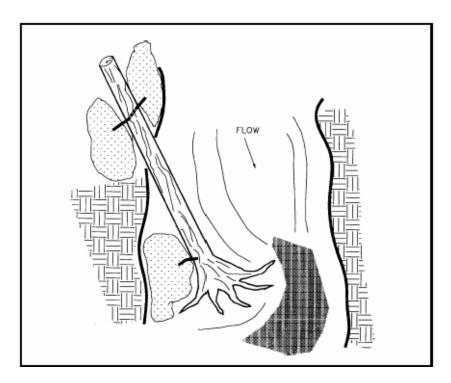
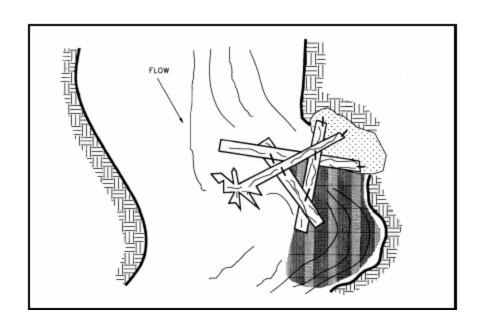


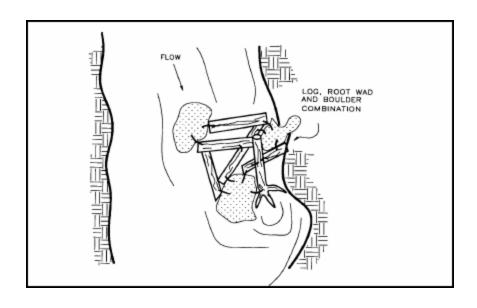
**Divide Log** 



Digger Log

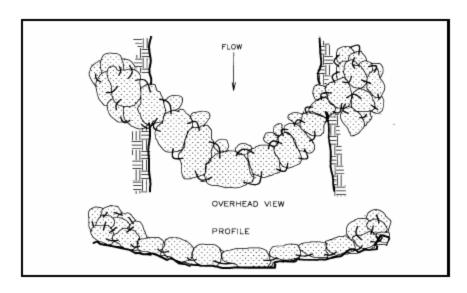


Spider Logs

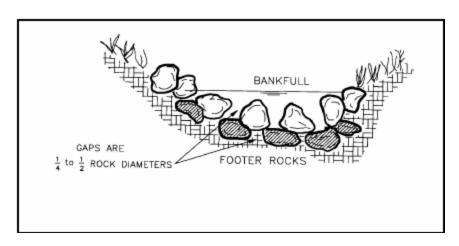


Log, root wad, and boulder combination

**Sheet:** 3 of 36

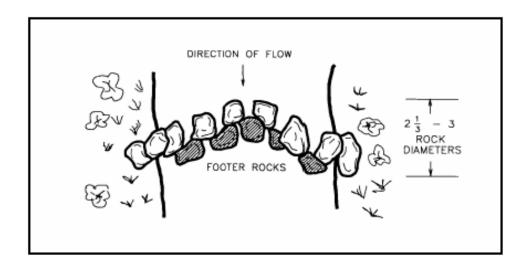


Downstream-V boulder weir

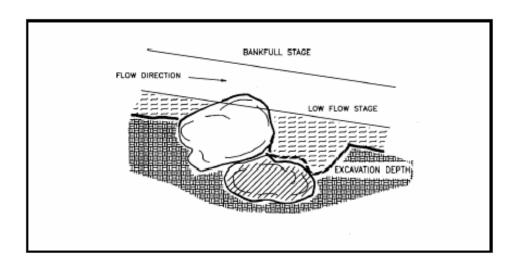


Vortex boulder weir, cross section view (Rosgen, 1993)

**Sheet:** 4 of 36 **Date:** June 6, 2003

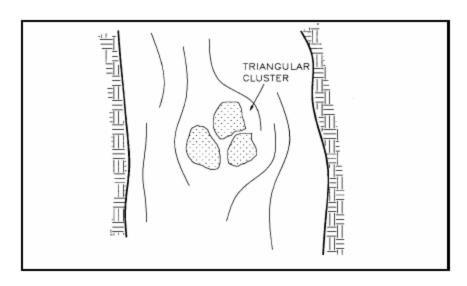


Vortex boulder weir, plan view (Rosgen, 1993)

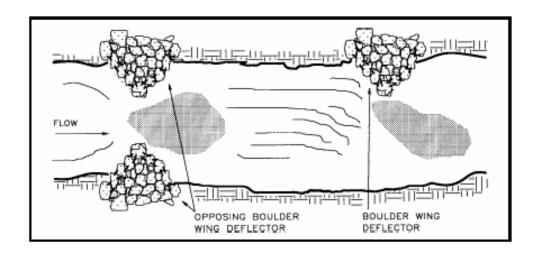


Vortex boulder weir, profile view (Rosgen, 1993)

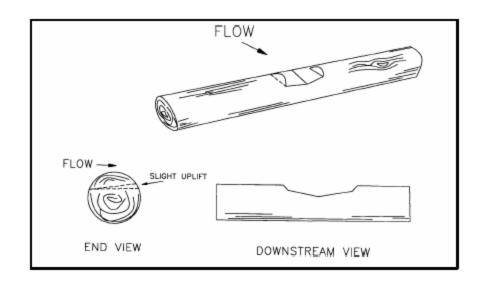
**Sheet:** 5 of 36



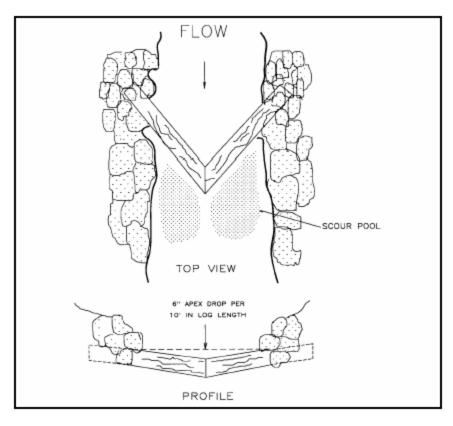
**Boulder cluster** 



Single and opposing boulder wing-deflectors



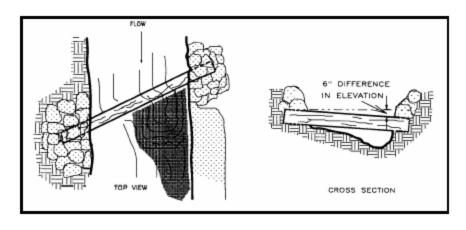
Straight log weir with low-flow notch



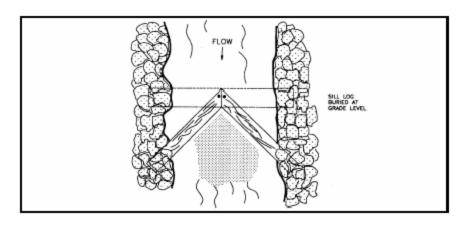
Downstream-V log weir

Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)

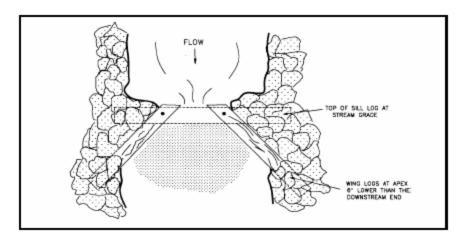
**Sheet:** 7 of 36



Diagonal log weir



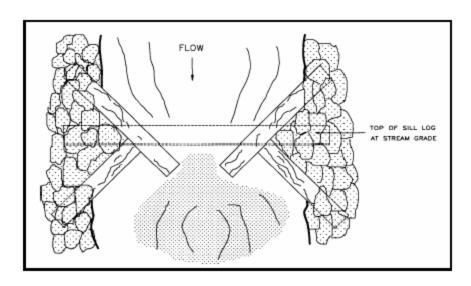
**Upstream-V** log weir



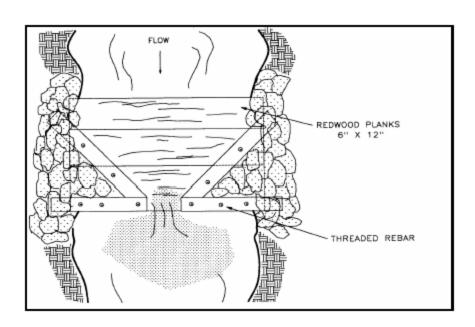
Upstream-V log weir with a low-flow notch

**Project Location:** SF District **Project Name:** Fisheries Restoration Grant Program

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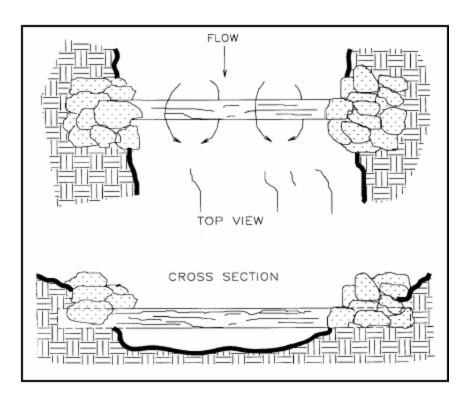


Opposing log deflectors over a sill log

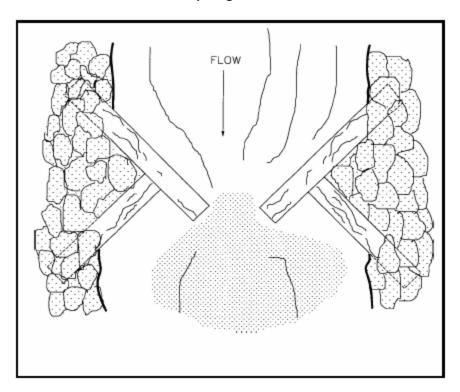


Log constrictors over planks

Project Location: SF District
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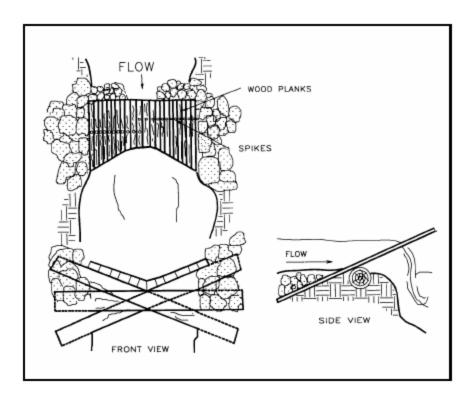


Upsurge weir

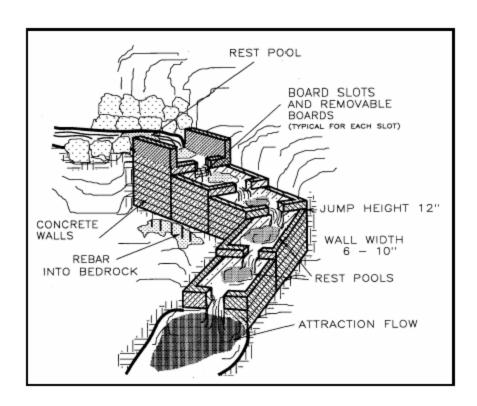


Opposing log wing-deflector

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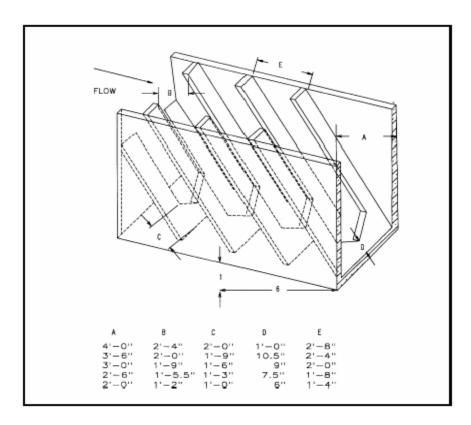


**Hewitt ramp** 

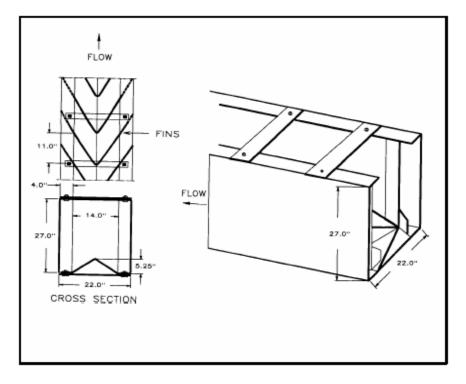


Step-and-pool fishway

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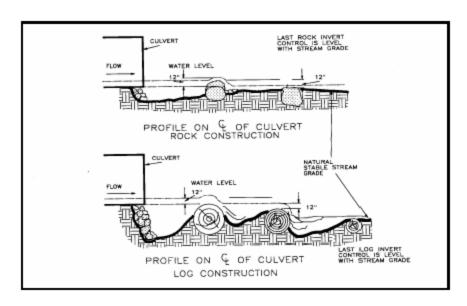
**Denil fishway** 



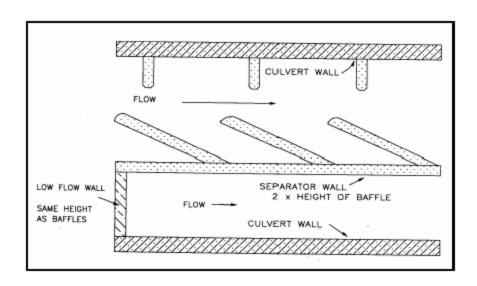
Alaskan steep-pass

Project Location: SF District
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Project Name: Fisheries Restoration Grant Program
Date: June 6, 2003
Applicant: Department of Fish and Game

Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)



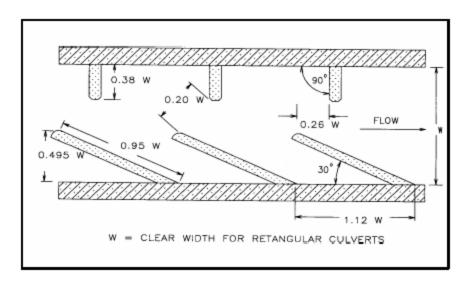
**Back-flooding weirs** 



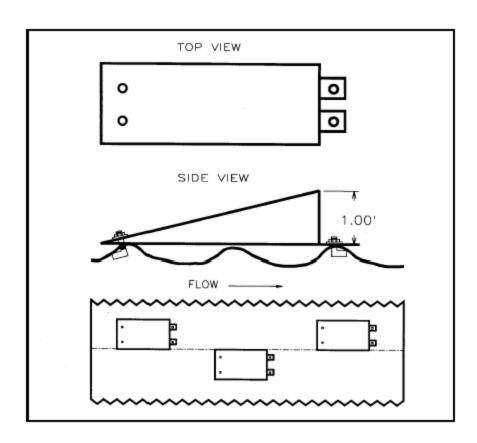
Washington baffles with a separator wall (Stream Enhancement Guide, British ColumbiaMinistry of Environment, 1980, p. 42)

Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)

**Sheet:** 13 of 36

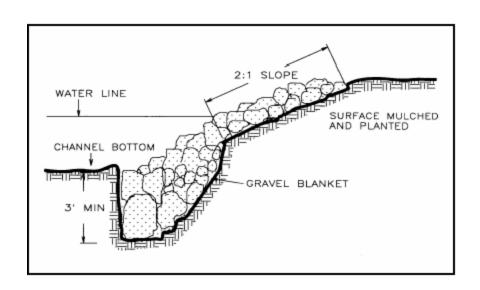


Washington baffles (Stream Enhancement Guide, British Columbia Ministry of Environment, 1980, p. 42)

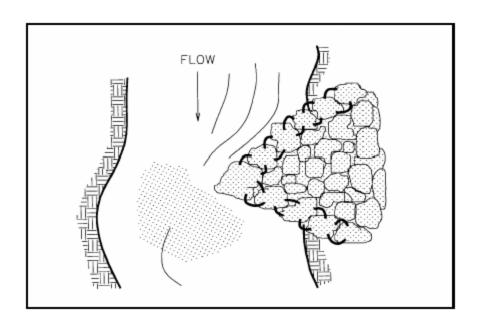


Corrugated metal pipe steel ramp baffles

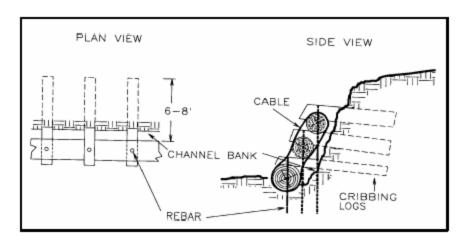
Project Location: SF District
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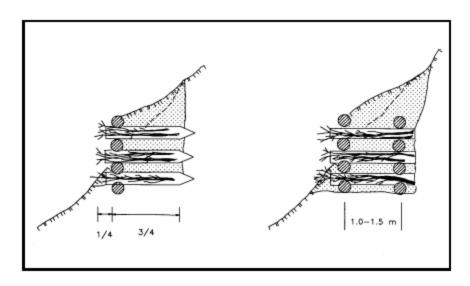
Riprap



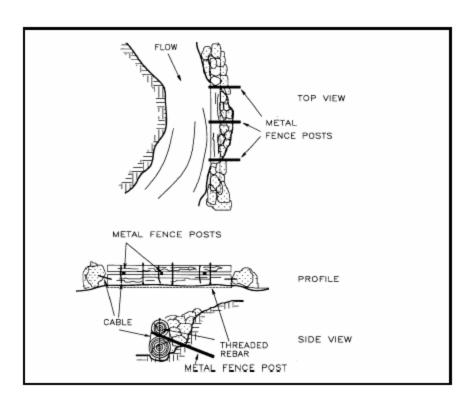
**Boulder wing-deflector** 



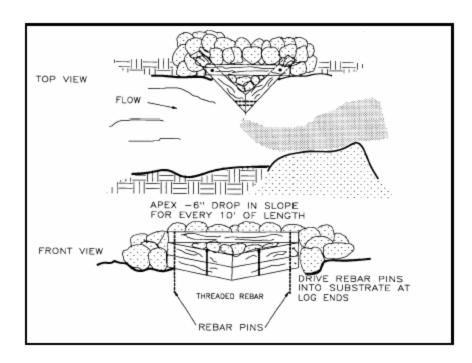
**Log Cribbing** 



Live Vegetative Crib Wall (Scheichtl and Stern, 1996)



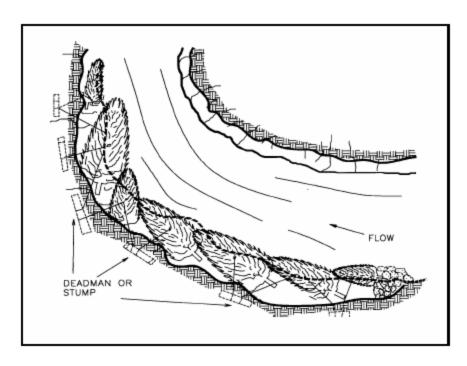
Log bank armor



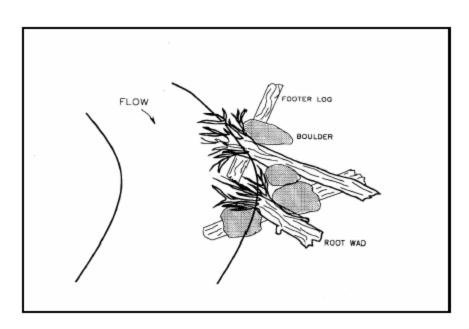
Log wing-deflector

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Project Location: SF District
Project Name: Fisheries Restoration Grant Program
Project Name: Department of Fish and Game
Applicant: Department of Fish and Game

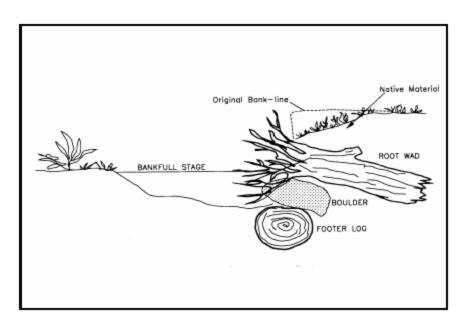
Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)



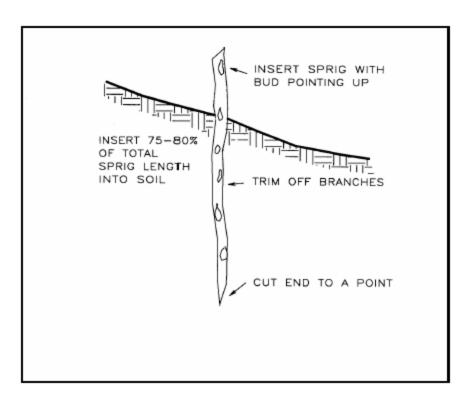
Tree revetment



Plan view of native material revetment (Rosgen, 1993)



Native material revetment (Rosgen, 1993)



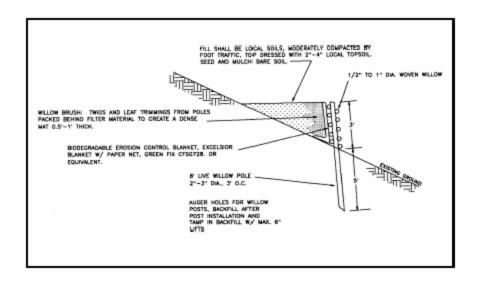
Willow sprigging (Prunuske, 1987)

**Project Location:** SF District **Project Name:** Fisheries Restoration Grant Program

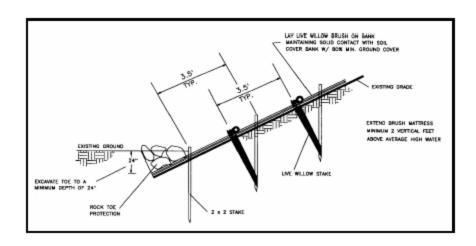
Applicant: Department of Fish and Game

Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)

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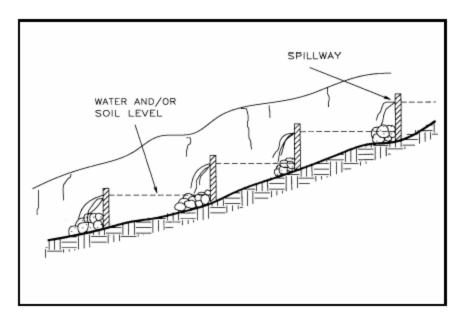


Willow Wall Revetment (L. Prunuske, 1997)

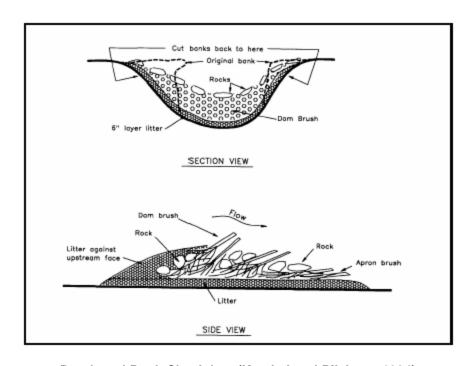


**Brush Mattress Cross Section (L. Prunuske, 1997)** 

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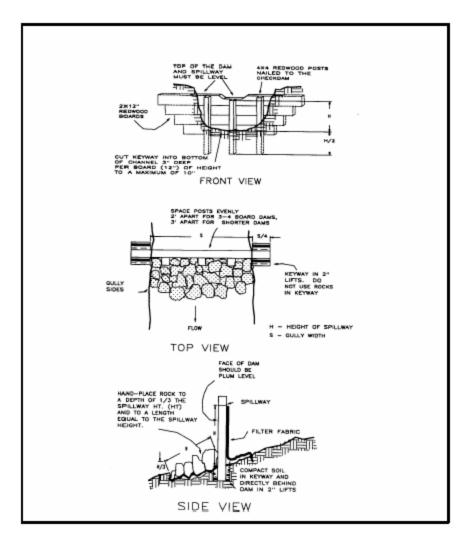
Checkdam placement (Prunuske, 1987)



Brush and Rock Checkdam (Kraebel and Pilsbury, 1934)

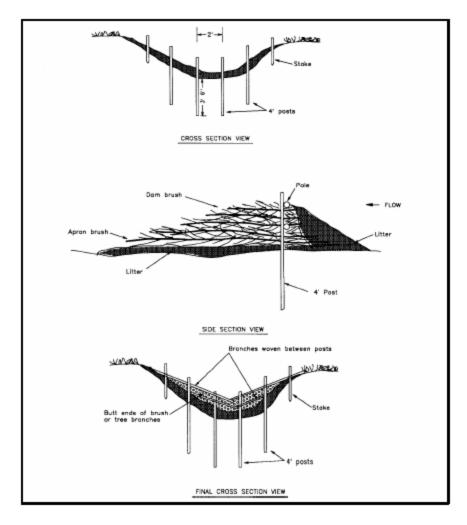
Project Location: SF District
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Project Name: Fisheries Restoration Grant Program
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Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)



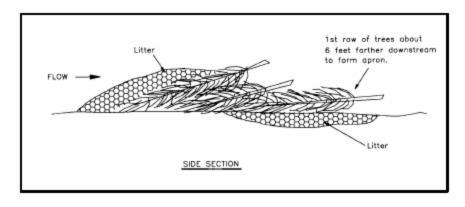
Redwood board checkdam (Prunuske, 1987)

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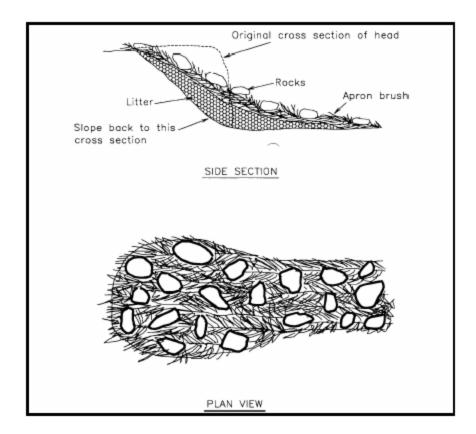


Post Checkdam (Kraebel and Pillsbury, 1934)

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Applicant: Department of Fish and Game

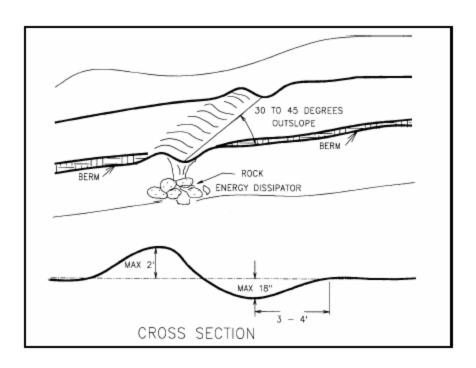


Tree Checkdam (Kraebel and Pillsbury, 1934)

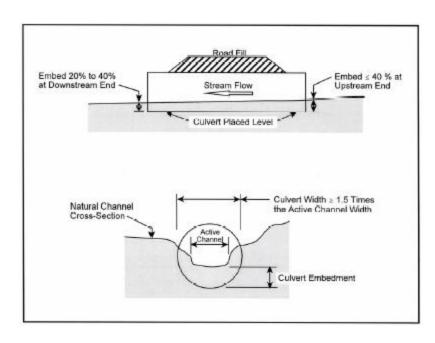


Brush and Rock Mattress (Kraebel and Pillsbury, 1934)

**Project Location:** SF District **Project Name:** Fisheries Restoration Grant Program



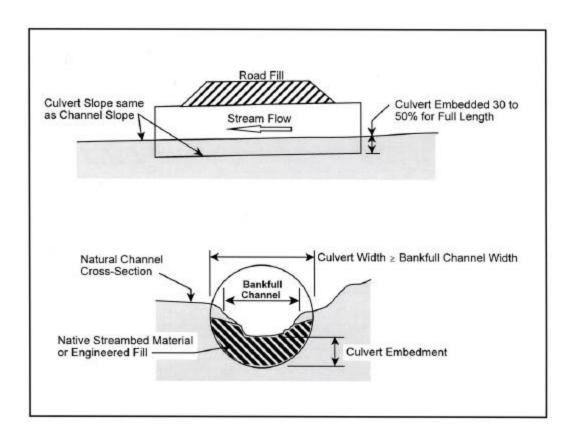
Waterbar



Active channel design option

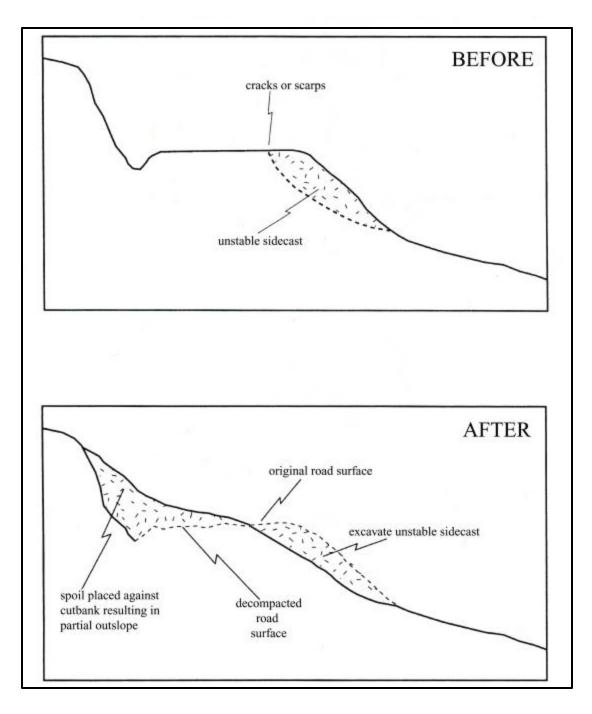
Project Location: SF District **Project Name:** Fisheries Restoration Grant Program

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Stream simulation design option

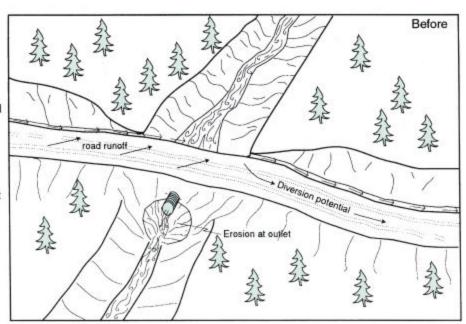
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Ripping or decompaction of the road surface and outsloping to approximate original grade

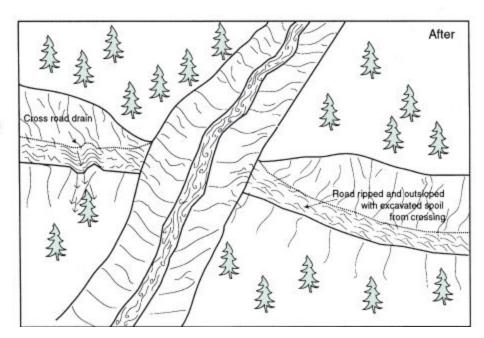
## Condition

- Diversion potential
- Road surface and ditch flows drain to stream
- Undersized culvert high in fill with outlet erosion and elevated plugging potential



## Treatment

- Road surface decompacted
- Cross road drains on old road
- Stream crossing fill completely excavated
- Excavated spoil used to outslope adjacent road



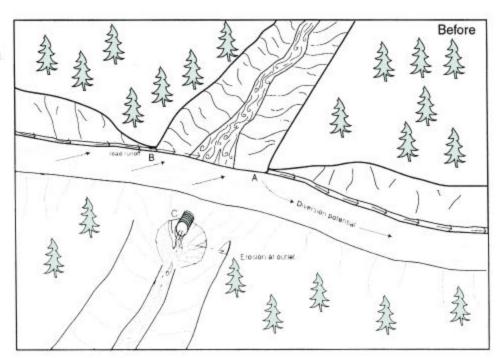
Stream crossing excavations for decommissioning

Project Location: SF District
Project Name: Fisheries Restoration Grant Program
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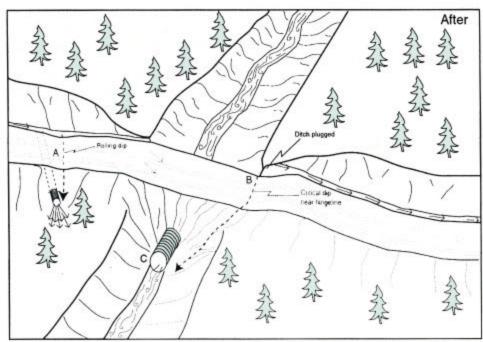
## Common Problems

- A Diversion potential
- B Road surface and ditch flows drain to stream
- C Undersized culvert high in fill with outlet erosion



## **General Standards**

- A Road surface and ditch "disconnected" from stream
- B No diversion potential
- C 100 year culvert set at base of till

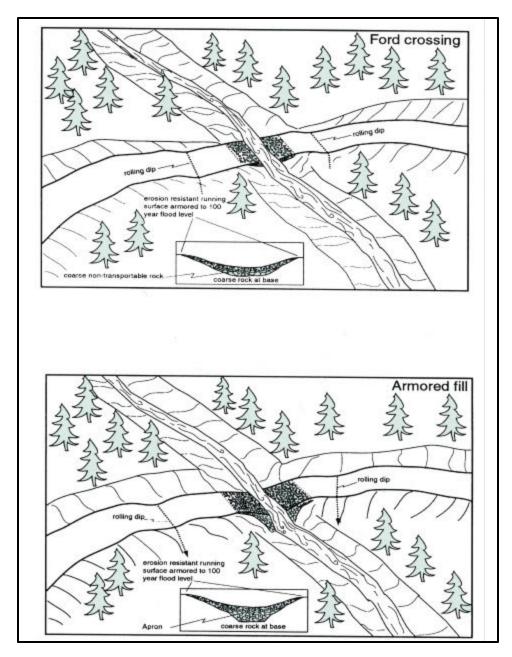


Typical upgraded stream crossing

**Project Location:** SF District **Project Name:** Fisheries Restoration Grant Program

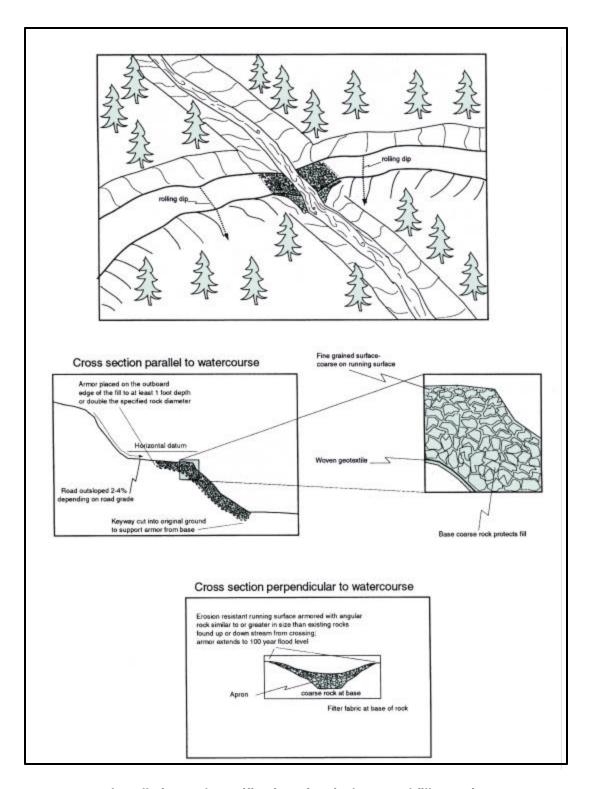
Applicant: Department of Fish and Game

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Typical armored fill stream crossing

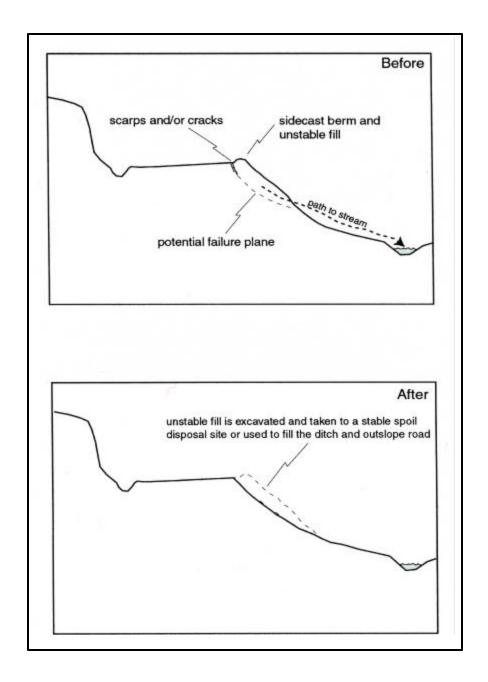
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Installation and specification of typical armored fill crossing

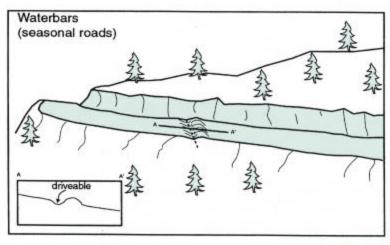
Date: June 6, 2003 Applicant: Department of Fish and Game

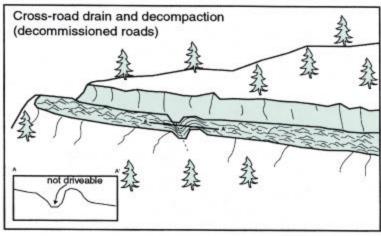
**Sheet:** 31 of 36

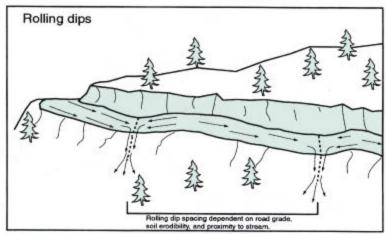


Removal of unstable sidecast materials

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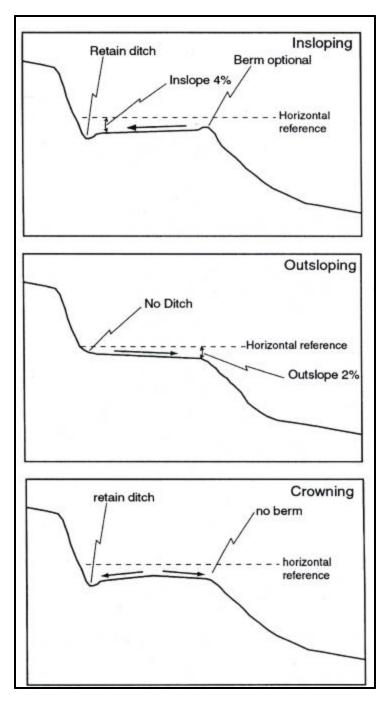
Techniques for dispersing road runoff

**Project Location:** SF District **Project Name:** Fisheries Restoration Grant Program

Applicant: Department of Fish and Game

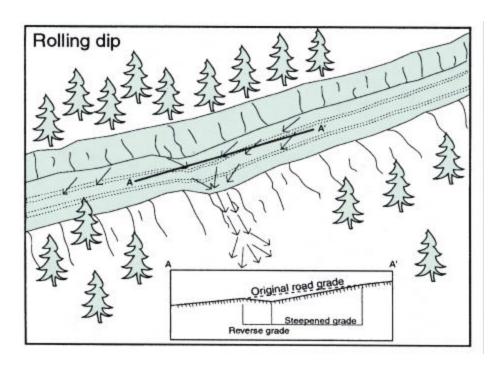
Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)

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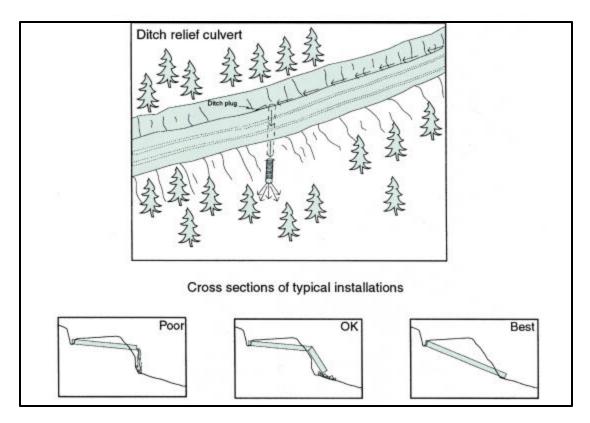


Utilizing road shape to reduce surface runoff rates

Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)



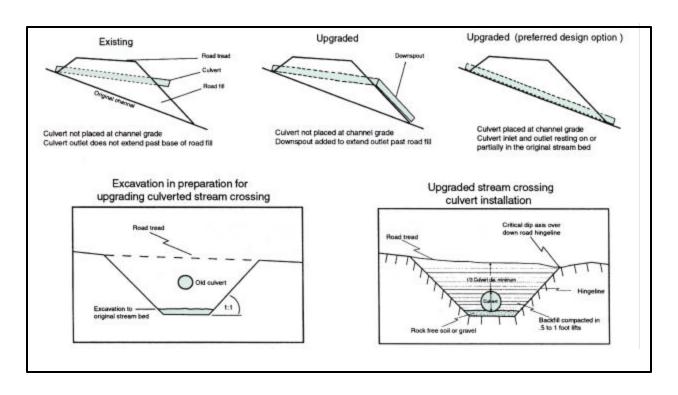
Specifications and use of rolling dips to reduce ditch erosion and surface runoff



Typical ditch relief culvert installation

Source of Drawings: California Salmonid Stream Habitat Restoration Manual, (Flosi et al., 1998)

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Typical stream crossing culvert installation on non fish-bearing streams

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