

# Winter/Spring 2003 Selective Fishery Monitoring Plan

## **Goals of the Monitoring Program**

The goal of the monitoring program is to collect unbiased data from this experimental demonstration fishery necessary to measure, evaluate, or describe effort and catch. Data collected will be used to describe:

- Kept and released catch by species
- Mark rate by species
- Impact rates on listed chinook and steelhead
- Capture and release condition of non-target salmonids
- Species-specific immediate mortality rates
- Recovery box use and effectiveness

Additionally, the monitoring program will collect information concerning net configurations (and associated catch), use and species-specific catch rates of nets equipped with steelhead excluders, and distribution of fishing effort within fishing zones.

Physical methods of capture (tangled, clamped, gilled, and wedged) and incidence of scale loss appear to affect post-release survival. While this information is important, collecting accurate data within an active commercial fishery is difficult. Safety and liability concerns require that observers stay clear of the work area (where the net is retrieved and cleared). Additionally, the success of a live capture fishery requires minimal handling and quick return of non-target catch to the water. Within the fishery, steelhead and unmarked spring chinook in good condition can be released without being brought onboard the boat. Since many of these fish are caught by tangling, it is difficult to collect unbiased data on physical capture method since fish caught by tangling are less likely to be observed. These realities make close inspection of each fish impossible. This type of detailed information is more readily obtained in a controlled research setting (i.e. test fishery) since a biologist has hands-on contact with each salmonid. Given these limitations, we will attempt to gather unbiased data on physical method of capture data from as many fish as possible that can be clearly seen. We will also attempt to collect tissue samples from a representative subsample of the steelhead captured in this fishery for future determination of the stock composition, however, the limitations described above may reduce our ability to complete this task.

Monitoring data will be used within the broader evaluation of live capture tangle nets to guide implementation and management of current and possible future fisheries utilizing this gear. Observers will also be able to assist with the continued education of fishers by answering questions regarding proper fish handling, condition assessment and recovery, and other topics related to live capture fisheries.

## **Fishery Description**

The purpose of this fishery is to provide access to the commercial allocation of Willamette River stock hatchery spring chinook while remaining within upriver spring chinook allocation limits and minimizing impacts on listed species. This fishery will be restricted to utilizing selective fishing gears and methods, including those in development that allow for the live release of unmarked spring chinook, all steelhead, and other non-target species. Regulations in effect for 2003 are based on the cumulative knowledge gained from Canadian selective fishing studies and

lower Columbia River live capture research and will specifically address weaknesses identified in the 2002 full-fleet demonstration fishery.

At the September 12, 2002 Columbia River Compact hearing, the states of Oregon and Washington adopted regulations concerning gear construction for the live capture commercial demonstration fishery. A maximum mesh size of 4.25" (stretched measure) was adopted based on the results of previous years of research and a modeling exercise designed to predict relationships between mesh size and physical capture method of steelhead. The adopted mesh size is predicted to function as a live capture tangle net for both spring chinook and steelhead while remaining effective at capturing hatchery-origin spring chinook. Data collected through monitoring will be compared with pre-season modeled results and help guide gear refinements for any future live capture fisheries.

The winter fishery will be focused on the late February through March time period to target earlier-returning Willamette Basin hatchery spring chinook. If run size and impact rates allow, additional spring season fishing periods may occur during the April through mid-May time frame. The initial fishing periods will be adopted at the February 6, 2003 Compact hearing. Based on pre-season run size forecasts, the Interim Management Agreement, and the Willamette Fish Management Plan, winter and spring season commercial mainstem fisheries downstream of Bonneville Dam have been allocated a 0.59% impact rate on upriver spring chinook listed under the Endangered Species Act (ESA) and a catch of 17,500 Willamette hatchery spring chinook.

### **Data Collection Goals**

Data will be used to describe catch and mark rates of target and non-target species or stocks, estimate numbers of kept and released catch, evaluate condition at capture and release of non-target salmonids (including immediate mortality rates), and track impact rates to listed stocks. Effort data will incorporate specific details of gear construction, net deployment and pick times, and fishing locations. The presence, type, and frequency of voluntary use of nets incorporating steelhead excluding devices will be recorded, along with associated catch data to determine if species-specific catch rates of nets incorporating these modifications differ from nets without this option. Environmental data will be collected daily in each location to describe other factors that could potentially affect the fishery. See Appendix 1 for specific data to be collected.

Observers hired by Washington Department of Fish and Wildlife (WDFW) and Oregon Department of Fish and Wildlife (ODFW) will be trained to ensure that data collected from this fishery are consistent and comparable. Training will include:

- Fishery background
- Fishery regulations
- Role of observers
- Data sheets and data entry procedures
- Net design and terminology
- Fish species identification
- Fin mark identification
- Recovery box design, requirements, and usage
- Criteria for assessing fish condition (standard 1-5 grading scale)
- Criteria for noting other physical damage including scale loss

- Criteria for determining physical capture method (tangled, clamped, gilled, or wedged)
- Live fish handling procedures
- Tissue sample collection

In addition to on-the-water monitoring, dockside sampling of the sold catch will occur at commercial buying and processing stations. Standard commercial fishery sampling protocol will be followed including a goal to sample a minimum of 20% of the landed commercial spring chinook catch for coded-wire-tag (CWT) recoveries and  $\geq 10\%$  of the catch for samples of length, weight, sex, scales, and stock (visual stock identification). Data will be used to describe the relative stock components, determine age structure, and characterize other biological aspects of the sold catch. Total landings will be estimated by dividing landing data (pounds sold) from fish receiving tickets by average fish weights obtained from dockside sampling.

Both data sources will be used to evaluate and track the fishery in-season to ensure that ESA-related catch limits are not exceeded and other management goals are achieved. In-season impact estimates will be based on pre-season estimates of long-term post-release mortality rates. Estimates of the sold catch will be used in conjunction with onboard monitoring data to estimate the number of fish released by species. Estimates of released steelhead will include numbers of marked and unmarked fish.

### **Logistical Approach**

The monitoring program is a stratified systematic program designed to representatively sample the fishery at appropriate rates in all areas. Sampling effort will be apportioned in relation to fishing effort with most monitoring occurring in areas of concentrated commercial fishing effort. Commercial effort within geographic sections of the river and associated sampling priority can be pre-determined to some degree based on staff's knowledge of Columbia River commercial fisheries, run timing, and results of monitoring efforts in 2002. To ensure adequate and representative coverage, priority levels for each geographic section have been established (Table 1)

**Table 1. Monitoring areas and coverage priority for the 2003 commercial tangle net demonstration fishery**

<b>Priority</b>	<b>Geographical Section</b>	<b>River Mile</b>
M	Buoy 10 to Astoria-Megler Bridge	3.0-13.9
H	Astoria-Megler Bridge to Tongue Point	14.0-17.9
H	Tongue Point to Three-Tree Point	18.0-30.9
H	Three-Tree Point to Wallace Island	31.0-46.9
H	Wallace Island to Railroad Tunnel (Fisher Island)	47.0-59.9
M	Railroad Tunnel (Fisher Island) to Rainier	60.0-67.9
M	Rainier to Port of Kalama	68.0-76.9
L	Port of Kalama to Lewis River	77.0-86.9
L	Lewis River to Willamette River	87.0-100.9
L	Willamette River to I-205 Bridge	101.0-112.9
L	I-205 Bridge to Camas (Lady Island)	113.0-120.9
L	Camas to Rooster Rock	121.0-128.9
L	Rooster Rock to Beacon Rock	129.0-142.0

but will be modified in-season in response to changes in fishing patterns. Various information sources, including observations during aerial sport effort surveys and reported landings, will be used to determine weekly distribution of commercial effort. In addition, observers will have the ability to communicate by cellular telephone to coordinate and adjust daily sampling coverage.

Sixteen trained observers employed by ODFW and WDFW (8 from each agency) will be on the water during each fishing period to observe and collect data from this fishery. Four agency boats will be used to transport and deploy observers among participating commercial fishing vessels. Observers will monitor and record the pertinent data associated with one or more drifts from each fishing vessel. The observer will then be shuttled to another commercial fishing vessel by the transport boat. By rotating observers among commercial fishing vessels, and observing a limited number of drifts per vessel, a higher proportion of fishers can be observed. This format will ensure representative sampling of the fleet and will improve communication and education.

Species-specific catch and mark rates, and condition at capture and release, and physical method of capture will be compiled, entered, reviewed, and edited following each fishing period. Preliminary summaries of daily landings, stock composition (visual stock identification), and coded-wire-tag recoveries for the sold catch will be prepared in-season and finalized post-season. Any tissue samples collected will be inventoried pending future analysis.

### **Observation Rates**

There has been some confusion regarding “observation rates” associated with monitoring of the live-capture commercial fishery in 2002. At least two different sampling rates relative to this fishery exist: 1) the percentage of fishing effort (or individual fishers) observed (fishermen observation rate), and 2) the percentage of harvested (landed) spring chinook observed at time of capture (catch sampling rate). Data for both of these rates must be collected randomly from a representative subsample of the population (fishers and harvest) but each serves a different purpose. The fishermen observation rate provides a measure of the percent of the participating fishers who were observed and is used to ensure the observed catch sample is collected from a representative component of the participating fishers. If the rate is sufficient to provide a representative sample, higher sampling rates for this variable provide limited statistical improvement in estimates of unobserved bycatch. However, in terms of education and regulation enforcement, it is important to optimize this rate since it represents the proportion of participating fishers who were contacted by observers. We will attempt to contact as many fishers each day as possible while maximizing the catch sampling rate (see below).

In 2002, we predicted observers would contact approximately 36% of the commercial vessels each day based on anticipated effort and the estimated number of boats that could be contacted in a 12-hour work day. We did not attempt to predict the percent of the total harvest we would observe. Due to several unknown factors (including potential effects of inclement weather, equipment failure, distribution of fishing effort, and season structure) predicting the fishermen observation rate was difficult.

Actual daily fishermen observation rates in 2002 ranged from 10-58% and averaged 20% for the season; about half of the anticipated rate. This lower-than-anticipated rate can be mainly attributed to expansion of the season into extended multi-day periods that included night fishing. The extended seasons reduced our ability to sample fishing effort by markedly increasing the number of open hours while effectively halving the number of observers since crews needed to be split between day and night shifts. Nighttime fishing reduced the ability of observers to

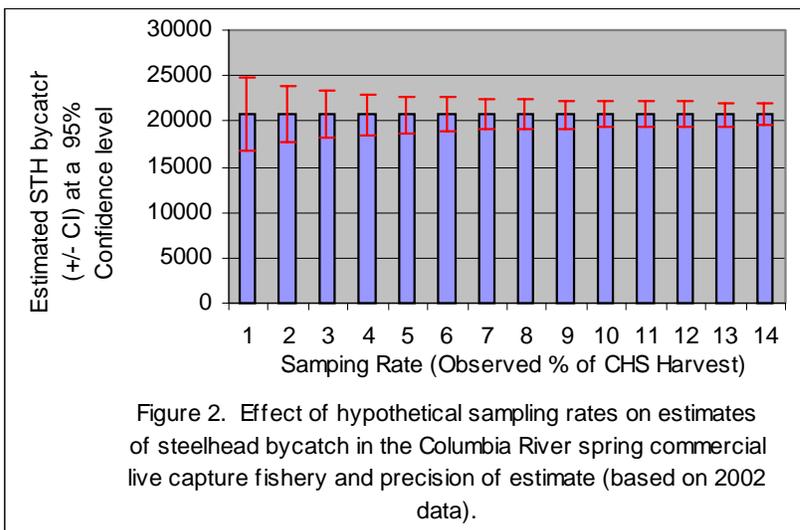
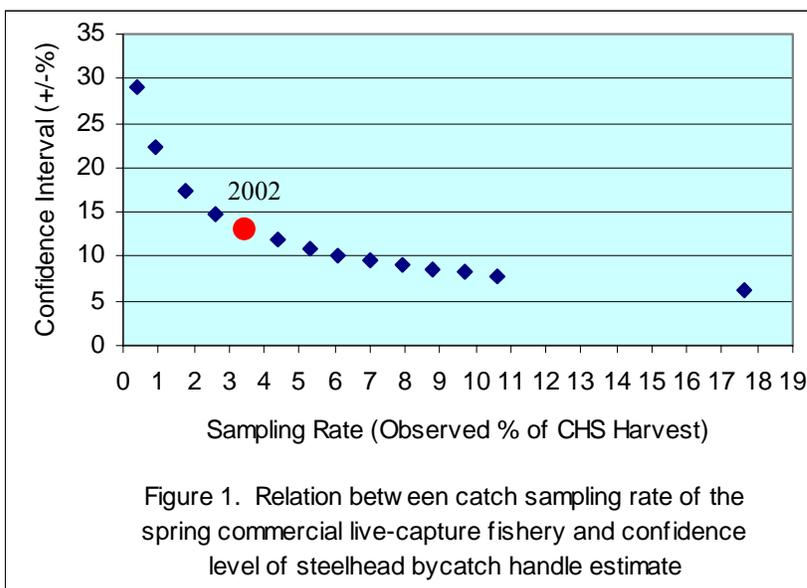
maneuver and locate fishing boats. Sampling efficiency was further reduced since agency boats were not well suited for inclement weather common in the lower Columbia River.

The catch sampling rate (observed ad-marked chinook:landed ad-marked chinook) serves as the basis to estimate cumulative daily or season total fishery bycatch (marked and unmarked steelhead, unmarked chinook, sturgeon, etc.) and to determine precision of estimates of immediate mortality, condition profiles, and physical capture method. Since the number of landed spring chinook is an accurate variable based on daily average fish weights and total poundage landings, this method of estimating bycatch is deemed reliable (corroborated by U.S. v. Oregon Technical Advisory Committee (TAC) in fall 2002). By applying the inverse of daily observed:landed spring chinook ratios to observed catches of each species, the total daily handle of each species by the fishery can be estimated. For example:

$$\text{Daily estimated steelhead handle} = \frac{\text{Daily landed (ad-marked) spring chinook}}{\text{Daily observed (ad-marked) spring chinook}} * \text{Daily observed steelhead handle}$$

In 2002, agency staff observed 3.5% of the saleable catch harvested in the live capture fishery. Although this rate may seem low, analyses of hypothetical sampling rates indicate it was adequate to provide an estimate of the total steelhead handle (sum of daily estimates by fishing zone) within confidence limits of  $\pm 13.0\%$  at a 95% confidence level (Figure 1; Appendix 2). Sampling at rates less than 2% would have resulted in progressively wider confidence intervals. Additional sampling would not change the estimate and would only moderately improve precision of the estimated steelhead handle (20,854 fish of which 8,425 were marked and 12,429 were unmarked) yet require a substantially greater financial outlay (Figure 2).

By addressing some of deficiencies identified during 2002, we expect to increase the catch sampling rate while assuring representative sampling throughout the fishery in 2003. The monitoring program will have access to more suitable boats, which should provide us the ability to observe the portion of the fishery below



Tongue Point, OR on a more regular basis. If the fishery is limited to primarily daylight open periods, effectively concentrating the effort, the efficiency of the monitoring program should improve with similar effort. The overall objective in 2003 will be to observe  $\geq 5\%$  of the landed spring chinook harvest, providing a confidence interval of approximately  $\pm 11\%$  for estimates of unmarked spring chinook and combined steelhead handle.

To determine immediate mortality in 2002, we observed the release of 404 spring chinook and 792 steelhead. Estimated immediate mortality rates within the fishery were 0.7% for spring chinook and 2.0% for steelhead. With these sample sizes, confidence limits of both estimates were  $\pm 1.0\%$  at a 95% confidence level based on the following equation:

$$c = \sqrt{(Z^2 * p * (1-p)) * s^{-1}}$$

where,

- c= desired precision or confidence interval (CI)
- Z= Z value (e.g. 1.96 for 95% confidence level)
- p= percentage (immediate mortality rate)
- s= sample size

This margin of error seems reasonable for this variable so larger sample sizes are not required; however, the anticipated increase in sampling rate during 2003 should result in further precision for this estimate.

### **Concurrent Studies**

In conjunction with this work, the WDFW is continuing a study initiated in 2001 to assess the long-term mortality of spring chinook captured in tangle nets. In 2003, this study will be expanded to include steelhead. Results of this study will be used to determine impact rates of the fishery.

### **Enforcement**

Enforcement of fishery rules and regulations, both specific to this demonstration fishery and general commercial fishing regulations, will be the role of the Oregon State Police and WDFW enforcement officers. The ability of Oregon State Police to enforce regulations within the 2003 tangle net fishery may be reduced from the 2002 level due to state budgetary constraints. The role of observers will be primarily for data collection but they may also help explain regulations and educate fishers in aspects particular to live-capture fisheries. Observers will pass along information on violations to the proper authorities. All staff will have access to a cellular phone to facilitate communication between the observers and enforcement.

### **Dissemination of Results**

Landed catch will be estimated for each fishing period. Catch estimates will be distributed to fishery managers via electronic facsimile and email, and will be posted on ODFW's Columbia River Management web site ([www.dfw.state.or.us/ODFWhtml/InfoCntrFish/InterFish/crm.html#LastFact](http://www.dfw.state.or.us/ODFWhtml/InfoCntrFish/InterFish/crm.html#LastFact)) for access by the general public. Stock-specific catch estimates and impact rates of listed species will be tracked in-season. Summaries of species-specific catch estimates and impacts to listed species will be provided to fishery managers via fact sheets developed for each Columbia River

Compact Hearing. Fact sheets will be posted on ODFW's Columbia River Management web site for public access.

Reports summarizing sampling effort, catch, mark rates, and capture condition profiles based on raw observation data will be prepared and distributed each week. Final reporting of the demonstration fishery analyses and results will be distributed around the end of the year along with results of steelhead and spring chinook long-term survival studies.

Appendix 1. Specific data to be collected in the 2003 commercial tangle net demonstration fishery.

- Environmental Data
  - Area
    - Commercial fishing zone
    - Drift
    - Geographic location
    - River mile
  - Date
  - Surface water temperature
  - Water clarity
  - Tidal stage
- Effort Data
  - Time: layout start/finish, pick start/finish
  - Gear
    - Presence/Absence and type of steelhead excluder (if applicable)
    - Net length
    - Mesh size
    - Number of meshes deep
    - Hang ratio
    - Presence of strings or slackers
    - Fishing depth of net
    - Mesh type
- Recovery Box
  - Single/double
  - Size
- Catch Data
  - Adipose marked chinook: number of adults and jacks
  - Non-adipose marked chinook: number of adults and jacks, condition at capture/release, length of time in recovery box
  - Steelhead: number captured, fin marks present, condition at capture/release, length of time in recovery box
  - Presence of anchor tags and tag number indicating a previously encountered salmonid
  - Physical capture methods<sup>a</sup> of salmonids and estimate of scale loss (if feasible)
  - Other catch: number of sturgeon by species and size groupings, number of other species encountered
- Additional comments will be recorded including marine mammal interactions/loss of catch, problems or specifics of a particular drift, etc.

<sup>a</sup> Tangled: captured anterior of the opercle insertion, clamped: captured so gills are held shut theoretically restricting ventilation, gilled: captured under the operculum, and wedged: captured by the body

Appendix 2. Estimated incidental handle of steelhead (hatchery, wild, and unknown) and associated confidence intervals (at a 95% confidence level) for the 2002 Columbia River commercial live-capture fishery. Each zone-specific estimate is the sum of daily estimates for that area.

Zone	Obs. STH handle (S) <sup>a</sup>	Obs. Marked CHS <sup>a</sup>	Sum (N) <sup>a</sup>	Marked CHS landed	% of season total CHS harvest	% of CHS landings observed	Estimated STH handle <sup>b</sup>	% of season total STH handle	Proportion (P)(P=S/N)	Lower CI of P <sup>c</sup>	Upper CI of P <sup>c</sup>	Weighted Confidence Interval (%) <sup>c</sup>	Lower CI for estimated STH handle	Upper CI for estimated STH handle
Z1	121	62	183	2702	19.1%	2.3%	3417	16.4%	0.6477	0.4704	0.8160	14.1%	2920	3883
Z2	587	303	890	9452	66.7%	3.2%	14053	67.4%	0.6475	0.5203	0.7747	10.0%	12598	15382
Z3	240	134	374	2020	14.3%	6.6%	3384	16.2%	0.6462	0.4658	0.8259	14.8%	2869	3869
Sum	948	499	1447	14174	100.0%	<b>3.5%</b>	<b>20854</b>	100.0%	0.6471	0.4855	0.8055	<b>13.0%</b>	<b>18387</b>	<b>23134</b>
							Observed steelhead mark rate=	40.4%						
							Estimated unmarked steelhead handle=	8425						
							Estimated marked steelhead handle=	12429						
<sup>a</sup> Sum of individual daily zone-specific observations														
<sup>b</sup> Sum of individual daily zone-specific estimates														
<sup>c</sup> Confidence intervals weighted in proportion to the total sample size (daily observed catch/total observed catch).														