Item 11:
Update on Upper Elk River Sediment Total Maximum Daily Load

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Eureka, CA

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Basin Planning
North Coast Regional Water Quality Control Board

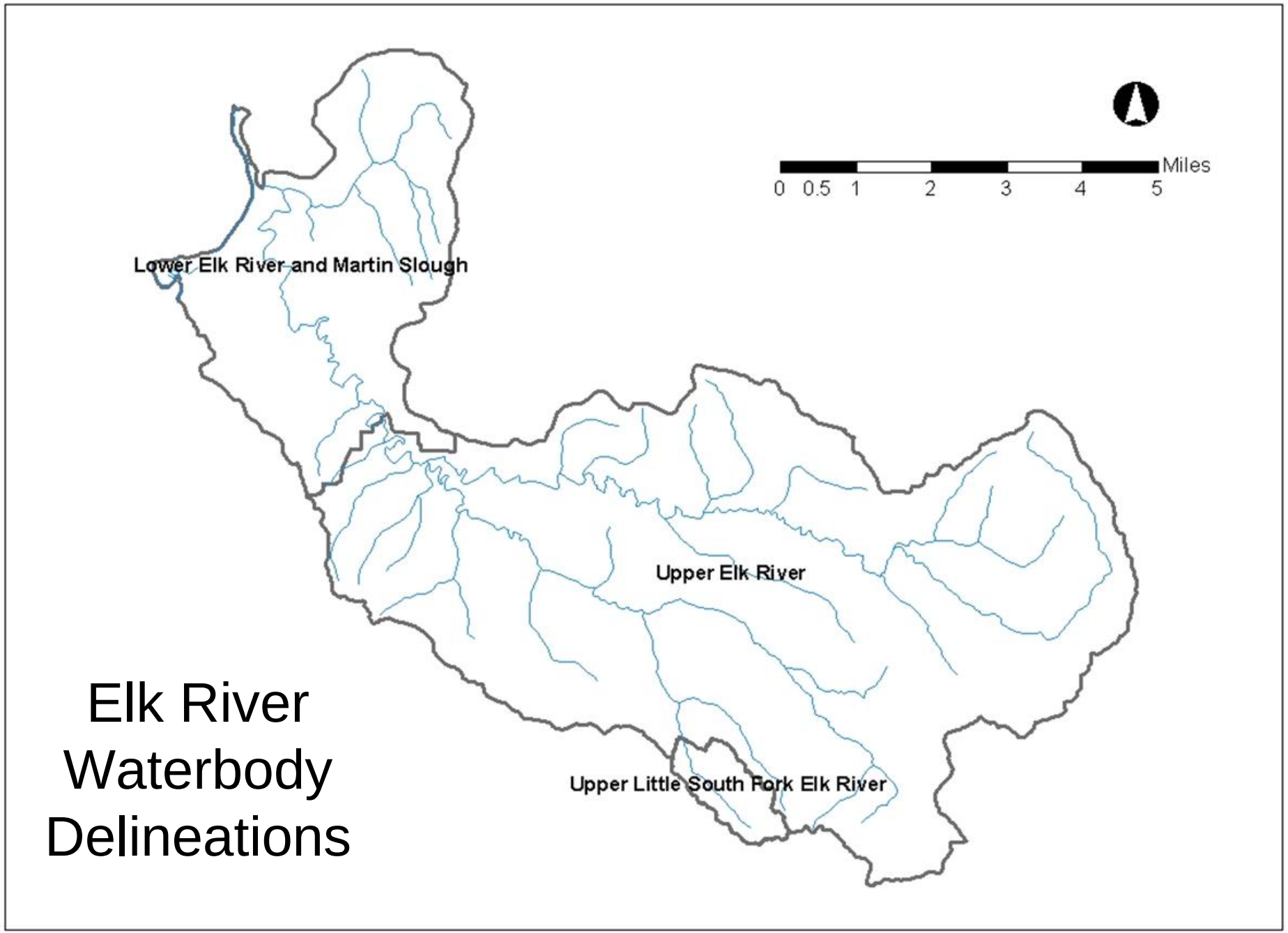
CALIFORNIA
Water Boards

Presentation Overview

- Project Team
- Status of Upper Elk River Sediment TMDL
- External Scientific Peer review process
- Technical elements of the TMDL
- TMDL Implementation strategy
- Update on *Elk River Recovery Assessment* funding request
- Next Steps

External Scientific Peer Review of Upper Elk River TMDL Staff Report

- Cal/EPA coordinates Peer Review Program through the University of California
- Four reviewers with expertise in fisheries, water quality, hydrology and geomorphology, and slope stability
- Technical TMDL submitted in March 4, 2013; comments received April 26, 2013
- Reviewers evaluated if the assertions, findings, and conclusions were based upon sound scientific knowledge, methods, and practices



Elk River Waterbody Delineations

Fine Sediment Impairments

- Deposition of settleable material impacts beneficial uses and causes flooding
  - Altered channel and floodplain morphology
  - Diminished streamflow conveyance capacity
  - Diminished pool size
  - Reduced substrate grain size
  - Cross-sectional areas continue to decrease
- Elevated turbidity and suspended sediment concentrations impact COLD, SPWN, MIGR, RARE, MUN

TMDL = Loading Capacity

= Natural Background

+ Waste Load Allocation

+ Load Allocation

+ Margin of Safety

Sediment Loading Capacity

- Multiple lines of inquiry:
  - Reviewed loading capacities established in other North Coast sediment TMDLs
  - Modeled loads below which localized channel scour is initiated
  - Calculated loads necessary to attain numeric turbidity objective
- Expressed as percentage of natural loading

Sediment Loading Capacity Based on Turbidity Objective

$$\frac{SSL_{Objective}}{SSL_{Background}} x\ 100 = \%\ Natural\ SSL\ to\ attain\ turbidity\ objective$$

Where:

$SSL_{Background}$ = SSL associated with background turbidity

$SSL_{Objective}$ = SSL associated with 1.2 x background turbidity

<u>Assumptions</u>

1. Conditions in Upper Little South Fork reference subbasin are representative of natural occurring background turbidity and the associated suspended sediment loads (SSL)
2. A change in SSL results in a commensurate change in total load
3. The mean of 2004-2007 water years provide good representation of a range of climatic conditions

Sediment Loading Capacity

Results

$$\frac{SSL_{Objective}}{SSL_{Background}} x\ 100 = \%\ Natural\ SSL\ to\ attain\ turbidity\ objective$$

2004	123%
2005	126%
2006	115%
2007	132%
Mean	**124%**

Loading Capacity = 120% of Natural loading,

with a Margin of Safety

TMDL *= Loading Capacity*

= ∑(Natural Background + Waste Load Allocation + Load Allocation + MOS)

= (0 WLA) + Load Allocations + MOS

= 1.2 x Natural Background

= 1.2 x (68 $yd^3/mi^2/yr$)

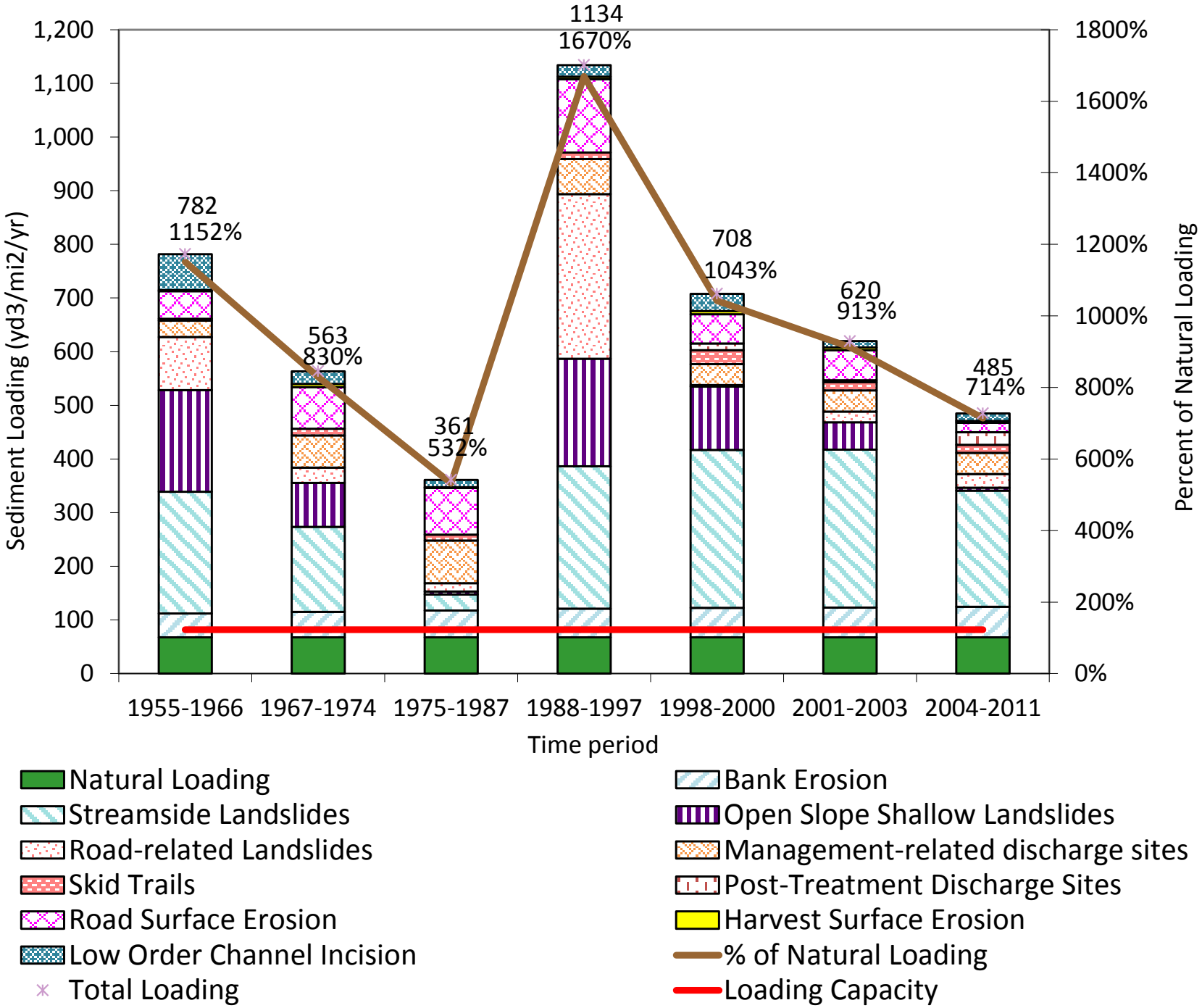
= 82 $yd^3/mi^2/yr$

Load Allocation = *Loading Capacity – Natural Background*

= *82 $yd^3/mi^2/yr$ - 68 $yd^3/mi^2/yr$*

= 14 $yd^3/mi^2/yr$

= *Upslope Loading - Instream Loading*


1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Sediment Loading (yd3/mi2/yr)
1800%
1600%
1400%
1200%
1000%
800%
600%
400%
200%
0%
Percent of Natural Loading
782
1152%
563
830%
361
532%
1134
1670%
708
1043%
620
913%
485
714%
1955-1966
1967-1974
1975-1987
1988-1997
1998-2000
2001-2003
2004-2011
Time period
Natural Loading
Bank Erosion
Streamside Landslides
Open Slope Shallow Landslides
Road-related Landslides
Management-related discharge sites
Skid Trails
Post-Treatment Discharge Sites
Road Surface Erosion
Harvest Surface Erosion
Low Order Channel Incision
% of Natural Loading
Total Loading
Loading Capacity

Instream Loading = (Volume management-related deposits) ÷ (upstream area) ÷ (10 year time frame for restoration)

Reach description (downstream to upstream)	**Estimated Volume Stored within Reach (yd^3)**	**Upstream drainage area (mi^2)**	**Volume per Unit Area (yd^3/mi^2)**	**Instream Loading ($yd^3/mi^2/yr$)**
Upper Mainstem: Shaw Gulch to confluence	260,000	45	5,777	578
Lower North Fork: confluence to Browns Gulch	280,000	22	12,727	1,273
Lower South Fork: confluence to Toms Gulch	100,000	19	5,263	526
Total Middle Reach	640,000	45	14,222	1,422

Management-Related Sediment Source Category	Allocation ($yd^3/mi^2/yr$)	2004-2011 Loading ($yd^3/mi^2/yr$)	Percent Reduction from 2011 Loading	Schedule to Achieve Allocations
Total Management-Related Upslope Sediment Loading	14	417	97%	20 years
Total Management-Related Instream Storage Loading	0	1,422	100%	10 years

Management-Related Sediment Source Category	**Schedule to Achieve Allocations**
Management Sediment Discharge Sites	5 years
Post-Treatment Sediment Discharge Sites	5 years
Road surface erosion	
Harvest Surface Erosion	
Open Slope Shallow Landslides	7 years
Road-Related Landslides	
Low Order Channel Incision	20 years
Bank Erosion	
Streamside Landslides	
Skid Trails	20 years
Total Management-Related Upslope Sediment Loading	**20 years**
Total Management-Related Instream Storage Loading	**10 years**

Targets: Translate Allocations and Objectives to Inform Implementation and Compliance

- Hillslope Targets
  - Address factors influencing sediment source categories
  - Provide basis for conditions in future permits
  - Progress informed by monitoring program
- Instream Targets to support beneficial uses and prevention of nuisance
  - COLD, SPAWN, MIGR, MUN
  - Bankfull conveyance capacity
  - Progress informed by monitoring program

Management-Related Sediment Source Category	Target
Headward Incision in Low Order Channels	Zero increase in existing drainage network
Bank Erosion and Streamside Landslides	Decreasing trend in length of unstable channel
	Harvest-related peak flow increases in Class II and III watercourse catchment areas do not exceed 10% in 10 years
	All road segments are hydrologically disconnected from watercourses
Open Slope Shallow Landslides	Decrease in management-related open-slope landslide delivery in conformance with load allocation

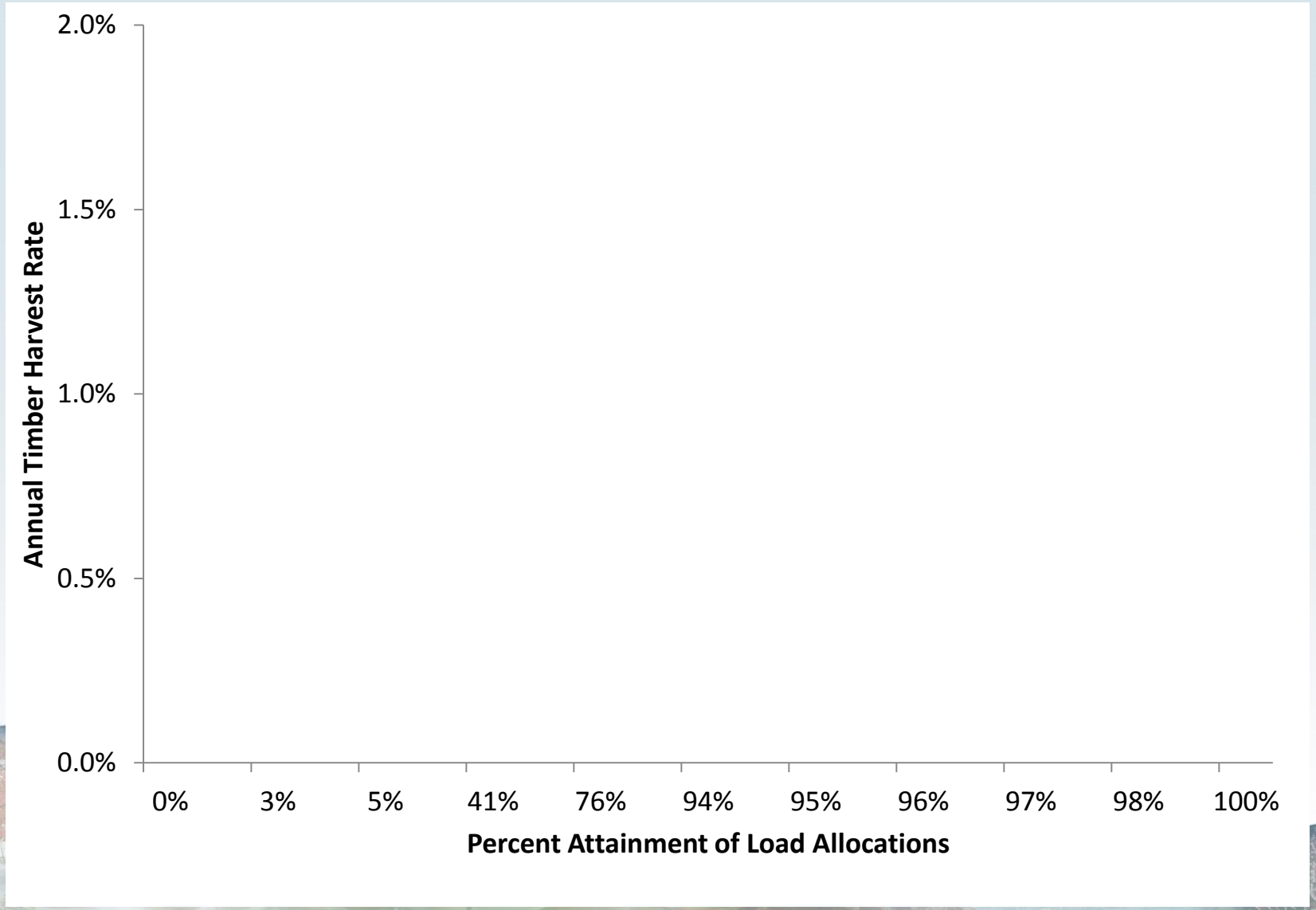
Management-Related Sediment Source Category	Target
Road Related Landslides	Improving trend in stability of roads in conformance with load allocation
Deep Seated Landslides	Zero increase in discharge from deep seated landslide due to management-related activities
Road Surface Erosion	Decrease road surface erosion to load allocation
Management Discharge Sites and Skid Trails	No new management discharge sites created
	Treatment of all controllable management discharge sites

Watershed Indicator	Targets
Riparian Areas	Improving trend in quality of riparian stands capable of providing: 1) delivery of wood and complexity to the channel for sediment metering, stabilization, and to provide habitat elements, 2) slope stability to minimize sediment delivery associated with landslide features, and 3) ground cover to ensure sediment control.
Timber Harvest Rate	The maximum timber harvest rate is ~1.5% of a Class I subbasin area and ~1.5% of ownership.

Program of Implementation

- Address upslope sources – revise WDRs
  - CAO program
  - Roads
  - Slope Stability
  - Riparian Protection and Enhancement
  - Harvest rate
- Remediate instream sources
  - Elk River Recovery Assessment and Implementation
- Adaptive Implementation
  - Informed by effectiveness monitoring and progress toward recovery

Adaptive Implementation for 20-Year Recovery Conceptual Model



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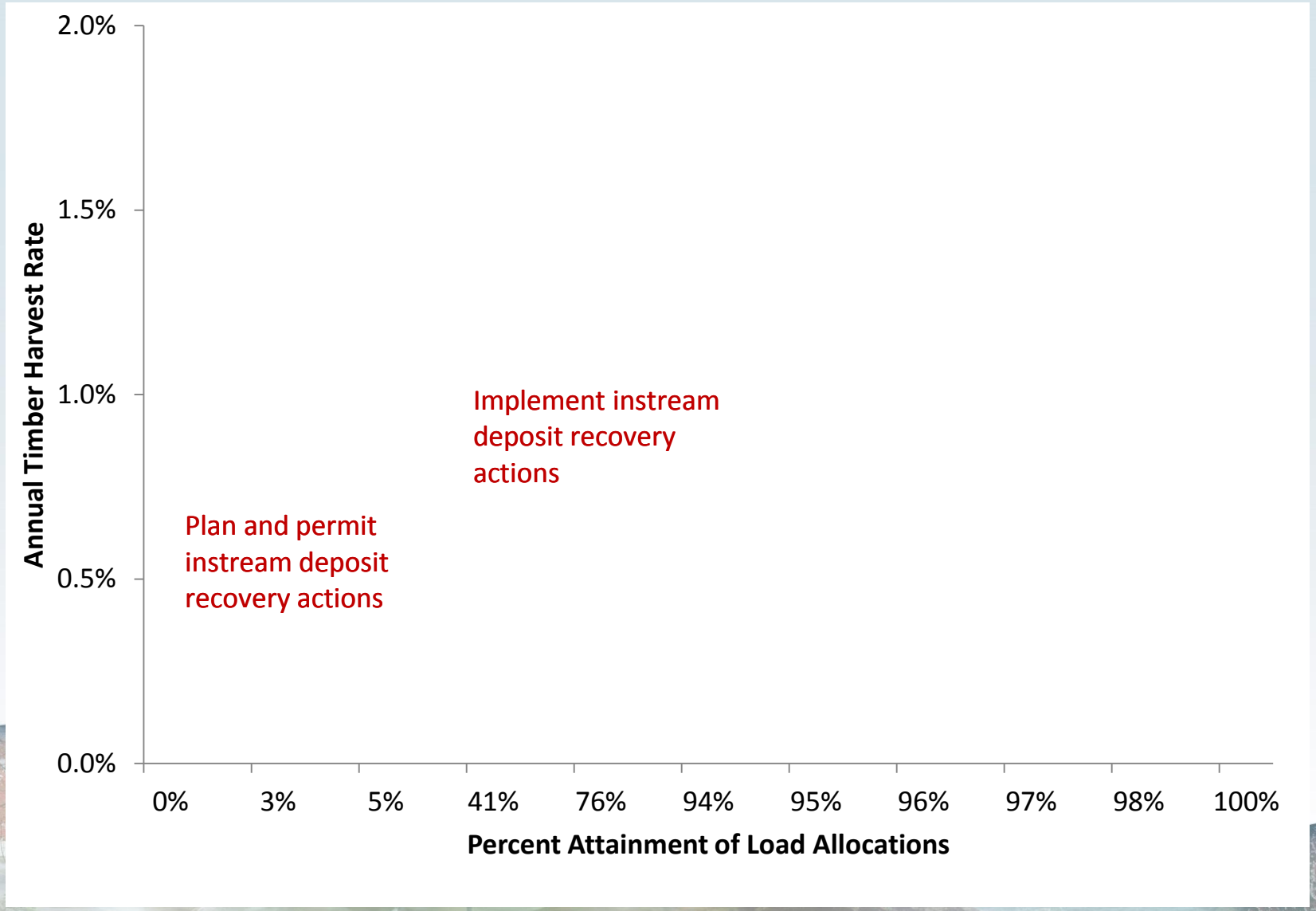

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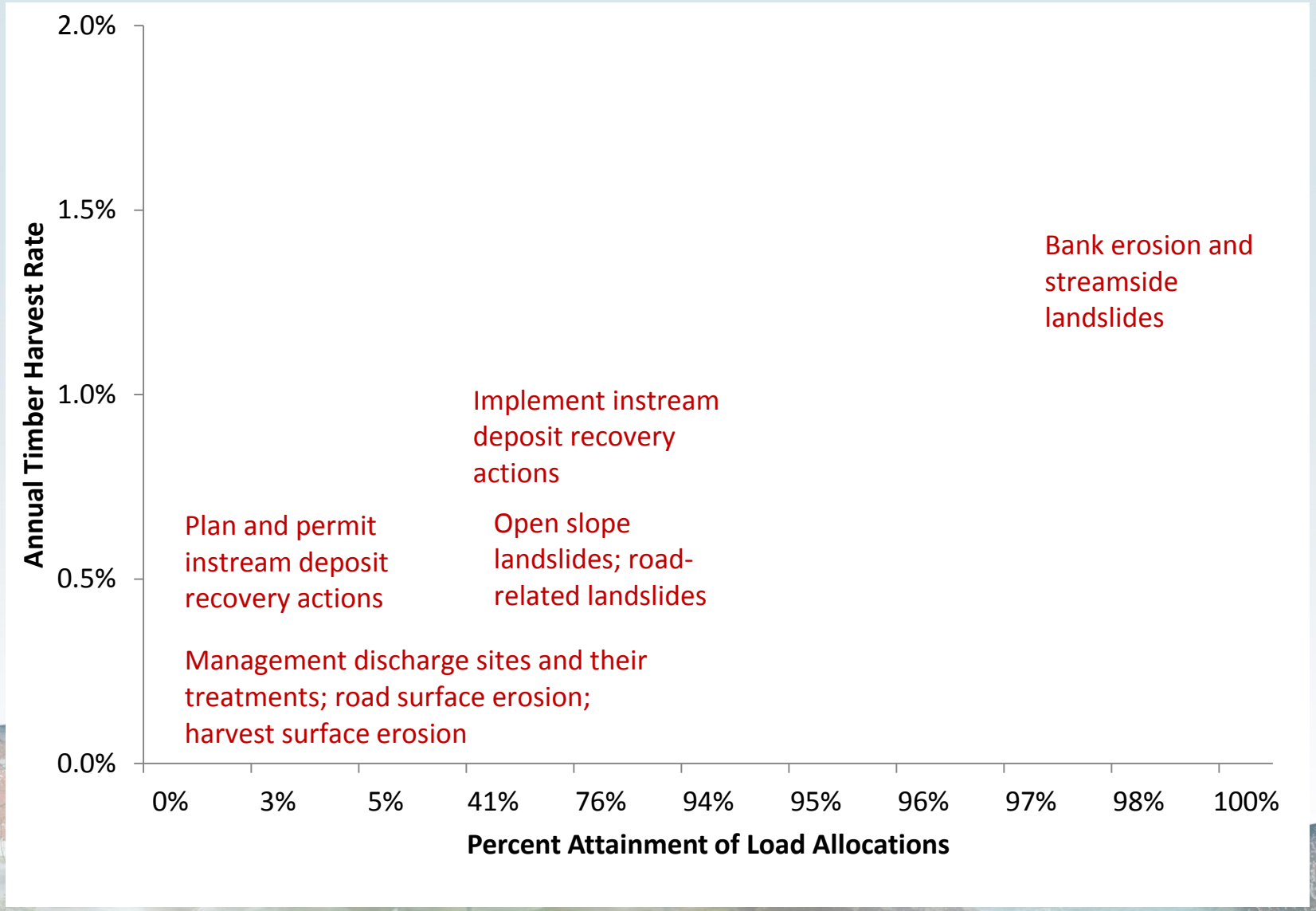

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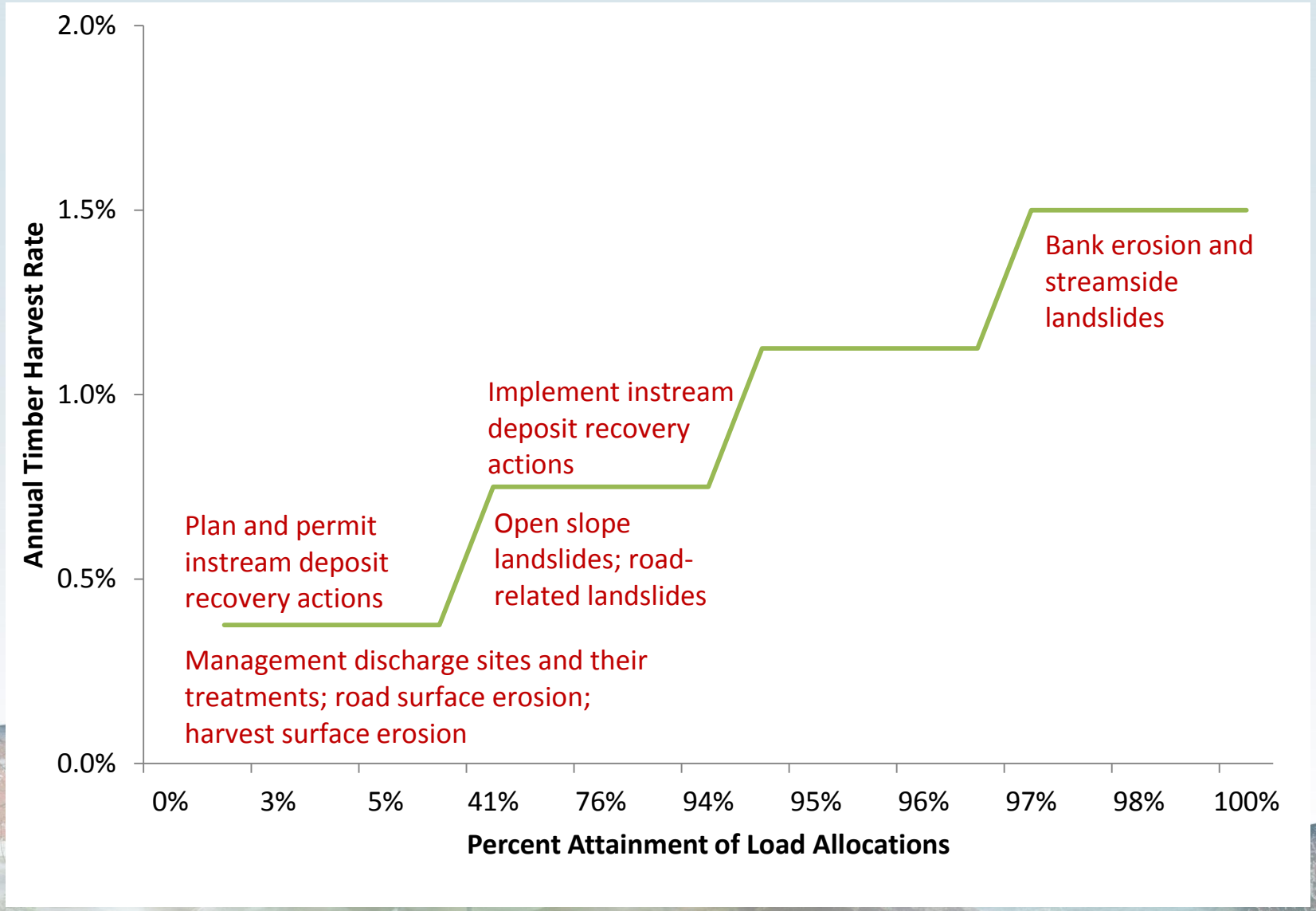

Peer reviewer comments

- Sound scientific basis for:
  - Water quality impairments
  - Reference subbasin in natural loading estimates
  - Management-related loading estimates
  - Loading Capacity
  - Load allocation strategy for hillslope and instream loading
  - Hillslope targets
  - LIDAR DEM and landslide hazard modeling and mapping strategy
  - Adaptive implementation
- Suggested greater detail on:
  - Instream conditions, provide individual cross section data
  - Implementation and monitoring plans
- Concerns/Recommendations:
  - Lower harvest rate may be needed to attain allocations
  - Channel conveyance target may not reflect unimpaired conditions
  - Habitat enhancement actions may be warranted for salmonids

Elk River Recovery Assessment

- Will identify feasible recovery actions for instream deposits from past management-related sediment discharges
- August 23, 2012 Regional Water Board Resolution supporting request to State Water Board for Cleanup and Abatement Account (CAA) funds
- Current funding request includes Recovery Assessment and implementation of pilot projects
- April 18, 2013 California Coastal Conservancy approved matching funds; HRC and RCAA matches committed
- May 7, 2013 State Board will consider CAA request
- Start work this summer

Next steps

- Continue Stakeholder Outreach
- Respond to Peer Reviews and post package on website
- Update technical TMDL for Public Review
- Present technical TMDL in a staff-led workshop in Eureka, including a 45-day public comment period
- Basin Planning and Timber staff to engage stakeholders on drafting permit revisions
- Present TMDL and implementation package to the Board for consideration