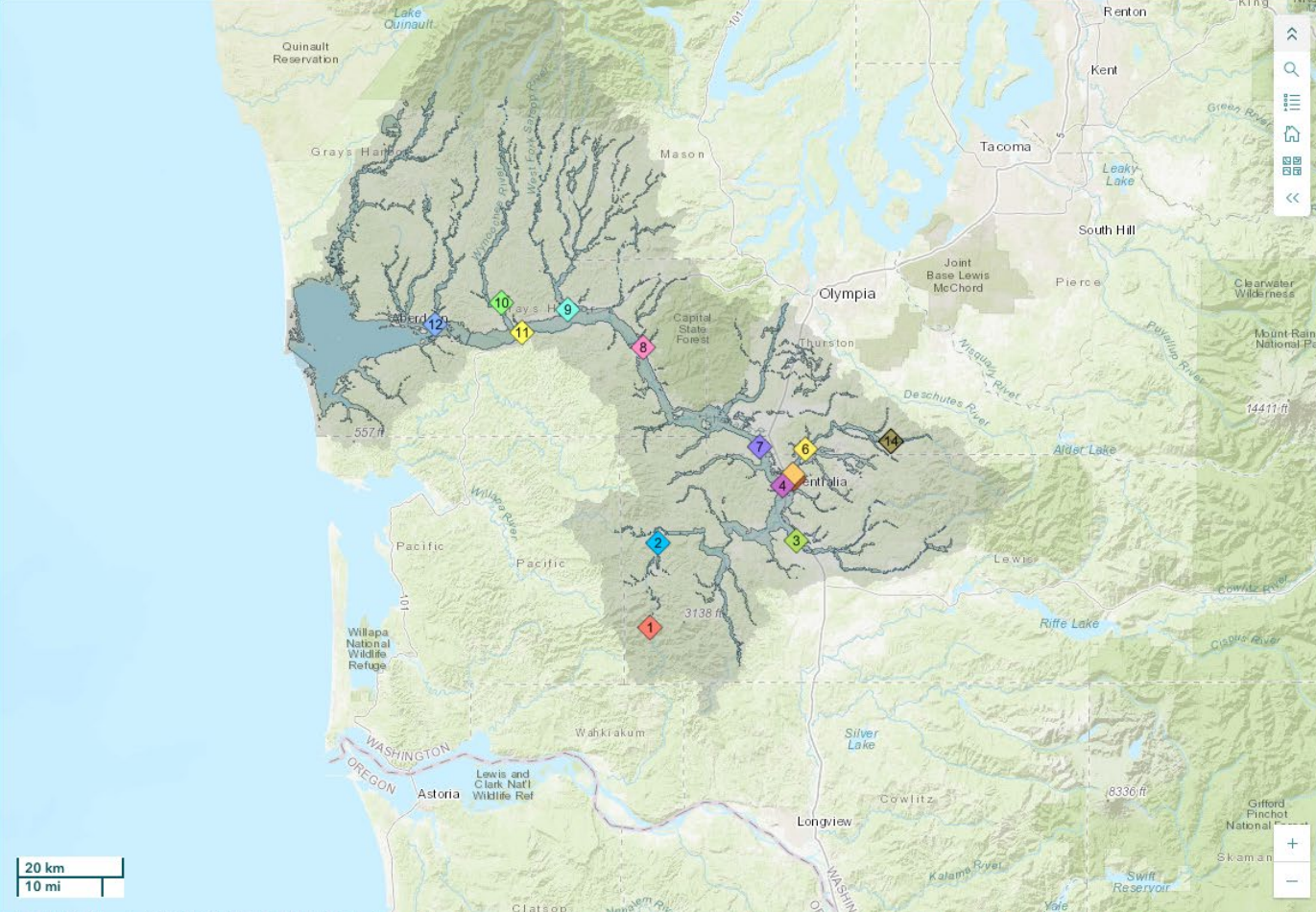
**Search**  
Click the gage icons on the map to review information about flood alert gages near you. Click the reset button to clear your selection and the home button to reset the map.

**Monitor**  
Click the tabs below the map to monitor flood alert sign-ups.

**Sign Up**  
Click "Sign Up Today" (below) to sign up for email flood alerts.


**Be Aware, Be Prepared**  
[Sign Up Today!](#)





Map | Sign-ups by Flood Season | Operating Cost | Sign-ups by Gage & Flood Season


Help Us Reach Our 2025-26 Goal!



5,517

0 6,000

**Community Sign-ups**




5,517 from 4,666

118% of the sign-ups of the previous season

Seasonal Sign-ups | Per Sign-up Costs

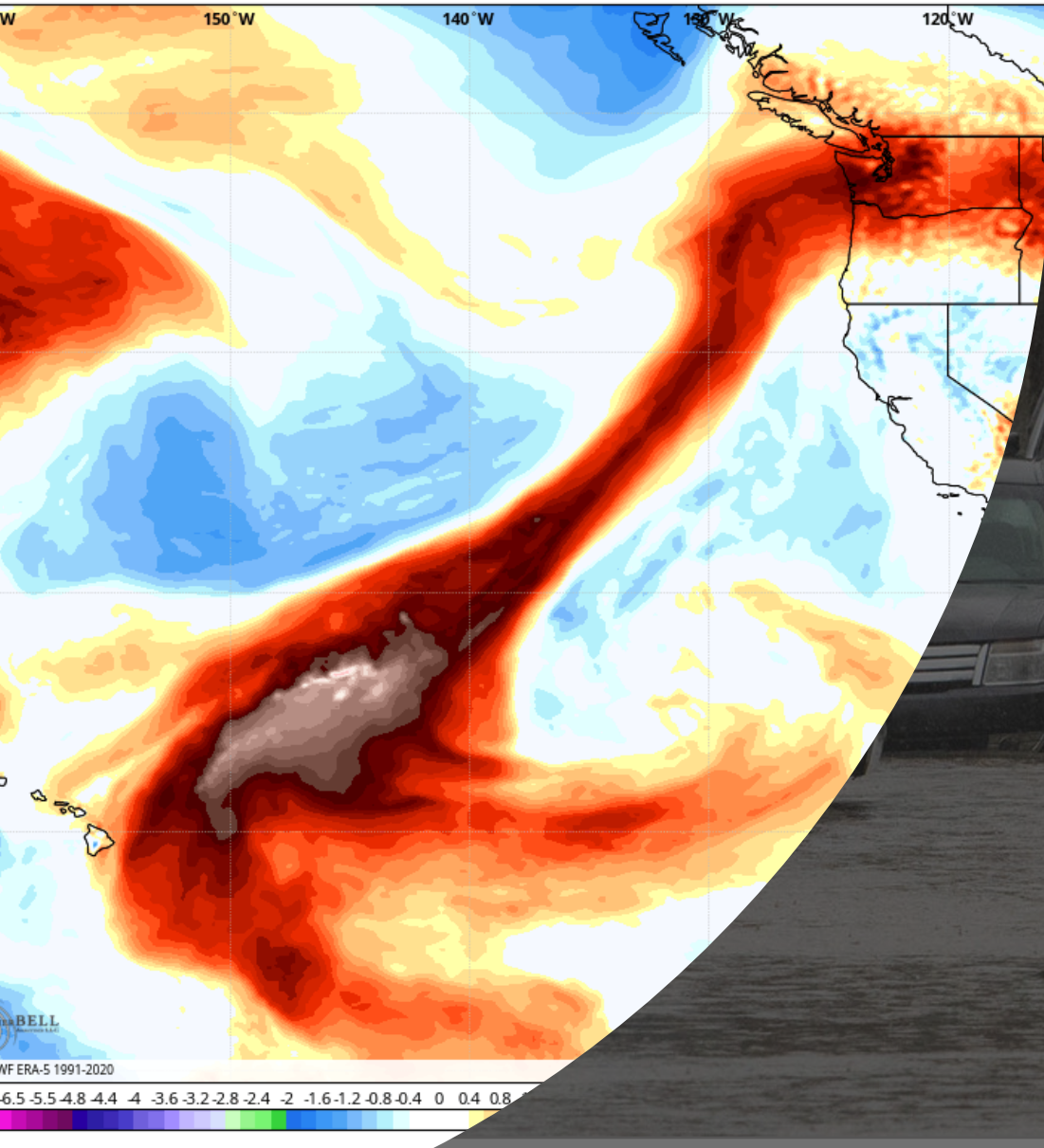
**Be Aware, Be Prepared: Learn**  
Office of Chehalis Basin



OBJECTIVE:

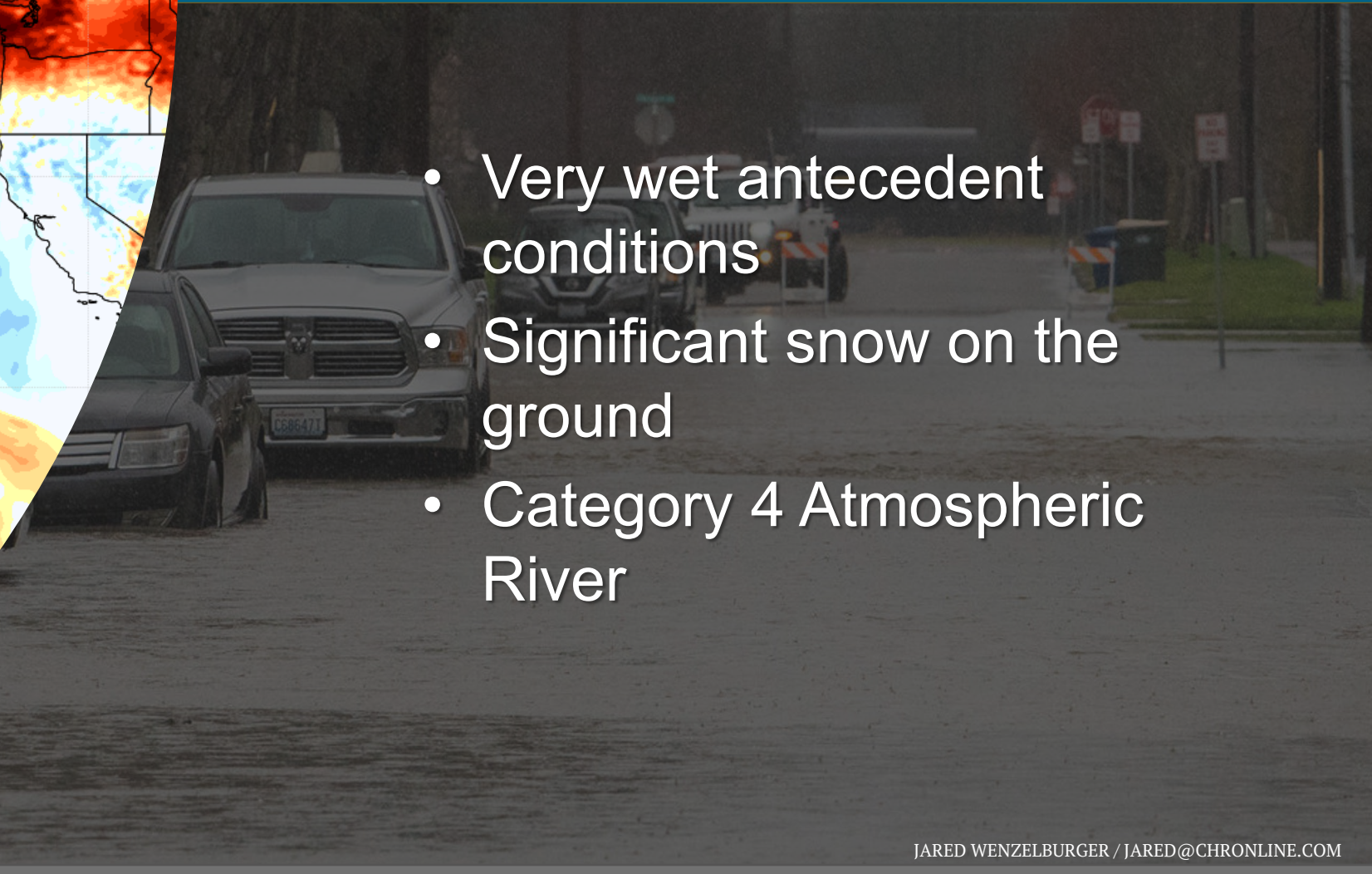
- Mitigate risk
- Reduce recognition time
- Increase response time

Watch on YouTube



# January 2022 Flood A Stress Test

- Very wet antecedent conditions
- Significant snow on the ground
- Category 4 Atmospheric River



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# Peak Flood Stages

## RECORD

- Newaukum nr Chehalis at 205.59'

## Major

- Skookumchuck nr Bucoda at 215.99' (record is 216.0')
- Chehalis at Porter
- Chehalis at Grand Mound

## Moderate

- Chehalis at Centralia (near major)
- Satsop nr Satsop (near major)
- Skookumchuck at Centralia

## Minor

- Chehalis nr Doty at 321.11'

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# Newaukum River near Chehalis, WA

## Current NWS Forecast

< 193.73 ft >

5/15/2026 9:45 AM

(observed value)

### River Stage (ft)

Hover mouse over river stage to show corresponding flood map

201.4

### Minor Flood Stage

202.4

203.4

### Moderate Flood Stage

204.4

### Major Flood Stage

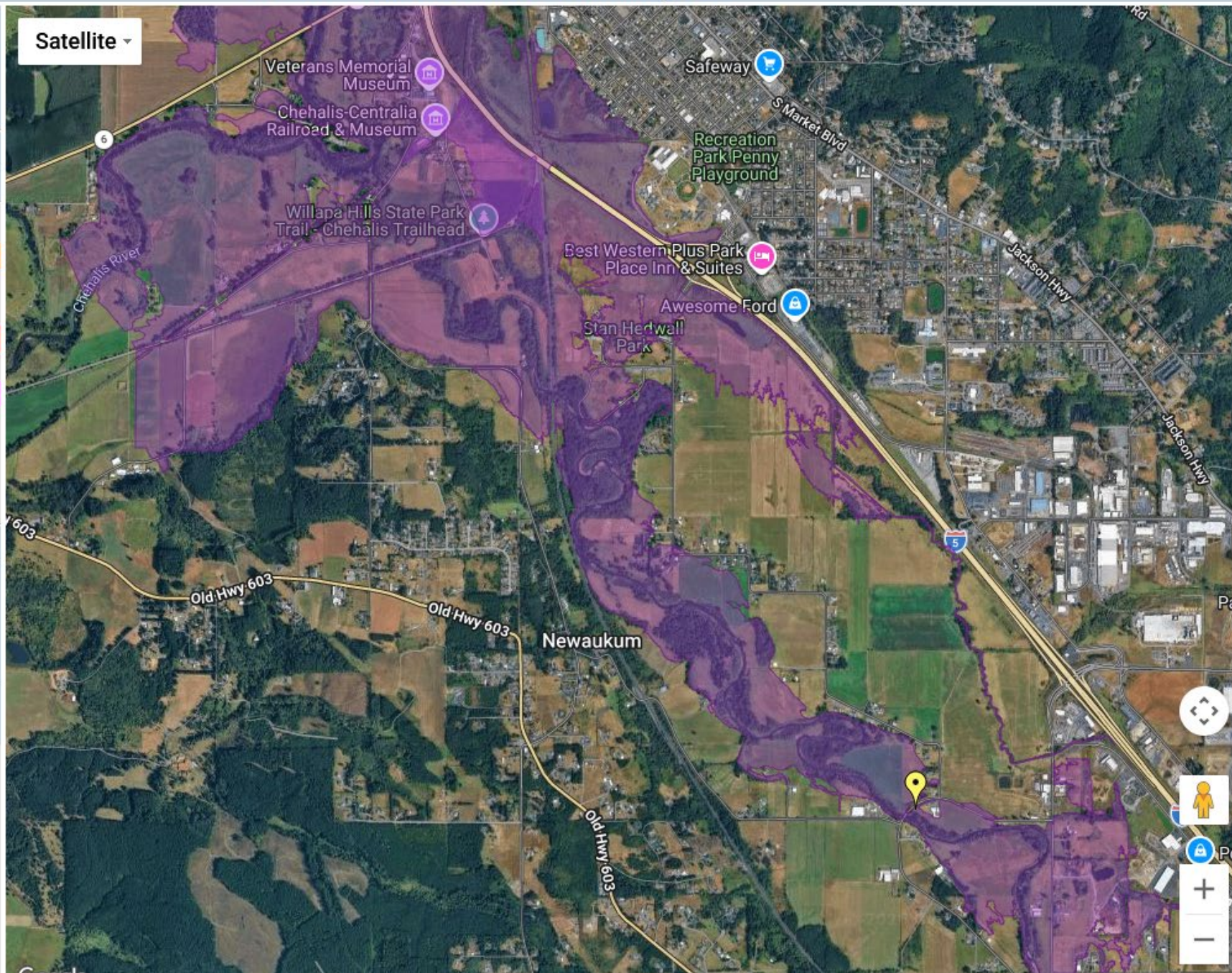
205.4

206.4

206.9

207.7

**Disclaimer:** 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.



Google

# Skookumchuck River at Bucoda, WA

## Current NWS Forecast

< 203.66 ft >

5/15/2026 9:45 AM  
(observed value)

### River Stage (ft)

Hover mouse over river stage to show corresponding flood map

209.5

#### Minor Flood Stage

211.5

212.0

212.6

#### Moderate Flood Stage

213.0

213.6

214.1

214.6

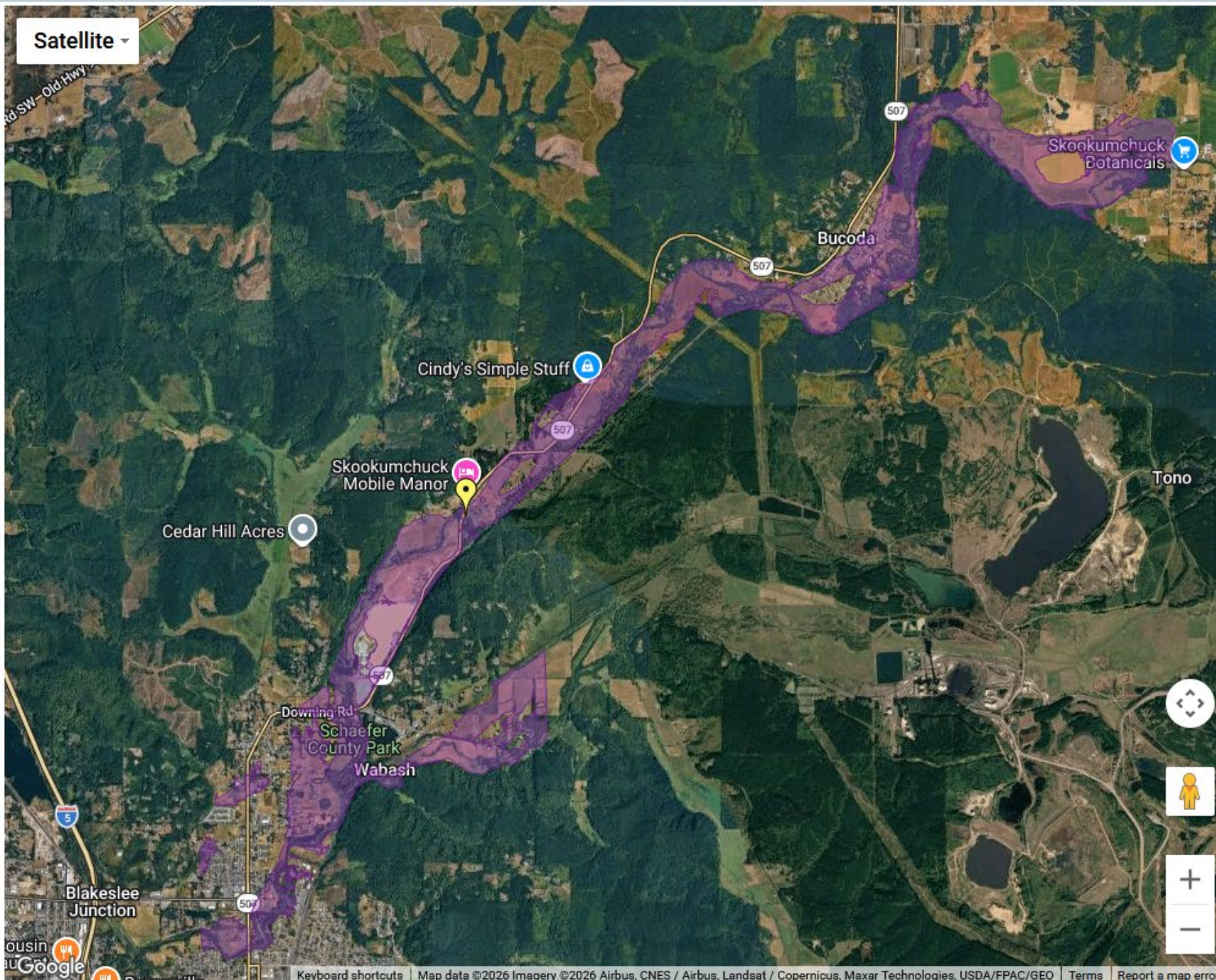
215.0

#### Major Flood Stage

215.2

216.0

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# Chehalis River at Centralia, WA

## Current NWS Forecast

152.85 ft

5/15/2026 9:00 AM  
(observed value)

## River Stage (ft)

Hover mouse over river stage to show corresponding flood map

164.3

164.9

165.9

166.9

167.9

## Minor Flood Stage

168.9

169.9

170.9

## Moderate Flood Stage

171.9

172.9

173.9

174.9

## Major Flood Stage

175.9

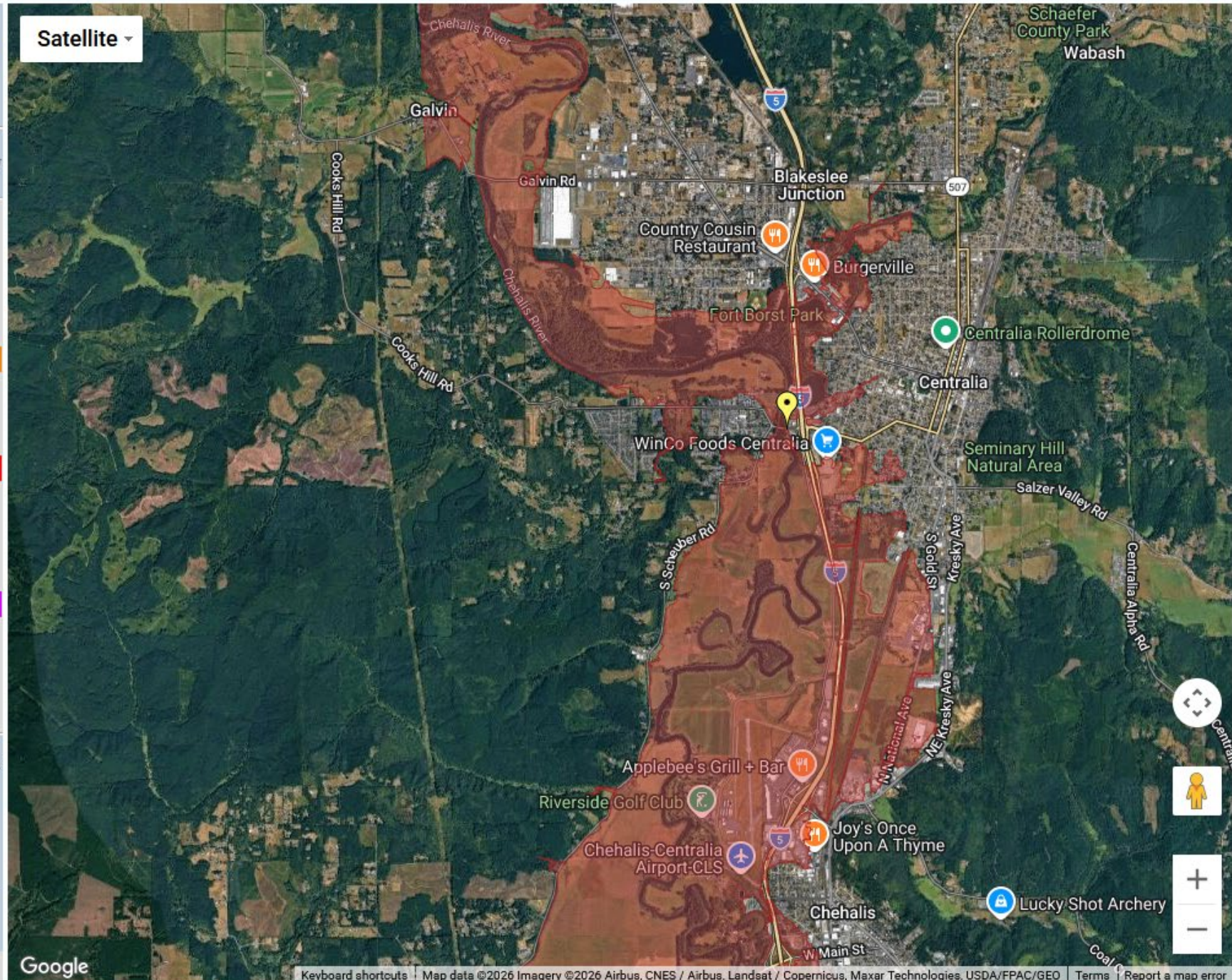
176.9

177.9

179.9

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Satellite



Google



Home

**Sign up for 2021-22 High Water ALERTs**

Flood season is here. The **Chehalis River Basin Flood Warning System ([www.chehalisriverflood.com](http://www.chehalisriverflood.com))** is a tool to help you be aware, be prepared. The Chehalis River Basin Flood Authority calls your attention to the following opportunity:

- Sign-Up Now To Receive 2021/22 Email High Water Alerts** -- The Chehalis River Basin Flood Warning System has the capability to send email alerts to anyone interested in receiving notification about rising river levels from key river gages in the Chehalis Basin. To sign-up for email alerts for the 2021/22 flood season please follow the directions **here**. Comments or questions can be directed to Scott Boettcher, Chehalis River Basin Flood Authority, 360/480-6600, [scottb@sbgh-partners.com](mailto:scottb@sbgh-partners.com).

11/23/2021 16:48:01

**Seasonal Outlook for Temperature and Precipitation**

Check out the latest outlook from the NWS Climate Prediction Center. Chances are that above average precipitation and below average temperature may be in store for western Washington. Click **HERE** for additional information.

01/15/2022 17:29:42



Weather Forecast	Rainfall Forecast	River Forecast	Flood Maps	Plot Gage Data	Gage Data Maps
Landslide	Radar Rainfall	Road Conditions	USGS Gages	Atmospheric Rivers	Chehalis Basin Gage Height Conversion Project

# Our Tools At Work

## Website

- **25,000** user logins from January 1-10

## Inundation Maps

- **73,000** hits from January 6-7

## Third-party posts

- The Chronicle
- WA Emergency Management

# Our Tools At Work



**Washington Emergency Management Division** posted a ⚠️ weather alert for Lewis County and 2 other counties. 1h · 🌐

There's lots of flooding potential in Western Washington in the coming days. One area of concern is the Chehalis River and the Skookumchuck River. The Chehalis Basin Flood Authority has potential flood maps & alert systems in place for residents to get warnings. You can find river gages near you and sign up to get notified about flooding issues near you. If flooding impacts you, sign up. You can also look at what areas are forecasted to be impacted by floods using Flood Inun... [See more](#)

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 CHEHALIS RIVER BASIN FLOOD AUTHORITY

[Home](#) [Map](#) [Sites](#) [News](#) [Dashboards](#)




Weather Forecast



Rainfall Forecast




River Forecast



Flood Maps




Plot Gage Data



Gage Data Maps




Landslide



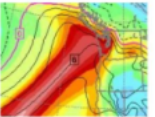
Radar Rainfall




Road Conditions



USGS Gages



Atmospheric Rivers




Chehalis Basin Gage Height Conversion Project

Photo Credit: 🇺🇸 🤖 🧐 70

8 Comments 66 Shares

👍 Like 💬 Comment ➦ Share



**The Chronicle** 56m · 🌐

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.

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 CHEHALIS RIVER BASIN FLOOD AUTHORITY

## Flood Inundation Maps

Select a gage location: Skookumchuck River at Centralia

### Skookumchuck River at Centralia, WA

**Current NWS Forecast**

185.73 ft

1/6/2023 5:00 PM (observed value)

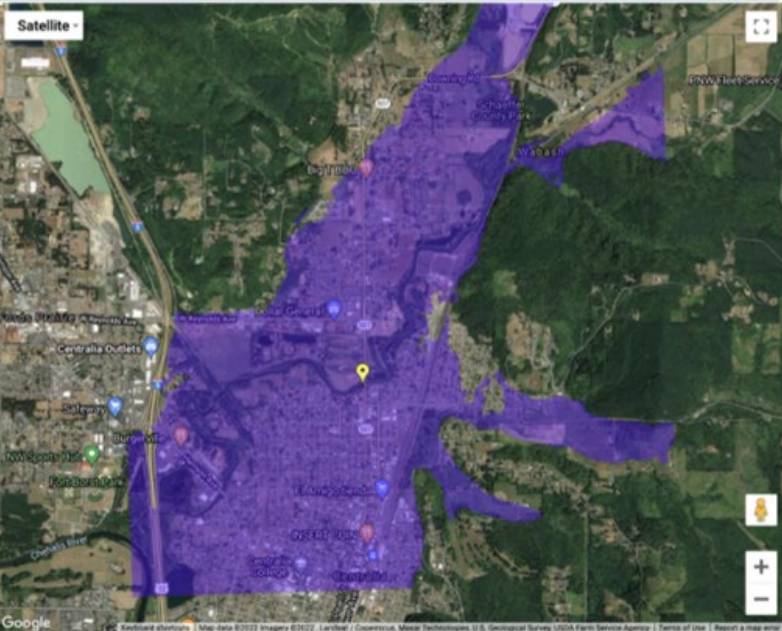
**River Stage (ft)**

lowest value over river stage to show corresponding flood map

184.4
185.4
186.4
187.4
188.4
188.4
<b>Minor Flood Stage</b>
189.4
<b>Moderate Flood Stage</b>
190.4
<b>Major Flood Stage</b>
191.4
192.4

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Satellite



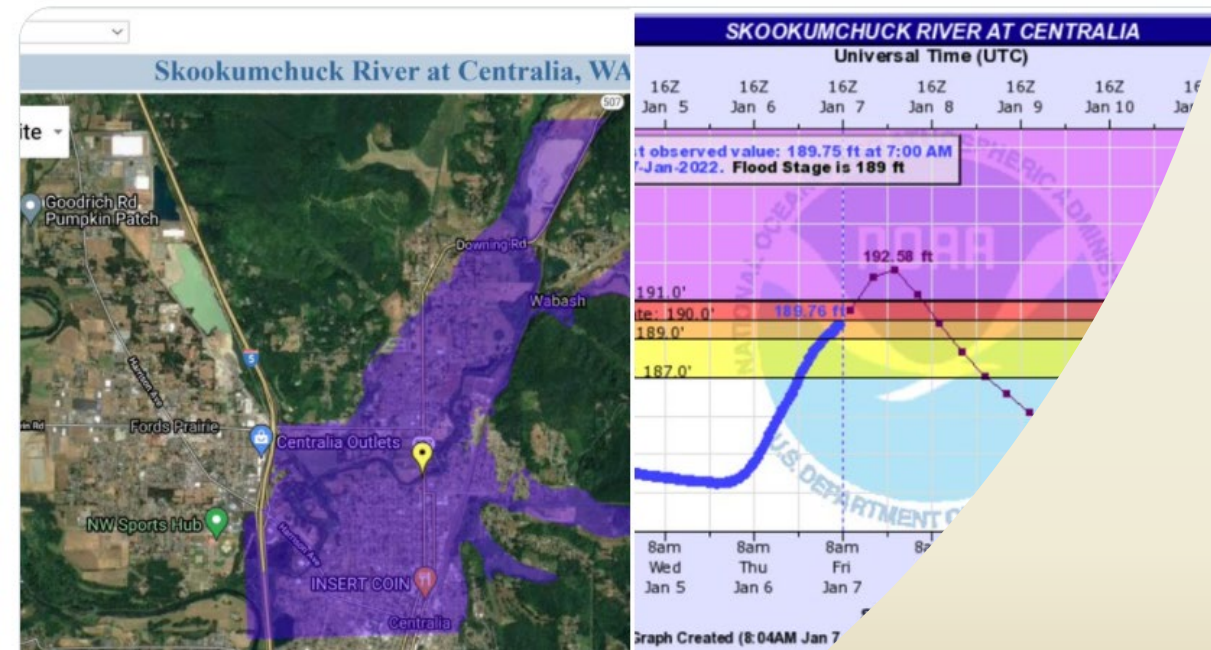
Google | Keyboard shortcuts | Map data ©2022 Imagery ©2022, Landsat | Copernicus, Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency | Terms of Use | Report a map error



# Our Tools At Work

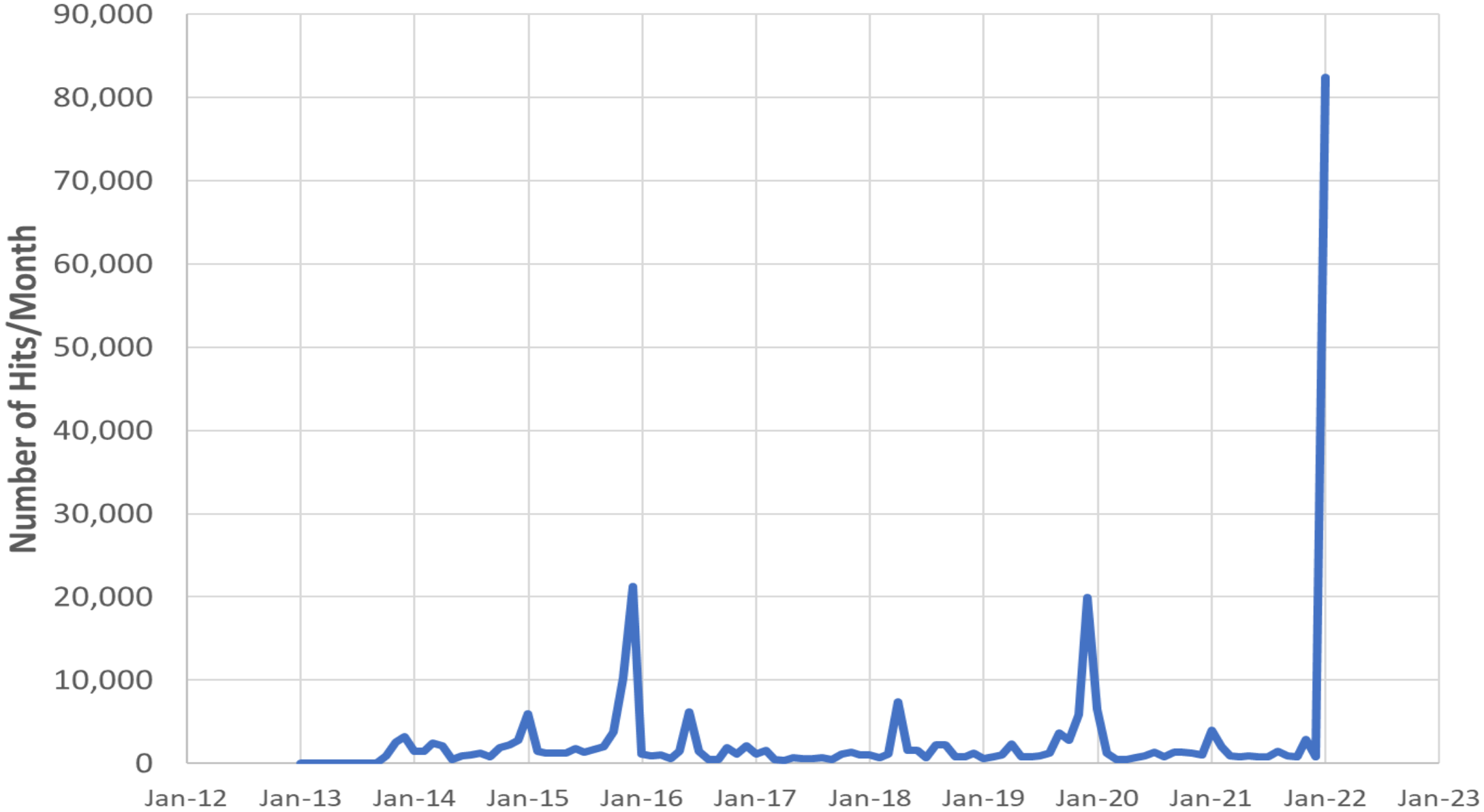
Here, you can see what flooding near I-5 would look like at 192.5 feet of water. The river gage shows the river may reach 192.58 feet

The Chehalis Basin Flood Authority has flood inundation maps & river gages for the region on its website. Find more here: [chehalis.onerain.com](http://chehalis.onerain.com)



Washington  
Emergency  
Management  
Twitter Feed

# Chehalis River Basin Flood Authority Flood Warning System Monthly Inundation Map Website Hits



# User Survey – High Water Alerts

## Why sign up?

- So that I know when the water is high even if I'm not aware that flooding is possible.
- I manage the Chehalis-Centralia Airport and I need to be kept up to date on events related to flooding.
- I'm a school superintendent. We have to decide on the safe passage of students.
- To keep abreast of river conditions and take necessary actions to prevent flooding damage.
- I have friends and family who live in the flood areas. I want to know when flooding is affecting the Lewis county roads.
- I live and work in flood zone.

## What can be improved?

- Need earlier alerts (North Fork Newaukum River)
- Accuracy of the forecasts and accuracy of the gauges
- Send alerts more frequently
- Need specific street locations
- More user-friendly visuals

# User Survey – Inundation Maps

## Positives

- These are invaluable when planning a response.
- They provide a visual representation of where problems are and are anticipated.
- Ability to assess potential damage areas.
- Great estimation of current flooding
- Great record of past floods
- It was very nice to see the information and plan safety routes

## Needs Improvement

- The map could use finer detail around the levee at the Chehalis-Centralia Airport.
- A gauge closer to my home would be helpful in predicting more accurately what has flooded and when to expect
- I wish I could type in various addresses to see those areas in particular.
- Need specific street locations
- More user-friendly visuals
- Update maps

# What's next?

- Added forecast gage in Bucoda and extended inundation mapping
- Moving to AWS for sign-ups and alerts
- Inundation mapping needs updating!
  - NWS experimental [Flood Inundation Mapping Services](#) through Sep. 2026
  - Better LiDAR?
- Maintain Esri Dashboard
  - Link AWS sign-ups to automatically update dashboard metrics on a periodic basis

# GIS as a Decision Support Tool for Flood Preparedness

