



# Chehalis River Basin

*Reducing Flood Damage Across The Basin*

**February 10, 2014**

**City of Chehalis**

**5:00 p.m.**



# Today's Presentation . . .

- Provide update

- Encourage discussion

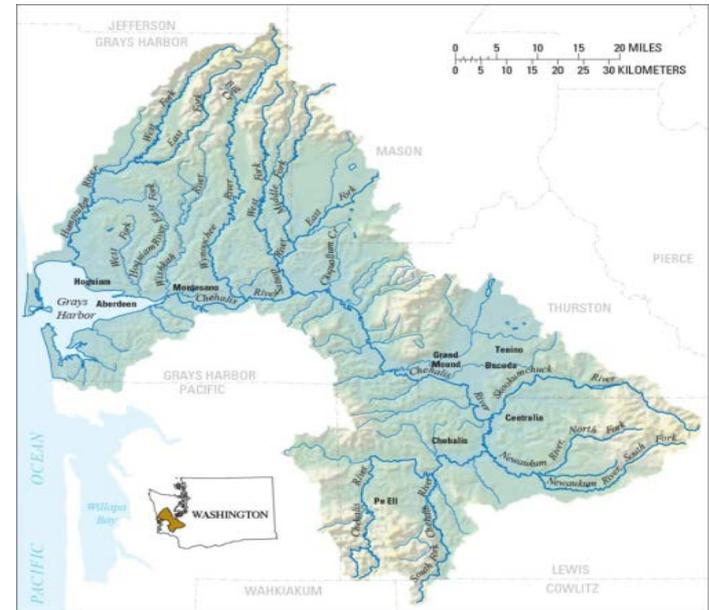
- Key messages . . .

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

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

**3. *Collaboration is key*** -- WA State Legislature, Governor's Office, Governor's Chehalis Basin Work Group, Chehalis River Basin Flood Authority, and WA State Agencies all working together = A powerful force for action!

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



# Action . . .



↑  
Photos Source: THE CHRONICLE →

February 2014

# “Governor’s Chehalis Basin Work Group”

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- **Appointed by Gov. Gregoire (2012); Re-confirmed by Gov. Inslee (2013).**
- **Developed Next Steps Framework, \$28.2 capital budget request (2013-15).**
- **Looking Forward → Tasked by Gov. Inslee to oversee implementation of 2013-15 budget, recommend next steps by mid-November 2014 for: Water retention; I-5; Other Basin improvements; Aquatic species enhancement.**
- **Members are:**
  - David Burnett (Chairman Chehalis Tribe).
  - Karen Valenzuela (Thurston County Commissioner, Vice-Chair Flood Authority).
  - Vickie Raines (Mayor Cosmopolis, Chair Flood Authority).
  - J. Vander Stoep (Private Attorney, Pe Ell Alternate Flood Authority).
  - Jay Gordon (President Washington Dairy Federation and Chehalis Farmer).
  - Sandi Triggs (Capital Budget Advisor to Governor).
  - Keith Phillips (Governor’s Energy and Environment Advisor).

# "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

- City of Aberdeen
- City of Cosmopolis
- City of Montesano
- City of Oakville

- ▶ Lewis County

- City of Centralia
- City of Chehalis
- City of Napavine
- Town of Pe Ell

- ▶ Thurston County

- Town of Bucoda



# Background . . .

- 2007 Flood -- \$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.

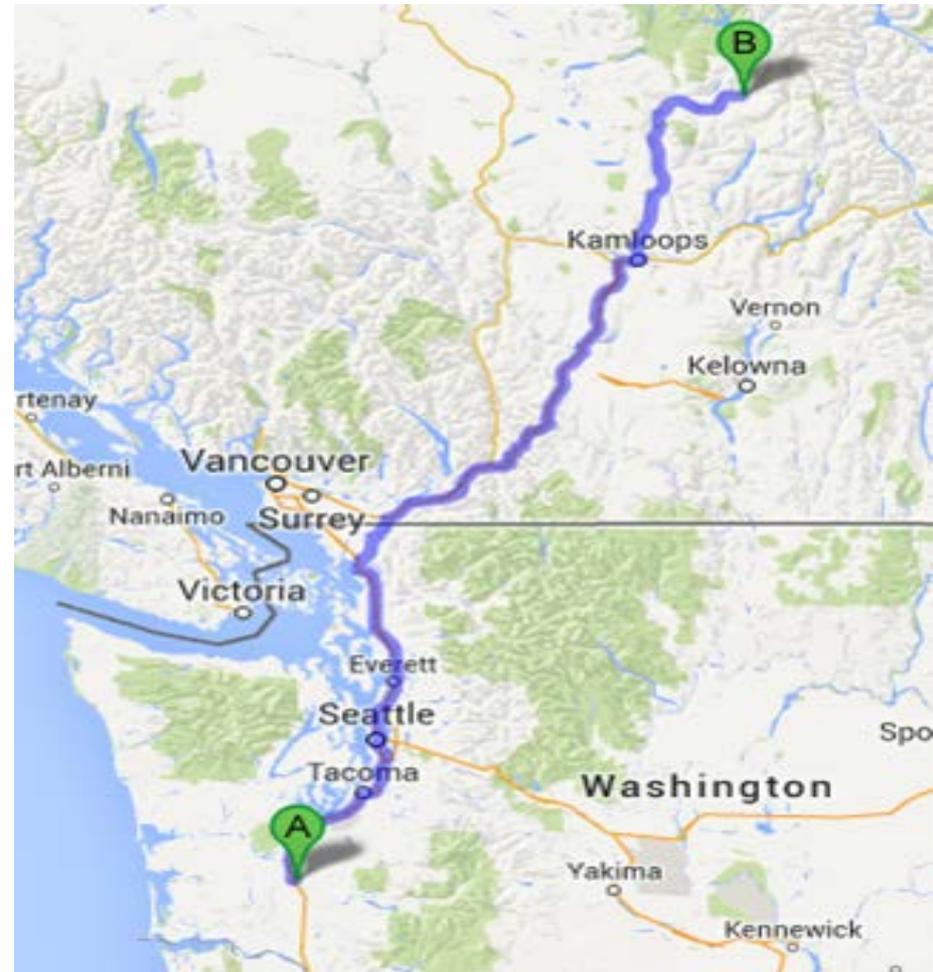


**City of Centralia and I-5**  
STEVE RINGMAN /  
SEATTLE TIMES

February 2014

# 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 or covering . . .
  - 80% of Kitsap County.
  - 69% of Clark County.
  - 59% of Thurston County.

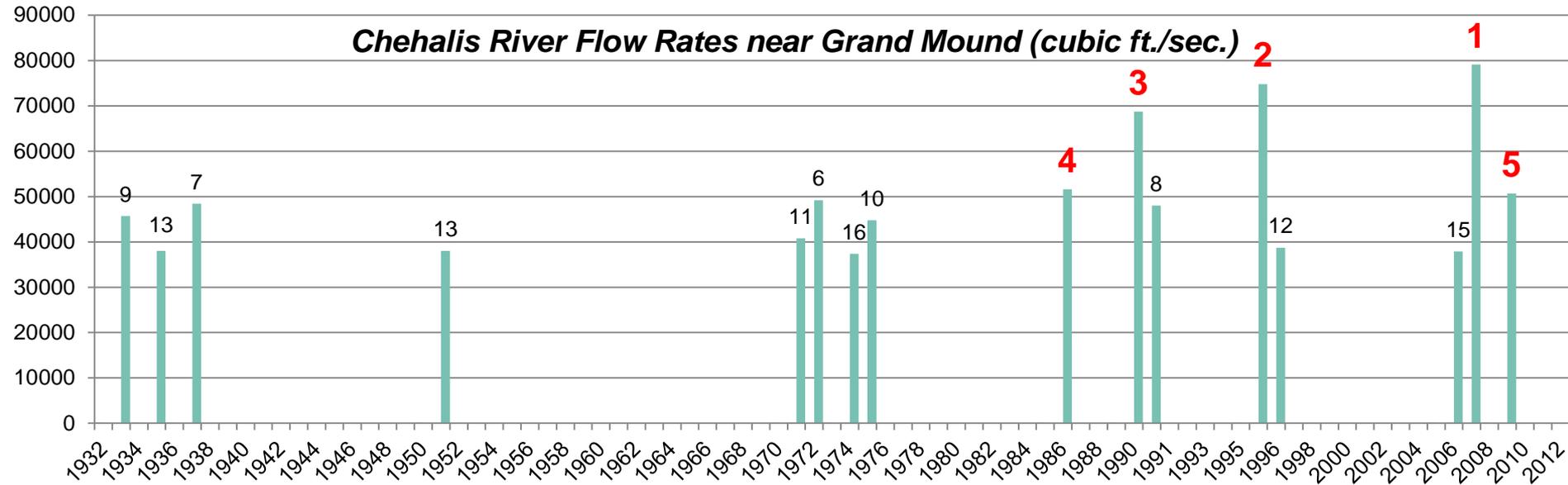


# Background . . .

## ■ 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 . . .*

**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

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><b>WHAT SALMON NEED IN FRESHWATER HABITAT</b></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 &amp; 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](http://www.chehalisbasinpartnership.org)

# Solution = Basin-Wide Approach

## Action-oriented, Multi-phase Approach

1. Basin-Wide Relationships
2. Hydraulic Understanding
3. Large Capitol Projects
4. Smaller-Scale Local Projects
5. Land Use, Floodplain Management
6. Enhance Salmon and Aquatic Species
7. Early Flood Warning
8. Outreach, Education and Communication

**THE CHEHALIS BASIN STRATEGY**  
Reducing Flood Damage and Enhancing Aquatic Species

For 80 years, little has been done to reduce flood damage in the Chehalis Basin. Now, for the first time, there is a broadly-supported, Basin-wide process that is implementing long-sought local progress and leading to a comprehensive strategy to address flooding, while at the same time enhancing aquatic species across the Chehalis Basin.

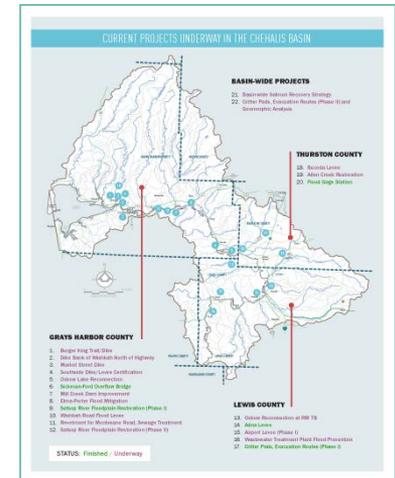
The 2013 Legislature funded a \$28 million program of capital investments that is building projects with immediate flood damage reduction and/or aquatic habitat benefits. The investment is also being used aggressively to fill data gaps, evaluate the feasibility of flood damage reduction actions, and create the first-ever plan for enhancing aquatic species in the Basin.



"Today, finally, we hold hope and see, for the first time, real efforts to mitigate the flooding that is sure to inundate the Chehalis River Basin again in the not-so-distant future."

— Lewis County Chehalis Editorial

Photo courtesy of Mark Quisenberry, The Observer



# 1. Basin-Wide Relationships



TOWN of BUCODA



WASHINGTON STATE  
CONSERVATION  
COMMISSION



Washington  
Department of  
**FISH and  
WILDLIFE**



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**



**Office of Financial Management**

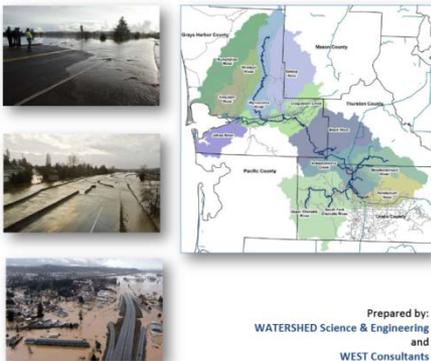
Better information. Better decisions. Better government.

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## 2. Hydraulic Understanding

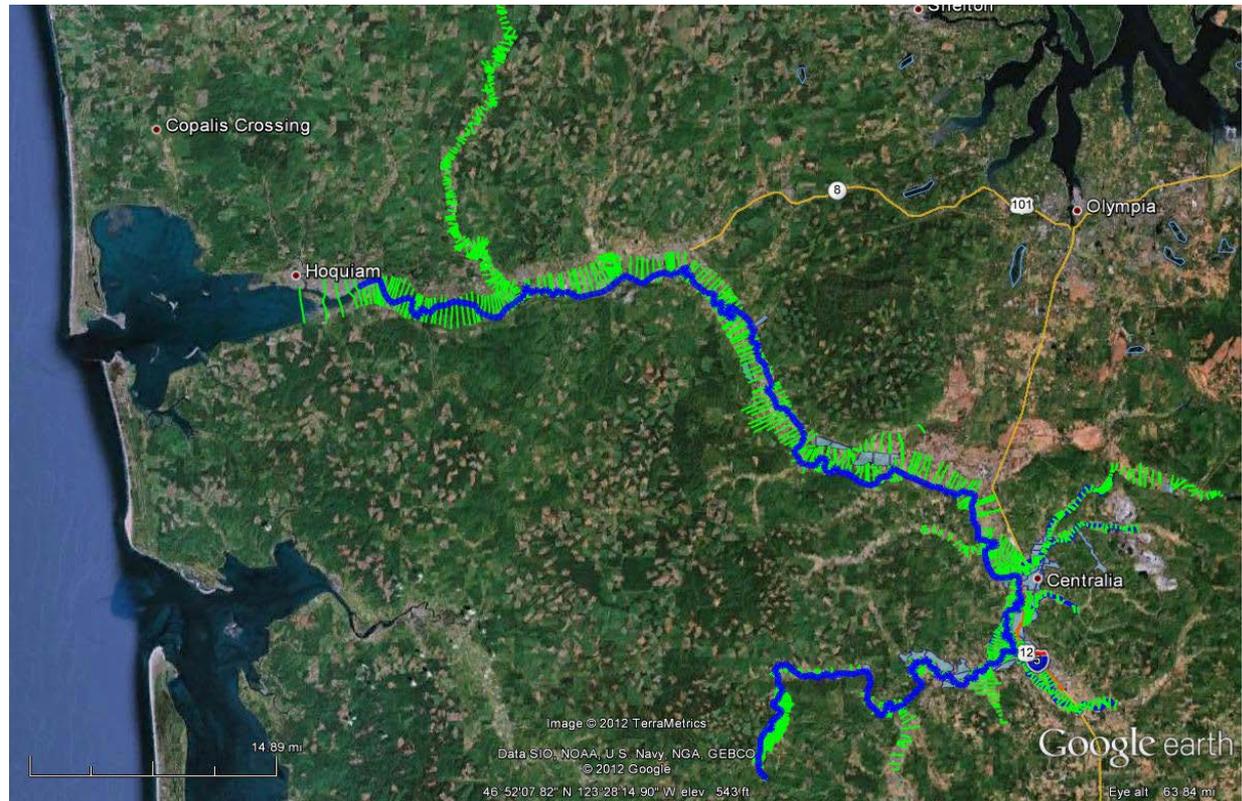
- **Science-based model** -- To inform decision-makers on hydraulic effects of potential flood relief options (at basin-wide and localized scales).
- **108 miles** -- Mouth of Chehalis River upstream to Pe Ell (108 miles).

Draft Report - Chehalis River  
Hydraulic Model Development Project



Prepared by:  
WATERSHED Science & Engineering  
and  
WEST Consultants  
Prepared for:  
Chehalis River Basin Flood Authority

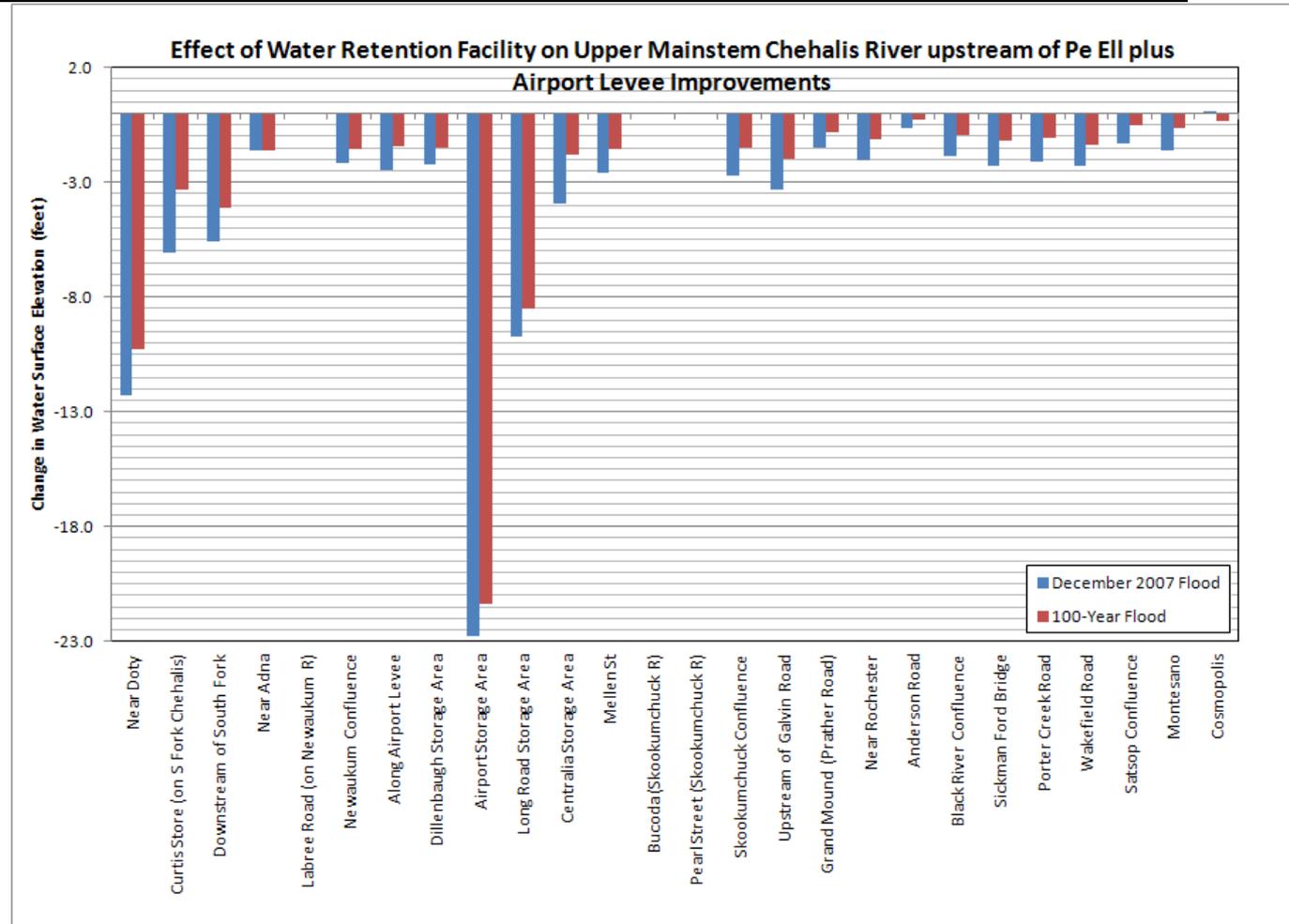
July 23, 2012



February 2014

## 2. Hydraulic Understanding

- Example: Basin-wide effects analysis** (Watershed Science and Engineering; Chehalis Basin Flood Hazard Mitigation Alternatives Report analysis; 12/2012)



# 3. Large Capitol Projects

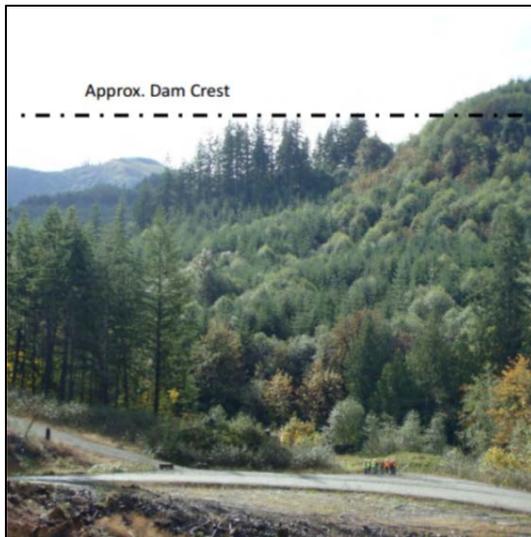
- **Technical team evaluating safety, feasibility of upper basin water retention structure** -- field visits, site and design considerations, world-wide research, etc.
  - Permanent reservoir with fish passage or Run-of-the-river without permanent reservoir.
  - Roller compact concrete or Earthen fill.
  - Flood-control only or Multi-purpose.
- **WSDOT evaluating alternatives to protect Interstate 5** – levees, walls, raise, etc.
- **Comprehensive set of recommendations to Governor, Legislature (11/2014).**

[www.ezview.wa.gov](http://www.ezview.wa.gov)

■ Governor's Work Group -- November 13, 2014 (Policy Workshop #1)

**Meeting Documents:**

- Agenda and Meeting Location for upcoming Policy Workshop #1 -- Click [here](#).
- Presentation 1: Work Group Charge and Process for Developing Recommendations -- Click [here](#).
- Presentation 2: Design Storm Selection -- Click [here](#).
- Presentation 3: Chehalis River Aquatic Species -- Click [here](#).
- Presentation 4: Aquatic Species Enhancement Plan -- Click [here](#).
- Presentation 5: Alternatives for Reducing Flood Damage -- Click [here](#).
- **Presentation 6: Dam Design and Fish Passage Research Findings -- Click [here](#).**
- Presentation 7: Methods for Comparing Alternatives -- Click [here](#).



Photos  
Source: →  
ANCHOR QEA

# 4. Smaller-Scale Local Projects

## 2012 Capital Budget:

- \$5.0M – Local projects.

## 2013 Capital Budget:

- \$15.2M -- Local projects, aquatic species enhancement.

Local Projects Funded (2013):



Local Projects Funded (2012):



Critter Pads Funded (2012):



Gages Funded (2011):



([https://www.ezview.wa.gov/site/alias\\_1492/34489/local\\_projects.aspx](https://www.ezview.wa.gov/site/alias_1492/34489/local_projects.aspx))



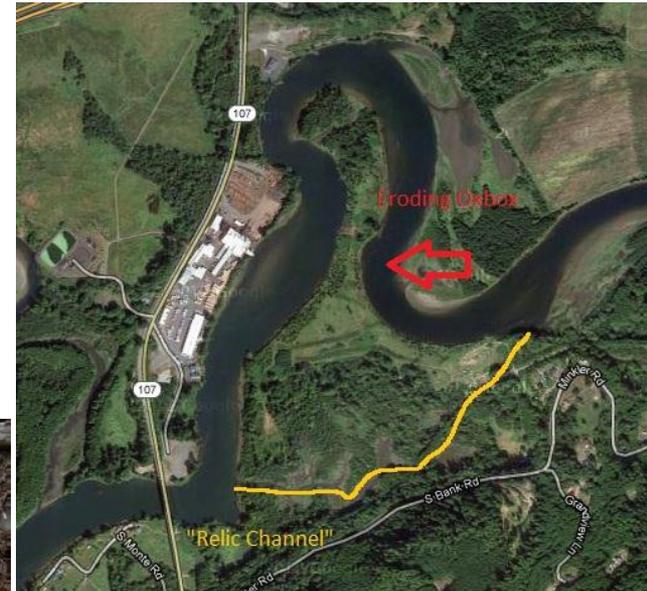
# 4. Smaller-Scale Local Projects

		2012 (\$)	2013 (\$)
<b>GRAYS HARBOR COUNTY</b>			
1 - Aberdeen	<a href="#">Burger King Trail/Dike</a>	24,600	140,000
2 - Aberdeen	<a href="#">Dike Bank of Wishkah North of Highway</a>	47,000	270,000
3 - Aberdeen	<a href="#">Market Street Dike</a>	0	670,000
4 - Aberdeen	<a href="#">Southside Dike/Levee Certification</a>	50,000	0
5 - Chehalis Tribe	<a href="#">Oxbow Lake Reconnection</a>	0	1,149,009
6 - Chehalis Tribe	<a href="#">Sickman-Ford Overflow Bridge</a>	2,075,000	0
7 - Cosmopolis	<a href="#">Mill Creek Dam Improvement</a>	0	737,750
8 - Grays Harbor County	<a href="#">Elma-Porter Flood Mitigation</a>	0	584,000
9 - Grays Harbor County	<a href="#">Satsop River Floodplain Restoration (Phase I)</a>	50,000	0
10 - Grays Harbor County	<a href="#">Wishkah Road Flood Levee</a>	125,000	690,000
11 - Montesano	<a href="#">Revetment for Montesano Rd., Sewage Treatment Plant, Mary's River Lumber</a>	102,426	6,000,000
12 - WDFW	<a href="#">Satsop River Floodplain Restoration (Phase II)</a>	450,000	0
<b>LEWIS COUNTY</b>			
13 - Chehalis Tribe	<a href="#">Oxbow Reconnection at RM 78</a>	0	602,383
14 - Lewis County	<a href="#">Adna Levee</a>	244,145	0
15 - Lewis County	<a href="#">Airport Levee (Phase I)</a>	1,239,829	0
16 - Pe Ell	<a href="#">Wastewater Treatment Plant Flood Prevention Dike</a>	0	521,000
17 - WSCC	<a href="#">Critter Pads, Evacuation Routes (Phase I)</a>	500,000	0
<b>THURSTON COUNTY</b>			
18 - Bucoda	<a href="#">Bucoda Levee</a>	42,000	305,000
19 - Chehalis Tribe	<a href="#">Allen Creek Restoration</a>	0	987,645
20 - Chehalis Tribe	<a href="#">Flood Gage Station</a>	50,000	0
<b>BASIN-WIDE</b>			
21 - TBD	<a href="#">Basin-wide Salmon Recovery Strategy</a>	0	1,350,000
22 - WSCC	<a href="#">Critter Pads, Evacuation Routes (Phase II) and Geomorphic Analysis</a>	0	850,000
		<b>\$ 5,000,000</b>	<b>\$ 14,856,787</b>

# 4. Smaller-Scale Local Projects

## ■ Revetment to Protect Montesano Road, Adjacent Facilities

- ❑ Mary's River Lumber = 120 family wage jobs.
- ❑ State Highway (SR 107) = At risk of damage.
- ❑ Montesano STP = Risk of overtopping.
- ❑ Solutions and Alternative = Balance time, cost, results.
- ❑ Project [website](#).

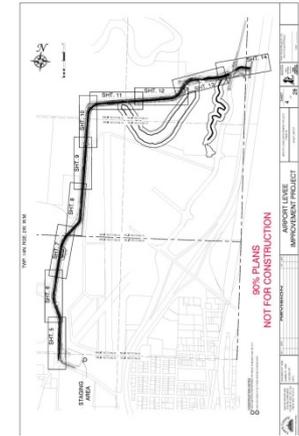


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# 4. Smaller-Scale Local Projects

## ■ Airport Levee (Phase I)

- ❑ Improve base of existing levee (expand inside width).
- ❑ Protect airport and adjacent revenue-generating retail complex.
- ❑ Project [website](#).



[Sign In](#)

## Lewis County - Airport Levee Project

[Portal ID #1749]

Updates Overview **Contacts** Events Library

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### Summary of the project

Last Updated: [January 9, 2014](#)

[Click HERE](#) To Return To Main Flood Authority Website

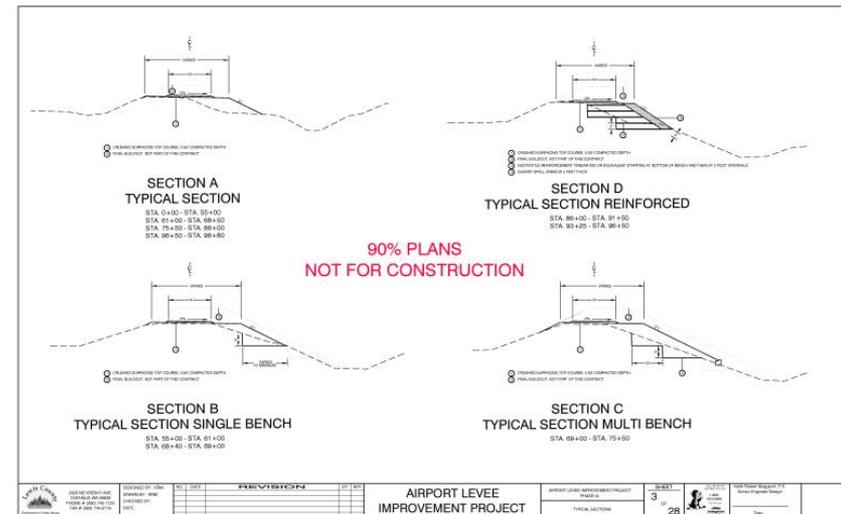
**2012 Funding -- \$1,239,829 (9/26/2012).**

**Description --** Phase I (levee base improvement) involves expanding the inside width of the existing levee without increasing levee elevation or causing any measurable adverse impact or effect. Phase I will improve the base of the levee and result in an additional 32 acre feet of fill inside the existing levee. The fill required for this levee project is less than one percent of the overall airport property volume and a much smaller percentage of the total flood volume in the twin cities area. Since the fill is behind the levee it will not block flows and will not create any measurable increase in upstream or downstream flooding based on the HEC-RAS hydraulic model for the basin. Project (Phase I) is planned to be completed Summer 2014.

**Flood Hazard Reduction Benefits --** Completion of Phase I at the Airport will provide immediate and critical additional flood protection to the airport facility and to the most active complex of retail stores in Lewis County which generate approximately \$550,000 per day in sales income with significant

*Pictures*

Typical levee base widening construction.



# 5. Land Use, Floodplain Management

- **Analyze local floodplain management programs across the Basin and, where appropriate, make recommendations to:**
  - protect existing homes/businesses.
  - ensure new development does not increase flood hazard risk.
  - identify ways to reduce flood insurance rates.
  - address properties that are repetitively flood damaged.

LEWIS COUNTY NOTICE TO CONSULTANTS FOR:

**Request for Proposals (RFP)  
Floodplain Management Analysis**

Lewis County is seeking a qualified consulting firm or team to provide professional services to complete a floodplain management analysis report for jurisdictions in the Chehalis Basin.

**PROJECT DESCRIPTION**

Lewis County, Fiscal Agent for the Chehalis River Basin flood Authority, is seeking a qualified consulting firm or team to provide professional services to complete a floodplain management analysis report for jurisdictions in the Chehalis Basin; provide technical assistance to explore potential local and regional cooperative efforts that allow jurisdictions to improve local floodplain management, and work with the local governments in the Basin to develop a strategic approach for buyouts, elevating structures, and other techniques to address repetitive loss properties. The work in this proposal is part of the 2013-2015 Chehalis Basin Strategy, a State of Washington effort to reduce flood damage and enhance aquatic species in the Chehalis River Basin. For more information, view the Ruckelshaus Center's Chehalis Basin project site: <http://ruckelshauscenter.wsu.edu/ChehalisFlooding.html>

Interested consultants shall provide a letter of interest, approach/methodology, budget, personnel resume(s), experience related to this project, and client references.

- **Contract work to be completed by August 31, 2014.**

## 6. Enhance Salmon (Aquatic Species)

- Collect aquatic species, water quality, hydrologic data.
- Model analyses to understand impacts/benefits on fish, wildlife, water quality, sediment, streamflow and flooding.
- Develop DRAFT and FINAL aquatic species enhancement plan.
- Comprehensive set of recommendations to Governor, Legislature (11/2014).



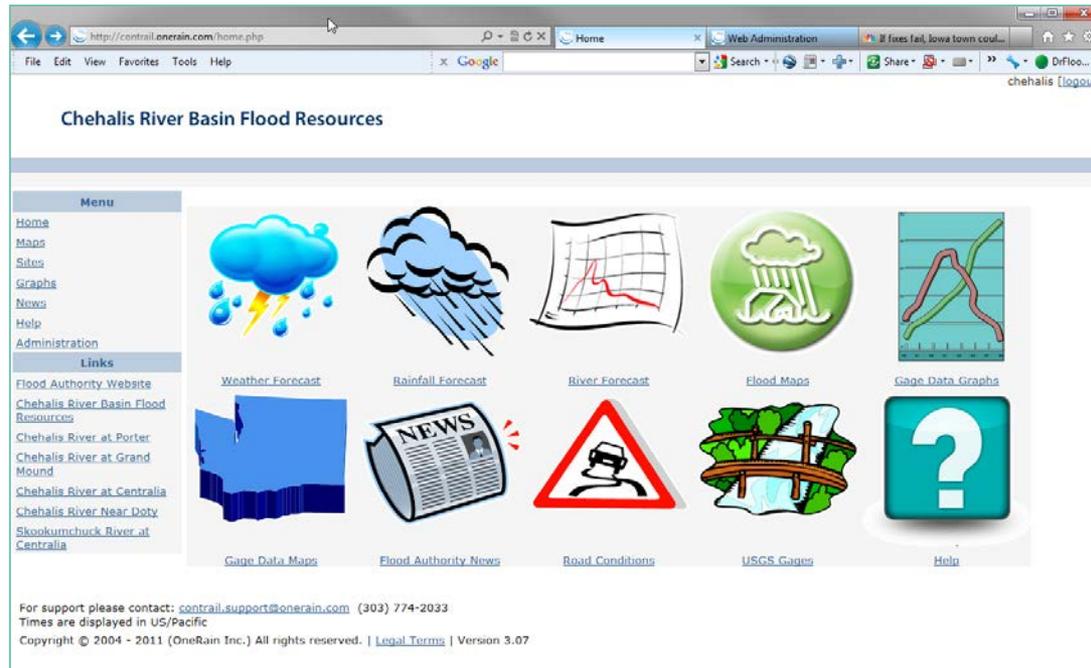
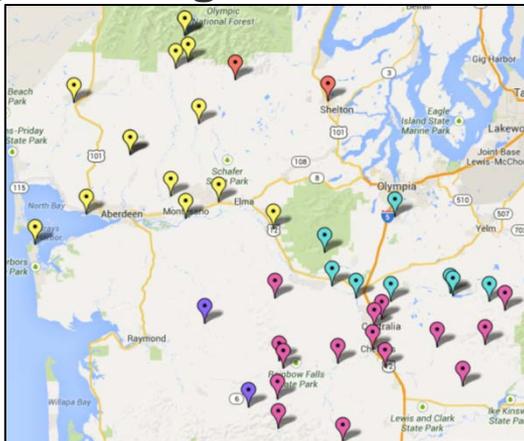
**Seine collections (Chehalis River)**



**Downstream snorkel surveys (Chehalis River)**

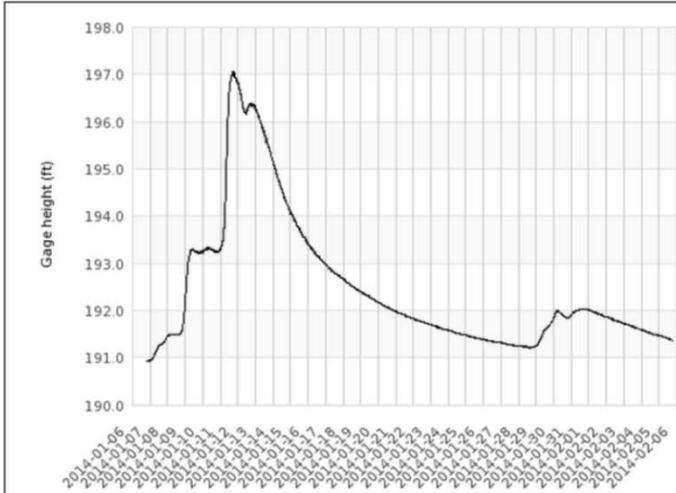
# 7. Early Flood Warning

- [www.chehalisriverflood.com](http://www.chehalisriverflood.com)
- Front-facing website.
- Data collection, data synchronization.
- Improved forecasting, early-warning.



# 7. Early Flood Warning

## Localized tracking, forecasting . . .



CHEHALIS RIVER NEAR ADNA, WA (12021800) - Gage height (02\_0065)

**Newaukum River near Chehalis, WA**

Current NWS Forecast: 2.68 ft (observed value) 2/7/2014 5:45 AM

River Stage (ft): 9.5

Minor Flood Stage	10.5
Moderate Flood Stage	11.5
Major Flood Stage	12.5
	13.5
	14.5
	15.0
	15.8

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 depends on actual water flow.

**Newaukum River near Chehalis, WA**

Current NWS Forecast: 2.92 ft (observed value) 2/5/2014 9:45 AM

River Stage (ft): 9.5

Minor Flood Stage	10.5
Moderate Flood Stage	11.5
Major Flood Stage	12.5
	13.5
	14.5
	15.0
	15.8

Disclaimer: Inundation maps show estimated areas of flooding.

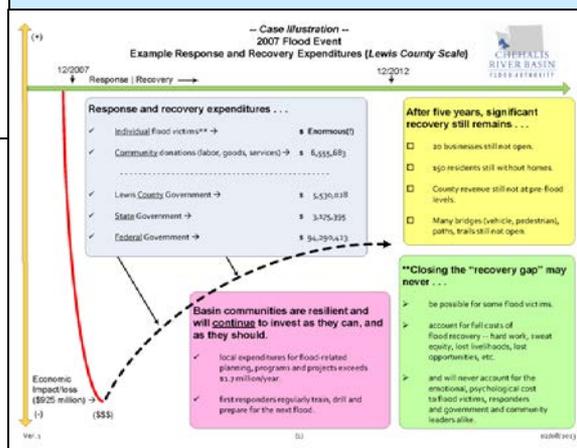
# 8. Outreach, Education and Communication

## Website

## Outreach Visits

## Project Signs

## Informational Analyses



## Email Distribution List

**Pat Anderson**  
[Pat.Anderson@lewiscou  
 ntywa.gov](mailto:Pat.Anderson@lewiscountywa.gov)

# Resources, Additional Information . . .

[www.ezview.wa.gov](http://www.ezview.wa.gov)

<http://ruckelshauscenter.wsu.edu/ChehalisFlooding.html>

[www.chehalisriverflood.com](http://www.chehalisriverflood.com)



February 2014

# Closing – 2007 Flood Damage . . .



Chehalis  
River near  
Doty  
USGS

# Closing – 2007 Flood Damage . . .



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

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# 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



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# Closing – 2007 Flood Damage . . .



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# Closing – 2007 Flood Damage . . .



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# Closing – 2007 Flood Damage . . .

**I-5 Under Water**  
BRUCE ELY /  
OREGONIAN



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# Closing – 2007 Flood Damage . . .



**Chehalis, WA**  
STEVE RINGMAN /  
SEATTLE TIMES

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# Closing – 2007 Flood Damage . . .



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# Closing – 2007 Flood Damage . . .

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



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# Closing – 2007 Flood Damage . . .

**I-5 Under Water**  
BRUCE ELY / OREGONIAN



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# Closing – 2007 Flood Damage . . .



Photos Source:  
WSDOT

February 2014

# Closing – 2007 Flood Damage . . .



February 2014

# Closing – 2007 Flood Damage . . .



# Closing – 2007 Flood Damage . . .



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

February 2014

# For Further Information . . .

**Vickie Raines, *Chair***

Chehalis River Basin Flood Authority  
(Member, Governor's Chehalis Basin Work Group)

360/590-4100

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**Edna Fund, *Chair***

Community Outreach and Education Committee  
(Flood Authority)

360/269-7515

[Edna.Fund@lewiscountywa.gov](mailto:Edna.Fund@lewiscountywa.gov)

**Arnold Haberstroh, *Chehalis Rep.***

Chehalis River Basin Flood Authority

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**Jim Kramer, *Facilitator***

Governor's Chehalis Basin Work Group, and  
Chehalis River Basin Flood Authority

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[jkramer.consulting@gmail.com](mailto:jkramer.consulting@gmail.com)

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[scottb@sbgh-partners.com](mailto:scottb@sbgh-partners.com)



Thank You . . .

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# Thank You!

**Note:**

**This Presentation Is Posted To  
“Chehalis River Basin Flood Authority” Website  
at [www.ezview.wa.gov](http://www.ezview.wa.gov).**