

# **TUCANNON EXPANDED PIT TAGGING 2012 ANNUAL REPORT**

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## **Abstract**

Tucannon River summer steelhead and spring Chinook are considered primary populations in the Snake River Basin. Redd counts for summer steelhead in the Tucannon River are limited due to spring-time stream conditions and prevent accurate estimates of adult returns to the river. With the addition of an in-stream PIT Tag array near the Tucannon River mouth, WDFW initiated PIT tagging of natural origin summer steelhead to estimate adult returns to the river. In addition, it has been shown that a portion of the summer steelhead and spring Chinook adult returns from the Tucannon River migrate to, and remain above, Lower Granite Dam. This hydro-system effect on both species needs to be monitored further so managers can decide the most appropriate actions to recover these populations. Specifically, this project expands the current efforts of PIT tagging on summer steelhead and spring Chinook in the Tucannon River, and assists WDFW in the maintenance/operation of the PIT Tag Array.

During the project period, the PIT Tag Array site was maintained with only 10 days lost due to loss of electrical power. While high stream flows were experienced during 2012, all antennas remained in place and are all operational. A total of 16 data files (all species detected) were created and uploaded to the PTAGIS data repository. Other standard maintenance to the PIT Array site was performed. Project staff coordinated the purchase of 3,000 PIT tags for natural origin summer steelhead captured at the WDFW Tucannon River smolt trap. Data from all PIT tagged summer steelhead during calendar year 2012 (2,449) were uploaded to PTAGIS by the end of the project period.

Project staff coordinated the purchase of 10,500 PIT tags from this project, acquired an additional 12,500 PIT tags from the LSRC program, and then contracted Biomark Inc., to PIT tag a total of 23,000 spring Chinook at Tucannon Fish Hatchery. Data from all tagged spring Chinook were uploaded to PTAGIS following release during March/April of 2012.

Project staff worked with BPA staff to ensure environmental compliance needs, quarterly status reports, and a statement of work for 2013 activities, were completed on time or as needed by BPA.

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## Introduction

Tucannon River summer steelhead and spring Chinook are considered primary populations in the Snake River Basin, and both are considered depressed based on estimated numbers of natural origin spawners from WDFW redd counts. However, redd counts (the basis for estimating adult spawners) for summer steelhead in the Tucannon River are limited in scope and effectiveness due to stream conditions (high, muddy) in the spring months. Further, the only permanent fish trapping facility (Tucannon Fish Hatchery) is located 37 miles up the basin, and the natural origin : hatchery origin stock composition is biased because of where hatchery mitigation or conservation steelhead are released in the Tucannon River. Unlike summer steelhead redd surveys, redd count surveys for spring Chinook in the Tucannon are very effective, with redds easily documented and surveyors generally find 25-35% of the spawned carcasses, providing excellent estimates of the natural origin : hatchery origin composition of spring Chinook on the spawning grounds.

Due to the poor success of redd surveys for summer steelhead in the Tucannon River, and the recent addition of a PIT Tag Antenna Array near the mouth of the Tucannon River (originally put in place for a bull trout migratory study in the Tucannon River), WDFW began PIT tagging both hatchery and natural origin summer steelhead smolts migrating out of the Tucannon River. The hatchery origin steelhead rear at Lyons Ferry Hatchery, and consists of both a non-native harvest mitigation stock (these releases were discontinued in 2010), and a within basin stock currently used for conservation purposes, but in the future will consist of both a conservation and harvest mitigation component. The purpose for implanting the PIT tags in the three steelhead groups were to estimate adult returns and survival rates (smolt-to-adult) to the Tucannon River. WDFW would rely on PIT tag detection systems at the mainstem dams and at the mouth of the Tucannon River to accomplish this task. This same technique could also be applied to the spring Chinook, though it's not as necessary since redd surveys are successful in providing spring Chinook adult return estimates.

However, from previous WDFW PIT tagging efforts of both summer steelhead and spring Chinook (natural and hatchery origin) in the Tucannon River, it has been shown that a portion of both species, and all origins, migrate past the mouth Tucannon River, pass Lower Granite Dam and remain upriver through the spawning season (Bumgarner et al. 2011, Gallinat et al 2011). This hydro-system effect on summer steelhead and spring Chinook from the Tucannon River is poorly understood and needs to be monitored further so managers can decide the most appropriate actions to recover these populations in the Tucannon River. The impact on the migratory/spawning behavior of hatchery origin summer steelhead and spring Chinook is problematic as well as it leads to these fish straying into other tributaries, and the undesirable

consequence of confounding healthy stock rebuilding and recovery efforts pursuant to the Endangered Species Act.

This project will continue to expand the current efforts of PIT tagging on natural origin summer steelhead and hatchery origin spring Chinook smolts in the Tucannon River, and assist in the maintenance/operation of the PIT Tag Array at the mouth of the Tucannon.

Based on the number of fish tagged for each species and expected smolt-to-adult survivals, WDFW estimates that between 40-60 adults will return from each release group over the two (steelhead) or three (spring Chinook) year return cycle. These data, and especially for fish returning to the Tucannon River, will provide the basis for monitoring the status of the depressed steelhead population over time, and for assessing the straying of summer steelhead and spring Chinook from the Tucannon River to areas above Lower Granite Dam.

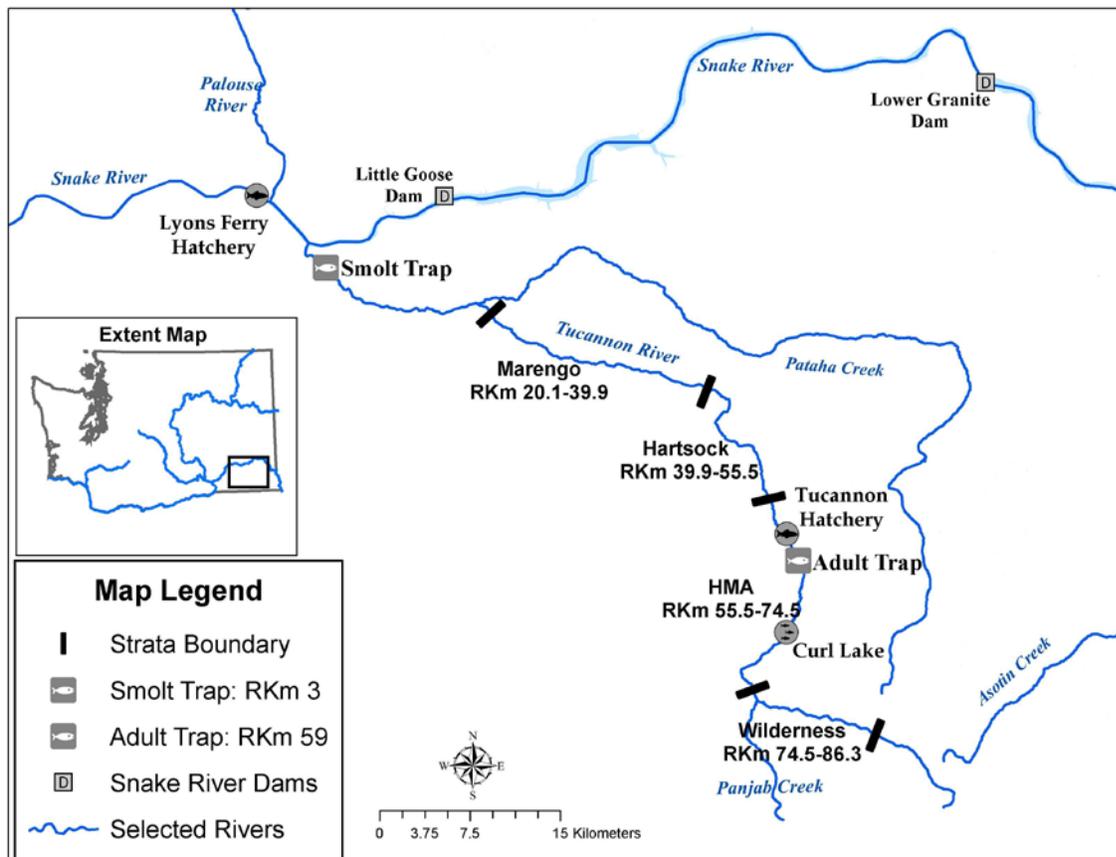
The Objectives of this project are:

- 1) Maintain/Operate Tucannon River PIT Tag Array
- 2) Purchase 12,500 PIT tags annually for Tucannon River Hatchery Origin Spring Chinook and have the fish tagged. For 2012, this number was reduced to 10,500 PIT tags as the Biomark tagging costs increased and the budget was limited.
- 3) Purchase 3,000 PIT tags annually for natural origin summer steelhead to be tagged at the Tucannon River smolt trap
- 4) Administer the BPA contract.

This project supports BPA funded Fish and Wildlife Program Strategies by providing data to monitor the status and trends of ESA listed fish populations within the Tucannon River and to assess their potential straying effect on other listed Snake River populations. This project indirectly supports BiOp RPA #40.2 (Implementation of Tucannon Endemic Steelhead Program). WDFW has begun implementation of the Tucannon Endemic Steelhead Program (BPA# 2010-050-00), which will eventually increase the number of hatchery endemic stock fish into the Tucannon River for conservation and harvest mitigation purposes. Part of the monitoring and evaluation encompassed in this program is to assess the hatchery effects on the natural population of steelhead within the Tucannon River. By PIT tagging natural origin summer steelhead, and using PIT Tag Arrays to describe their returns to river, hatchery endemic stock effects to the natural population may be determined.

## Description of Project Area

The Tucannon River empties into the Snake River between Little Goose and Lower Monumental Dams approximately 622 river kilometers from the mouth of the Columbia River (Figure 1). Stream elevation rises from 150 m at the mouth to 1,640 m at the headwaters (Bugert et al. 1990). Total watershed area is approximately 1,295 km<sup>2</sup>. Local habitat problems related to logging, road building, recreation, and agriculture/livestock grazing have limited the production potential of both summer steelhead and spring Chinook in the Tucannon River, though many of these issues are currently being addresses through various habitat conservation programs. Land use in the Tucannon watershed is approximately 36% grazed rangeland, 33% dry cropland, 23% forest, 6% WDFW, and 2% other use (Tucannon Subbasin Summary 2001). The PIT Tag array is currently located approximately ¼ mile below the smolt trap where the natural-origin summer steelhead are tagged and released, which is located approximately 1.7 miles above the mouth of the Tucannon River. Hatchery origin spring Chinook are tagged at the Tucannon Fish Hatchery, and eventually released from Curl Lake Acclimation pond after two months of acclimation time.



**Figure 3. Location of the Tucannon River, and Lyons Ferry and Tucannon Hatcheries within the Snake River Basin (Gallinat et al. 2010).**

**Objective 1: Maintain/Operate Tucannon River PIT Tag Array:** *This project will assist WDFW in the operation/maintenance of the lower Tucannon River PIT tag array. Specifically, this project will purchase approximately 550 gallons of propane to provide electrical power for the PIT Tag array, provide staff time to download/upload collected PIT tag data from the array to PTAGIS, and provides some minor maintenance costs associated with replacement antennas if needed, or MUX repair.*

During the project period, WDFW staff operated and maintained the lower Tucannon River PIT Tag array (Photo 1). Propane bottles were filled as needed. There was only a limited time during the year when power was lost due to running out of propane. This down time equated to approximately 11 days without power. Generally, each time propane bottles were re-filled, project staff also downloaded stored data from the Array. During the project period, 16 data files (approximately 3.3 weeks/download period) comprising all fish species detected were created and uploaded to the PTAGIS data repository.



**Photo 1. Lower Tucannon River PIT Tag Array as redeployed in 2010. Three 15ft antennas that quit working were replaced during the summer of 2011 with 20ft antennas. The array now spans from shoreline to shoreline with three rows.**

During PIT Tag Array sites visits, project staff would check how each individual antenna was working and report any problems. While we experienced very high stream flows during the spring of 2012 in the Tucannon River, all six antennas remained in place, though sometimes an antenna cable would become disconnected. These were documented, with cables re-attached when stream flows resided and it was safe for staff to enter the river. The current antenna configuration provides 100% coverage of the stream channel, and consists of three rows of antennas, maximizing our ability to detect fish with PIT Tags. All antennas are currently working to normal parameters.

**Objective 2: PIT Tag Tucannon River Hatchery Origin Spring Chinook:** *This project will purchase 12,500 PIT tags annually (reduced to 10,500 in 2012) for hatchery origin spring Chinook tagging at the Tucannon FH prior to release of smolts. This project will also provide the funds to contract with Biomark, Inc. to insert the PIT Tags into the spring Chinook smolts at the Tucannon Hatchery prior to release.*

During the project period, WDFW arranged with BPA to purchase 10,500 PIT tags that would be inserted into hatchery origin Tucannon River spring Chinook at the Tucannon Fish Hatchery. This amount reflects a decrease in the original goal of tags, but had to be done to balance the budget for the project. In addition, WDFW obtained an additional 12,500 PIT tags from the U.S. Fish and Wildlife Services' Lower Snake River Compensation Plan (LSRCP) program. In total, 23,000 spring Chinook would be tagged prior to release in 2012.

Due to the location and when the spring Chinook needed to be tagged at the Tucannon Fish Hatchery, it was decided that Biomark Inc. would perform the actual tagging of the fish. WDFW and Biomark reached an agreed tagging cost and Biomark performed the tagging in January 2012. Tagging operations went as planned. As part of their regular tagging activities, Biomark collected a length from nearly every fish tagged, and this data was provided to WDFW (Figure 2). The bi-modal length distribution in Figure 2 is due to a size at release study as part of the LSRCP program. This size at release study was concluded with fish released in 2012.

At the conclusion of tagging activities, Biomark provided the necessary data files to WDFW for uploading into PTAGIS. These files were uploaded after the total release of fish from Curl Lake occurred and mortalities were removed from the tagging files. All subsequent data analysis provided from these PIT Tag groups (either as juvenile out-migrants or as adult returns) will be conducted by WDFW, funded under the LSRCP program, and will be provided in LSRCP Annual Progress Reports or other forums.

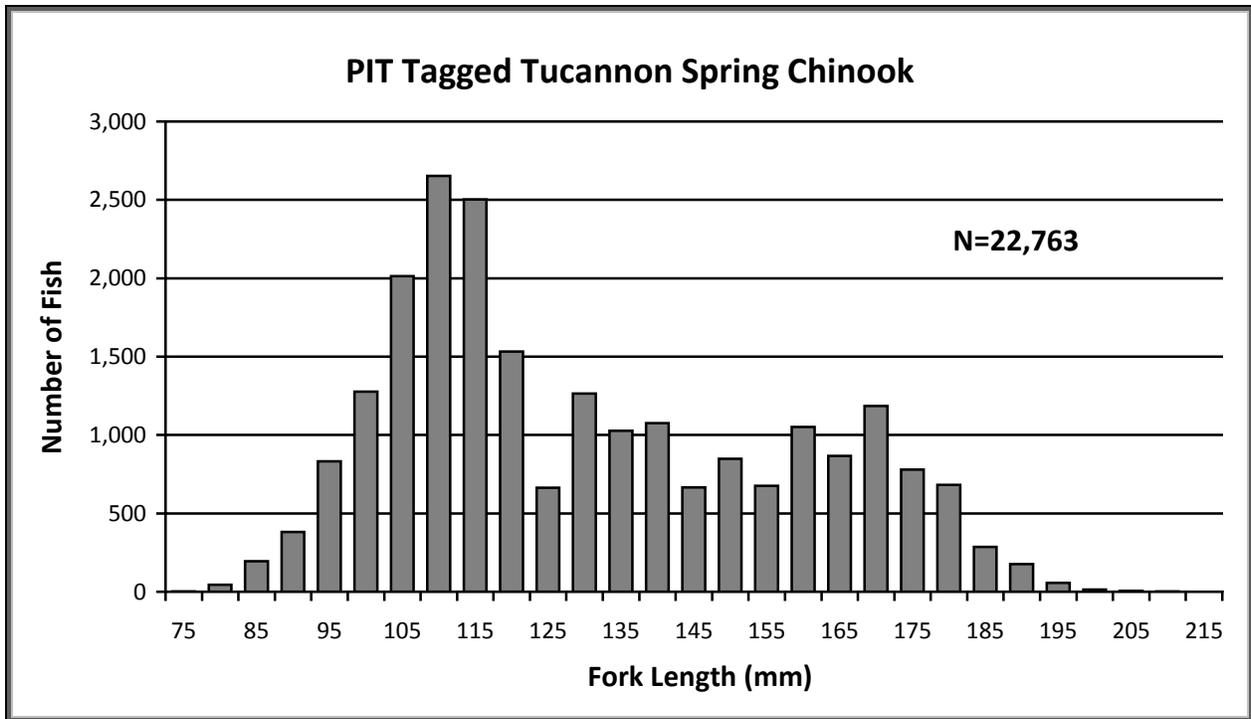


Figure 4. Length frequency distribution of hatchery origin Tucannon River spring Chinook salmon tagged at the WDFW Tucannon Hatchery, January 2012.

**Objective 3: PIT Tag Tucannon River Natural Origin Summer Steelhead:** *This project will purchase 3,000 tags annually for summer steelhead tagging at a smolt trap operated by WDFW.*

During the project period, WDFW arranged with BPA to purchase 3,000 PIT tags that would be inserted in the natural origin Tucannon River summer steelhead at the Tucannon River smolt trap. The Tucannon River smolt trap is operated and maintained by WDFW staff and funded under the LSRC program to describe the smolt migrations of spring and fall Chinook, and summer steelhead from the Tucannon River. Tagging of summer steelhead at the smolt trap during 2012 went as planned, and many of the 3,000 PIT tags were used (2,449). A total of 53 different tagging files containing natural origin summer steelhead were created and uploaded to the PTAGIS database in 2012. As part of WDFW standard smolt sampling, staff collected a length from nearly every summer steelhead tagged (Figure 3). The majority of the fish tagged are from the spring months (Table 1), which also generally produce the largest size of the migrants. Trapping does not occur from July to September due to the lack of fish migration during this time period.

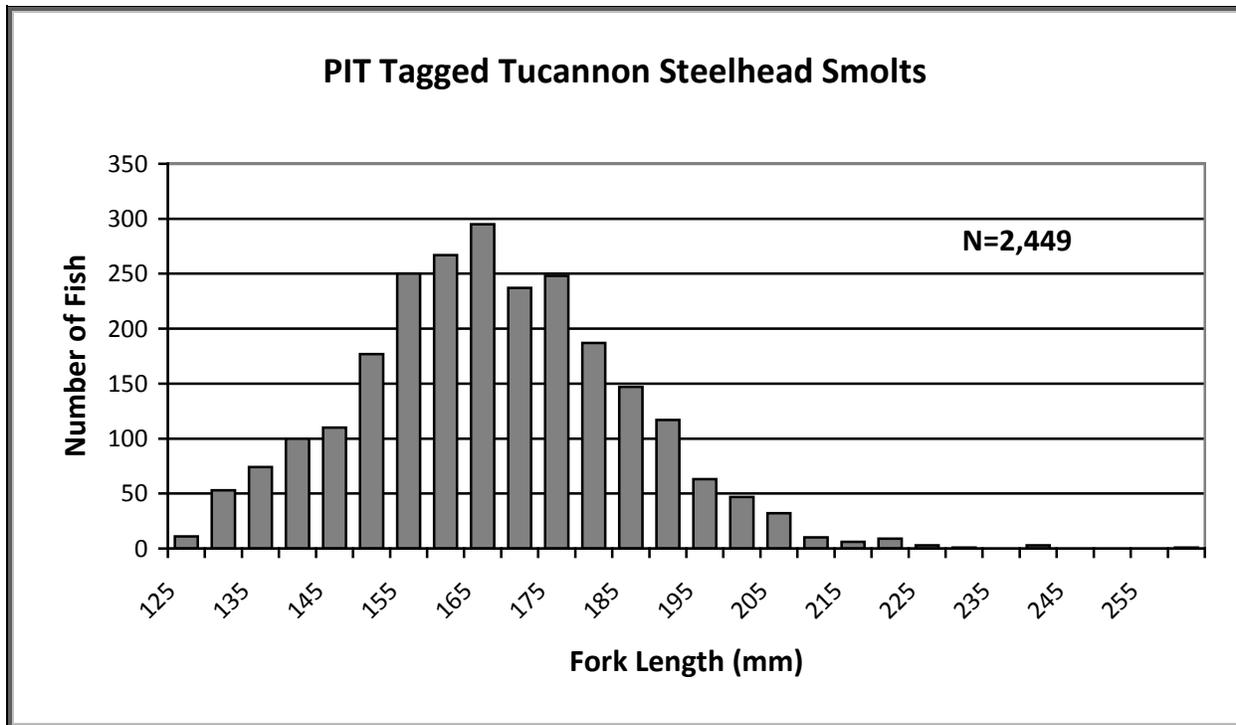


Figure 5. Length frequency distribution of natural origin Tucannon River summer steelhead tagged at the WDFW Tucannon River Smolt Trap, calendar year 2012.

Table 2. Number of natural origin summer steelhead PIT tagged in 2012 and mean length of smolt by month.

Month	Number of fish tagged	Mean length of fish tagged
January	49	147.8
February	20	156.0
March	27	170.1
April	537	173.4
May	1306	165.6
June	100	168.0
July-September	No Trapping Conducted	
October	4	141.3
November	77	153.1
December	328	149.1

As previously mentioned, operation/maintenance of the Tucannon River smolt trap is funded under the LSRCP program through the USFWS. Therefore, the actual tagging and uploading of the PIT tag data from the steelhead smolts is funded under the LSRCP. All subsequent data analysis provided from these PIT Tag groups (either as juvenile out-migrants or as adult returns) will be conducted by WDFW funded under the LSRCP program or BPA project 2010-050-00 (Tucannon River Endemic Steelhead Supplementation Program), and will be provided in future LSRCP Annual Progress Reports, BPA Annual Reports for 2010-050-00, or other forums.

**Objective 4: Administer the BPA Contract:** *Project staff worked with BPA staff to ensure environmental compliance needs, quarterly status reports, and a statement of work for 2013 activities, were completed on time or as needed by BPA.*

Project staff provided the necessary documentation/communication with BPA environmental compliance staff to ensure ESA coverage was provided for proposed activities that might cause “take” of listed species within the Tucannon River.

Project staff completed quarterly status reports on time and provided budget accruals as needed for proper budget management. Staff also worked with the BPA COTR to complete a budget request and Statement of Work for FY2013 activities. Staff procured the order of PIT tags for 2013 needs with BPA and PSMCF PIT tag requisition staff, and coordinated the contract with Biomark Inc for spring Chinook PIT tagging activities set to occur in early January 2013.

During the contract year, a new system for reporting RM&E Metadata was created ([monitoringmethods.org](http://monitoringmethods.org)), where protocols/designs/methods for each BPA funded project are published. Protocols for this particular project were reviewed, but none have been reported as “published” to [monitoringmethods.org](http://monitoringmethods.org). However, nearly all of the funds for this project are directed at purchasing PIT tags or PIT tagging services from Biomark, Inc.; the need for a specific sampling protocol is limited in scope, and is likely not required.

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