



PIT Tag Information System Columbia Basin

Newsletter

OCTOBER 2023
Volume 21
ISSUE 2

The PTAGIS Newsletter is published periodically by Pacific States Marine Fisheries Commission.

We welcome input from the PTAGIS community, so email us at ptagis_newsletter@ptagis.org with your story ideas.

If you have questions regarding the contents of this publication, or about the PTAGIS program, please contact PTAGIS Staff.

Contributors for this issue include:

KARA JAENECKE
kara.jaenecke@noaa.gov

SCOTT LIVINGSTON
slivingston@psmfc.org

JENNIFER LUNDY
jlundy@psmfc.org

NICOLE TANCRETO
ntancreto@psmfc.org

JOHN TENNEY
jtenney@psmfc.org

DON WARF
dlwarf@psmfc.org

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A Fisheries Data Project of the Pacific
States Marine Fisheries Commission

2024 PIT TAG WORKSHOP

NICOLE TANCRETO (PTAGIS Portland Office)

The 2024 PIT Tag Workshop is scheduled to take place at Skamania Lodge in Stevenson, Washington, from Tuesday, January 30 to Thursday, February 1, 2024. Registration costs \$370 and includes two breakfasts and two lunches at Skamania Lodge. Vendor booths (\$500) and a limited number of student registrations (\$200) are also available. A limited number of rooms are available at Skamania Lodge at the prevailing government rate of \$152 per night. If you are planning to attend the workshop we recommend booking rooms as soon as possible. See the [2024 PIT Tag Workshop page](#) for all the details and links to book a room and register for the workshop.

The draft schedule for workshop presentations has been released and is also available on the 2024 workshop page. The main session starts at 1:00 PM on Tuesday afternoon with an opening ceremony and a keynote video presentation, and continues with presentations on detection methods and data analysis techniques. The evening closes with a hosted reception and poster session. Wednesday is a full day with presentations on fisheries management and monitoring, survival monitoring, research related to tags, and data management. Thursday morning continues with sessions organized by the Instream PIT Tag Detection System (IPTDS) Subcommittee with presentations covering IPTDS data analysis tools; setting up power, networking and communications at IPTDS sites; all things antennas; and setting up M5 on a Raspberry Pi. Thursday afternoon will conclude the workshop with optional concurrent training sessions on PTAGIS tagging software, PTAGIS reporting tools, and hands-on sessions related to the instream presentations from the morning.

For details about registration, accommodations, or the workshop schedule, see the [2024 PIT Tag Workshop page](#) on the PTAGIS website. If you have any questions about the workshop, please email PITTagWorkshop@psmf.org.

We look forward to seeing you in 2024! ☺

M5 SOFTWARE UPDATES

NICOLE TANCRETO (PTAGIS Portland Office)

The latest version of M5 was released on October 10, 2023. This update includes fixes to the Sync Clock feature for the IS1001-Master Controller and attempting to connect to a password-protected IS1001-MC. It also includes updates to the underlying technology to be on the latest stable versions. The previous version of M5, released on May 5, 2023, added support for GPS units, setting a custom starting sequence for files, additional logging and an update to the file submission process to better handle slower data connections.

As a reminder, M5 is the real-time interrogation data collection software. It runs on Windows 10/11 and Linux and is currently being used at several interrogation sites running on a Raspberry Pi. You can find out more information and download the software on the [M5 page](#) on the PTAGIS website. ☺

PIT TAGS AND PILE DIKES: AUTONOMOUS AND STATIONARY METHODS FOR EXPANDING PIT INTERROGATION IN THE LOWER COLUMBIA RIVER ESTUARY

KARA JAENECKE (Ocean Associates, Inc.)

Recent success in pile dike detection systems suggest these sites may offer an autonomous and cost-effective method to improve detection rates of PIT-tagged fishes in the Columbia River estuary. In 2023, the NOAA Estuary PIT Detection Project, with resources and additional funding provided by the NOAA PIT R&D Project and Washington Department of Fish and Wildlife, expanded pile dike interrogation to four sites in the lower estuary, between RKM 58 and 80 (site codes PD5, PD6, PD7, and PD8 in PTAGIS; Figure 1). These sites were installed to supplement juvenile salmonid detections within the existing PIT Trawl sample reach. Data collected from these sites in 2023 encompassed PIT-tagged fishes of various species and age classes, including adult, jack and juvenile Chinook (*Oncorhynchus Tshawytscha*), Coho (*O. kisutch*), Sockeye (*O. nerka*), and steelhead (*O. mykiss*), as well as white sturgeon (*Acipenser transmontanus*), green sturgeon (*A. medirostris*), cutthroat trout (*O. clarkii*), and northern pikeminnow

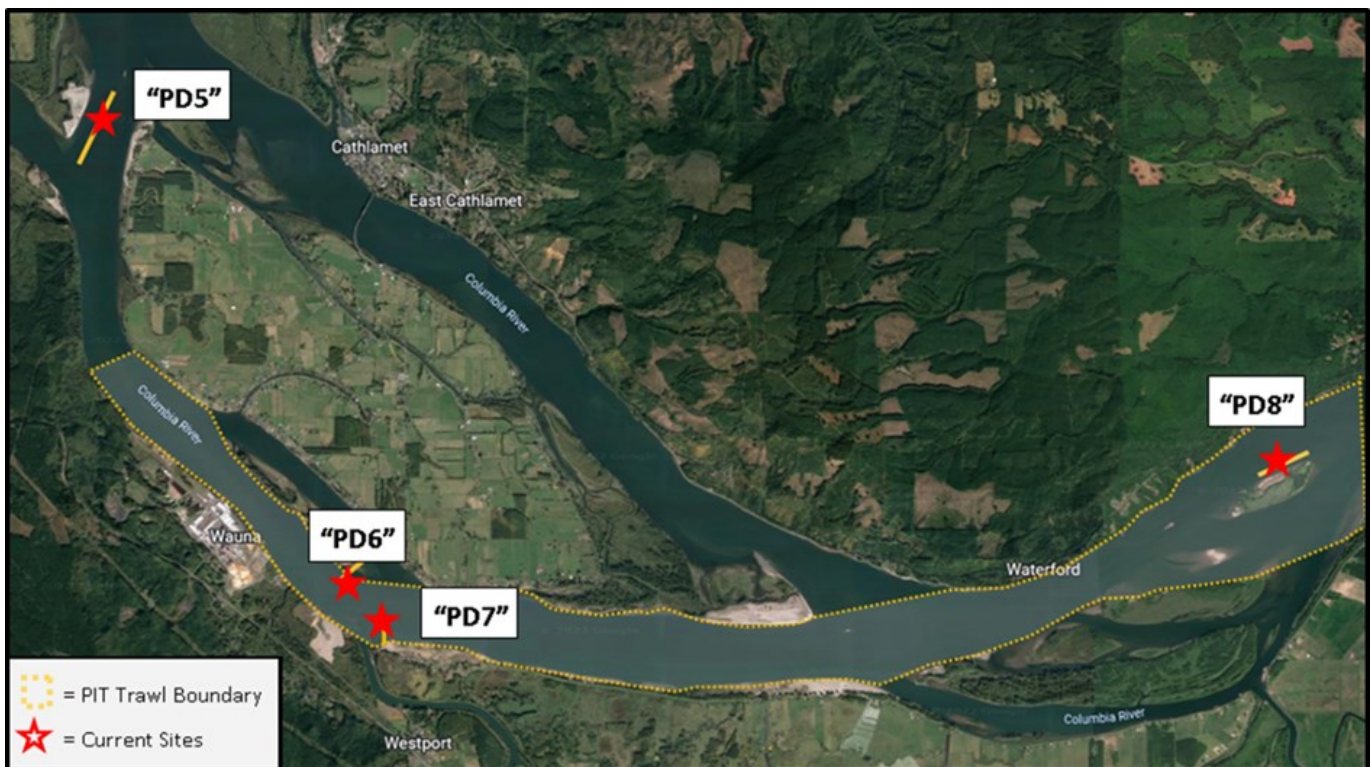


Figure 1. Map of pile dike site locations in 2023.

(*Ptychocheilus oregonensis*).

Observations from previous years showed that placement and orientation of both antennas and pile dikes relative to river flow were key to determining detection rates of juvenile salmonids: antennas deployed along the upstream face of dikes were more effective at detecting juvenile salmonids compared to downstream antennas, and in 2022, the array installed along a training dike oriented ~45 degrees to flow (PD6), detected juvenile salmonids at nearly tenfold the rate of the array installed along a spur dike (PD7), which was oriented perpendicular to flow (Figure 2). These results informed our target sites for expansion and antenna layout in 2023.

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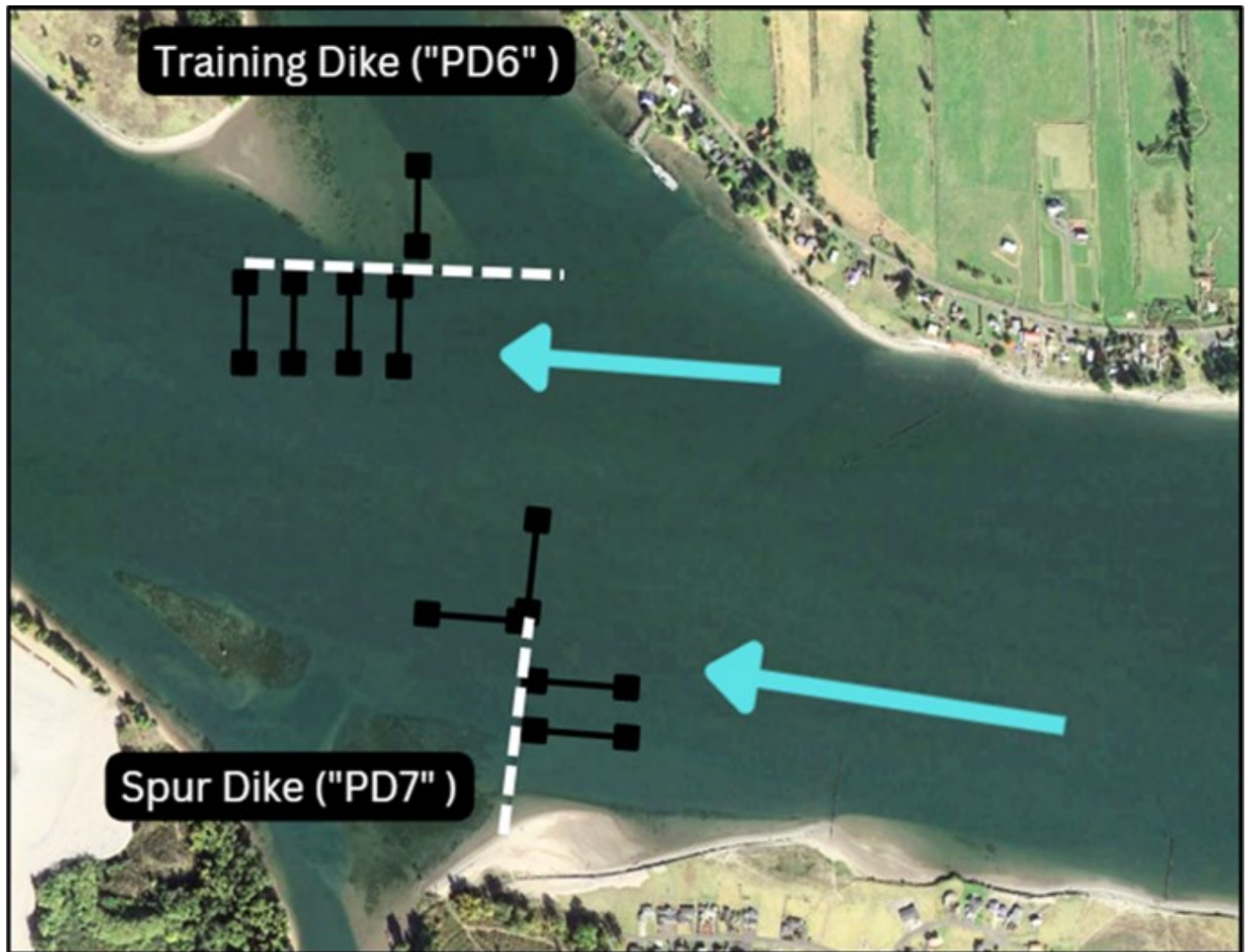


Figure 2. Spur and training dike orientations for interrogation sites "PD6" and "PD7".

Site installation began in March 2023 and all sites were running autonomously with 4-6 antennas by early April. Electronics were housed in pelican boxes mounted to floating platforms tethered behind the dikes. Each site was powered from a bank of four 12V deep-cycle batteries and included a single solar panel and charge controller, DC-DC converter, cellular modem, a Biomark IS1001 MTS transceiver, and up to six 2.4 x 6.1 m cable antennas. Antennas were mounted from fabricated aluminum brackets installed along the upstream face of the dikes and oriented perpendicular to river flow (Figure 3).

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Figure 3. Pile dike PIT interrogation sites equipped with solar panels, electronics barges, antenna brackets, and antennas. Clockwise from top left: site PD6, barge at PD8, antenna orientation at PD5.

From 1 April through 11 September 2023, these four pile dike sites recorded 15,710 (57%) of the 27,633 tags detected by the NOAA Estuary PIT Detection Project. Interestingly, less than 3% ($n=651$) of all detections shared overlap between systems. PD5 and PD6 were the most successful sites, detecting over 90% of all 2023 pile dike detections, with a respective 7,457 and 6,734 detections. For comparison, the NOAA PIT trawl detected 9,754 fish during the sample season from 4 April through 15 June, and the towed flexible antenna system detected a total of 2,169 fish from 1 May through 9 June.

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Table 1. Total detections collected by the NOAA Estuary PIT Detection Project from 1 April through 25 September 2023.

Species	PD5	PD6	PD7	PD8	Flex	MTX	Total
Chinook	3,977	4,476	537	502	181	3,986	13,659
Coho	756	294	69	42	177	691	2,029
Steelhead	2,346	1,680	94	125	1,741	4,442	10,428
Sockeye	117	105	18	4	31	386	661
Cutthroat Trout	30	8	3	2	3	12	58
Northern Pikeminnow	2	0	0	5	0	0	7
White Sturgeon	51	8	43	14	0	0	116
Green Sturgeon	0	1	0	0	0	0	1
Unknown	178	162	33	28	36	237	674
Total	7,457	6,734	797	722	2,169	9,754	27,633

As observed in previous years at PD7, antennas oriented downstream of pile dikes were more effective than upstream antennas at detecting adult salmonids and sturgeon. In late June 2023, after the conclusion of our trawl sample season and spring juvenile outmigration, we relocated the majority of antennas at each pile dike site to the downstream face of their respective dikes to prioritize adult detections. Across all sites, we detected 387 adult and 14,210 juvenile salmonids from 1 April through 25 September. During the same period, we detected 115 unique white sturgeon, including several long-term residents - one of which has been detected annually at PD7 since 2013 (Tag code: 3D6.00087E56F9).

Table 2. Species and age class of salmonids (excluding cutthroat trout) detected on pile dike sites in 2023.

Species	Adult	Jack	Juvenile
Chinook	170	350	8,845
Coho	27	3	1,114
Steelhead	159	0	4,040
Sockeye	31	0	211
Total	387	353	14,210

Data collected from these sites in 2023 exemplifies the high potential of autonomous systems to supplement detection of juvenile salmonids in the estuary. We will continue development in the coming years to streamline installation and expand to new pile dike interrogation sites, thereby increasing PIT Tag detection rates in the lower Columbia River estuary and contributing valuable data to multiple studies throughout the basin. 🌀

PTAGIS OPERATIONS & MAINTENANCE SUMMARY FOR 2023

SCOTT LIVINGSTON (PTAGIS Kennewick Office)



Figure 4. Easton Dam

O&M Summary 2023

The PSMFC PTAGIS Kennewick office is responsible for ensuring the PIT tag detection systems in main stem juvenile fish bypass facilities and adult fish ladders are functioning at peak performance while those passage systems are in operation. The Kennewick office also monitors and cooperatively maintains Separation by Code (SBC) hardware at nine of those facilities, allowing researchers to selectively separate PIT-tagged fish as they move through passage facilities. The Kennewick staff continues to provide technical assistance for multiple other projects involving the installation or development of new detection systems.

Juvenile fish bypass facilities (JFF) on the Snake and Columbia Rivers began operating in March and April. Detection efficiency rates for 2023 are being kept at or above the previous year's rates of greater than 99%. The single antenna in the Bonneville Corner Collector (BCC) is the exception to this with an estimated efficiency rate in the seventies based on NOAA live fish testing using 12mm tags. 2023 BCC YTD detections are 71,130.

Separation by Code diversion efficiency (SBC) rates remain high for 2023 with all diversion gates running above 97%.

Adult Ladder Efficiency (ALE) also remains high in dam-to-dam comparisons. All sites maintained an approximate 98 to 99% detection efficiency over a 12-month rolling report period.

PTAGIS OPERATIONS & MAINTENANCE SUMMARY FOR 2023

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Other PTAGIS Field Office Projects for 2023

New Installation at Easton Dam (ESD)

In April of this year, the PTAGIS Kennewick office, in conjunction with the US. Bureau of Reclamation (USBR) and sub-contractors completed the installation of two pass-through antennas, a data collection platform (DCP), and communications infrastructure at Easton dam, Juvenile Bypass System. PTAGIS Kennewick provided the R&D and antenna design package to the USBR, antennas were constructed and installed in the channel by a USBR sub-contractor.



Figure 5. Complete DCP in one enclosure.



Figure 6. Antennas in fishway.



Figure 7. Level and Temperature Sensors.



Figure 8. Transceiver Enclosures.

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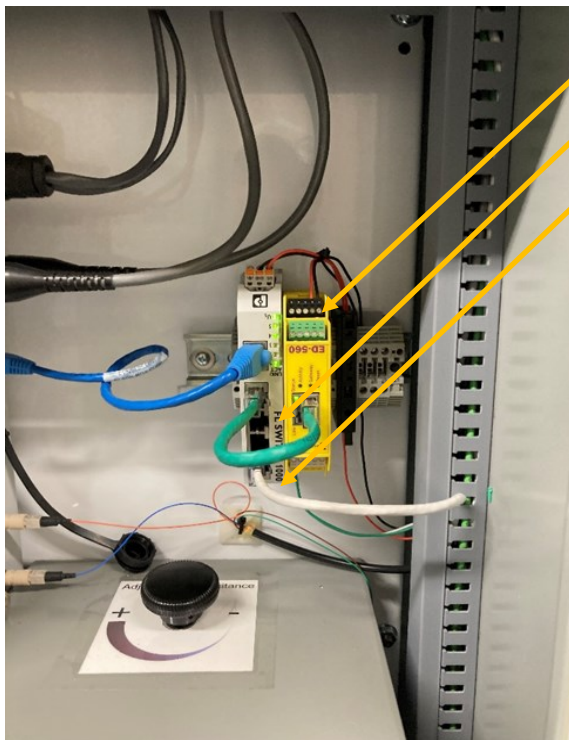
Update: Lower Granite Spillway Project 2023

On April 3, 2023, the spill gates were opened at 0003 hrs.' operating under the Flex Spill pattern schedule. The GRS PIT tag detection system continues to detect PIT tags at an exceptional rate. All 11 antennas exceeded detection rate expectations throughout the duration of the spill. The spill season ended on September 1st, although the OGEE is periodically opened, and then closed for various reasons. As of September 27th, 2023, all 11 antennas have detected nearly 156,000 PIT tags combined.

OGEE transceiver upgrades.

Remote controlled power supply voltage adjustment. The PTAGIS Kennewick staff developed and installed control devices that allow for remote adjustment of the power supply for each Ogee transceiver. This adjustment can be made over an internet connection and allows for the full range of control of the 0-48 Vdc exciter drive.

The purpose of this device is to provide the ability to adjust the exciter drive voltage of the transceivers without traveling to the site. Only small, incremental voltage changes are made to try and improve detections along with overall system performance.



- *IP- based, analog control device.*
- *Network switch*
- *Ethernet connection*

Figure 9. Transceiver Enclosures.

PTAGIS OPERATIONS & MAINTENANCE SUMMARY FOR 2023

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Update: Bonneville - Cascade Island (BO2) Ladder antennas

In April of 2023, due to the instability of the PIT tag room and failing antennas, the legacy BO2 site, (lower 16 antennas) and associated PIT tag building was permanently decommissioned. In 2022, new, highly efficient Pass-thru antennas were installed in the UMT and count window locations which are now the current BO2. Since installation, the detection rate of the new UMT antennas proved to surpass the detection rates of the legacy ladder antennas. Half Duplex Mode for Lamprey is now operational.

Update: Bonneville Dam Powerhouse 1. Ice and Trash Sluiceway PIT tag antenna design

PTAGIS Kennewick team continues to work closely with the USACE-Portland District PDT regarding the antenna shield construction and structural modifications to the chain gate. The goal is to mount a series of 4 PIT tag antennas on the top of the chain gate in slot 1B. The below graphic represents the current YTD design.

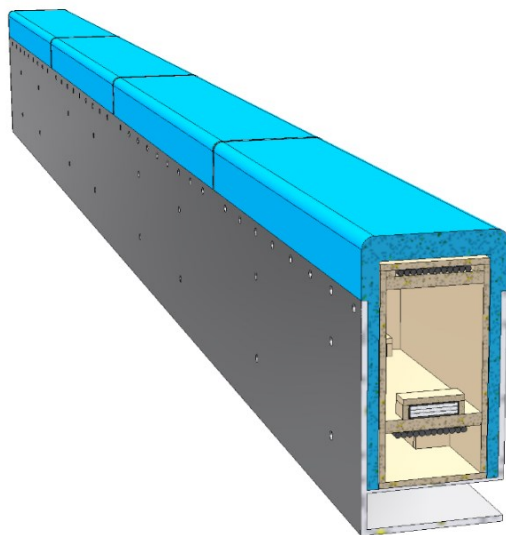


Figure 10. The above model shows the antenna and shield assembly cut away.

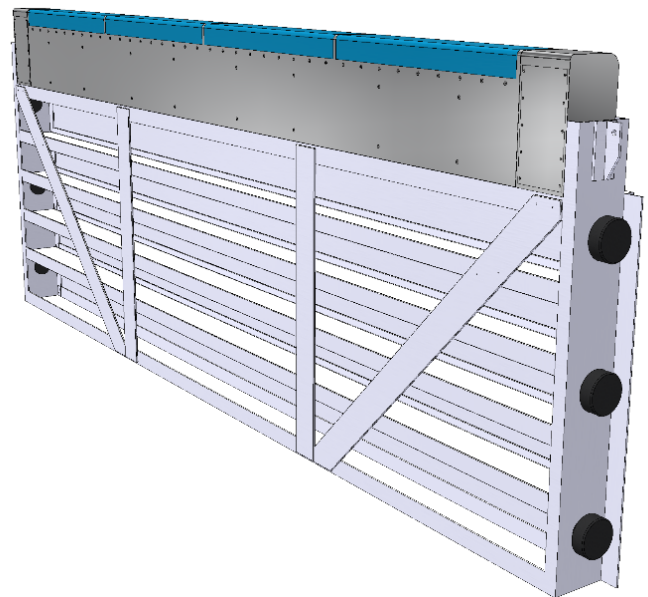


Figure 11. The above model shows the proposed antenna/shield attached to the Chain Gate.

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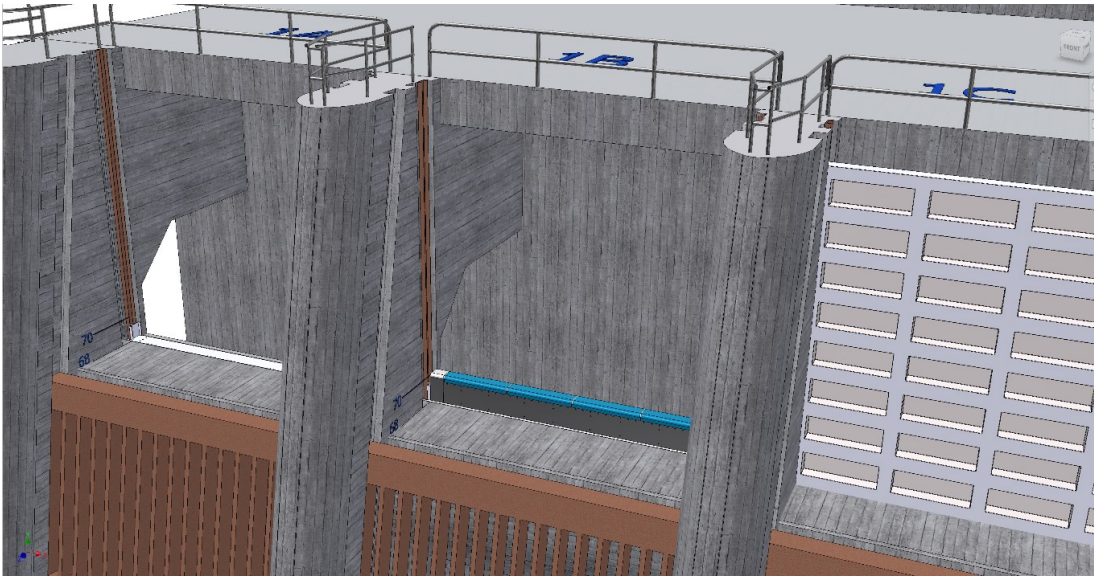


Figure 12. The model shows entrance 1B with the antenna (In Blue) positioned on the chain gate.

The structural and mechanical engineering required for this project is being provided by the USACE Portland District. This level of engineering support is paramount to the success of the project and likely could not have been achieved without the expertise of the USACE engineering staff.

Update: PTAGIS Data Collection Platform (DCP) Annual Updates

Starting the first week in November, Kennewick staff will perform the annual Windows 10 LTSC (Long Term Service Contract) updates. These updates install security patches and other important Windows components to ensure the DCPs remain secure and stable.

Note: Due to the lean nature of the Win 10 LTSC along with PTAGIS DHCP's update policies, these system-wide update activities are performed on an annual basis only, generally in the late fall when fish movement is low. A Standard Operating Procedure (SOP) was written to ensure no PIT tag detections were lost during this upgrade process.

Additional Projects and Activities

- **Update: BO4 ladder remodel.** The Washington Shore upper ladder is currently being redesigned to improve fish passage in the area of the existing PIT tag antennas. PTAGIS staff provided a PIT tag design packet along with technical support to the COE PDT. Construction of this project is to start winter of 2024.
- **Cle Elum (CED).** Started the Pit tag system design for the USBR.
- **Clear Creek Dam (CCD).** PIT tag system design for the USBR.
- **Klickitat Hatchery design.** Completed phase 1 for the YIN.
- **Designed a new-technology thin body antenna using a water-resistant cable.** 🔄