December 5, 1989

TO : Anderson Creek File

FROM : Rick Macedo

SUBJECT: 1603 Violation, Anderson Creek, Anderson Valley, Mendocino County

Warden Lou Morgan and I conducted an on-site review of an unauthorized streambed alteration to Anderson Creek. According to what I observed at the scene, a caterpillar tractor diverted approximately 200 feet of Anderson Creek. Prior to diversion, the stream had meandered through a moderately vegetated corridor and flowed adjacent to an existing orchard. The caterpillar operator had re-channeled the stream away from the orchard and directed flows through an unvegetated area. The sinuosity of the stream section has been altered so that it now flows in a more linear or straighter aspect.

In addition to straightening out the channel and reducing the amount of riparian cover, the stream has been widened to the extent that water depth is now shallower and spread over a greater area. Fine materials (soil) was observed over downstream sections of the affected area and a block of terrace soil had been pushed into the stream channel by the tractor.

Although flows are intermittent over this section of Anderson Creek, steelhead trout and several non-game fish species use the stream for spawning, feeding and rearing of young during autumn, winter, and spring months. The stream also sustains a riparian corridor, which is important to a variety of plant, fish and wildlife organisms.

It is my opinion that the affected section of Anderson Creek was adversely impacted by the unauthorized re-channelization in the following ways:

A. Decrease in Average Water Depth - The re-channelization of the subject stream section has increased stream width, thereby decreasing average stream depth. During low-flow periods, such an alteration may encourage a break in surface hydraulic continuity earlier than normal. A break in hydraulic continuity would effectively create a de-watered island which would prevent both immigration and emigration of fishes.

B. Decrease in Riparian Cover - The subject stream diversion has de-watered the original channel. This will negatively impact riparian vegetation that pre-project stream flows had once supported. The new channel is void of riparian and provides no cover for fish or wildlife organisms.

C. Increase in Stream Temperatures - Due to the fact that the new channel is void of riparian vegetation, solar radiation can be

expected to have a greater impact on increasing stream temperatures. Steelhead will be adversely impacted as these organisms become stressed during prolonged periods of high temperatures.

D. Increase in Stream Velocity - Straightening of the affected stream will increase average stream velocities. This may directly affect fishes attempting to hold in feeding stations or gain access to upstream areas.

E. Increase in Down-Stream Erosion - Increased stream velocities can be expected to increase erosion of down-stream areas. There are several down-stream parcels which are currently being affected by bank failure due to stream hydraulics. Increasing stream velocities can only aggravate this already tenuous situation.

F. Increase in In-Channel Sedimentation - In addition to stream -bank soils being deposited in the new channel, in-channel sediments (fines) have been brought to the surface as a result of tractor operations. Fine particles such as silt, organic, soil and fine sands cause a variety of problems for fish, particularly steelhead. A proliferation of fines in a stream channel will increase water turbidity. Highly turbid water-will reduce the ability of a fish to respire by affecting gill structures. Sediment laden water is particularly deleterious to very young fish and adults that have migrated many miles from the ocean and are already in a stressed condition.

Fine sediments may affect spawning success by preventing adequate oxygenation of fish eggs and/or removal of nitrogenous wastes. It is well documented that egg survival is lowered with increases in stream channel sediments.

G. Decrease in Fish-Food Production - Increases in fine sediments will decrease available habitat for most fish prey. Aquatic insects and crustaceans (aquatic invertebrates) compose the greatest portion of food organisms for Anderson Creek fishes. Fines tend to cover the interstitial spaces between submerged rocks. It is these interstitial spaces where most aquatic invertebrates live and reproduce. Stream channels with high amounts of fine sediments are virtually void of these aquatic organisms. Conversely, channels with low fines and good stream flows support a variety of invertebrates, hence ample food for fishes.

cc: L. Morgan; J. Emig