Information Item

Update on Implementation of Elk River TMDL

Item No. 7

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Dr. Lance Le, WRCE
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Santa Rosa
August 17, 2017

CALIFORNIA Water Boards

Presentation Overview

I. State Board Approval of Action Plan for Upper Elk River Sediment TMDL (Alydda)
II. Elk River Recovery Assessment Progress (Lance)
III. Conceptual Model (Lance)
IV. Pilot Sediment Remediation Projects (Chuck)
V. Elk River Watershed Stewardship Program (Chuck)

Action Plan for the Upper Elk River Sediment TMDL

- Regional Water Board adoption in May 12, 2016
- Public comment period for State Board's consideration of approval from began December 15, 2016 and closed January 17, 2017
- Tentative State Board hearing planned for February 2017
- Postponed to August 1, 2017

Action Plan for the Upper Elk River Sediment TMDL

- State Board staff questions about the Action Plan
- EO memo with nonsubstantive corrections
  - Control of all controllable water quality factors influencing sediment delivery
  - Minimization and elimination of sediment sources
- State Board approved TMDL Action Plan on August 1, 2017
  - Adopted via a resolution drafted by State Board counsel

Action Plan for the Upper Elk River Sediment TMDL

- State Board "understandings"
  - Hillslope indicators and numeric targets apply throughout the discharger's area of ownership
  - WDRs or other orders for the 2 major landowners will:
    - Incorporate specific provisions that implement all of the hillslope indicators and targets, unless the Regional Board makes specific findings
    - Contain additional specific provisions to ensure all anthropogenic discharges are minimized and eliminated
    - Require achievement of zero load allocation by 2031, unless TMDL revised prior to this date

Action Plan for the Upper Elk River Sediment TMDL

- State Board direction to the Regional Board
  - Review WDRs for the 2 major landowners and revise as necessary to make them consistent with State Board's understandings
  - Include interim milestones and earlier compliance requirements than 2031, where appropriate and to the maximum extent feasible.
  - Complete revisions expeditiously, but no later than January 2019
  - Provide written updates to the ED every six months
- State Board encourages full participation by all stakeholders in the Watershed Stewardship Program

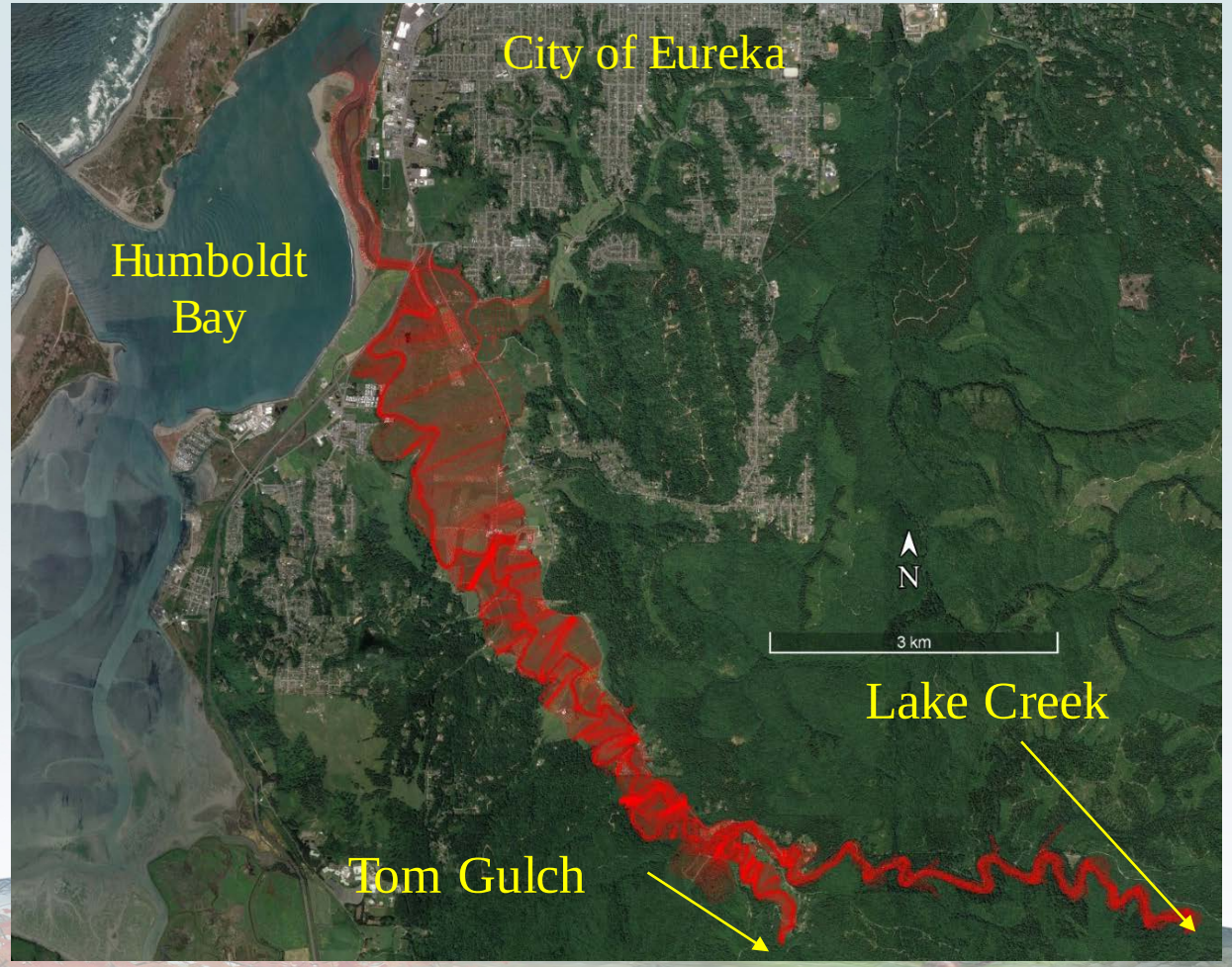
Elk River Recovery Assessment (ERRA)

- Purpose:
  - What are the current geomorphic and hydraulic conditions?
  - What combination of actions can recover Beneficial Uses and abate nuisance flooding?
- Elk River Recovery Assessment funded by State Water Board Cleanup and Abatement Account
  - Substantial cost shares from Coastal Conservancy, HRC, and contractors (California Trout, Stillwater Sciences, Northern Hydrology and Engineering)

Progress: Data Update, Data Collection, TAC

- Updating & revising existing hydrology and sediment data
- Topographic and water data collection
  - Channel surveys, sediment sampling, hydrology
- Technical Advisory Committee (TAC)
  - Purpose: constructive feedback to ERRA work products
  - Membership: federal, state, local, private entities
  - Three meetings: (1) introduction; (2) conceptual model; (3) model scenarios

Model Geographic Extent

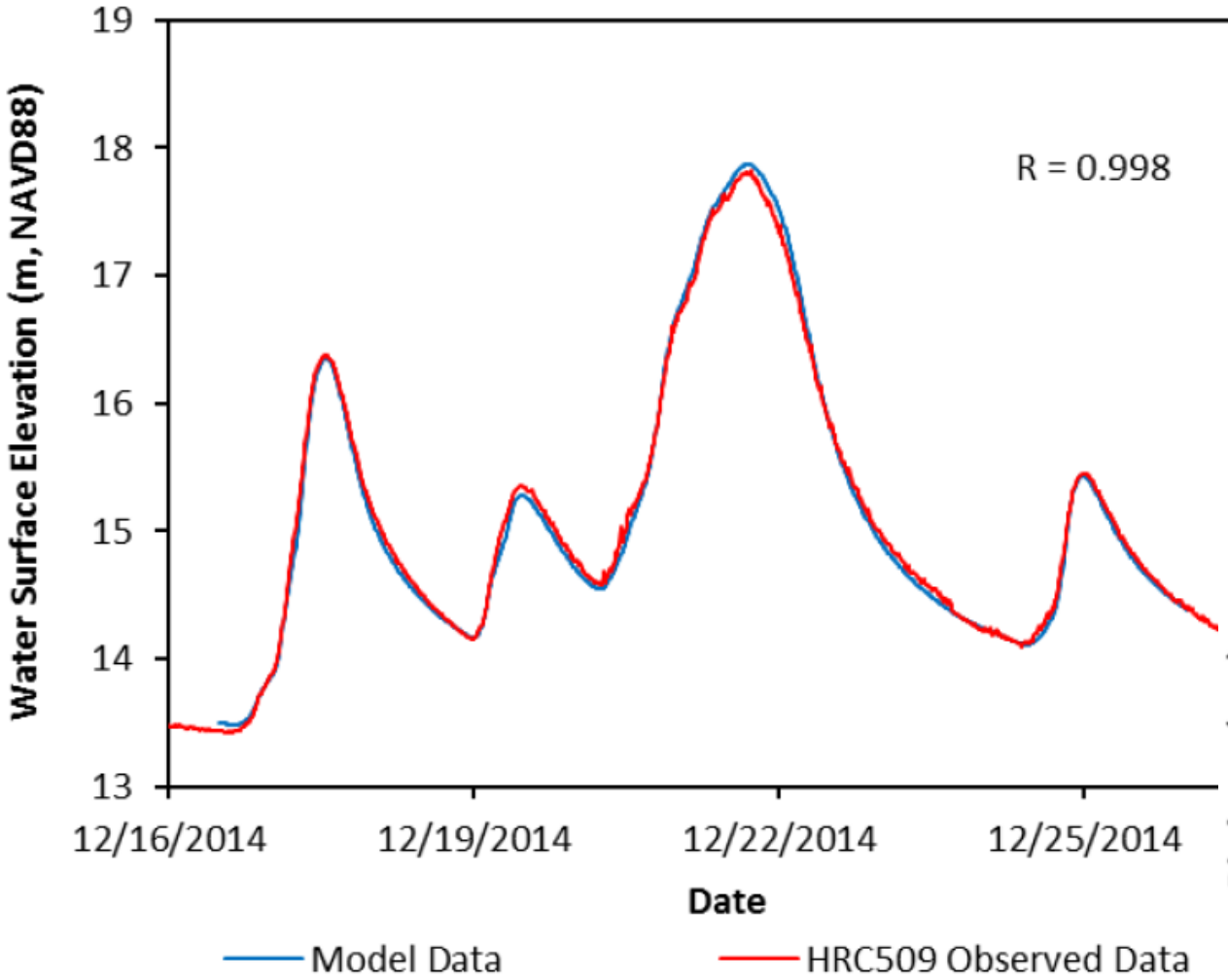


- Environmental Fluid Dynamics Code (EFDC)
  - Open-source, developed by US EPA
- Upper Boundaries
  - South Fork Elk River and Tom Gulch confluence
  - North Fork Elk River and Lake Creek confluence
  - Data collection range extends to North Fork and Bridge Creek confluence
- Lower Boundary at Humboldt Bay
- Total channel length ~**18 river miles**
- Total modeled area ~ **3.27 mi^2 (2100 acres)**
  - Including floodplain and surrounding area, based on elevation

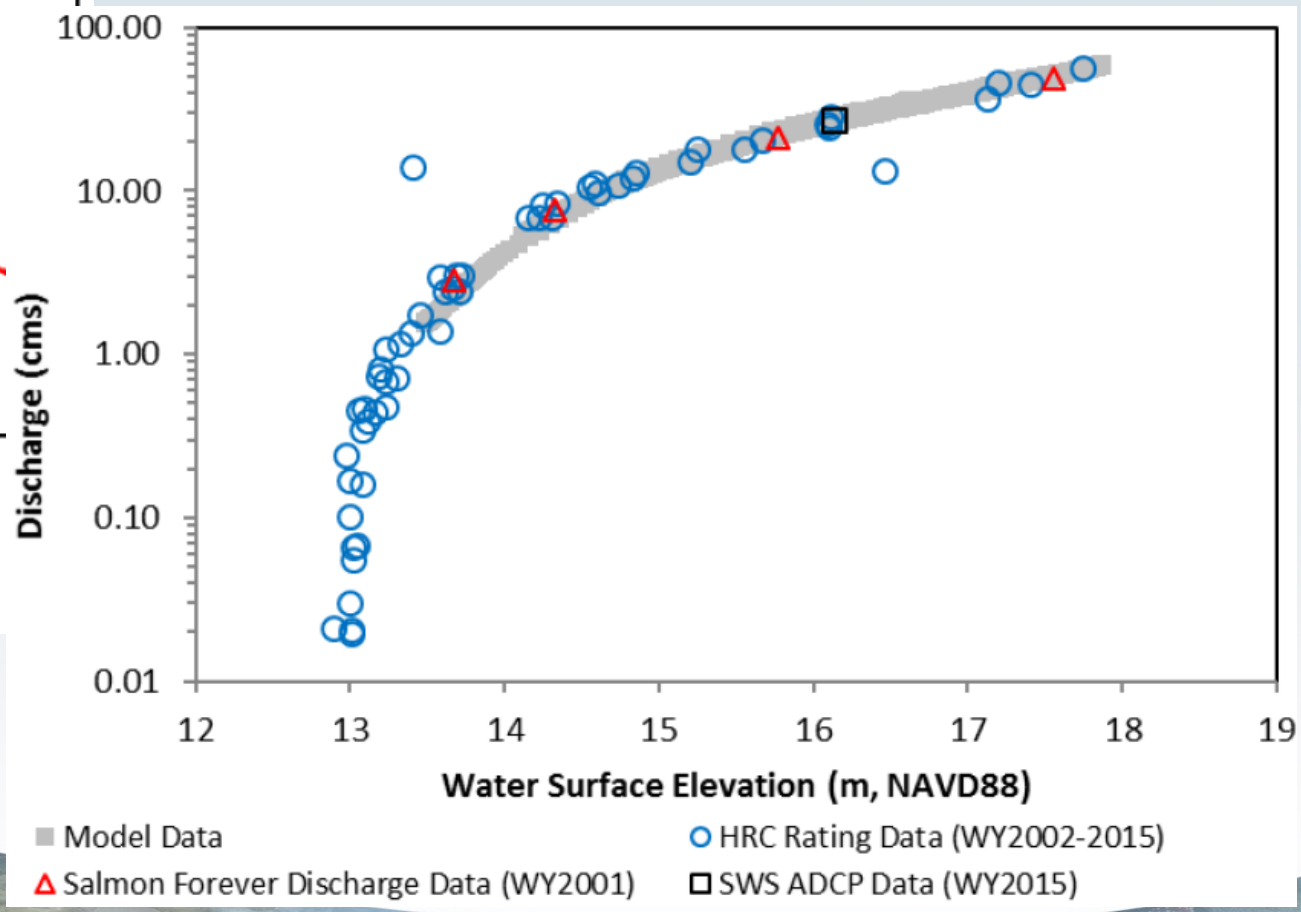
Progress: Hydrodynamic Model

- Hydrodynamic model developed and calibrated
- Model outputs to assess recovery:
  - Flood inundation, magnitude, duration
  - Suspended sediment concentrations & load
  - Topographic changes to channel, floodplain
- Three scenarios based on:
  - Sediment from upper watershed
  - Recovery actions recommended by contractors and approved by TAC

Model Calibration Results
(December 2014 Flood @ Steel Bridge)



Water Elevation



Discharge vs. Water Elevation

Calibration efforts consistent with observations collected by HRC and Salmon Forever

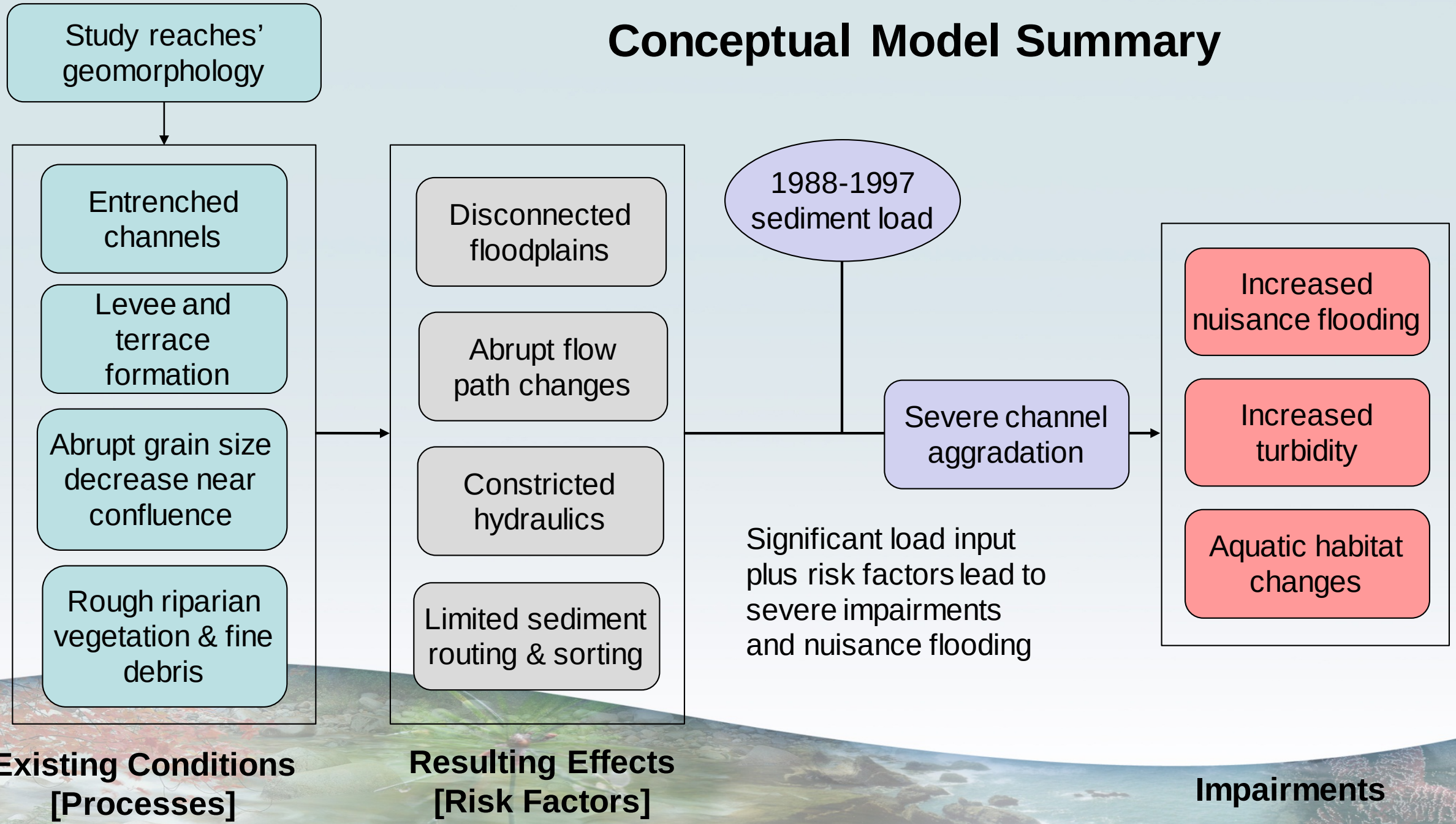
Progress: Hydrodynamic Model Scenarios

Scenario	#1	#2	#3
Question(s) answered:	Will recovery occur **without any intervention**?	Will recovery occur with **reduced sediment concentrations** from upper watershed alone?	Will recovery occur with **restoration actions** alone**?**
Variable(s) modified:	None: current channel conditions; vegetation; and inbound sediment concentrations	Reduced sediment concentrations from North Fork and South Fork Elk River	Lower channel bed; vegetation removal; modified infrastructure; other actions
Status:	Modeling complete Analysis pending	In progress	Proposed but requires TAC review

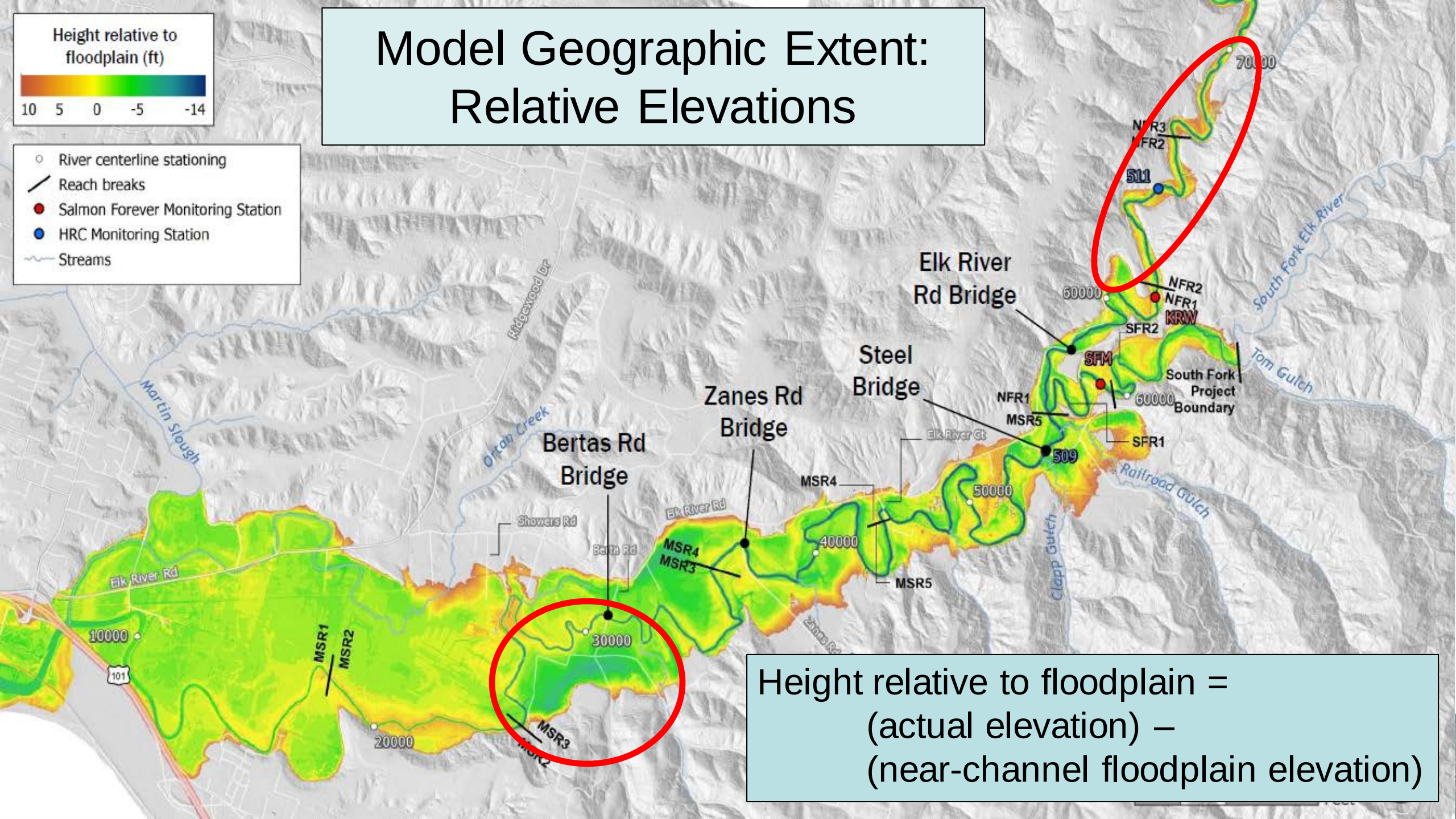
Conceptual Model

- Purpose: link Stewardship Program and ERRA
  - Need for implementation programs to work synergistically
- Interprets and summarize data for less technical audience:
  - Details current landscape and hydrologic conditions
  - Links current conditions to risk factors and impairments
  - Informs recommended recovery actions
- Funded by CWA § 205(j) grant for planning projects

Conceptual Model Summary

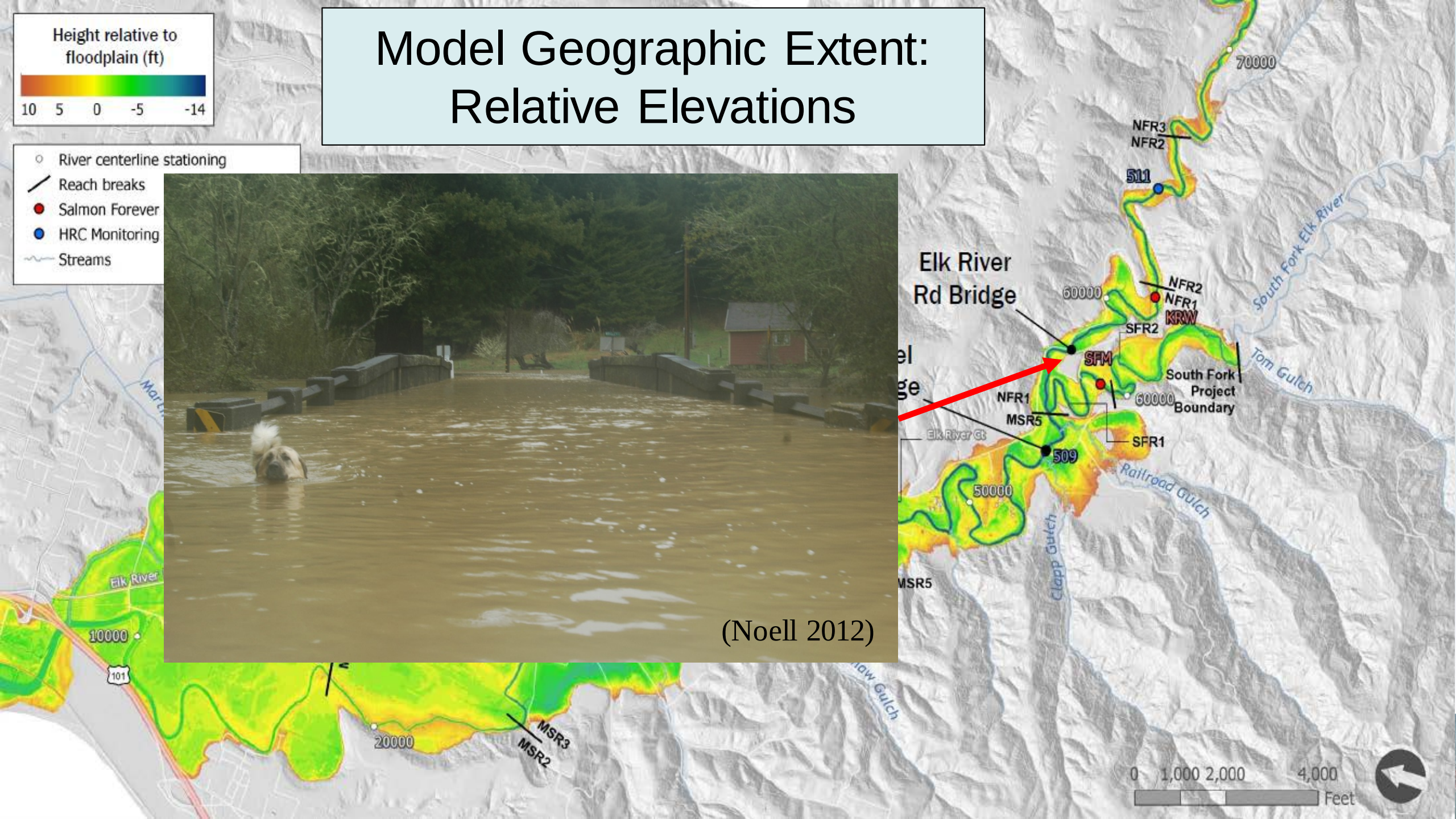


Model Geographic Extent: Relative Elevations



Height relative to floodplain =
(actual elevation) –
(near-channel floodplain elevation)

Model Geographic Extent: Relative Elevations



(Noell 2012)

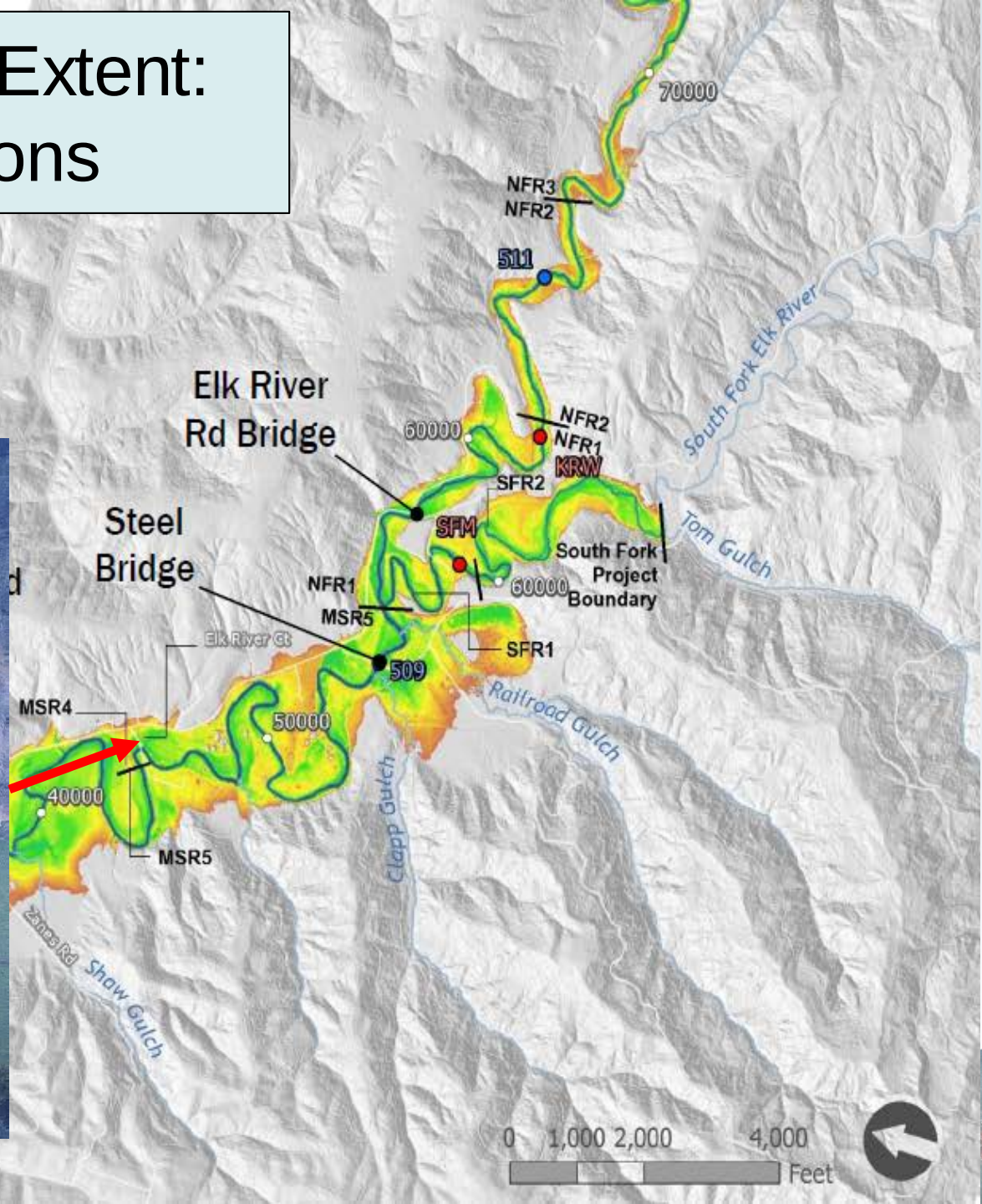
Model Geographic Extent: Relative Elevations

Height relative to floodplain (ft)

10 5 0 -5 -14

- River centerline stationing
- Reach breaks
- Salmon Forever Monitoring Station
- HRC Monitoring Station
- Streams

(Humboldt County, 2004)



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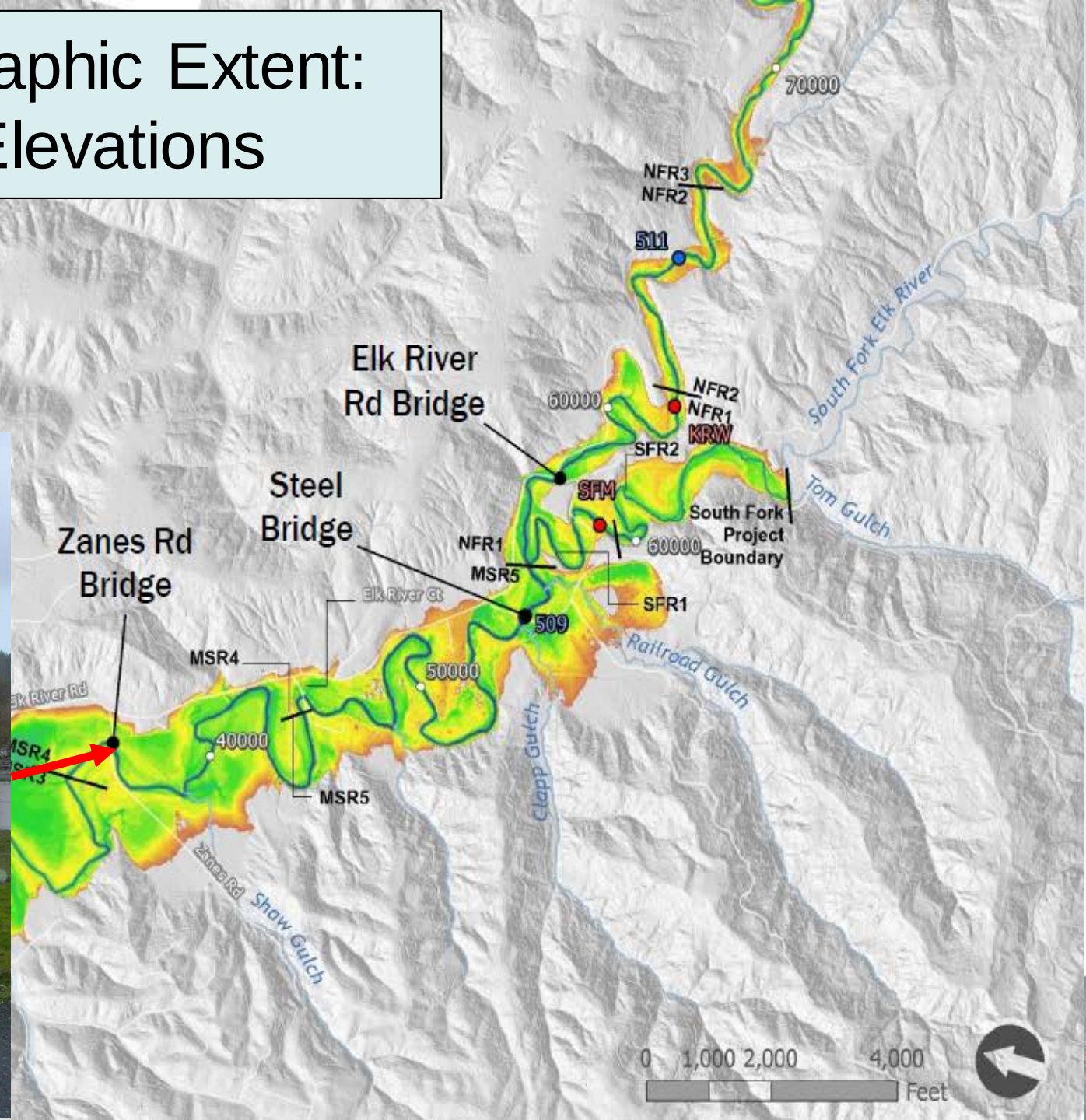
(Wrigley 2009)



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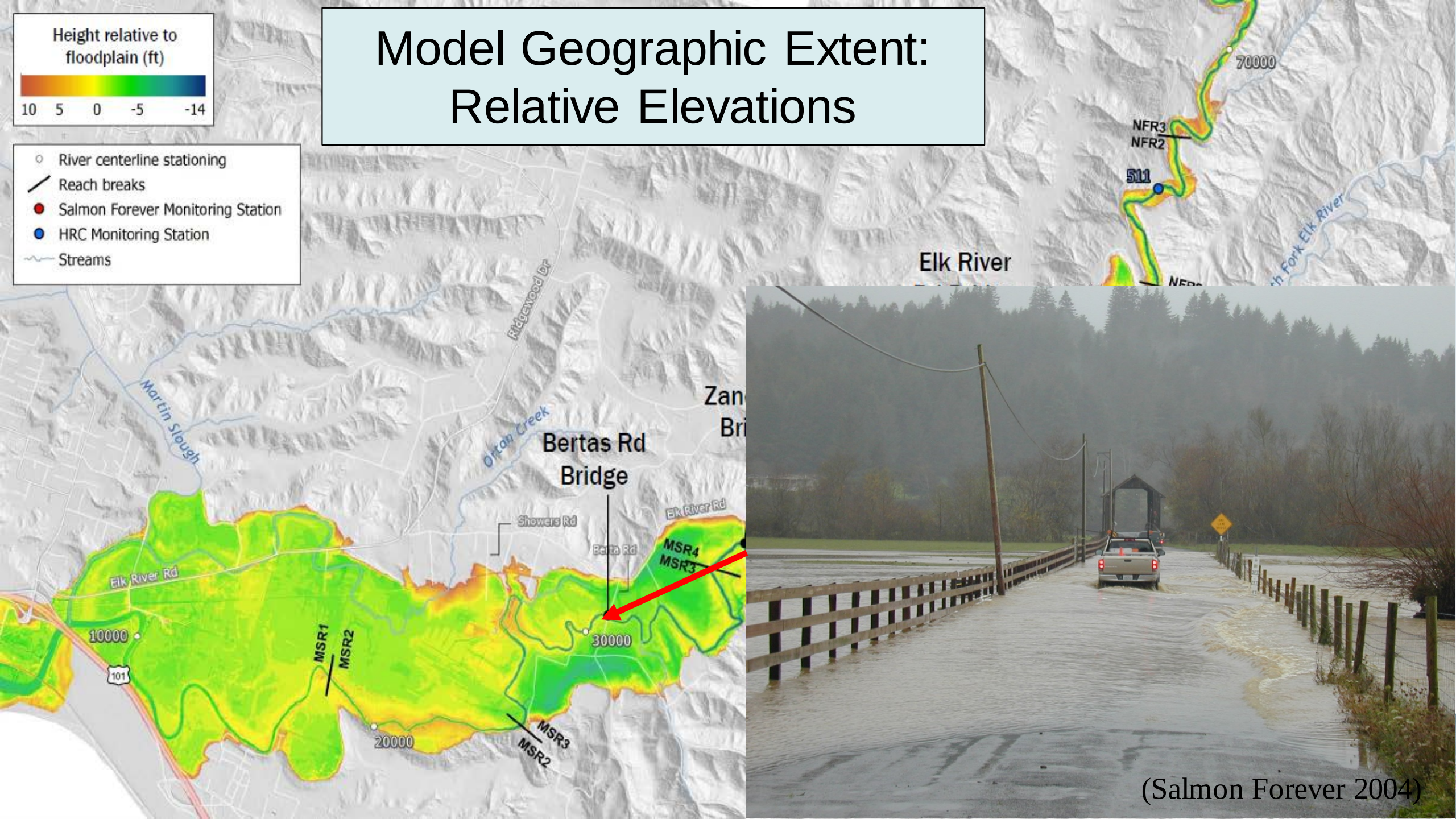
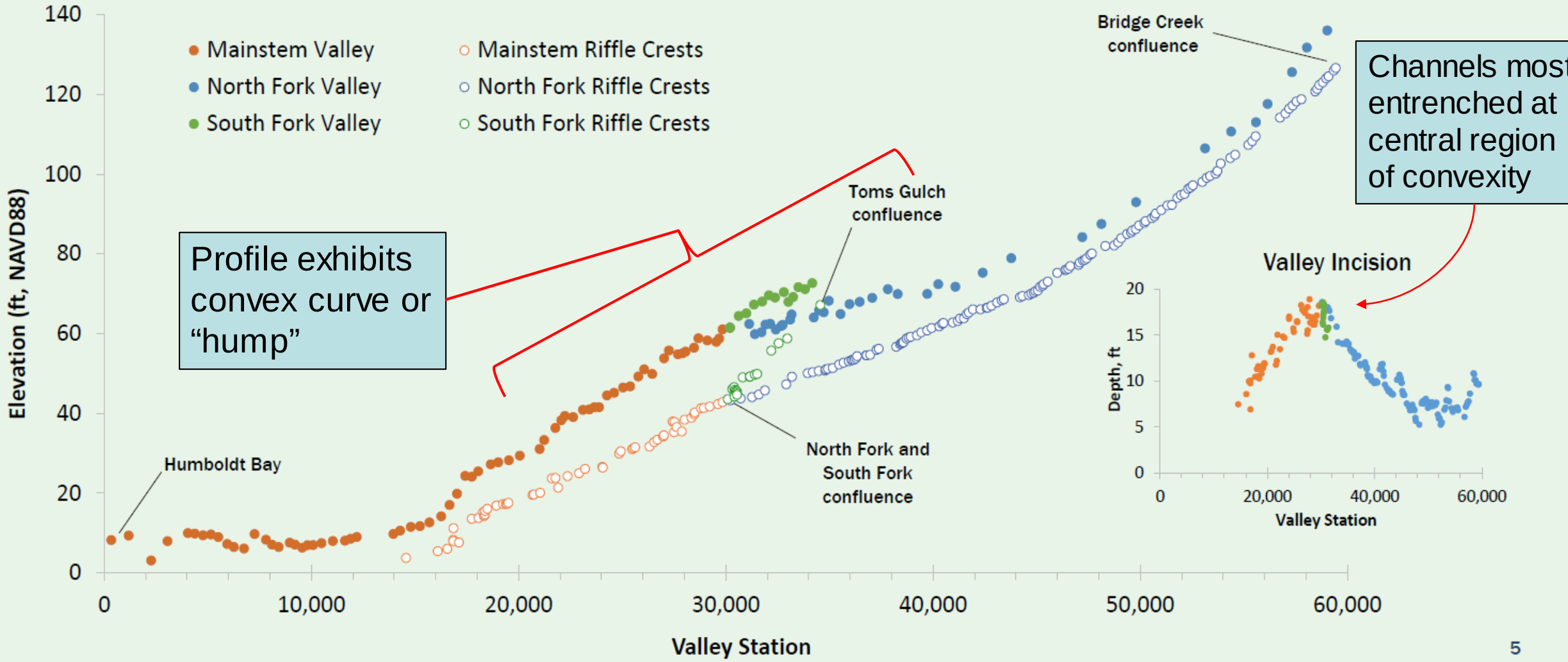
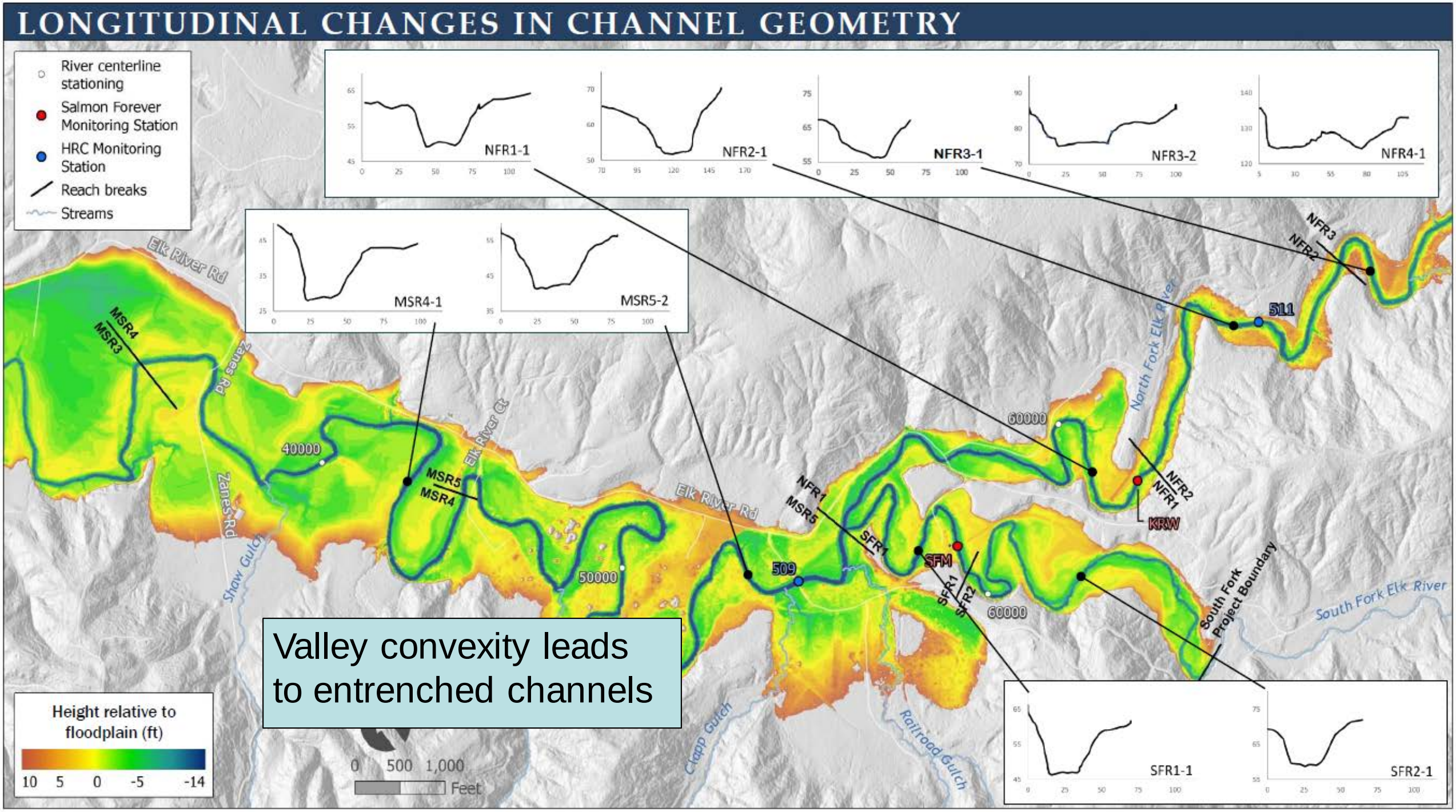


(Salmon Forever 2004)

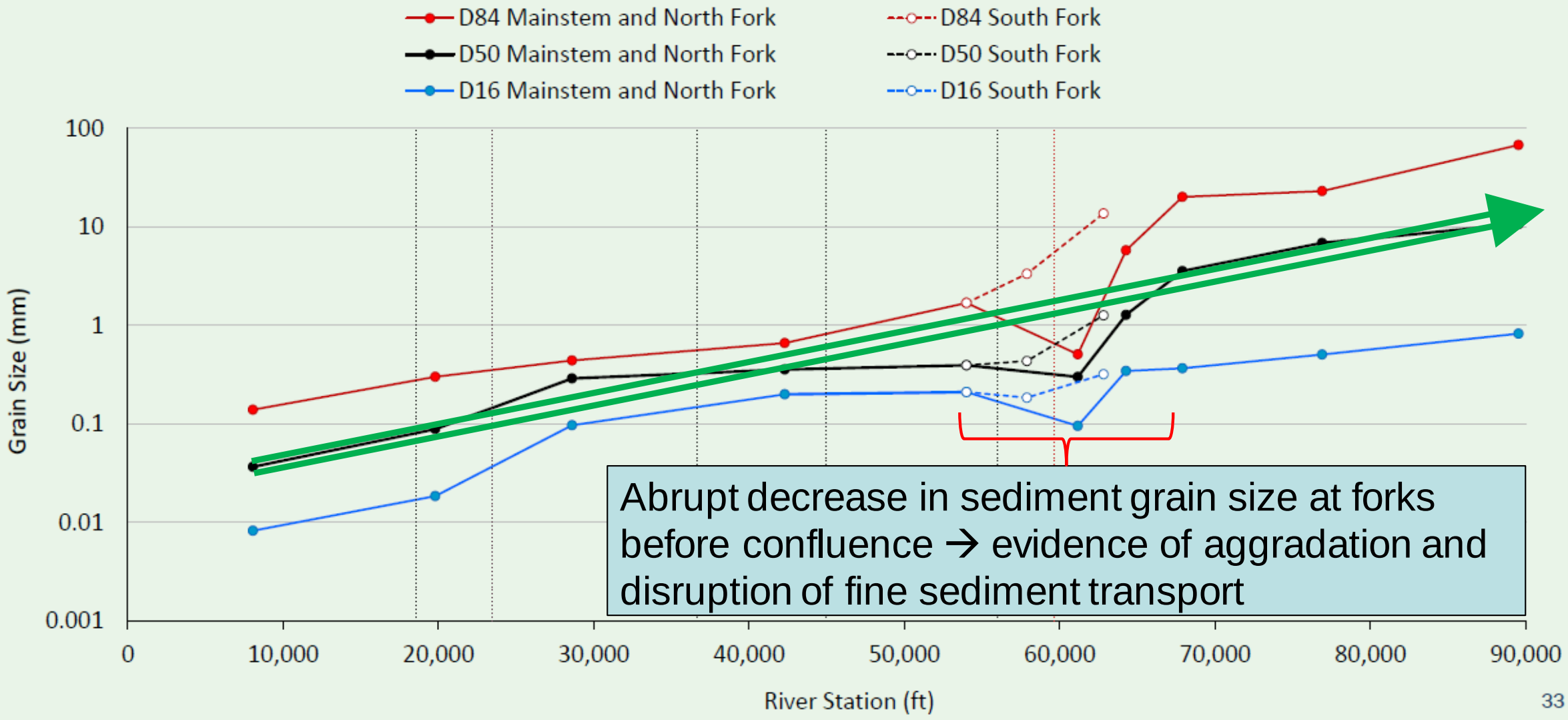
VALLEY LONGITUDINAL PROFILE



LONGITUDINAL CHANGES IN CHANNEL GEOMETRY



LONGITUDINAL CHANGE IN BED PARTICLE SIZE

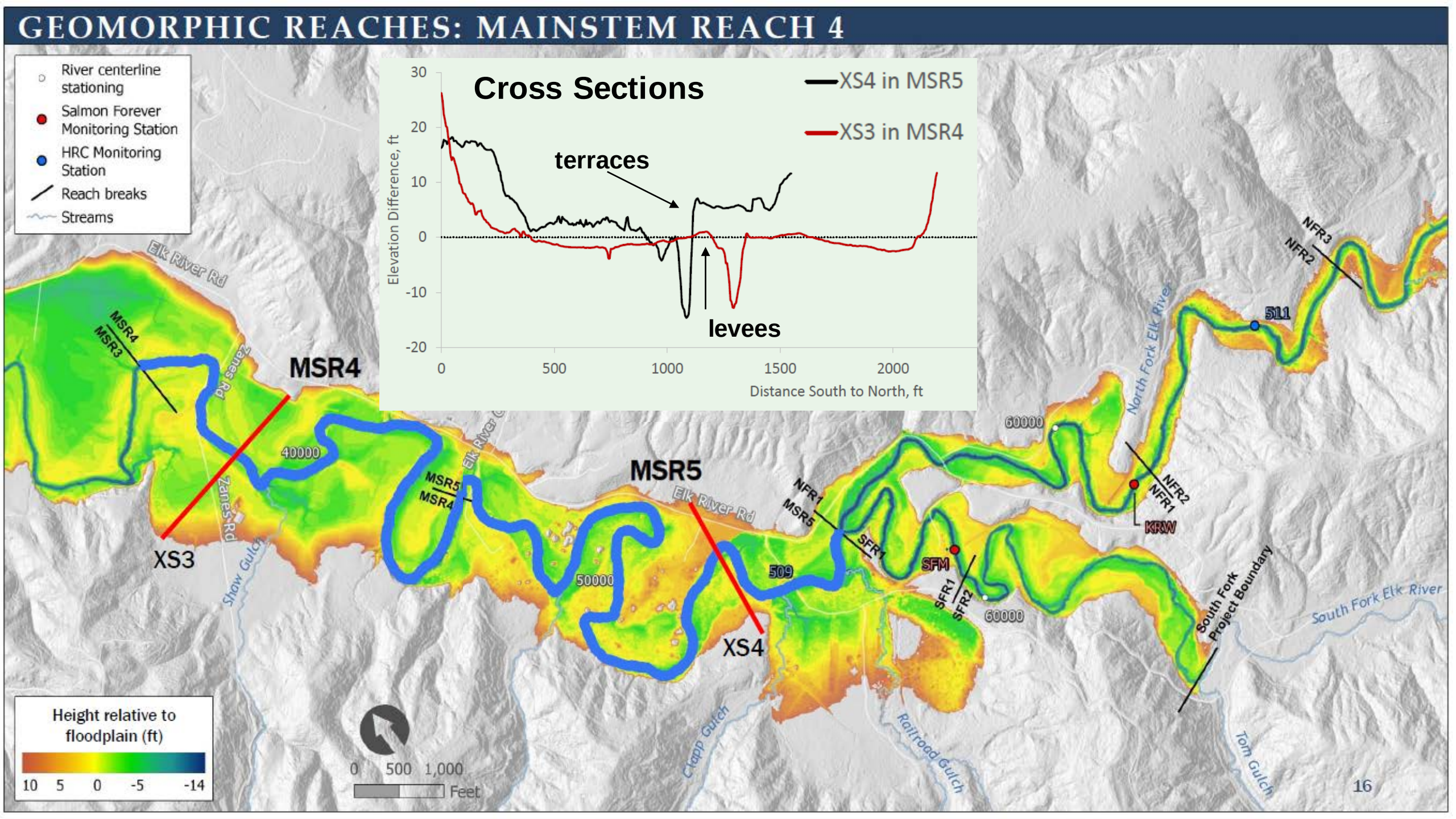


Rough Riparian Zones

Dense vegetation; e.g. invasive sedge anchors fine sediment

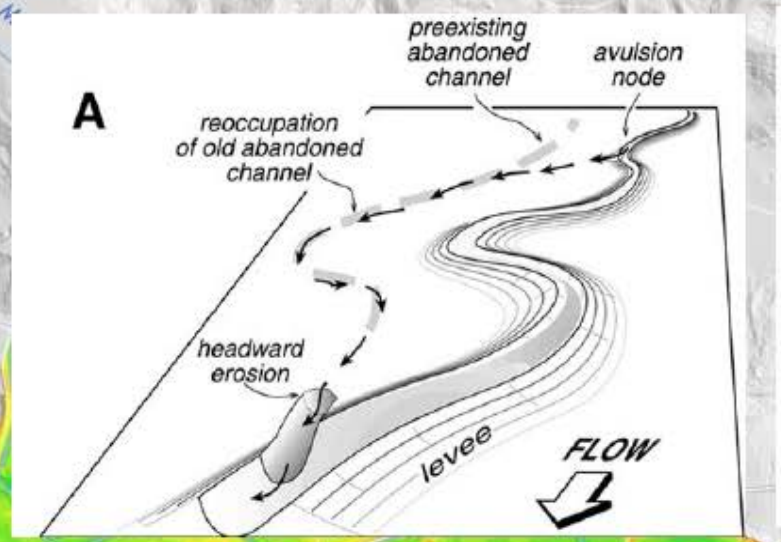
Fine woody debris and constricted channel

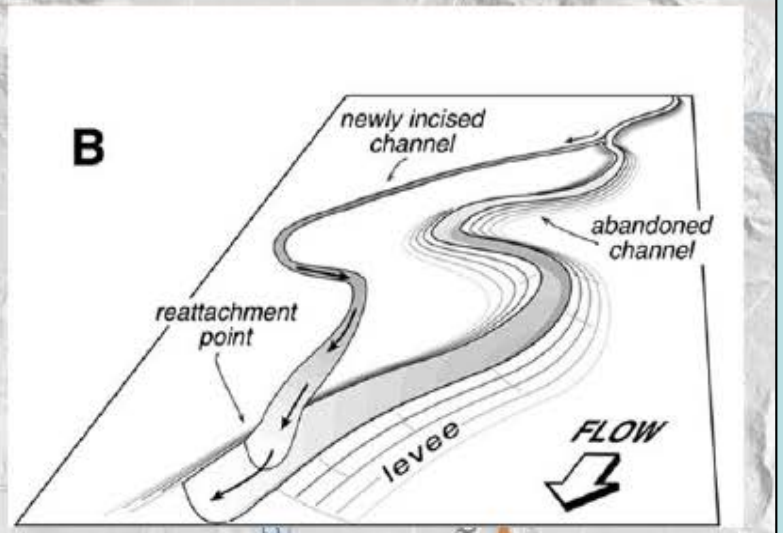
GEOMORPHIC REACHES: MAINSTEM REACH 4



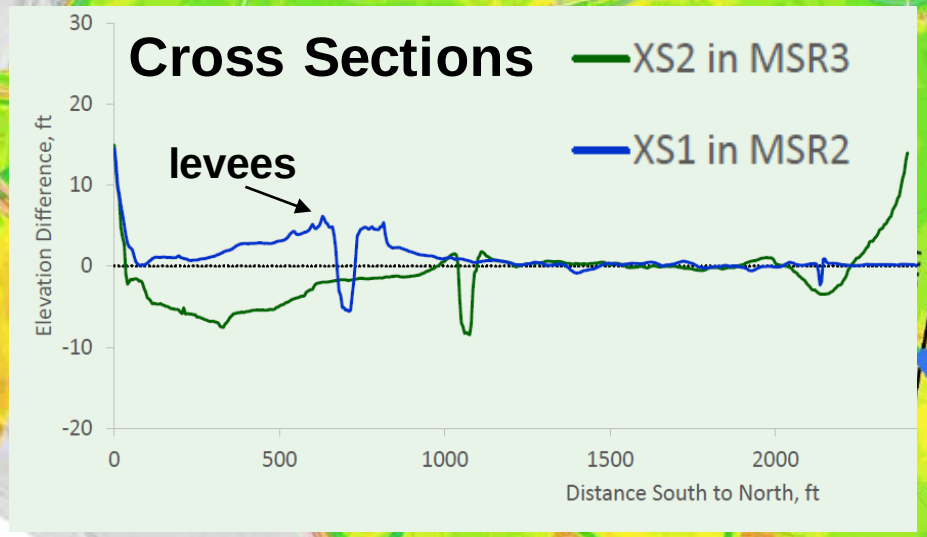
GEOMORPHIC REACHES: MAINSTEM REACH 3

Narrow floodplains confined by terraces and levees
→ avulsion events or new channel development
→ flooding between old and new channel





River centerline stationing
Salmon Forever Monitoring Station
HRC Monitoring Station
Reach breaks
Streams



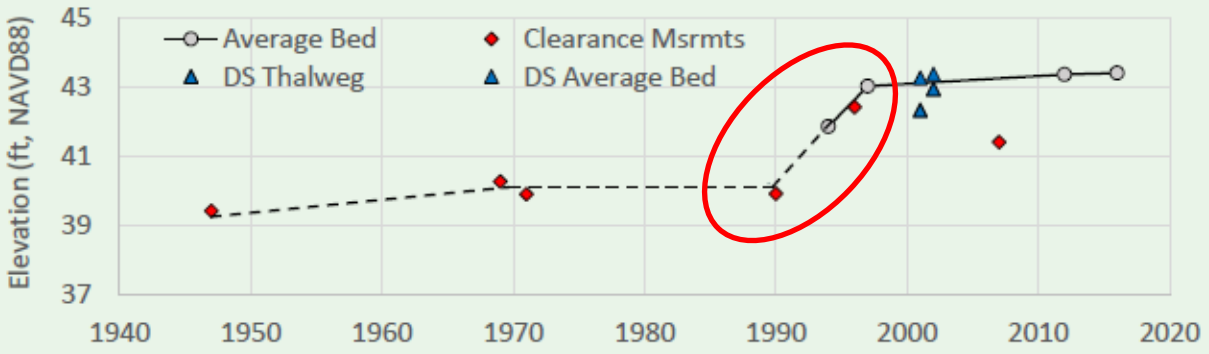
XS1
XS2
MSR2
MSR3
30000
20000
Berta Rd

Height relative to floodplain (ft)
10 5 0 -5 -14

0 500 1,000
Feet

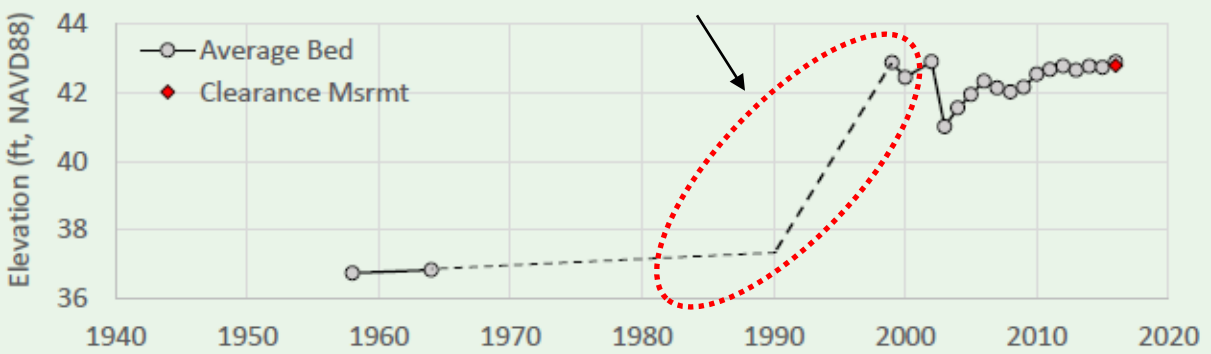
BED ELEVATION CHANGES AT BRIDGES

1988-1997 sediment load → channel aggradation

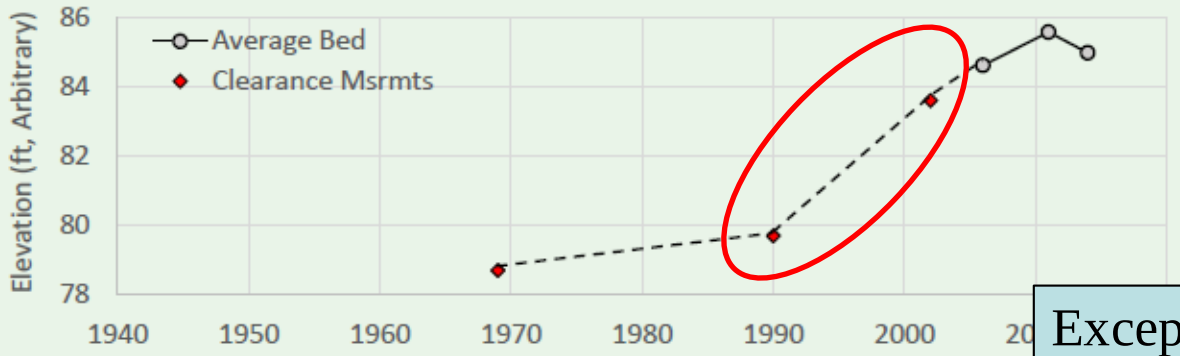


North Fork Bridge
(River Mile 10.4)

Inferred from ERRA team

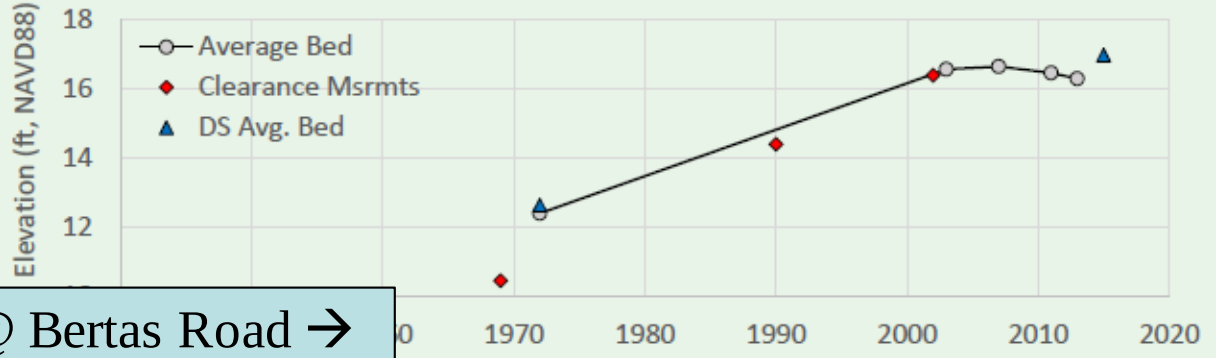


Steel Bridge
(River 9.9)



Zanes Road Bridge
(River Mile 6.8)

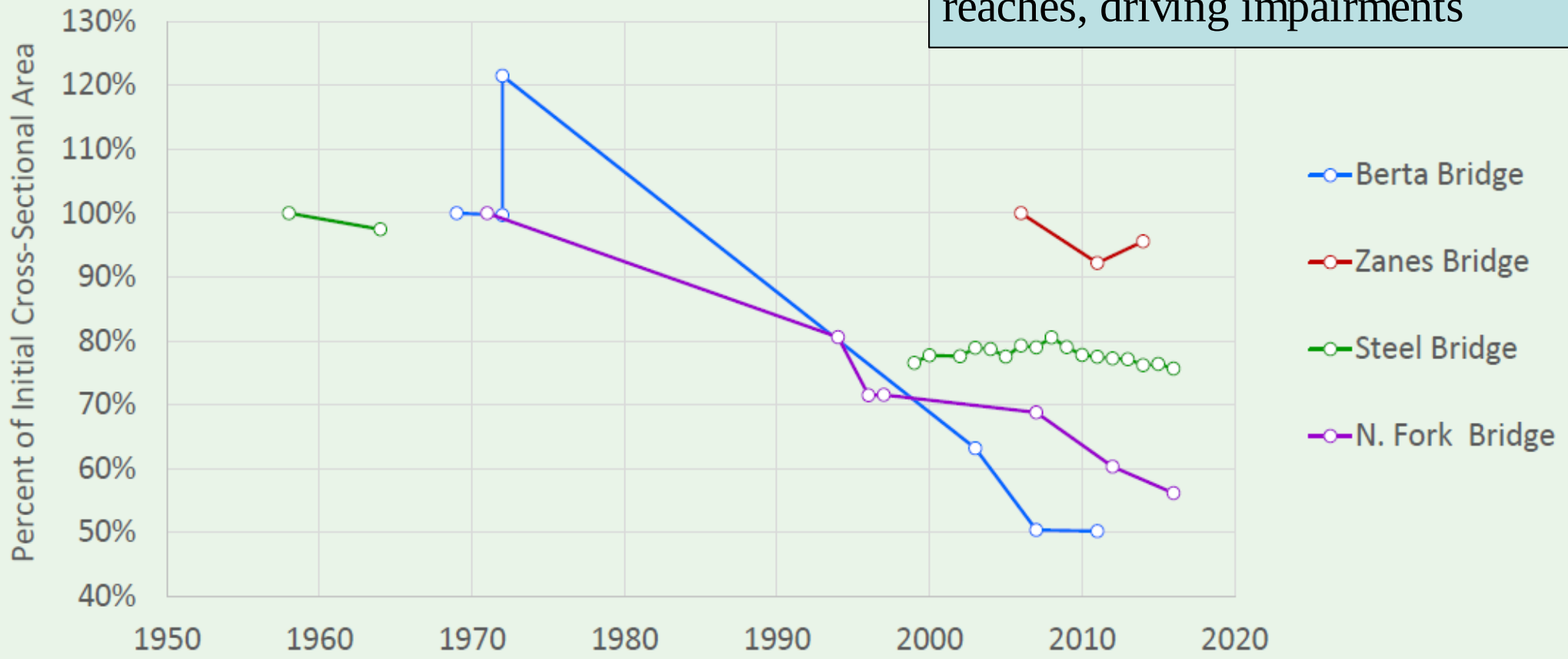
Except @ Bertas Road → different process causing gradual aggradation



Berta Road Bridge
(Rive Mile 5.5)

CHANGES IN CHANNEL XS AREA AT BRIDGES

Channel aggradation continues in some reaches, driving impairments



Key Findings

1. Progression of land forms controls channel geometry, sediment characteristics, and hydrodynamics

2. Channel entrenchment and rough riparian zones disrupt fine sediment transport across the impacted reaches

3. 1988-1997 sediment load = main driver of impairments & nuisance in impacted reaches
   - but downstream of impacted reach (i.e. Berta Road), different processes dominate

4. Hydrodynamic model consistent with independent observations and conceptual model

Next Steps

- Contract deadline extended to May 2018
- Completion of pilot project (Fall 2017)
- TAC meeting (Late 2017 - Early 2018)
  - Finished model scenario runs
  - Finalization of “desired conditions” for Scenario 3
- Final Report (April 2018)
  - Modeling results and interpretation
  - Provides recovery action recommendations by reach

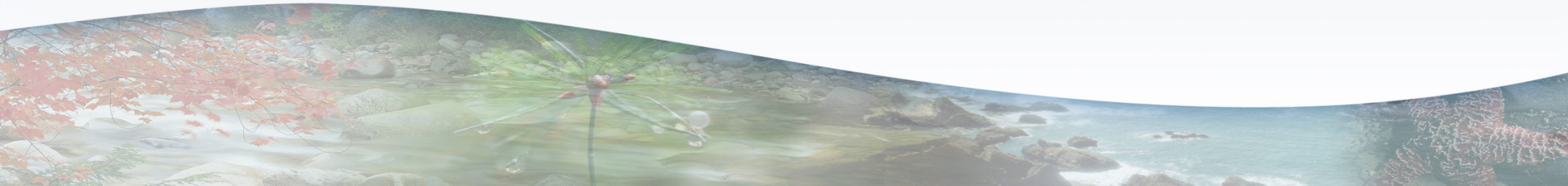
Additional funding

- SWAMP contract will be out for bid
  - Assessment for data gaps
  - Updating digital elevation data
  - Topography
    - Channel features, cross-sections, etc.
  - Water and suspended sediment
    - Stage, discharge, concentrations
- Intended to augment needs from Stewardship
  - Coordinated Science and Monitoring workgroup

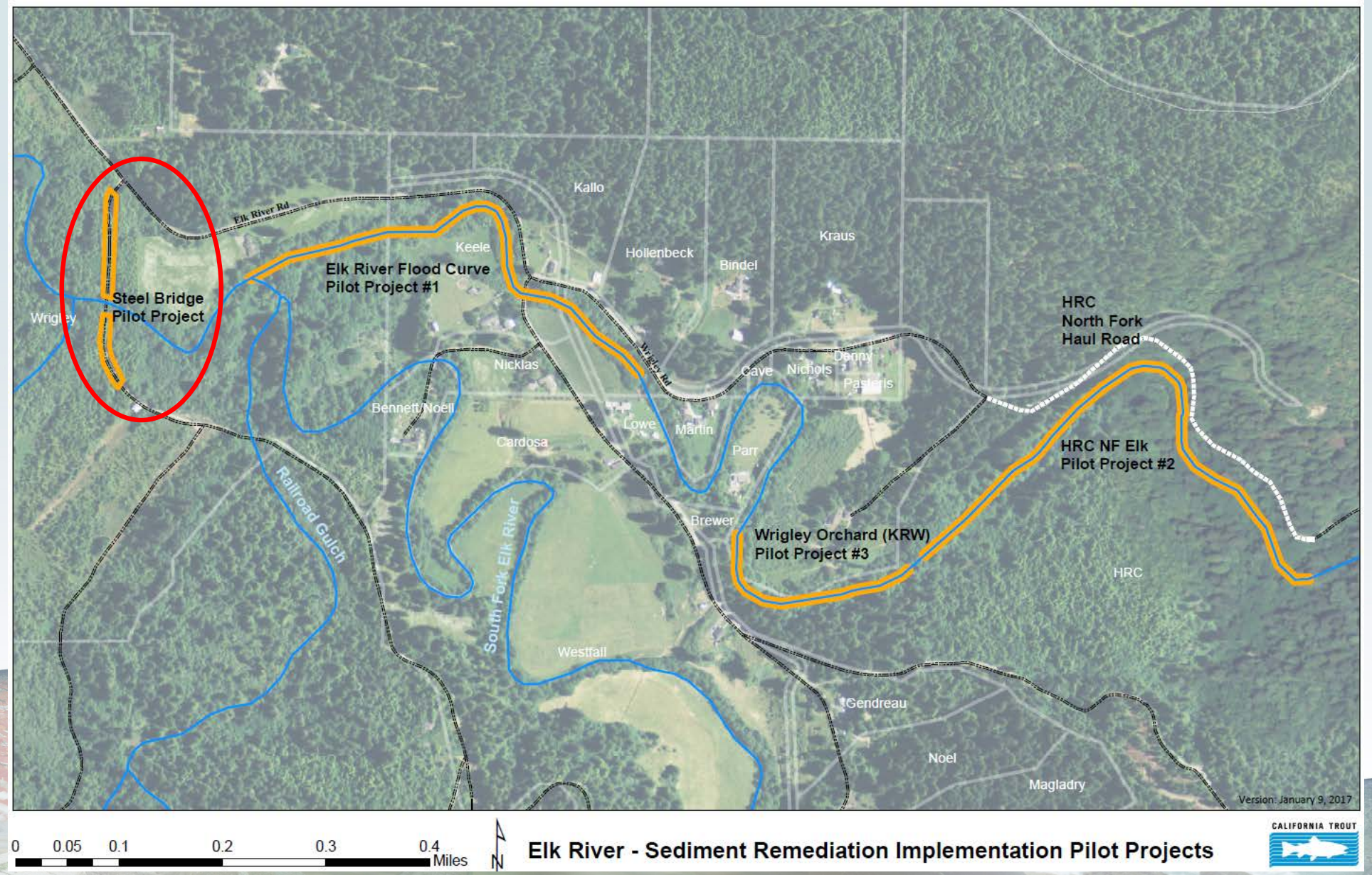
Sediment Remediation Pilot Projects

Why Pilot Projects?

- Learning opportunity
- Better understand system responses
- Experience navigating the permitting environment
- Negotiate property access agreements
- Minimize risk - scaled for safety



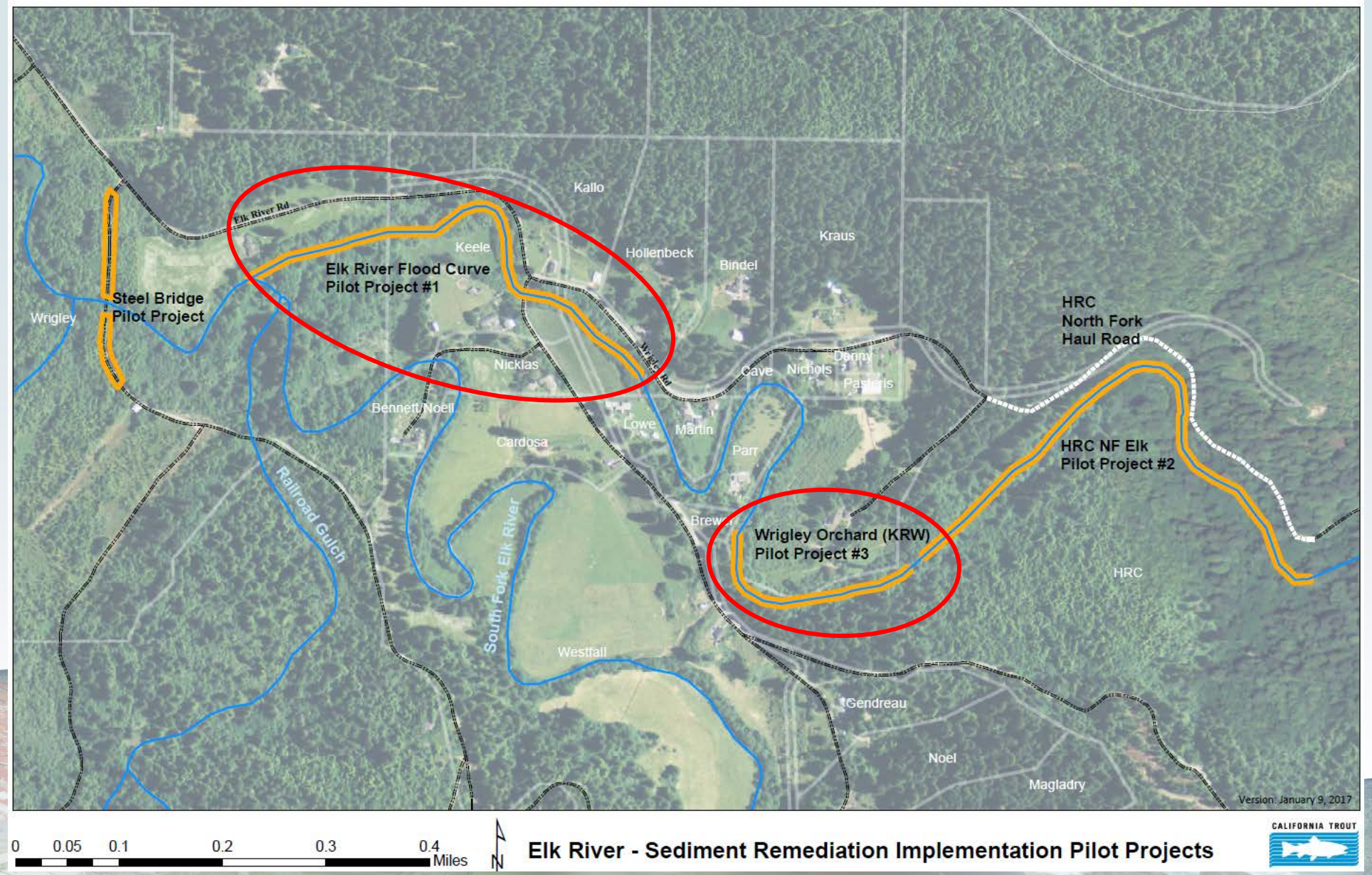
Sediment Remediation Pilot Projects



Sediment Remediation Pilot Projects

- Remove 2-5 ft berm traversing floodplain at **Steel Bridge**, including road base, asphalt, vegetation
- Lessens hydraulic constriction from bridge structure
- Design plans and CEQA compliance complete
  - Construction imminent
- Active cooperation between HRC, the Wrigley family, and CalTrout
  - Project located on Wrigley's property

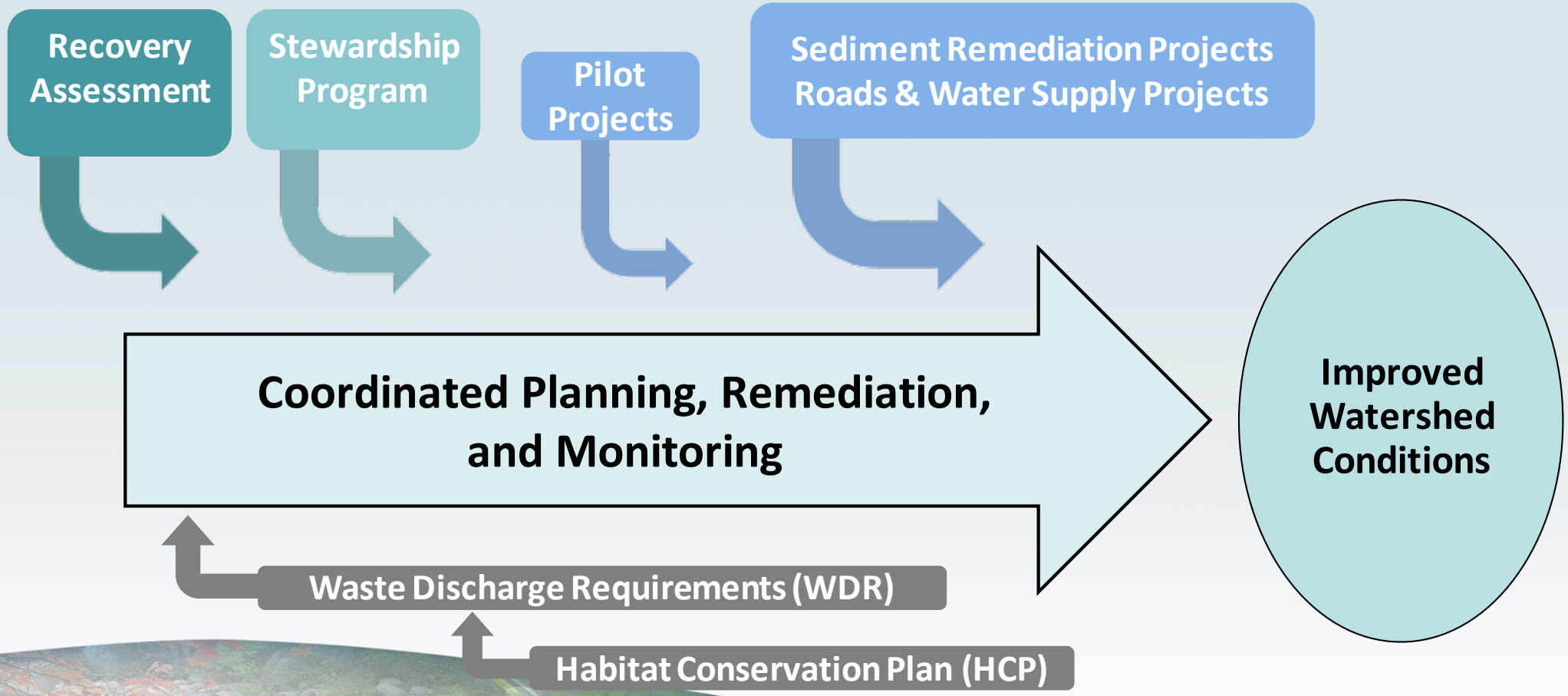
Sediment Remediation Pilot Projects



Sediment Remediation Pilot Projects

- Two project sites (**Flood Curve & Wrigley orchard**) treating 3,750 linear ft of North Fork Elk River; removal of 18,000 yd^3 of sediment;
- 30% design plans complete and CEQA compliance in process; landowner access agreements on file;
  - Construction planned to commence June 2018
  - Regional Water Board serving as lead CEQA agency
- Expected outcome: minor improvement to flooding severity; test predictions of ERRA models; increase bankfull conveyance;
- Active cooperation between HRC, CalTrout and residents.

UPPER ELK RIVER WATERSHED TMDL IMPLEMENTATION ELEMENTS



A PROGRAM OF ADAPTIVE MANAGEMENT

Elk River Watershed Stewardship Program

- More than 15 meetings of the Stewardship Steering Committee convened in 2014-2016
- Sediment Remediation, Health and Safety, Road Infrastructure, Nuisance Flooding work groups convened
- Year 1 deliverables received; contractors paid
- Transition to new lead in progress based on Humboldt County withdrawal; scope, budget, schedule being revised

Elk River Watershed Stewardship Program

THE PROGRAM IS:

⇒ An open and transparent venue for residents, land managers, and other stakeholders to develop solutions and identify potential projects (remediation and restoration actions, flood hazard mitigation, monitoring plans, and more)

⇒ Looking for near-term opportunities for improvements around water quality, nuisance flooding, infrastructure, fisheries, drinking water supply, and coordinated monitoring

⇒ Supportive of voluntary, non-regulatory solutions

⇒ Aiming to build an organizational structure to support long-term collaboration in the watershed

⇒ A process to develop implementation strategies and actions that can be used to secure funding and attract support

THE PROGRAM IS NOT:

⇒ Intended to mediate or adjudicate long-standing conflicts

⇒ A framework for enforcing regulatory actions

⇒ A tool for delivering predetermined outcomes

PROGRAM GOALS

1. Seek common ground among diverse participants
2. Identify strategies and solutions to:
   - ⇒ Improve the hydrologic function, water quality and habitat conditions of Elk River
   - ⇒ Reduce nuisance flooding and improve transportation routes during high water conditions
   - ⇒ Improve residential and agricultural water supplies
3. Promote coordinated science and monitoring
4. Ensure that individual actions fit together and collectively yield the greatest benefit.

Visit
http://ucanr.edu/elkstewardship
to learn more!

WHO'S INVOLVED

Everyone is invited. The Program will be guided through 2018 by a Steering Committee, that includes the County of Humboldt, UC Cooperative Extension, CalTrout, the Natural Resources Conservation Service, and the North Coast Regional Water Quality Control Board.

WHAT TO EXPECT

The Elk River Watershed Stewardship Program offers an opportunity for the community and stakeholders to provide input and contribute towards enhancing watershed conditions. Participation is voluntary. Participants can expect to be heard and help develop achievable solutions over the next two years.

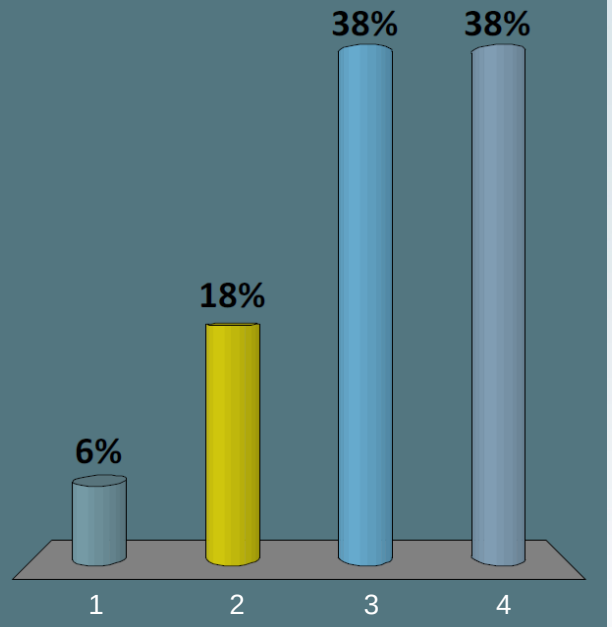
Elk River Watershed Stewardship Program

- Information presented on Stewardship scope and schedule
- Elk River Recovery Assessment
- Sediment Remediation Pilot projects.

Elk River Watershed Stewardship Program

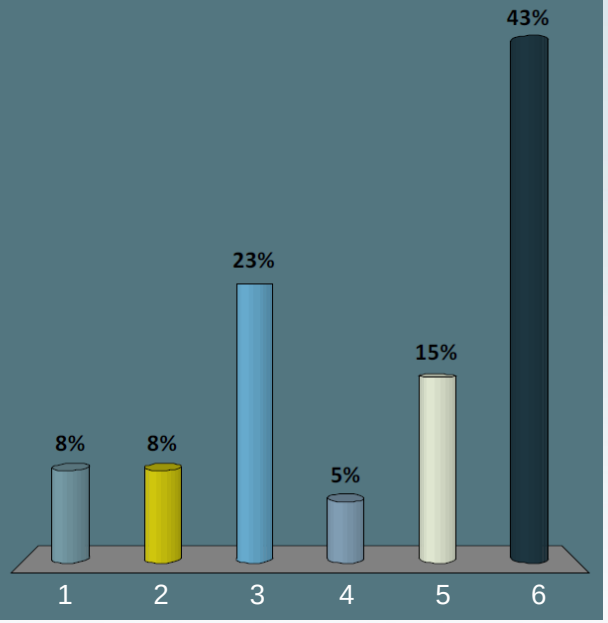
What is your level of likely participation?

1. I will follow the program
2. I plan to participate in some meetings
3. I plan to join workgroup(s)
4. I plan to be deeply engaged



Which workgroups do you plan to join?

1. Roads
2. Water supply
3. Sediment remediation
4. Science and monitoring
5. All of the above
6. More than one workgroup



Elk River Watershed Progress - Summary

- Upper Elk River TMDL approved by State Board (8/1/17)
- Elk River Recovery Assessment hydrodynamic and sediment transport model has been calibrated and scenarios are currently running
- Pilot projects on schedule – construction underway (Steel Bridge)
- Stewardship activities continue while transition to new lead entity is finalized

Comments and Questions?

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