

# PITAGIS

news letter

## ISO Transition Project Update

Work is progressing on the transition of our 400 kHz PIT tag interrogation system to the new system based upon the International Standards Organization (ISO) specifications, ISO-11784 and ISO-11785.

### Infrastructure

400 kHz PIT tag interrogation systems at Snake River dams were de-commissioned on September 1 1999. The John Day 400 kHz PIT interrogation systems was decommissioned on Monday, October 4, 1999, and McNary's 400 kHz system was decommissioned on Monday, October 11, 1999.

Electrical and communications infrastructure as well as access platform construction by Corps of Engineers contractors is underway. The completion of this work is scheduled for the end of December 1999.

After the facilities are de-watered (November 1999-January 2000), electro-magnetic shield (EMF) sections will be removed from some fish flumes. These EMF

*'ISO Transition Project Update' continued on page 5...*

## PIT Tag Forecasts

Confirmation of PIT Tag forecasts submitted to the Northwest Power Planning Council's Annual Implementation Workplan have been sent to the project sponsors.

Projects sponsors should check with their PIT Tagging Coordinators and verify the tag forecasts and estimate the month in which tags are required for their marking projects. This information was to be faxed back to the PIT Tag Operations Center at (503) 650-5426 by Friday, October 15, 1999. If you have not returned your verified forecasts, please do so immediately!

All FY2000 requests for PIT Tags should be submitted on the *new* PIT Tag Distribution Request Form (PDRF). This form is different from last year's form and was designed to suffice for multiple years. It removes all references to 400kHz PIT Tags. Distribution requests for FY2000 projects *must* be submitted on this new form. The new forms were included with your "FY2000 BPA Direct-Funded PIT Tag Forecast" letter dated October 1, 1999. ❖

## Assistance Needed

HELP!!! Debbie Frost of NMFS is assembling a report and presentation for the upcoming PIT Tag Workshop 2000. After exhausting many sources, she is asking for help in collecting PIT tag retention data for ADULT salmon, preferably taken from spawning or near-maturation records and separated by sex. If you have data you would like to contribute for her presentation/publication, please contact her at [debbie.frost@noaa.gov](mailto:debbie.frost@noaa.gov) or at (360) 698-3112. Many thanks. ❖

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# Status Report on the Development of PIT Tag Interrogation Systems for Adult Salmon Transiting Fish Ladders

*This article was submitted by the co-chairs of the current Adult PIT Tag Development Team: Dr. Sandra Downing (NMFS), Dave Askren (BPA), and Blaine Ebberts and Dave Hurson (COE).*

## Introduction

Due to the importance to the entire fisheries community of the development of PIT tag interrogation systems for adult salmon transiting fish ladders, we thought it would be useful to start submitting quarterly updates to the *PTAGIS Newsletter*. Unlike future updates, this first one will provide an overall introduction and history of the project.

The ability to detect returning PIT tagged adult salmon has long been a critical need for the fisheries community; its need was included in the 1995 NMFS Biological Opinion. In that document, the U.S. Army Corps of Engineers (COE), Bonneville Power Administration (BPA), and National Marine Fisheries Service (NMFS) are directed to “complete the design and development of adult fish PIT tag detector systems in adult fish passage facilities at mainstem dams immediately, followed by installation with no adverse effect to adult passage” (Incidental Take Statement para. 14). The 1998 NMFS Supplemental Biological Opinion directed the installation of adult detection systems at Federal Columbia River Power System (FCRPS) projects prior to the return of any adult steelhead from the 1999 outmigration (XII.1.g). Data from the adult detection system will support investigations addressing transport benefits, conversion rates between dams, travel time, fallback rates, and smolt-to-adult return rates (SAR) of listed steelhead and other salmonids (XII.3.e). In addition, the Northwest Power Planning Council recognized the need and called for an adult PIT tag system in their 1994 Fish and Wildlife Program.

The first interrogation system for adult salmon using 400 kHz technology was installed at Lower Granite Dam in 1986 and the second was installed at Bonneville Dam’s Adult Sampling and Monitoring Facility (AS&MF) in 1998. These 400 kHz systems, using electronics developed for juvenile fish, can interrogate adult salmon transiting 31-cm diameter pipes but are incapable of interrogating fish transiting fish ladders. Longer read range is possible with 134.2 kHz tags than with 400 kHz tags, because they incorporate a different data recovery scheme, new silicon technology, and are governed by less stringent Federal Communication Commission (FCC) emission

regulations. These advantages should enable the detection of returning adult salmon within fish ladders instead of being restricted to small diameter pipes. Because there were no commercially available transceiver systems that could read tags in fish ladders, National Marine Fisheries Service (NMFS) initiated a development program for interrogation systems for fish ladders using 134.2 kHz ISO-based technology in FY98. This was after the first series of fish tests for the juvenile system had been run at McNary Dam.

A multi-agency “Adult PIT Tag Development Team” (APTDT) was formed in 1998 to oversee and guide the work necessary to implement PIT tag interrogation with adult ladders. This team was formed with the charter of “planning, reviewing technical issues and providing guidance during the development, evaluation and installation of adult PIT tag systems throughout the Columbia River Basin” (CRB). The Team is co-chaired by BPA, COE, and NMFS, and includes members from other fisheries agencies and PSMFC. Since the development of these interrogation systems is so critical to the entire fisheries community, the APTDT will become more formalized and active during the fall of 1999. The APTDT will be responsible for such tasks as drafting a requirements document for an orifice transceiver and drafting a management plan that includes project objectives, goals, and schedule. These will then be sent out for regional review and comment. This process will also obtain fisheries management input to ensure that the system will satisfy regional research needs. The APTDT will also form technical teams such as a team to conduct the evaluation of the transceiver systems under development.

Interrogation systems consist of antennas (coils of wires), antenna housings, and transceiver systems that decode the return signals and transmit usable tag codes to the computer. All three of these components must be developed to produce interrogation systems that will work in fish ladders. In addition, some new evaluation techniques must be developed to enable the community to evaluate the interrogation systems in this new environment. We anticipate that the development of the interrogation systems and evaluation techniques will go through three phases: Development Phase, Evaluation Phase, and an Implementation Phase. The work that has been completed and some that is planned for each phase is described below.

*‘Adult Detection Status’ continued on page 3...*

## Development Phase

The initial work has concentrated on designing and fabricating antenna systems (antennas and their housings) for orifices, developing transceivers, developing system evaluation techniques for use in the field, and recording fish behavior with video cameras in orifices equipped with antenna systems. This work was, in part, described in the January 1999 (Volume 3, Issue 5) of the *PTAGIS Newsletter*. The development efforts will continue to focus on the interrogation of fish passing through weir orifices since the majority (anecdotal evidence suggests around 90%) of fish use them; however, some development work will be done for interrogating fish transiting the weir overflows. However, until more information is collected by the COE on the importance of the proportion of fish that pass over overflows and whether the weir overflows can be modified, no informed decision can be made to implement or install detectors for weir overflows.

*Antenna systems*—In FY99, NMFS developed and evaluated several different antenna systems for orifices. Different antenna geometries were investigated to learn which yielded better reading ranges. NMFS also designed three antenna housing styles for orifice applications (insert-only, insert with extension, and extension-only). They then tested different material for fabricating these housings before settling on fiberglass. Antenna housings were installed in two fish ladders at Bonneville Dam, Cascades Island and the AS&MF exit ladder. The Antenna housings had openings measuring either 46 x 46 cm (2,090 cm<sup>2</sup>) or 61 x 61 cm (3,721 cm<sup>2</sup>), depending on the ladder. Fish behavior to the antenna housings is being determined with video cameras positioned to monitor fish transiting modified and unmodified orifices. This work is being conducted by the COE.

Exploratory work is being conducted to determine the technical feasibility of developing a PIT tag interrogation system for weir overflows. The COE is scheduled to start a hydraulic modeling study this fall that will evaluate several weir overflow antenna housing designs. If the study determines that the weir overflows can be modified to permit antennas wider than the thickness of the weir wall, then antenna housing(s) will be fabricated and evaluated in the laboratory and at Bonneville Dam using transceivers from different manufacturers. The COE has also mounted hardware for using the video cameras to monitor the weir overflows in the AS&MF and Cascades Island Ladders. This winter, they will install hardware into the Washington Shore Ladder. They

will use this equipment to document actual numbers of fish using overflows and orifices. The issue of whether these modifications would impact fish passage would also need to be investigated.

*Transceiver systems*—In the fall of 1997 and spring of 1998, NMFS examined and tested available transceivers—none was satisfactory, as they could not read tags in 3,721-cm<sup>2</sup> antennas. Thus, in the spring of 1998, NMFS initiated contracts to different companies for transceiver development work. The reason for the multiple development paths was to try to ensure that a transceiver system for fish ladders would be produced in time to interrogate the returning salmonids tagged with ISO tags. One path was based on the ISO-based pass-by (flat-plate) transceiver system developed by Patton Engineering (PE) with design input from NMFS. This prototype is referred to as the PE/NMFS system. The second path had RF Engineering submit a design and simulation report followed with them developing an analog board (the portion of the transceiver system that decodes the tag signal) that is due for delivery this October. This analog board would then be incorporated into a complete transceiver system. The last path was initiated in the fall when Destron-Fearing (DF) had successfully finished the development work of the PIT tag readers for juvenile system. It is based on modifying the ISO-based transceiver system (model FS1001) and is referred to as the DF system.

During the summer and fall of 1998, NMFS ran laboratory tests in their Sand Point Electronics Shop on the latest models of analog electronics from different manufacturers using several antenna designs to determine which transceiver systems would yield acceptable reading ranges under simulated field conditions. As part of this effort, a full-scale model of the reinforcement-bar layout for a weir was constructed to determine its effects on antenna electrical loading, tuning, and tag detection under several antenna configurations. The laboratory test results yielded two encouraging pieces of information. The first was that with minor modifications, the ladder environment or reinforcement bar in the immediate vicinity of the orifice would not prevent tags from being read in the orifices. The other was that we became confident that at least one of the transceiver systems being developed would be able to read tags in a 3,721-cm<sup>2</sup> square orifice at an acceptable level of efficiency.

Further testing with the two prototype (PE/NMFS and DF) systems in the AS&MF using test sticks found ade-

quate read ranges for detection of adult salmon was obtained under dry and static watered-up ladder conditions with the orifice antennas. These prototype transceiver systems will be further developed during this fall and winter to improve their electronics and other features needed for reliable year-round operation at CRB Dams. Present plans are to test the transceiver systems in the laboratory and at the AS&MF exit ladder in 2000 under dry, watered-up, and operational conditions (ladder operational and using tagged fish).

*Evaluation Techniques*—Determining tag-reading efficiencies for specific antennas installed in fish ladders is more complicated than for systems installed at the bypass/monitoring facilities for juvenile salmon. This is because fish can follow multiple pathways through a fish ladder. We critically need a method for determining how many tagged fish actually pass through or over a specific antenna. To obtain this information on fish passage in a ladder, the COE and NMFS have done some preliminary work with a bright orange streamer tag and testing with various types of video cameras. New cameras have been ordered and more testing will be done this fall by the COE after they arrive. One of the questions they are trying to answer is what is the maximum turbidity when they can still distinguish the visual tags as the fish swim through an orifice or over an overflow. This information is needed to help determine when it will be possible to run operational tests.

### **Evaluation Phase**

*Transceiver/Antenna Systems Testing*—Extended-range PIT tag interrogation systems can only be tested to a limited extent in a laboratory setting, thus field tests are required to verify laboratory findings, to determine effects of antenna housings on hydraulics, to determine behavioral responses of fish to antenna systems, to determine reading efficiency with fish, effect of ambient noise on tag detection, and to verify suitability of equipment for installation and long-term operation. All of these factors will be tested in the AS&MF exit ladder in FY00. This facility is an ideal test site because it provides good access to power and equipment, and can be dewatered throughout the year. The plan is to install more antennas in this ladder so that fish tests can be run simultaneously on multiple transceiver systems.

*Antenna systems*—All antenna systems are being evaluated using the same criteria: ease and cost of installing, water tightness, pressure effects on the housing, resistance to damage, fish response to the antenna housings,

and ability to read tags when attached to transceiver systems. During the installation, no significant differences were found in terms of ease and cost for installing the three styles of housings. During FY99, NMFS has monitored the antenna systems installed in the ladders for electronic stability and leakage over the course of the field season. No major problems have occurred. The COE has been videotaping fish going through different orifices in the two ladders and has not documented any fish species (e.g., salmonids and lamprey) hesitating to use the modified orifices. The inspection during this upcoming dewatering period in early 2000 will indicate if the material used in the antenna housings was resistant to damage. The read distance for tags is approximately the same for all three housing styles. Based on the current results, NMFS is making a preliminary recommendation to use the insert-only design since it does not change the original orifice geometry. The COE will concentrate its video work on this style in 2000 to compare fish movement through modified and unmodified orifices.

*Transceiver systems*—Based on results from laboratory electronic tests, similar tests were conducted in 1999 at Bonneville Dam with the PE/NMFS and DF transceiver systems. The initial tests conducted in the January-February time period showed that the PE/NMFS system could read tags in air throughout both 2,090-cm<sup>2</sup> and 3,721-cm<sup>2</sup> modified orifices. In May, tests were conducted under watered-up conditions with the PE/NMFS system that showed no significant differences from the tag read ranges measured during the dry tests. These results contrast with the 400 kHz technology that varies significantly between dry and watered-up test conditions.

Representatives from DF tested their transceiver (model FS1001) in January at Bonneville Dam to determine how well their equipment operated and what needed to be modified for it to work in fish ladders. Results showed limited tag read range in a non-modified orifice environment. After making modifications to their equipment, DF retested their equipment in August. Results showed that the DF had significantly improved the tag read range of their system, enabling tags to be read throughout orifices measuring up to 3,721-cm<sup>2</sup> in both dry and watered-up conditions.

These results suggest that both of the PE/NMFS and DF systems should be able to read PIT tagged fish in the orifices found at Bonneville Dam. Further testing of these transceiver systems will be conducted in the spring of 2000 using PIT tagged spring chinook salmon.

The current plan is to thoroughly test transceiver systems in the laboratory and field in the summer of 2000 when steelhead and fall chinook salmon are available. A multi-agency evaluation team will be formed that produces a testing protocol to be used for all transceiver systems. As was done with the transceiver systems for juvenile salmon, we anticipate that these systems will be evaluated for tag-reading efficiencies with tagged drones and live fish. For the fish tests, we are seeking to achieve reading efficiencies of >90% in individual 3,721-cm<sup>2</sup> orifices. We also anticipate that the transceivers will undergo environmental testing and other electronic bench tests in the laboratory to confirm that data-through put times and read range meet the requirements of the CRB fisheries community. Furthermore, that they will be evaluated for ease of installation, reliability of operation and maintenance issues, diagnostic capabilities, and purchasing costs.

*Evaluation Techniques*—Toward developing and evaluating the techniques for determining reading efficiencies for fish tests run in fish ladders, NMFS conducted preliminary tests with steelhead released into the AS&MF exit ladder that were tagged with visual and PIT tags. The COE was not fully satisfied with the results for video detection of fish in orifices or over the overflows. They subsequently ordered new colored cameras that will be evaluated in the fall and spring.

**Implementation Phase**

*Antenna systems*—Results obtained from evaluating the antenna systems for orifices in 2000 work will guide the installation of antenna systems for all future installations. Until information is collected on the importance of fish passage over weir overflows and whether modification of weir overflows will be allowed (research being supported by the COE), the decision cannot be made to implement or install detectors for weir overflows. The community needs to be aware that most likely the transceivers will never be able to read tags in the entire water column above most weir overflows.

*Transceiver systems*—Results from the thorough evaluation to be performed during 2000 should yield a transceiver system or systems that the evaluation team can recommend to the APTDT. A decision in the September-October time frame should allow ample time for the manufacture of units needed for a full-ladder study in 2001. Results may also help the community decide when it will be possible to install orifice-based interrogation systems in other ladders. ❖

shields will be re-fabricated to meet more stringent functional standards. The coils on these flume sections will be wrapped at this time. Contractors' bids on the shield replacement projects are due October 25, 1999.

Installation of new stationary transceivers and wrapping of the ISO coils within the interrogation systems should be completed by February 21, 2000. The following table shows coil wrapping status.

Coil Wrap Status as of October 7, 1999:

<u>Site</u>	<u>Total Coils</u>	<u>Coils Wrapped</u>
GRJ	27	12
GOJ	27	8
LMJ	38	0
MCJ	40	8
JDJ	24	24
B2J	12	12
PRJ	5	5
Total	173	69

Communications panels have been completed for McNary, John Day and Bonneville II. Construction of communications panels for Lower Monumental, Little Goose and Lower Granite is underway.

The programmable logic controller (PLC) for Little Goose is complete. The PLC for Bonneville II is under construction. The PLC for Lower Granite requires a minor modification.

Software development for the PLC's at GRJ, GOJ, B2J has not yet begun.

System testing and integration will be performed after all installations are complete. The National Marine Fisheries Service will coordinate live fish testing at all facilities in order to directly measure interrogation coil reading efficiencies prior to the main out-migration in 2000. An outline of a test plan was provided to members of the ISO Transition Planning Team for their review.

**Portable Transceiver**

All portable transceivers have been distributed to Direct-Funded Columbia River Fish and Wildlife projects. Tagging coordinators should begin working with these transceivers in order to become familiar with their capabilities.

**Stationary Transceivers**

All transceivers were delivered to PTOC Field Headquarters in Kennewick, Washington. Installation progress is reflected in the table at the top of page 6.

Transceivers Installed as of October 7, 1999:

<u>Location</u>	<u>Nbr Required</u>	<u>Nbr Installed</u>
GRJ	23	0
GOJ	25	0
LMJ	31	0
MCJ	34	4
JDJ	24	24
B2J	12	0
PRJ	5	5
Total	154	33

The number of coils wrapped reflects the total number of coils that may have transceivers connected to them. Because of the higher performance of the new system, and in order to reduce costs, the ISO system will operate fewer transceivers in certain monitor locations. For example, in certain locations, only three transceivers will be used rather than four, but four coils will be wrapped. If performance in these locations becomes an issue and funds become available, then additional transceivers can be connected to the pre-wrapped coils. Specific details of the number of coils per monitor can be found at [www.ptagis.org/ISO\\_Transition/Monitor\\_Inventory](http://www.ptagis.org/ISO_Transition/Monitor_Inventory).

The NMFS experimental diversion system at Lower Granite (GRX) is being incorporated into the production site named GRJ.

Site configurations will be changed to reflect the switch-over to the ISO system. This means that the names of certain monitors will change and that most of the coil numbers used throughout the system will also change. These changes will be posted to the PTAGIS ISO Transition web link listed above, in the near future.

**Tag Availability**

ISO tags are available from multiple manufacturers. Columbia River Basin Direct-Funded projects are bound by a sole-source supplier agreement, in which tags are provided by Destron Fearing.

The Tag Evaluation Team will meet before the end of November 1999 and discuss the possibility of completing the procurement and technical specification for tags.

**Questions?**

If you have any questions regarding the ISO Transition, please contact your PIT Tag Steering Committee representative or the co-chairs of the Transition Planning Team, Charles Morrill at (360) 902-2747, John Rowan at (503) 230-4238, or Carter Stein at (503) 650-5400. ❖

## List of 1999 U.S. Army Corps of Engineers PIT Tagging Projects

Below is a listing of all U.S. Army Corps of Engineers projects in the Columbia River Basin that use PIT tags.

<u>Project #</u>	<u>Project Name</u>	<u>Agency/Sponsor</u>
MPE-W-95-1	A Study to Compare the Adult Returns of Inriver Migrating Versus Barged Juvenile Anadromous Salmonids.	NMFS
MPE-W-95-3	Evaluation of the Effects of Multiple Dam Passage on the Physiological Condition of Migrating Juvenile Salmon.	USGS
MPE-W-99-6a	Effects of Spill on Passage of Hatchery Yearling Chinook Salmon at Ice Harbor.	NMFS
MPE-W-99-6b	Comparative Performance of Sham Radio-tagged and PIT-tagged Juvenile Salmonids.	NMFS/USGS
MPE-W-99-10	Evaluate Specific Trouble Areas in the Juvenile Fish Facilities for Fish Passage Improvement; A Comparison of the Lower Monumental Dam PIT Tag Diversion System Versus the Primary Bypass System.	NMFS
MPE-W-95-2a	Evaluate the Migration Behavior of In-river or Transported PIT-Tagged Juvenile Salmonids in the Columbia River Estuary.	NMFS
MPE-W-95-2b	Electronic Recovery of PIT Tags from Piscivorous Bird Colonies in the Columbia River Basin.	NMFS

Correction (indicated by **bold** text) to the List of 1999 Columbia River Basin PIT Tagging Projects, as published in the July 1999 issue of the *PTAGIS Newsletter*:

LSRCP Lower Snake River Compensation Program

USFWS ❖

# 1999 Interrogation Activity Summary

Below us a summary of 1999 PIT tag interrogation activities at the sites operated and maintained by the PIT Tag Operations Center (PTOC) of the Pacific States Marine Fisheries Commission (PSMFC).

<u>Site Code</u>	<u>Site Location</u>	<u>Operation Dates</u>
BVX	Bonneville Dam PH1; Flat Plate	03/23/99—10/29/99
BVJ	Bonneville Dam PH1; Sample	03/20/99—10/29/99
B2J	Bonneville Dam PH2, Bypass	04/14/99—06/04/99; 06/18/99—07/26/99
B2A	Bonneville Dam Adult Fish Lab	01/01/99—12/31/99
JDJ	John Day Dam	04/01/99—10/01/99
MCJ	McNary Dam	03/29/99—10/09/99
LMJ	Lower Monumental Dam	04/01/99—09/01/99
GOJ	Little Goose Dam	04/01/99—09/01/99
GRJ	Lower Granite Dam	03/25/99—09/01/99
GRX	Lower Granite Dam Diversion	03/25/99—09/01/99
GRA	Lower Granite Dam Ladder	01/01/99—12/31/99
PRJ	Prosser Dam at Chandler Canal	02/22/99—08/13/99

*BVX & BVJ*—These two sites operated in tandem to provide interrogation coverage of the Bonneville First Powerhouse Downstream Migrant Channel (DSM1). Fish were available to the BVJ sample between 1600-2400h throughout the operational dates. The BVX detector was operated concurrently with BVJ before March 30 and after September 15, and 24 hours/day during the rest of the interrogation season.

*B2J*—This was the first year of operation of the new Bonneville Second Powerhouse juvenile fish bypass. The new sampling facility was still under construction (due to be operational for the 2000 outmigration), but NMFS and U.S. Geological Survey researchers utilized a skeletal PIT tag diversion and interrogation system during the spring and early summer. All PIT tag data recorded at this site were reported to PTAGIS.

*B2A*—The Adult Fish Lab is located in a side channel of the North Shore Ladder at the Bonneville Dam Second Powerhouse. Fish have been diverted from the ladder into the Lab for six to eight hours per day, two or three days per week, since early April. All fish that enter the lab are passively interrogated for 400 kHz PIT tags.

*JDJ*—Since 1998, the Juvenile Fish Facility (JFF) at John Day Dam has been equipped with both 400 and some 134.2 kHz PIT tag interrogation equipment. The 134.2 kHz ISO-compatible monitors have provided diagnostic data on the durability and reliability of the equipment being deployed in preparation for the transition to, and standardization on, the 134.2 kHz tag. The 400 kHz equipment was permanently decommissioned at John Day Dam on October 1, 1999, as scheduled, in preparation for that transition. The JFF will continue to operate until Octo-

ber 29; all fish in the facility's subsample will be scanned for 400 kHz PIT tags, and any "recapture" data will be submitted to PTAGIS.

*MCJ*—The JFF at McNary Dam is also configured with a few detectors capable of reading 134.2 kHz ISO-compatible PIT tags, in addition to a full complement of 400 kHz equipment. The 400 kHz detectors were permanently decommissioned on October 11, as scheduled, for the transition to the ISO-standard equipment. As at John Day Dam, all fish in the facility subsample will be scanned for 400 kHz tags. The facility may continue to subsample as late as December 15.

*LMJ, GOJ, GRJ, & GRX*—Again in 1999, specific PIT tagged fish were diverted onto barges at GRJ and GOJ as part of the on-going Comparative Survival Study (CSS). All PIT tag interrogation equipment was permanently decommissioned at the Snake River JFFs on September 1. Since that time, all of these sites have scanned 100% of the facility collections for 400 kHz PIT tags, and have submitted any "recapture" data to PTAGIS. The Snake River JFFs will operate through October. Effective with water-up of the Lower Granite Dam JFF in 2000, the interrogation components previously identified with "GRX" will be incorporated directly into the "GRJ" site.

*GRA*—The trap in the fish ladder at Lower Granite Dam provides the only comprehensive interrogation capability for PIT tagged adult salmon in the Snake River. The 400 kHz interrogation equipment has operated during the entire adult passage season.

*'Interrogation Summary' continued on page 8...*

... 'Interrogation Summary' continued from page 7

The PIT Tag Operations Center maintains a detailed log of activities concerning the PIT tag interrogation equipment we operate. For detailed information on specific interrogation activities or facility operations, both current and historic, please refer to the "PTOC O&M" section of our web site at [www.ptagis.org/Ptoc\\_OM](http://www.ptagis.org/Ptoc_OM). ❖

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## Workshop 2000

Registration Packets have been sent out for the PIT Tag Workshop 2000, to be held January 11-14, 2000 at Skamania Lodge in Stevenson, Washington.

Be sure to send your early registration in by Friday, October 29, 1999. If you have not received your registration information, please go to [www.ptagis.org/Workshop2000](http://www.ptagis.org/Workshop2000) and use the form published there. ❖

## Remote User Access Changes

In order to improve system performance and security, PSMFC recently modified its default gateway for remote user access. While this was transparent to most users, some individuals have experienced difficulty logging into the PTAGIS database using the TelNet protocol. To avoid any future problems we suggest that, effective immediately, you point your TelNet client to [telnet.ptagis.org](http://telnet.ptagis.org). For your convenience you can also now FTP directly to [ftp.ptagis.org](http://ftp.ptagis.org), as well as browse our web site at [www.ptagis.org](http://www.ptagis.org). ❖

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We welcome input from the PIT Tag community, so feel free to call (503/650-5400), fax (503/650-5426), e-mail, or write us with your story ideas. If you have any questions regarding the contents of this publication, or about the PTAGIS program, please contact Carter Stein, PTAGIS Program Manager. Editing and layout by Liza Bauman. Unless otherwise noted, contributors include Carter Stein ([carters@psmfc.org](mailto:carters@psmfc.org)), Dave Marvin ([dave\\_marvin@psmfc.org](mailto:dave_marvin@psmfc.org)), John Tenney ([john\\_tenney@psmfc.org](mailto:john_tenney@psmfc.org)), and Liza Bauman ([liza\\_bauman@psmfc.org](mailto:liza_bauman@psmfc.org)). Date of issue: 10/21/99.

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