

A photograph of a stream flowing through a forest. The water is dark and rippling. Large logs are scattered in the water and along the banks. The background is filled with green trees and foliage. The text is overlaid on the top half of the image.

Developing Plans to Integrate Wood Loading Techniques into Watershed Scale Restoration

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With lots of help from
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Anna Hall
Pat Moorehouse
Joel Flynn

Pacific Watershed Associates

Collaborators

A photograph of a river flowing through a forest. The water is dark and turbulent, with white foam from rapids. On the right bank, a person wearing a backpack and outdoor gear stands near a large fallen log. The background is filled with green trees and foliage.

CDFW FRGP

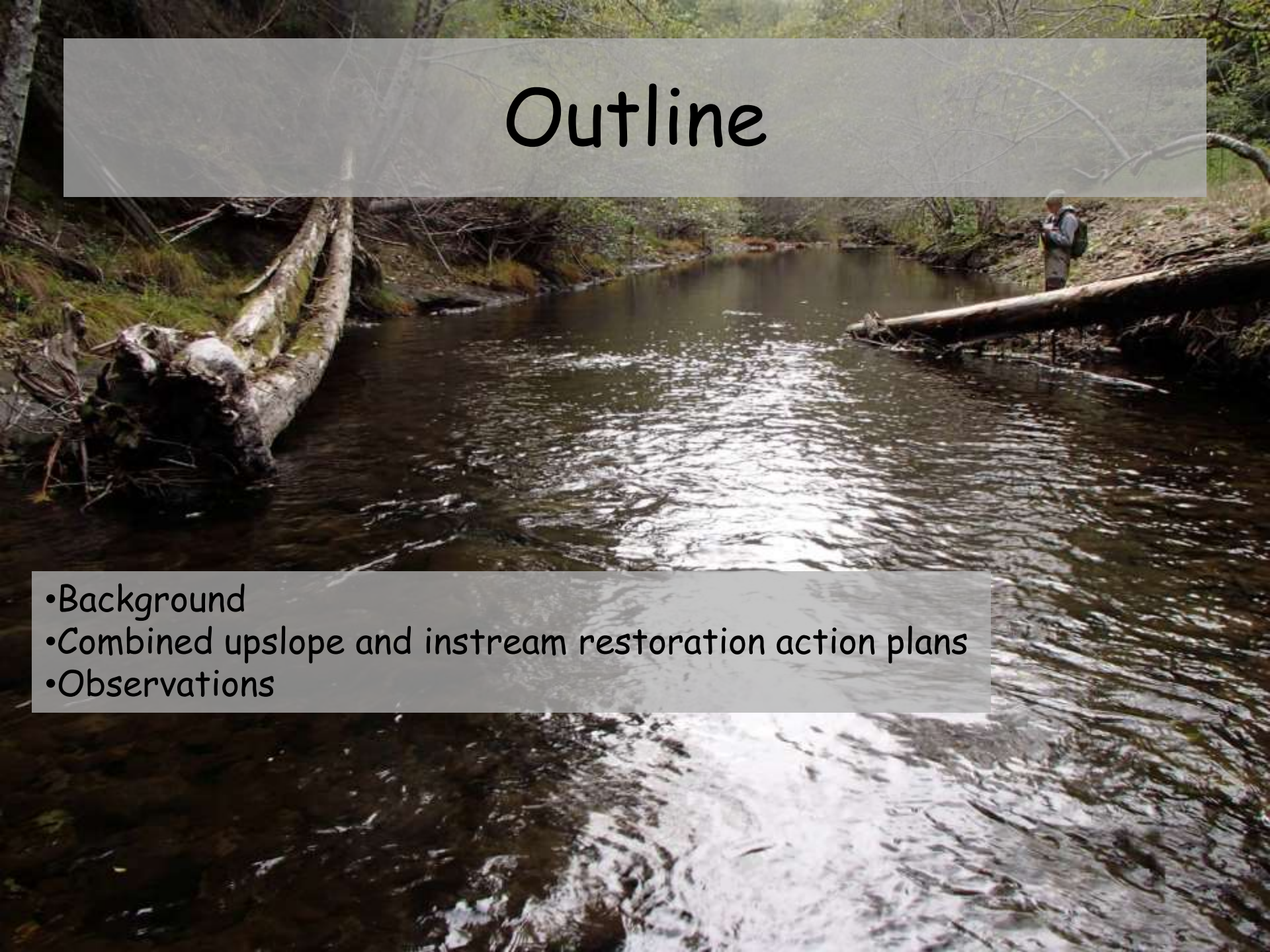
Redwood Forest Foundation

Campbell Global

ERWIG

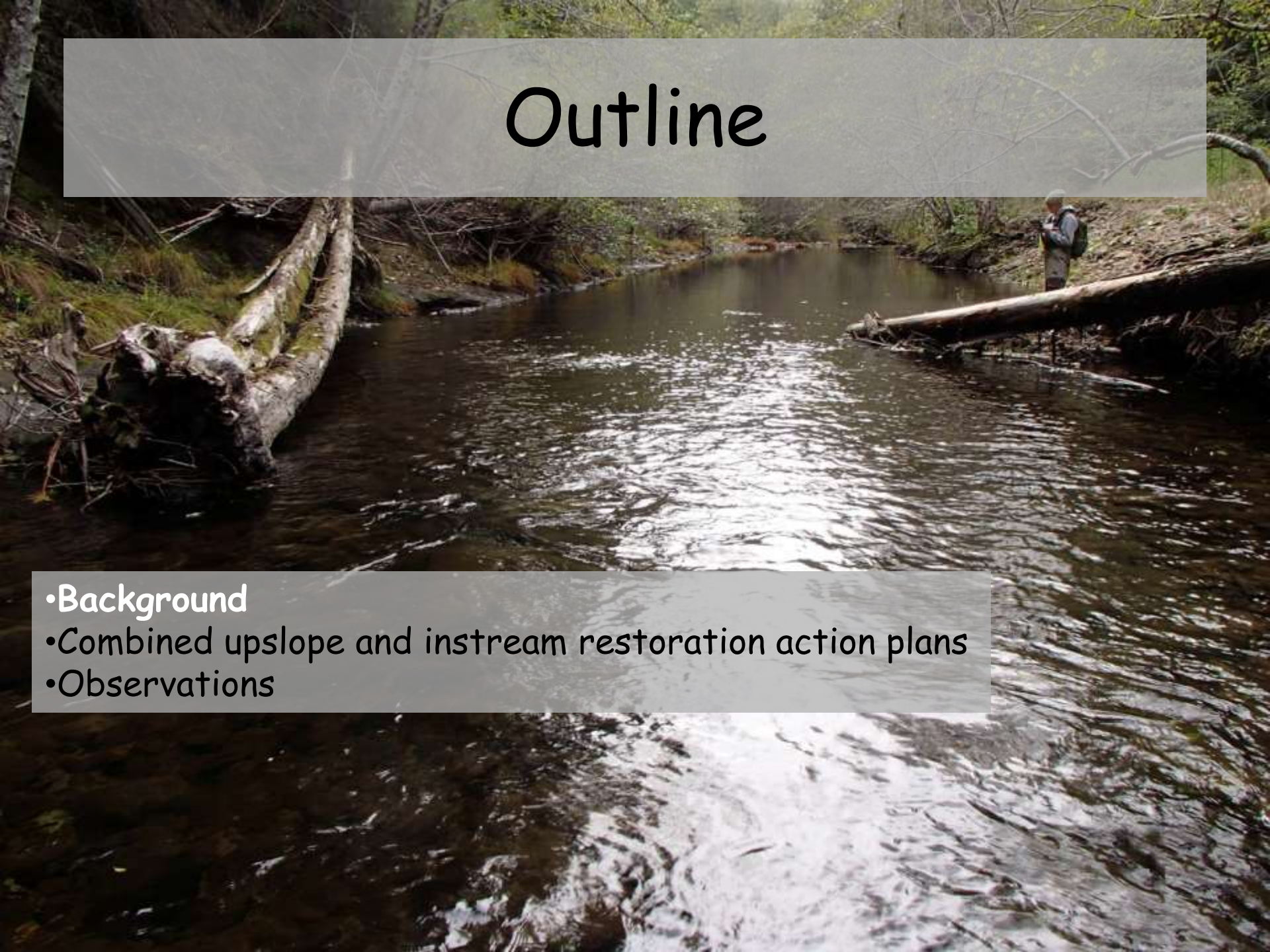
California Conservation Corps

Outline

A photograph of a river with a person on the bank and large logs in the water. The river is flowing through a wooded area with large logs in the water. A person is standing on the bank on the right side of the image. The water is dark and has some white foam or rapids. The background is a dense forest with green trees.

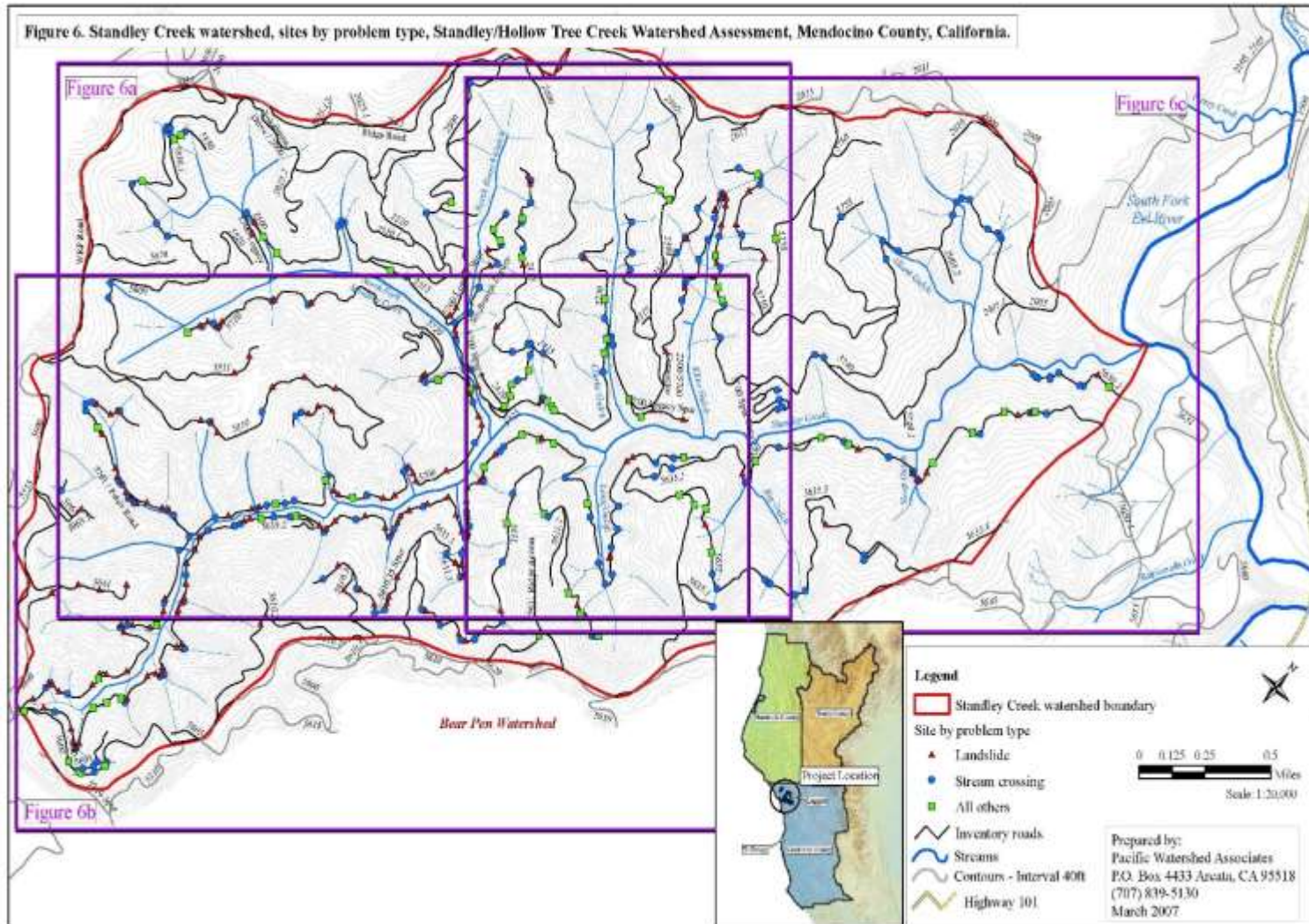
- Background
- Combined upslope and instream restoration action plans
- Observations

Outline

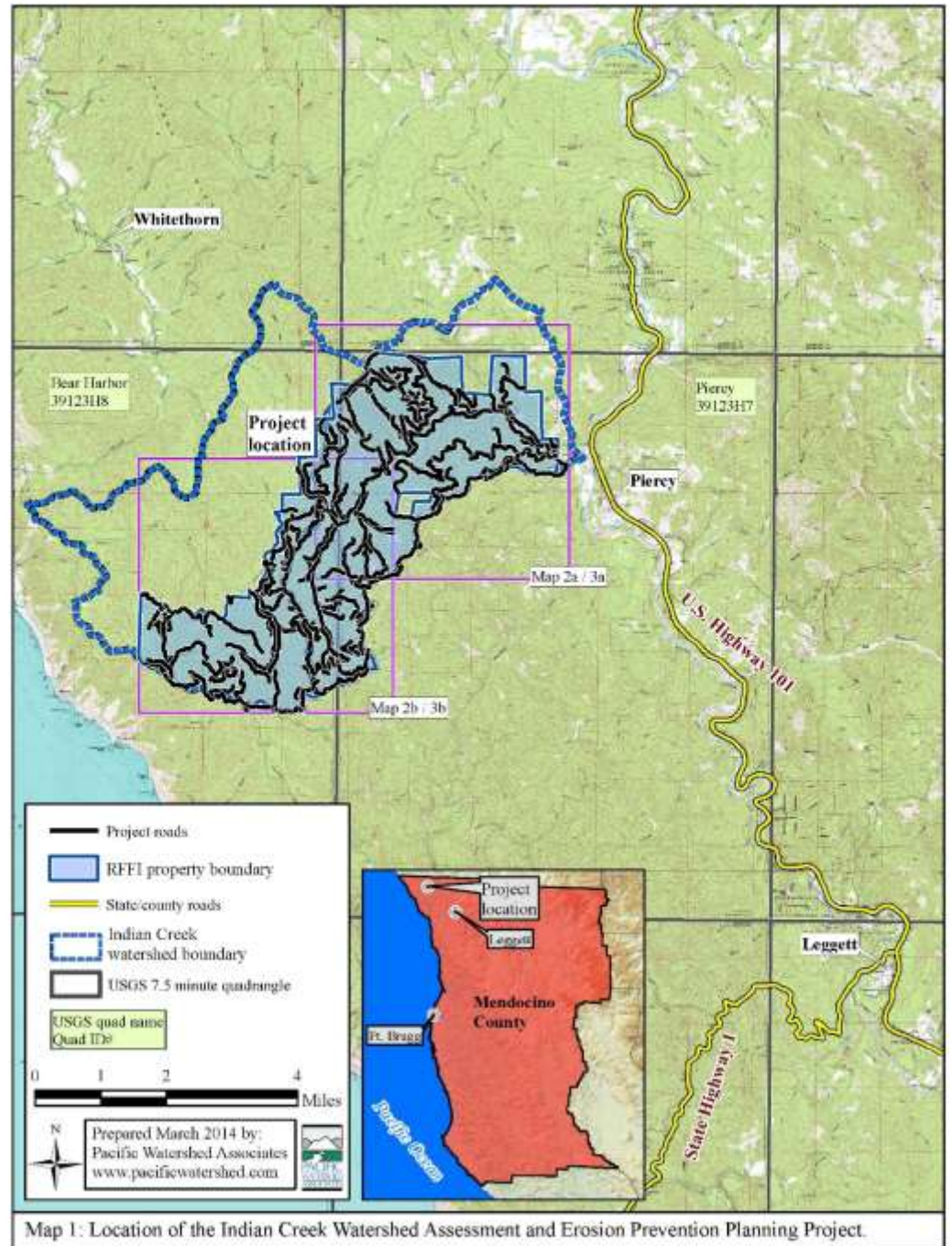
A photograph of a river with a person on the bank and large logs in the water. The river is flowing through a wooded area with many fallen logs and branches in the water. A person is standing on the right bank, looking towards the river. The water is dark and has some white foam from the rapids.

- **Background**
- Combined upslope and instream restoration action plans
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Standley Creek Road Assessment



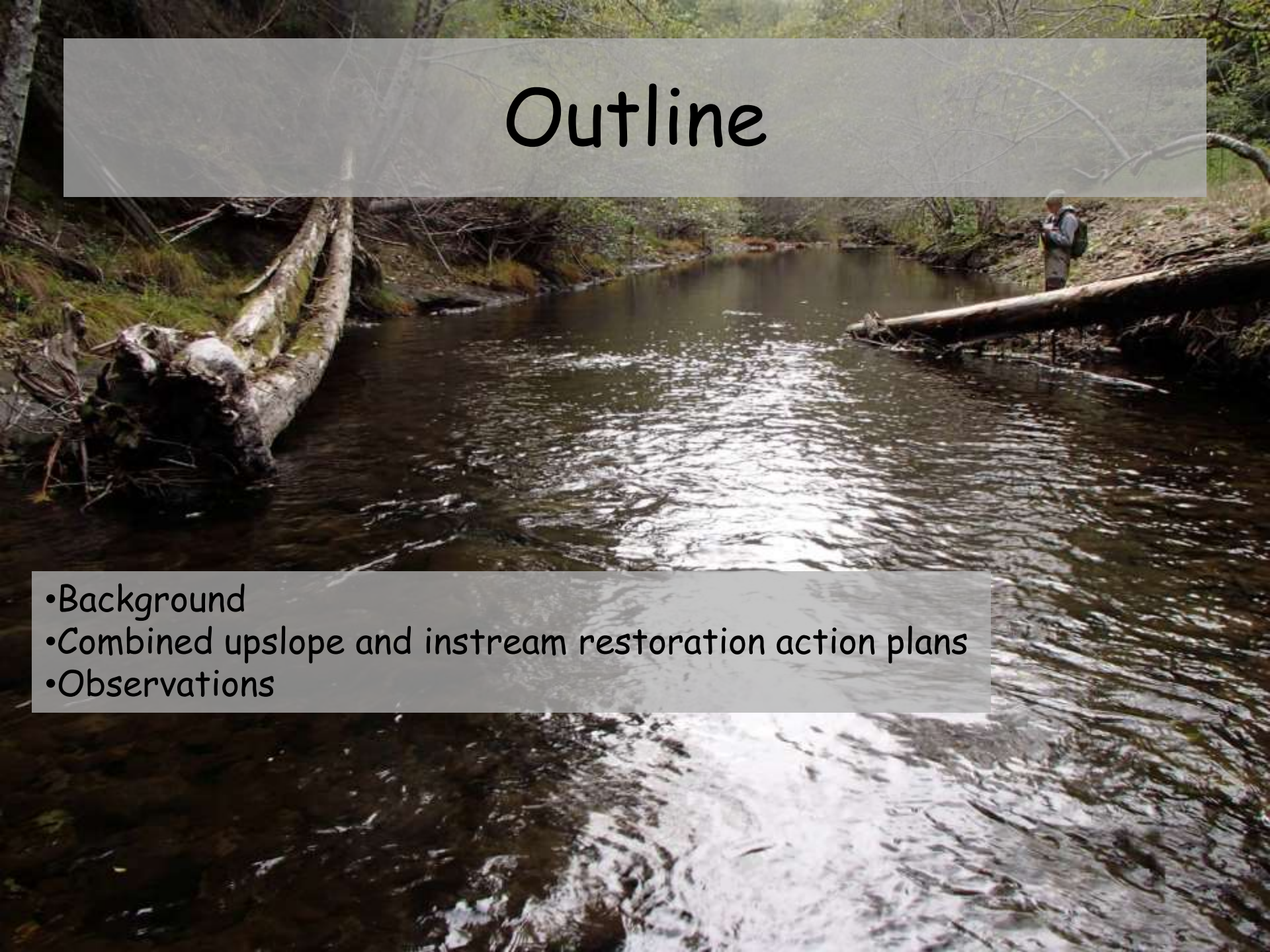
Indian Creek Road Assessment



Failing log spanner bridge
(nice big fat reusable logs)



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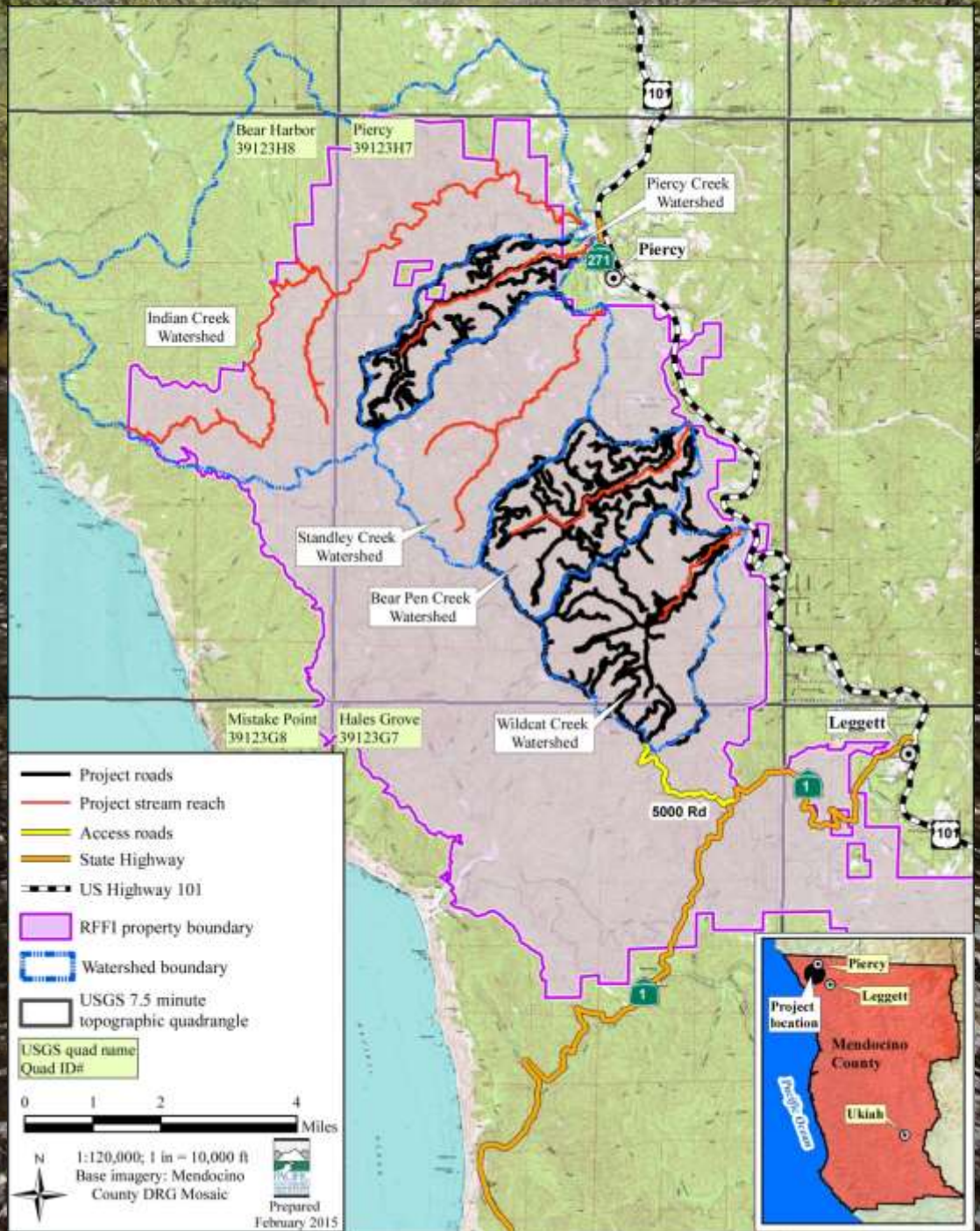
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Usal Forest Coho Recovery Plan

Goal: Codevelop upslope sediment reduction and instream habitat improvement prioritized action plans on 5 watersheds over a 50,000 acre area.

Location: South Fork Eel River, Leggett CA.

Watersheds: Wildcat, Bear Pen, Standley, Piercy, Indian



The assessment area

A photograph of a stream flowing through a forest. The water is clear and reflects the surrounding greenery. A person wearing a backpack and a hat is standing on the right bank, looking towards the stream. There are fallen logs and branches in the water and along the banks. The background is filled with trees and foliage.

Primary data categories for the stream survey

data collected every 500'

- General information
- Location data
- Bankfull width and depth estimates
- Channel and valley characteristics
- Channel and bank sedimentary characteristics
- Reach accessibility
- Material availability
- Riparian size and composition
- Riparian anchoring conditions




Data collected at existing LWD features

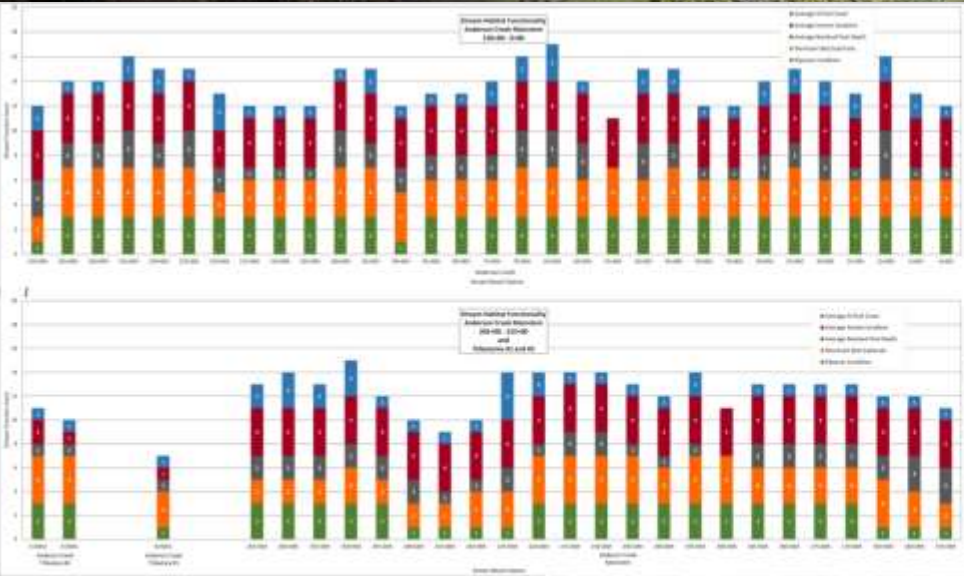
- Feature ID #
- Key log attributes
- Racked material %
- Associated residual pool depth
- % pool cover
- Origination (constructed/natural)
- Notes on jam characteristics

Anderson Creek Roads

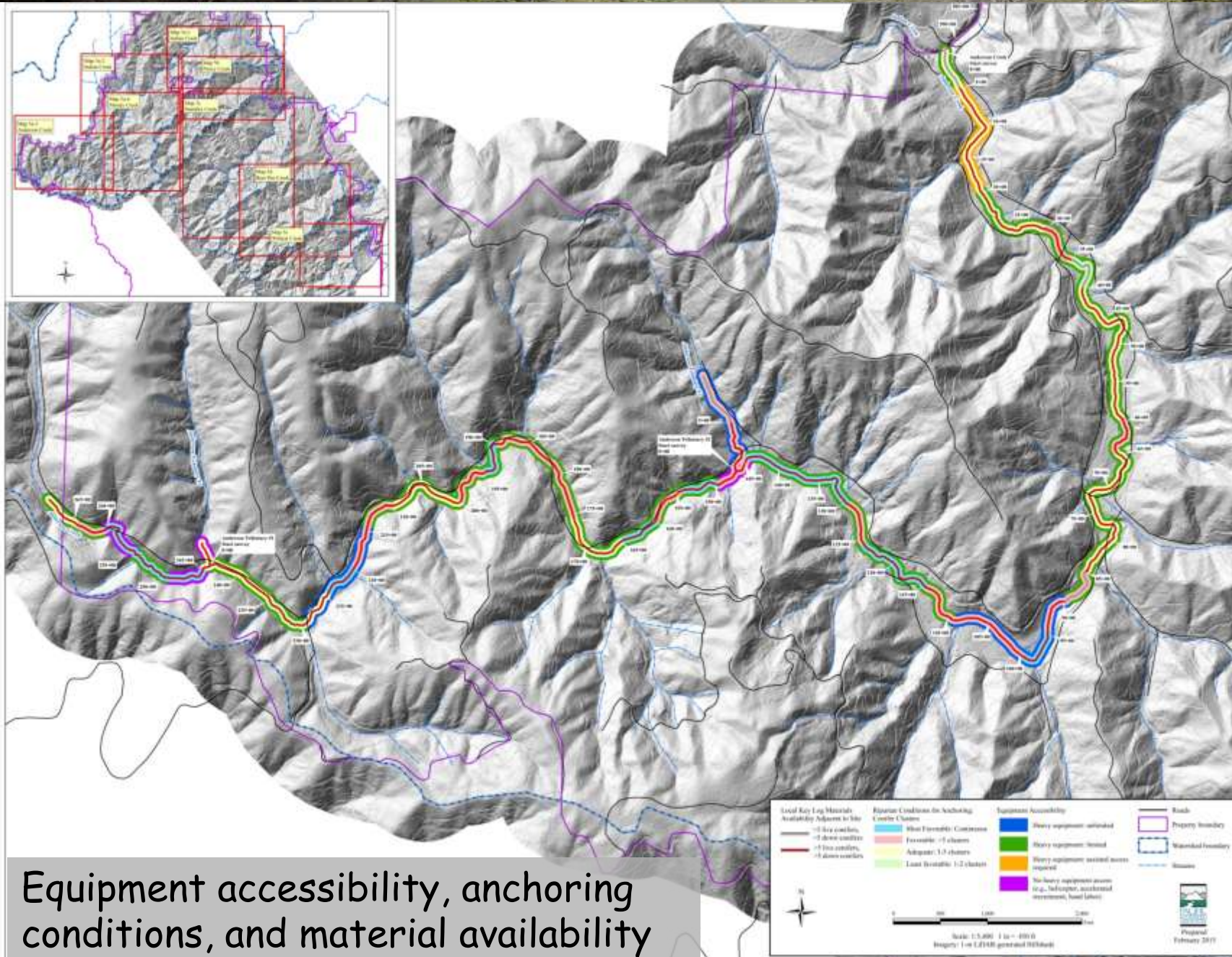


Table 8. Scoring parameters for selected riparian corridor attributes, Usal Forest Watershed Action Plan for Coho Recovery in the South Fork Eel River, Mendocino County, California

Increasing functionality 				
Condition 	Minimal	Low	Moderate	High
Score 	1	2	3	4
Riparian Corridor attribute				
Riparian Conditions	small dia. 0"-12"; <50 % conifer	Small dia. 0"-12"; >50% conifer	Large dia. >12"; <50 % conifer	Large dia.>12"; >50% conifer
Avg residual pool depth	0-0.99	1-1.99	2-2.99	3+
% Cover	0-24.99	25-49.99	50-74.99	>75
Dominant bed substrate	bedrock/boulder/Fine-grained	>50% Sand; <25% Cobble/Gravel	>50% Sands; 25% - 50% cobble/gravel	<50% sands; >50% cobble and gravel dominated
Channel grade	5+	4-4.99	3 to 3.99	1 to 2.99 (<3)



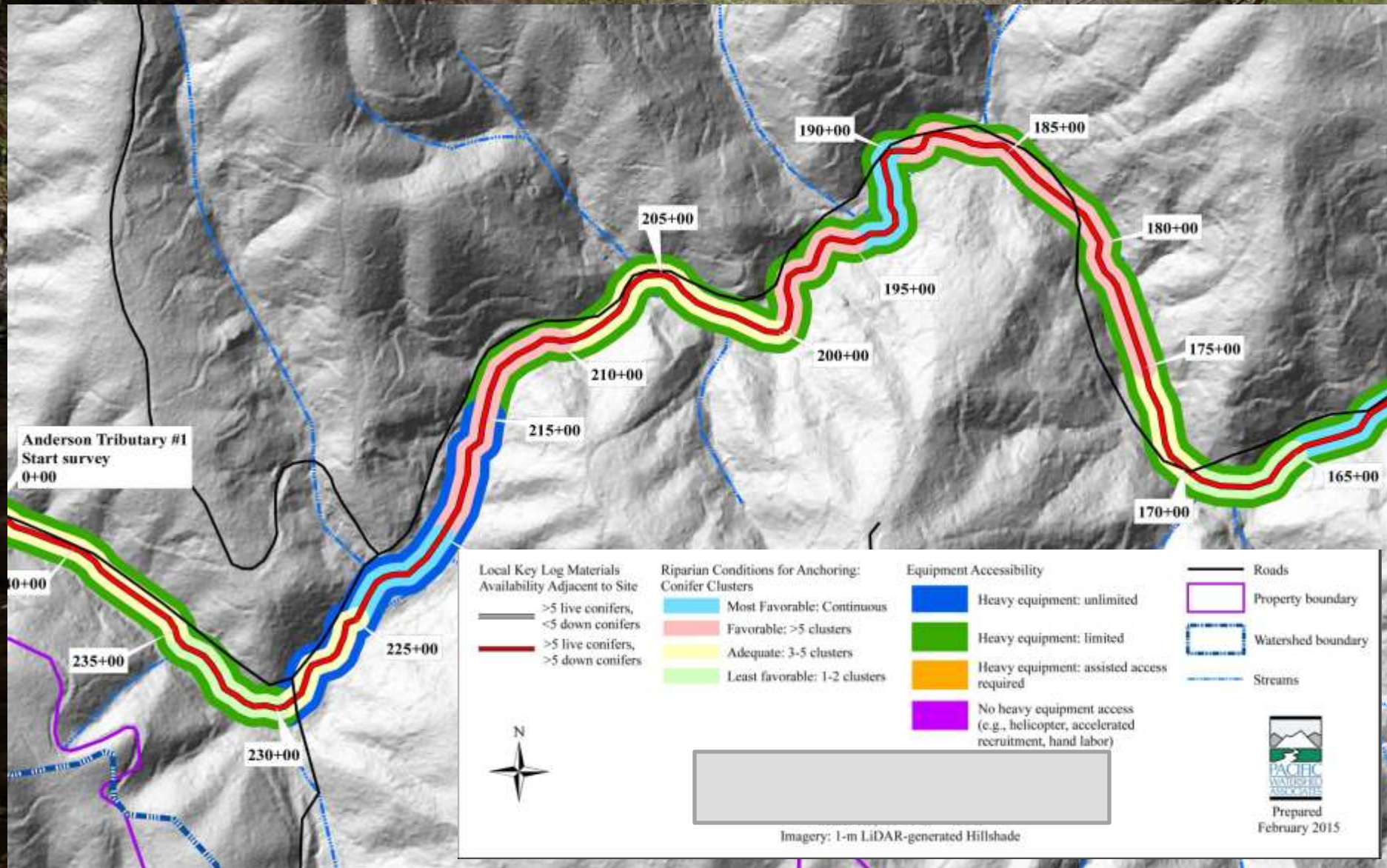
Stream habitat functionality and LWD distribution observations



Equipment accessibility, anchoring conditions, and material availability

Map 5a-3. Streamside equipment access, local material availability, and riparian anchoring conditions, Anderson Creek, Uval Forest Watershed Action Plan for Coho Recovery in the South Park Eel River, Mendocino County, California.

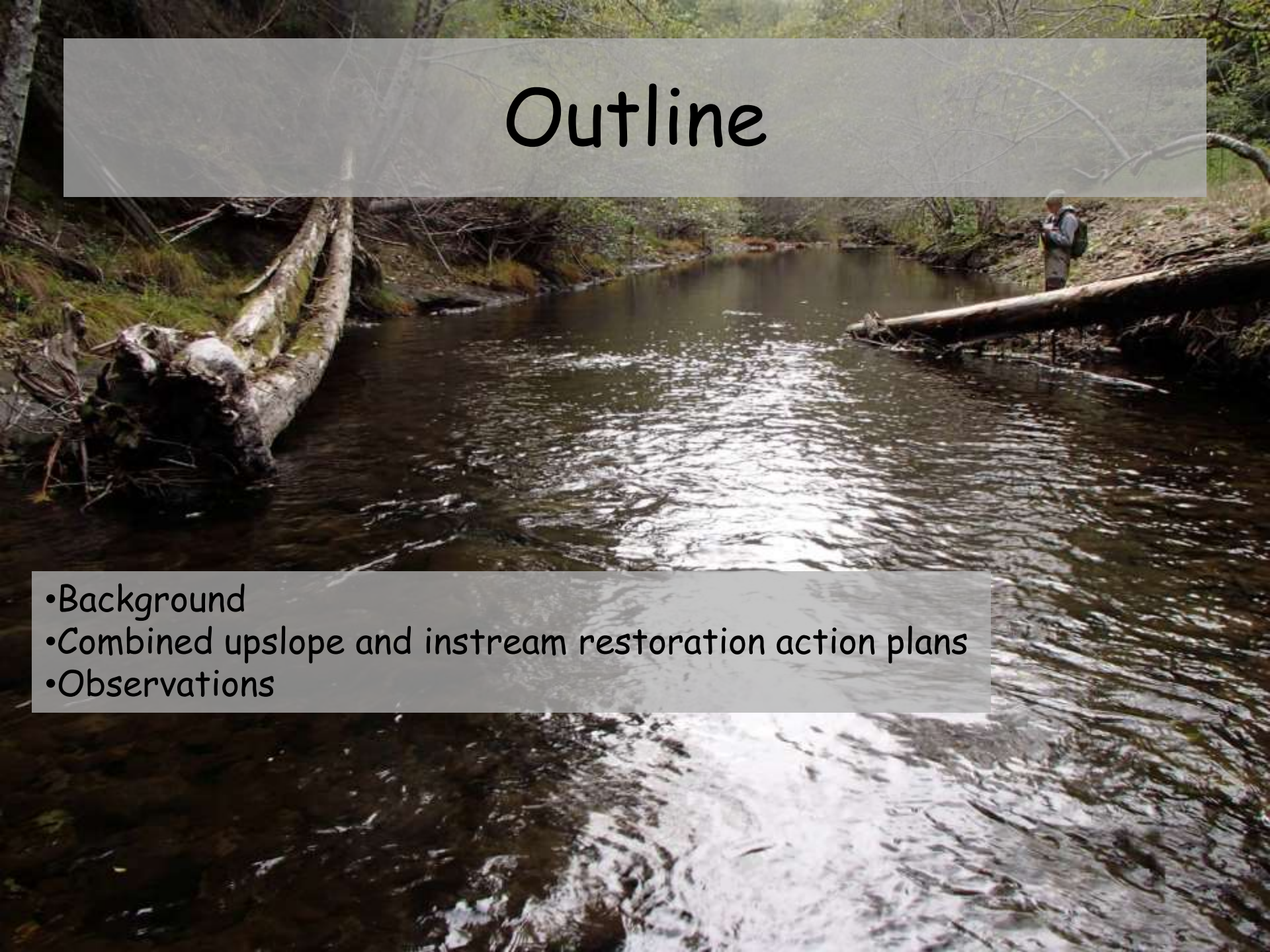
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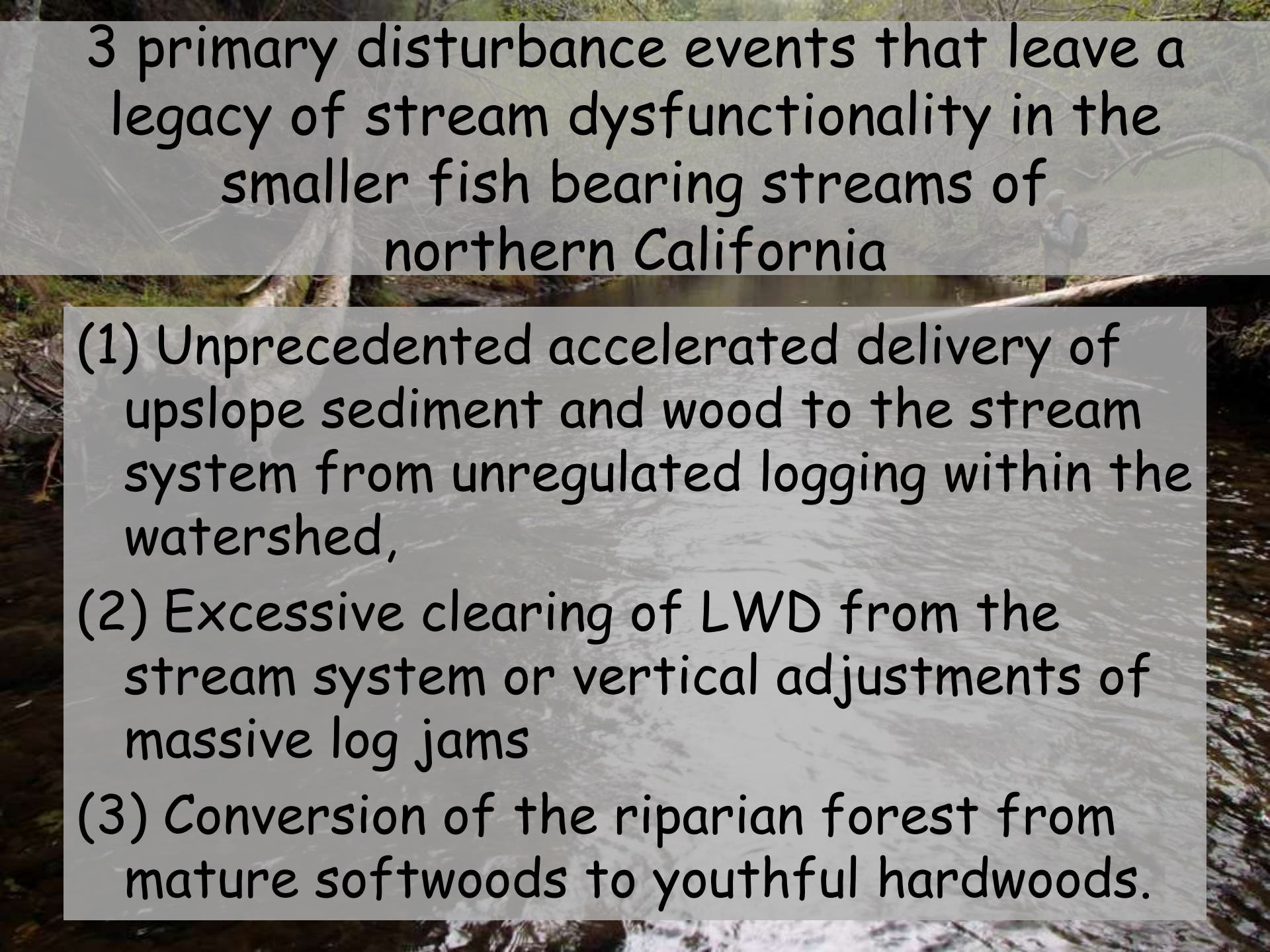
Anderson and Moody Creek Prioritized Action Plan



Outline

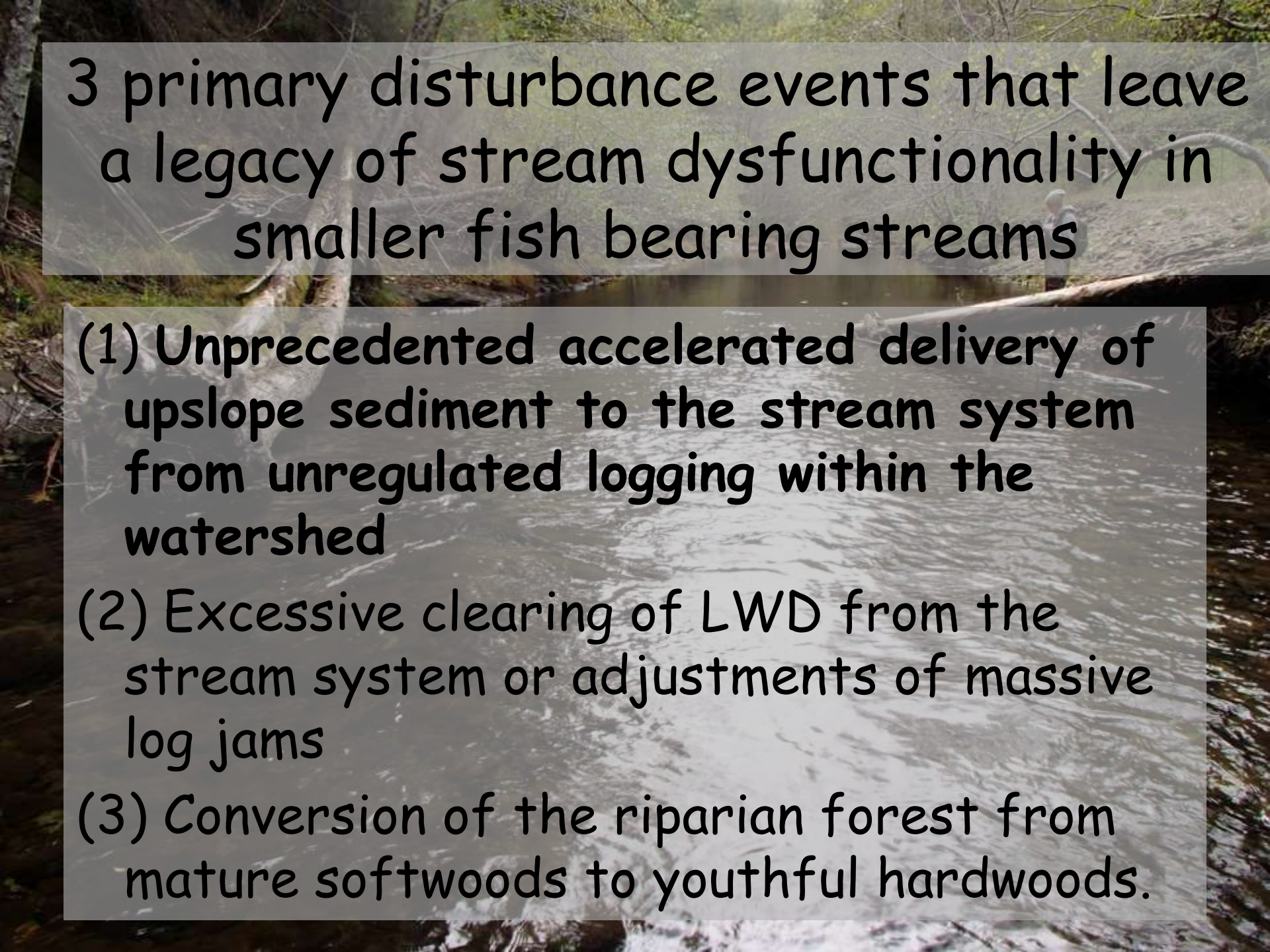
A photograph of a river with large logs in the water and a person on the bank. The river is flowing through a wooded area with many fallen logs and branches. A person is standing on the right bank, looking towards the water. The water is dark and has some white foam from the logs.

- Background
- Combined upslope and instream restoration action plans
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A person is wading in a stream, carrying a large log. The stream is surrounded by trees and vegetation. The text is overlaid on a semi-transparent grey box.

3 primary disturbance events that leave a legacy of stream dysfunctionality in the smaller fish bearing streams of northern California

- (1) Unprecedented accelerated delivery of upslope sediment and wood to the stream system from unregulated logging within the watershed,
- (2) Excessive clearing of LWD from the stream system or vertical adjustments of massive log jams
- (3) Conversion of the riparian forest from mature softwoods to youthful hardwoods.

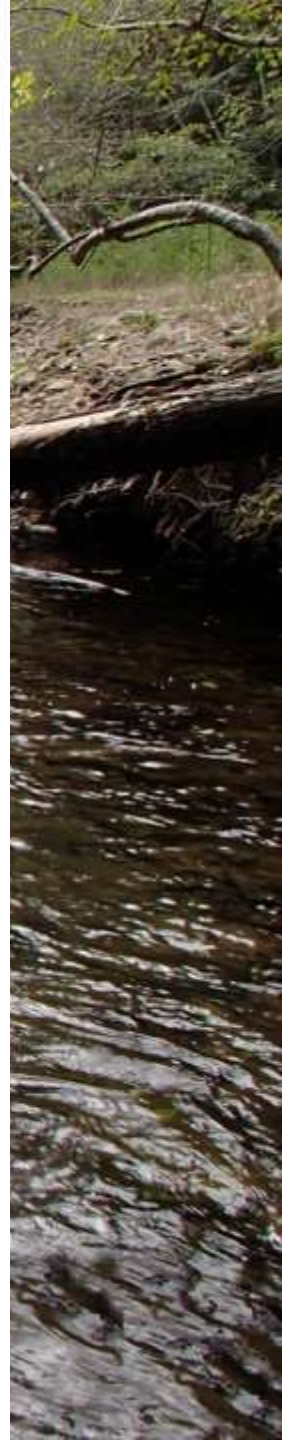
A photograph of a stream flowing through a forest. The water is clear and turbulent, with white foam visible. A person is standing in the background, partially obscured by the stream. The surrounding forest is lush and green.

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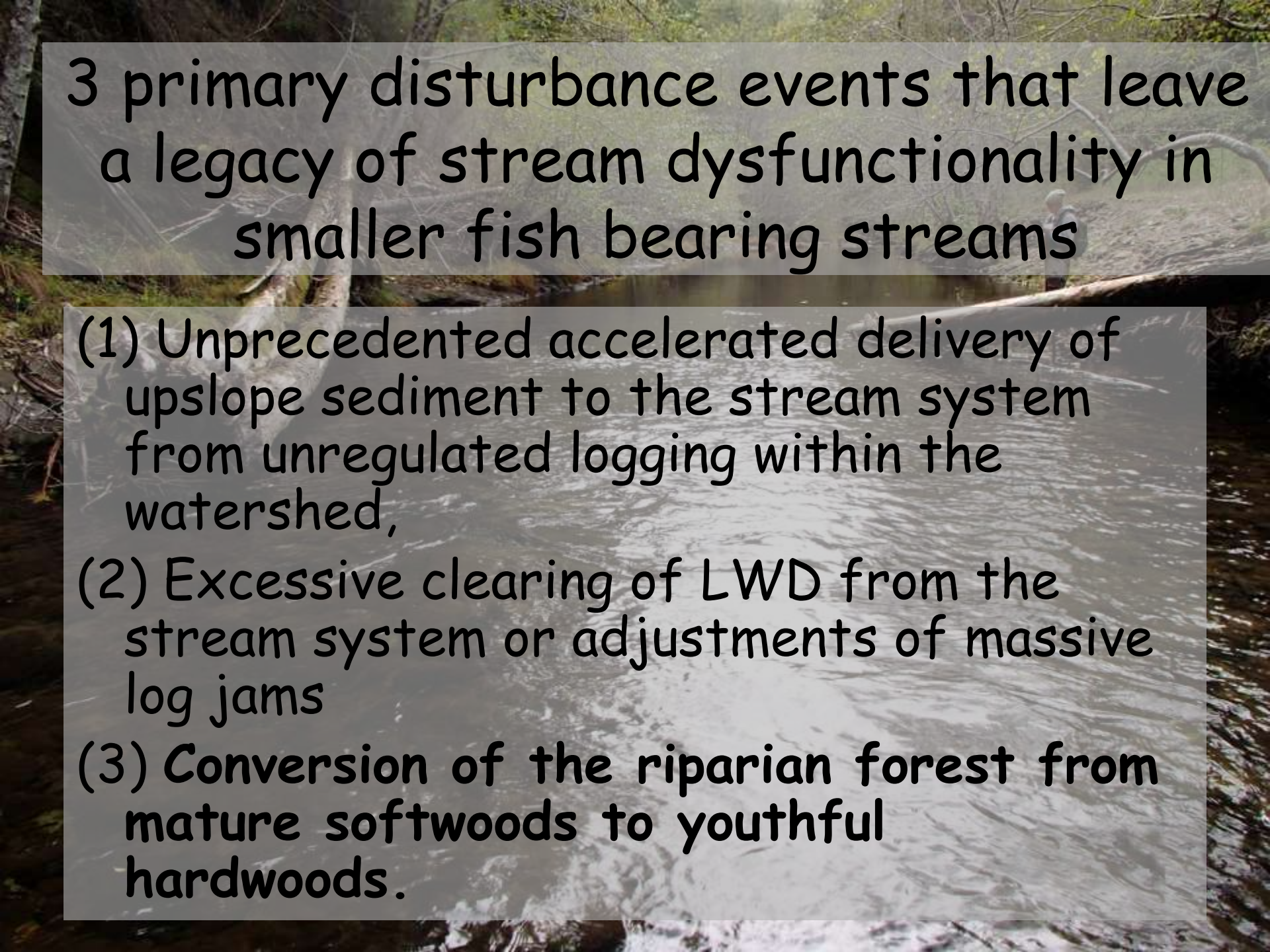
(2) Excessive clearing of LWD from the stream system or adjustments of massive log jams

(3) Conversion of the riparian forest from mature softwoods to youthful hardwoods.







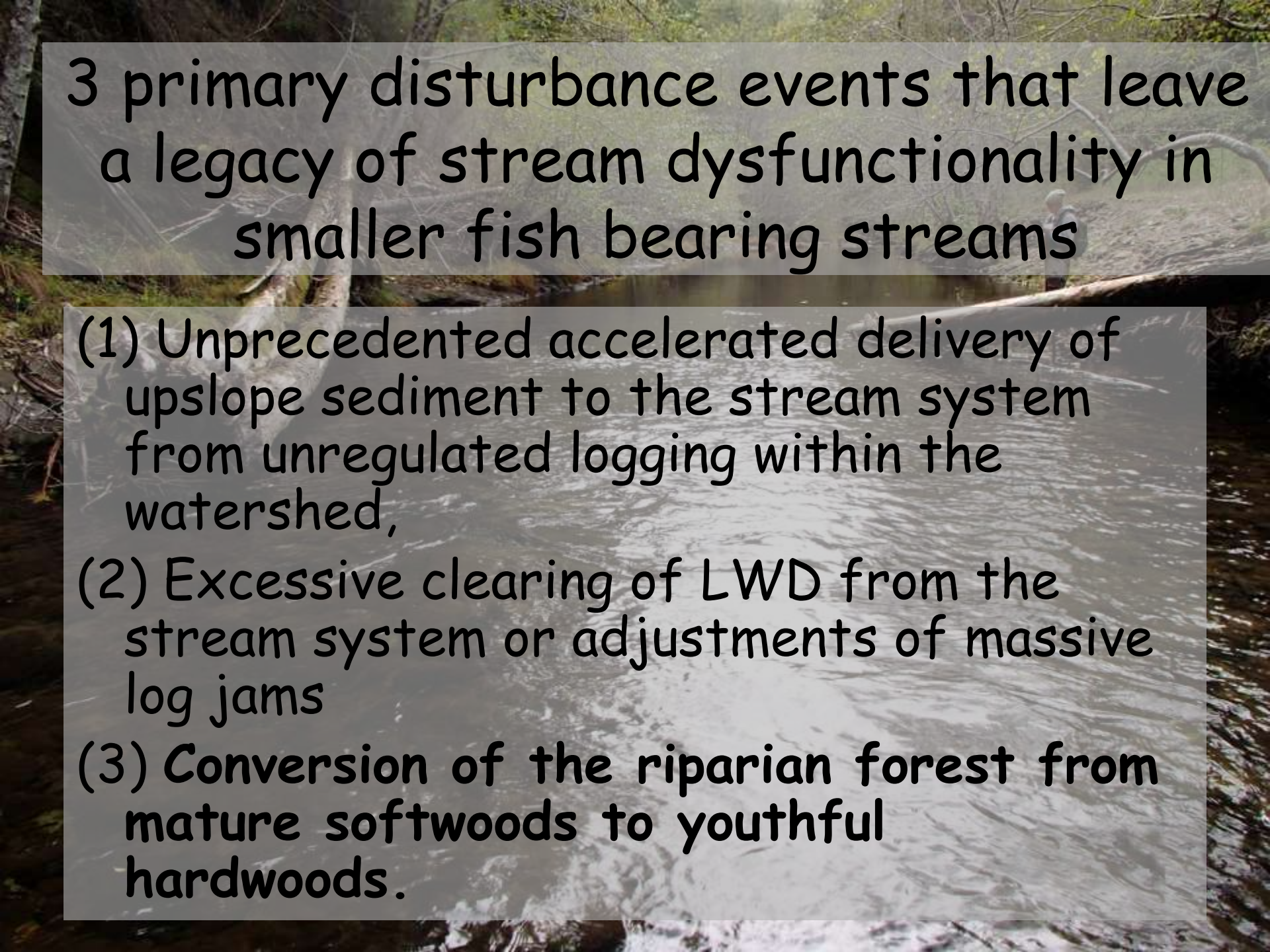
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Deciduous forest



What used to be a conifer dominated riparian forest is now dominated by deciduous forest

2014/11/06







Conclusions

- The instream protocol appears to be an effective way to rapidly develop action plans that combine both upslope sediment reduction and instream habitat enhancement projects
- The protocol also provides a basic snapshot of habitat conditions within the inventoried stream reaches
- Accelerated conifer growth should be encouraged in the riparian zones of heavily disturbed fish bearing streams to achieve a natural process of functional wood recruitment