

**DEVELOPING INTEGRATED FLOOD  
MANAGEMENT FROM SCRATCH**

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SCOTT BOETTCHER, CHEHALIS RIVER BASIN FLOOD AUTHORITY

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**CHEHALIS RIVER BASIN**

- NORTHWEST COAST, WA
- 2,660 SQ. MI.



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**CHEHALIS RIVER BASIN FLOOD AUTHORITY**

- LEWIS COUNTY
- GRAYS HARBOR
- THURSTON COUNTY
- CITY OF ABERDEEN
- CITY OF CENTRALIA
- CITY OF CHEHALIS
- CITY OF COSMOPOLIS
- CITY HOQUIAM
- CITY OF MONTESANO
- CITY OF NAPAVINE
- CITY OF OAKVILLE
- TOWN OF BUCODA
- TOWN OF PE EL

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**GOALS**

- MITIGATE FLOOD RISK
- REDUCE FLOOD DAMAGE
- INCREASE FLOOD THREAT AWARENESS
- PROACTIVE CULTURE
- AQUATIC ENHANCEMENT



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**2007**



THE OREGONIAN / Bruce Ely



Photo by Bob Weire

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**2009**



<http://www.komstar-us.com/weather/blog/2009/04/23/042309.html> AP



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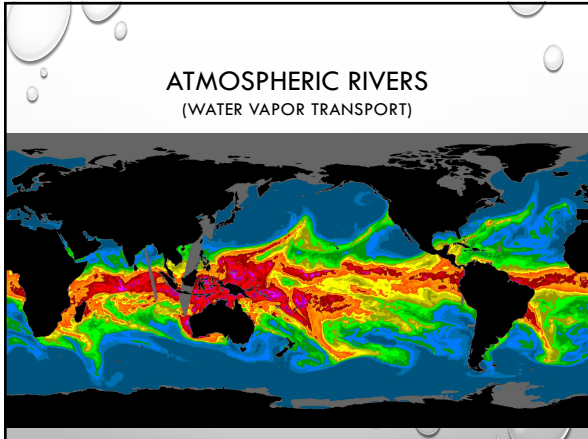
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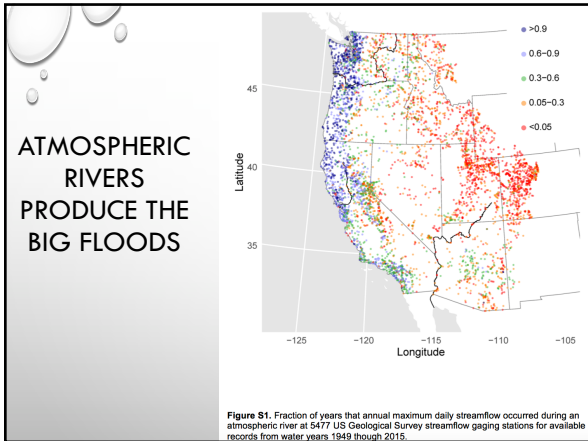
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### NEEDS ASSESSMENT

- IMPROVE RIVER FORECAST
  - PRECIPITATION MONITORING
  - SNOW PACK MONITORING
  - IMPROVE STREAM GAGING
  - RESERVOIR LEVELS & RELEASE PLANS
  - DAM FAILURE WARNING
- IMPROVE COMMUNICATION
  - WEB-BASED DATA AND WARNING



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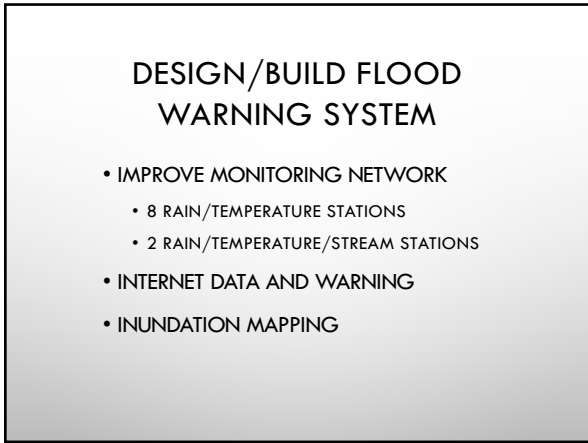
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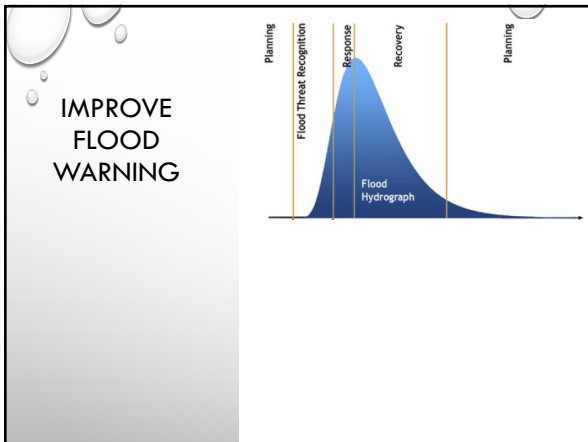
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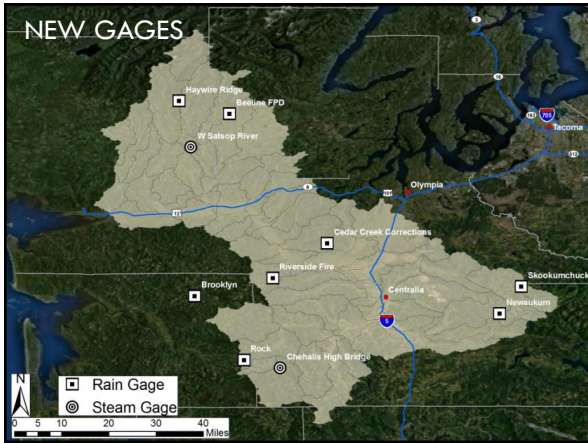
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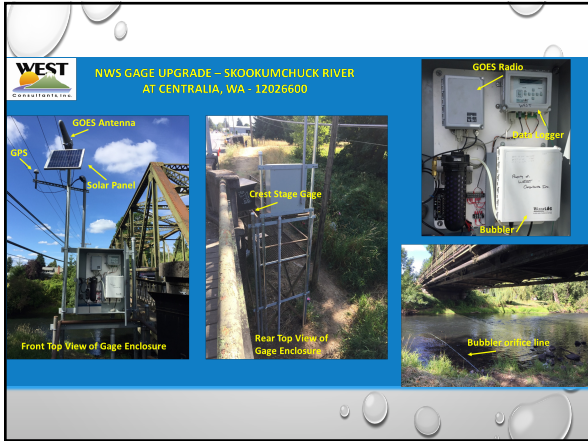
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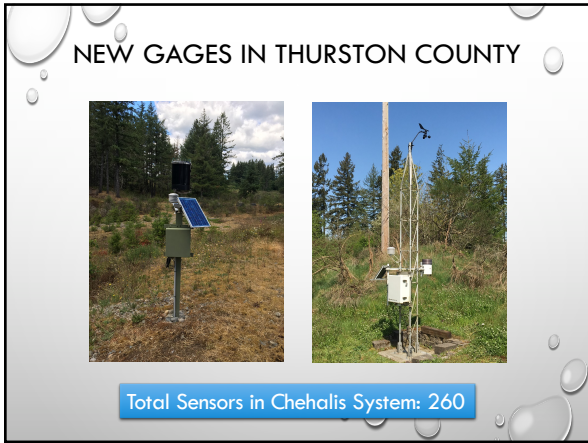
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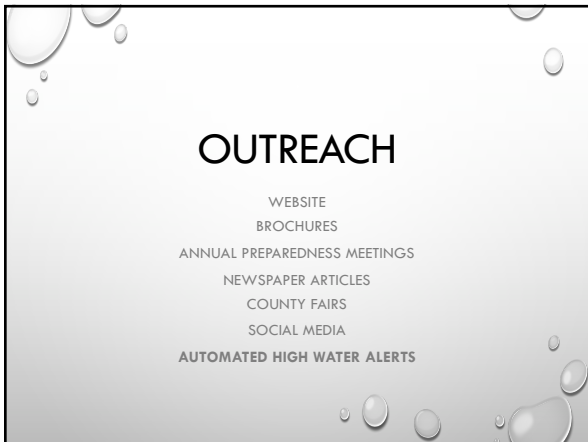
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### Chehalis River Basin Flood Warning System

Access real time Rainfall, River Levels, and other Flood related information below.

Rainfall Summary
River Summary
Additional Resources

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

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### High Water Alerts

Over 300 real-time observations used to support river forecasts are at risk across the country. Refer to the USGS's Nationwide List of Threatened Streamgages for additional information.

Weather Forecast Office Seattle, WA      Northwest River Forecast Center

Flood Warning

View all valid statements/warnings

Hydrograph
River at a Glance
Download
Weekly Chance of Exceeding Levels
Chance of Exceeding Levels During Entire Period

#### CHEHALIS RIVER AT PORTER

##### Universal Time (UTC)

Stage (ft)	62	182	62	182	62	182	62	182	62	182	62	182	62
Time	Nov 21 18:00	Nov 21 18:00	Nov 22 06:00	Nov 22 06:00	Nov 22 18:00	Nov 22 18:00	Nov 23 06:00	Nov 23 06:00	Nov 23 18:00	Nov 23 18:00	Nov 24 06:00	Nov 24 06:00	Nov 24 18:00
Record	26.0												
Hydrograph	23.0												
Forecast	21.7												
Observed	21.14												

Graph Created (10:17PM Nov 23, 2011)      Observed      Forecast (Issued 3:17PM Nov 23)

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### Chehalis River at Centralia, WA

Current NWS Forecast

53.27 ft

3/6/2014 11:30 AM (observed value)

River Stage (ft)

Hover mouse over river stage to show corresponding flood map

61.0
61.6
62.6
63.6
64.6
<b>Minor Flood Stage</b>
65.6
66.6
67.6
<b>Moderate Flood Stage</b>
68.6
<b>Major Flood Stage</b>
69.6
70.6
71.6
72.6
73.6
74.6
76.1

Inundated area at river stage 69.6 ft.

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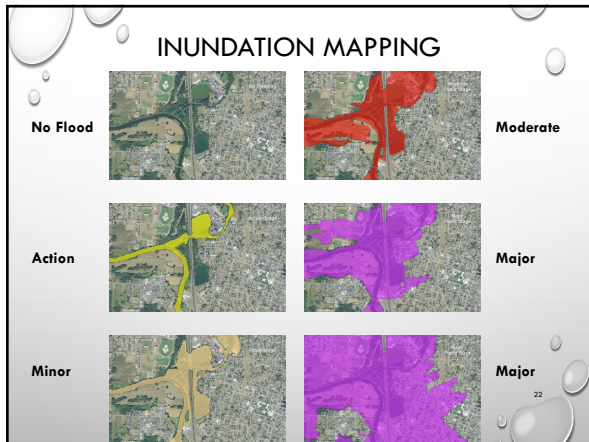
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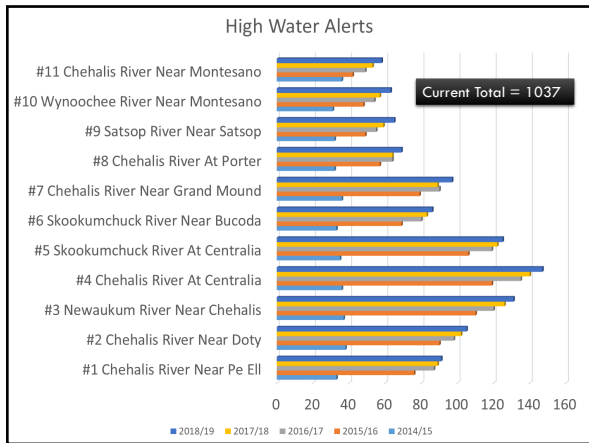
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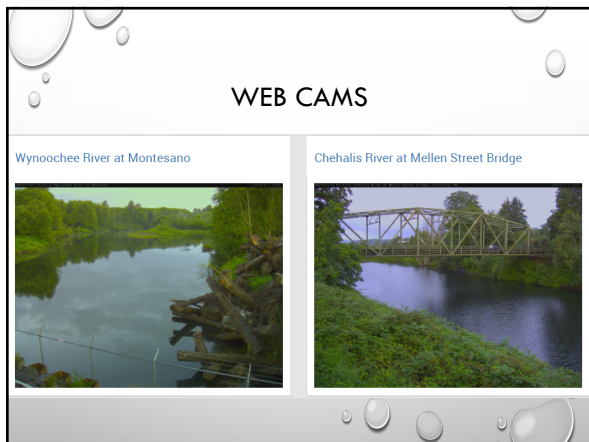
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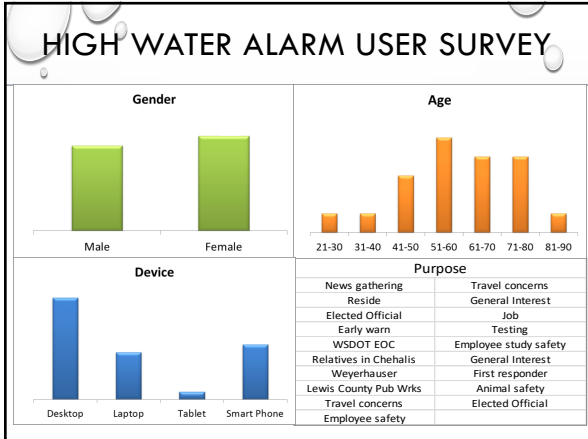
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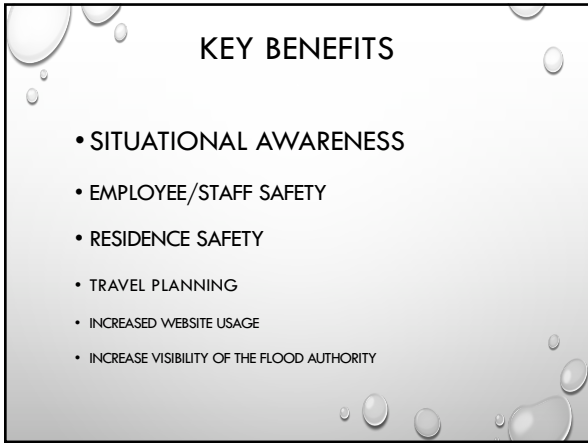
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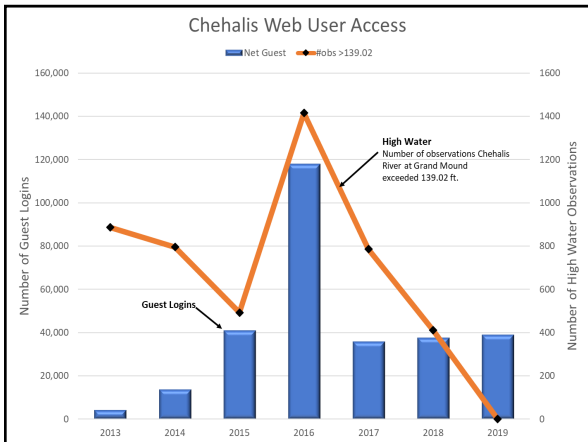
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### SYSTEM REVIEW

- GAGE INVENTORY
- GAGE DATUM UPGRADE
- GOES RADIO UPGRADE
- RIVER GAGE TECHNOLOGY UPGRADE
  - SENSORS
  - COMMUNICATION
  - RATING CURVES

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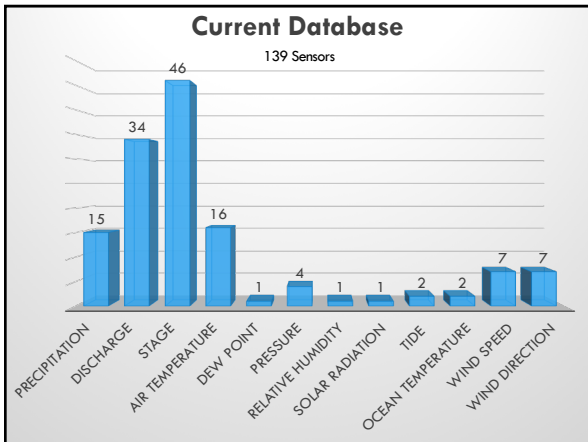
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### POTENTIAL SENSOR DATABASE

Gage Type	Professional Near-Real-Time with Systems Available In Contrail	Professional Not-Real-Time	Citizen Scientist	Total
Precipitation	67	265	541	873
Discharge	40	1	0	41
Stage	52	10	0	62
Air Temperature	97	40	615	752
Dew Point	1	0	0	1
Pressure	26	7	608	641
Relative Humidity	47	1	616	664
Solar Radiation	17	1	33	51
Tide	2	0	0	2
Ocean Temperature	2	0	0	2
Wind Speed	70	4	616	690
Wind Direction	70	4	616	690
Wind Gust	48	1	111	160
Snow Depth	4	17	0	21
Other	63	107	0	170
<b>Total</b>	<b>606</b>	<b>458</b>	<b>3756</b>	<b>4820</b>

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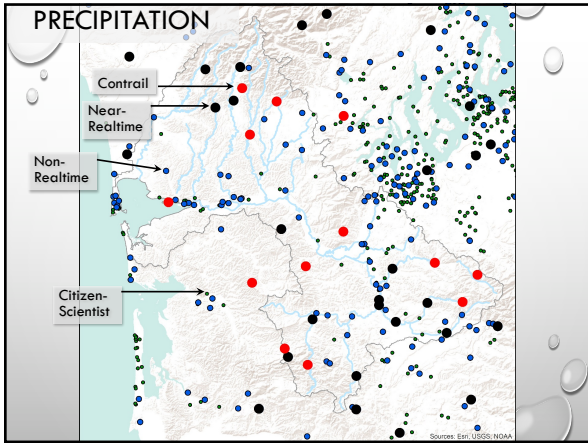
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