# Upper Elk River Technical Analysis for Sediment and Update on Sediment Total Maximum Daily Load and Stewardship Framework

Item No. 1

November 18, 2015

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CALIFORNIA Water Boards

# Presentation Outline

- Current vision for the Elk River Watershed
- Phased Sediment TMDL for the Upper Elk River Watershed
- Summary of Tetra Tech's Technical Sediment TMDL for the Upper Elk River Watershed (October 2015)
- Next Steps for the Upper Elk River TMDL and TMDL Action Plan for the watershed
- Overview of Watershed Stewardship

# Vision for the North Coast Region

- Healthy Watersheds
- Effective Regulation
- Strong Partnerships

# Vision for the Elk River Watershed

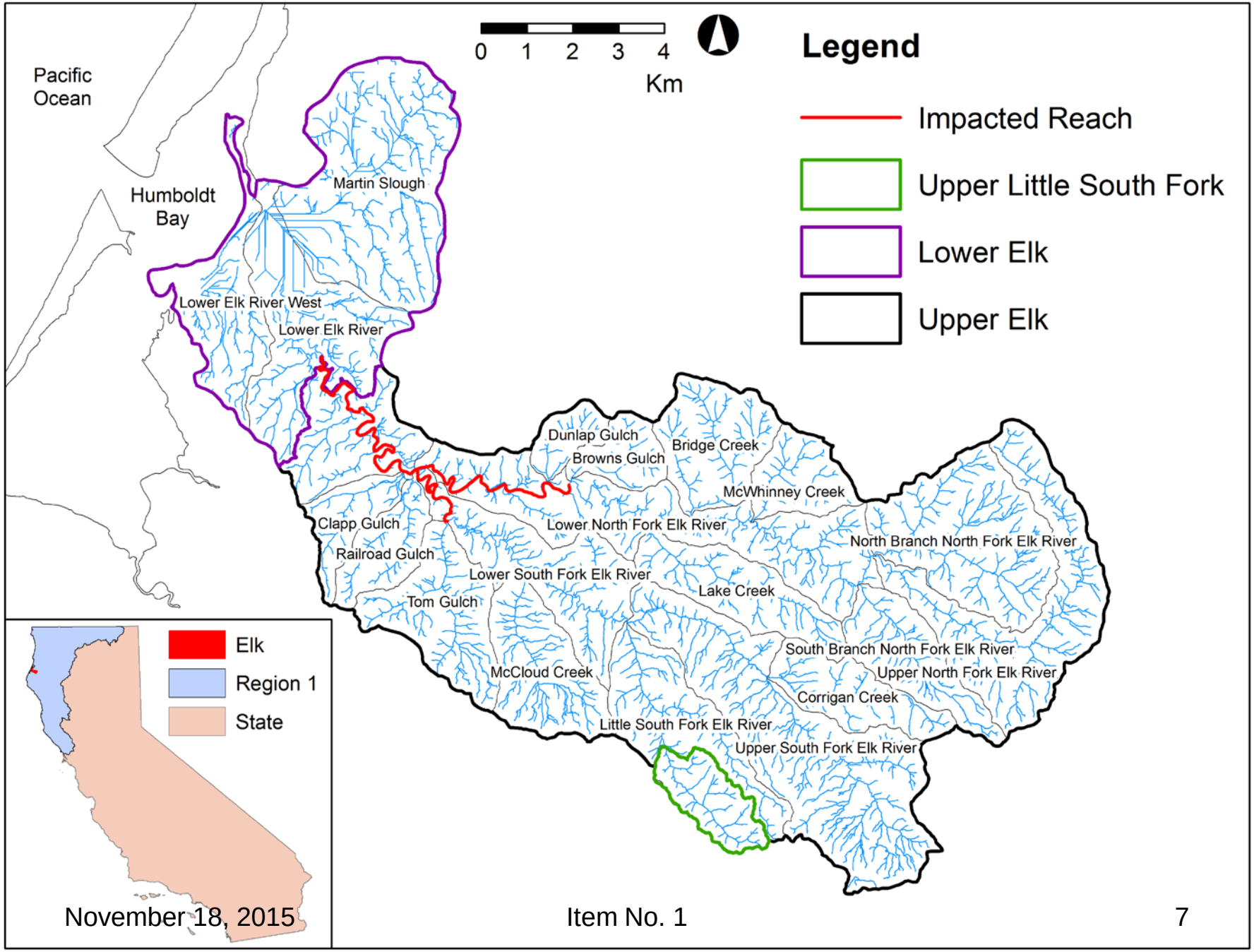
- Healthy Watershed
  - A Two-Phased Sediment TMDL for the top of the watershed through the impacted reach (Upper Watershed)
  - Elk River Recovery Assessment from the top of the impacted reach to the bay
- Effective Regulation
  - Waste Discharge Requirements for upper watershed timberland owners
  - Sediment TMDL Action Plan to define a program of implementation for the entire watershed
- Watershed Stewardship Framework
  - Coordinated monitoring, remediation, restoration, and adaptive management for the entire watershed coordinated through an organized assemblage of committed partners

# Upper Elk River Sediment TMDL
# A Two-Phased TMDL

- Phase 1
  - Defined by *existing* sediment loading capacity in the impacted reach
  - Tetra Tech Report is a technical analysis of sediment for the Upper Elk River Watershed, suitable for approval as a technical sediment TMDL by the Regional Water Board or EPA
- Phase 2
  - Will be defined by *expanded* sediment loading capacity resulting from sediment remediation and channel restoration of the impacted reach
  - Elk River Recovery Assessment to model current and future sediment hydrodynamics to the bay
  - Remediation Workgroup to be established under the Watershed Stewardship framework to oversee remediation design, permitting, funding, and implementation

# Technical Sediment TMDL for the Upper Elk River Watershed Tetra Tech (2015)

- Problem Statement
- Desired Future Conditions
- Sediment Source Analysis
- Sediment Loading Capacity and Load Allocations
- Framework for Implementation, Monitoring and Adaptive Management


Pacific Ocean
Humboldt Bay
Martin Slough
Lower Elk River West
Lower Elk River
0 1 2 3 4
Km
Legend
Impacted Reach
Upper Little South Fork
Lower Elk
Upper Elk
Dunlap Gulch
Browns Gulch
Bridge Creek
McWhinney Creek
Clapp Gulch
Lower North Fork Elk River
North Branch North Fork Elk River
Railroad Gulch
Lower South Fork Elk River
Lake Creek
Tom Gulch
South Branch North Fork Elk River
McCloud Creek
Upper North Fork Elk River
Corrigan Creek
Little South Fork Elk River
Upper South Fork Elk River
Elk
Region 1
State

# Problem Statement

- Nuisance Flooding
  - Health and safety implications
  - Property damage
  - Reduced channel capacity results in overbank floods (~4x year in North Fork Elk River)
- Sediment-related beneficial use impairments
  - Contact and Non-Contact Recreation
    - Lack of deep pools
    - Silt-sized material on channel bottom
    - Anaerobic condition during summer months
    - Presence of aquatic vegetation and algae growths

# Problem Statement (cont'd)

- Sediment-related beneficial use impairments (*cont'd*)
  - Cold Freshwater Habitat
    - Stream substrate is very fine
    - Potential spawning gravels are embedded
    - Pool depths have decreased by sediment filling
    - High concentrations/durations affect feeding and rearing behavior
  - Domestic and Agricultural Water Supplies
    - Impacted stream morphology (filling of pools)
    - Produced offensive tastes and odors
    - Promoted bacteria growth (reducing effectiveness of disinfection)
    - Increased frequency of maintenance and replacement of hot water heaters, treatment facilities, and agricultural equipment

# Desired Future Conditions

- To support salmonids throughout their historical range
- To support the use of surface water for domestic drinking water and agricultural water supplies, particularly within the impacted reach
- To contain historic bankfull discharges within the bankfull channel, particularly within the impacted reach

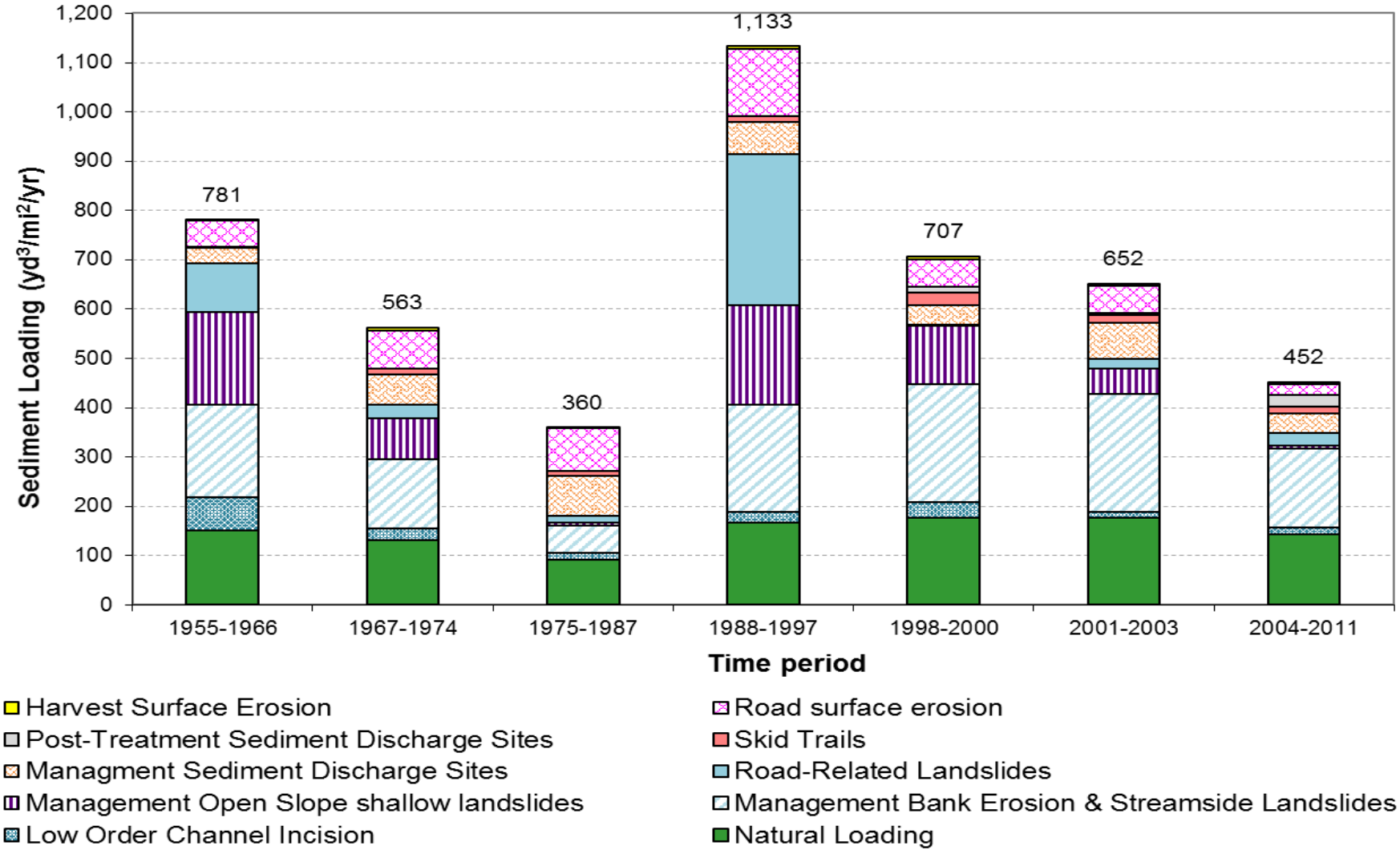
# Desired Future Conditions

- Instream Water Quality Indicators
  - Bankfull channel capacity
  - Chronic turbidity
  - Salmonid life stage requirements to be defined through coordinated monitoring and adaptive management
- Hillslope Water Quality Indicators
  - Upper Elk River specific
  - Roads
  - Harvest areas
  - Management Discharge Sites

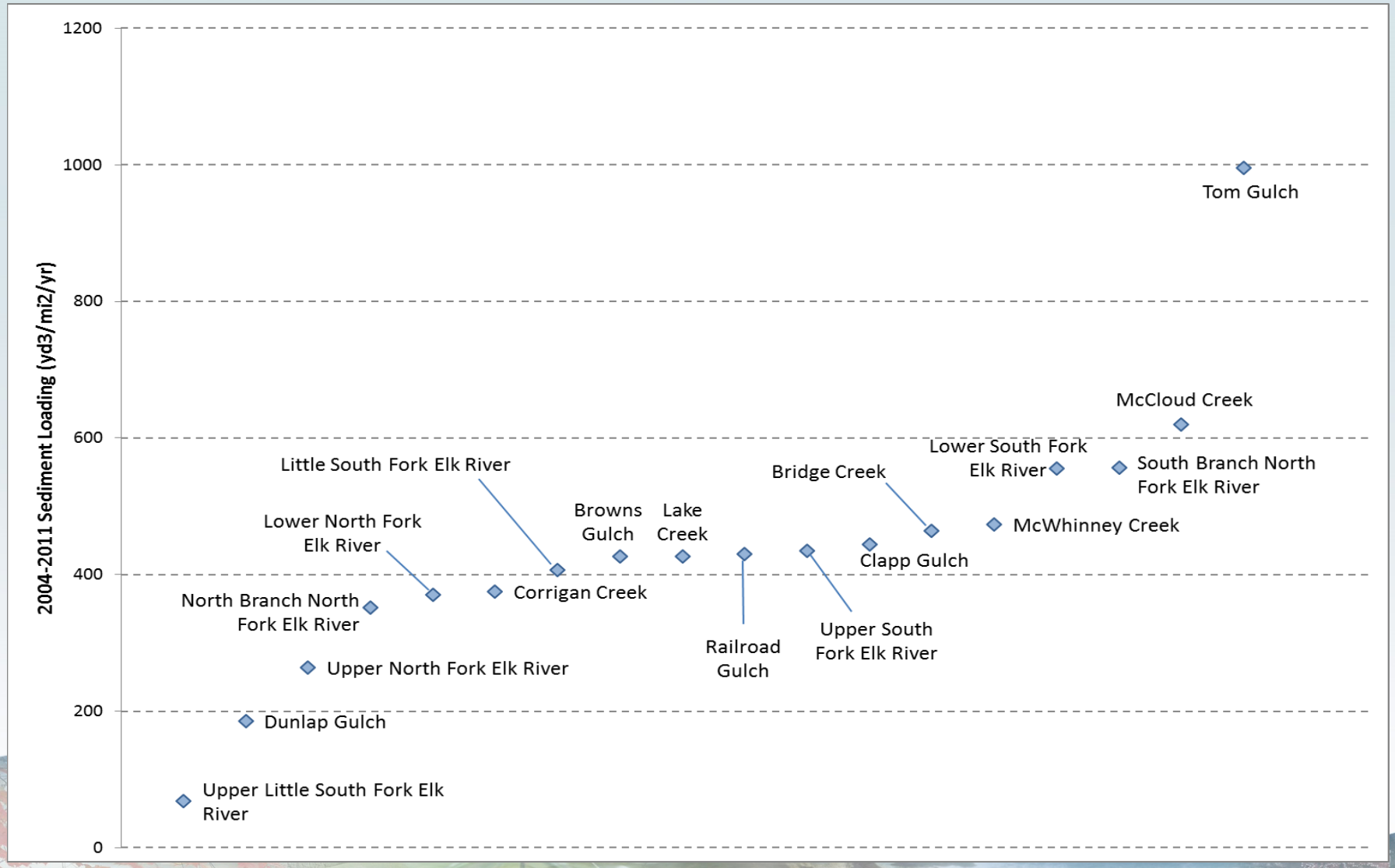
# Upper Elk River Specific Hillslope Water Quality Indicators

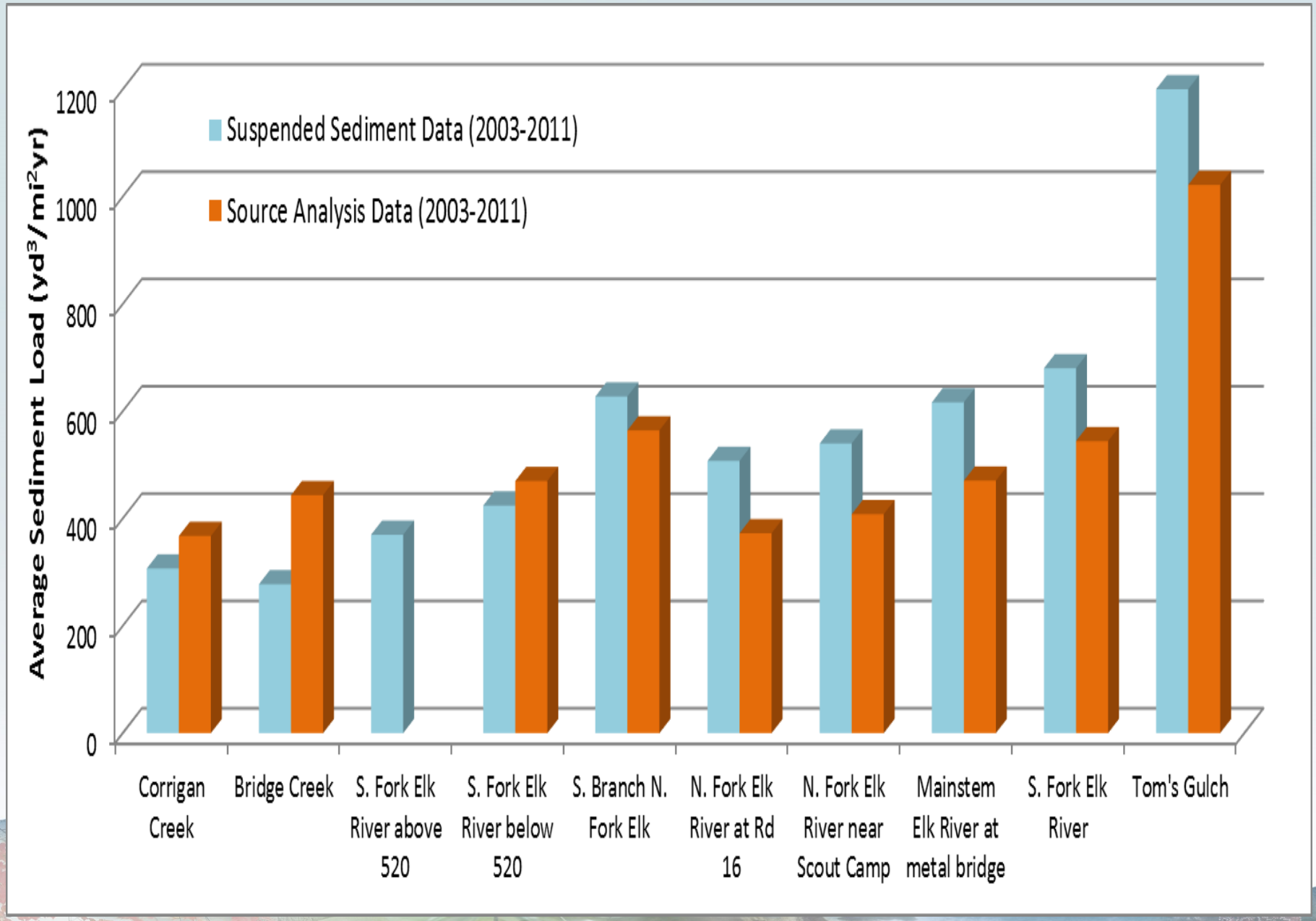
- Headward incision in low order channels
- Peak flows
- Channels with actively eroding banks
- Characteristics of riparian zones in Class I and II watercourses
- Characteristics of riparian zones in Class III watercourses

# Sediment Source Analysis

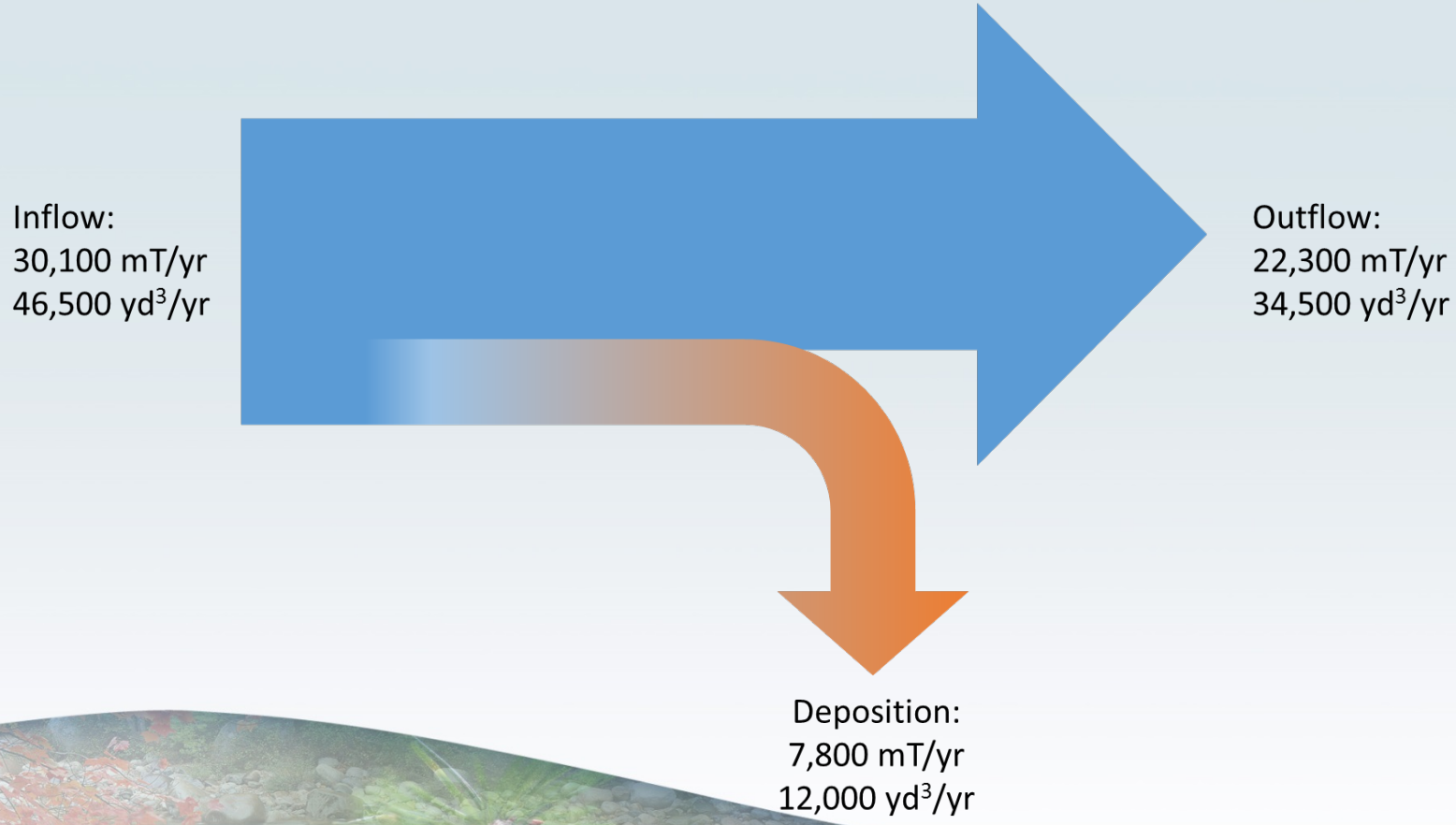


# Sediment Source Analysis




Average Sediment Load (yd³/mi²yr)
1200
1000
800
600
400
200
0
Suspended Sediment Data (2003-2011)
Source Analysis Data (2003-2011)
Corrigan Creek
Bridge Creek
S. Fork Elk River above 520
S. Fork Elk River below 520
S. Branch N. Fork Elk
N. Fork Elk River at Rd 16
N. Fork Elk River near Scout Camp
Mainstem Elk River at metal bridge
S. Fork Elk River
Tom's Gulch

# Estimate of Sediment Flux in Impacted Reach



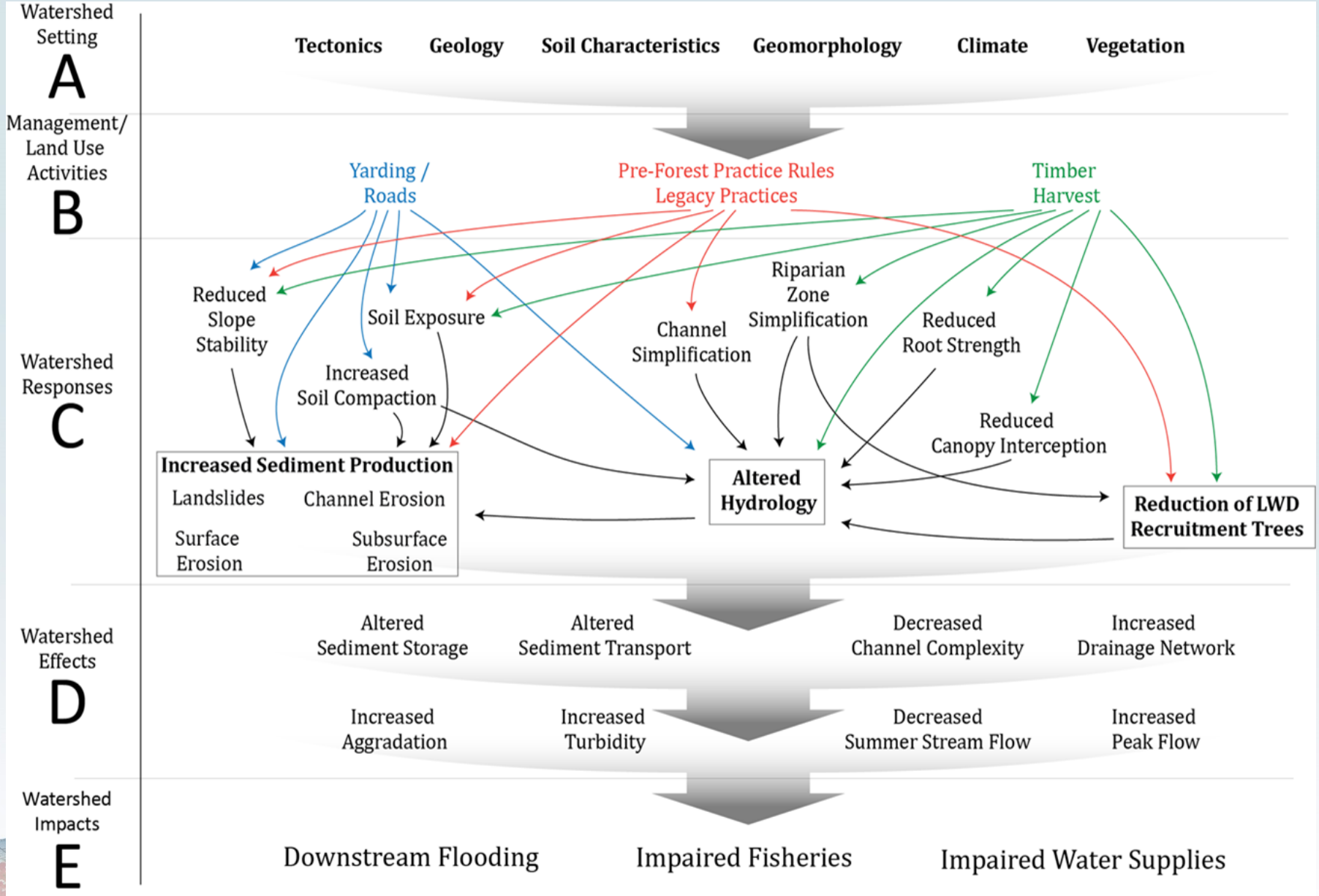
# Sediment Loading Capacity

Because of sediment aggradation, there is currently no loading capacity for additional sediment within the impacted reach. This observation is based on:

- Sediment inflows to the impacted reach that exceed outflows,
- Continued aggradation in the impacted reach, and
- Continued exceedances of sediment-related WQS.

# Zero Sediment Load Allocation

- There is no assimilative capacity for additional sediment in the impacted reach and therefore the loading capacity is zero.
- A zero sediment loading capacity is equivalent to a zero sediment load allocation (LA).
- The zero LA is attributed to all controllable nonpoint sources of sediment.


Watershed Setting
A
Tectonics
Geology
Soil Characteristics
Geomorphology
Climate
Vegetation
Management/ Land Use Activities
B
Yarding / Roads
Pre-Forest Practice Rules Legacy Practices
Timber Harvest
Watershed Responses
C
Reduced Slope Stability
Soil Exposure
Riparian Zone Simplification
Channel Simplification
Reduced Root Strength
Increased Soil Compaction
Reduced Canopy Interception
Increased Sediment Production
Landslides
Channel Erosion
Surface Erosion
Subsurface Erosion
Altered Hydrology
Reduction of LWD Recruitment Trees
Watershed Effects
D
Altered Sediment Storage
Altered Sediment Transport
Decreased Channel Complexity
Increased Drainage Network
Increased Aggradation
Increased Turbidity
Decreased Summer Stream Flow
Increased Peak Flow
Watershed Impacts
E
Downstream Flooding
Impaired Fisheries
Impaired Water Supplies

# Implementation, Monitoring and Adaptive Management- *Upper Watershed*

- A sediment load reduction program will address:
  - Sediment production
  - Peak flows and other flow alterations
  - Drainage network
  - Channel complexity
  - Turbidity
- The sediment load reduction program for the upper watershed to be contained in Waste Discharge Requirements

# Implementation, Monitoring and Adaptive Management- *Impacted Reach*

- An instream remediation and restoration program will address:
  - Sediment storage
  - Sediment transport
  - Aggradation
  - Instream habitat
- The instream remediation and restoration program includes:
  - Elk River Recovery Assessment, including pilot projects
  - Assembly of a Remediation Workgroup
  - Translation of Recovery Assessment conclusions into project designs
  - Permitting, funding, and implementation of project designs.

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# Sediment TMDL Action Plan

- Watershed Stewardship Framework
- WDRs and waivers for timberland owners:
  - HRC
  - Green Diamond Resource Company
  - Bureau of Land Management
  - NTMP owners
- Remediation and restoration actions

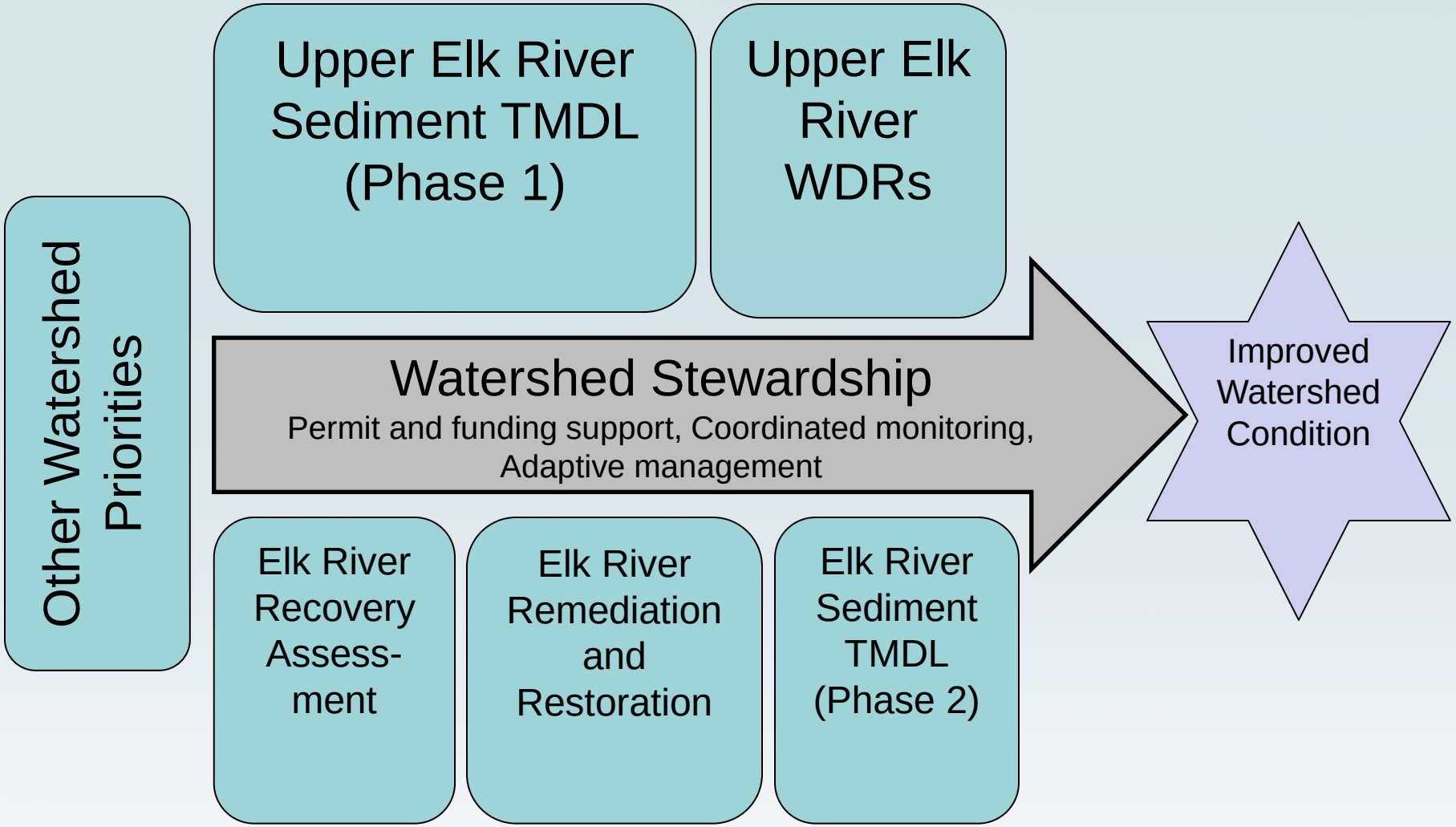
# TMDL Next Steps

- Staff recommends that the Board consider approving the Technical Sediment TMDL for the Upper Elk River Watershed in March 2016
  - Tetra Tech 2015
- Staff recommends that the Board consider adopting an amendment to the Basin Plan to include a Elk River Watershed Sediment TMDL Action Plan that describes a program of implementation for the entire watershed

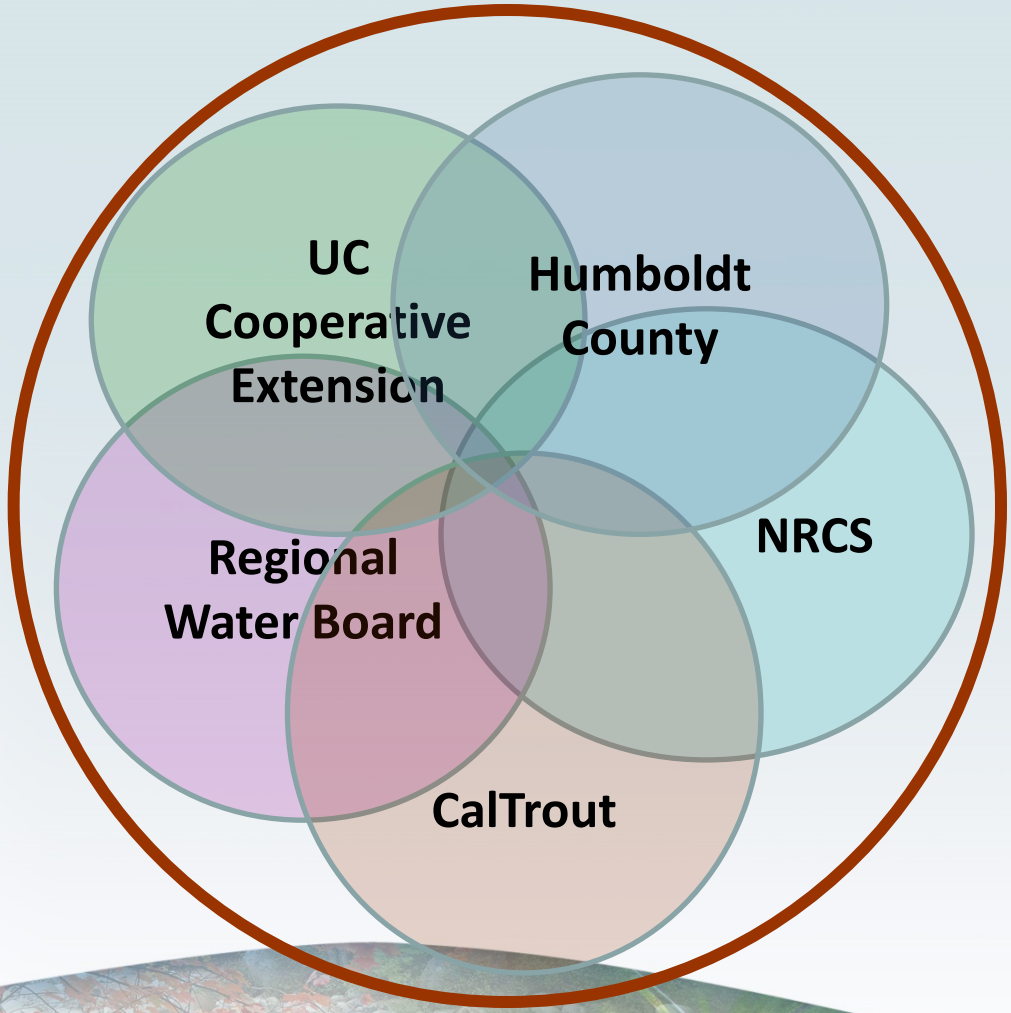
# Elk River Watershed Stewardship Program

From Draft Operating Agreement:

Engage community members, residents, scientists, land managers, and regulatory agencies in developing a collaborative planning process that seeks to enhance conditions in the Elk River watershed.


Upper Elk River Sediment TMDL (Phase 1)
Upper Elk River WDRs
Other Watershed Priorities
Watershed Stewardship
Permit and funding support, Coordinated monitoring, Adaptive management
Improved Watershed Condition
Elk River Recovery Assess-ment
Elk River Remediation and Restoration
Elk River Sediment TMDL (Phase 2)

# Elk River Watershed Stewardship Steering Committee




## Draft (in Process) Operating Agreement Concepts

- Create opportunities for partnerships
- Strategies to renew health & function of watershed
- Sustain vibrant working landscape
- Provide open transparent & non-regulatory process sensitive to diverse perspectives and interests
- Promote coordinated monitoring and adaptive management

# Elk River Stewardship Organizational Components

- Steering Committee
- Health & Safety Work Group
- Sediment Remediation Work Group
- Science & Monitoring

# Status of Elk River Watershed Stewardship Project

- Seven facilitated meetings to develop Operating Agreement (ongoing)
- Currently developing consensus on Work Plan for 319(h) grant funding
- Initiating coordination with Recovery Assessment

# Existing and Potential Funding

| Source | Activity | Status | Amount |
|---|---|---|---|
| Cleanup & Abatement | Recovery Assessment | Contract underway | $475,030 * |
| 319(h) | Watershed Stewardship Planning | Contract pending | $174,956 * |
| TRFRF | Pilot Project / Remediation | Application pending | $638,557 * |
| Proposition 1 | Remediation | Pending Stewardship Planning | TBD |
| Humboldt Redwood Company | Various | Existing and future support | TBD |
| Integrated Water Resource Management | Infrastructure | Pending Stewardship Planning | TBD |

* Does not include in-kind matches from participating organizations

# Watershed Stewardship Next Steps

- Fall 2015: Pending application for TRFRF funding for pilot projects
- January 2016:  Finalize 319(h) Scope of Work
- Spring 2016: Watershed-wide Stakeholder meetings
- Late Spring 2016: Initiate Work Groups
- 2017: Coordinate on the implementation of pilot projects
- Ongoing: Seek additional funding (e.g., Prop 1)

# Thank You

Questions?