COLLEGE OF THE ENVIRONMENT
UNIVERSITY of WASHINGTON

Flooding and climate change

Guillaume Mauger
Climate Impacts Group
gmauger@uw.edu
206.685.0317

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CLIMATE IMPACTS GROUP

Climate Science in the Public Interest

Technical Expertise in Support of Adaptation

- Locally-specific information about climate impacts for planning purposes
- Scientific synthesis and assessments
- Identification of emerging climate impacts, risks and vulnerabilities
- Expertise for adaptation planning processes and approaches
- Technical review of agency climate science

Background:

it’s warming

All scenarios project warming

2050s *(relative to 1950-1999)*	
Low emissions *(RCP 4.5)*	+4.3°F *(2.0-6.7°F)*
High emissions *(RCP 8.5)*	+5.8°F *(3.1-8.5°F)*

Projected Change in Average Annual PNW Temperature
(relative to 1950-1999 average)

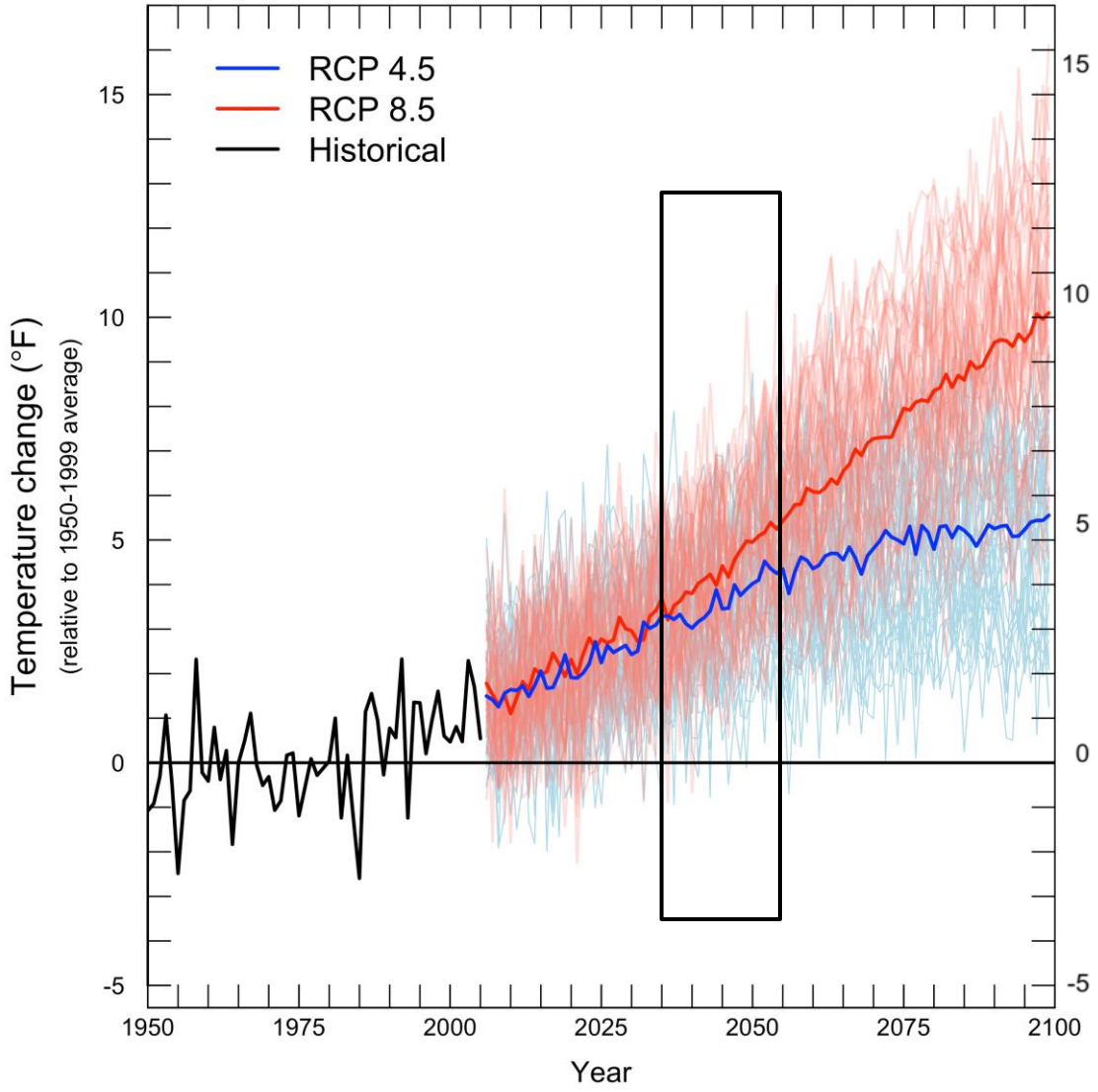


Figure source: Climate Impacts Group, based on projections used in IPCC 2013; 2050 projections from Mote et al. 2013

Changing flood risk:

Sea level rise,

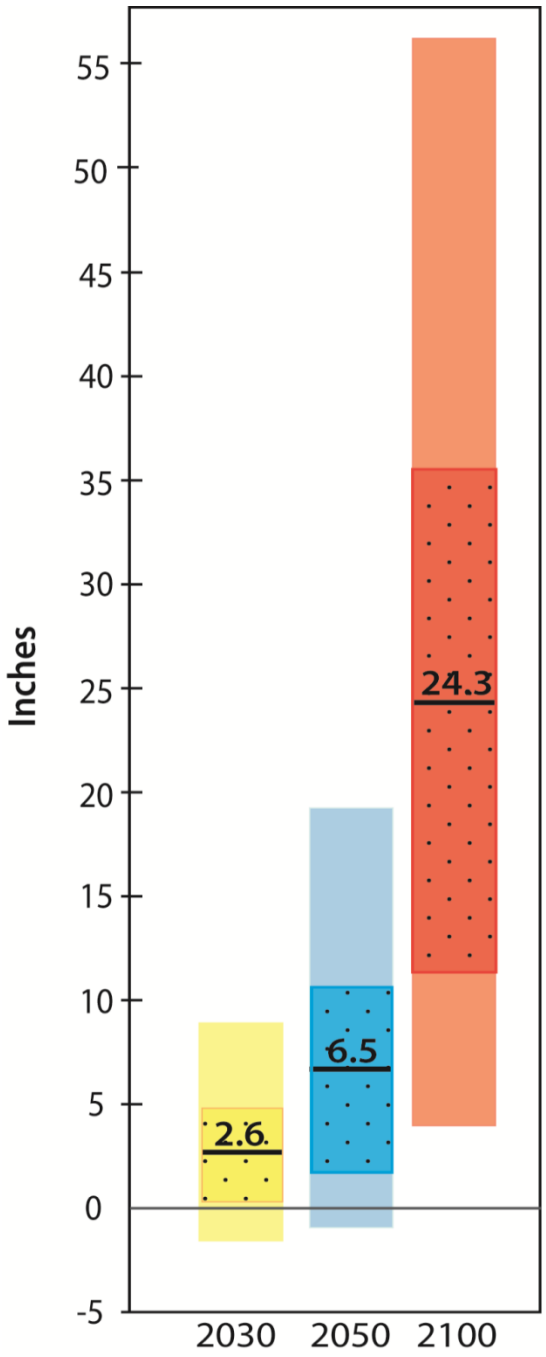
Snow, and

Heavy precipitation

Sea Level Rise:

Projected in All Scenarios by 2100

Projected Range, Seattle *Relative to 2000 (NRC 2012)*	
2030	−1.5 to +8.8 inches
2050	−1.0 to +18.8 inches
2100	+3.9 to +56.3 inches



Changing flood risk:

Sea level rise,

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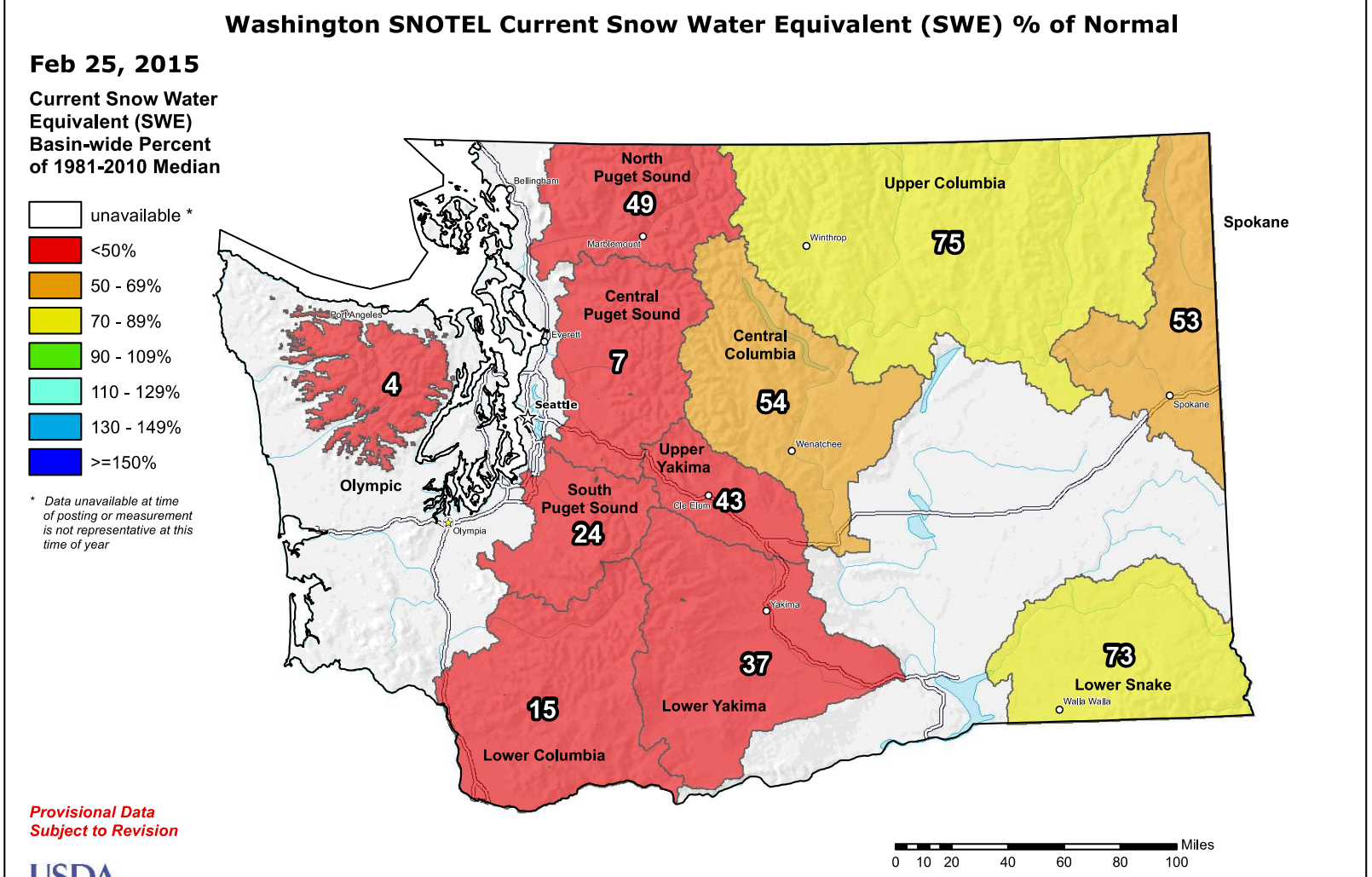
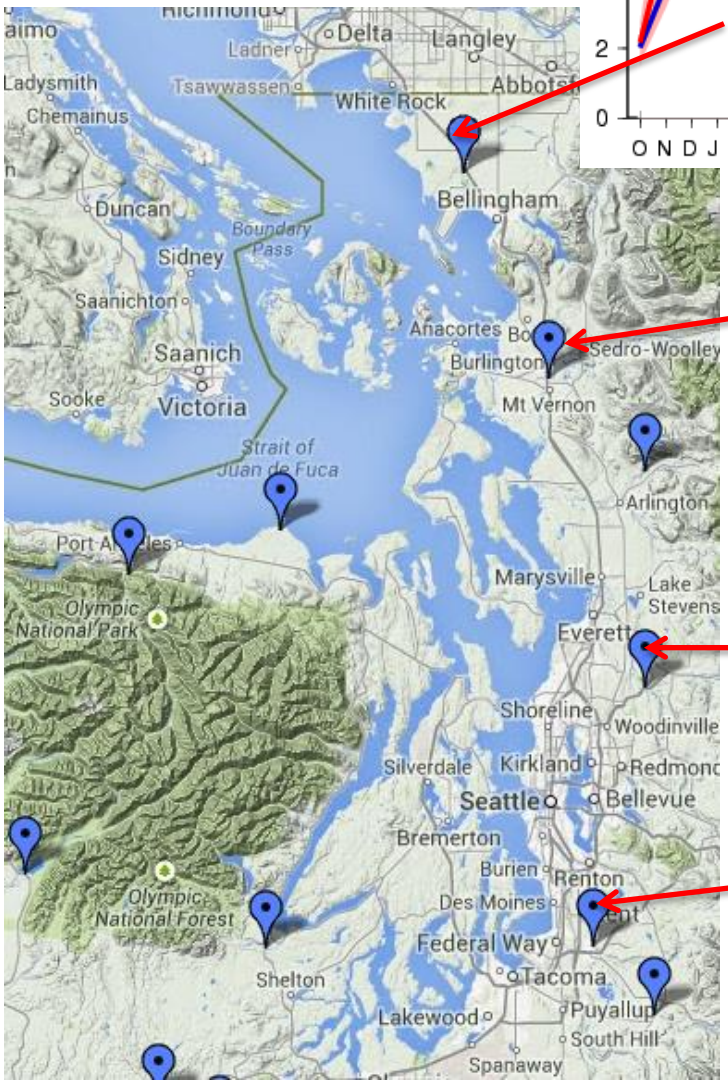
Winter 2015: An analog for the future

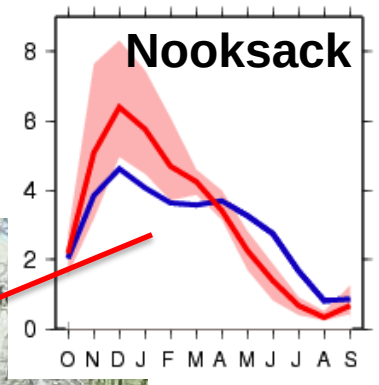


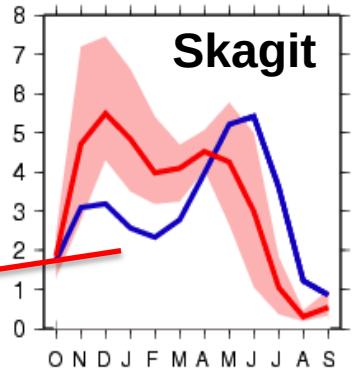
Data downloaded on Feb. 25, 2015:
http://www.wcc.nrcs.usda.gov/snow/

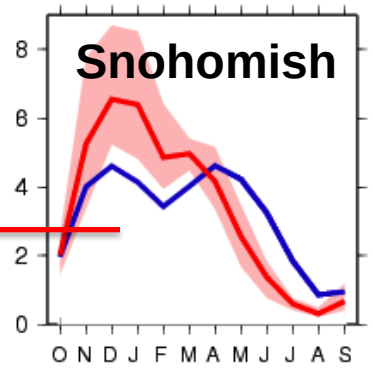
Based on a majority of climate models, this year's conditions will be *the new normal* ***by 2050***

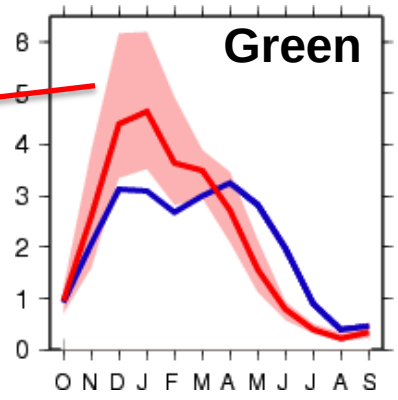
Less snow











= more winter runoff

Changing flood risk:

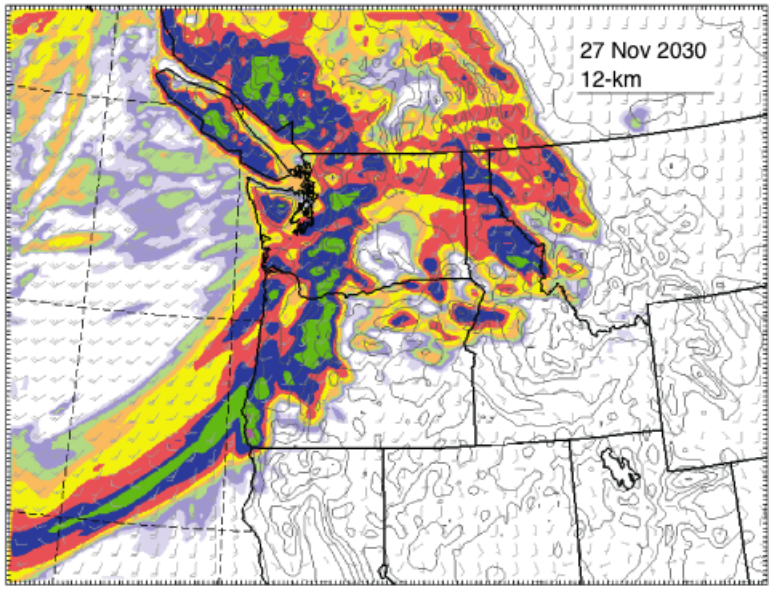
Sea level rise,

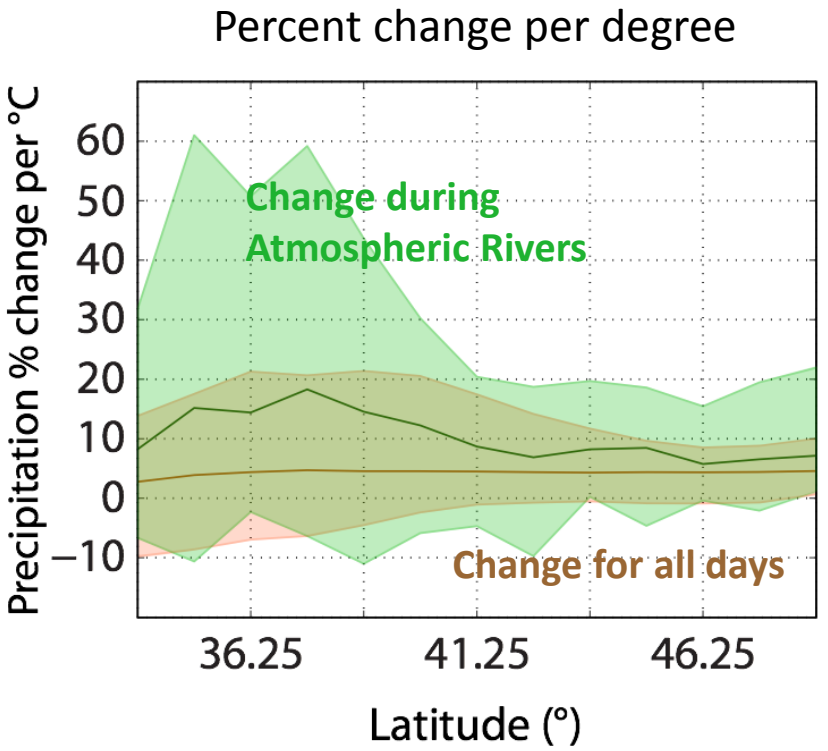
Snow, and

Heavy precipitation

Atmospheric rivers: *strong response to warming*

(aka "Pineapple Express")





- Changes in normal precipitation: 1.5-3.5% per degree
- ***Changes in extreme:*** 5-12% per degree

Warner et al, 2014

Changing flood risk:

Sea level rise,

Snow, and

Heavy precipitation

Others?

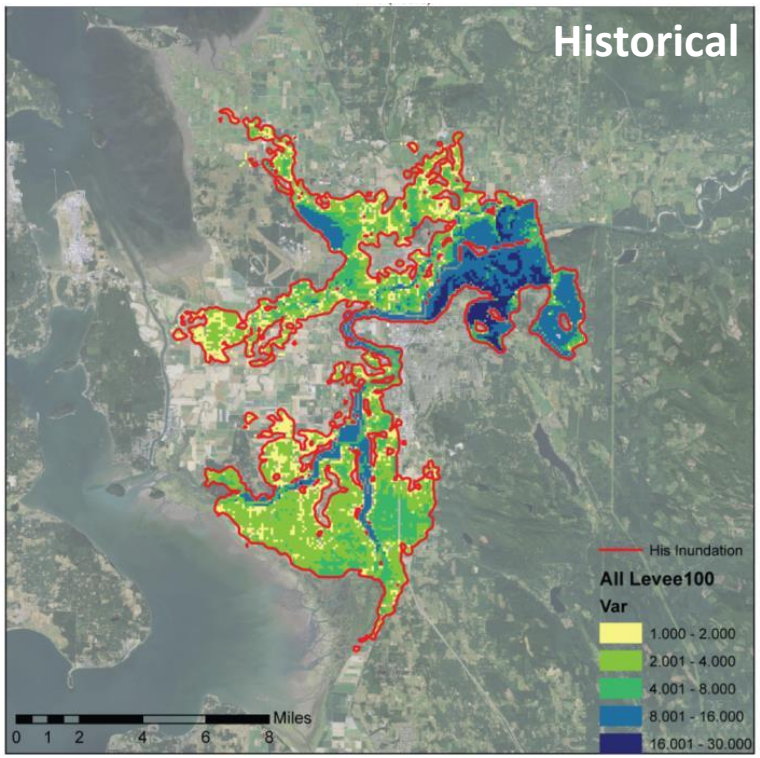
Other climate impacts on flooding?

- **Storm surge: No change**
- **Sediment: Increasing.**
  - Fewer glaciers, heavier precip
- **Forest cover: ???**
  - Wildfires, insect outbreaks, development/logging

Consequences:

Making our data useful

Skagit River:



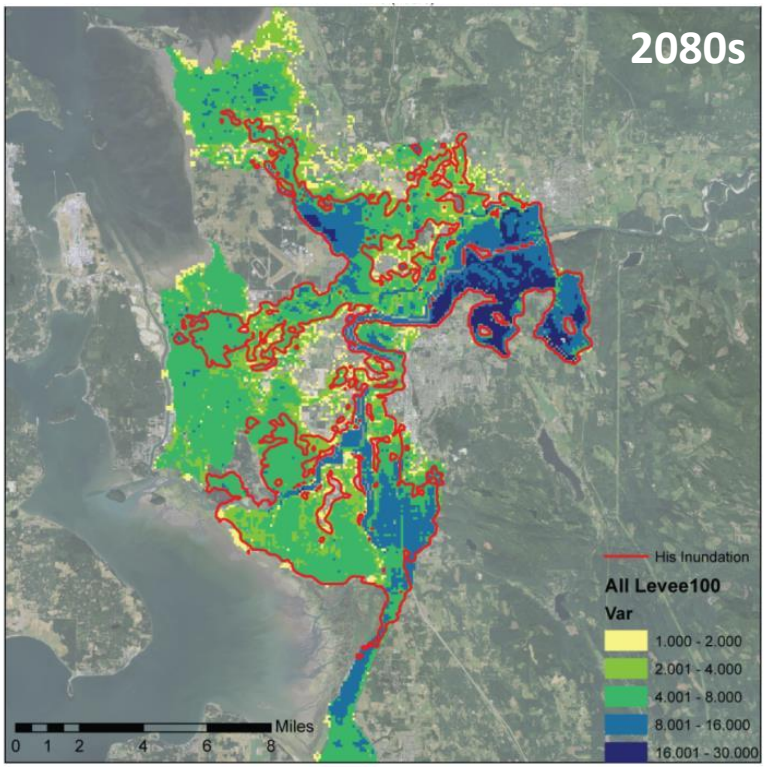
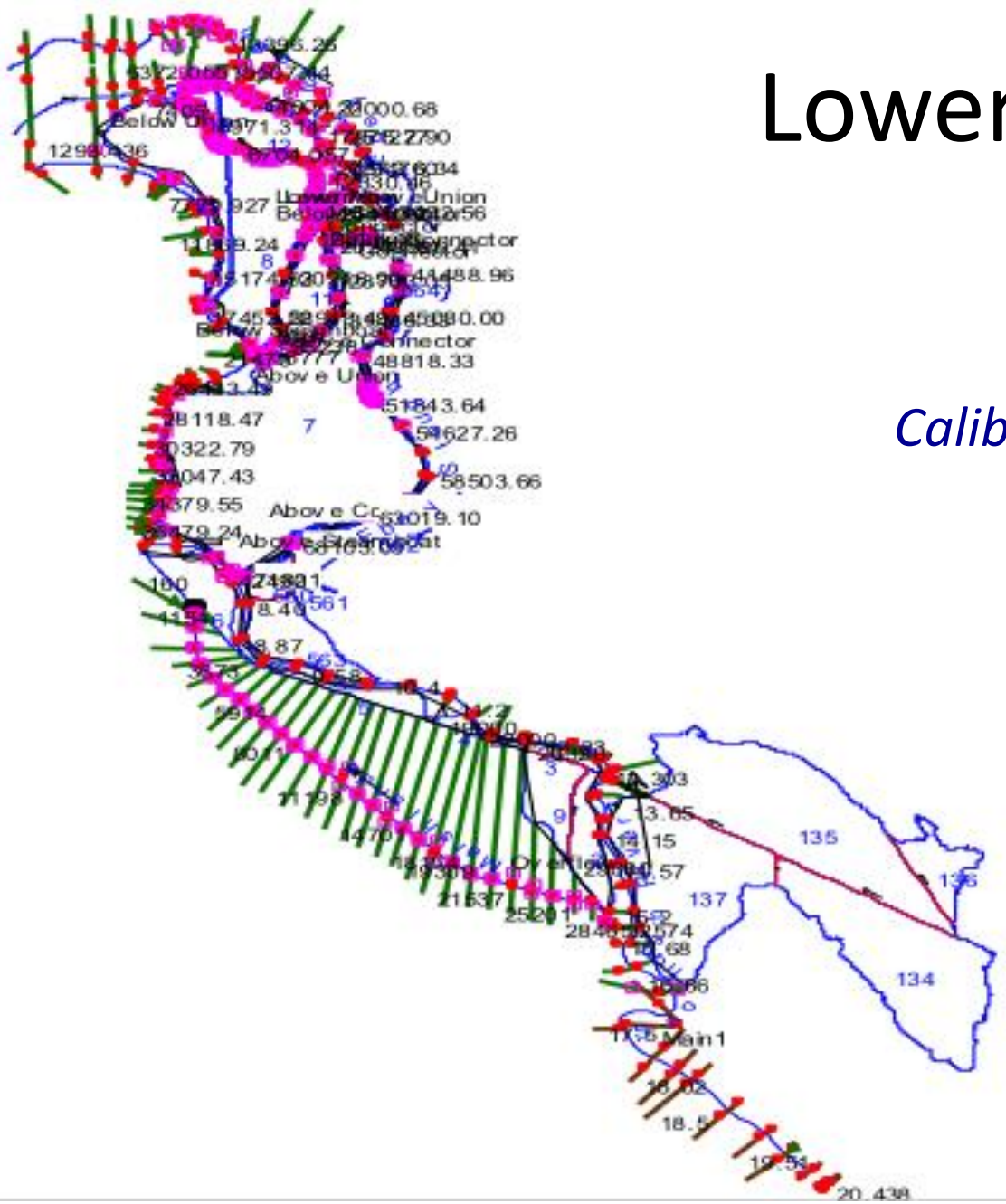


Figure Source: Joe Hamman, UW



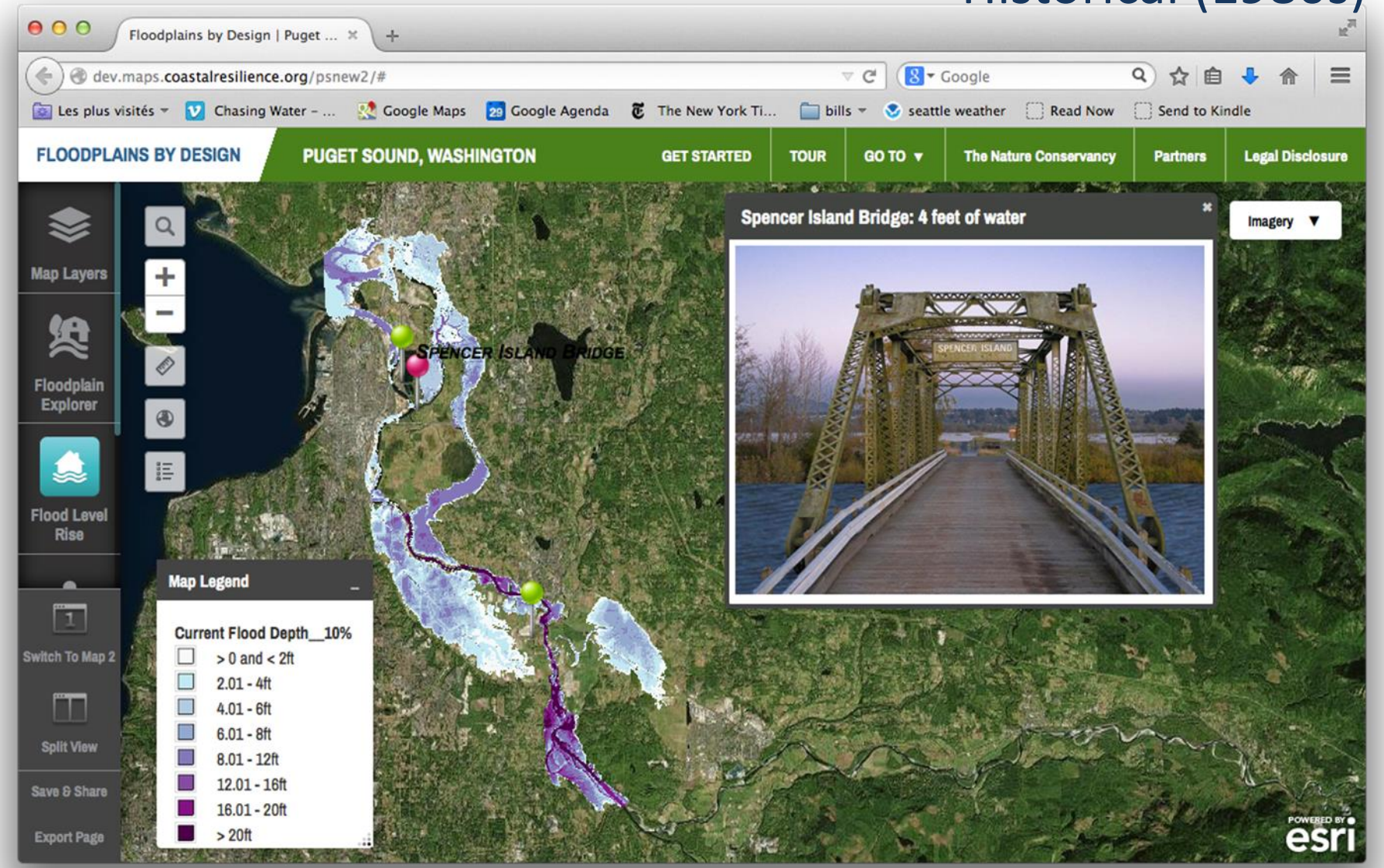
Lower Snohomish: 1D HEC-RAS

Calibrated on Nov 1990 and Jan 2009 floods

WEST Consultants, Inc.

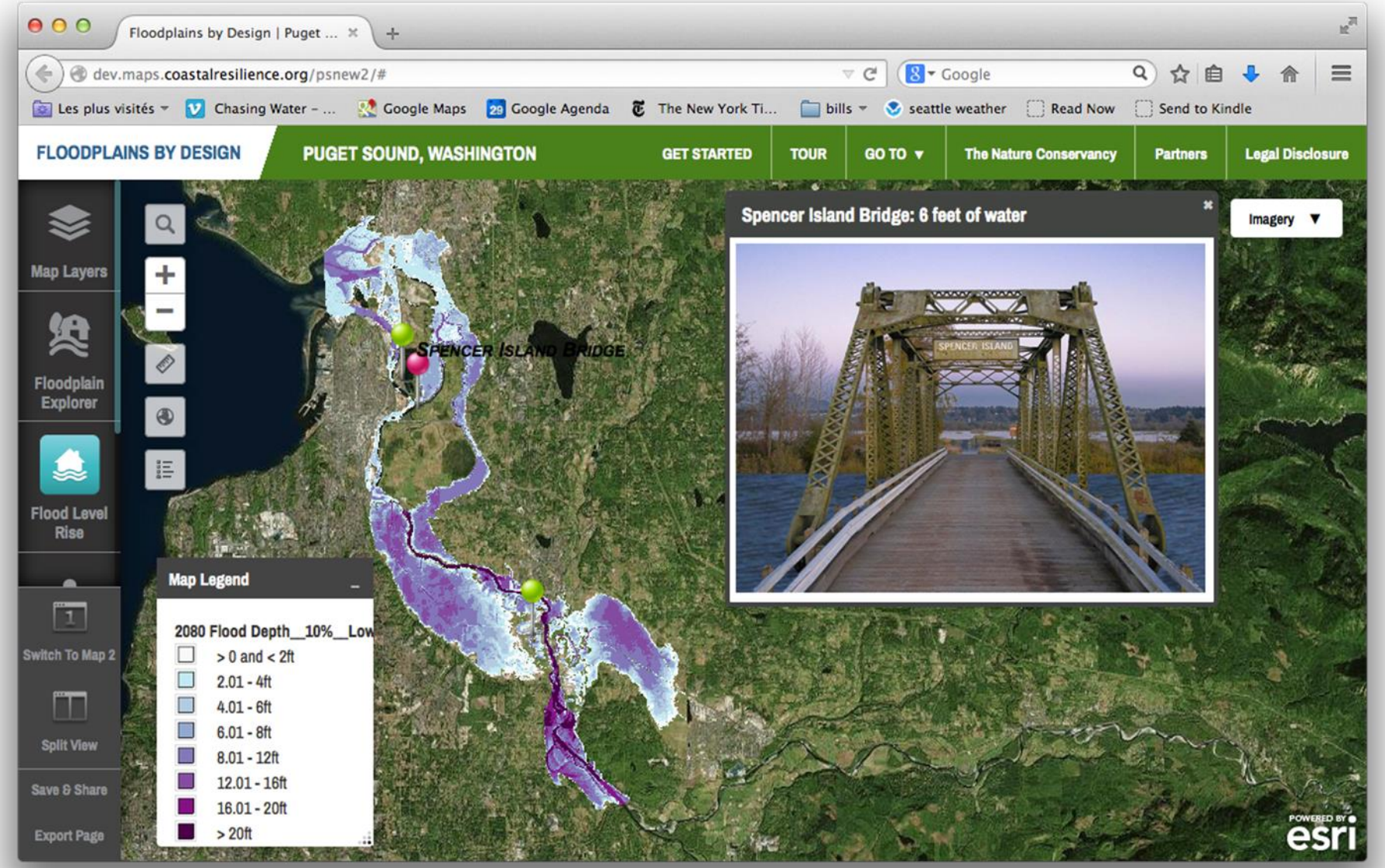
Results

10-year Flood, Historical (1980s)



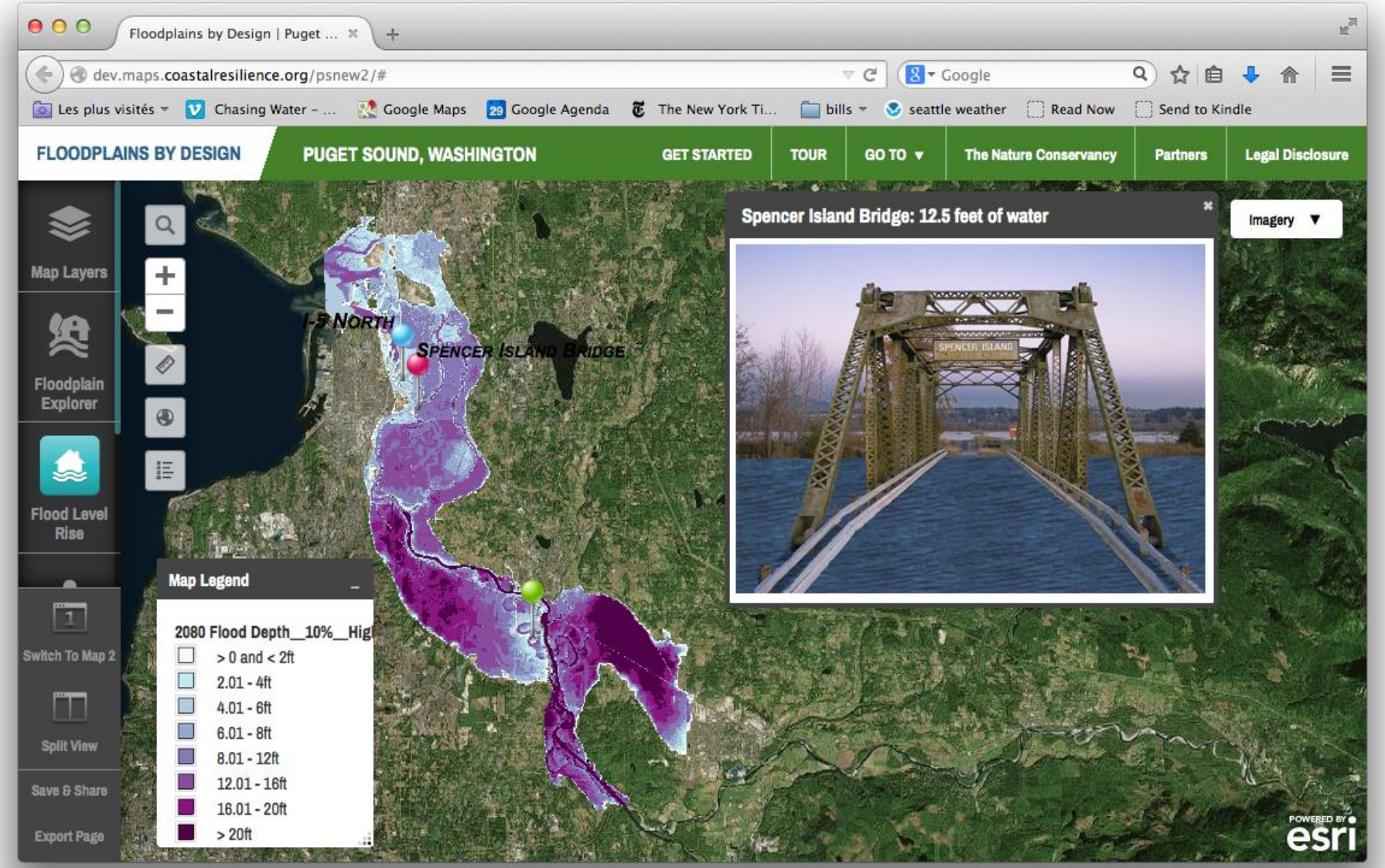
Results

10-year Flood, A1b 2080s, Low



Results

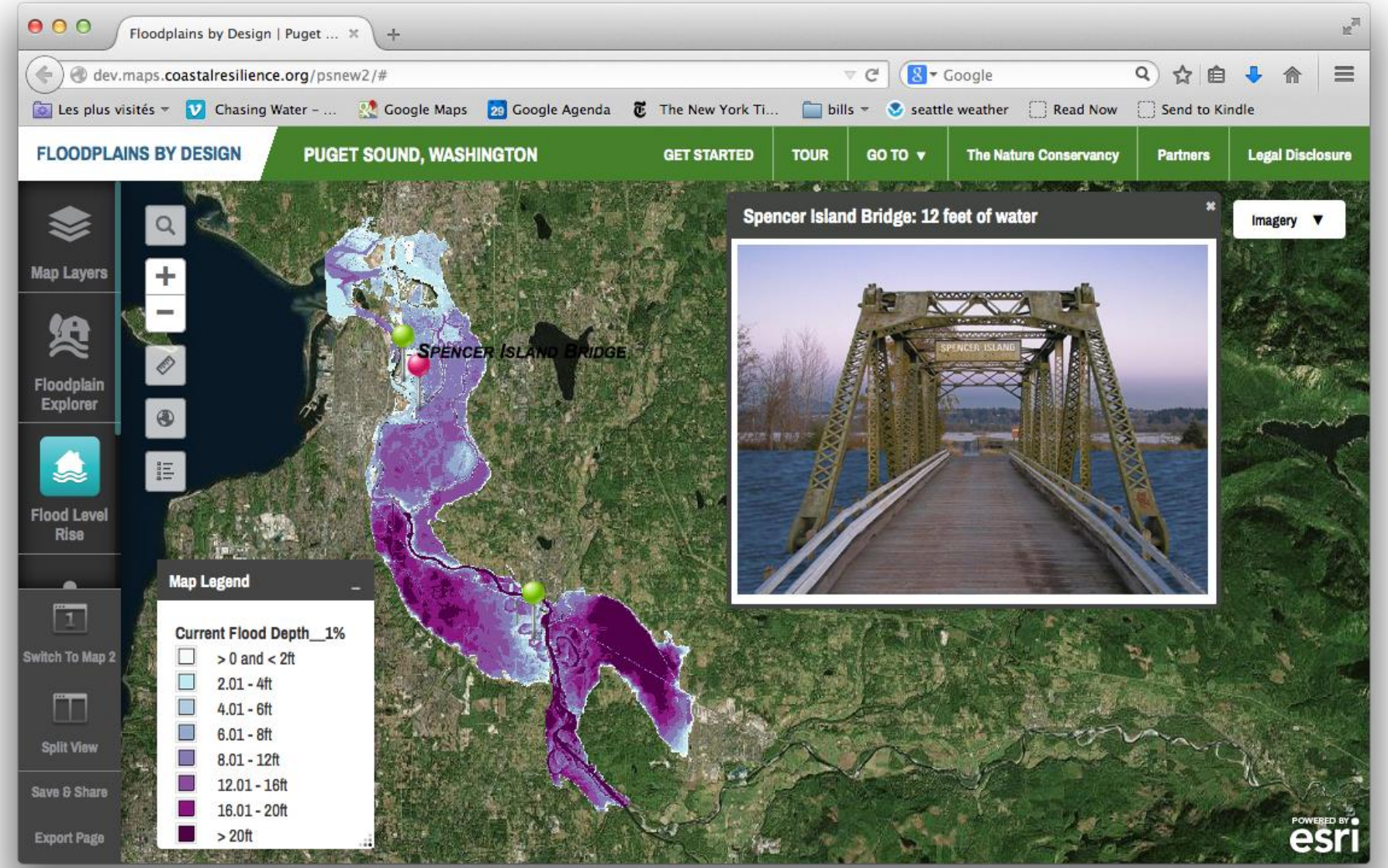
10-year Flood, A1b 2080s, High



www.maps.coastalresilience.org/pugetsound

Results

100-year Flood, Historical (1980s)



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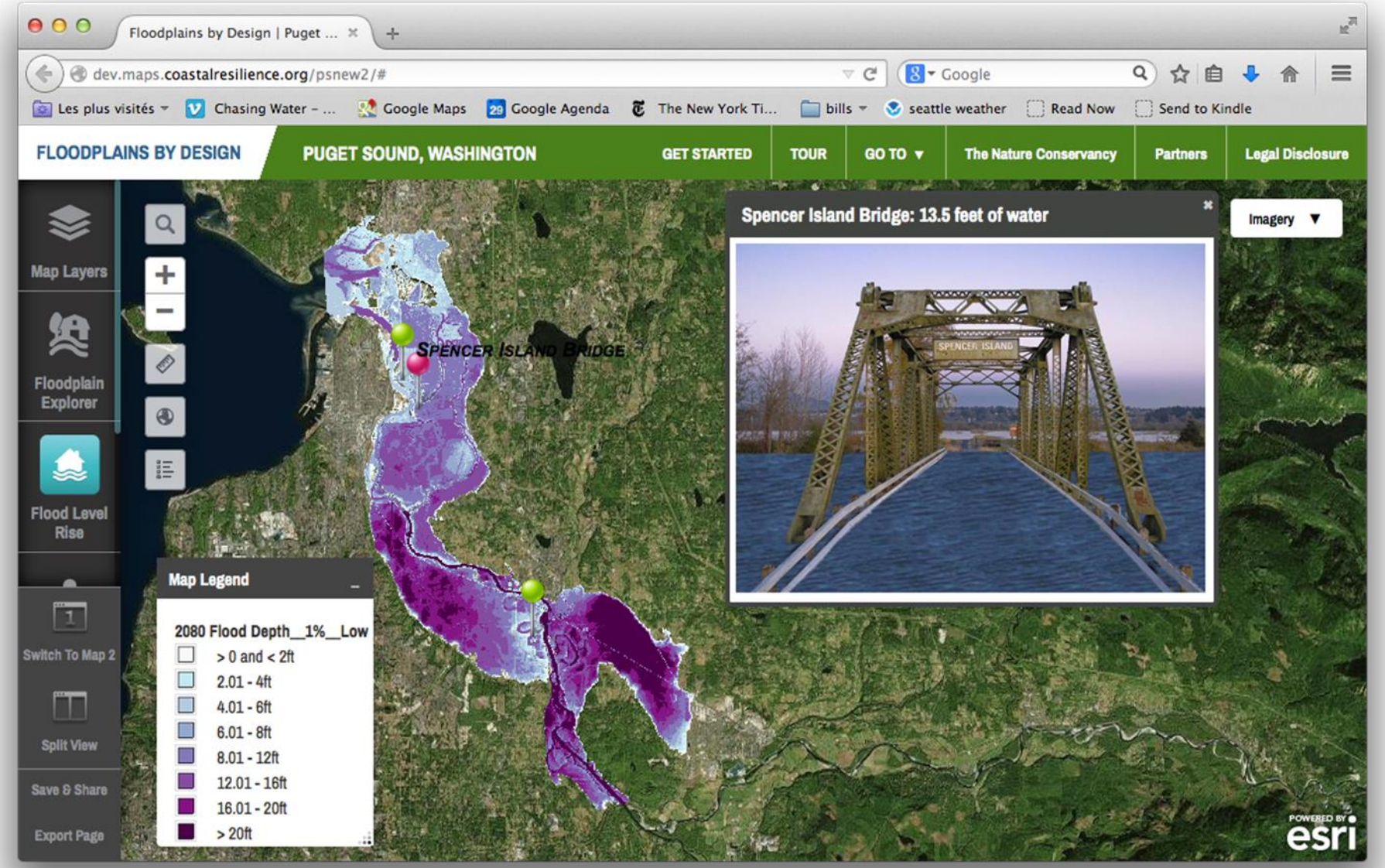

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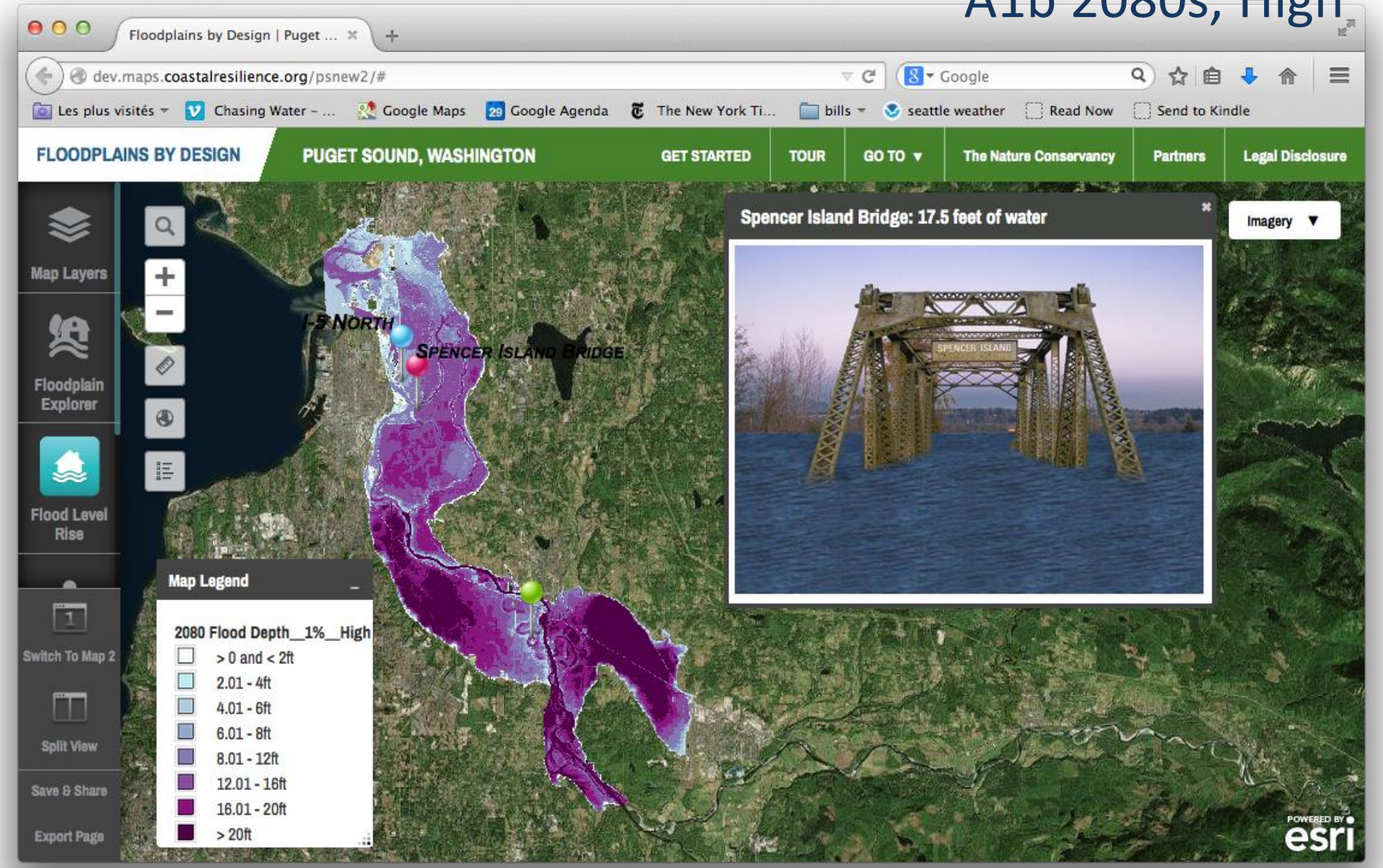

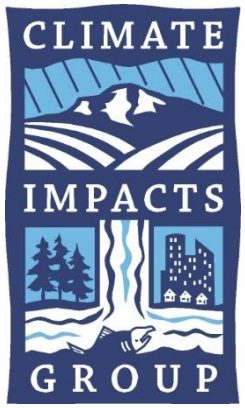

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