

Chehalis River Basin Flood Authority

*Reducing Flood Damage and
Restoring Aquatic Species*

Duane Crouse
City of Napavine
January 14, 2022

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 aquatic species.

2. **Basin-wide strategy** -- An action-oriented, multi-phased Basin-wide strategy is key to protecting communities along the river and to enhancing aquatic species.

3. **Collaboration is key** -- WA Legislature, Governor's Office, Chehalis Basin Tribes, Office of Chehalis Basin, Chehalis Basin Board, Chehalis River Basin Flood Authority, and many Federal, State and Local Agencies all working together = Action!

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



Action . . .



↑
Photo Source: THE CHRONICLE →

January 2022

“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**

- | | | |
|---|--|---|
| <ul style="list-style-type: none">▶ Grays Harbor County<ul style="list-style-type: none">○ City of Aberdeen○ City of Cosmopolis○ City of Hoquiam○ City of Montesano○ City of Oakville | <ul style="list-style-type: none">▶ Lewis County<ul style="list-style-type: none">○ City of Centralia○ City of Chehalis○ City of Napavine○ Town of Pe Ell | <ul style="list-style-type: none">▶ Thurston County<ul style="list-style-type: none">○ Town of Bucoda |
|---|--|---|

“Office of Chehalis Basin”

Office of Chehalis Basin - Washin x +

ecology.wa.gov/About-us/Get-to-know-us/Our-Programs/Office-of-Chehalis-Basin

DEPARTMENT OF ECOLOGY
State of Washington

Regulations & Permits Research & Data Blog Contact Us

Home Air & Climate Water & Shorelines Waste & Toxics Spills & Cleanup

Office of Chehalis Basin

Our programs

- Air Quality
- Environmental Assessment
- Hazardous Waste & Toxics Reduction
- Nuclear Waste Program
- Office of Columbia River
- Office of Chehalis Basin**
- Strategy
- EIS
- Shorelands & Environmental Assistance

Building on the success of the earlier Chehalis Basin Work Group, the 2016 Washington Legislature created the Office of Chehalis Basin within Ecology to administer legislative funding to implement the [Chehalis Basin Strategy](#). In April 2018, [Andrea McNamara Doyle](#) was chosen to lead the office.

Besides forming the Office of Chehalis Basin, the Legislature also established the Chehalis Basin Board to provide long-term oversight of the strategy. The board is responsible for developing budget recommendations to the Governor's office to implement the strategy. Our Office of Chehalis Basin provides support to the board.



Photo courtesy of Washington Department of Fish and Wildlife.

The seven-member board typically meets monthly. Members represent the [Chehalis River Basin Flood Authority](#), [Confederated Tribes of the Chehalis Reservation](#), and [Quinalt Indian Nation](#), as well as agricultural, environmental, and economic interests in the basin. There are also five non-voting board members representing various state agencies. Find out more about [board meetings and members](#).

Department of Ecology - Commi x +

ezview.wa.gov/site/alias__1962/37068/chehalis_basin_board.aspx

Chehalis Basin Board

Chehalis Basin Board meetings

The Chehalis Basin Board usually meets the first Thursday of every month.

The Chehalis Basin Board's next scheduled meeting is on February 6, 2020 at the Chehalis Tribal Gathering Center ([map to location](#)). All meeting materials are posted below. Meeting summaries will be posted once they have been approved by the Board, typically after the following meeting.

Board Member Contact Information				
Voting Members				
Name	Term Date	Appointing Authority	Phone	E-mail
Harry Pickernell	Appointment November 2018	Confederated Tribes of the Chehalis Reservation	360-273-5911	pickernell@ecy.wa.gov
Edna Fund	July 2017-June 2020	Chehalis River Basin Flood Authority	360-740-1120	fund@ecy.wa.gov
Jay Gordon	July 2019-June 2023	Chehalis River Basin Flood Authority	360-482-3485	ggordon@ecy.wa.gov
Tyson Johnston	Appointment June 2017	Quinalt Indian Nation	360-276-8211 ext. 1855	johnston@ecy.wa.gov
Steve Malloch	July 2019-June 2023	Office of the Governor	206-818-0482	malloch@ecy.wa.gov
Vickie Raines, Chair	July 2017-June 2020	Chehalis River Basin Flood Authority	360-249-3731	raines@ecy.wa.gov
J. Vander Stoep	June 2017-July 2020	Office of the Governor	360-748-9281	vstoep@ecy.wa.gov
Ex Officio Members				
Name	Designation Date	Agency	Phone	E-mail
Michael Garrity	March 2019	Department of Fish and Wildlife	360-902-8113	Michael.Garrity@dfw.wa.gov
Stephen Bernath	June 2017	Department of Natural Resources	360-902-1028	stephen.bernath@dnr.wa.gov
Bart Gernhart	November 2018	Department of Transportation	360-905-2012	GernhaR@wsdot.wa.gov
Stu Trefry	June 2017	Washington State Conservation Commission	360-584-5213	strefry@scc.wa.gov
Gordon White	July 2017	Department of Ecology	360-407-6977	gordon.white@ecy.wa.gov

Office of Chehalis Basin staff contacts:

Director: Andrea McNamara Doyle
Email: andrea.doyle@ecy.wa.gov
Phone: 360-407-6548

Executive Assistant: Cindy Bradley
Email: cindy.bradley@ecy.wa.gov
Phone: 360-407-7674

Principal Planner: Chrissy Bailey
Email: chrissy.bailey@ecy.wa.gov
Phone: 360-407-6781

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



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



Background . . .

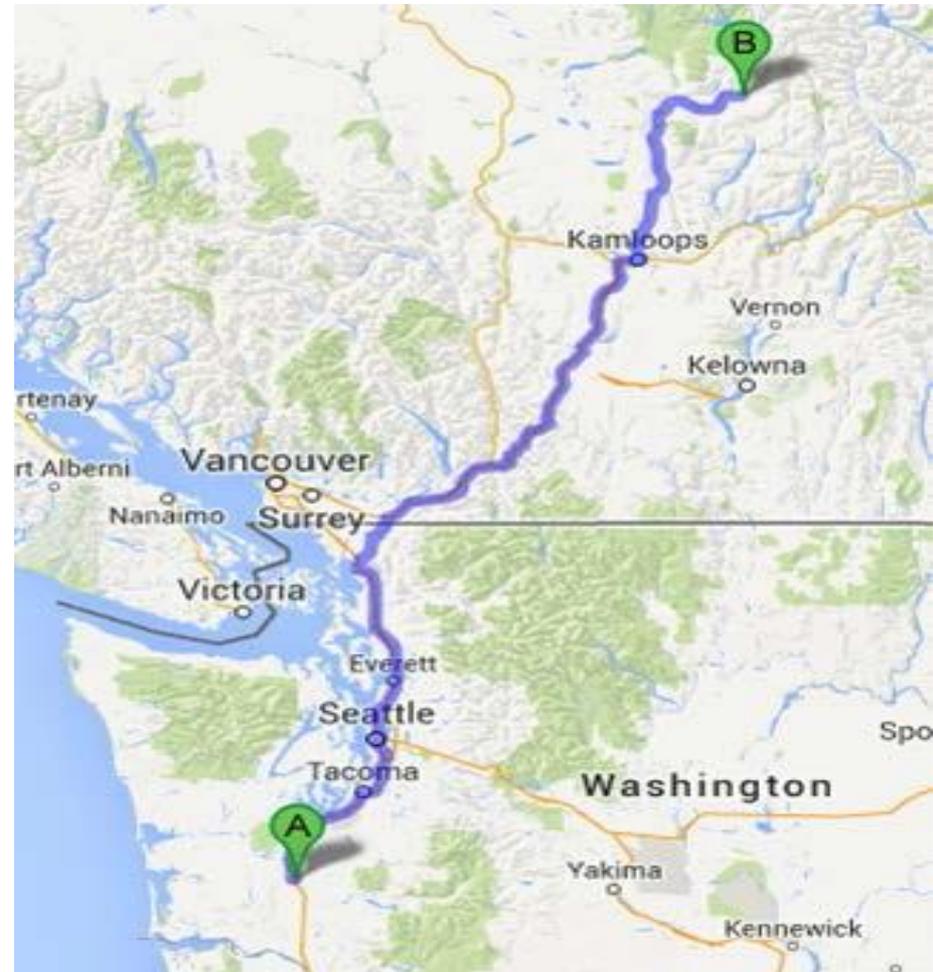
- 2007 Flood -- I-5 and Hwy 507 Interchange looking South.



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.

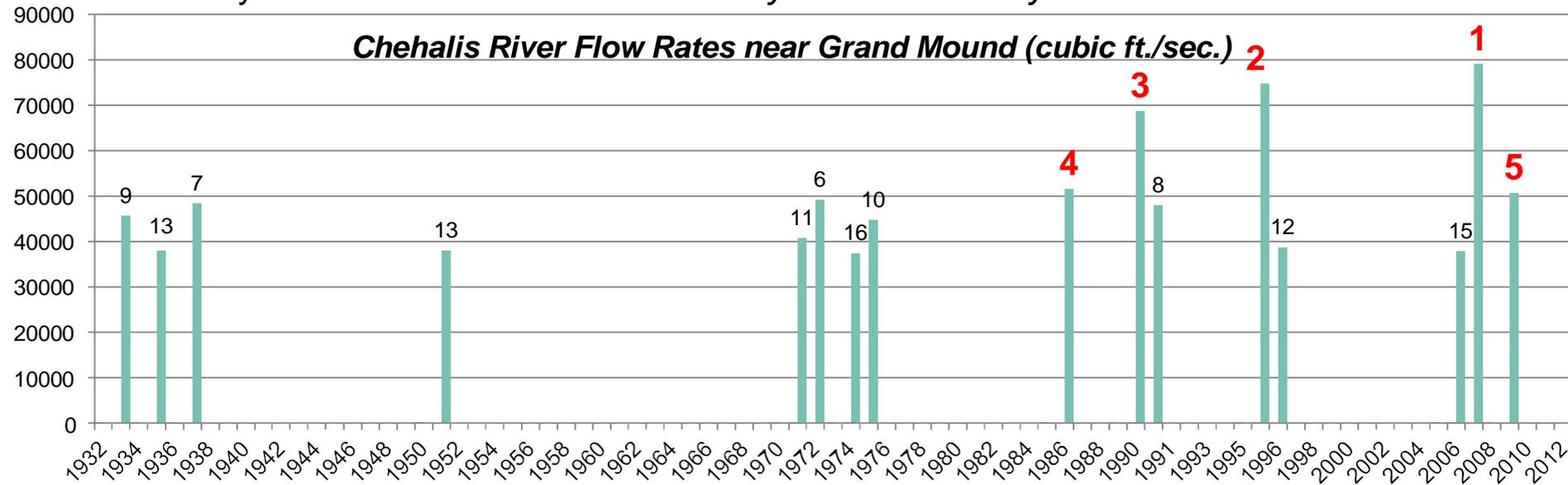


Background . . .

■ 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 substantially below historic levels.
- Chehalis River and tributaries face significant water quality issues.



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

CHEHALIS BASIN SALMON & TROUT

OCEAN PHASE		SPAWNING PHASE
	<p>The salmonid lifecycle involves adults maturing in the ocean, migrating back to their home streams and spawning, embryos incubating, fry emerging, juveniles growing, and smolts migrating to the estuary to acclimate to saltwater and moving out into the ocean</p> <p>WHAT SALMON NEED IN FRESHWATER HABITAT</p> <p>Cool, clean water</p> <p>Appropriate water depth, quantity and flow velocities</p> <p>Upland and riparian (stream bank) vegetation to stabilize soil & provide shade</p> <p>Clean gravel for spawning and egg-rearing</p> <p>Large woody debris to provide resting and hiding places</p> <p>Adequate food</p> <p>Varied channel forms</p>	

www.chehalisbasinpartnership.org

Background . . .

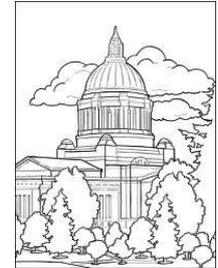
Salmon-habitat potential

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%

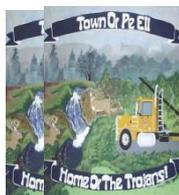
Source: Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species; Pe Ell Public Meeting; 10/14/2014; Page 13;

<https://www.ezview.wa.gov/Portals/1492/images/Pe%20Ell%20Meeting%2010%2014%2014.pdf>.

1. Basin-Wide Relationships

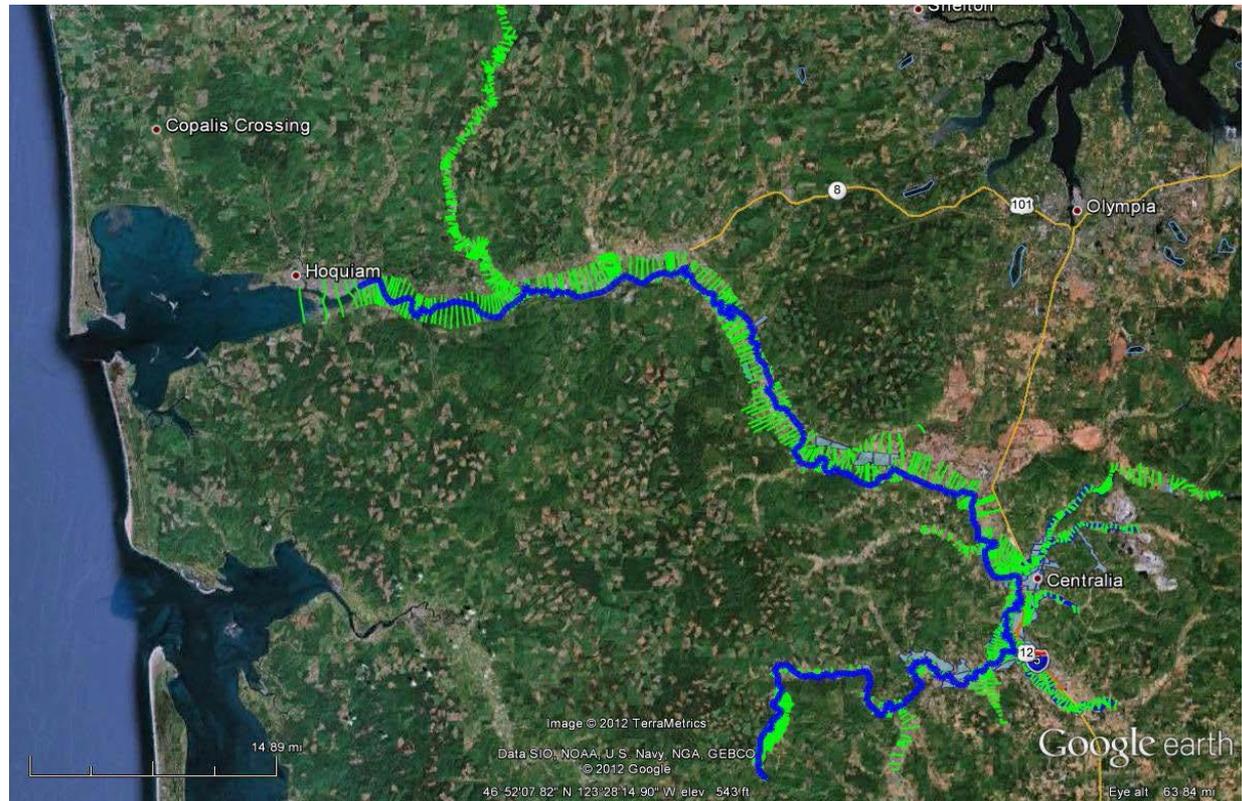


TOWN of BUCODA



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).



January 2022

2. Hydraulic Understanding

- **Example: Basin-wide effects analysis** (Source: *Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species; Pe Ell Public Meeting; 10/14/2014; Page 51;* https://www.ezview.wa.gov/Portals/_1492/images/Pe%20Ell%20Meeting%2010%202014%2014.pdf.)

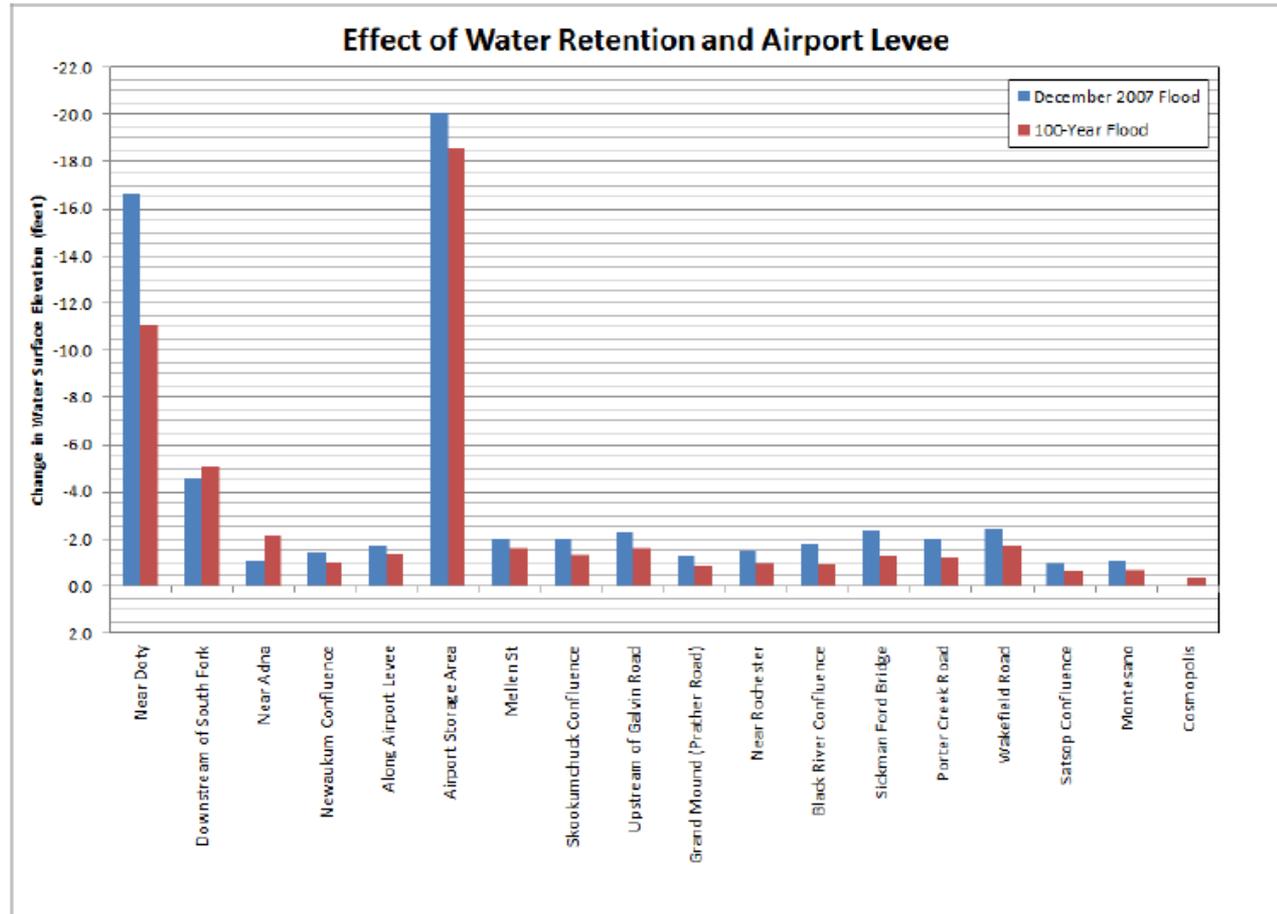


Figure 2: Predicted Changes in Water Surface Elevations from Water Retention and Airport Levee

3. Master Strategy (Game Plan)

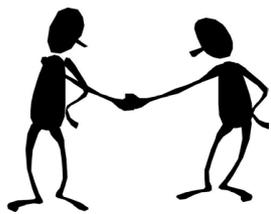
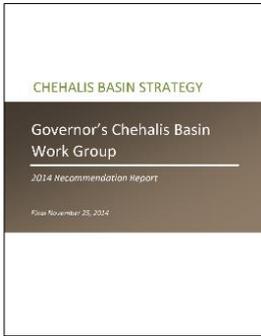


Evolution (2008 to present):

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

Key Elements:

1. Evaluation, implementation of Large Capital Projects:
 - Flood Retention Dam on upper Chehalis River.
 - Airport Levee Improvements.
 - North Shore Levee in Aberdeen, Hoquiam.
2. Basin-wide Aquatic Species Restoration (100s of miles spawning/rearing habitat).
3. Local Flood-Damage Reduction Projects.
4. Local Flood-Proofing, including raising homes, CRS actions, local ordinance improvements, etc.
5. Costs/Benefits: 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:

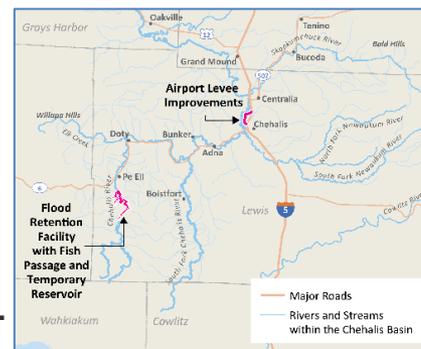
- ❑ Formal environmental review (Programmatic EIS) was conducted to evaluate alternatives.

2017-19:

- ❑ CBFCZD Project-level EIS starts.

2019-21:

- ❑ CBFCZD Project-level EIS continues.



CHEHALIS RIVER BASIN FLOOD AUTHORITY
City of Montesano
Another Chehalis Basin Flood Protection Project
Wastewater Treatment Plant Flood Prevention Dike
 Schedule → February 2014 to April 2014
 Budget → \$511,153
 Benefit → Protecting essential public infrastructure for all Basin residents
www.ezview.wa.gov
STELLAR
Parametrix

5. Local Projects (Basin-wide)

2012 Sup Capital Budget:

- \$5.0M

2013-15 Capital Budget:

- \$10.7M

2015-17 Capital Budget:

- \$15.7M

2017-19 Capital Budget:

- \$9.6M

2019-21 Capital Budget:

- \$6.3M

- 26 complete

- 10 underway

- \$46.7M State (2012-21)

- \$10.8M Local (2012-21)

Another Chehalis Basin Flood Protection Project
 Wastewater Treatment Plant Flood Prevention Dike
 Schedule → February 2014 to April 2014
 Budget → \$511,153
 Benefit → Protecting essential public infrastructure for all Basin residents
www.ezview.wa.gov
STELLAR
Parametrix

Another Chehalis Basin Flood Protection Project
 Drinking Water Prevention Gates
 Schedule → March 2014 to July 2014
 Budget → \$1,000,000
 Benefit → Protecting essential infrastructure for all Basin residents
www.ezview.wa.gov
STELLAR
Parametrix

1. ~2-4 years to design, permit, construct.
2. Protect people, property, infrastructure.
3. Improve readiness, response, resiliency.
4. Completed 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 funding phase = \$250K to \$2M.

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

www.ezview.wa.gov/chehalisbasinlocalfloodreliefprojects

Local Projects (2012-21)
www.ezview.wa.gov/chehalisfloodauthority

Contact: Scott Boettcher; Staff, Chehalis River Basin Flood Authority; 360/480-6600; scottb@sbgh-partners.com

5. Local Projects (Farm Pads)

Category	Value (Millions)
Total Value Protected	\$9.30M
Livestock Protected	\$7.95M
Equipment Protected	\$1.35M
\$\$\$ Expended	\$645K

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

10/17/2019

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

Contact: Scott Boettcher, Staff, Chehalis River Basin Flood Authority; 360/480-6600; scottb@sbgh-partners.com



10/17/2019

7. Restore Salmon and Aquatic Species

Correcting Fish Barriers



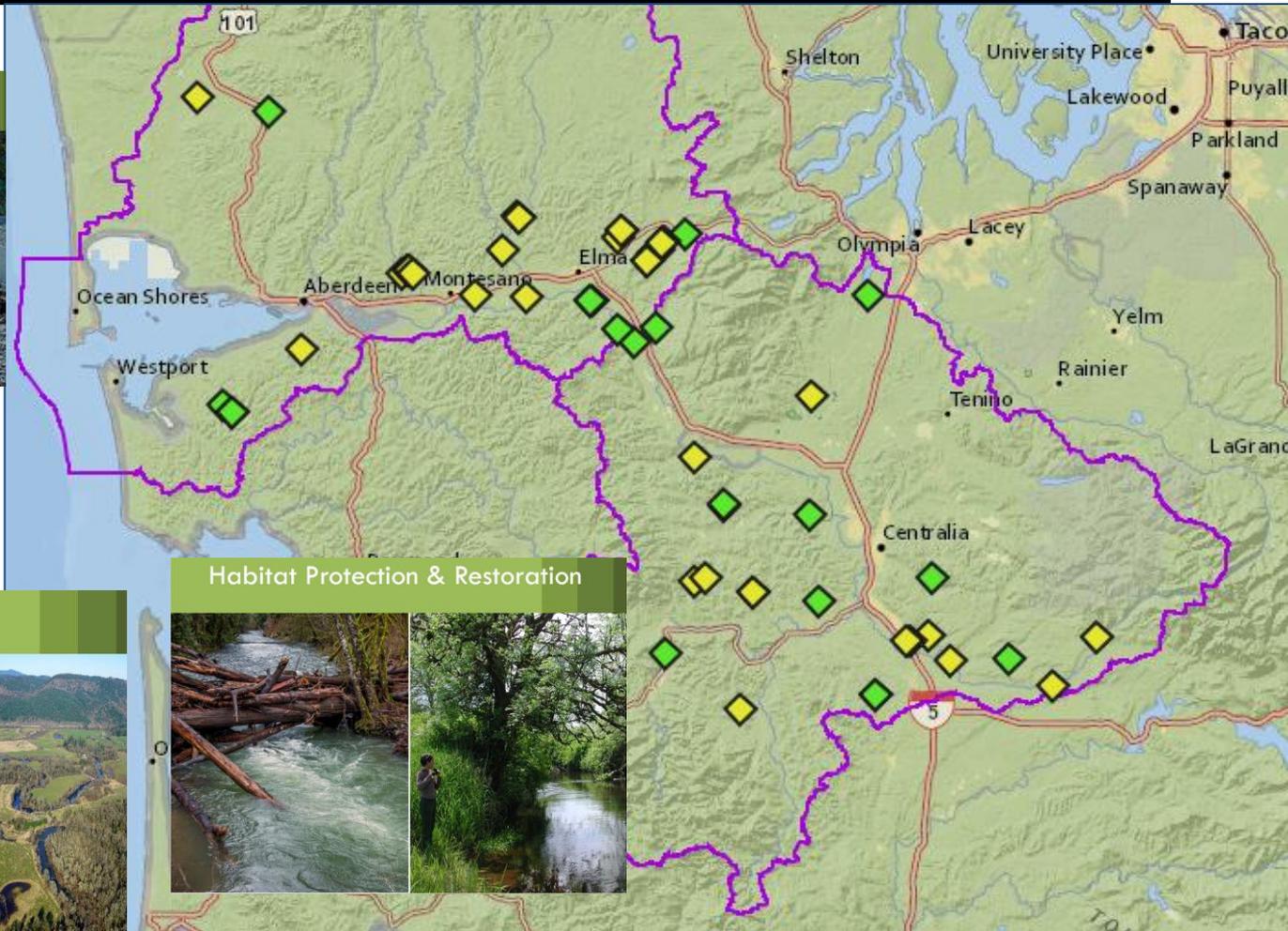
Results so far (2019) . . .

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

Uplands & Floodplains



Habitat Protection & Restoration



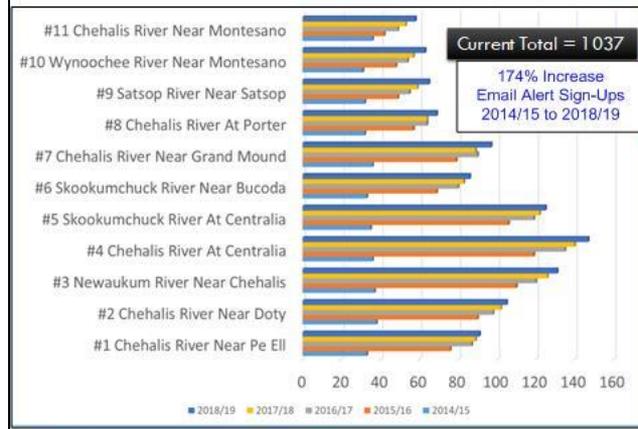
7. Restore Salmon and Aquatic Species

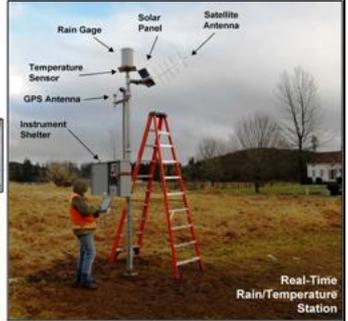
Other Fish and Aquatic Species



8. Early Flood Warning

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





Chehalis Basin Flood Warning & Alert System
www.chehalisriverflood.com

Contact: Scott Boettcher; Staff, Chehalis River Basin Flood Authority; 360/480-6600; scottb@sbg-hpartners.com 23 10/17/2019

Closing – 2007 Flood Damage . . .



Chehalis
River near
Doty
USGS

Closing – 2007 Flood Damage . . .



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

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 . . .



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Closing – 2007 Flood Damage . . .



January 2022

Closing – 2007 Flood Damage . . .

I-5 Under Water
BRUCE ELY /
OREGONIAN



January 2022

Closing – 2007 Flood Damage . . .

Chehalis, WA
STEVE RINGMAN /
SEATTLE TIMES



January 2022

Closing – 2007 Flood Damage . . .



January 2022

Closing – 2007 Flood Damage . . .

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



January 2022

Closing – 2007 Flood Damage . . .



I-5 Under Water
BRUCE ELY / OREGONIAN

Closing – 2007 Flood Damage . . .



Photos Source:
WSDOT

January 2022

Closing – 2007 Flood Damage . . .



January 2022

Closing – 2007 Flood Damage . . .



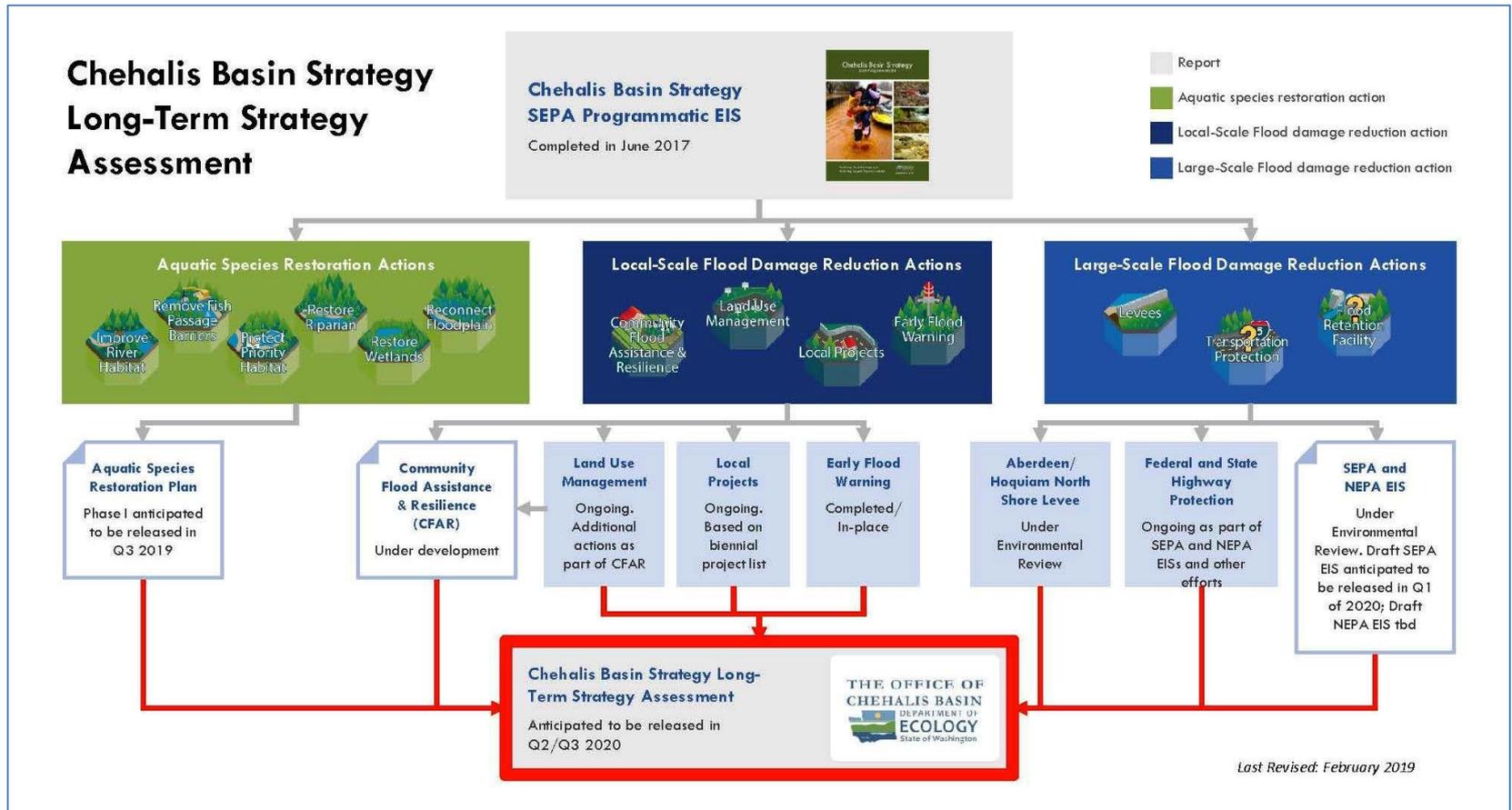
Closing – 2007 Flood Damage . . .



Wakefield Road,
Elma, WA
GREG GILBERT /
SEATTLE TIMES

January 2022

What's Next – Long-Term Strategy



<https://www.ezview.wa.gov/DesktopModules/Documents2/View.aspx?tabID=37068&alias=1962&mid=70197&ItemID=8343>

For Further Information . . .

Vickie Raines, Grays Harbor County Representative

Chair, Chehalis River Basin Flood Authority

Chair, Chehalis Basin Board

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Edna Fund, Lewis County Representative

Vice-Chair, Chehalis River Basin Flood Authority

Member, Chehalis Basin Board

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Chrissy Bailey

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chrb461@ECY.WA.GOV

Key Links . . .

Key Organizations:

1. Chehalis River Basin Flood Authority -- www.ezview.wa.gov/chehalisfloodauthority
2. Office of Chehalis Basin -- <https://ecology.wa.gov/About-us/Get-to-know-us/Our-Programs/Office-of-Chehalis-Basin>
3. Chehalis Basin Board -- https://www.ezview.wa.gov/site/alias_1962/37068/chehalis_basin_board.aspx
4. Chehalis River Basin Flood Control Zone District -- <https://www.chehalisriverbasinfczd.com/>
5. Chehalis Basin Lead Entity -- <http://www.chehalisleadentity.org/>

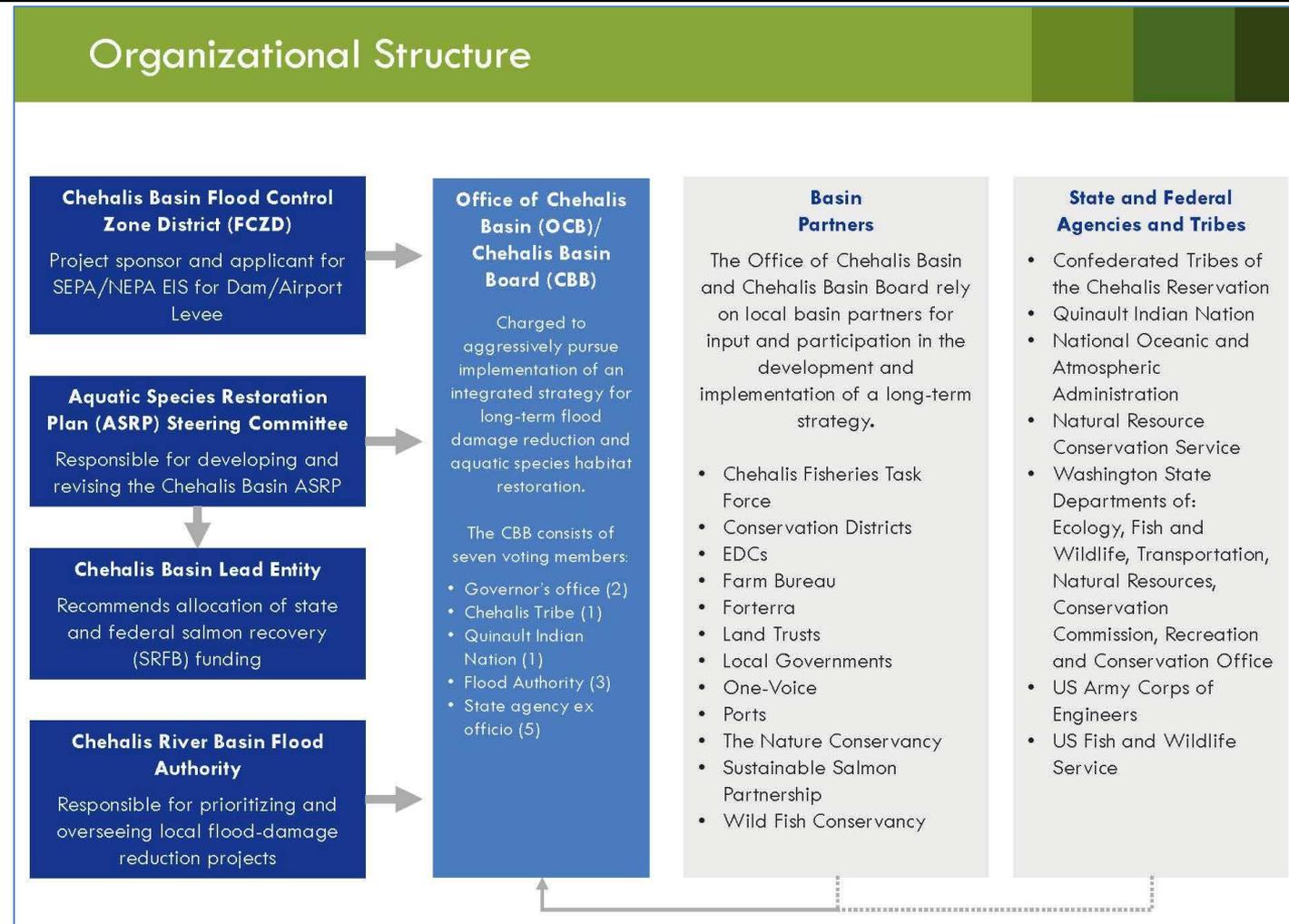
Key Activity Areas:

1. Flood Warning System -- www.chehalisriverflood.com
2. Local Projects -- https://www.ezview.wa.gov/site/alias_1492/34489/local_projects.aspx
3. EIS -- <https://ecology.wa.gov/About-us/Get-to-know-us/Our-Programs/Office-of-Chehalis-Basin/EIS>
4. Long-Term Strategy --
<https://www.ezview.wa.gov/DesktopModules/Documents2/View.aspx?tabID=37068&alias=1962&mid=70197&ItemID=8343>
5. Chehalis Basin Strategy -- www.chehalisbasinstrategy.com
6. ASRP -- <http://chehalisbasinstrategy.com/asrp/>
7. Flood Retention Facility (operation) --
https://www.dropbox.com/s/cnlkmoj3ftw06ag/Chehalis_Final_09.30.2019.mp4?dl=0 (visualization)

Also → Sign-Up for Email Gage Alerts –

https://www.ezview.wa.gov/Portals/_1492/images/Flood%20Warning%20System%20Gage%20Alerts%20-%202011-13-2020.pdf

Key Organizations . . .



Chehalis Basin Flood Control Zone District (FCZD)
Project sponsor and applicant for SEPA/NEPA EIS for Dam/Airport Levee

Aquatic Species Restoration Plan (ASRP) Steering Committee
Responsible for developing and revising the Chehalis Basin ASRP

Chehalis Basin Lead Entity
Recommends allocation of state and federal salmon recovery (SRFB) funding

Chehalis River Basin Flood Authority
Responsible for prioritizing and overseeing local flood-damage reduction projects

Office of Chehalis Basin (OCB)/Chehalis Basin Board (CBB)
Charged to aggressively pursue implementation of an integrated strategy for long-term flood damage reduction and aquatic species habitat restoration.

The CBB consists of seven voting members:

- Governor's office (2)
- Chehalis Tribe (1)
- Quinault Indian Nation (1)
- Flood Authority (3)
- State agency ex officio (5)

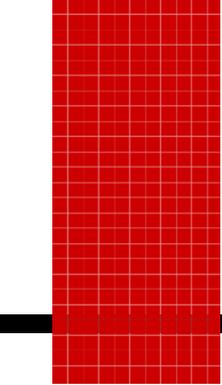
Basin Partners
The Office of Chehalis Basin and Chehalis Basin Board rely on local basin partners for input and participation in the development and implementation of a long-term strategy.

- Chehalis Fisheries Task Force
- Conservation Districts
- EDCs
- Farm Bureau
- Forterra
- Land Trusts
- Local Governments
- One-Voice
- Ports
- The Nature Conservancy
- Sustainable Salmon Partnership
- Wild Fish Conservancy

State and Federal Agencies and Tribes

- Confederated Tribes of the Chehalis Reservation
- Quinault Indian Nation
- National Oceanic and Atmospheric Administration
- Natural Resource Conservation Service
- Washington State Departments of: Ecology, Fish and Wildlife, Transportation, Natural Resources, Conservation Commission, Recreation and Conservation Office
- US Army Corps of Engineers
- US Fish and Wildlife Service





Thank You . . .

Thank You!

Note:

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

Email Distribution Lists

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January 2022