Chehalis River Basin Hydraulic Modeling and Flood Relief Alternatives Evaluation

WATERSHED Science & Engineering
WEST Consultants

Presented May 17, 2012
(Revised May 18, 2012)

Overview of Today's Discussion

Evaluation of potential flood relief projects

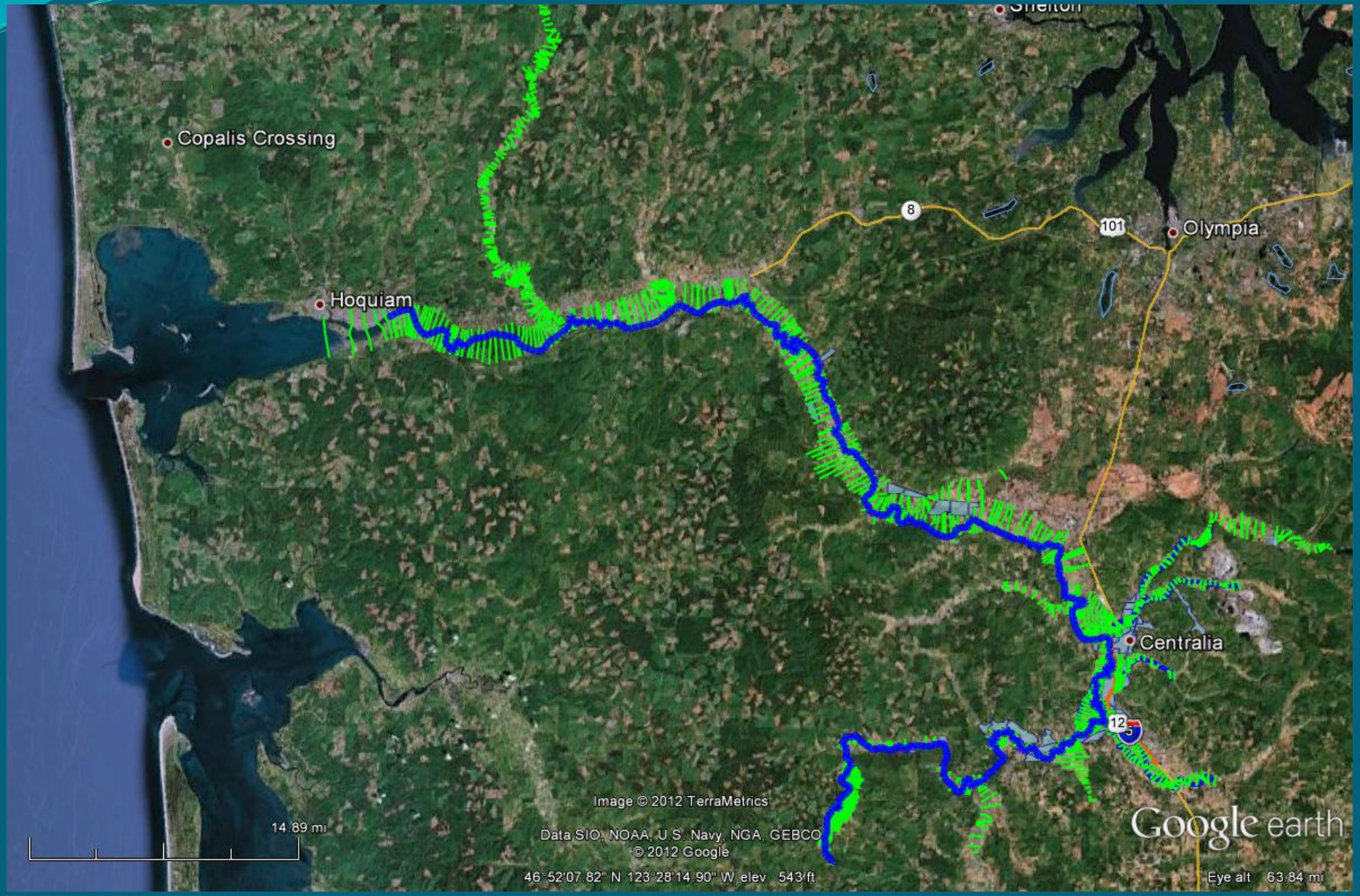
- Upstream retention on mainstem Chehalis (w and w/out levee)
- Corps Twin Cities Project
- WSDOT I-5 flood protection project
- Mellen Street Bypass
- Channel Dredging (Mellen Street to Lincoln Creek Confluence)
- Complete Bridge Replacement Option
- Specific Bridge Replacements
  - Highway 6
  - Mellen Street
  - Galvin Road
  - Sickman Ford

Questions and next steps

Preliminary Data Subject to Change

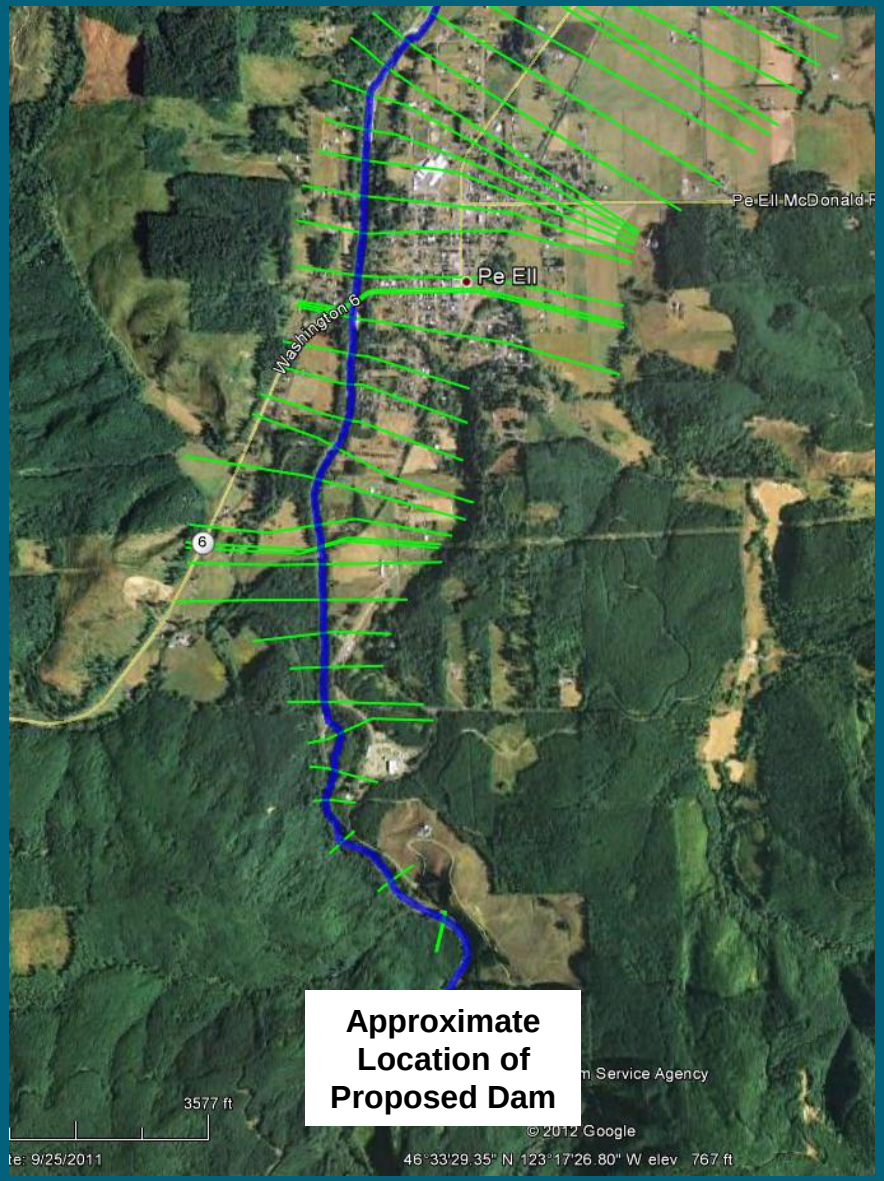
Important Note: The results and data shown in this presentation are preliminary and subject to change. The data were developed using a preliminary version of the Chehalis River Basin HEC-RAS model. The model is still under development and as such the model, and all analyses produced using the model, are preliminary for discussion purposes only. Furthermore, all maps shown in this presentation were developed using automated mapping techniques which are appropriate for preliminary evaluations. The maps may not be entirely accurate in some locations and should be used with caution.

Model Extents

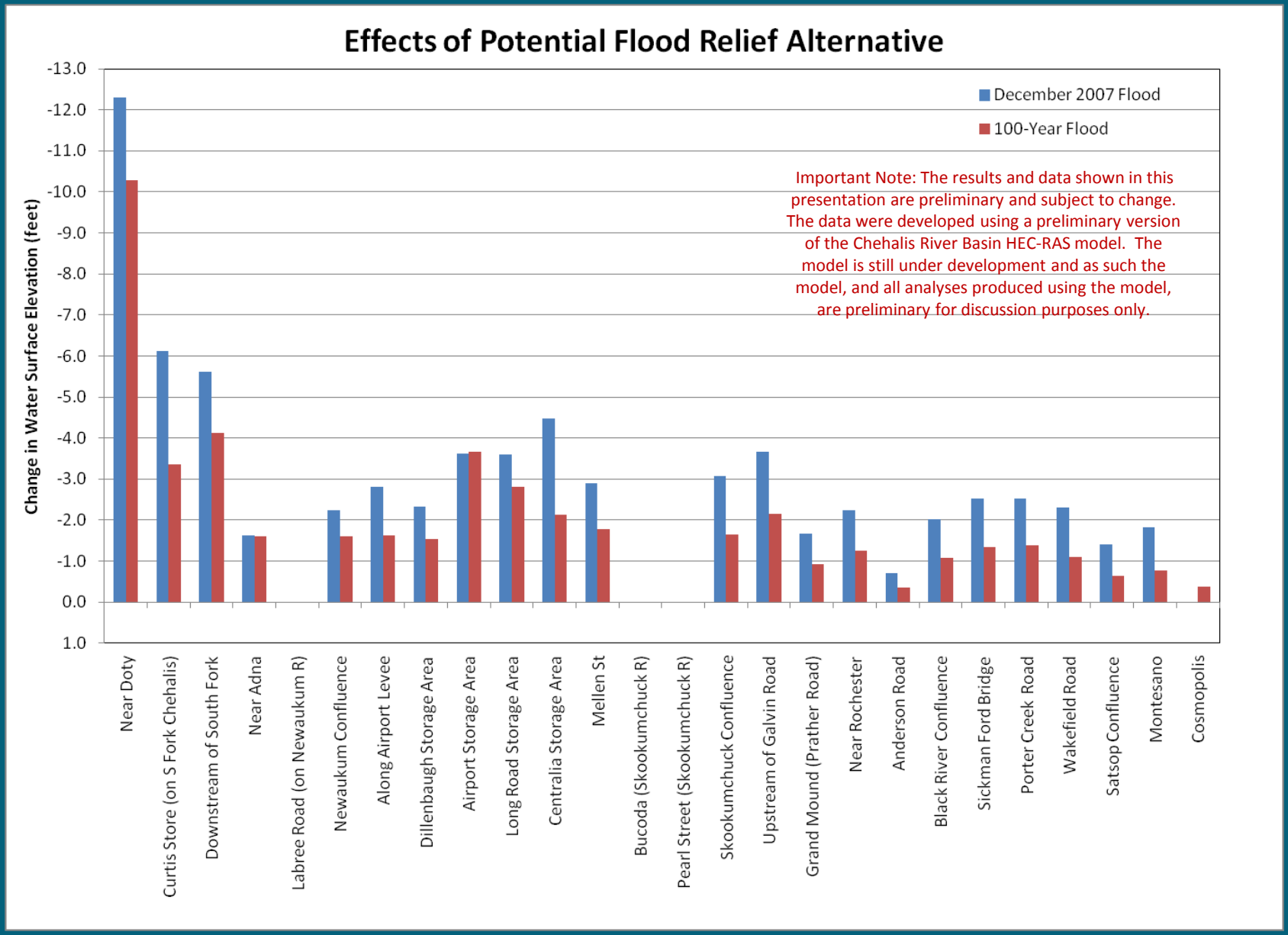


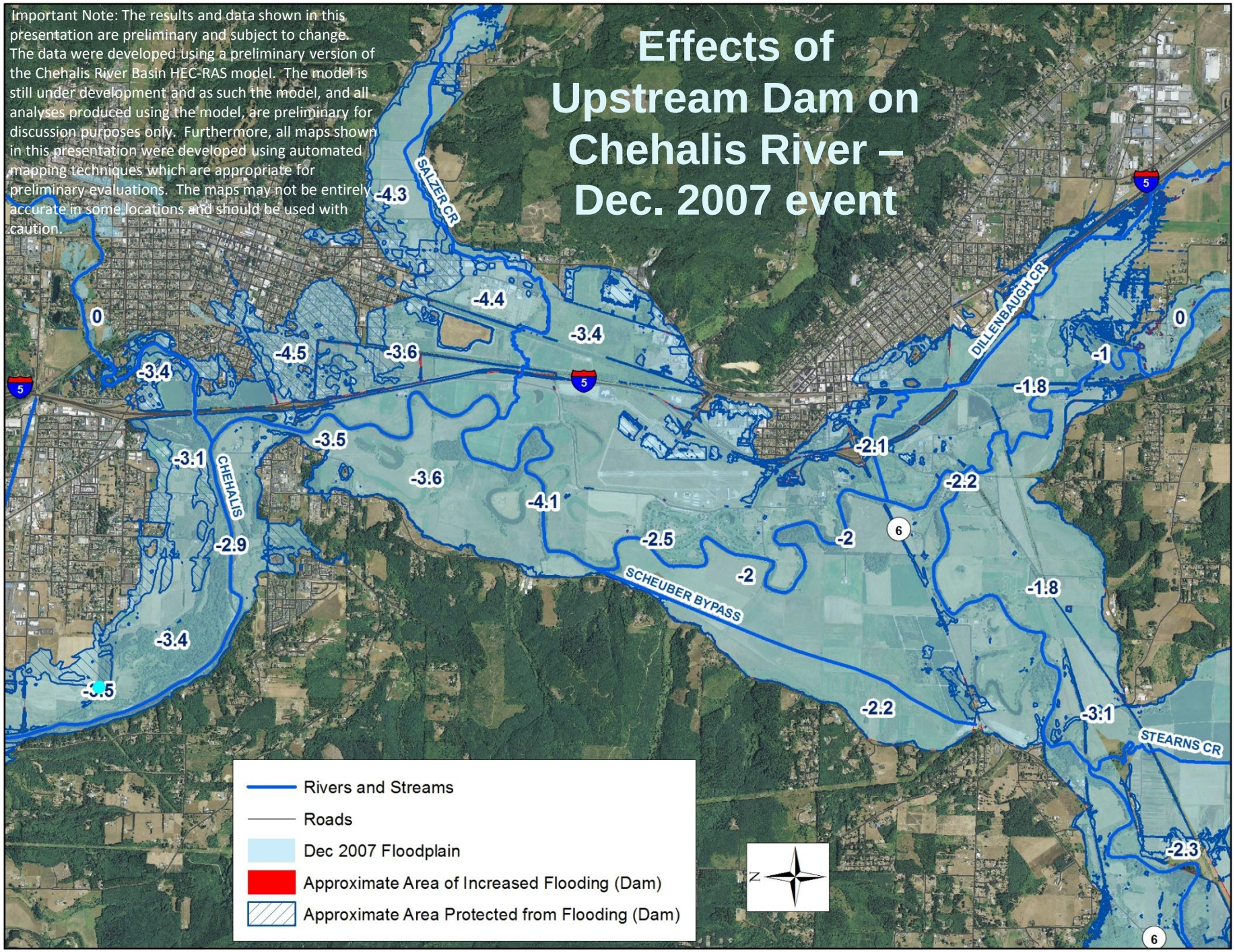
Upstream Dam on Chehalis River

- Upstream of Pe Ell
- 80,000 acre feet of dedicated flood control storage
- Assumed to have little or no outflow during flood
- Can fully capture 100-year or December 2007 flood



Upstream Dam on Chehalis River

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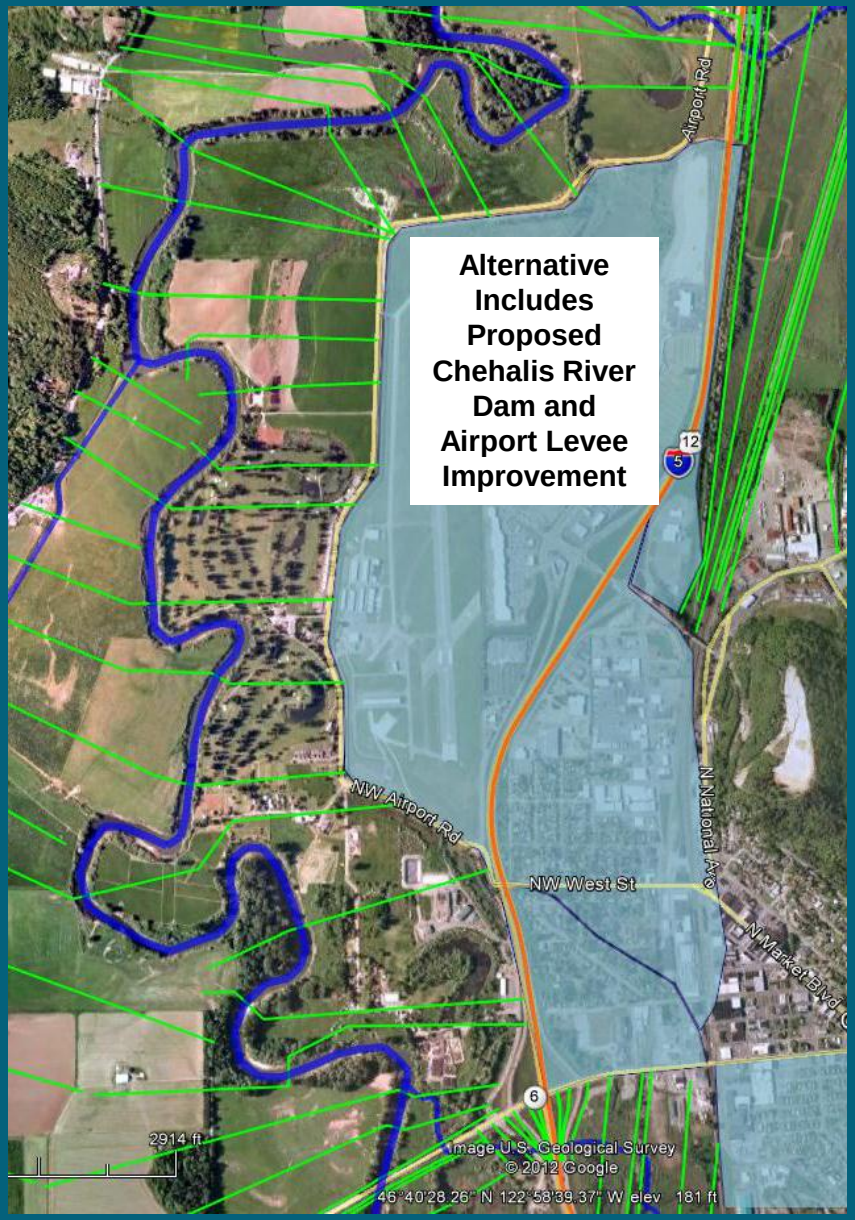
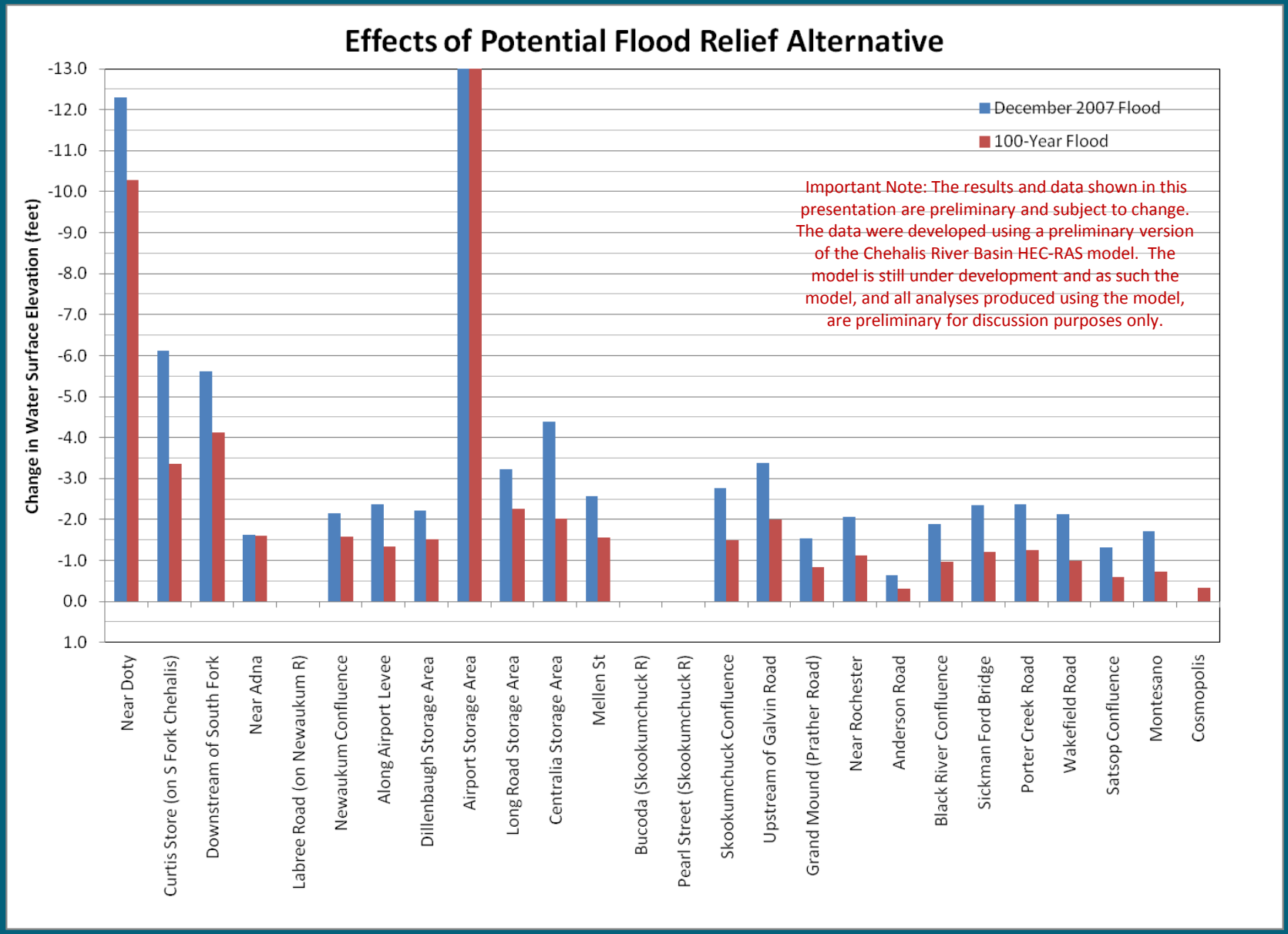
Effects of Upstream Dam on Chehalis River – Dec. 2007 event
SALZER CR
DILLENBAUGH CR
CHEHALIS
SCHEUBER BYPASS
STEARNS CR
-4.3
-4.4
-3.4
-4.5
-3.6
-3.5
-3.1
-3.6
-4.1
-2.9
-2.5
-2
-2.2
-1.8
-2.1
-1
-1.8
-3.4
-3.5
-2.2
-3.1
-2.3
0
Rivers and Streams
Roads
Dec 2007 Floodplain
Approximate Area of Increased Flooding (Dam)
Approximate Area Protected from Flooding (Dam)
N

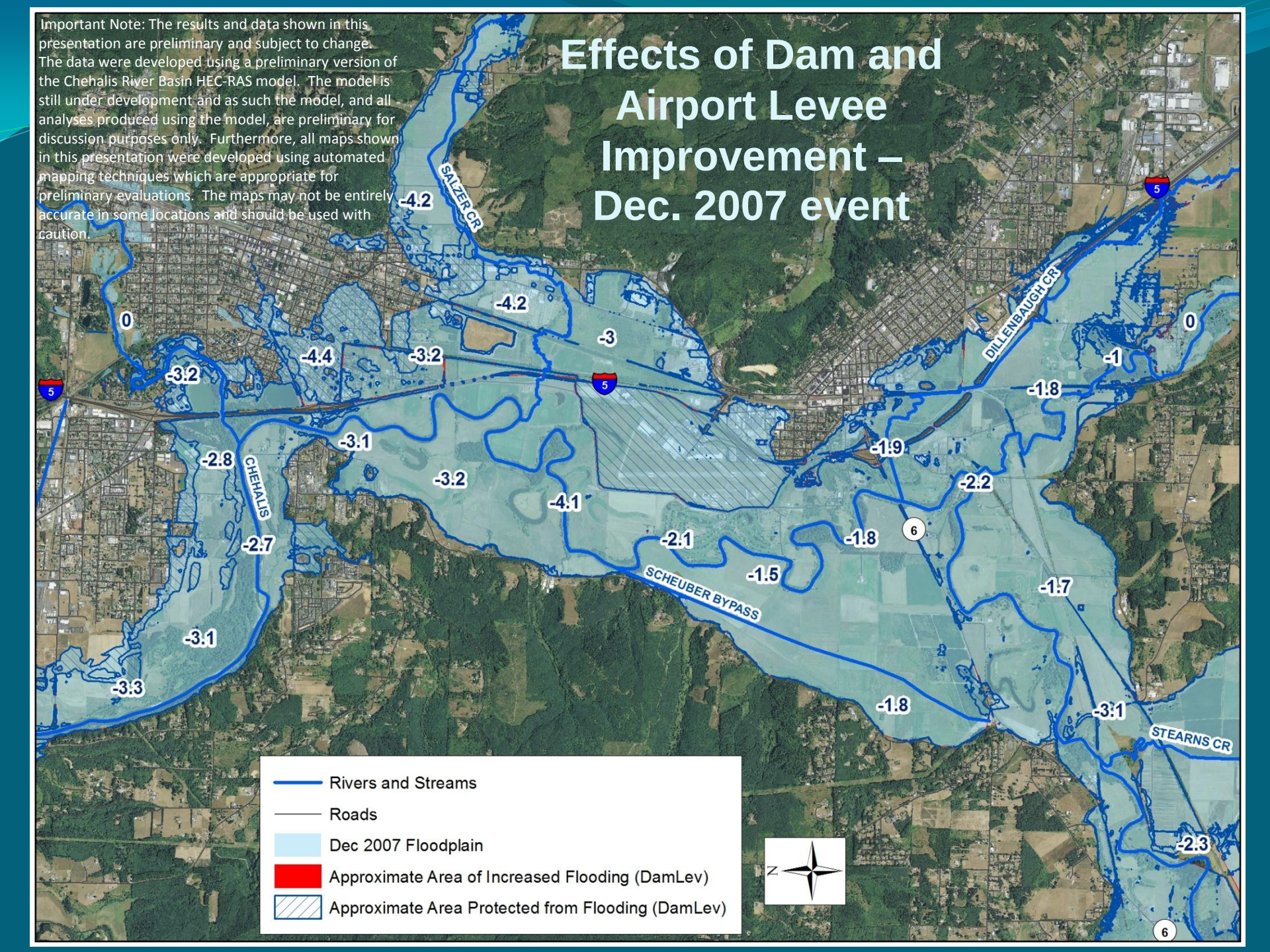
Upstream Dam on Chehalis River Plus Levee

- Includes Dam on Mainstem Chehalis River (same as earlier alternative)
- Add Airport levee raise



Upstream Dam on Chehalis River Plus Levee

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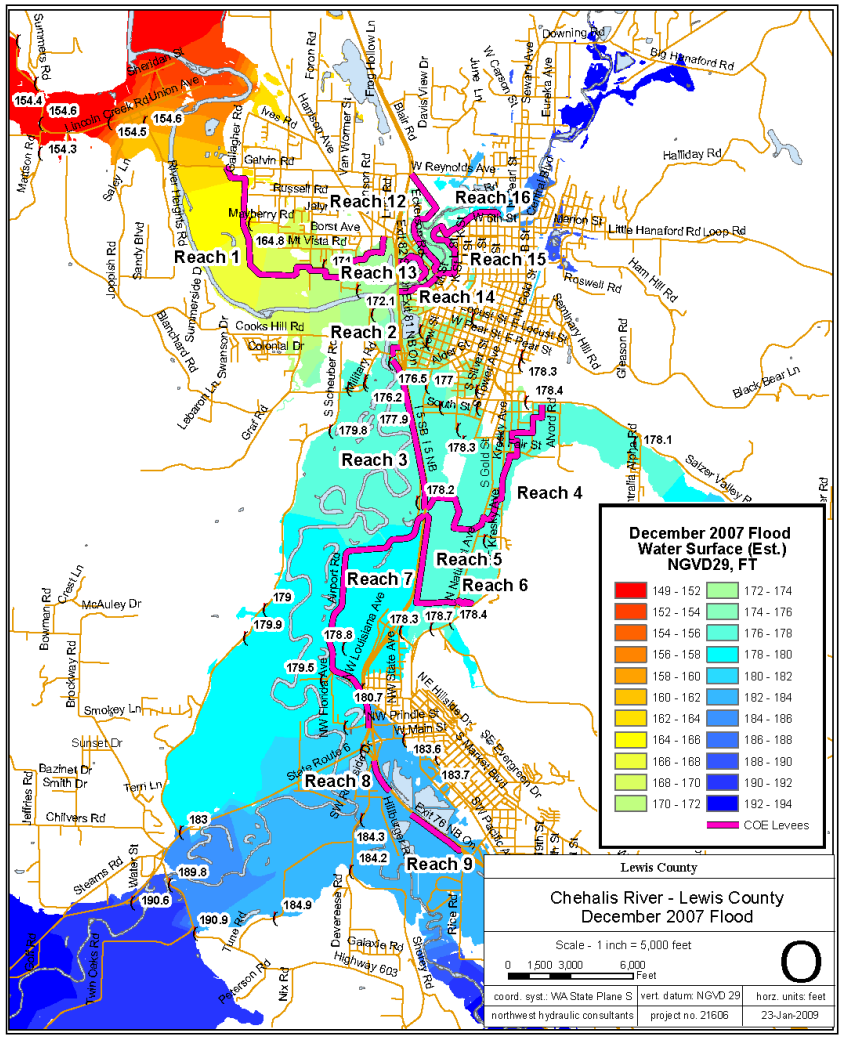
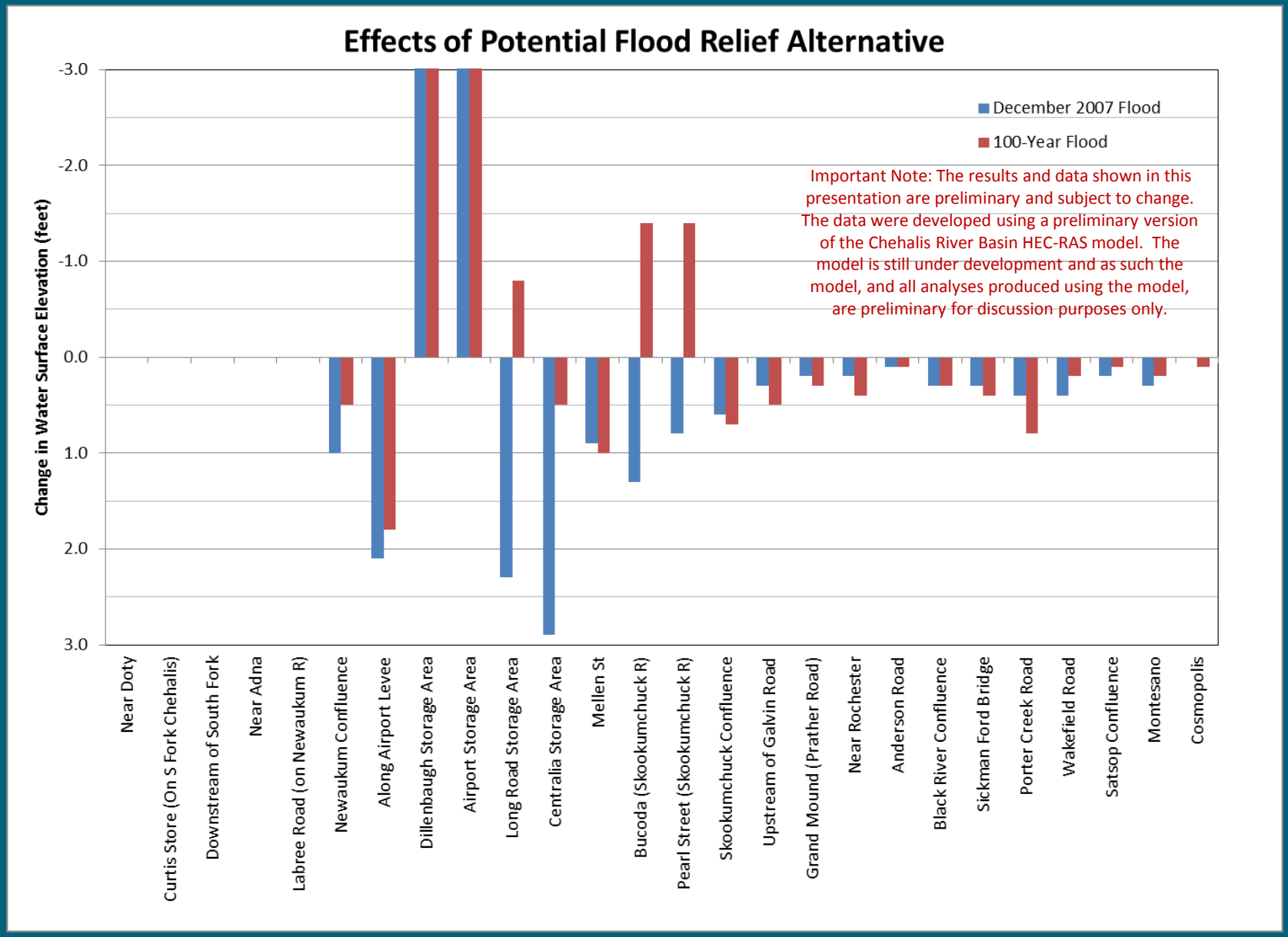
Effects of Dam and Airport Levee Improvement – Dec. 2007 event
SALZER CR
DILLENBAUGH CR
CHEHALIS
SCHEUBER BYPASS
STEARNS CR
-4.2
-4.2
-3
0
-4.4
-3.2
-3.2
-1
0
-1.8
-3.1
-1.9
-2.8
-3.2
-2.2
-4.1
-2.7
-2.1
-1.8
-1.5
-1.7
-3.1
-3.3
-1.8
-3.1
-2.3
Rivers and Streams
Roads
Dec 2007 Floodplain
Approximate Area of Increased Flooding (DamLev)
Approximate Area Protected from Flooding (DamLev)
N

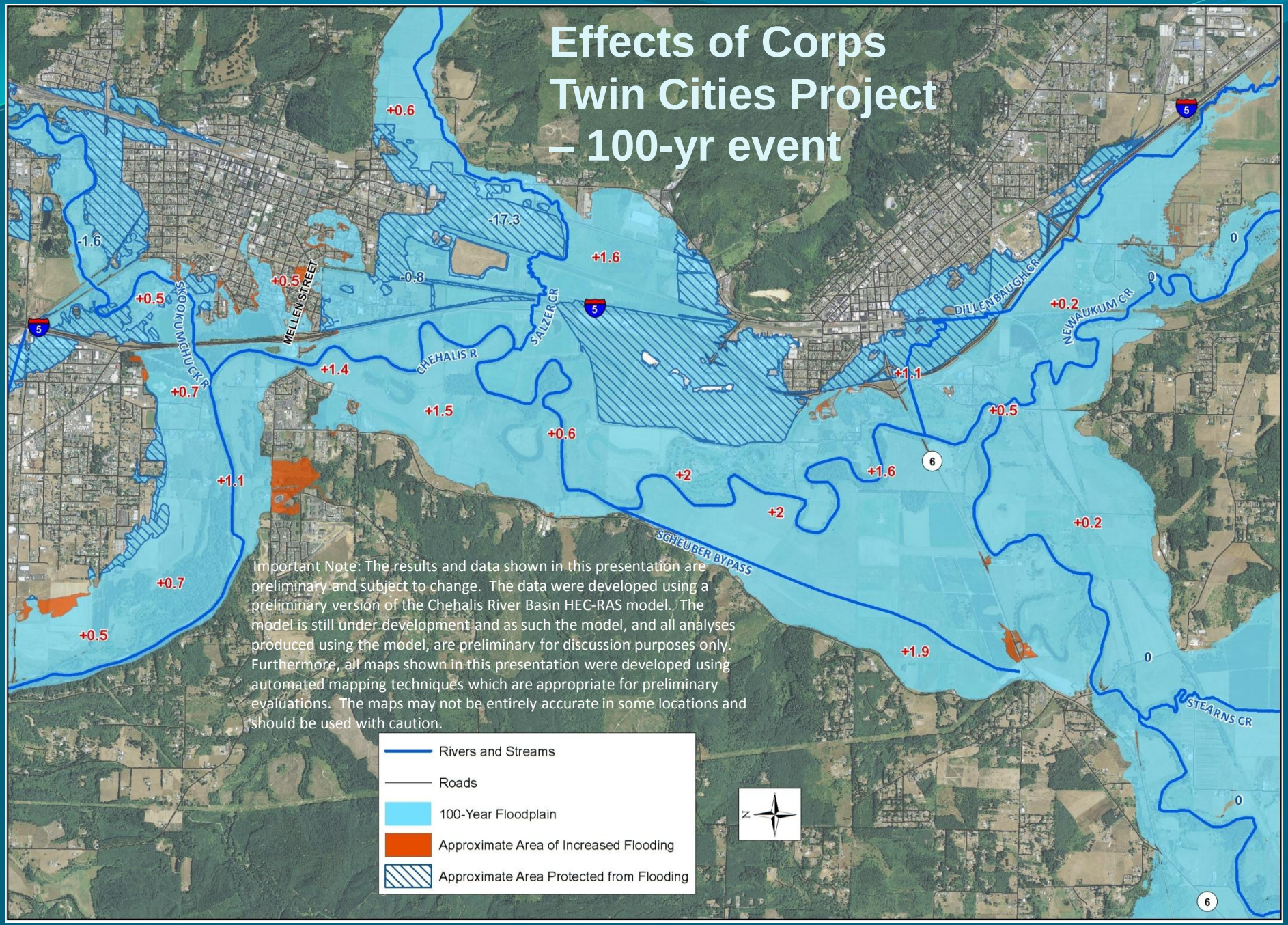
Corps Twin Cities Project

- Series of new or expanded levees, primarily near Centralia and Chehalis
- Reoperation of existing Skookumchuck Dam
- 11,000 acre feet of flood control storage



Corps Twin Cities Project




Effects of Corps Twin Cities Project – 100-yr event
+0.6
-17.3
-1.6
+1.6
+0.5
-0.8
+0.5
MELLEN STREET
SKOOKUMCHUCK R
CHEHALIS R
SALZER CR
DILLENBAUGH CR
NEWAUKUM CR
+0.2
+1.4
+1.1
+0.7
+1.5
+0.5
+0.6
+1.6
+1.1
+2
+2
+0.2
SCHEUBER BYPASS
+0.7
+0.5
+1.9
0
STEARNS CR
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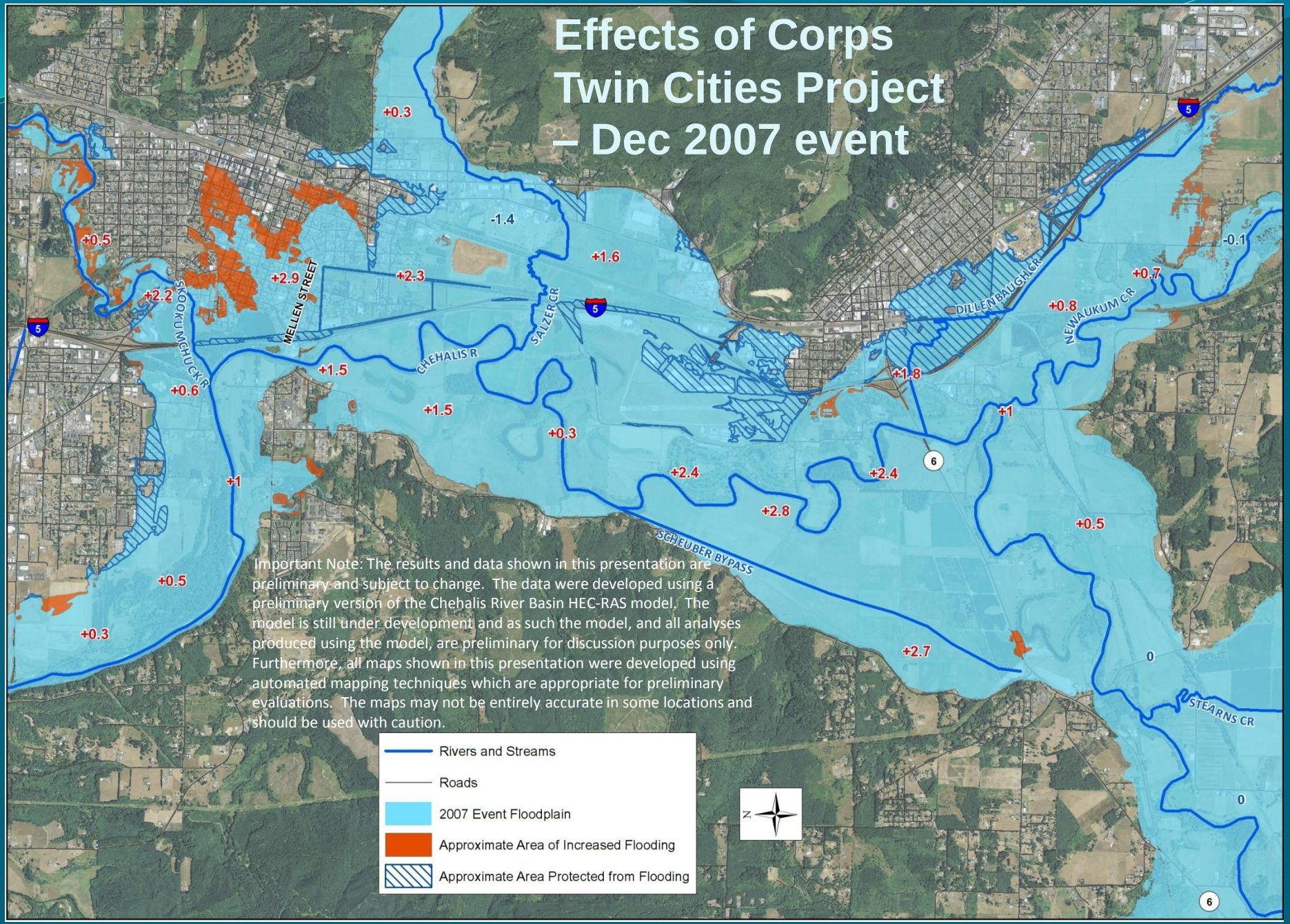
Rivers and Streams
Roads
100-Year Floodplain
Approximate Area of Increased Flooding
Approximate Area Protected from Flooding


Effects of Corps
Twin Cities Project
– Dec 2007 event
+0.3
-1.4
+0.5
+1.6
-0.1
+2.9
+2.3
+0.7
+2.2
+0.8
MELLEN STREET
SALZER CR
DILLENBAUGH CR
NEWAUKUM CR
SKOOKUMCHUCK R
CHEHALIS R
+1.5
+1.8
+0.6
+1.5
+1
+0.3
+2.4
+2.4
+1
+2.8
+0.5
SCHEUBER BYPASS
+0.5
+0.3
+2.7
0
STEARNS CR
0
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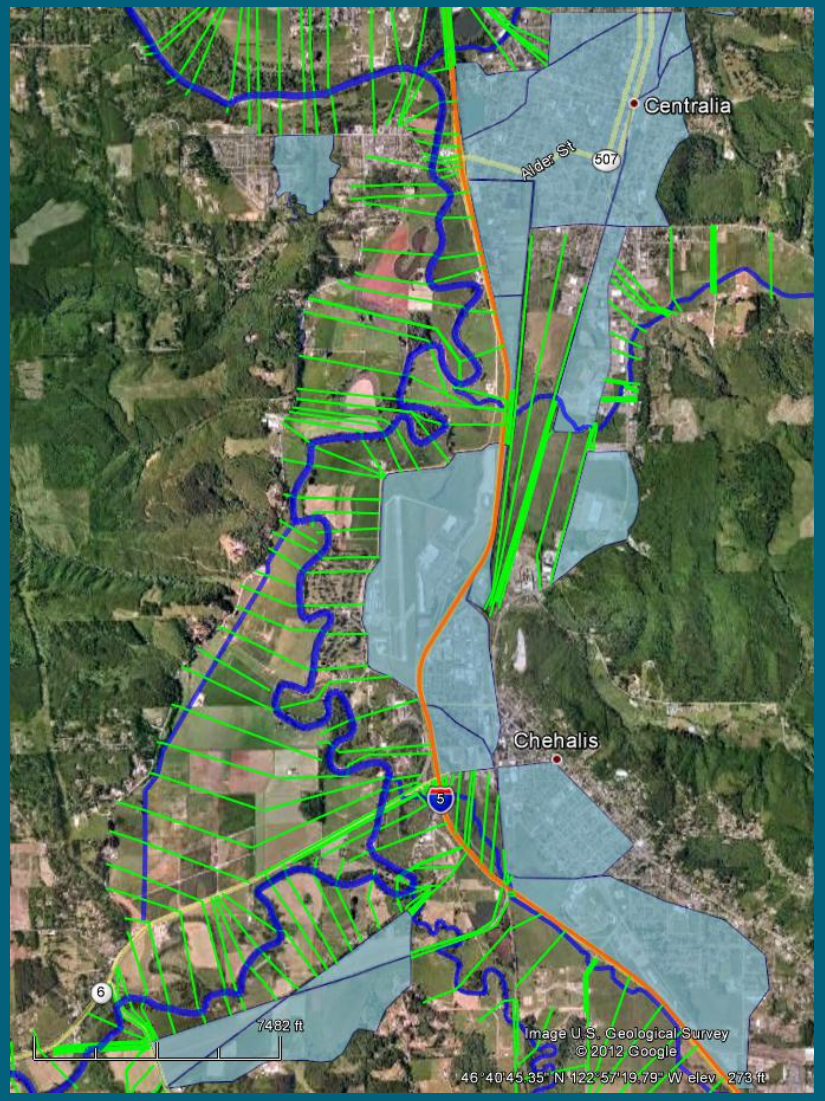
Rivers and Streams
Roads
2007 Event Floodplain
Approximate Area of Increased Flooding
Approximate Area Protected from Flooding
N

WSDOT I-5 Protection Project

- Isolation (flood proofing) I-5 via levee or floodwalls
- Consider with and without Airport levee raise
- 2012 MTB Project is part of baseline model



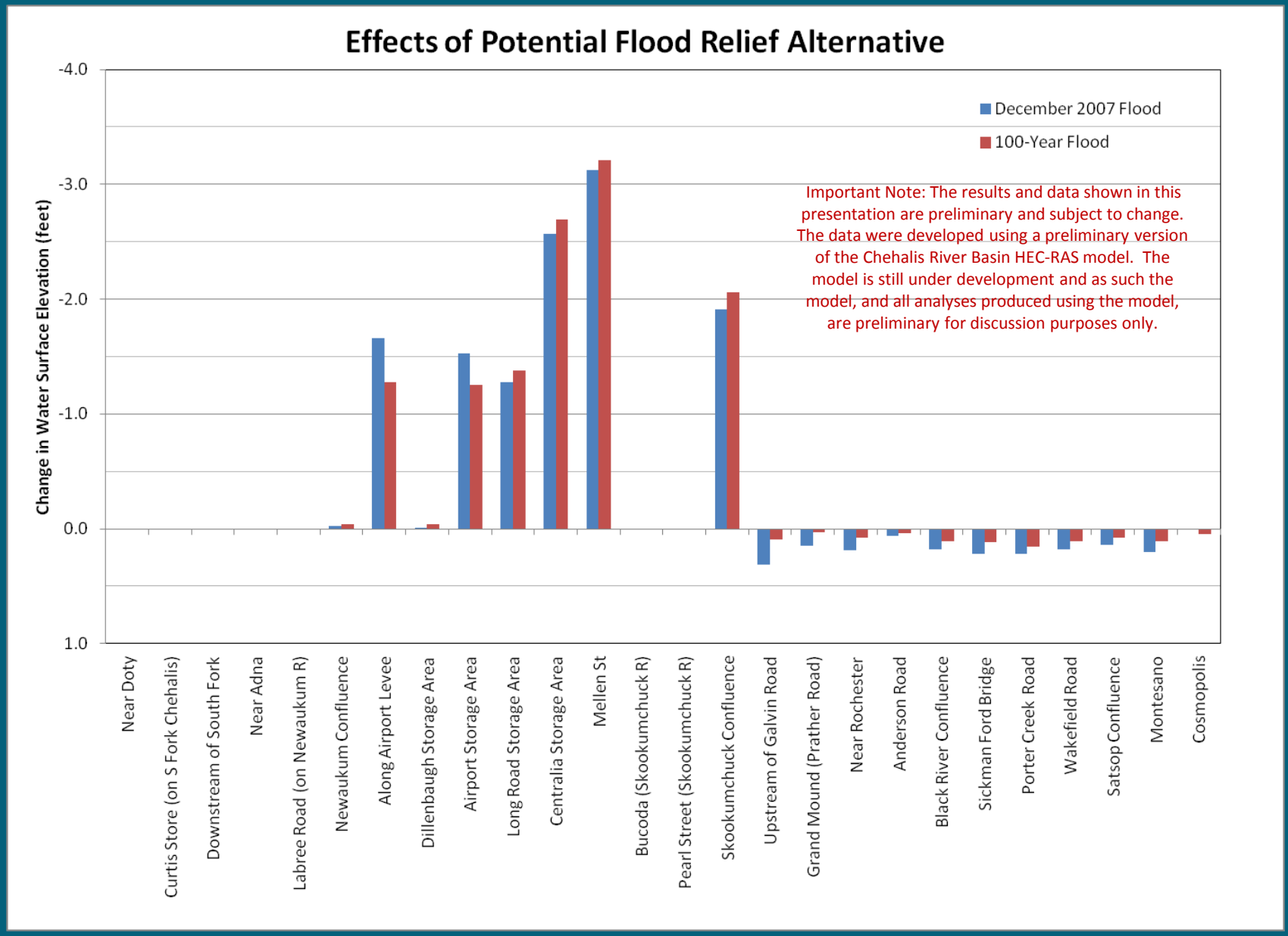
WSDOT I-5 Protection Project

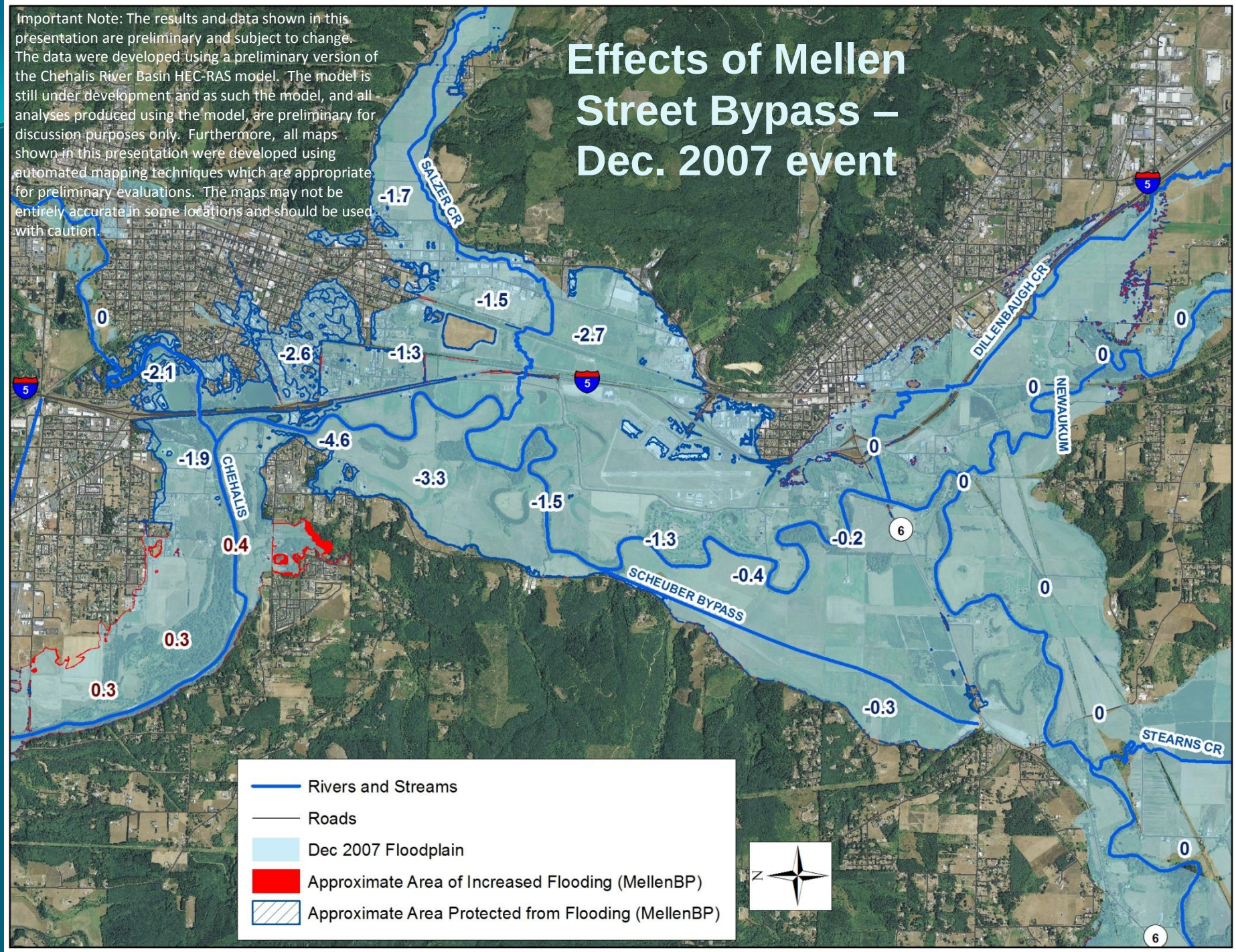
WSDOT and it's consultant will be producing and presenting results for this alternative at a later date

Mellen Street Bypass

- Flood Bypass on left bank
- Bypass Mellen Street Bridge and Skookumchuck Confluence
- 700-foot wide, 10-foot deep high flow channel
- Very Preliminary Evaluation Only

Mellen Street Bypass

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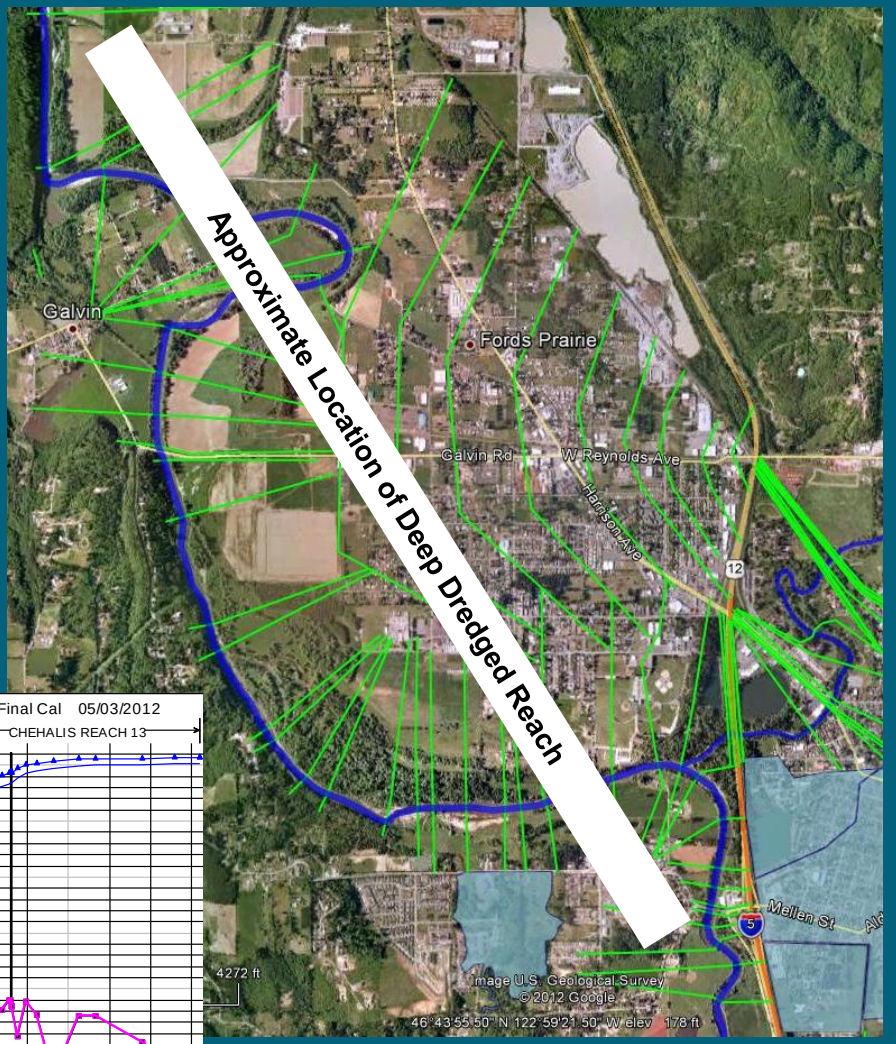
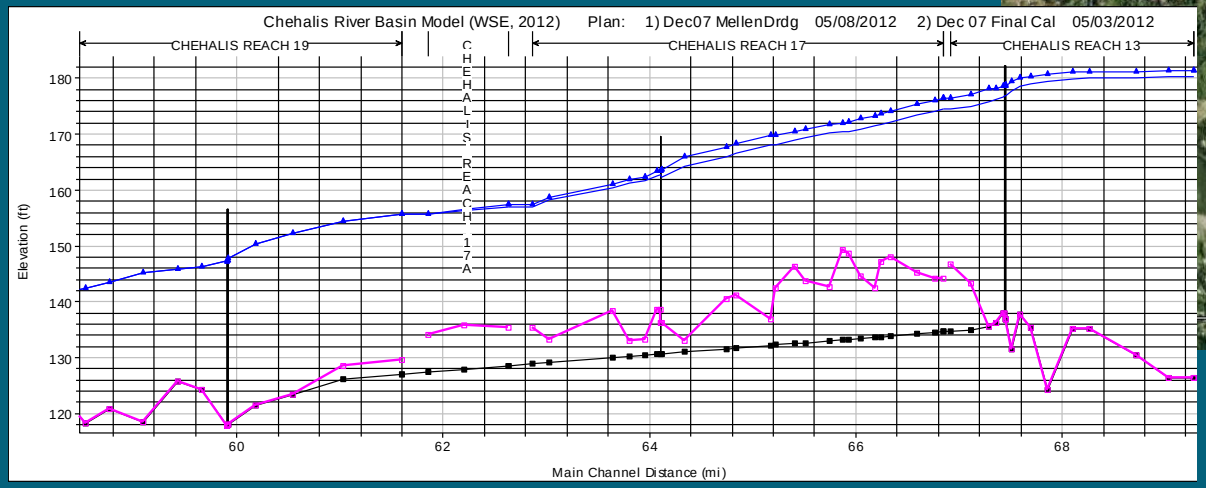
Effects of Mellen Street Bypass – Dec. 2007 event
SALZER CR
DILLENBAUGH CR
NEWAUKUM
CHEHALIS
SCHEUBER BYPASS
STEARNS CR
-1.7
-1.5
-2.7
-2.6
-1.3
-2.1
-4.6
-1.9
-3.3
-1.5
-1.3
-0.2
-0.4
-0.3
0.4
0.3
0.3
0
Rivers and Streams
Roads
Dec 2007 Floodplain
Approximate Area of Increased Flooding (MellenBP)
Approximate Area Protected from Flooding (MellenBP)
N

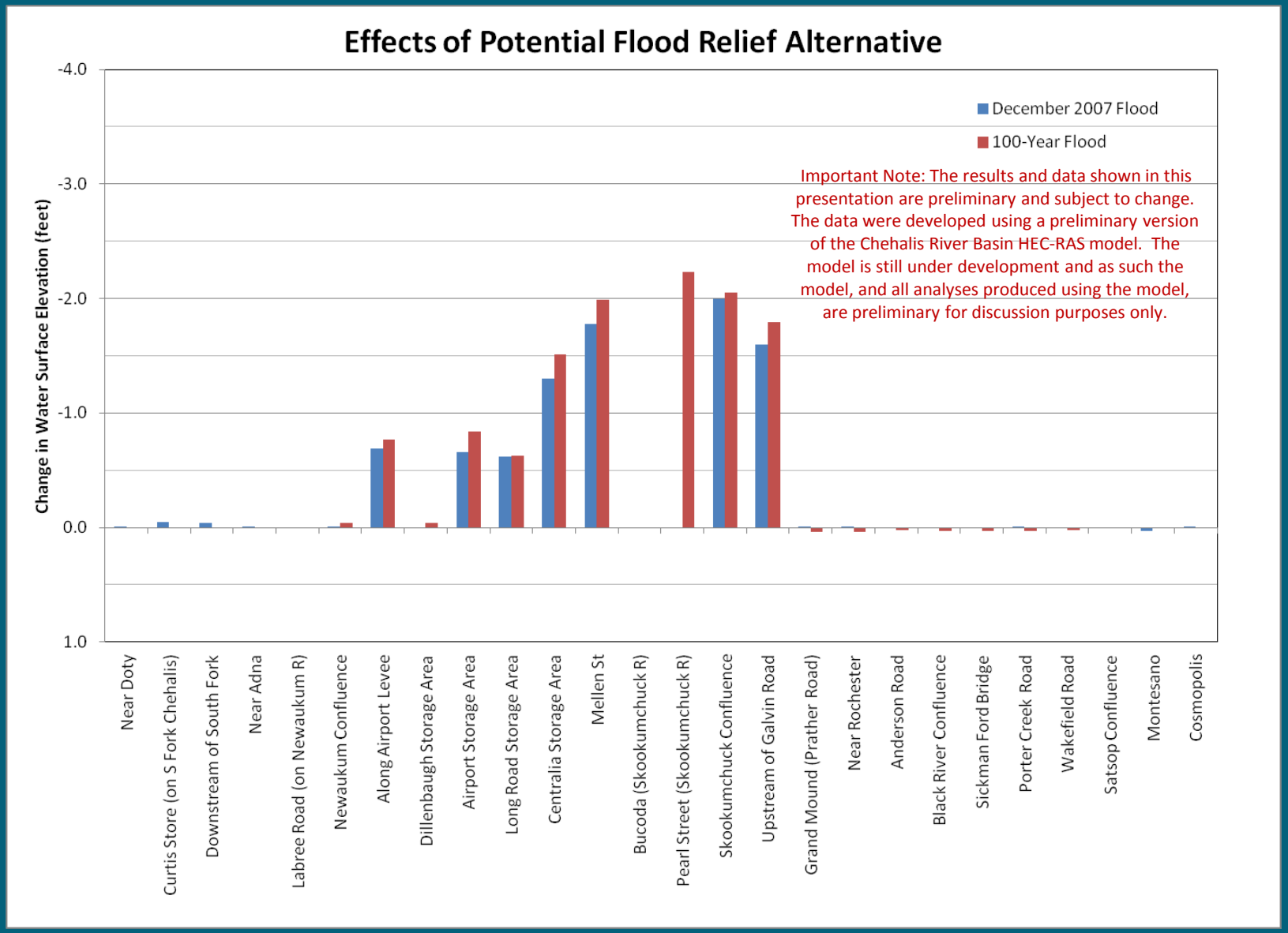
Dredge Mellen St to Lincoln Creek

- Dredge main channel from D/S of Mellen Street to D/S of Lincoln Creek
- 150-ft bottom, up to 15 feet deep
- Remove “hump” in channel





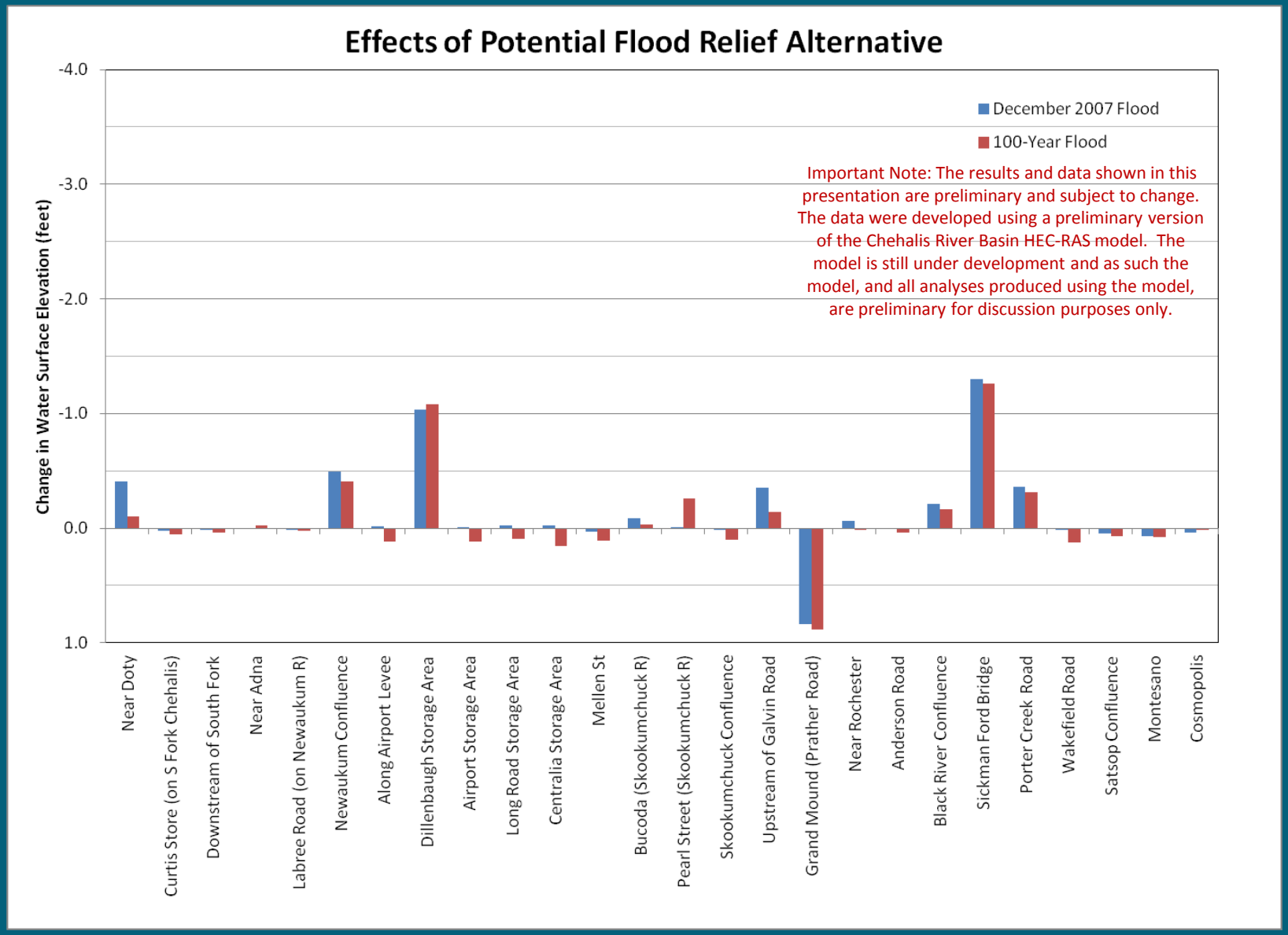
Dredge Mellen St to Lincoln Creek



Bridge Removal

- Remove all Bridges in Chehalis River Model
- Also Evaluate Individual bridge replacements at SR-6, Mellen Street, Galvin Road, Sickman Ford

Basin-Wide Bridge Removal



Bridge Removal – Individual Bridges

Bridge Alternatives Analysis Summary

Location		Max Water Surface Elevation (feet NAVD) or Change in Flood Water Surface (feet)										
		Dec 07	Dec w/o Bridges	Change	Dec w/o Hwy 6	Change	Dec w/o Mellen	Change	Dec w/o Galvin	Change	Dec w/o SickFord	Change
Description	X-section	(ft NAVD)	(ft NAVD)	(ft)	(ft NAVD)	(ft)	(ft NAVD)	(ft)	(ft NAVD)	(ft)	(ft NAVD)	(ft)
Near Doty	100.95	328.11	327.70	-0.41	328.11	0.00	328.11	0.00	328.12	0.01	328.11	0.00
Curtis Store (on S Fork Chehalis)	1.81	238.94	238.97	0.03	238.92	-0.02	238.92	-0.02	238.93	-0.01	238.92	-0.02
Downstream of South Fork	86.42	227.68	227.70	0.02	227.66	-0.02	227.66	-0.02	227.67	-0.01	227.66	-0.02
Near Adna	80.23	197.90	197.91	0.01	197.89	-0.01	197.89	-0.01	197.90	0.00	197.89	-0.01
Labree Road (on Newaukum R)	4.11	204.67	204.68	0.01	204.67	0.00	204.67	0.00	204.67	0.00	204.67	0.00
Newaukum Confluence	75.2	186.62	186.13	-0.49	186.28	-0.34	186.62	0.00	186.62	0.00	186.62	0.00
Along Airport Levee	71.49	182.00	181.99	-0.01	182.00	0.00	181.96	-0.04	182.01	0.01	182.00	0.00
Dillenbaugh Storage Area	SA #301	186.56	185.53	-1.03	186.27	-0.29	186.56	0.00	186.57	0.01	186.56	0.00
Airport Storage Area	SA #2	182.02	182.01	-0.01	182.03	0.01	181.99	-0.03	182.03	0.01	182.02	0.00
Long Road Storage Area	SA #5	179.53	179.51	-0.02	179.53	0.00	179.49	-0.04	179.54	0.01	179.53	0.00
Centralia Storage Area	SA #610	178.90	178.88	-0.02	178.91	0.01	178.84	-0.06	178.92	0.02	178.90	0.00
Mellen St	67.43	178.53	178.56	0.03	178.54	0.01	178.57	0.04	178.53	0.00	178.53	0.00
Bucoda (Skookumchuck R)	11.1	244.21	244.12	-0.09	244.21	0.00	244.21	0.00	244.21	0.00	244.21	0.00
Pearl Street (Skookumchuck R)	2.43	186.76	186.75	-0.01	186.76	0.00	186.76	0.00	186.76	0.00	186.76	0.00
Skookumchuck Confluence	66.88	176.48	176.49	0.01	176.48	0.00	176.48	0.00	176.47	-0.01	176.48	0.00
Upstream of Galvin Road	64.9	168.27	167.92	-0.35	168.28	0.01	168.28	0.01	167.90	-0.37	168.28	0.01
Grand Mound (Prather Road)	59.909	147.39	148.22	0.83	147.40	0.01	147.39	0.00	147.40	0.01	147.39	0.00
Near Rochester	54.476	124.25	124.19	-0.06	124.25	0.00	124.24	-0.01	124.26	0.01	124.25	0.00
Anderson Road	51.499	106.03	106.03	0.00	106.03	0.00	106.02	-0.01	106.03	0.00	106.03	0.00
Black River Confluence	46.937	92.94	92.73	-0.21	92.95	0.01	92.93	-0.01	92.96	0.02	92.68	-0.27
Sickman Ford Bridge	44.175	85.52	84.22	-1.30	85.53	0.01	85.51	-0.01	85.54	0.02	84.18	-1.34
Porter Creek Road	33.6	54.67	54.31	-0.36	54.68	0.01	54.66	-0.01	54.69	0.02	54.69	0.02
Wakefield Road	23.96	39.63	39.64	0.01	39.63	0.00	39.61	-0.02	39.64	0.01	39.64	0.01
Satsop Confluence	19.89	34.47	34.52	0.05	34.48	0.01	34.47	0.00	34.48	0.01	34.49	0.02
Montesano	12.5	17.17	17.24	0.07	17.18	0.01	17.16	-0.01	17.19	0.02	17.20	0.03
Cosmopolis	1.99	11.00	11.04	0.04	11.00	0.00	11.00	0.00	11.03	0.03	11.00	0.00

Note: Negative change means that the alternative has lower simulated water levels, positive change indicates the alternative raises water levels.

Project Status Update

Preliminary (USACE) Model Distributed – February 14, 2012

Modeling Meeting with State team – February 23, 2012

Distribution of Refined Model – March 7, 2012

Comments from State Tech Team and USACE – March 30, 2012

Final Existing Conditions Model Distributed - May 3, 2012

Preliminary Alternative Runs Completed – May 9, 2012

WSDOT Updating Baseline Geometry to Include MTB Project

Modeling of Alternatives to be Updated – by May 31, 2012

Reporting and Presentation of Results – June 2012

Questions and next steps