State of California

M e m o r a n d u m

To : Warden Edward Ramos
Post Office Box 852
Point Arena, California 95468

Date : July 26, 1995

From : Department of Fish and Game George Heise

Subject : Bank stabilization at Copper Queen Ranch, Rancheria Creek, Mendocino County

As a follow-up to our site visit of July 20. 1995, this memo provides my comments and recommendations for stabilization of the eroding stream banks along Rancheria Creek at the Copper Queen Ranch, and placement and removal of a seasonal gravel dam on the creek for irrigation.

Bank Stabilization

It appears to me that the lateral erosion of the north and south banks of Rancheria Creek is, in part, caused by the formation and growth of a large mid-channel gravel bar. As new sediment is deposited on the bar, there will be increasing pressure to erode the north and south banks as the creek seeks to create a new channel with the capacity to transport the creek's bedload.

It is my opinion that a single channel should be excavated through the center of the mid-channel gravel bar. The excavated gravel should be used to backfill the active eroding channels on the north and south banks.

The flow line of the reconstructed channel should be a uniform slope and connect a point in the stable channel above the bar to a stable point in the channel below the bar. The cross section of the channel should be similar to stable stream sections in the project vicinity. The alignment of the channel should provide a smooth transition from the meander above the bar to the meander below.

Where the existing north and south bank channels are to be filled, live willows should be included in the fill to promote vegetative reinforcement of the bank. Any willow plantings should extend well into the subsurface water.

If resources are not available for backfilling of the entire north and south channels, then obscuring of the upstream end of the channels should be conducted first, to guide the stream course to the center of the channel.

The property owners plans to install approximately 200' of riprap on the south bank is an appropriate measure to arrest the erosion of the bank in this area. I recommend that an attempt be made to incorporate live willow cuttings along the toe of the riprap and possibly behind it.

Seasonal Gravel Dam

Attached to this memo is a section of the Department of Fish and Game's field guide for the preparation of 1600 agreements that discusses gravel dams. This should provide a suitable guide for the installation and removal of gravel dams, however alternatives to gravel dams should be considered where feasible.

If a gravel dam is to be constructed, I recommend that a culvert, of sufficient size to handle the stream flow, be placed at grade in the flowing stream, and then constructing the dam from the banks towards the culvert. Once the dam is in place, water can be impounded by placing boards in front of the culvert to back up the flow and create the desired pond. This construction sequence should eliminate the need for a silt filter barrier.

Enough flow should be released through the culvert to satisfy other requirements of the Fish and Game Code including the downstream passage of fish. Removal of the gravel dam should be performed in the dry, before flow returns to the creek in the fall.

Alternatives to a gravel dam include the use of a bladder dam filled with water, the excavation of a pumping sump in the channel and directing the low flow channel to the sump, or construction of a well on the creek bank that would tap the underflow of the creek. The construction of a well would have the advantage being able to provide irrigation water beyond the time when surface flow had subsided.

If I can be of further assistance on this project, please contact me at (916) 653-2189.

George Heise
Hydraulic Engineer

Attachments

cc's (see next page)

cc: Mr. Ken Aasen
Department of Fish and Game Yountville. California

Mr. Rick Macedo Department of Fish and Game Yountville, California

Lt. Frank Russel Department of Fish and Game Yountville, California

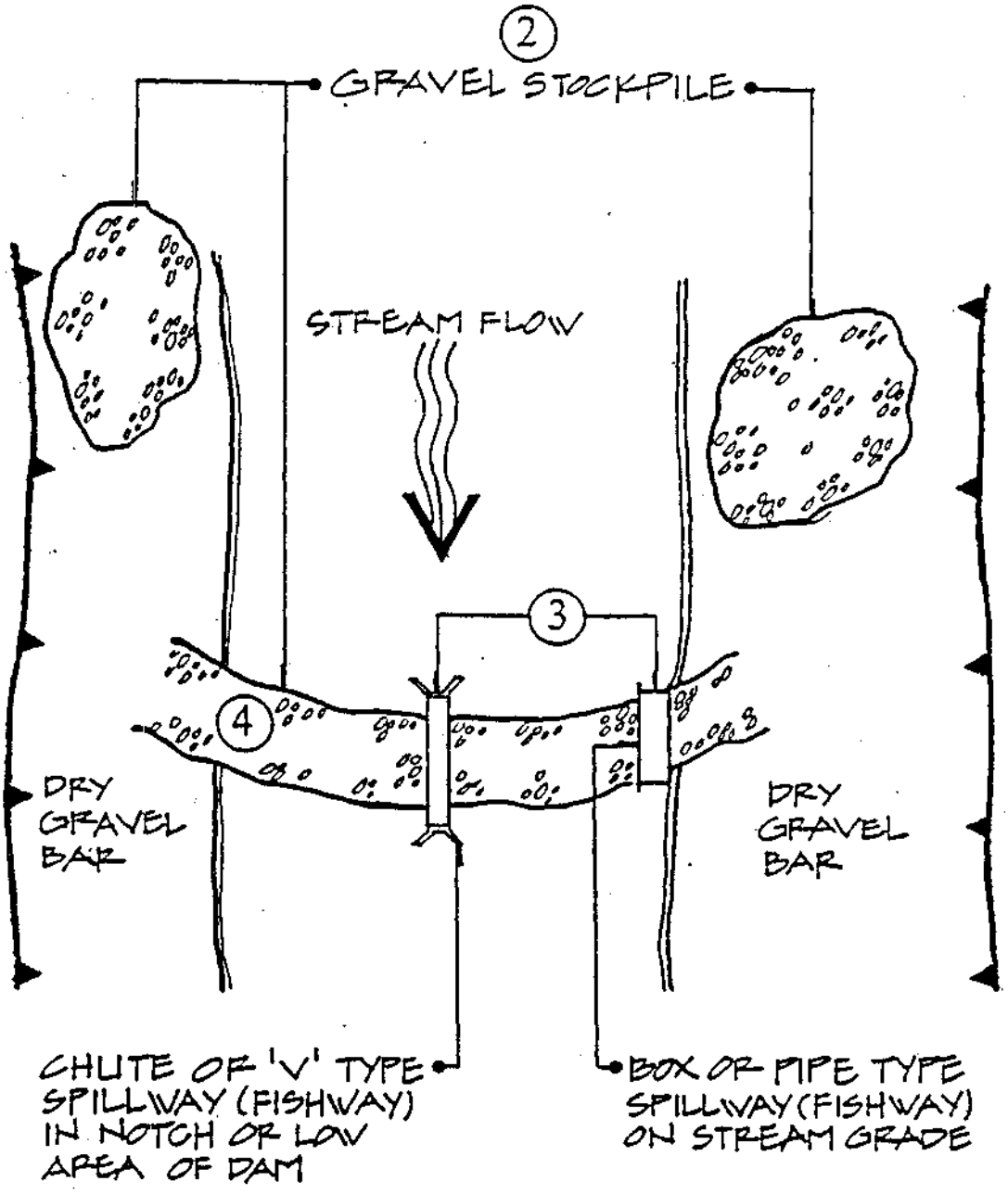
GRAVEL DAMS

Gravel seasonal dams require no permanent structures, but do require annual construction in the stream. These dams should be constructed of clean gravel (clean river run or cleaner). Soil should not be allowed except as a vehicle driving surface (one foot maximum) if the dam is also used as a road. This soil must be removed prior to the beginning of winter flows.

In many cases gravel seasonal dams have been installed annually for many years, it may be politically difficult to prevent their construction even if impact on fishery resources can be documented.

The sequence of construction of gravel seasonal dams is as follows (See Figure X-l):

1. If there will be any excavation of gravel within the flowing stream, a gravel silt filter-barrier should be placed as close downstream of the dam site as possible prior to any other work being done. If the gravel is taken from a dry bar and the gravel is clean enough, a silt filter-barrier may not be needed. In larger streams a silt filter-barrier may be impractical. Installation of the silt filter-barrier could cause as much roiling of the stream as installation of the dam.
2. Gravel for the dam, wherever possible, should be skimmed from dry bars using the cleanest material available. Gravel bars should not be cut down to below water level. A taper should be left on all bars. The gravel to be used should be stockpiled on a dry bar at the edge of the stream close to the dam site.
3. When enough gravel has been stockpiled, it should be pushed out into the stream on an angle from upstream toward downstream to help minimize the amount of turbidity to be handled by the silt barrier. The intent is to keep tractor work in the flowing stream to a minimum.
4. Downstream fish passage should be provided with an outlet pipe or spillway at stream grade level. If fish will be migrating - upstream while the dam is in place, a fishway must be provided. The District Fishery Biologist and Department engineers must be consulted about fishway design. A separate small channel sometimes can be built to provide fish passage around the dam.
5. Removal of riparian vegetation should be held to an absolute minimum to avoid erosion of banks, loss of riparian habitat, and to keep water temperatures cool.
6. The silt filter-barrier, if used, should be opened by hand to stream grade in the center of the barrier just wide enough to allow for fish passage. Removal of the barrier by heavy equipment may cause as much disturbance as the barrier is intended to prevent. This opening should only be made after the water is clear of turbidity.



Gravel Seasonal Dam

Figure:
X-1