Street and Road Maintenance Best Management Practices Workshop

Prepared for the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)

Conducted in Half Moon Bay, California

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Conducted by

Pacific Watershed Associates, Inc

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BMPs are Commonly used for Storm Water Pollution Prevention

Storm Water Pollution Prevention:
Why do we care?

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SFRWQCB

San Mateo County, along with the municipalities within the southern San Francisco Bay Area, is regulated by the San Francisco Bay Regional Water Quality Control Board (SFRWQCB).

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Permits

Currently there are three main types of Storm Water Permits

- Municipal Permits
- General Construction Permits
- Industrial Permits

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Permits

Municipal (Separate Stormwater Sewer Systems (MS4)) Permits

- Typically an MS4 is a 5 year permit for Municipalities
  - And is partly the reason we are here today. This training is part of San Mateo County's MS4 permit requirements.

This training is focused on deployment of practical and effective storm water BMPs for road maintenance activities to protect riparian habitat, aquatic species, and water quality.

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Workshop Goals

The goal of this training is to provide a suite of available BMPs, include practical demonstrations of proper BMP use and installation for :

Preventing Erosion: straw mulch, erosion control blankets, re-vegetation.

Preventing Sedimentation: inlet protection, gravel bags, silt fences, straw wattles, straw bales, and re-vegetation.

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Additionally it is our goal to provide you with the tools to determine what the best BMPs may be for the job.

Effects of Uncontrolled Storm Water

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Nuisance and Catastrophic Flooding

Effects of Uncontrolled Storm Water

Erosion

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Effects of Uncontrolled Storm Water

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Sedimentation

How do you control Storm Water?

To the best of your ability
by utilizing the
Best Management Practices
available or BMPs.

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Best Management Practices

What is the most appropriate BMP?

It will depend on your problem and your objective.

Questions?

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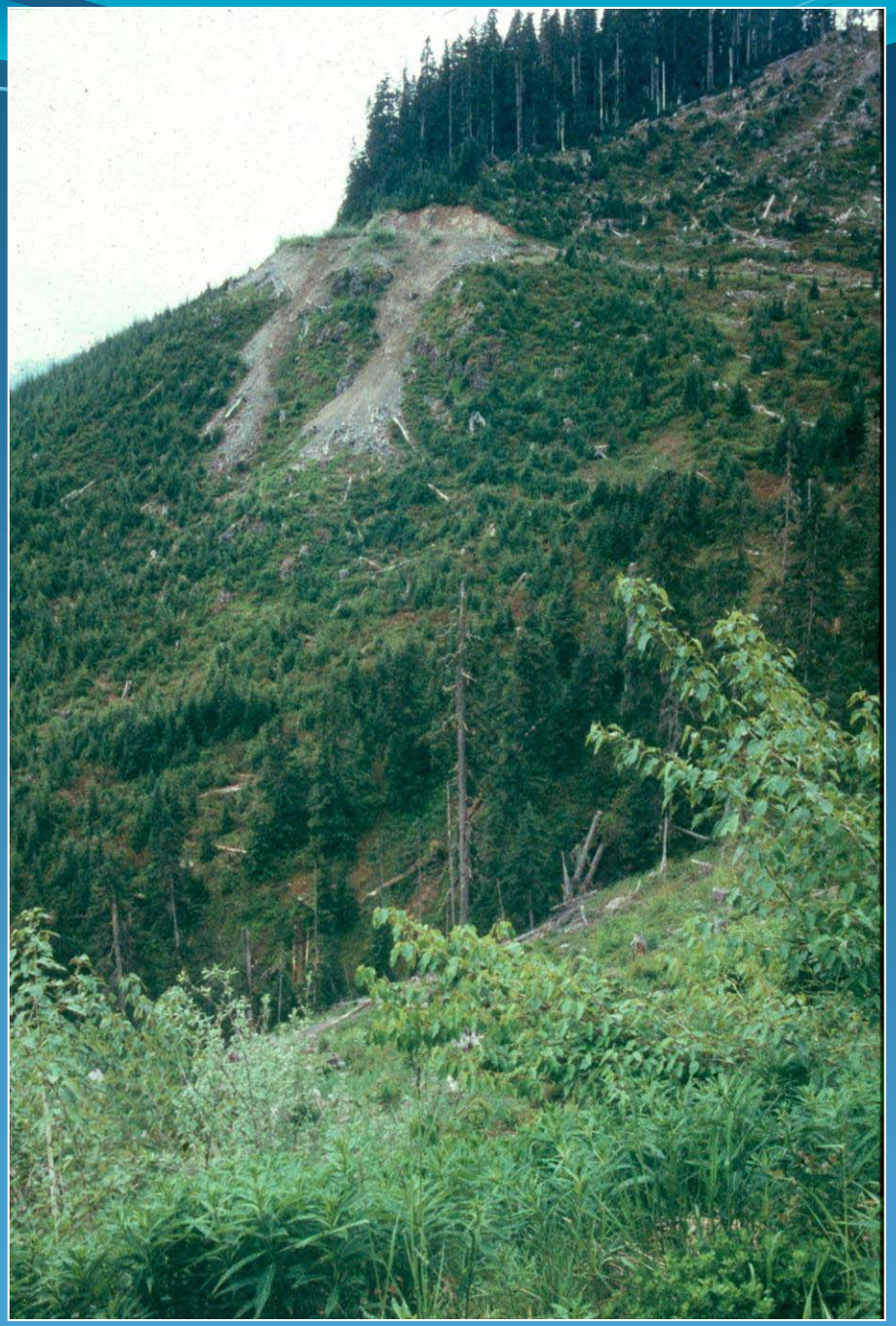
Types of Erosion

Erosion - the loss of soil material by means of water or wind



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Types of Sedimentation

Sedimentation – the deposition and/or accumulation of material

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Sediment Delivery

Sediment delivery – the deposition and/or delivery of material to watercourses.

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Types of Erosion and Sedimentation

Erosion and Sedimentation can be categorized as either

- Chronic

OR

- Episodic

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Chronic vs Episodic

Chronic - occurs on an on-going basis, during every rainfall event that results in surface runoff

Episodic - occurs during storm events that may occur over an indeterminate time

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Chronic Erosion

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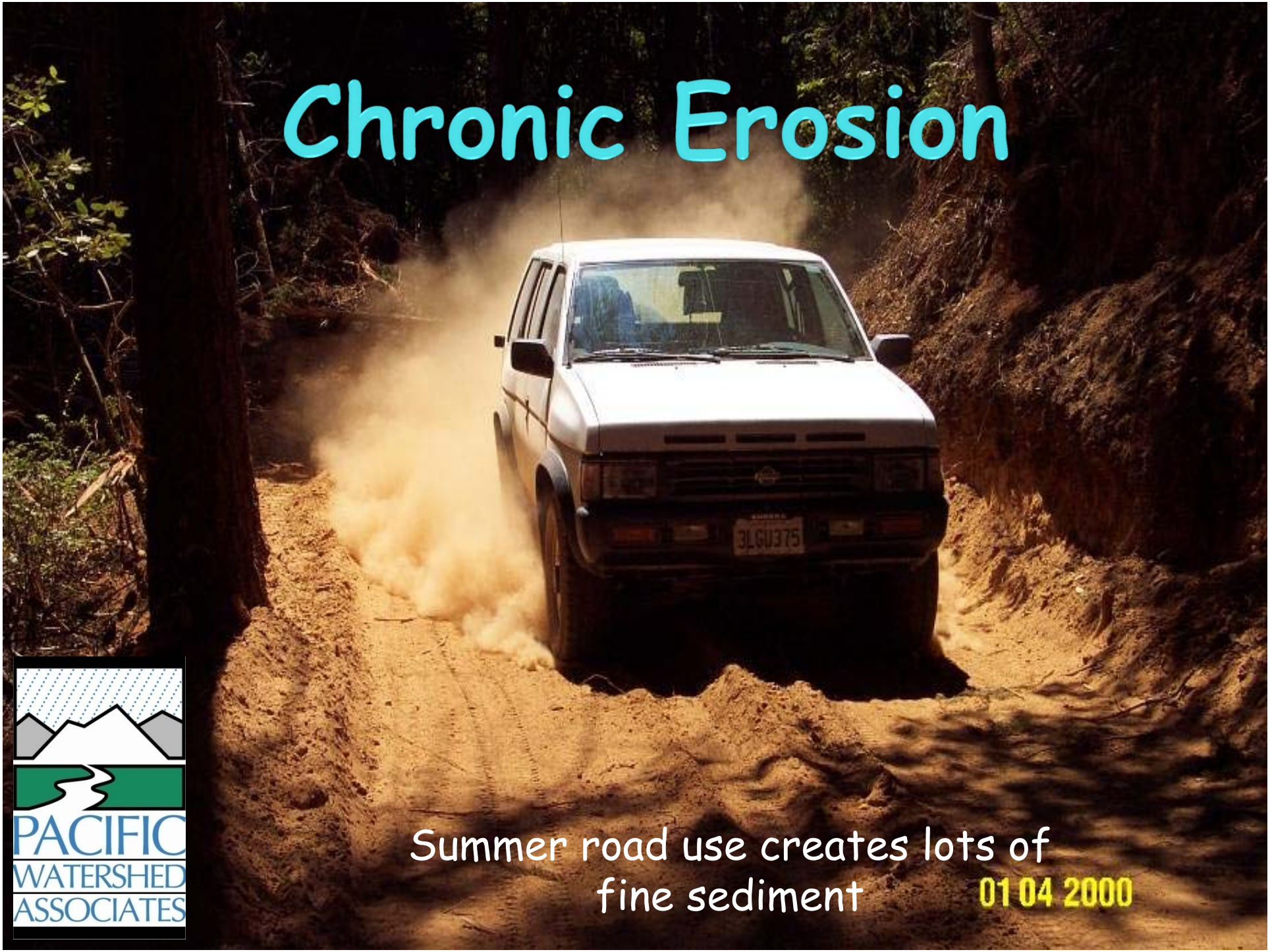
Chronic surface erosion is caused by mechanical abrasion and poor road surface drainage…

Chronic Erosion



Summer road use creates lots of fine sediment

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Chronic Erosion
Road surface lowering:
0.1’ to >0.5 ft./decade, depends on use level
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Chronic Erosion

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Road surface lowering: only sediment source is connected road & ditch

Chronic Sedimentation

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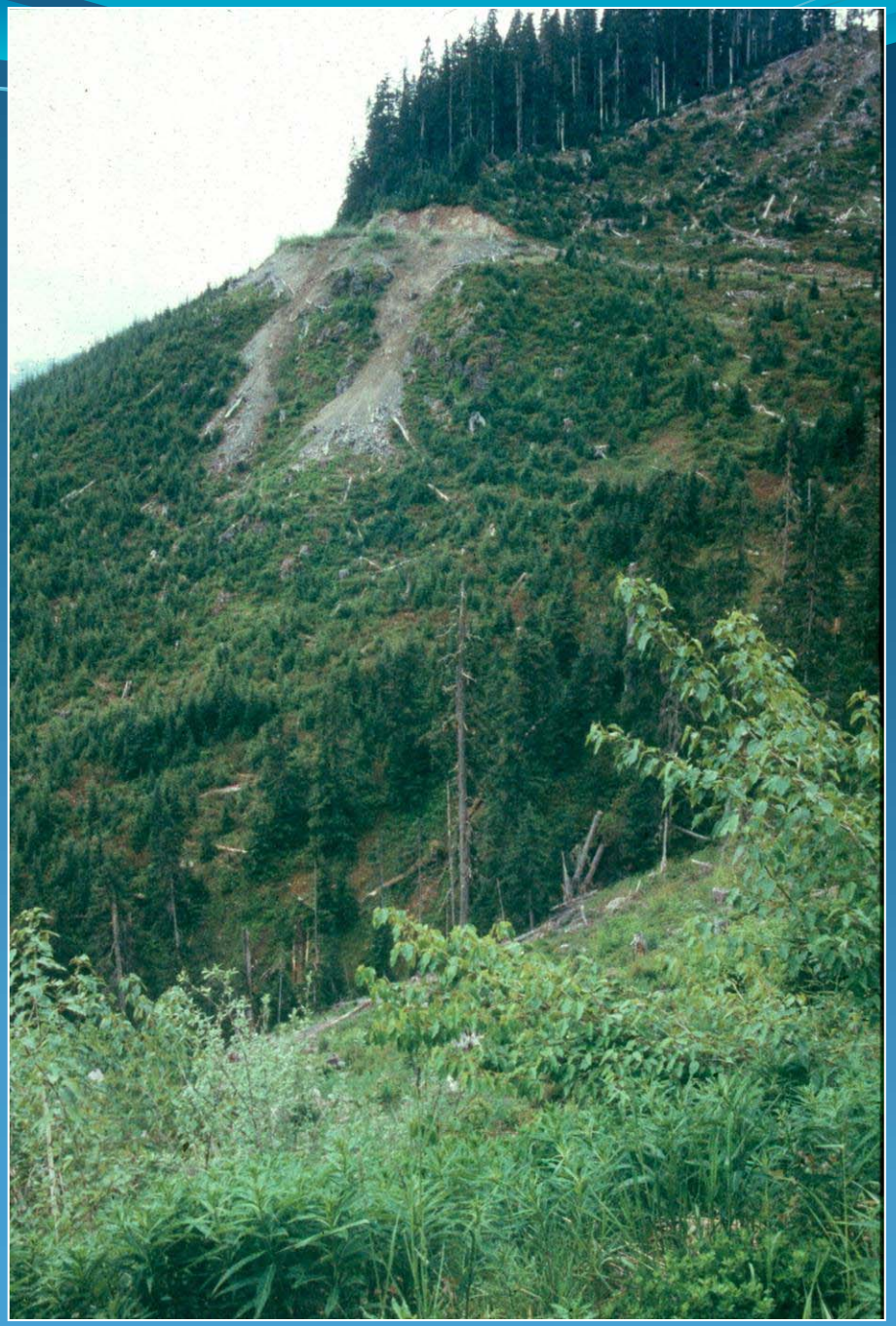
Episodic Erosion

Mass Wasting



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Episodic Erosion

Stream Crossings

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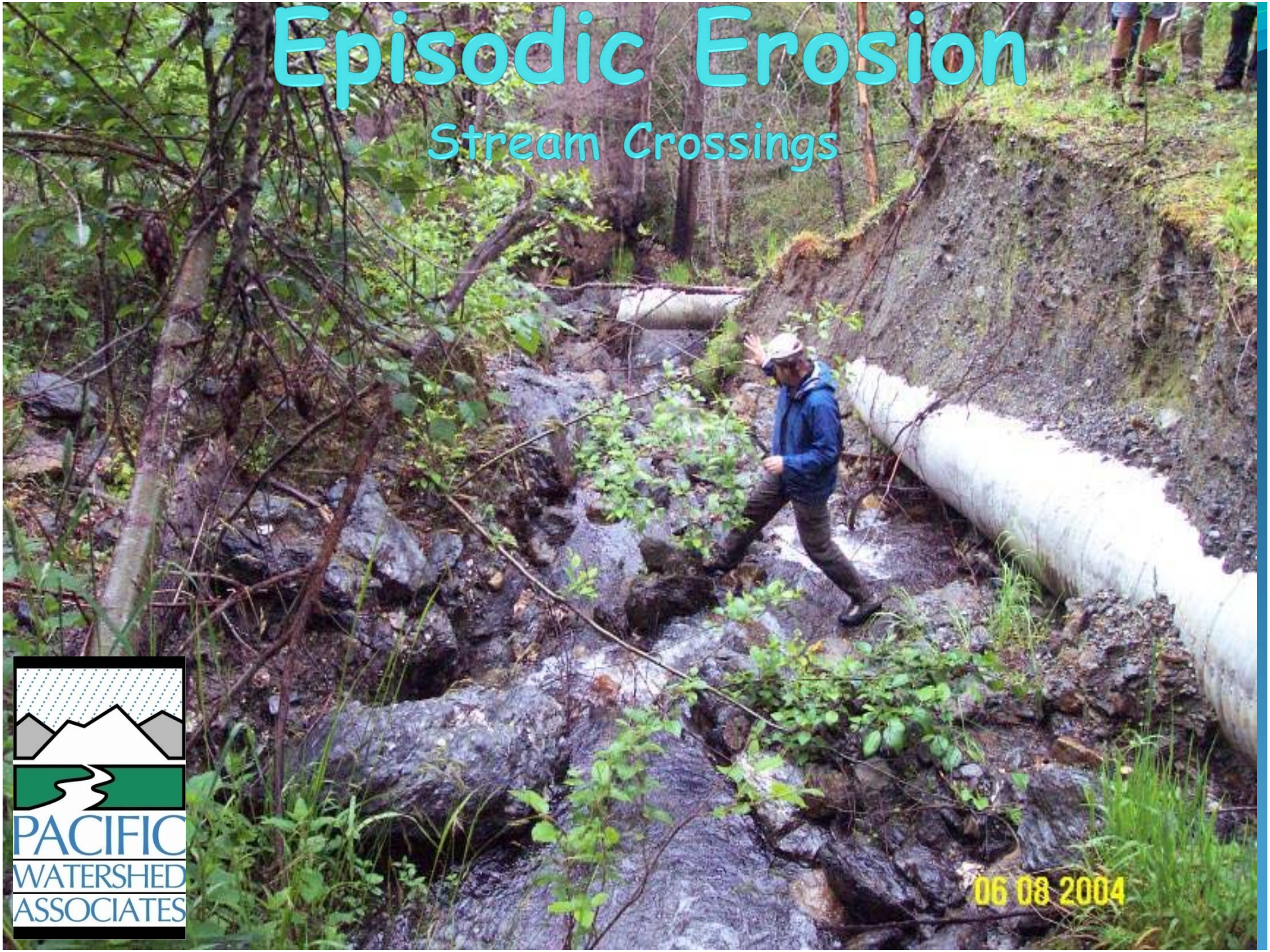
Episodic Erosion

Stream Crossings



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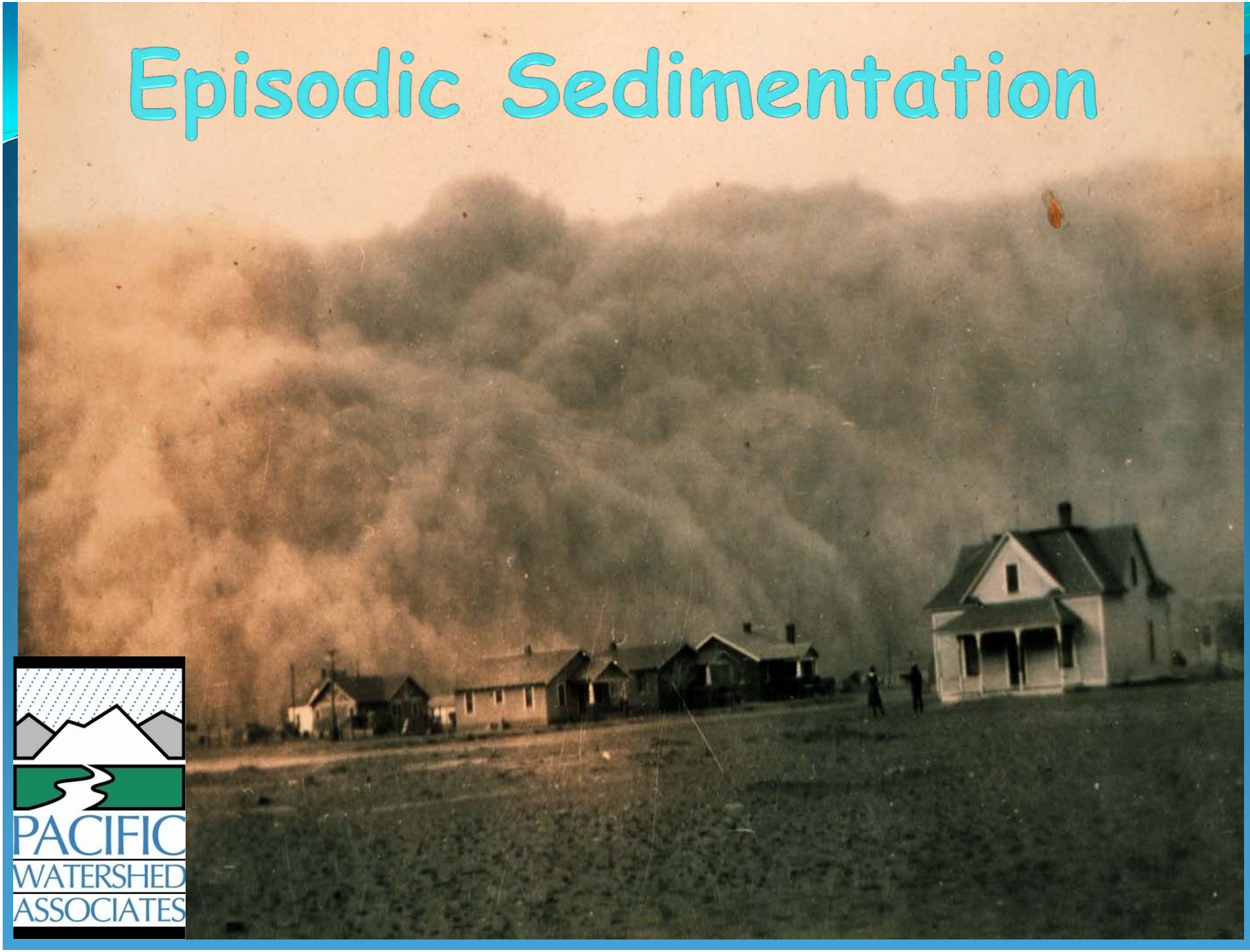
Episodic Sedimentation



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Episodic Sedimentation

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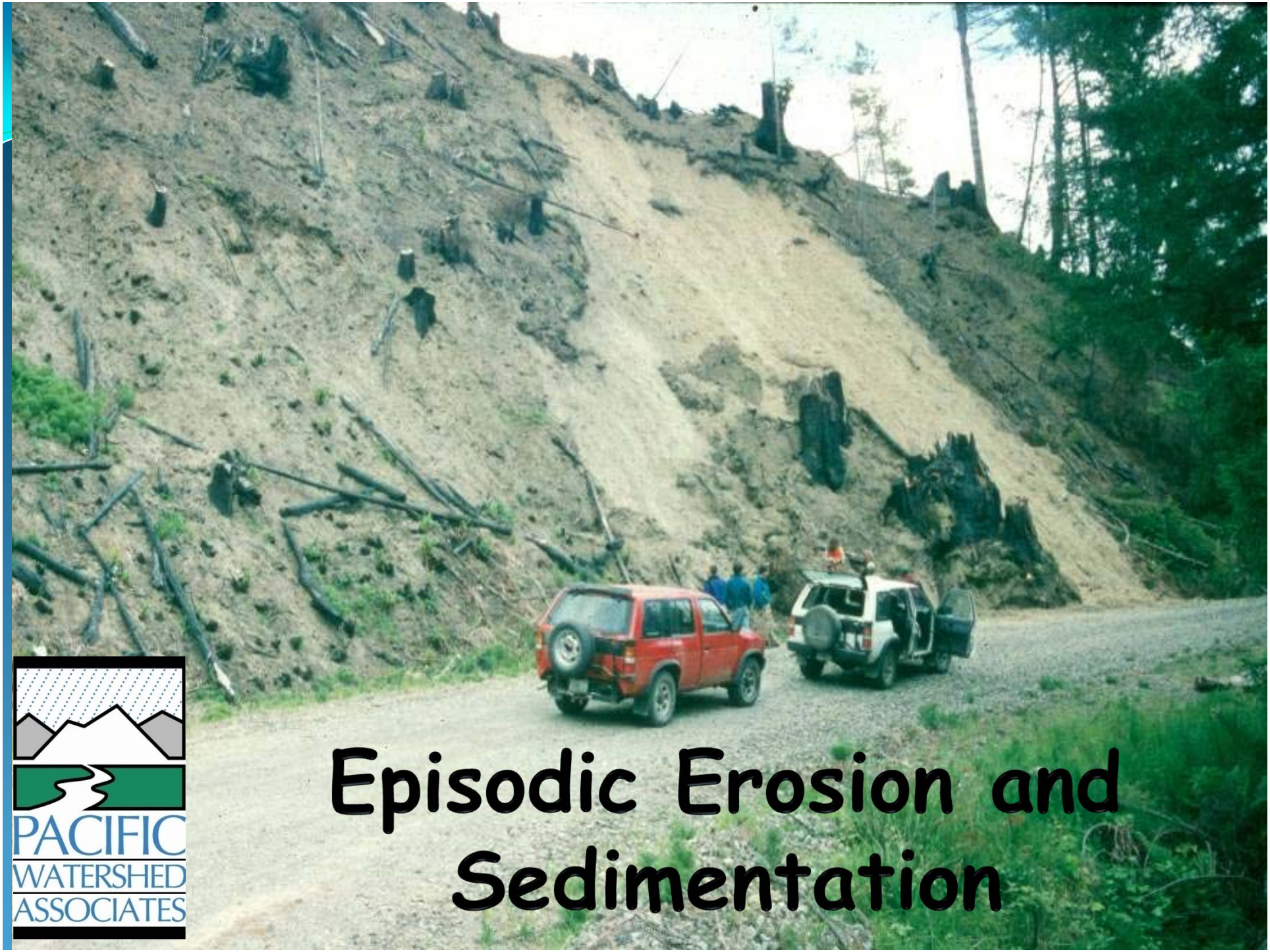

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Episodic and Chronic Erosion

Gully erosion can develop in a single storm event (episodic). However, if left untreated, erosion will continue every time it rains (chronic).

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Episodic and Chronic Sedimentation

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Episodic can lead to Chronic

Treat the cause, not the symptom.
If you don't change anything, it's just going to happen again…

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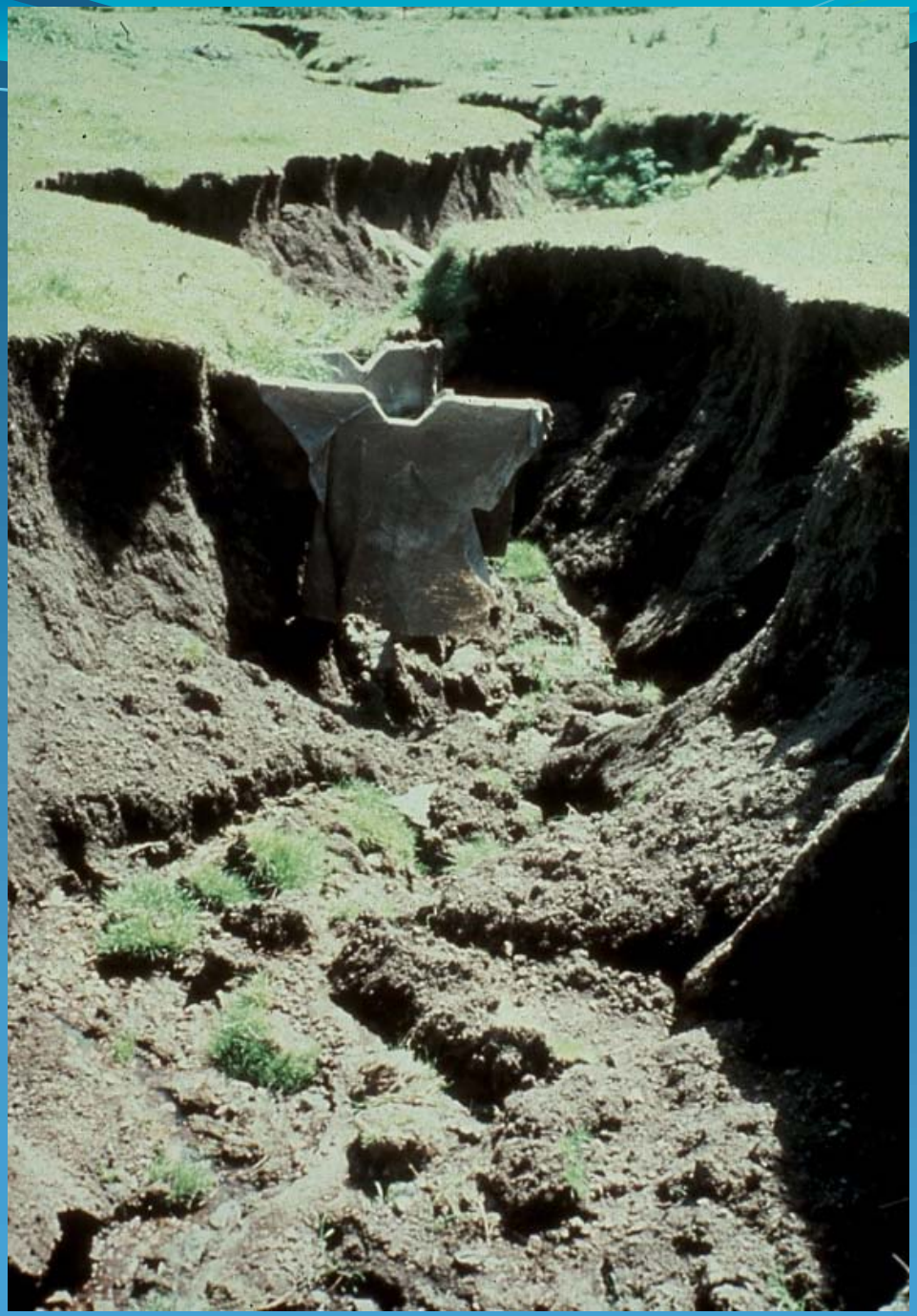

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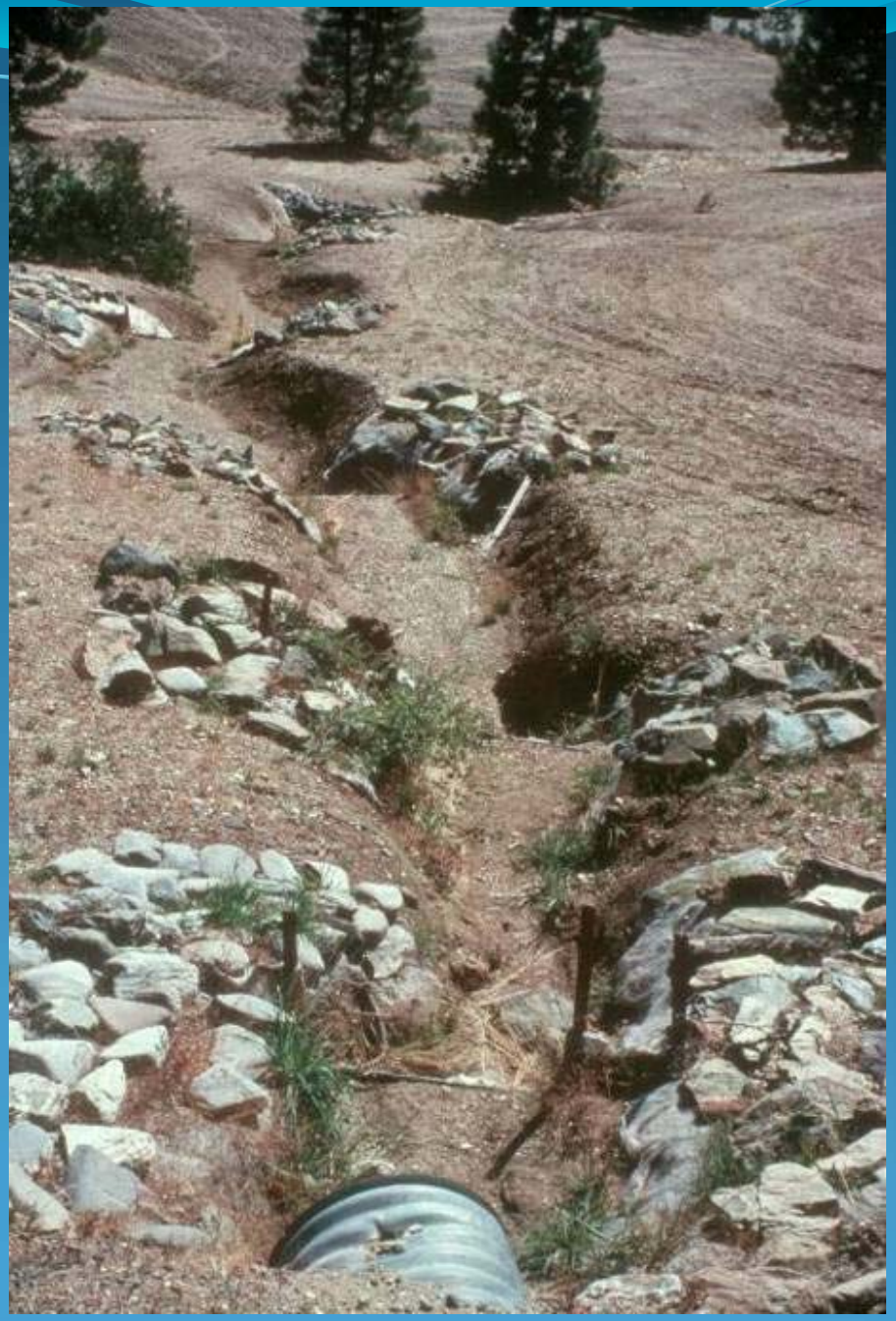

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Introduction to Field Assessment

Six Step Process

1)Problem identification – through inventory and assessment

2)Problem quantification – determining future sediment delivery

3)Prescription development – heavy equipment and labor intensive treatments

4)Treatment prioritization

5)Implementation

6)Maintenance

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Step 1: Identifying the Problems

The Forward-Looking Erosion Inventory

Predictive

Systematic, repeatable, semi-quantitative

Develops logical and effective erosion control and erosion prevention treatments

Prioritizes treatment immediacy (priority) based on erosion potential, potential sediment delivery, treatment cost-effectiveness or other variables

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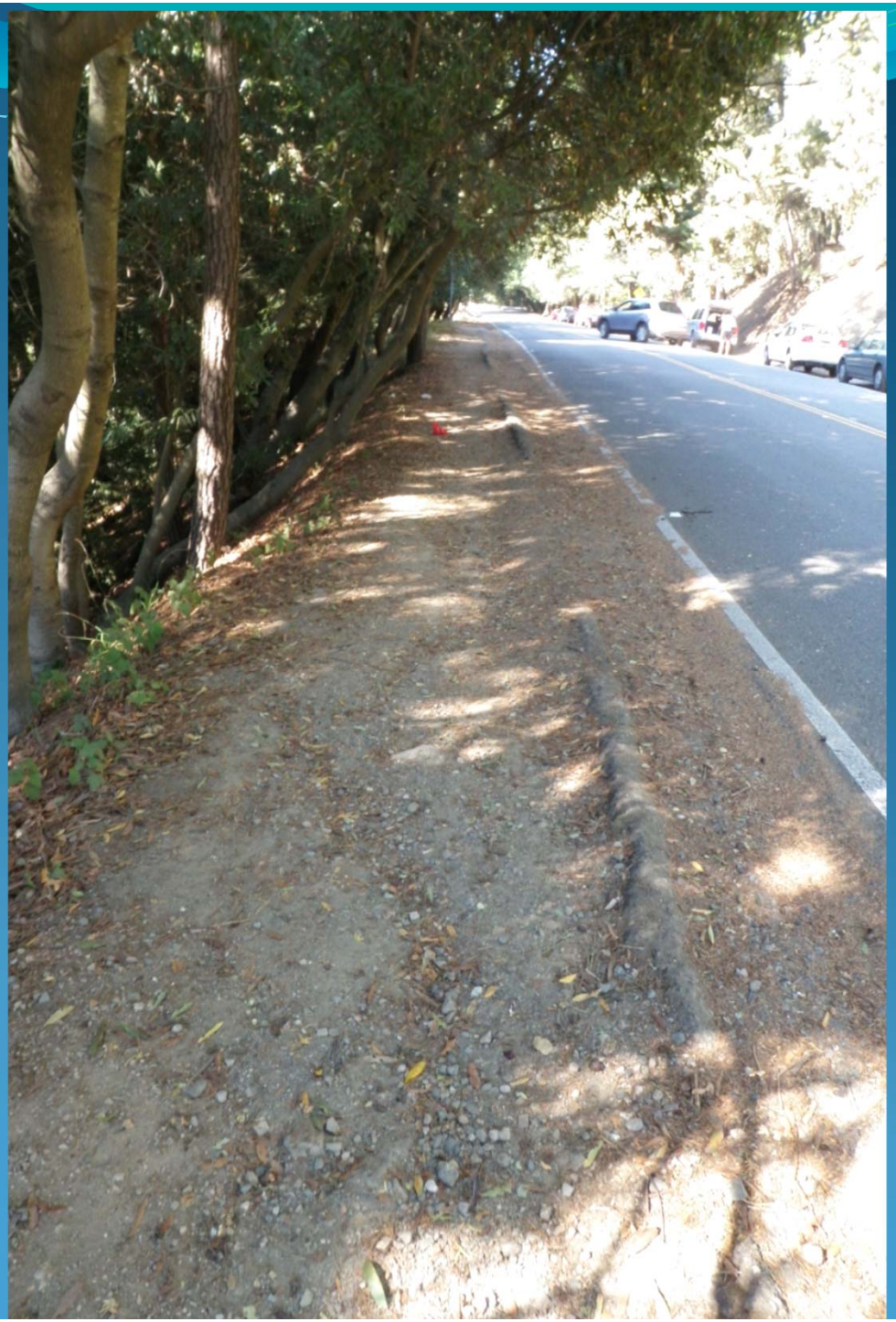
Problem identification

identifying problems of erosion, sedimentation, and their sources



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What to Inventory…
(The "Big" Three)

Stream crossings

- ✓ Culvert capacity
- ✓ Plugging potential
- ✓ Diversion potential
- ✓ Site erosion

Road-related landslides

Road surface runoff and related erosion

- ✓ Hydrologically connected roads and ditches
- ✓ Gullies

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Problem qualification and quantification

determining potential hazards and future sediment delivery volumes

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Prescription development: Identifying treatment solutions and associated materials, equipment and labor needs

Before:3 undersized culverts

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Cost-effectiveness evaluation and prioritization: prioritizing treatments based on available funds, potential hazards, and anticipated results

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Implementation: based on prioritization available funds, potential hazards, and anticipated results

Hydrologic Connectivity treatments:

Road shaping (insloping, outsloping, crowning)

Road surface drainage structures (rolling dips, ditch relief culverts, cross road drains, waterbars

Site Specific treatment options:

Stream crossings (culvert sizing, culvert placement, eliminate diversion potential, reduce plugging potential)

Landslides (remove overburden, redirect runoff)

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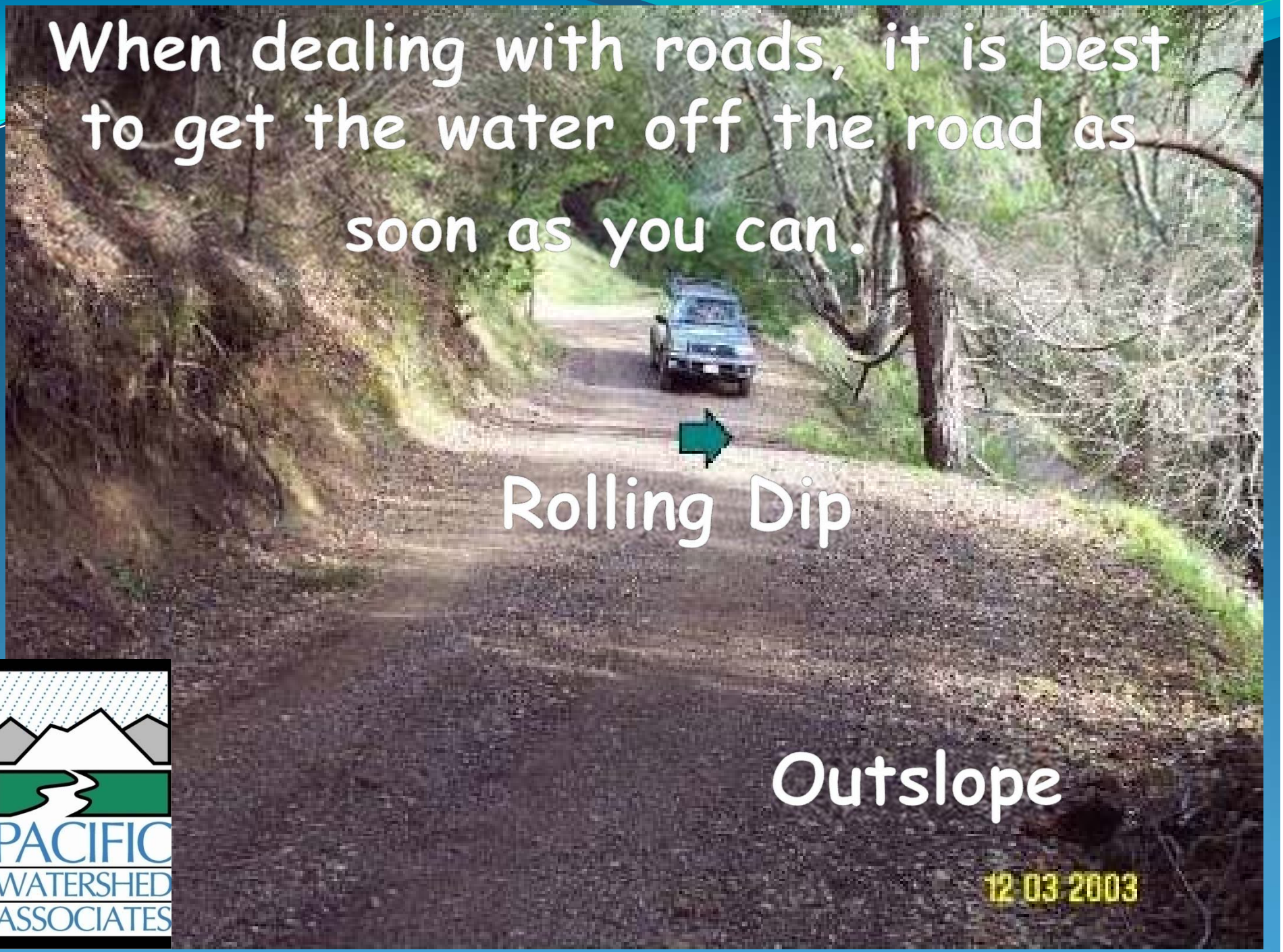

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Practical objectives for road sediment control treatments

Reduce failure potential (likelihood)

Reduce failure magnitude (volume)

Reduce road-related sediment delivery

Lower, more predictable aquatic and water quality impacts

Lower cost of storm damage repair

Less time "out of service" after storms –fewer washouts and road failures

Potential increased ability to access and use under "wet"conditions

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Maintenance

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The BMP Tool Bag

Selection of appropriate BMP will depend on the problem and your goals

They are:

- Scheduling
- Vegetation Preservation
- Erosion Control BMPs
- Run-On/Runoff Control BMPs
- Sediment Control BMPs

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Scheduling

Scheduling IS your BEST BMP

You don't want to be installing BMPs in the rain.

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Vegetation Preservation

Vegetation Protection

Don't disturb an area if you don't have to.

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Run-On/Runoff Control BMP Practices

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Run-Off/Run-On Control BMPs

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Run-Off/Run-On Control BMPs

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Erosion Control BMPs

The first goal is to keep sediment where it is.

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Erosion Control BMPs

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Erosion Control BMPs

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Sediment Control BMPs

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Sediment Control BMPs

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Sediment Control BMPs

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Questions?