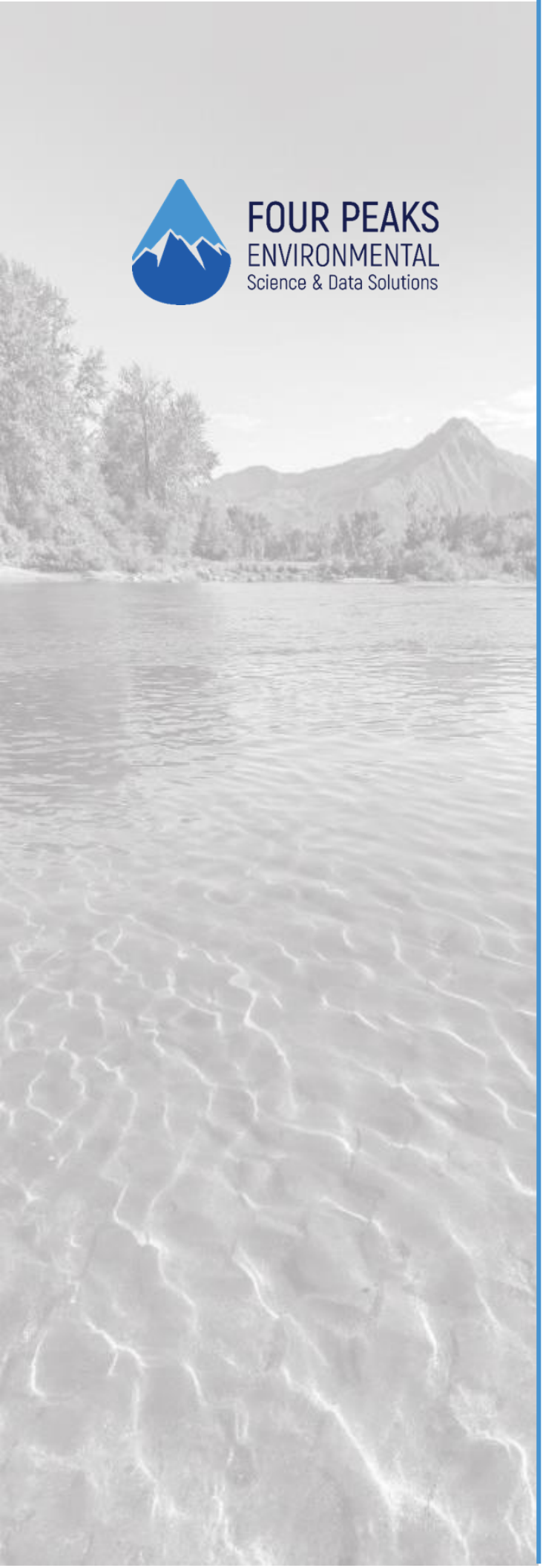

FOUR PEAKS ENVIRONMENTAL
Science & Data Solutions

2022 FISH COUNTING PLAN (DRAFT)

January 2022

Prepared for
U.S. Army Corps of Engineers
201 N 3rd Ave
Walla Walla, Washington 99362

Prepared By
Four Peaks Environmental
Science & Data Solutions
338 South Mission StreetWenatchee, Washington 98801

Table of Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Definition
COR	Contracting Officer's Representative
DST	Daylight Savings Time
OPSEC	operations security
PST	Pascific Standard TIme
QA	Qaulity Assurance
RM	river mile
UPS	universal power supply
USACE	U.S. Army Corps of Engineers

1 Introduction

The U.S. Army Corps of Engineers (USACE) operates eight mainstem hydroelectric projects on the Columbia and Snake rivers with facilities to accommodate upstream passage of adult fishes (Figure 1). Each project has one or more fish counting stations integrated with the fishways where specific species are enumerated throughout the year (Table 1). Visual counts (i.e., live viewing) are required for 16 hours per day on each project during the primary fish counting season from April 1 to October 31 with 8 hours of nighttime counts taken from digital video during the peak runs. During the remainder of the year, counts are conducted by a combination of visual counts and increased use of digital recording. In all cases, fishery observers identify and enumerate fish hourly by species in each fishway and resulting data are provided to USACE. Counting locations are detailed in Table 2.

Figure 1. Hydroelectric projects in the Columbia and Snake rivers

Source: USACE. Note: USACE fish counting efforts occur from Bonneville Dam to Lower Granite Dam.

In 2019, Four Peaks Environmental Science & Data Solutions (Four Peaks) incorporated a new information technology system to electronically tabulate and transfer fish count data to USACE-designated sites daily. The Four Peaks project team also outfitted each count station with the equipment, networking, and internet access required to successfully implement the new system including furniture, computers, and video systems. Count data were posted electronically to a secure data repository accessible by USACE over the internet daily with a target delivery time of 0630 hours Pacific Time the following day. The Four Peaks project team implemented a statistically rigorous quality control program to verify achievement of the overall program requirement of maintaining a 95% count accuracy for salmonids and 85% accuracy for American Shad. For the 2022 fish counting season, Four Peaks intends to use the same successful software and infrastructure for providing count data, while incorporating changes based on technology advancements, lessons learned, and feedback gathered in 2019,2020, and 2021.

The purpose of the 2022 Fish Counting Plan is to detail the plan for meeting requirements specified by USACE in Contract No. W912EF19C0002, including staff planning, employee training, quality control, project schedule, information technology, safety, security, and reporting. These individual components will guide implementation and serve as a reference for project staff during the 2022 season.

Table 1. Fish species counted at dams on the Columbia and Snake rivers

Species	Group	Code	Note
Chinook Salmon (*Oncorhynchus tshawytscha*)	Adult: 22 inches or longer in length. *Clipped adipose fin	Clp CA	1, 2, 3, 4, 5
	Adult: 22 inches or longer in length. *Unclipped adipose fin	CA	1, 2, 3, 4, 5
	Jack: 12 to 22 inches in length.	CJ	
Steelhead (*Oncorhynchus mykiss*)	Clipped adipose fin—Hatchery	Clp SH	5
	Unclipped adipose fin—Presumed Wild	SH	5
Sockeye Salmon (*Oncorhynchus nerka*)		BB	
Coho Salmon (*Oncorhynchus kisutch*)	Adult: 18 inches or longer in length. *Clipped adipose fin	Clp KA	1, 2, 3, 4, 5
	Adult: 18 inches or longer in length *Unclipped adipose fin	KA	1, 2, 3, 4, 5
	Jack: 12 to 18 inches in length	KJ	
American Shad (*Alosa sapidissima*)		AL	Count only at Bonneville, McNary, Ice Harbor, and Lower Granite dams
Pacific Lamprey (*Entosphenus tridentatus*)		LP	
Chum Salmon (*Oncorhynchus keta*)		none	
Pink Salmon (*Oncorhynchus gorbuscha*)		none	
Bull Trout (*Salvelinus confluentus*)		BT	Record presence as a comment in computer in addition to net hourly upstream count
White Sturgeon (*Acipenser transmontanus*)		none	Record as a comment in computer
Atlantic Salmon (*Salmo salar*)		none	Record as a comment in computer
Grass Carp (*Ctenopharyngodon idella*)		none	Record as a comment in computer
Eulachon (*Thaleichthys pacificus*)		none	Record as a comment in computer

Notes:
Source: USACE Contract No. W912EF19C0002
(1) During visual counting at Bonneville, The Dalles, John Day, and McNary dams, clipped and unclipped Chinook salmon shall be separately identified and counted only from 0800–0900 PST (0900–1000 DST) and 1400–1500 PST (1500–1600 DST). These index counts for clipped and unclipped Coho Salmon shall be made at Bonneville and McNary dams only. Outside of these two hourly periods, all Chinook and Coho salmon will be counted as unclipped fish.
(2) During visual counting at Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams, clipped and unclipped Chinook Salmon shall be identified and counted. Clipped and unclipped Coho Salmon will be counted at Lower Granite Dam only.
(3) During visual counting at all dams, if a computer malfunction or power outage occurs, all species groups shall be identified and counted except that all Chinook and Coho salmon will be counted as unclipped fish.
(4) During day time video counting at all dams, all species groups shall be identified and counted except that all Chinook and Coho salmon will be counted as unclipped fish.
(5) Steelhead and Chinook and Coho salmon under 12 inches in length are not counted.

Table 2. Fish counting stations at USACE-operated projects on the Columbia and Snake rivers, 2022

Count Station	Description
Bonneville Dam	Bonneville Dam is located in the Portland District on the Columbia River at RM 145, near North Bonneville, Washington. It has three fish ladders: Bradford Island ladder, located near the south or Oregon side of the river; Cascades Island ladder, located in the center of the river; and the Washington ladder, located on the north or Washington side of the river. The Cascades Island ladder has a tunnel part way up the ladder that connects it to the Washington ladder. Fish passing up the Cascades Island ladder are diverted through this tunnel to the Washington ladder, where they are counted. The Bradford Island and Washington ladders are counted separately. Fish counting does not take place at the Cascades Island ladder unless the Washington ladder is out of service for maintenance and/or the upper end of the Cascades Island ladder is operated for passing adult fish. On rare occasions, counting is done at all three count stations and shall only be performed when directed in writing by the COR.
The Dalles Dam	The Dalles Dam is located in the Portland District on the Columbia River at RM 192, near The Dalles, Oregon. It has two fish ladders, located on the north and south sides of the river. Fishery observers count at both ladders.
John Day Dam	John Day Dam is located in the Portland District on the Columbia River at RM 216, near Rufus, Oregon. It has two fish ladders, located on the north and south sides of the river. Fishery observers count at both ladders.
McNary Dam	McNary Dam is located in the Walla Walla District on the Columbia River at RM 292, near Umatilla, Oregon. It has two fish ladders, located on the north and south sides of the river. Fishery observers count at both ladders.
Ice Harbor Dam	Ice Harbor Dam is located in the Walla Walla District on the Snake River at RM 9, near Burbank, Washington. It has two fish ladders, located on the north and south sides of the river. Fishery observers currently count the south ladder by direct observation and simultaneously observe and count north ladder passage via closed-circuit TV.
Lower Monumental Dam	Lower Monumental Dam is located in the Walla Walla District on the Snake River at RM 41, near Kahlotus, Washington. It has two fish ladders, located on the north and south sides of the river. Fishery observers currently count the north ladder by direct observation and simultaneously observe and count south ladder passage via closed-circuit TV.
Little Goose Dam	Little Goose Dam is located in the Walla Walla District on the Snake River at RM 70, near Starbuck, Washington. It has one fish ladder, located on the south side of the river, where fishery observers count fish.
Lower Granite Dam	Lower Granite Dam is located in the Walla Walla District on the Snake River at RM 107, near Almota, Washington. It has one fish ladder, located on the south side of the river, where fishery observers count fish.

Notes:
Source: USACE Contract No. W912EF19C0002
COR: Contracting Officer Representative
RM: river mile

2 Staffing Plan

2.1 Project Management Team

The project management team consists of managers and subject-matter experts that will be responsible for implementation of the fish counting program in 2022 (Figure 2). The project manager will have overall responsibility for leading the fish counting project. The project manager role will continue to be filled by Sam Haffey for the 2022 fish counting season. Mr. Haffey served as the information technology/data officer for the 2019 fish counting season and as project manager for the 2020 and 2021 fish counting seasons and is experienced and qualified to assume project management responsibility in 2022. In 2022, Elliot Koontz will fill the role of deputy project manager. Mr. Koontz has been involved as data manager for the project for three years and is intimately familiar with project operations and data requirements. Mr. Koontz will be taking a larger role in working with count management staff to supervise management of fishery observers and daily operations at the projects. Additionally, Mr. Koontz will serve as the primary point of contact with the USACE Contracting Officer, Brooke Moore, and the USACE Contracting Officer Representatives (CORs), Dr. Chris Peery and Bob Wertheimer, with guidance from Mr. Haffey. Dr. Peery will have overall COR responsibility for the fish counting program, but Dr. Peery and Mr. Wertheimer have geographic focal areas for day-to-day project oversight at fish counting facilities along the Snake River (Walla Walla District) and Lower Columbia River (Portland District), respectively.

Figure 2. Organization chart for adult counting program oversight

Mark Weiland, who has decades of experience working with USACE on Columbia and Snake River dams, will continue to be closely involved in the project and will serve as an advisor to the project team with specific focus on field deployments and other site issues. He'll also serve as Operations Manager in the Portland District, and assist with equipment and IT infrastructure issues as they arise.

Melissa Hambelton will return in 2022 as the Columbia River Count Manager (Portland District). Ms. Hambelton is a former fishery observer with 5 years of experience counting fish at Bonneville and The Dalles. She also acted as Columbia River Operations Supervisor from 2020 to 2021, and is experienced with the Four Peaks' count protocols and software.

Joel LaHaie will return in 2022 as Snake River Operations Manager (Walla Walla District). He has been involved with managing the Snake River projects since 2019 and will continue to provide support with operations management and assist with IT infrastructure issues as they arise in the Walla Walla District. Michele Burns-Rodriguez will also return in 2022 as the Snake River Count Manager (Walla Walla District). Ms. Burns-Rodriguez, a former Fishery Observer II from McNary Dam and co-manager of the Snake River District in 2020 and 2021, will continue to assist Mr. LaHaie with management for the Walla Walla District dams.

In addition to count management and staff operation, Ms. Hambelton and Ms. Burns-Rodriguez will also be solely responsible for performing all quality control counting during periods of live counting (April–October; see Table 7) for the Portland and Walla Walla Districts, respectively. This will ensure that quality control counts are performed by those individuals with the most experience in fish identification, thus enhancing the accuracy of quality control counts and increasing reliability of comparisons to fishery observer counts, as necessary (see Section 4 below). Ms. Hambelton and Ms. Burns-Rodriguez will also be responsible for training/retraining all fishery observers. Ms. Hambelton and Ms. Burns-Rodriguez each have at least 5 years of experience counting fish at stations in the Portland and Walla Walla Districts, and thus are most well-equipped to perform these tasks.

Count supervision also calls for the maintenance of day-to-day operations and management of fishery observers, including equipment installation, maintenance, observer scheduling, timecard approval, safety, access, and coordination with project biologists. For these duties, we will be expanding our team to allow Ms. Hambelton and Ms. Burns-Rodriguez to focus on quality control and training. Madison Carpenter will return in 2022 as a count supervisor for both districts. Ms. Carpenter has been involved in counting operations and count supervision since 2019, and acted as a junior count supervisor in 2020 and 2021. Additionally in 2022, Ella Head will be joining the team as a count supervisor. Ms. Head was introduced to the project in Fall 2021 and has already been involved in supervising counts for daily accuracy and typical project operations. In addition to count supervision, Ms. Head will be responsible for hiring fishery observers, scheduling shifts, and tackling personnel issues for both districts, to allow Ms. Hambelton and Ms. Burns-Rodriguez more time towards QC operations. Both count supervisors will be responsible for overseeing standard count operations and management periodically and performing the travel to projects in the Portland and Walla Walla Districts as necessary to retrieve quality control video, fix station infrastructure, and perform hands-on work at count stations

During the 2022 count season, count supervisor on-call responsibilities will rotate weekly, with one count supervisor responsible for fielding issues river-wide each count week (Friday to Thursday). The on-call supervisor will be responsible for daily data review, following up with fishery observers to resolve data issues, and fielding issues called in by fishery observers. The on-call supervisor will report issues as necessary to the supervisor team, data manager, and project manager for resolution. The schedule of count supervision will rotate weekly between these four individuals (Hambelton, Burns-Rodriguez, Carpenter, and Head) and will be determined at least a month ahead of time, in order to adapt as necessary and provide support for other counting operations, such as quality control counting. Mr. LaHaie, Mr. Koontz, and Mr. Haffey will also provide backup support to count supervisors, as necessary.

Mr. Koontz will maintain responsibility for the backend count data system monitoring and maintenance. Mr. Koontz will monitor the data delivery system to maintain timely data delivery and will be responsible for notifying data users of any delays in data delivery. Kevin McCraney and Ben Hegman will return to the project to provide IT support. Mr. McCraney and Mr. Hegman have an extensive background in IT

infrastructure and software development and have been intimately involved with the project in testing and deploying DNNCams at certain sites. Mr. McCraney will continue to improve the functionality and usability of DNNCams as they become more widely used (see Section 5), while Mr. Koontz will rely on Ms. Head and Mr. Hegman to provide IT support to the projects and perform data corrections as they become necessary throughout the count season.

Our overall coordination approach will be structured to meet the needs of USACE and promote efficient, effective communication. All contractual and operational issues will be communicated by the project manager to the Contracting Officer Technical Representative or COR. Operational communications will be delegated to the level requested and approved by the Contracting Officer Technical Representatives. Contact information for key project members is provided in Table 3.

Table 3. Contact information of key project oversight staff for the 2022 adult counting season

Name	Project Role	Location	Preferred Contact
Chris Peery	COR, Walla Walla District	Walla Walla, WA	(509) 527-7124 christopher.a.peery@usace.army.mil
Bob Wertheimer	COR, Portland District	North Bonneville, WA	(503) 374-8801 robert.h.wertheimer@usace.army.mil
Brooke Moore	Contracting Officer	Walla Walla, WA	(509) 527-7913 brooke.n.moore@usace.army.mil
Sam Haffey	Project Manager	Seattle, WA	(206) 428-3077 Ext. 3 shaffey@fourpeaksenv.com
Elliot Koontz	Data & IT Manager	Seattle, WA	(206) 428-3077 Ext. 701 ekoontz@fourpeaksenv.com
Mark Weiland	Operations Advisor (Portland District)	Stevenson, WA	(509) 415-3480 Ext. 5 mweiland@fourpeaksenv.com
Melissa Hambleton	Count Manager (Portland District)	The Dalles, OR	(509) 415-3480 Ext. 707 mhambelton@fourpeaksenv.com
Joel LaHaie	Operations Manager (Walla Walla District)	Ellensburg, WA	(509) 415-3480 Ext. 704 jlahaie@fourpeaksenv.com
Michele Burns-Rodriguez	Count Manager (Walla Walla District)	Umatilla, OR	(509) 415-3480 Ext. 712 mburns@fourpeaksenv.com
Madison Carpenter	Count Supervisor	Wenatchee, WA	(509) 415-3480 Ext. 715 mcarpenter@fourpeaksenv.com
Ella Head	Count Supervisor	Vancouver, WA	(509) 415-3480 Ext. 720 ehead@fourpeaksenv.com
Kevin McCraney	Data & IT Support	Seattle, WA	(206) 428-3077 Ext. 706 kmmcraney@fourpeaksenv.com
Ben Hegman	Data & IT Support	Bellingham, WA	(206) 428-3077 Ext. 717 bhegman@fourpeaksenv.com

2.2 Fishery Observers

Counting activities will be conducted by staff at the **Fishery Observer I** and **Fishery Observer II** levels (See Section 2.2.1; Table 4). Two Fishery Observer II staff will be employed at each of the eight projects and will coordinate on a regular basis with Operation Managers and Supervisors who in turn coordinate with the rest of the project management team (Table 5). The remaining staff at all eight projects and all substitute staff will be employed as a Fishery Observer I. The fishery observers that will be employed for the start of the 2022 count season are shown in Table 6.

2.2.1 Job Descriptions

The **Fishery Observer I** performs routine tasks associated with recurring and continuing work according to prescribed or established procedural standards and technical methods assigned. This worker assures that tasks are completed, data is developed, and methods used in securing and verifying data are technically accurate and in compliance with instructions and established procedures. This worker makes estimates of numbers and species composition of fish, using at a minimum, simple, dichotomous keys according to detailed procedures. According to established standards and detailed procedures, this observer: (1) records data on appropriate forms and logs, some of which may be electronic; (2) maintains field equipment and supplies; (3) collects scientific, management, and compliance information; and (4) makes observations of operations. The Fishery Observer I obtains, enters, and transfers data electronically, and obtains and records information on electronic equipment.

In addition to the duties carried out by the Fishery Observer I, the **Fishery Observer II** independently executes duties, while learning when and how to resolve exceptions and special problems or to make adaptations in the procedures and makes estimates of numbers and species composition of fish observed, using knowledge of various statistically valid sampling methods and dichotomous keys. The Fishery Observer II will advise Operations Managers and Supervisors and routinely communicate with project staff.

Table 4. Duties and compensation of fishery observers in 2022 (tentative as of February 1, 2022)

Position	Highlight Duties	Compensation
Fishery Observer I	- Fish identification and enumeration - Data entry - Verification of data quality - Follow established protocols	- Minimum hourly wage of $27.93 - Paid holidays - Paid vacation - Sick leave
Fishery Observer II	- Same duties as Fishery Observer I - Operate independently - Problem solving - Advise operations team	- Minimum hourly wage of $30.48 - Paid holidays - Paid vacation - Sick leave

Note:
Hourly compensation includes $4.18/hour of fringe benefits paid directly to employees.

Table 5. Relationship between project management, supervisors, operations team, and fishery observer II staff, 2022

Management	Operations	Project	Fishery Observer II
S. Haffey E. Koontz	M. Weiland M. Hambelton	Bonneville	Cheryl Engle and Robin Hudson
		The Dalles	Rayline Dobbs and Amy Frost
		John Day	Stephanie Essex
	J. LaHaie M. Burns-Rodriguez	McNary	Jana Simpson
		Ice Harbor	Vonnie Rodriguez
		Lower Monumental	Barbara Matheny
		Little Goose	La Donna Brabant and Sandra Wallis
		Lower Granite	Debby Stallcop

Table 6. List of fishery observers with 1 or more years of experience (tentative list as of February 1, 2022)

Name	Project	Name	Project
Engle, Cheryl	Bonneville	Simpson, Frank	McNary
Heiserman, Diana	Bonneville	Simpson, Jana	McNary
Hudson, Robin	Bonneville	Love, Jake	McNary
Leighton, Laura	Bonneville	Groff, Sharon	Ice Harbor
Maupin, Linda	Bonneville	Rodriguez, Vonnie	Ice Harbor
Nelson, Della (Irene)	Bonneville	Shove, Del	Ice Harbor
Dobbs, Rayline	The Dalles	Stadin, Joni	Ice Harbor
Frost, Amy	The Dalles	Close, Mike	Lower Monumental
Gorsuch, Kristin	The Dalles	Close, Susan	Lower Monumental
Green, Kathi	The Dalles	Fagalde, Cheryl	Lower Monumental
Reardon, Becky	The Dalles	Matheny, Barbara	Lower Monumental
Essex, Stephanie	John Day	Brabant, La Donna	Little Goose
Golphenee, Ashley	John Day	Fry, Jackie	Little Goose
Marquez, Carmen	John Day	Wallis, Sandra	Little Goose
Neal, Barb	John Day	Osborn, Kimberly	Lower Granite
Patten-Rowan, Christina	John Day	Stallcop, Debby	Lower Granite
Brown, Donald	McNary	Tibbetts, Robert	Lower Granite
Eldrige, Jennifer	McNary	Bridenbaker, Trey	Portland District Fill In
Eubanks, Sandra	McNary	Farabee, Rachel	Portland District Fill In
Heidebrink, Dylan	McNary	Fleischmann, Bettine	Portland District Fill In
Hilde, Cara	McNary	Newman, Dylan	Portland District Fill In
Miyata-Higa, Victoria	McNary	Ramirez, Beck	Portland District Fill In

3 Mobilization and Count Start-Up

Computers and video recording equipment were shut down and maintained at most count stations at the end of the 2021 count season. Video counting has continued through winter at Bonneville Washington Shore and Little Goose, while various other ladders have been shut down for maintenance (including Bonneville Bradford Island, Lower Monumental, and Little Goose). Video counting will occur at Bonneville, The Dalles, McNary, and Lower Granite dams starting March 1, 2022. Live counting will then commence at all projects beginning April 1, 2022, and continue until October 31, 2022, at most projects (live counting continues at Bonneville Dam through November 30, 2022). At Bonneville Dam, nighttime video counting in 2022 will begin on May 15 and continue until September 30. At The Dalles, John Day, McNary, and Lower Granite dams, nighttime video counting will occur from June 15 to September 30, 2022. This year, additional nighttime video counting is scheduled to occur from October 1 to November 30, 2022, at The Dalles, as well as additional daytime video counting at The Dalles and McNary from November 1, 2022, to February 28, 2023. Daytime video counting is also scheduled to occur as normal at Bonneville from December 1, 2022, to February 28, 2023, and at Lower Granite Dam from November 1, 2022, to December 30, 2022. All periods where video footage is reviewed will be counted directly from video or with use of a DNNCamera, with ample notification about the proposed equipment reported prior to the beginning of counting. The expected count schedule for the 2022-2023 year is provided in Table 7.

Table 7. Expected count schedule for the 2022–2023 year

Project	Count Type	Dates[1]	Times[2]
Bonneville	Video/DNN	March 1 – March 31	Daytime (0400–2000 PST)
	Live	April 1 – November 30	Daytime (0400–2000 PST)
	Video/DNN	May 15 – September 30	Nighttime (2000–0400 PST)
	Video/DNN	December 1 – February 28	Daytime (0400–2000 PST)
The Dalles	Video/DNN	March 1 – March 31	
	Live	April 1 – October 31	Daytime (0400–2000 PST)
	Video/DNN	June 15 – November 30	Nighttime (2000–0400 PST)
	Video/DNN	November 1 – February 28	Nighttime (0400 – 2000 PST)
John Day	Live	April 1 – October 31	Daytime (0400–2000 PST)
	Video/DNN	June 15 – September 30	Nighttime (2000–0400 PST)
McNary	Video/DNN	March 1 – March 31	Daytime (0400–2000 PST)
	Live	April 1 – October 31	Daytime (0400–2000 PST)
	Video/DNN	June 15 – September 30	Nighttime (2000–0400 PST)
	Video/DNN	November 1 – February 28	Nighttime (0400 – 2000 PST)
Ice Harbor	Live	April 1 – October 31	Daytime (0400–2000 PST)
Lower Monumental	Live	April 1 – October 31	Daytime (0400–2000 PST)
Little Goose	Live	April 1 – October 31	Daytime (0400–2000 PST)
Lower Granite	Video/DNN	March 1 – March 31	Daytime (0400–2000 PST)
	Live	April 1 – October 31	Daytime (0400–2000 PST)
	Video/DNN	June 15 – September 30	Nighttime (2000–0400 PST)
	Video/DNN	November 1 – December 31	Daytime (0400–2000 PST)

Notes:

Source: USACE Contract No. W912EF19C0002

1. Dates are presented from March 2022 until February 2023.
2. Times are presented in Pacific Standard Time (PST). When Daylight Saving Time (DST) is in effect, generally March through November, a counting period from 0400–2000 PST equates to 0500–2100 DST. Similar one-hour "spring-ahead" shifts occur for 2000–0400 PST when DST is in effect.

The Four Peaks team will remobilize equipment to the count stations according to the schedule shown in Table 8. All count computers will have software patches applied to bring the operating system and other required software to the latest versions before redeployment. We will also perform an audit of the wireless networks at each count station to ensure count station security, and update internet connectivity at various stations. The dates given below are based on a current understanding of resource availability, and the Four Peaks team may adapt this schedule to meet developing staff schedules. All equipment will be in place before the scheduled resumption of counting at each station. Four Peaks will notify USACE of any changes.

Table 8. Preparation and Training schedule for the 2022 adult fish counting program

Milestone	Date(s)	Lead	Notes
Setting up Bonneville, The Dalles, and McNary count stations for DNN counting and Lower Granite for video counting in March	Week of February 20, 2022	Weiland, Hambelton, LaHaie, Burns-Rodriguez, Head	Includes re-installing DNNCams and adjusting lighting as necessary.
Fishery Observer I and II Re-Hiring	Week of March 6, 2022	Hambelton, Burns-Rodriguez	March video fishery observers have already been re-hired and scheduled.
Spring Run Training for Fishery Observers	Week of March 13, 2022	Hambelton, Burns-Rodriguez	
Setting up count stations for live counting	Weeks of March 20 and 27, 2022	Weiland, LaHaie	
Software upgrades on count computers	Week of March 27, 2022	Koontz	
Prepare for nighttime video counting	Week of May 8, 2022	Weiland, LaHaie	Includes checking of DNNCam installations where approved.
Summer Run Training for Fishery Observers	Week of April 17, 2022	Hambelton, Burns-Rodriguez	
Fall Run Training for Fishery Observers	Week of June 26, 2022	Hambelton, Burns-Rodriguez	
Winter Run Training for Fishery Observers	Week of October 30, 2022	Hambelton, Burns-Rodriguez	

Once counting begins, we will staff all visual and video shifts according to predetermined work schedules that reflect the counting periods described in the contract. In the event that staff are unable to work a shift due to illness or another unforeseen event, the first contingency will be to backfill that shift with another fishery observer. In situations where backfilling is not possible for part of or an entire shift, video recordings of fish passage during the missing shift will be used to count fish. These counts will be provided as soon as possible to meet the reporting timelines identified in the contract.

4 Training and Count Data Quality Control

Training for the fish counting program will cover all target species in Table 1. Observers will also be trained to identify fish injuries. A library of fish passage videos collected during the 2020 and 2021 count seasons will be used to train fishery observers. Instruction manuals proven to be effective in previous count seasons will be used to train fishery observers to operate the count entry software and video playback devices. Observers will also be trained on the use of manual recording and reporting procedures in the event of power, equipment, or network outages (as specified in the 2022 Quality Control Plan). New hires will undergo more detailed training, whereas rehires with a record of accurate fish counts will be provided materials to refresh identification skills and data entry procedures. Two additional training sessions will be held for all fishery observers during the season at the beginning of the Sockeye and Coho salmon runs respectively. These sessions will focus on refreshing fishery observers on the differences between comigrating species to reduce misidentification of one species with the other. See Table 8 for the expected timing of these training sessions. In addition to improving run training materials, Four Peaks will be providing periodic updates to counters when species are documented in the river and sending quarterly e-mails describing typical species documentations per hour at each project to provide a more robust understanding to fishery observers of run sizes. More details about these efforts are provided in the 2022 Quality Control Plan.

A quality control program similar to that implemented in 2021 will be used to check count accuracy throughout the season. Each fishery observer will have 1 hour of their counts selected at random each month. The selected hours will be recounted by a supervisor (either Ms. Hambelton for the Portland District or Ms. Burns-Rodriguez for the Walla Walla District). Counts for selected hours will be aggregated by species for each fishery observer and scored by comparison to the recount. Fishery observers that fail to meet the 95% accuracy for salmonid species and 85% accuracy for shad will have their results analyzed and will be subject to retraining. The 2022 Quality Control Plan provides a more in-depth explanation of the protocol to be utilized to improve counter accuracy should QC results indicate an issue, including remote and in-person training sessions by count managers. . Details of the 2022 quality control program are contained in the 2022 Quality Control Plan submitted under a separate cover.

The accuracy of quality control counts will be checked in a similar manner by USACE staff, who will report any discrepancies they find to the Four Peaks project manager. Consensus in species identification will be confirmed during three meetings to be held between count supervisors and the USACE team involved in checking the quality control counts. Meeting dates will be chosen to coincide with the early portion of the run for focal species (Table 9). These meetings, established in 2020, will be used to help verify species identification protocols, and identify if specific identification issues remain that require resolution. In 2022, these meetings will be expanded to include a “blind” count session, wherein USACE and Four Peaks staff collectively count samples of passage video together without any prior knowledge and compare counts to determine where biases may exist. In addition to identification meetings, USACE will continue to provide Quality Assurance (QA) count results to Four Peaks, who will process them to compare them to quality control counts and determine if discrepancies exist. This automated processing of Quality Assurance scores will allow Four Peaks to identify discrepancies more quickly in certain count classes that may require attention.

Table 9. Seasonal quality control and assurance fish identification meeting schedule

Meeting Number	Species of Emphasis	Date of Meeting[1]
1	Chinook Salmon	Last week of April
2	Sockeye Salmon, Pink Salmon[2]	Mid-June
3	Coho Salmon, Steelhead, and Chinook Salmon	Mid-September

Notes:
1. Proposed dates may need to be adjusted to reflect actual run-timing.
2. Pink Salmon will only be included in this discussion during in-run years (currently odd-numbered years, e.g., 2019, 2021, and 2023).

5 Information Technology

To fulfill counting objectives and meet data transmission timeliness requirements, Four Peaks has developed and maintains an information technology count management system. This system includes count data entry software, called Anadromous, that is deployed to count stations and server-side software, and a database, called SpawningGround, deployed to a cloud hosting service. Both software systems were developed expressly for entering, managing, and reporting the adult fish counts. Anadromous allows for efficient entry of counts from visual counts, uncompressed recorded video, and DNNCam image streams using a customized input keyboard.

Anadromous automatically transmits hourly count data to SpawningGround where it is logged and stored to a secure database server. SpawningGround automates the delivery of count data, packaging the daily count data into the required deliverable files and transmitting them to the Fish Passage Center and the data archive accessible by USACE. SpawningGround also includes web interfaces where count supervisors and the project manager can monitor count stations, data delivery status, quality control metrics, and outstanding issues in count data that have yet to be delivered. In the 2020 count season, Four Peaks added additional data correction tools to the web interface which allowed for streamlined count data correction and limited the number of data files that need to be rereported due to data corrections made after initial delivery. This interface will continue to be utilized in 2022 to maintain the accuracy of incoming count data. In addition, improvements to SpawningGround will be made to track project-wide counting trends and conversion rates, following discussion with USACE personnel during the 2021 End of Year Review. These features will allow for count managers to understand broad scale trends in count accuracy that might be missed in analyzing individual counters.

Most count stations have remained in place during the off-season; however, equipment (i.e., computers, monitors, networking equipment, and universal power supplies) was demobilized from the Dalles and John Day at the end of the 2021 live count season to prevent damage from flooding that sometimes occurs during the winter at these stations. Four Peaks will redeploy this equipment and verify that all stations have serviceable IT infrastructure ahead of the count commencement at each station. Internet connectivity was established at each count station in 2019 and will continue throughout the 2022 season, with potential improvements to internet infrastructure being considered in Walla Walla District projects.

The DNNCam, a computer vision system capable of compressing live fish passage video into images of passing fish, has been approved for use for video counting at McNary and Lower Granite Dam, as well as at Bonneville and The Dalles outside periods of excessive shad passage. Currently, Four Peaks anticipates using DNNCams for spring counting (March 1 – March 31) at Bonneville, The Dalles and McNary Dams, while using typical video recording infrastructure for spring counting at Lower Granite Dam. Use of DNNCams further into the year will depend upon fish passage rates and equipment availability, but are anticipated to include summer counting at McNary (June 15 – September 30), as well as winter counting at Bonneville, The Dalles, McNary, and Lower Granite. DNNCam counting will continue to follow previous protocols for relying on video during periods of equipment outages or to enumerate passage of unique species (i.e., Pacific lamprey), as well as perform weekly DNN QC checks on cameras to assess accuracy. Four Peaks will continue to inform the USACE about plans for deploying DNNCams and utilizing them at projects as counting periods occur.

Protocols in place to maintain data integrity during times when IT equipment or software malfunctions are detailed in the Fish Counting Quality Control Plan (Four Peaks 2022) and are summarized briefly here.

Anadromous is programmed to cache count data on site in the event of an internet outage or cloud system downtime and transmits the cached count data once internet connectivity and/or cloud servers are available. This approach preserves count data onsite during internet or cloud system outages and makes sure that the data are available for reporting once connectivity is established. This procedure has been effective as demonstrated by the fact that no data have been lost over the past 3 years that Four Peaks has managed the adult counting project and an on-time delivery rate that exceeds the 95% contract requirement.

The DNNCam uses the station internet service to transmit compressed video (i.e., images of passing fish) as it is collected. In the event of an internet outage that prevents image transmission, the DNNCam utilizes cache memory on the device to store image data until a connection is reestablished and the images can be transmitted. This cache has the capacity to store 1,000 images. Image data will be overwritten before transmission if outages persist for prolonged periods in which more than 1,000 images are collected before the internet service returns. Four Peaks has developed protocols to prevent count data corruption due to lost DNNCam images under these conditions. Additional DNNCam specific protocols have been developed to maintain data integrity during DNNCam operations.

In the event of IT malfunctions, or other event (e.g., power outage) that prevents electronic entry of the fish counts, Four Peaks will implement a fallback system based on manual (paper) counts using the paper forms documented in the contract, which will then be faxed to the Fish Field Unit as required by the contract. Each station is equipped with universal power supplies (UPS) that are intended to provide short-term power to equipment in the event of small power outages.

Table 10 provides additional detail on the components of deployed IT systems and their purpose.

Table 10. Information technology components of the 2022 adult counting program

Component	Purpose	Notes
Count station computers with custom counting software (includes power backup)	Run the counting software for both visual and video counts	In the event of a system malfunction, or other event that temporarily disables a computer, count will be entered on paper counting forms that will be faxed to the Fish Field Unit at the end of shift.
Custom counting software (Anadromous)	Allows efficient entry of both visual and video counts while interfacing automatically with Four Peaks cloud-based data management systems on an hourly basis	Anadromous is programmed to be resilient to internet outages, allowing electronic count entry to continue without data loss until internet connectivity is reestablished.
Viewing monitors	Deployed for video counts to view video during playback of previously recorded fish passage	
Customized, programmable data entry keyboard	Permits rapid data entry of both visual and video fish counts	
Analog or digital camera with DVR	Permits recording of video during night and other periods where video counts replace visual counts	Video systems are of a digital or analog nature based on project specifics and currently installed infrastructure. Both systems record video for playback.

Component	Purpose	Notes
DNN Camera (at select locations)	Compresses video into single images of passing fish	Production deployments at approved stations. Specific protocols have been developed to maintain data integrity. These protocols are specified in the 2022 Fish Counting Quality Control Plan.
Video backup devices	Gathers video backup to protect against data loss due to error, damage, or other circumstances	All count data must be archived for the length of the contract, but video must be stored for a minimum of 14 days.
Wireless cell or satellite communication modems and accessories	Provides access to the internet to transmit count data to Four Peaks cloud-based data management system on an hourly basis and enables remote access to the count computers for maintenance and monitoring	Internet provided via cable, cellular, satellite, or radio communications depending on what is available at each site. These communication systems are separate from the USACE networks and communication lines at projects.
Furniture, refrigerators, heaters, etc.	Provides observers with an effective and efficient space to conduct work duties while facilitating the proper deployment of all IT infrastructure	

6 Safety, Security, and Access

While on the projects, Four Peaks team members will follow all relevant safety requirements in the USACE Safety and Health Requirements Manual, safety instructions from authorized USACE personnel.

The safety, security, and access requirements for the USACE projects include the following:

- Four Peaks submitted a written Activity Hazard Analysis regarding each project site (i.e., dam) before counting began in 2019 that describes potential hazards to project staff and actions to avoid injury. Four Peaks will provide copies of the approved Activity Hazard Analysis to all Four Peaks team members prior to the start of counts at each dam in 2022.
- All Four Peaks team members will carry photo identification and wear a USACE-issued project pass or district contractor identification above the waistline at all times.
- Fishery observers will contact the powerhouse operator or other project point-of-contact by telephone at the beginning and end of each work shift if required, so project personnel will know they are on the project.
- All Four Peaks vehicles, including personal vehicles used by fishery observers, inside project security zones will be clearly marked with "Four Peaks" and "Fish Counting" on both sides.
- All Four Peaks team members will submit to security inspections and checks (including inspection of toolboxes, briefcases, lunch boxes, and other containers) when entering security zones.
- Four Peaks will comply with applicable installation, facility, and area commander installation/facility access as well as local security policies and procedures (provided by government representative).
- Four Peaks will provide all information required for background checks/investigations and to meet installation and facility access requirements.
- All Four Peaks team members requiring access to specific USACE facilities will complete Anti-Terrorism Level I Awareness training when required by the project biologists for the given facility.
- All Four Peaks team members will comply with all personal identity verification requirements as directed by the Department of Defense, Headquarters Department of the Army, and/or local policy.
- All Four Peaks team members will receive a brief/training on the local suspicious activity reporting program when required by the project biologists for the given facility.
- All Four Peaks team members requiring access to specific USACE installations will complete Level I Operations Security (OPSEC) training when required by the project biologists for the given facility. Additionally, all Four Peaks team members will complete annual OPSEC Awareness training when required.
- All Four Peaks team members requiring access to specific USACE installations will complete Hazardous Energy Control Procedure training when required by the project biologists for the given facility.
- All Four Peaks team members, including subcontractor employees who do not possess the appropriate security clearance or access privileges, will be escorted in sensitive and/or restricted areas, and areas where they may be exposed to classified and/or sensitive materials.

- Four Peaks will pre-screen candidates using the E-verify program website to meet the established employment eligibility requirements.
- Four Peaks will ensure that candidates have two valid forms of government-issued identification prior to enrollment to ensure the correct information is entered into the E-verify system.

Following some spurious infractions surrounding access protocols in 2021, these requirements will be summarized in a document provided to all fishery observers during the hiring period to make sure these protocols are well-understood by all staff members prior to badging.

In 2022, Four Peaks will continue to operate under the contagion control protocols established in 2020 to control spread of COVID-19The contagion control protocols are:

- All fishery observers and project management staff must use a cloth covering that covers the nose and mouth when more than one person is in a count station.
- All staff must maintain a minimum of 6 feet of separation whenever possible. Maintain the maximum separation possible in situations where 6 feet of separation is not possible.
- Whenever possible, schedule performance of duties at times when the count station is not occupied.
- Vaccination is strongly recommended for those who are eligible.

The contagion control protocols will remain in effect until further notice. Four Peaks has surveyed fisheries observers staff to gain an understanding of vaccination rates across projects. Due to ongoing litigation around Executive Order 14042 requiring COVID-19 vaccinations of federal contractors, there is currently no plan on requiring vaccination to count staff for the 2022–2023 year. Four Peaks will follow guidance from the USACE regarding the status of vaccine mandates and corresponding enforcement.

7 Weekly Reporting

Weekly reports will be delivered via electronic mail to the COR by the project manager on a weekly basis throughout the 2022 period of performance beginning on March 1, 2022, and ending February 28, 2023, (covering the final week of performance in the contract year ending February 28, 2023). Weekly reports will be in the form of a technical memorandum and summarize the following project updates as applicable:

- Staffing updates, including new hires or staff turnover
- Personnel problems that affected fish counting
- Scheduled quality control or testing activities
- Training activities and results of quality control checks or testing
- Missed counting hours or day
- Observed counting problems
- Observed fish passage issues
- Status of count station issues, such as lighting or window cleaning
- Suggestions for improving the fish counting program
- Current quality control metrics by species and project, and detailed results for any fishery observers checked during the week
- Current project uptime and on-time delivery statistics

Weekly reports will be updated as necessary to provide more in-depth explanations of passage patterns and counting operations as the season progresses.

References

Four Peaks Environmental Science & Data Solutions (Four Peaks). 2022. Fish Counting Quality Control Plan. Prepared for the U.S. Army Corps of Engineers Contract No. W912EF19C0002. Wenatchee, WA.