

Chehalis River Basin

*Reducing Flood Damage and
Restoring Aquatic Species*

8:30 a.m.

March 11, 2019

Thurston County Commissioner Menser

Today's Presentation . . .

- Provide update, encourage discussion.

- Key messages . . .

1. Broad agreement -- For first time in a century there is progress across the Basin on next steps to reduce flood damage and enhance salmon, aquatic species.

2. Basin-wide strategy -- An action-oriented, multi-phased Basin-wide strategy is needed to protect communities along the river and to enhance aquatic species.

3. Collaboration is key -- WA Legislature, Governor's Office, Governor's Chehalis Basin Work Group, Chehalis River Basin Flood Authority, and WA Agencies all working together = Action!

4. Fundamental principle -- Solving one's problems doesn't increase another's.



Action . . .



Photo Source: THE CHRONICLE →



March 2019

“Chehalis River Basin Flood Authority”

- **Formed in 2008**
- **Formal body focused on:** (1) flood hazard mitigation throughout the Basin; and (2) decision-making that is . . .
 - ❑ informed by science.
 - ❑ protective of Basin residents/communities.
 - ❑ environmentally appropriate.



- **Basin jurisdictions represented**

- | | | |
|-----------------------|---------------------|-------------------|
| ▶ Grays Harbor County | ▶ Lewis County | ▶ Thurston County |
| ○ City of Aberdeen | ○ City of Centralia | ○ Town of Bucoda |
| ○ City of Cosmopolis | ○ City of Chehalis | |
| ○ City of Hoquiam | ○ City of Napavine | |
| ○ City of Montesano | ○ Town of Pe Ell | |
| ○ City of Oakville | | |

March 2019

[illegible]

Background . . .

- 2007 Storm -- \$938M Basin-wide damage, \$300M lost economic activity (WA).



Exit 77 (I-5) in Chehalis
STEVE RINGMAN / SEATTLE TIMES



City of Centralia
STEVE RINGMAN / SEATTLE TIMES



↑
← **Photos Source:** LEWIS COUNTY,
DIVISION OF EMERGENCY
MANAGEMENT

6



**State Route 6,
West of Adna**
MIKE
SALSBURY /
AP



March 2019

Background . . .

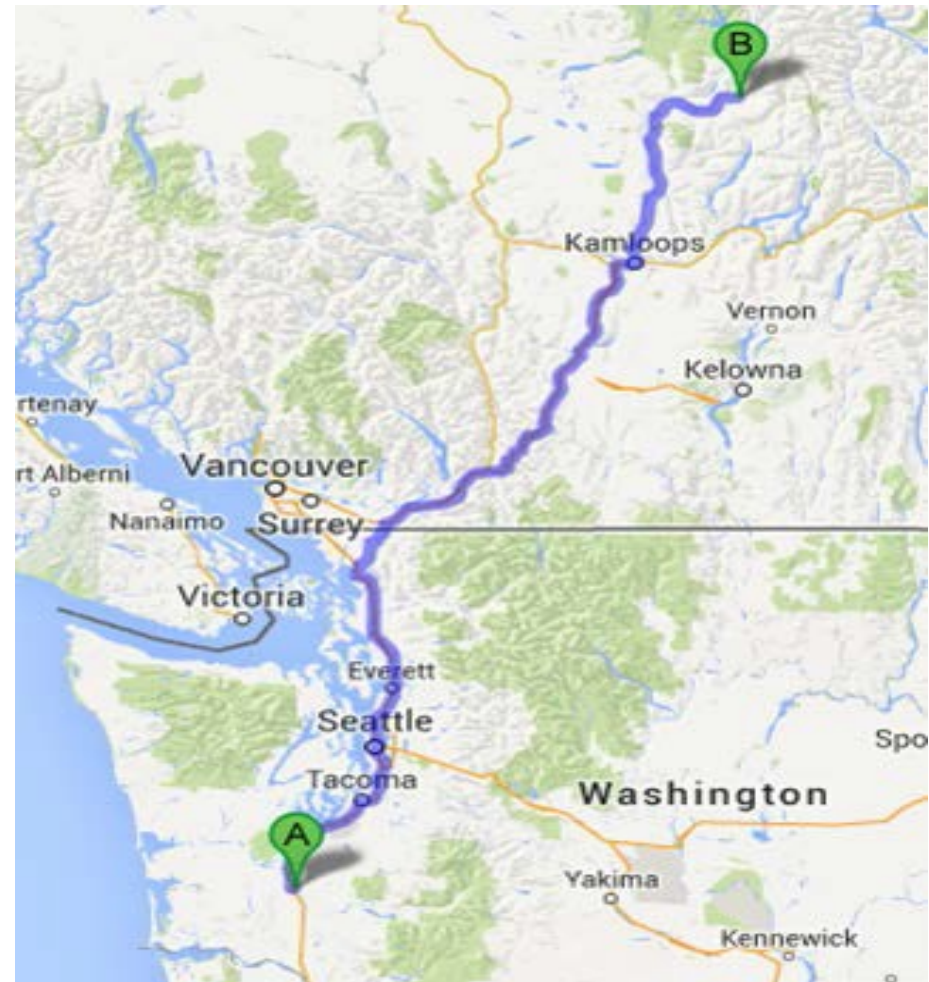
- 2007 Flood -- I-5 and Hwy 507 Interchange looking South.



City of Centralia and I-5
STEVE RINGMAN /
SEATTLE TIMES

Background . . .

- 289,983 acre feet of measured water (12/03-08/2007).
- Equivalent to covering roadway between Chehalis and North of Kamloops with 1 foot of water 1-mile wide or covering . . .
 - 80% of Kitsap County.
 - 69% of Clark County.
 - 59% of Thurston County.

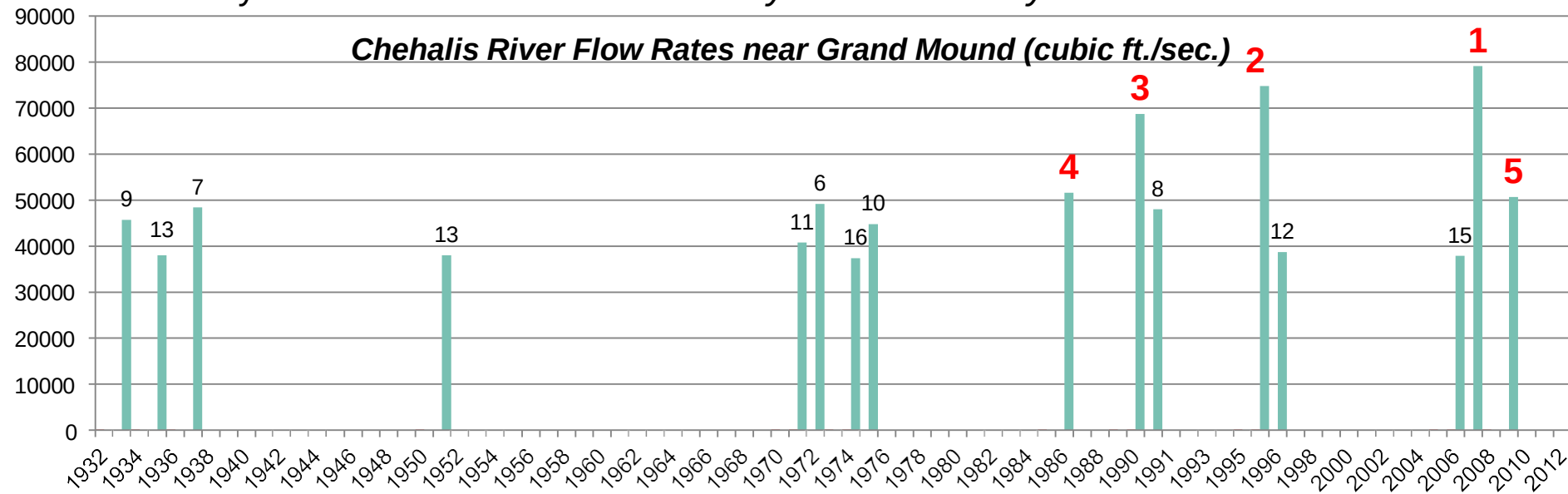


Background . . .

■ Ranked high flow events (1932 - 2012) . . .

- ❑ I-5 closed 1990, 1996, 2007, 2009.
- ❑ Five largest events since 1986 -- *Frequent floods are getting worse and damage is increasing . . .*
- ❑ 100 year flood estimate -- *Increased by 33% in last 30 years.*

Chehalis River Flow Rates near Grand Mound (cubic ft./sec.)



Background . . .

- Chehalis is the second largest river basin in the state, rich in natural resources . . .
- Salmon populations are 15-25% of historic levels.
- TMDL for the basin (<http://www.ecy.wa.gov/programs/wq/tmdl/ChehalisRvrTMDLSummary.html>).



Upper Chehalis (5/31/2010)
JAMES E. WILCOX / WILD GAME FISH
CONSERVATION INTERNATIONAL



Background . . .

Salmon-habitat potential

Species	Current Spawner	Habitat Degradation
Spring Chinook Salmon	2,300	78%
Fall Chinook Salmon	24,317	45%
Coho Salmon	42,000	69%
Winter-run Steelhead	8,700	44%

Source: Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species; Pe Ell Public Meeting; 10/14/2014; Page 13.

Solution = Basin-wide Approach

Action-oriented, Multi-phased Approach

1. Basin-Wide Relationships
2. Hydraulic Understanding
3. Master Strategy (Game Plan)
4. Large Capitol Projects
5. Small-Scale Local Projects
6. Local Floodplain Management
7. Restore Salmon and Aquatic Species
8. Early Flood Warning
9. Outreach, Education and Communication

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species

For the first time—after over a century of catastrophic floods and hundreds of studies—broad agreement is building on a comprehensive strategy to reduce flood damage, restore salmon populations, and support the prosperity of communities in the Chehalis Basin.



The problems in the Chehalis Basin are real and action is being taken now to protect communities and restore aquatic species.

Frequent floods are getting worse and damage is increasing. The five largest floods in the Chehalis Basin's history have occurred during the past 10 years, causing over \$2 billion in damage to homes, property, businesses, roads, and bridges. Each of the seven floods caused in the days following a change made from the historical 100-year flood magnitude to a more frequent 50-year flood magnitude, and another small event was a major contributor to the cost of damage. Floods will cause \$1.5 billion in the next 100 years if the action is taken.



Salmon populations are seriously degraded and continue to decline. The natural resources of the Chehalis Basin have experienced historic and rapid declines and continue to decline. The Chehalis Basin supports the world's largest and most diverse wild salmon population, including the most diverse collection of spring-run chinook salmon. At least 100 years ago, spring-run chinook were abundant in the Chehalis Basin. Today, they are nearly extinct. The very variable and unpredictable nature of the natural resource of chinook salmon, which is the only species of salmon that is native to the Chehalis Basin, is a major concern for the Basin.

Changing the history of flooding. For most citizens, there has been a failure to adequately address the natural resources of the Chehalis Basin. The Chehalis Basin has experienced significant damage to its natural resources. The Chehalis Basin has experienced significant damage to its natural resources. The Chehalis Basin has experienced significant damage to its natural resources.

7/24/2015

Implementing a Comprehensive, Integrated Approach for Fish and Floods. An "interactive evaluation of the potential need to, technical feasibility, and costs of various flood damage reduction ideas." In November 2010 the Governor's Chehalis Basin Work Group issued the report "Chehalis Basin Flood Damage Reduction: A Comprehensive, Integrated Approach for Fish and Floods." The report is a key document in the development of the Chehalis Basin Flood Damage Reduction Strategy.

- A concrete flood reduction plan on the upper Chehalis River, paired with investments in the Chehalis Central Mainstem Dam.
- Restoration of over 200 miles of spring chinook spawning and rearing habitat, removal of priority fish passage barriers, restoration of chinook habitat, and a comprehensive strategy to address the restoration of chinook habitat.
- Investment in high-priority, smaller-scale flood damage reduction projects, with a focus on projects that are cost-effective.
- Local government land use management actions to protect remaining floodplains, including early warning, flood proofing of businesses and public structures to provide additional protection for residents and structures that are already located in floodways.

Over the next two years, the Washington State Department of Ecology will coordinate with the Work Group, Governor's office, and other agencies and stakeholders to set the vision and set the terms and cost of the recommended actions of flood damage reduction and aquatic resource restoration actions through preparation of a Comprehensive Chehalis Basin Flood Damage Reduction Strategy. The Comprehensive Chehalis Basin Flood Damage Reduction Strategy will be a key document in the development of the Chehalis Basin Flood Damage Reduction Strategy.

There will be several opportunities for public input on this programmatic plan.

- October 2015 public meeting and formal public comment period on the draft document.
- August 2016 public meeting and formal public comment period on the draft document.
- November 2016 public meeting and formal public comment period on the draft document.

The development of a programmatic plan will provide for public input, and other interested parties will be invited to participate in the development of the programmatic plan. The programmatic plan will be a key document in the development of the Chehalis Basin Flood Damage Reduction Strategy.

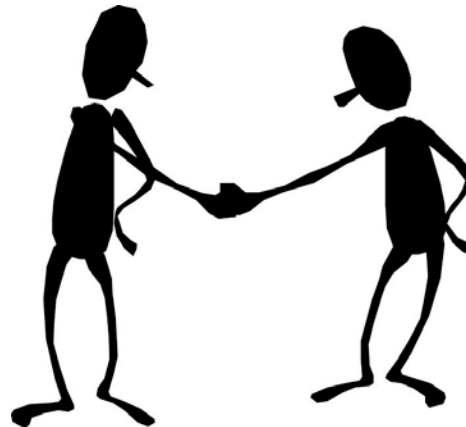


7/24/2015

1. Basin-Wide Relationships



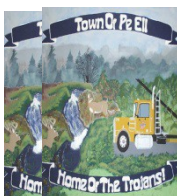
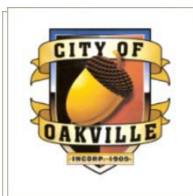
TOWN of BUCODA



WASHINGTON STATE
CONSERVATION
COMMISSION



WASHINGTON STATE DEPARTMENT OF
Natural Resources



Office of Financial Management

Better information. Better decisions. Better government.

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2. Hydraulic Understanding

- **Science-based model** -- To inform decision-makers on hydraulic effects of potential flood relief options (at basin-wide and localized scales).
- **108 miles** -- Mouth of Chehalis River upstream to Pe Ell (108 miles).

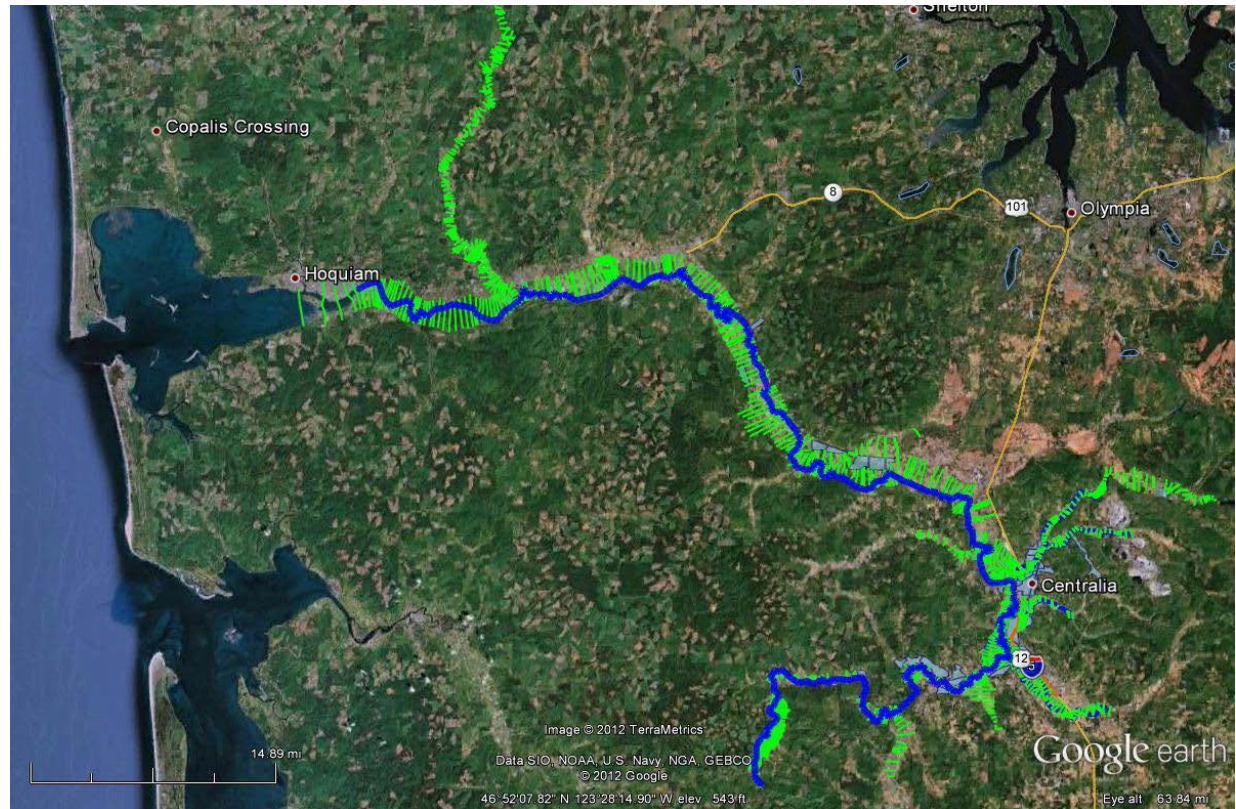
Draft Report - Chehalis River
Hydraulic Model Development Project



Prepared by:
WATERSHED Science & Engineering
and
WEST Consultants

Prepared for:
Chehalis River Basin Flood Authority

July 23, 2012



2. Hydraulic Understanding

- **Example: Basin-wide effects analysis**
(Governor's Chehalis Basin Workgroup, 2014 Recommendations Report, 11/25/2014)

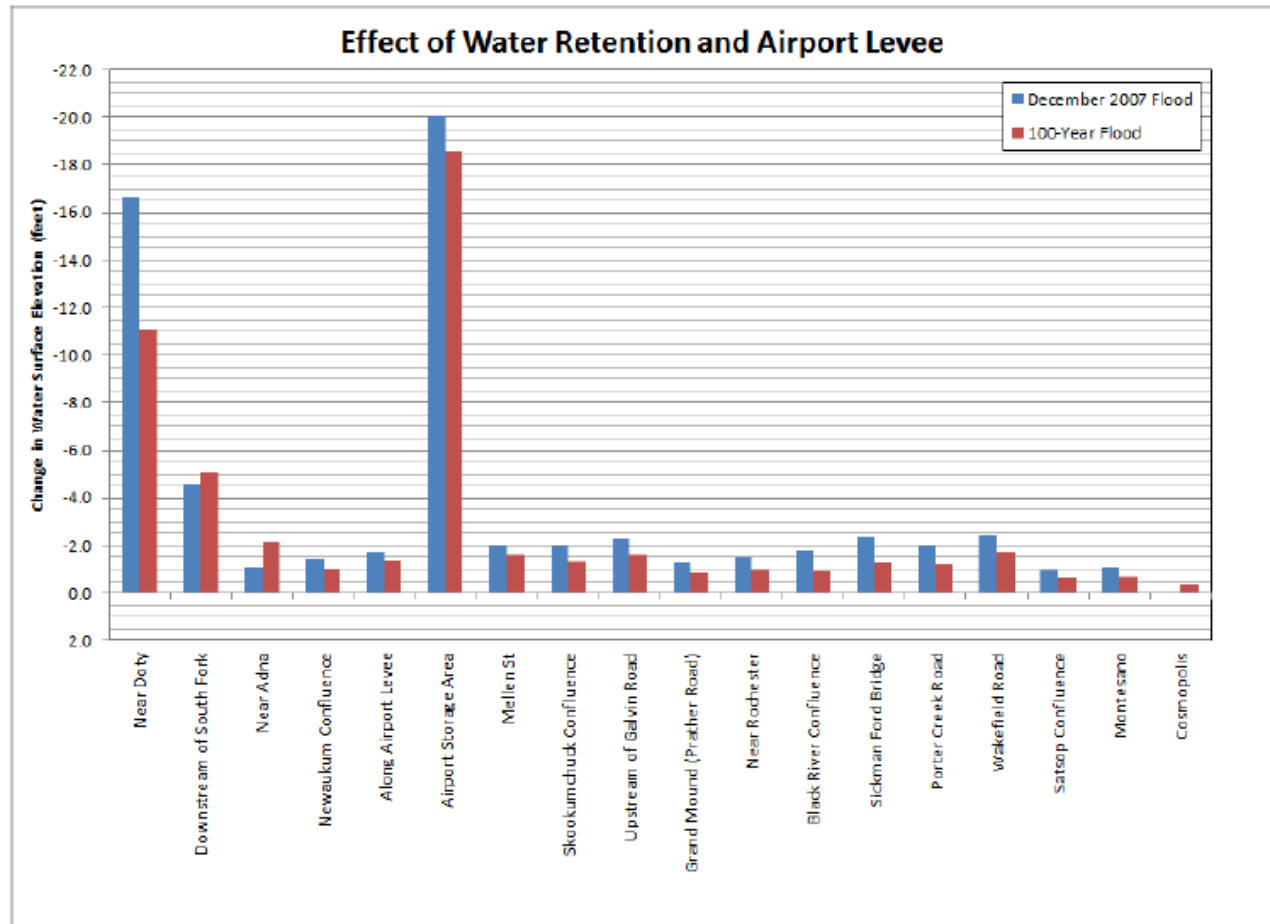


Figure 2: Predicted Changes in Water Surface Elevations from Water Retention and Airport Levee

3. Master Strategy (Game Plan)

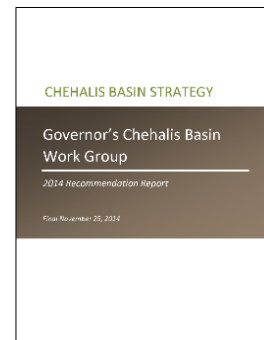


❑ Evolution (2008 to present):

Flood Authority → Governor's Workgroup → Office of Chehalis Basin.

❑ Key Elements:

1. Evaluation, implementation of Large Capital Projects:
 - o Flood Retention Dam on upper Chehalis River.
 - o Airport Levee Improvements.
 - o North Shore Levee in Aberdeen, Hoquiam.
2. Basin-wide Aquatic Species Restoration (100+ miles spawning/rearing habitat).
3. Local Flood-Damage Reduction Projects.
4. Local Flood-Proofing, including raising homes, CRS actions, local ordinance improvements, etc.
5. Cost = \$500-600M; Benefit = \$720M (100 yrs.); No Action = \$3.5B (100 yrs.).



4. Large Capitol Projects



■ 2013-15:

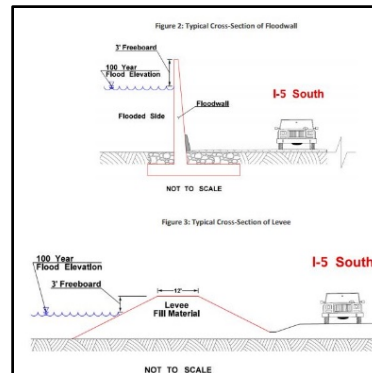
- ❑ Technical team developed baseline knowledge on safety, feasibility of Flood Retention Dam alternatives -- field visits, site and design considerations, world-wide research, etc.
 - Permanent reservoir (w/ fish passage) or Run-of-the-river (no permanent reservoir).
 - Roller compact concrete or Earthen fill.
 - Flood-control only or Multi-purpose.
- ❑ WSDOT evaluated I-5 Protection alternatives -- levees, walls, raise road, etc.

■ 2015-17:

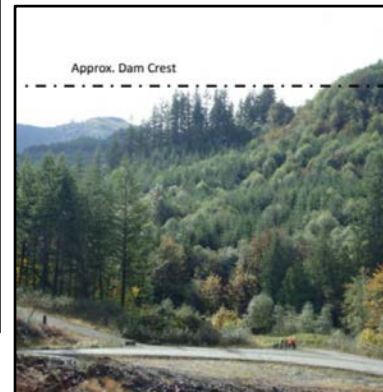
- ❑ Formal environmental review (Programmatic EIS) was conducted to evaluate alternatives.

■ 2017-19:

- ❑ Project-level EIS starts.



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← Photo source:
ANCHOR QEA



Aberdeen Proposed Northside Dike/Levee



5. Local Projects (Basin-wide)

2012 Supplemental Capital Budget:

- \$5.0M

2013-15 Capital Budget:

- \$10.74M

2015-17 Capital Budget:

- \$15.7M

2017-19 Capital Budget:

- \$9.6M

- 24 complete
- 15 underway
- \$40.4M State (2012-19)
- \$9.3M Local (2012-19)



1. ~2-3 years to design, permit, construct.
2. Protect people, property, infrastructure.
3. Improve readiness, response, resiliency.
4. Examples:
 - ✓ Drinking Water (Boistfort, Bucoda).
 - ✓ Wastewater (Montesano, Pe Ell).
 - ✓ Emergency Response (Grays Harbor County, Chehalis-Centralia Airport).
 - ✓ Regional Economic Infrastructure (Montesano).
 - ✓ Community Protection (Adna, Bucoda, Centralia, Chehalis, Chehalis Tribe, Oakville).
 - ✓ Flood Warning Infrastructure (Basin-wide).
5. Typical cost = \$250K to \$2-3M.

- Construction, Complete
- Construction, Incomplete
- Plan/Study/Tool, Complete
- Plan/Study/Tool, Incomplete

www.ezview.wa.gov/chehalisbasinlocalfloodreliefprojects

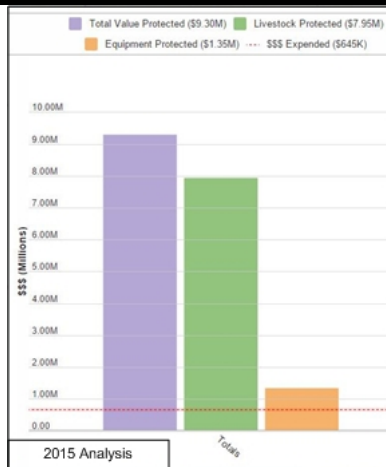
Local Projects (2012-19)

www.ezview.wa.gov/chehalisfloodauthority



10/05/2018

5. Local Projects (Farm Pads)



1. Save lives, livelihoods.
2. Protects people, animals, equipment.
3. 26 locations throughout Basin.
4. <2 years to design, permit, construct.
5. 14:1 return-on-investment.
6. Benefit whole basin.
7. Reusable.
8. Testimonials → <http://arcg.is/2b632Ai>.

- ★ → Complete
- ☆ → Underway

Farm Pads, Evacuation Routes (2012-19)



www.ezview.wa.gov/chehalisfloodauthority

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10/05/2018

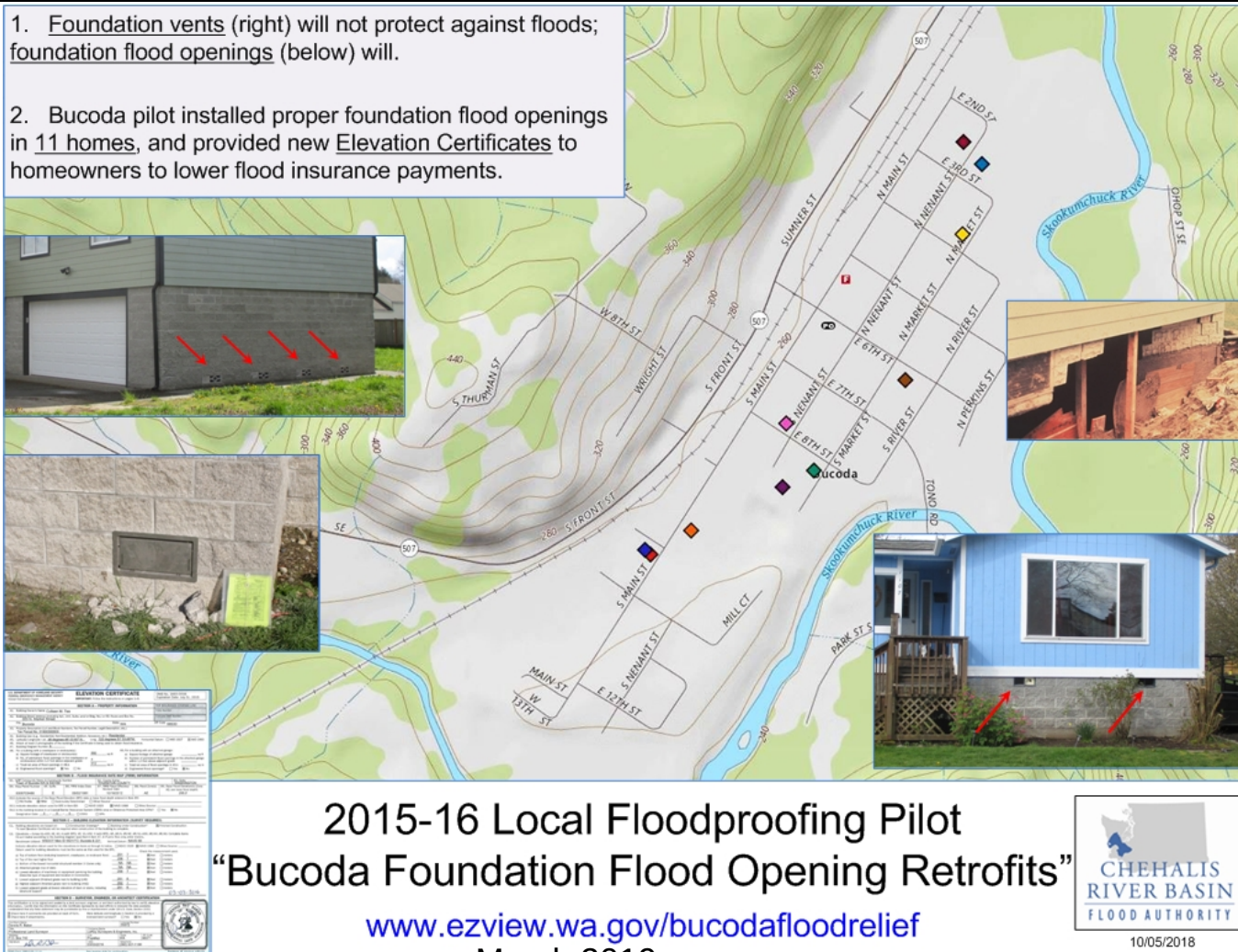
19



6. Land Use, Floodplain Management (Floodproofing Pilot)

1. Foundation vents (right) will not protect against floods; foundation flood openings (below) will.

2. Bucoda pilot installed proper foundation flood openings in 11 homes, and provided new Elevation Certificates to homeowners to lower flood insurance payments.



2015-16 Local Floodproofing Pilot
"Bucoda Foundation Flood Opening Retrofits"

www.ezview.wa.gov/bucodafloodrelief

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7. Restore Salmon and Aquatic Species

Correcting Fish Barriers



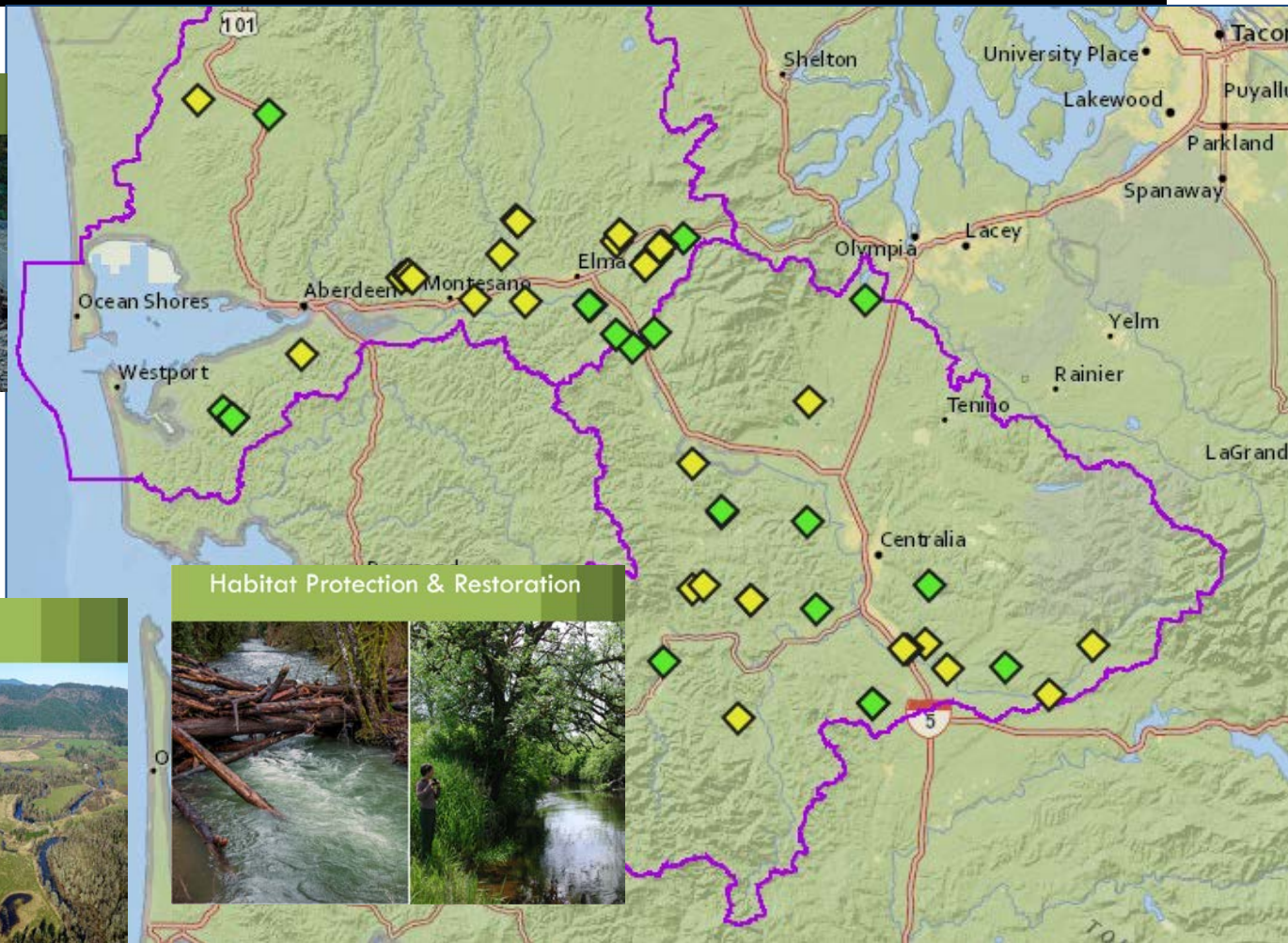
Results so far . . .

- 23 Complete (\$3.8M)
- 31 Underway (\$7.9)

Uplands & Floodplains



Habitat Protection & Restoration



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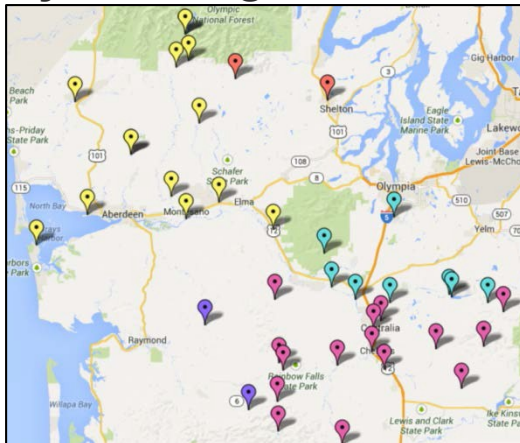
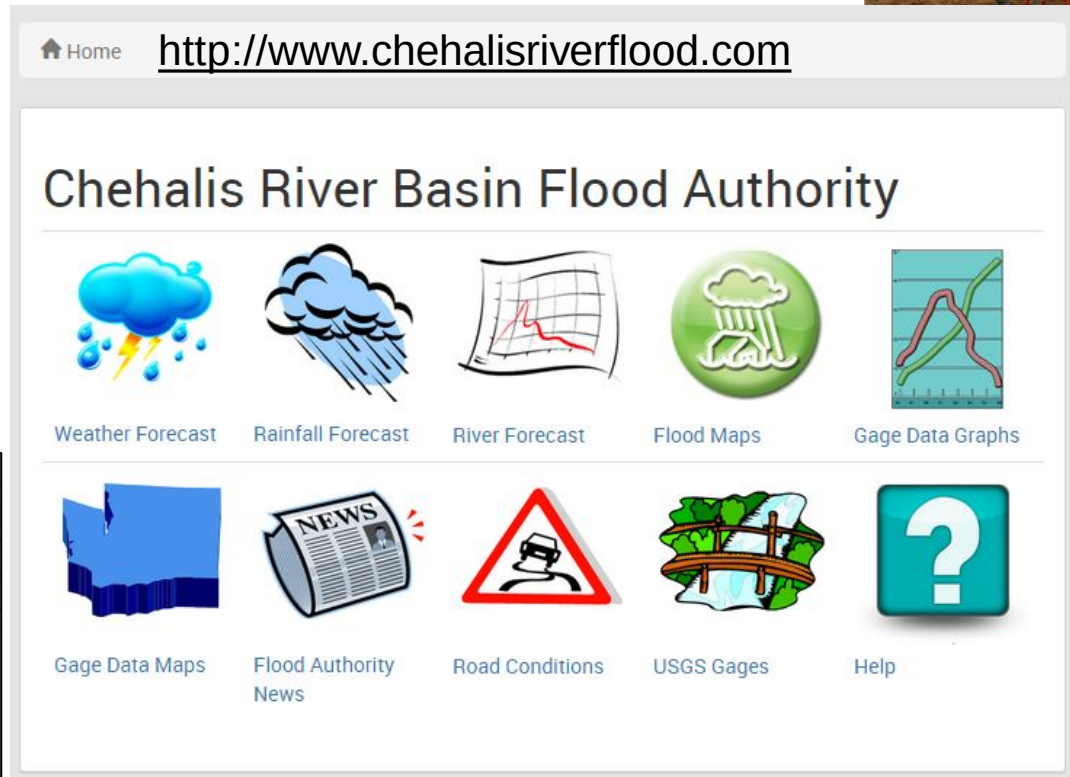
7. Restore Salmon and Aquatic Species

Other Fish and Aquatic Species



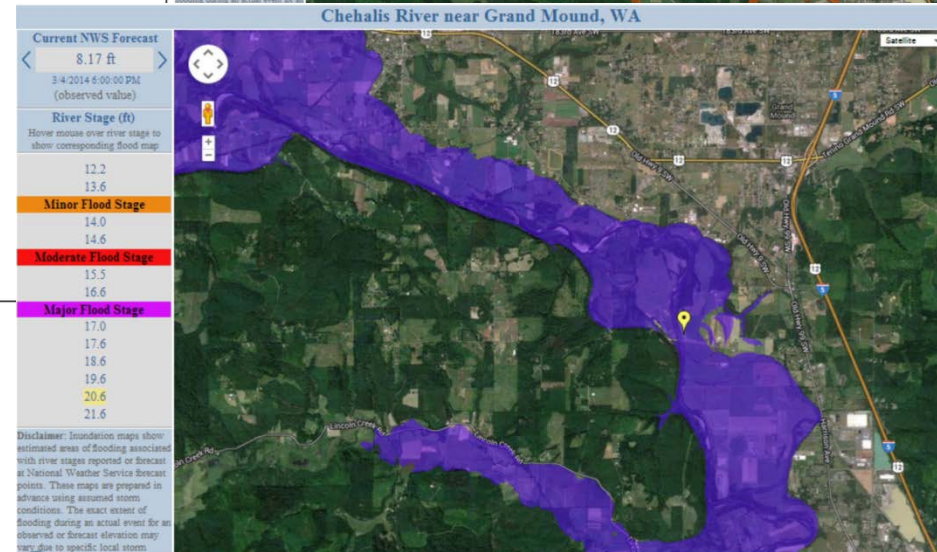
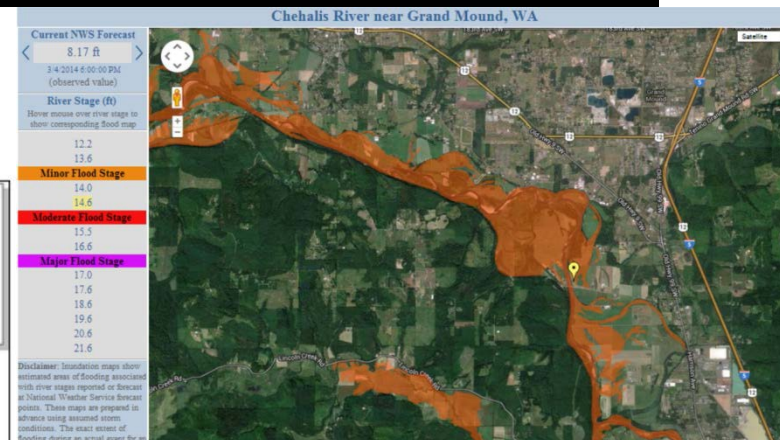
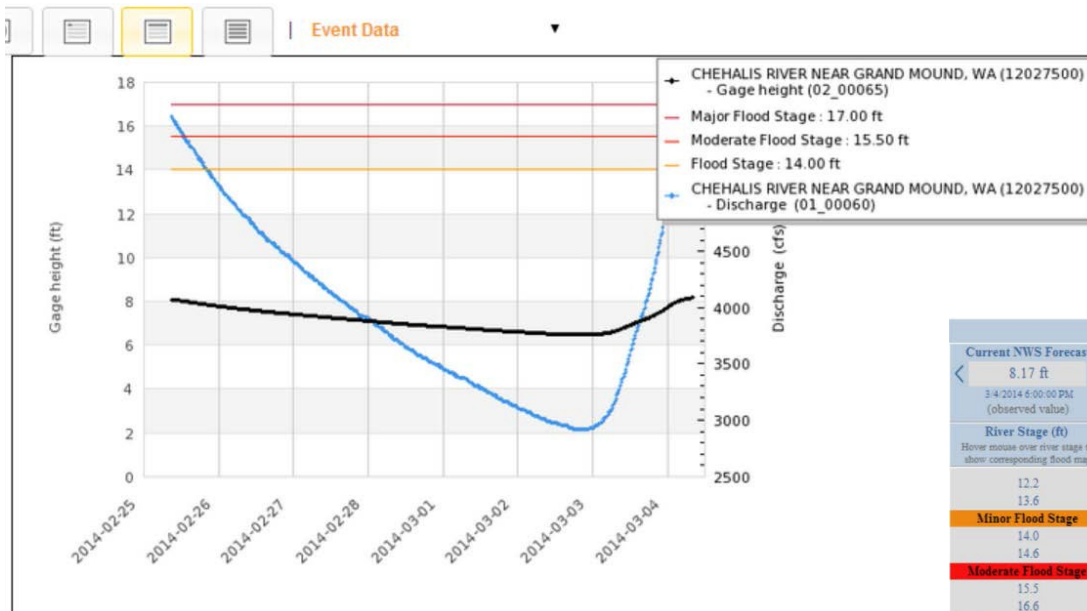
8. Early Flood Warning

- www.chehalisriverflood.com
- Front-facing website.
- Data collection, data synchronization.
- Improved forecasting, early-warning.



8. Early Flood Warning

Localized tracking, forecasting . . .

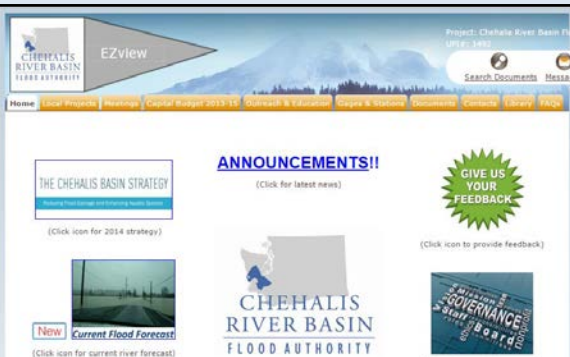


Daily discharge, cubic feet per second -- statistics for Mar 4 based on 84 years of record [more](#)

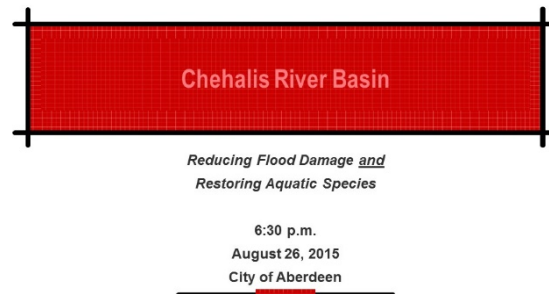
Min (2005)	25th percentile	Median	Mean	Most Recent Instantaneous Value Mar 4	75th percentile	Max (1987)
903	2340	3260	4670	5830	6340	22700

9. Outreach, Education and Communication

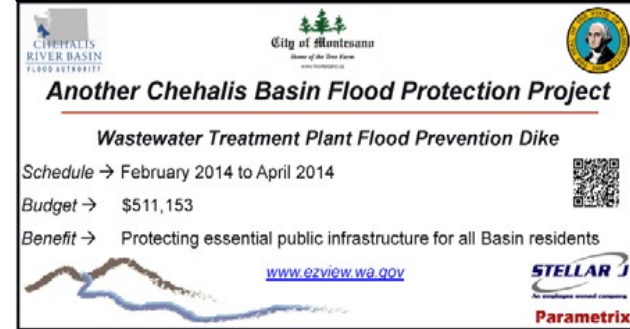
Website



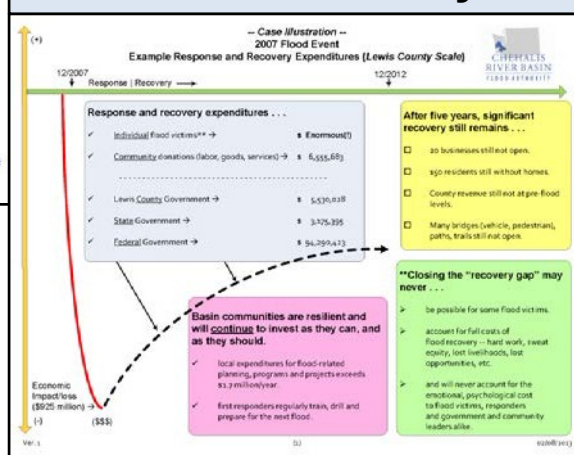
Outreach Visits



Project Signs



Informational Analyses



Chehalis Basin Flood Stories

Chehalis Basin Flood Stories

- [Farm Pads & Evacuation Routes](#)
- [Flood Warning System](#)
- [Local Capital Construction Projects](#)



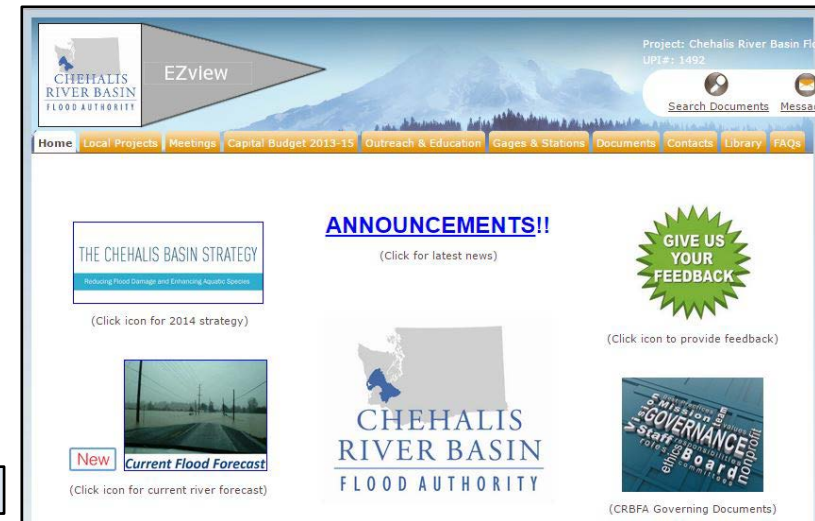
9. Outreach, Education and Communication



www.chehalisbasinstrategy.com



www.ezview.wa.gov/chehalisfloodauthority



www.chehalisriverflood.com



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Closing – 2007 Flood Damage . . .

Chehalis
River near
Doty
USGS



Closing – 2007 Flood Damage . . .

**Clearing Mud in
Curtis, WA**
STEVE RINGMAN /
SEATTLE TIMES



March 2019

Closing – 2007 Flood Damage . . .



**Curtis, WA, Aftermath
of 7 Feet of Water**
STEVE RINGMAN /
SEATTLE TIMES

Closing – 2007 Flood Damage . . .



**Chandler Road Bridge
near Doty, WA**
STEVE RINGMAN /
SEATTLE TIMES

Closing – 2007 Flood Damage . . .



March 2019

Closing – 2007 Flood Damage . . .



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Closing – 2007 Flood Damage . . .



I-5 Under Water
BRUCE ELY /
OREGONIAN

Closing – 2007 Flood Damage . . .



Chehalis, WA
STEVE RINGMAN /
SEATTLE TIMES

Closing – 2007 Flood Damage . . .



March 2019

Closing – 2007 Flood Damage . . .



**Jackson Street,
Centralia, WA**
STEVE RINGMAN /
SEATTLE TIMES

Closing – 2007 Flood Damage . . .

I-5 Under Water
BRUCE ELY / OREGONIAN



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Closing – 2007 Flood Damage . . .



Photos Source:
WSDOT

March 2019

Closing – 2007 Flood Damage . . .



March 2019

Closing – 2007 Flood Damage . . .



March 2019

Closing – 2007 Flood Damage . . .



**Wakefield Road,
Elma, WA**
GREG GILBERT /
SEATTLE TIMES

What's Next – 2019-21 Budget Development

Chehalis River Basin Flood Authority

Chehalis Basin Board Discussion Document
2019-21 Local Flood Hazard Reduction Project Proposals (ordered, prioritized)

9-27-2018

RECOMMEND MOVING FORWARD Tier I -- Continues/Completes Existing Project		FUNDING APPROACH:	
	Project Cost	State Capital Budget Request	To Be Addressed Locally
1. Aberdeen -- Fry Creek Flood Restoration & Flood Reduction (Phase IIb, New Pump Station)	\$ 3,000,000	\$ 2,499,011	\$ 500,989
2. Centralia -- China Creek Flood and Habitat Mitigation (Phase 2)	\$ 2,500,000	\$ 2,500,000	Notes 1
3. Hoquiam -- Northshore Levee (West Segment)	\$ 800,000	\$ 666,403	\$ 133,597
4. Chehalis -- Flood Storage and Habitat Enhancement Master Plan (Phase II)	\$ 487,991	\$ 406,498	\$ 81,493
5. Grays Harbor County -- Keys Road Flood Protection	\$ 375,000	\$ 200,000	\$ 175,000
6. Port of Chehalis -- Berwick Creek Flood Reduction, Restoration	\$ 500,000	\$ 416,502	\$ 83,498
7. CRBFCZD -- Chehalis River Basin Comprehensive Flood Hazard Management Plan	\$ 275,000	\$ 229,076	\$ 45,924
8. Thurston -- Weather and Stream Flood Hazard Monitoring Telemetry	\$ 49,835	Consider for future funding.	
9. WCSSF -- Chehalis Basin Habitat Work Schedule Documentation and Implementation	\$ 85,464	Consider for future funding.	
	\$ 8,073,290	\$ 6,917,491	\$ 1,020,501

HOLD FOR LATER FUNDING Tier II -- Starts New Project		Project Cost
1. Lewis -- Multi-Jurisdictional Flood Warning and Response Plans	\$	130,000
2. Boistfort Valley Water -- Water System Plan Update	\$	150,000
3. Thurston CD -- Allen Creek Hydrologic Assessment	\$	62,500
4. Lewis -- Unnamed Tributary to Stearns Creek (Pleasant Valley Road MP 4.25) Stream Realignment	\$	846,000
5. Montesano -- South 9th Street Culvert Replacement	\$	140,000
	\$	1,328,500

CONSIDER UNDER CFAR ("Community Flood Assistance and Resilience Program") Tier III -- Home Elevations, Buy-outs, Relocations		Project Cost
1. Thurston -- Elevates or Buy Outs	\$	500,000
2. GH CD -- Wynoochee Home Relocation	\$	104,033
	\$	604,033

Notes:

1 -- Project is looking to reduce overall costs for (1) dirt hauling, and (2) vegetation plantings.

Map --> <https://arcg.is/PofTv>

Legend --> Construction Planning

What's Next – EIS Starts

OB Fri 9/28/2018 9:00 AM
On behalf of Washington Department of Ecology and U.S. Army Corps of Engineers <diane.butorac@ECY.WA.GOV>
Environmental Review Starts for Proposed Chehalis River Basin Flood Damage Reduction Project
To CHEHALISSEPAEIS@LISTSERV.ECOLOGY.WA.GOV

Environmental review starts for Chehalis River project

Public comments sought in first step of environmental assessment process

CHEHALIS – To reduce flood risks in the state's second-largest river system, the Chehalis River Basin Flood Control Zone District is proposing to construct a new **floodwater retention structure** on the Chehalis River near the town of Pe Ell in Lewis County.

The district also is seeking to raise the current levee at the **Chehalis-Centralia Airport**, including elevating part of Airport Road and making other improvements.

Since the proposal is likely to adversely affect the environment, the Washington Department of Ecology and U.S. Army Corps of Engineers (USACE) are seeking public comment to help the agencies define what should be studied in the environmental review for the proposed flood-damage reduction project.

Under the proposal, the Chehalis River would flow normally through the structure except during major floods, when the facility could be operated to hold up to 65,000 acre feet of floodwaters in a temporary reservoir. The water would be released back to the river system as soon as it was safe to do so.

The two agencies are leading separate environmental reviews of the district's proposal but are holding a joint scoping period to make it easier for the public to submit comments. The agencies have established a project website (<http://chehalisbasinstrategy.com/eis/>) with information about the scoping process, public meetings, how to submit comments, and other information about the environmental review process.

Ecology is using the State Environmental Policy Act (<https://ecology.wa.gov/regulations-permits/SEPA-environmental-review>) to evaluate the proposal while the USACE is conducting its environmental review under the National Environmental Policy Act (<https://openet.org/wiki/RAPID/Roadmap/9-FD-k>). Each agency will develop a separate environmental impact statement (EIS) to assess the project.

The first step in the environmental review process is obtaining public input about the scope of the EIS to help identify project alternatives, probable significant adverse impacts, potential mitigation measures, and licenses or other approvals that may be required.

In mid-October, USACE and Ecology will conduct two open house-style public meetings to gather comments:

- **Montesano: Oct. 16, from 5 to 8 p.m. at Montesano City Hall, 112 N. Main St.**
- **Centralia: Oct. 17, from 5 to 8 p.m. at Centralia College, Bowman Rotary Banquet Rooms, 600 Centralia College Boulevard.**

Both agencies will accept public comments through Oct. 29. Comments can be submitted electronically through the project website (<http://chehalisbasinstrategy.com/eis/>) or mailed to:

Chehalis Flood Damage Reduction Project EIS Anchor QEA
720 Olive Way, Suite 1900
Seattle, WA 98101

Each agency will summarize the comments received during scoping into a summary document, and make the summaries available on the project website.

Contacts:
Curt Hart, Ecology communications, 360-407-6944, @ecologyWA Patricia Graesser, USACE communications, 206-764-3750

For Further Information . . .

Vickie Raines, Grays Harbor County Representative

Chair, Chehalis River Basin Flood Authority

Chair, Chehalis Basin Board

360/249-3731

vraines@co.grays-harbor.wa.us

Edna Fund, Lewis County Representative

Vice-Chair, Chehalis River Basin Flood Authority

Member, Chehalis Basin Board

360/740-1283

Edna.Fund@lewiscountywa.gov

Scott Boettcher

Staff, Chehalis River Basin Flood Authority

360/480-6600

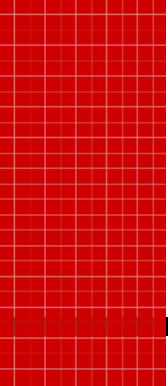
scottb@sbgh-partners.com

Cindy Wilson (Alternate for Thurston County) and **Alan Vanell**

Members, Chehalis River Basin Flood Authority

wilsonc@co.thurston.wa.us

counvanell@scattercreek.com



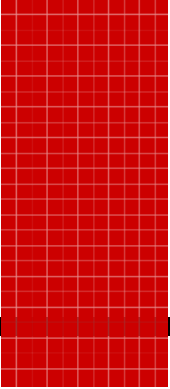
Key Links . . .

1. Chehalis River Basin Flood Authority -- www.ezview.wa.gov/chehalisfloodauthority

- Flood Warning System -- www.chehalisriverflood.com
- Sign-Up for Email Gage Alerts -- <https://www.ezview.wa.gov/DesktopModules/Documents2/View.aspx?tabID=28124&alias=1492&mid=69571&ItemID=6465>
- See Gage Alerts Tally Over Time -- <https://data.wa.gov/dataset/Gage-Alert-Sign-Ups-2014-18/f4wb-hxqz>
- Interactive Map (Local Projects, Farm Pads, Flood Warning System Gages, Bucoda Pilot, Habitat Projects) -- <http://arcg.is/19GXma>

2. Chehalis Basin Strategy -- www.chehalisbasinstrategy.com

3. Office of Chehalis Basin – <https://ecology.wa.gov/About-us/Get-to-know-us/Our-Programs/Office-of-Chehalis-Basin>



Thank You . . .

Thank You!

Note:

**This Presentation is Available at
“Chehalis River Basin Flood Authority” Website
at www.ezview.wa.gov/chehalisfloodauthority.**

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