**DRAFT Programmatic Issue:**

**PIT-tag and Other Tagging Projects**

**Issue:** The ability to mark and tag fish is one of the most important and useful techniques available to fishery managers and researchers. Tagging of salmon, steelhead and other fish species using Passive Integrated Transponder (PIT) tags, as well as use of active tags such as acoustic and radio telemetry, is a key tool for monitoring and evaluating both juvenile and adult salmon passage from headwater rearing areas through the mainstem hydropower projects, into the ocean, and back to the spawning grounds. Both passive and active tags are used in a wide array of research, monitoring and evaluation (RM&E) projects throughout the Columbia Basin. Fish tagging projects utilizing both passive and active tags are funded under the Council’s Fish and Wildlife Program, the 2008 FCRPS Biological Opinion, the Fish Accords, various Habitat Conservation Plans, the Corps-sponsored Anadromous Fish Evaluation Program (AFEP), and state salmon and steelhead recovery efforts. Collectively, these programs utilize either active or passive tags (or both) to monitor the status of fish populations, evaluate the effectiveness of various management actions, and resolve critical uncertainties in recovery strategies.

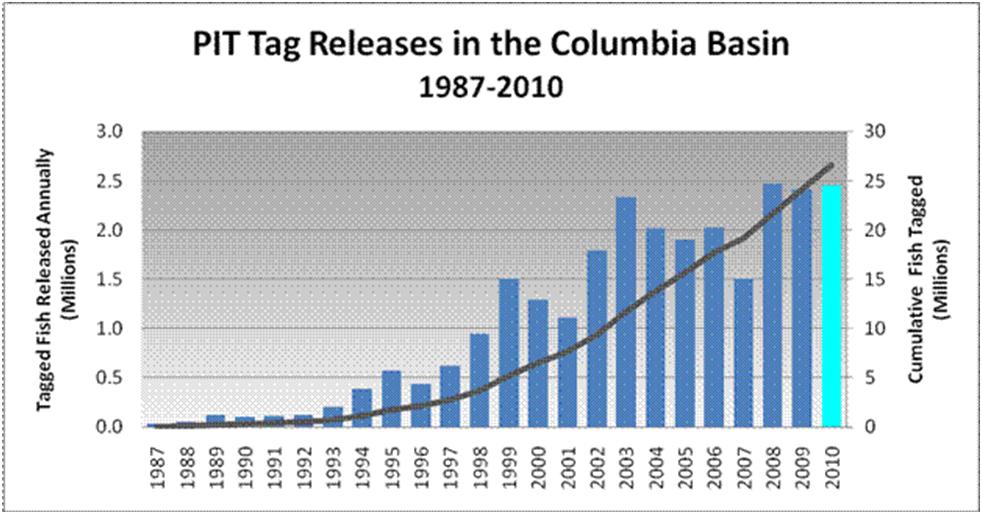
One issue that has been raised is whether all these tagging efforts are well coordinated so that we have a comprehensive monitoring and evaluation program addressing the critical data gaps or uncertainties, and that tags, data and results are being shared among sponsors in such a way to adaptively manage future work? A secondary issue pertains to the status of the data collected to date, and what does it tell us? Total three-year average funding proposed for all tagging projects in this programmatic topic area for FY 2012-2014 is approximately $15 million (Table 1).

**Background and Staff comments:**

Tagging projects give fishery managers the ability to measure fish survival and travel time from headwater rearing areas through the mainstem Columbia and Snake rivers and into the Pacific Ocean. Moreover, due to their long tag life, PIT-tag projects can also monitor adult salmon and steelhead migration timing and survival during upstream migration past the mainstem hydropower projects to the spawning grounds, e.g., ability to obtain salmon life-cycle metrics such as smolt-to-adult return rates. In the Basin-level Biological Objectives section on p. 11 of the Council’s Fish and Wildlife Program, we state one of our objectives related to anadromous fish losses is to “Halt declining trends in Columbia River Basin salmon and steelhead populations, especially those that originate above Bonneville Dam…” and “Significantly improve the smolt-to-adult return rates (SARs) for Columbia River Basin salmon and steelhead, resulting in productivity well into the range of positive [2-6 percent] population replacement.”

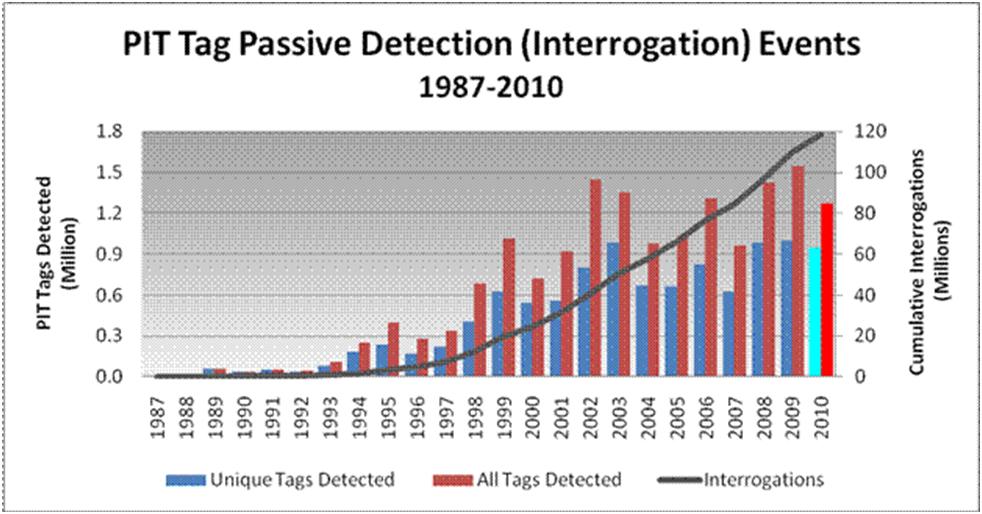
The Adult Fish Passage section on pp. 46-47 of the Program states “emphasis should be placed on research, monitoring and evaluation …” and “installation of PIT-tag and radio-tag detectors.” In particular, the Program says to “install PIT-tag detectors at key mainstem projects and/or near the mouths of major tributaries…” and “utilize known-origin PIT-tagged fish to evaluate adult survival (conversion rates) through key reaches of the mainstem Snake and Columbia rivers.”

The use of PIT tags in the Columbia River Basin has grown steadily (Figure 1). Almost 2.5 million fish have been tagged and released each year during 2008 and 2009, and the same, or an increase in, marking effort is anticipated for 2011 and future years.



**Figure 1**.  Annual and cumulative numbers of PIT-tagged fish released in the Columbia Basin. Source: PSMFC.

 PIT-tag interrogation events generally exhibit the same increasing annual trend as the corresponding tagging events (Figure 2).  Over one million PIT-tagged fish have been detected each year since 2008.  Salmon and steelhead smolts account for over 99% of the tags detected.  On average, each PIT-tagged fish is detected at 1.5 interrogation sites (including smolt bypass facilities, hatchery and acclimation ponds, adult fish ladders, and in-stream monitoring arrays).  As the PIT-tag marking effort in the Columbia Basin increases, so will the number of tags detected.



**Figure 2**. The annual numbers of PIT-tagged fish detected, and the cumulative number of individual antenna interrogations. Smolts detected at transportation sites are generally returned to the river, and thus can be detected again at a downstream site. Source: PSMFC.

**ISRP Comments:** The Fish and Wildlife Program’s suite of tagging projects address the need for monitoring and evaluating hydrosystem passage of upriver salmon and steelhead stocks, and PIT-tag projects can provide salmon life-cycle data, e.g., SAR information. In its overall review of the various Hydrosystem RM&E projects, the ISRP found that, as a group, the projects addressed “most of the Council’s questions regarding major program management questions and associated HLIs. [The projects] were also responsive to 2008 BiOp RPAs. In addition, the ISRP did not find excessive overlap of objectives or duplication of data collection among the [mainstem] group of projects.”

The ISRP also did not find any priority Fish and Wildlife Program data gaps, which includes route-specific passage survival, in the suite of mainstem RM&E projects. This is primarily because the Corps of Engineers’ AFEP projects provide detailed study data such as route-specific passage survival at individual mainstem hydropower dams, as well as other significant survival and fish performance testing concerning juvenile and adult salmonid hydrosystem passage. Specifically, the Corps of Engineers is funding and implementing 11 dam passage or transportation-related RM&E projects through its Columbia River Fish Mitigation Program (CRFM) at a total cost of over $17 million in FY 2011. See page 6 for a list of the Corps-funded AFEP projects for 2011 which are using PIT or other fish tags.

The ISRP also noted “the life history-related projects in the [mainstem] group also provide important information on Lower Snake River salmonids,” which include the following projects:

1. PIT-tagging wild spring/summer Chinook salmon—population status monitoring, migration characteristics, and tributary habitat conditions (project 1991-028-00);
2. RM&E of emerging issues and measures to recover Snake River fall Chinook salmon-- population status monitoring, migration characteristics, and both hydrosystem and hatchery critical uncertainties (projects 1991-029-00 and 2002-032-00); and
3. Characterizing migration and survival for juvenile Snake River sockeye salmon between upper Salmon River Basin and Lower Granite Dam (project 2010-076-00).

A concern noted by the ISRP was that “emerging evidence indicates PIT-tagged salmon can shed their tags at very high rates … and that tag loss may vary considerably depending on hatchery and time since tagging.” Unaccounted tag loss could “lead to underestimating survival,” particularly SARs, and variable tag loss could “potentially confound experiments that rely on tag recovery rates and minimal measurement error.”

Staff notes that tagging effects are not a new issue. Effects of PIT-tagging were extensively studied and documented by NOAA scientists during development of the PIT-tag technology in the 1980s and 1990s. In sum, the NOAA studies raised some concern about tag retention in adult female salmon that were mature and near spawning. The studies also showed some effects on fish growth related to the presence of PIT-tags, although not consistently. NOAA concluded that any type of fish tagging is likely to reduce survival compared to untagged fish, and they speculated that PIT-tagging could reduce survival to adulthood by 5-10 percent. These studies also recommended that tagged fish be held for a month or more after marking to reduce effects on post-tagging SARs, a recommendation which has been implemented by most Program studies using PIT tags.

Staff also notes that two treatment survival studies (e.g., studies with test and control releases) using PIT-tagged fish would not likely be biased by unaccounted tag loss since both treatment groups should experience a similar rate of tag loss. In addition, any tag bias associated with long-term monitoring and survival projects such as the smolt monitoring program (project 1987-127-00), the Comparative Survival Study (CSS project 1996-020-00) and survival estimates for fish passage through Snake and Columbia river dams and reservoirs (project 1993-029-00) should be minimized when making inter-annual data comparisons, as tag loss should be similar from year-to-year. However, survival results from these studies should be considered conservative, or *minimum* survival rates due to the potential for tag loss.

**ISRP Suggestions:**

The ISRP recommended additional “experimental approaches like NOAA’s delayed mortality project (project 2003-041-00) could help address some of the key uncertainties associated with hydrosystem passage through the four lower Snake River dams. This type of work should be explored further and expanded.”

The ISRP called for more effort “to identify tagging techniques to minimize PIT-tag loss and to account for variable tag loss.” As noted above, PIT-tagging protocols have been developed and are being used in the Columbia Basin to minimize tag loss. The ISRP also recommended “a sensitivity analysis be conducted to assess how tag loss can bias and alter survival estimates related to hydrosystem passage RM&E. This recommendation is largely consistent with language in the Fish and Wildlife Program which states “the [study] metrics selected should minimize the risk to wild fish from tagging and handling.” Accordingly, a sensitivity analysis could be conducted to assess how tag loss can bias or alter survival estimates related to hydrosystem passage RM&E.

The ISRP also suggested a need for “an ecosystem program centered on the reservoirs and estuary… and a need to “link the inter-relationships between all the major species (salmonids, sturgeon, lamprey, pikeminnow, shad, cyprinids and others)” with a food web focus. Staff notes that such a program would need to be carefully designed to ensure it produced results of direct use to managers. The ISRP suggested some of the key elements that could be addressed in a food web synthesis include “invasive species (particularly shad), food and space limitations/competition, and predation in the context of depensatory mortality, perhaps in an umbrella type project examining hydrosystem spill and transport survival estimates through the reservoirs and estuary.”

**Relation to Council Questions**

The Council formed several policy issues as questions in July 2010. The projects within this programmatic area are typically well-defined for the purposes of addressing objectives relative to the Fish and Wildlife Program needs. PIT and other tagging projects provide information pertaining to migration and survival of both juvenile and adult salmonids through the mainstem hydropower system, provide key life history information on Snake River salmonids, and can also address HLIs by providing SAR data for those tributaries with PIT-tag detectors. As a rule, these tagging projects are well coordinated with tagging projects elsewhere in the basin, e.g., they are implemented in an integrated, cost-effective manner.

For example, marked fish utilized in the CSS project 1996-020-00 and project 1993-029-00 may be from groups PIT-tagged specifically for those projects or from marked groups planned for other research studies. Wherever possible, the CSS project uses mark groups from other research projects and coordinates with other marking programs to meet CSS tagging requirements to reduce costs and handling of fish. To that end, the CSS project has a history of regional collaboration and is currently cooperating with numerous other agencies in the PIT-tagging of smolts. For example, all of the smolts marked and pre-assigned during the 2010 migration year are outlined in Tables 2-4.

The CSS and other tagging projects will continue coordination efforts to avoid redundancy and save costs as recommended by the ISAB/ISRP reviews (2007 and 2009). Collaboration on tagging Snake River Basin hatchery fish in recent years includes those with the marking programs of the Lower Snake River Compensation Plan. Specifically, this includes Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife (Table 2). The CSS project has also collaborated with Idaho Power Company (IPC) and the U.S. Fish and Wildlife Service (USFWS).

The Program’s tagging projects also address most of the Council’s questions regarding major Program management questions and associated HLIs, and are also responsive to 2008 Biological Opinion RPAs. In addition, there is little overlap of objectives or duplication of data collection among the group of tagging projects. Data from all the PIT-tag projects is submitted into the PITAGIS (project 1990-080-00) open source information and data base system, which manages all the Columbia Basin’s PIT-tag mark/detection event data. Finally, these tagging projects are providing the region with important data sets in terms of monitoring the status of fish populations, evaluating the effectiveness of management actions, and resolving critical uncertainties in recovery strategies.

**Possible Options:**

1 – Recommend continued funding of the PIT and other tagging projects for a period of five years.

2 – Recommend two years of continued funding of all of the PIT and other tagging projects conditional on completion of the 2013 NMFS BiOp check-in report, development of a regional PIT tag plan and completion of the review of LSRCP hatcheries. Make any adjusted funding recommendations by the end of FY 2013.

3—**(Staff preferred)** Except for projects 2003-041-00, 1991-029-00 and 2002-032-00, recommend continued funding of the PIT and other tagging projects for a period of five years. Recommend funding for project 2003-041-00 through FY 2014, as this project is in process of collecting adult return data from the transport study and should be completed by then. Recommend two years of continued funding for projects 1991-029-00 and 2002-032-00 conditional on completion of the 2013 NMFS Biological Opinion check-in report and the review of LSRCP fall Chinook salmon hatcheries.

**Table 1--List of tagging projects included in this programmatic issue:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Project #** | **Project Title** | **Sponsors** | **F&WL**  **Program** | **BiOp/**  **Accord** | **Funding Req. Annual**  **FY 2012-2014** |
| 1983-  319-00 | Development and Evaluation of Fish-Tracking Technologies | NOAA-NWFSC | X | BiOp | $ 892,541 (FY 2012)  $1,090,820 (FY 2013)  $ 274,925 (FY 2014)  *$ 752,762 (3-yr. avg.)* |
| 2001-  003-00 | Installation and Evaluation of Established PIT-tag Technologies | NOAA and Pacific States Marine Fisheries Commission (PSMFC) | X | BiOp | $ 280,681 (FY 2012)  $2,168,331 (FY 2013)  $2,648,616 (FY 2014)  *$1,699,209 (3-yr. avg.)* |
| 1990-  080-00 | Columbia Basin PIT-Tag Information System (PITAGIS) | PSMFC | X | BiOp | *$2,615,000 (FY 2011)* |
| 1987-  127-00 | Smolt Monitoring by Non-Federal Entities | Fish Passage Center et al. | X | BiOp/  Accord | $2,520,475 (FY 2012)  $2,583,487 (FY 2013)  $2,648,074 (FY 2014)  *$2,584,012 (3-yr. avg.)* |
| 1996-  020-00 | Comparative Survival Study (CSS) | Fish Passage Center et al. | X | BiOp/  Accord | $1,344,880 (FY 2012)  $1,378,502 (FY 2013)  $1,412,965 (FY 2014)  *$1, 381,782 (3-yr. avg.)* |
| 1993-  029-00 | Survival Estimates for Passage of Juvenile Salmonids through Snake and Columbia River Dams and Reservoirs | NOAA-NWFSC | X | BiOp | $2,720,444 (FY 2012)  $2,744,927 (FY 2013)  $2,769,633 (FY 2014)  *$2,745,001 (3-yr. avg.)* |
| 2003-041-00 | Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon thru Snake River Dams | NOAA-NWFSC |  | BiOp | $ 71,683 (FY 2012)  $ 72,328 (FY 2013)  $ 72,979 (FY 2014)  *$ 72,330 (3-yr. avg.)* |
| 1991-028-00 | PIT-Tagging Wild Snake River Spring/Summer Chinook | NOAA-NWFSC | X | BiOp | $ 486,488 (FY 2012)  $ 490,867 (FY 2013)  $ 495,284 (FY 2014)  *$ 490,880 (3-yr. avg.)* |
| 2008-518-00 | Upstream Migration Timing | CRITFC | X | BiOp/  Accord | $ 296,145 (FY 2012)  $ 303,549 (FY 2013)  $ 311,137 (FY 2014)  *$ 303,610 (3-yr. avg.)* |
| 1991-029-00 | Research, Monitoring and Evaluation of Emerging Issues and Measures to Recover SR Fall Chinook Salmon ESU | USFWS/USGS | X | BiOp | $ 534,112 (FY 2012)  $ 534,112 (FY 2013)  $ 534,112 (FY 2014)  *$ 534,112 (3-yr. avg.)* |
| 2010-076-00 | Characterizing Migration and Survival for Juvenile Snake River Sockeye Salmon between the Upper Salmon River Basin and Lower Granite Dam | IDFG/NOAA | X | BiOp | $1,030,306 (FY 2012)  $1,038,039 (FY 2013)  $1,045,863 (FY 2014)  *$1,038,069 (3-yr. avg.)* |
| 2002-032-00 | Snake River Fall Chinook Salmon Life History Investigations (using otolith microchemistry) | USGS/USFWS/PNNL/  IDFG/NOAA | X | BiOp | $ 975,000 (FY 2012)  $ 815,370 (FY 2013)  $ 815,370 (FY 2014)  *$ 868,580 (3-yr. avg.)* |
|  | ***FY 2012-2014 Total Average*** |  |  |  | ***$15,085,347 est’d.*** |

Following are the Corps-funded fish tagging and passage-related projects under AFEP for FY 2011:

1. Lower Columbia River Biological Opinion Dam Passage Performance Testing (using acoustic tags); COE study codes SPE-P-10-1, SPE-P-10-2, SPE-P-08-3; total study cost is $13.3 million; implementing agency is PNNL.
2. Survival Study Methodologies—JSATS Transmitter Downsizing; COE study code SPE-P-06-2; study cost is $708,000; implementing agency is PNNL.
3. Survival Study Methodologies—JSATS Data Processing Software; COE study codes SPE-P-10-1, SPE-P-10-2 and SPE-P-08-3; cost is $400,000; implementing agency will be PNNL.
4. Survival Study Methodologies—JSATS Tag and Tagging Effects (lab study only); COE study code SPE-P-06-4; study cost is $500,000; implementing agency is PNNL.
5. Development of Standard Protocols for Tagging Juvenile Pacific Lampreys with PIT-tags or other tags; COE study code LMP-08-2; study cost is $110,000; implementing agency is USGS.
6. Snake River Adult Sockeye Salmon Survival/Transportation Study; COE study code n/a; estimated study cost is $300,000; implementing agency may be U. of Idaho.
7. Lower Snake River Biological Opinion Dam Passage Performance Testing (using acoustic tags); COE study code n/a; study has a funding placeholder of about $500,000; implementing agency may be PNNL.
8. Snake River Fall Chinook Salmon Transport Studies; COE study code TPE-W-04; study cost is $1.4 million; implementing agency is NOAA-NWFSC.
9. Study to Determine the Seasonal Effects of Transporting Snake River Spring Chinook Salmon and Steelhead; COE study code TPE-W-04; study cost is unknown; implementing agency is NOAA-NWFSC.
10. Identifying Overwintering Locations of Snake River Fall Chinook Salmon (otolith study); COE study code TPE-W-11-2; study cost is $136,000; implementing agencies are NOAA-NWFSC, U. of Idaho and USFWS.
11. Juvenile Snake River Sockeye Salmon Transportation Evaluation; COE study code TPE-W-10-1; study cost is unknown; implementing agency is NOAA-NWFSC.

**Preliminary Recommendations:**

Except for projects 2003-041-00, 1991-029-00 and 2002-032-00, staff recommends continued funding of the PIT and other tagging projects for a period of five years. Staff recommends funding for project 2003-041-00 only through FY 2014, as this project is in process of collecting adult return data from the transport study and should be completed by then. Staff recommends funding through FY 2013 for projects 1991-029-00 and 2002-032-00, conditional on completion of the 2013 NMFS BiOp check-in report and the review of LSRCP hatcheries.

Table 2. Snake River hatchery groups marked during 2010 that have all or part of their PIT-tags provided by the CSS project. Many groups have tags cooperatively provided the CSS project and/or other entities. The hatchery, species, tag funding sources and tag totals are shown for each. Through cooperative efforts, tagging pre-assignments are carried out by either the CSS project or the other associated agencies.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **PIT-Tag Funding Source1** | | | | | |  |
| **SR Hatchery** | **Species** | **IDFG / LSRCP** | **CSS** | **IPC** | **ODFW / LSRCP** | **USFWS** | **WDFW / LSRCP** | **Total PIT-tags** |
| Rapid River | Chinook |  | 32,000 | 20,000 |  |  |  | 52,000 |
| McCall's | Chinook | 20,000 | 32,000 |  |  |  |  | 52,000 |
| Clearwater | Chinook | 51,000 | 21,800 |  |  |  |  | 72,800 |
| Pahsimeroi | Chinook |  | 6,400 | 15,000 |  |  |  | 21,400 |
| Sawtooth | Chinook | 15,000 | 6,400 |  |  |  |  | 21,400 |
| Magic Valley | Steelhead | 24,600 | 10,400 |  |  |  |  | 35,000 |
| Hagerman | Steelhead | 19,000 | 8,100 |  |  |  |  | 27,100 |
| Niagara Springs | Steelhead |  | 22,300 | 6,000 |  |  |  | 28,300 |
| Clearwater | Steelhead | 16,800 | 7,000 |  |  |  |  | 23,800 |
| Lookingglass (Imnaha AP) | Chinook |  | 21,000 |  |  |  |  | 21,000 |
| Lookingglass (Catherine AP) | Chinook |  | 21,000 |  |  |  |  | 21,000 |
| Irrigon (Grande Ronde, Imnaha) | Steelhead |  | 14,000 |  | 31,400 |  |  | 14,000 |
| Dworshak | Chinook |  | 52,000 |  |  |  |  | 52,000 |
| Dworshak | Steelhead |  | 9,000 |  |  | 19,900 |  | 9,000 |
| Lyon's Ferry (Cottonwood AP) | Steelhead |  | 2,000 |  |  |  | 6,000 | 2,000 |
| **Grand Total** |  | 146,400 | 265,400 | 41,000 | 31,400 | 19,900 | 6,000 | 452,800 |

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| 1 Agencies are Idaho Department of Fish and Game (IDFG), Idaho Power Company (IPC), Oregon Department of Fish and Wildlife (ODFW), U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife (WDFW), and Lower Snake River Compensation Plan (LSRCP).  Table 3. Wild fish marked in 2010 that have all or part of their PIT-tags provided by the CSS project. Many groups have tags cooperatively provided the CSS and other studies. The location of marking, species, tag funding sources and tag totals are shown for each. Through cooperative efforts pre-assignments are carried out by the CSS project on these groups, except for the Chiwawa Trap and Lower Wenatchee Trap (i.e., Upper Columbia Basin).   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  |  | **PIT-Tag Funding Source1** | | | |  | | **Location** | **Wild Species** | **SMP** | **CSS** | **IDFG** | **ODFW** | **Total PIT-tags** | | Clearwater/Salmon tributaries | Ch./St. |  | 24,000 | 40,000 |  | 64,000 | | Snake & Salmon Traps | Ch./St. | 23,400 | 7,000 |  |  | 30,400 | | Clearwater Trap | Ch./St. |  | 5,200 |  |  | 5,200 | | Grande Ronde Trap | Ch. | 9,000 | 1,400 |  |  | 10,400 | | Grande Ronde tributaries | Ch. |  | 2,200 |  | 2,500 | 4,700 | | Chiwawa Trap, Lower Wenatchee Trap | Ch./St. |  | 30,000 |  |  | 30,000 | | **Grand Total** |  | 32,400 | 69,800 | 40,000 | 2,500 | 144,700 | | 1 Agencies are Smolt Monitoring Program (SMP), Idaho Department of Fish and Game (IDFG), and Oregon Department of Fish and Wildlife (ODFW). Ch = wild Chinook and St = wild steelhead. PIT-tags are provided for both wild Chinook and wild steelhead at some locations but the actual numbers captured and tagged by species a not known until after the outmigration is complete. | | | | | | |   Table 4. Groups marked in 2010 that do not include PIT-tags provided by the CSS project but which are included in the CSS study. The CSS project does random pre-assignments for some groups. The location of the marking location or hatchery, the species, the primary marking agency and tag totals are shown for each.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  | **PIT-Tag Marking Agency1** | | | | | | | | | **Location/Hatchery** | **Species** | **CTUIR** | **SBT** | **NPT** | **ODFW** | **COE** | **USFWS** | **YINN** | **SMP** | | **Wild Groups** |  |  |  |  |  |  |  |  |  | | Lookingglass Creek (Grande Ronde basin) | Ch./St. | 3,500\* |  |  |  |  |  |  |  | | East Fork Salmon, West Fork Yankee Rivers (Salmon basin) | Ch./St. |  | 1,300\* |  |  |  |  |  |  | | Imnaha Trap (Imnaha basin) | Ch./St. |  |  | 15,000\*\* |  |  |  |  |  | | John Day River | Ch./St. |  |  |  | ~9,300 |  |  |  |  | | Trout Creek (Deschutes basin) | St. |  |  |  | ~1,300 |  |  |  |  | | **Hatchery Groups** |  |  |  |  |  |  |  |  |  | | Snake River | Sockeye |  |  |  |  | 63,600● |  |  |  | | Carson | Chinook |  |  |  |  |  | 15,000 |  |  | | Cle Elum | Chinook |  |  |  |  |  |  | 40,000 |  | | Leavenworth | Chinook |  |  |  |  |  |  |  | 15,000 | | Warm Springs | Chinook |  |  |  |  |  | 15,000 |  |  | | **Grand Total** |  | 3,500 | 1,300 | 15,000 | ~10,600 | 63,600 | 30,000 | 40,000 | 15,000 | | \* The CSS pre-assigns these groups through cooperative efforts with the primary marking agency.  \*\* Pre-assigned by NPT. ● Pre-assigned by COE. | | | | | | | | | | | 1 Agencies are: Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Shoshone-Bannock Tribes (SBT), Nez Perce Tribe (NPT), Oregon Department of Fish and Wildlife (ODFW), Corps of Engineers (COE), U.S. Fish and Wildlife Service (USFWS), Yakima Indian Nation (YINN), and Smolt Monitoring Program (SMP). Ch = wild Chinook and St = wild steelhead. At some locations the actual numbers of fish captured and tagged by species are not known until after the outmigration is complete. | | | | | | | | | | |

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