VII. WHAT ARE THE LIKELY EFFECTS OF SUCTION DREDGING ON ANADROMOUS FISHES, ESPECIALLY COHO SALMON, IN THE KLAMATH RIVER AND ITS TRIBUTARIES?

The general effects of suction dredging on fish are well described in Harvey (1986) and Harvey and Lisle (1998) and so will be described only briefly here. The effects vary according to a variety of factors including size of stream, fish species present, season of dredging, and frequency and intensity of dredging. The key is that suction dredging represents a chronic unnatural disturbance of natural habitats that are already likely to be stressed by other factors and can therefore have a negative impact on fishes that use the reach being dredged.

Direct effects include entrainment of invertebrates and small fish in the dredges, altering of the habitat that supports the food supply of fishes, and changing channel structure in ways that make it less favorable for fish (usually by making it less stable and complex). An area of particular concern in the Klamath River and its tributaries is the creation of piles of dredge tailings that are attractive for the spawning of salmonids but that are so unstable they are likely to scour under high flows, greatly reducing survival of the embryos placed within the gravel.

A more immediate effect is the impact of chronic disturbance of the fishes, which can change their behavior and cause them to move to less favorable conditions. I am particularly concerned in this regard with dredging in or near thermal refugia of juvenile salmonids.

As discussed in the NRC (2003) report and references therein, the Klamath River and some of its tributaries can reach temperatures in excess of 65-70ºF during the day in late summer. Such temperatures are very stressful or even lethal for many salmonids, so the fish seek out cooler areas, where small tributaries flow into the river or there is upwelling of ground water. Juvenile coho salmon, Chinook salmon, and steelhead will often be packed into these areas during the day.

This past August, I spent a day with Dr. Michael Deas, who was documenting the nature of a thermal refuge created by the inflow of single creek into the Klamath River. When I swam through the refuge area with a mask and snorkel I was impressed with the concentrations of fish in the area (and the lack of them in the main river) and how much even a minor disturbance of the habitat would reduce the ability of the area to support fish.

Adult salmon and steelhead can also be disturbed by the intense dredging activities. I am particularly concerned with spring-run Chinook salmon, a species with which I have worked closely in the Sacramento River drainage. Adult spring-run Chinook spend the summer in pools in rivers, especially the Salmon River (and its forks) and Wooley Creek.

They have to survive the summer without feeding, using reserves of fats and oils they bring up from the ocean.

Chronic disturbance of the type created by dredging and dredgers can increase stress on these fish and has the potential to reduce their over-summer survival.

An often overlooked impact of dredging is that the people involved often live on or close to the stream in remote areas for weeks at a time, where they not only dredge, but swim, bathe, and fish (sometimes illegally). Such activity can cause spring-run Chinook to use up precious energy reserves if they have to move to less favorable areas or swim about avoiding people.

It is important to note that the Klamath River and its tributaries support the highest diversity of anadromous fishes of any river in California including: coho salmon, chum salmon, multiple runs of Chinook salmon, coastal cutthroat trout, multiple runs of steelhead, eulachon, green sturgeon, white sturgeon, Pacific lamprey, and river lamprey. This is the reason, of course, why the river also supported a rich and diverse fishery by the native peoples who live along the river. Today virtually all the species are in decline or threatened with declines from multiple factors (see NRC 2003). Therefore, in my professional opinion, suction dredging should only be allowed in areas where it can be demonstrated there will no immediate or cumulative impact on the anadromous fishes. It should be assumed there is harm, unless it can be proven otherwise.

One reason for my taking this conservative position, is that we simply do not now the effects of dredging on many species, especially when the intensity of dredging is increasing. For example, the larvae (ammocoetes) of Pacific and river lamprey live in soft materials along the stream edge or in slow-moving sections of stream. Dredging of areas where ammocoetes are abundant will push them into the water column where they can be readily consumed by predators, contributing further to the likely declines of the species. Even for salmonids, our information, with the exception of a few studies such as that of Harvey (1989), is largely anecdotal or in non-peer reviewed reports (see, for example, the bibliography of DFG 1994)..

Studies are also largely confined to looking at immediate effects of single dredges and they do not examine the cumulative or long-term effects of multiple dredges and activities associated with the dredges. Indeed little has changed since DFG (1994, p. 71) listed the need for additional studies on practically every important aspect of the environmental impacts of dredging. Harvey and Lisle (1998) present a strategy for acquiring much of the needed information.