Overview of Adipose Fin Clipping in the Columbia Basin

Summary of a presentation given to the Northwest Power Planning Council Fish and Wildlife Committee on October 17, 2001 on behalf of the CBFWA Anadromous Fish Committee

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In a document dated July, 2000 the governors of Idaho, Montana, Oregon and Washington endorsed a program to mark as many hatchery reared salmon as feasible to facilitate harvest in selective fisheries. In response to a request from the Council, we assembled data and maps depicting adipose fin clipping rates for 2000 releases, summarized below, to illustrate how much progress has been made toward that goal and to identify obstacles and opportunities for further progress.

The only mark suitable for a mass marking program is to remove ("clip") the adipose fin. This fin is the only one that offers the advantages of simplicity and ease of removal, low injury and mortality, low rate of regeneration, and easy visible detection. Adipose clipping has several purposes when applied to fish of hatchery origin: determining fishery exploitation rates in conjunction with Coded Wire Tag (CWT) recoveries, determining marine and freshwater distribution, determining overlap with wild fish in spawning areas, broodstock management, and identification for selective fisheries. Historically, the adipose clip has been used to identify fish that have been marked with a CWT as a visual "flag" for recovery purposes.

Progress toward marking most hatchery salmon has been significant for coho and spring chinook, but has not been instituted widely for fall chinook (Table 1, and maps depicting releases of clipped salmon at http://www.streamnet.org/online-data/massmarkingmaps.html). Coho and spring chinook adipose clipping rates are already approaching those for steelhead. The steelhead information is presented for comparison purposes, since steelhead have been successfully adipose marked for selective fisheries for years. Since some stocking of steelhead for restoration purposes will likely continue, this probably represents a reasonable expectation of maximal adipose clipping rates for salmon, for which stocking for restoration purposes will likely also continue. Issues surrounding the adipose marking rates for coho, spring/summer chinook and fall chinook are discussed below.

Table 1. Summary of Columbia Basin anadromous salmonid releases in 2000 that were marked with an adipose fin clip.

Species	Percent Adipose Clipped
Steelhead	86.2%
Coho	82.0%
Spring/Summer Chinook	71.0%
Fall Chinook	7.1%

Coho and Spring/Summer Chinook

These species are currently being marked with an adipose clip probably to the degree that is realistically achievable at this time. Virtually all fish raised with the intent of supporting fisheries are adipose fin clipped. In 2000, exceptions to this generalization included a few releases in the Columbia estuary and Willamette River that were not able to be marked before release (these are being marked in subsequent years) and some marking rates determined by negotiations under U.S. v. Oregon. Otherwise, fish that were not adipose clipped were intended for restoration purposes, as determined by the individual state, tribal or federal management agencies and agreements between them. These fish raised for supplementation of depressed wild populations were not clipped to protect them from harvest and thereby improve escapement.

Early results from clipping / selective harvest programs are encouraging. The 2001 spring chinook sport fishery in the lower Columbia was highly successful, harvesting 15,700 marked fish with 15,500 unmarked (mostly wild) fish released, resulting in satisfied anglers, economic benefits to surrounding communities of ~$15 million, and low impact to wild fish (estimates from WDFW). Initial concerns over effectiveness of selective fisheries for salmon are being resolved. Impacts to released wild fish in freshwater fisheries were demonstrated to be low by a three year ODFW study in the Willamette River, and preliminary results of a new study by WDFW suggest that tangle nets are equally effective at catching fish but have substantially higher survival of released fish than regular commercial gill nets.

Issues: For coho and spring/summer chinook, the primary issue remaining is a difference of opinion between management agencies on the appropriate role of hatchery salmon in wild fish supplementation programs. The issue involves two contrasting opinions: One advocates using hatchery fish primarily for harvest and minimizing interaction with wild stocks (i.e., favors mass adipose clipping); the other supports the idea that hatchery stocks should not be subjected to targeted harvest but should contribute to the overall restoration of the population (i.e., opposes mass adipose clipping). Depending on how this issue is resolved, the proportion of hatchery fish used for harvest or supplementation, and thus the proportion clipped, could be adjusted in the future. The management agencies and the National Marine Fisheries Service (NMFS) will continue to work on resolving this issue. Much of this will likely be worked out through the U.S. v. Oregon process to develop a new Columbia River Fish Management Plan, which is targeted for completion by the end of 2003.

Fall Chinook

Adipose clipping has not been initiated for supporting selective fisheries for fall chinook. The few fall chinook that were adipose clipped in 2000 were marked to allow determination of distribution upon return to the river or to identify fish that had received a CWT.

Issues: As with coho and spring/summer chinook, there are differences of opinion among managers on the use of hatchery fish for harvest or supplementation of wild stocks. During the presentation to the Council's Fish and Wildlife Committee on October 17 a representative from the Columbia River Intertribal Fish Commission expressed the sentiment that these fish should not be marked or targeted in selective fisheries to maximize their contribution to wild spawning.

A second issue is that selective harvest of hatchery fall chinook confounds the fishery impact assessment models used to estimate harvest impacts to individual stocks. The models assume that hatchery fish are harvested at rates similar to wild fish, allowing hatchery fish to represent harvest rates for wild fish. That basic assumption is invalidated when adipose clipped hatchery fish are harvested in selective fisheries at a higher rate than unmarked wild fish. An alternative approach, referred to as "double index" marking, has been initiated to circumvent this problem, but not all components of the fishery are sampled with the electronic equipment necessary to locate the coded wire tags. More importantly, because of more year classes at sea compared to coho, with different exploitation rates between year classes, uncertainty is substantially increased relative to selective fishery impacts for fall chinook stocks even with the double index marking approach. This change could affect existing commitments to maintain the viability of the coast-wide CWT assessment and management program under the Pacific Salmon Treaty. This technical issue will have to be resolved through the Pacific Salmon Commission.

The remaining issue is logistical. Fall chinook reside in the hatchery only a short time before release. This presents problems given the large numbers (over 70 million in 2000) of fish produced, since there is little time to do the marking and the fish have to be marked at a very small size. Significant resources will be needed to undertake a mass marking program for fall chinook, although some management agencies have already committed to doing so. Marking costs may approximate $25 per thousand annually (~$1.75 million for 70,000,000), plus start up costs of building new marking trailers (Gary Shurman, WDFW, personal communication). Use of automated marking trailers might reduce labor costs, but the marking machines are slow and very expensive (approximately a half million dollars each).

Conclusions

The Governors' objective of marking coho and spring chinook for selective fisheries is largely being met. Fall chinook, however, have not yet been included under this approach.

Two significant issues are primary determinants of the percentage of hatchery fish that are mass marked with an adipose fin clip for the purpose of supporting selective fisheries:

1) The appropriate role of hatchery reared fish in restoration and supplementation of wild populations, and
2) The impact of selective fisheries on the ability to continue to estimate harvest rates of stocks under the Pacific Salmon Treaty with acceptable levels of precision.

The role of hatchery origin fish has been under discussion for some time. The 2000 Biological Opinion for operation of the hydrosystem has called for the management agencies to develop a coordinated comprehensive marking strategy for the Columbia Basin (RPA #174). Since marking is tied to the particular management objectives, this basic issue will have to be addressed by the management agencies and NMFS while developing the strategy. Work on the strategy has been initiated under a steering group comprised of staff from USFWS, the state fish and wildlife agencies, CRITFC, and lead by Larry Rutter of NMFS. This effort is likely to be completed in FY 2002.

The issue of potentially compromising the ability to determine harvest impacts by expanded adipose clipping for selective fisheries is primarily related to fall chinook, since mass marking and selective fisheries are already being implemented for coho and spring/summer chinook. That is partially because the simpler life history of coho (fewer years at sea) makes it easier to accommodate the issue, and Columbia Basin spring chinook are encountered in the ocean commercial and recreational fisheries less frequently than fall chinook. For fall chinook there are still differences of opinion between those who see the double index marking program as a way around the problem and those who believe there is insufficient detection capability in parts of the fishery to make it work, and that the potential loss of harvest impact information is too great. They also point out that it may violate provisions in the Pacific Salmon Treaty that requires a viable coast wide CWT assessment and management program be maintained. This issue will have to be resolved through the Pacific Salmon Commission.

While it is clear that not all hatchery fish are being marked for selective fisheries as suggested by the Governors, the release data from 2000 demonstrate that significant progress has been made. The remaining issues are currently being addressed by the management agencies, and should be resolved in the relatively near future.