

WINTER STEELHEAD SPAWNING SURVEY  
PROCEDURES MANUAL

2022



OREGON ADULT SALMONID INVENTORY AND  
SAMPLING PROJECT (OASIS)  
OREGON DEPARTMENT OF FISH AND WILDLIFE

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## INTRODUCTION

Winter steelhead (*Oncorhynchus mykiss*) historically occurred in varying abundance in all of Oregon's coastal streams. In 1992, the harvest of natural origin steelhead was restricted as a conservation measure by the Oregon Department of Fish and Wildlife (ODFW). Further restrictions have followed, effectively eliminating the take of natural origin steelhead in much of coastal Oregon. In the past, a combination of dam passage counts and angler catch card records were used to track trends in adult steelhead abundance. The elimination or significant reduction in angler retention of natural origin steelhead significantly reduced the value of using catch-card data for indexing trends in coastal Oregon natural steelhead populations. Accurately depicting the status of steelhead populations is imperative for the management of steelhead resources, leading to the development of this project as a method for tracking abundance, distribution, timing, and hatchery-wild relationships in wild winter steelhead.

Unlike coastal salmon monitoring, which relies on live adult counts and carcass recoveries to estimate abundance, steelhead monitoring relies on redd counts and observations of live fish. This is because steelhead spend only a short time on spawning beds, and fish not actively spawning are elusive, hard to count and do not usually die near where they spawn. Also, the winter steelhead spawning season is protracted, lasting up to 6 months. Steelhead also have a basin wide spawning distribution, spawning in higher gradient headwater streams as well as larger tributaries and mainstem rivers.

The 2022 survey season will be the twentieth year of coast wide random steelhead adult sampling, and the thirteenth year in select populations of the Lower Columbia. A spatially balanced probabilistic sampling design was used to select survey sites across a stream network of winter steelhead spawning habitat. Repeat visits to each site from February through at least May will generate a total redd count for each survey, which will then be used to generate abundance estimates. Sites must be visited at least once every fourteen days. The majority of steelhead sites were also surveyed during the salmon spawning season, October through January. Observations of steelhead and their redds from the salmon season are included in the steelhead monitoring data. Survey effort in the Oregon Coast has been reduced compared to previous years with the goal to obtain information at the Distinct Population Segment (DPS) scale rather than the smaller monitoring area level. In the 2022 season we will also conduct population level steelhead spawning surveys in the Lower Columbia.

## **SURVEYOR SUPPLY LIST**

### Forms:

1. Steelhead Survey Landowner Contact Forms.
2. Spawning Survey Evaluation Forms.
3. Description Change Forms.
4. List of Survey Location Descriptions.
5. Report of Operations Form.

### Equipment:

Flagging  
Painted rocks  
Life jacket and spray jacket  
Boat with oars and pump  
Tie-downs and rope for boat transportation  
Uniform shirts  
Uniform hat with ODFW logo  
Raincoat  
Orange field vest  
Chest waders, with belt  
Wading boots  
Knee Pads (optional)  
Wading staff/gaff  
Polarized sunglasses  
Coastal Steelhead Spawning Survey Procedures Manual  
OASIS Admin Handbook  
Scale envelopes  
Measuring tape (in millimeters)  
Tweezers  
Knife  
Pencils  
Permanent markers  
Survey boundary signs and aluminum nails  
Machete  
C.B. radio  
PDA and charger  
Cell phone and charger

## SURVEY PROCEDURES

### Organizing Work

Each crew (two members) will have a list of about 45-50 surveys. Some surveys will require floating and others walking. Each survey should be conducted every 7 to 14 days. Though it may not be possible to survey large water sites at the start of the season, an effort should be made to get into them as soon as possible. Group surveys into daily work schedules that fit a two-week rotation. Stream flow and visibility will determine whether or not a survey can be conducted so be prepared to be flexible. As you become familiar with your surveys you will be able to change your schedule to accommodate changing water conditions. Remember, some float surveys might be walkable at lower flows, while some foot surveys can be floated at higher flows.

### Survey Considerations

Most surveys will be conducted on foot using a similar protocol to the salmon spawning surveys performed in the fall. In addition to counting live fish and recording adipose clipped fish, individual redds will be marked. Unlike foot surveys, float surveys are conducted moving downstream and are always done by both members of the crew, each in a one person inflatable boat. Boating safety is an important part of the job covered in more detail on pages 23-28.

Most crews will have two vehicles, which allows for shuttling. **Obtaining landowner permissions are required for both float and foot surveys.** In sections of stream commonly floated by the public we do not require permission from every landowner, but every landowner on the survey should be notified that we are in the area so that redd marking materials (i.e., flags and rocks) are not disturbed. In addition, landowner permissions are required at the put in and take out locations even if they are not within the survey boundaries. Permission is also required before entering, crossing or parking on any private property.

To increase the level of safety and maximize the area covered, **float surveys are always conducted by pairs of surveyors.** Crews lacking boating experience should conduct initial floats on potentially dangerous surveys with crew leaders. While conducting float surveys each person will be wearing waders and a belt, life jacket, spray jacket, and other miscellaneous gear. It is imperative that waist belts are fastened tightly and life jackets are zipped all the way up. A tightly fastened waist belt will slow water from filling your waders. The take home message for all float surveys is that if you feel uncomfortable, portage or line your boat around rapids, or skip the survey until you can assess it with your crew leader. You should carry a bag of some sort to hold rocks and a dry bag to carry extra clothes and food on longer floats. On some float survey days you may want to combine multiple surveys together and make a longer overall float. For example, if a six mile section of river has three surveys spread throughout its length with gaps between each one it might be worth it to float the entire six miles (only surveying 3 miles) to minimize put in and take out time.

The normal procedure for a float survey is to load both of the boats in the back of one vehicle. Depending on the vehicle, the frames may need to be detached so the boats will fit snugly. Each crew will be provided plenty of straps to tie down the boats. Drive to the site and drop one vehicle off at the take out. Drive up to the start point and look for a good put in. If there isn't a decent boat launch at the start point, drive upstream to acquire an easier river access point. Once at the launch site please **carry** your boats down to the water. Dragging inflatable boats increases the chance of ripping holes and dramatically reduces their life-span. Once in the water you will need to find the most productive way to cover each survey. On bigger streams this usually means one person on each side of the stream so that each person can see to the bank and to the middle of the stream. When approaching high density redd areas, standing in the boats will greatly increase your ability to identify redds and live fish. In order to protect the boats while standing, you may use boots without studs, or ensure there is a rubber mat or carpet in the boat for you to stand on. When live fish or redds are encountered communication is key so that everything is recorded accurately and no single fish or redd is counted twice. It is helpful to first float over the redds to get an accurate count and then to double check the area once on the bank. Give yourself extra time for float surveys, especially early in the season as you are getting familiar with the floats, and later as redd density increases.

We often survey popular fishing areas. Be courteous in how you approach and pass both boat and bank anglers. Do not float over the water that they are fishing. As you approach, ask them where they wish you to proceed. If they appear to be ignoring you, keep as far away from them as possible. Generally, with drift fisherman, it is best to get as close to them as possible. With people back-bouncing or hot-shotting, it is best to keep as far away as possible. Give fisherman the Right of Way. We do not want to be disruptive or diminish their angling experience.

### **Fish Counts**

▼ Steelhead Counts - 50100.00 Seg 1: Deer Cr			
Live Unmarked Steelhead			
−	0	⊗	+
Live Ad-Clipped Steelhead			
−	0	⊗	+
Live Clip Unknown Steelhead			
−	0	⊗	+

Steelhead are more easily frightened than salmon, so take time to identify fin clips when fish are encountered. Success in identifying marks on live fish varies between surveyors, but generally crews can determine fin mark status on 40% of fish. If you get into the season and realize you're not identifying many fin marks it might be time to slow down during the survey. It's **OK** to spend a little extra time trying to identify fin clips. Your polarized glasses and hat will help considerably in

identification. Look ahead for likely sections (tail-outs) where you would expect fish to be spawning and approach these sections slowly. Look for areas near the stream where you can get in an elevated position. Visibility is greatly improved from an elevated position. If you cannot positively identify a fin mark then record it as unknown. In some areas marked fish returning to hatcheries are given a second mark and then trucked downstream and released to provide more angling opportunities for the public. Look for colored tags on any part of the fish, or punches on the operculum (gill plate). If any marks or tags other than adipose clips are observed please

make a comment under notes, and inform your assistant project leader. All steelhead carcasses should be sampled for biological data. See “Carcass Sampling” (page 20) for sampling details. Other species you may encounter include Pacific Lamprey, Western Brook Lamprey, and cutthroat trout. Pacific Lamprey tend to spawn in the larger streams while Western Brook Lamprey and cutthroat are generally found higher up, in smaller tributaries. For each species observed you will be recording the overall live fish activity.

### **Redd Counts and Marking**

The screenshot shows the 'Mark Redds' form in the ODFW SGS Surveys app. The form is titled 'Mark Redds' and has a green header with the app name and navigation icons. The fields are: 'Redd number \*' (text input), 'Species \*' (dropdown menu), 'Initial Date \*' (date picker), 'Rock Color' (dropdown menu), 'Confidence' (dropdown menu), 'Removal Date' (date picker), and 'Comments' (text input). At the bottom, there is a trash icon, '1 of 1', and a plus icon.

To prevent double counting, steelhead redds will be marked using colored rocks and flagging. Place a rock inside the bowl of the redd and put flagging in a nearby tree. Use a sharpie to write the date, species, redd number, rock color and a brief description of where the redd is located in relation to the flag.

**Record all steelhead redds in the Redd Longevity form.** Acquire GPS coordinates and record the redd number, rock color, initial date, and then later, the date when the redd is no longer visible. If you find that you are having difficulty acquiring a GPS signal, try using the app **GPS Test**. By starting this app first, your phone will more readily acquire a signal and make the GPS coordinate acquire better in Survey 123. You will also record the redd confidence code. This code indicates how sure you are that the redd is in fact a redd. (1= completely confident, 2 = probable redd, 3 = uncertain if a redd). In areas with high redd densities please write additional comments (e.g. 2m out and 1m upstream from flagging) that will help identify which redd is which. Each redd will receive a number to identify it. Number the redd with a combination of your surveyor ID, the date, and a consecutive number (see “Unique ID code”

description below). When a redd is no longer visible, the date will be recorded as the removal date. ***For the 2022 season, we will develop a plan for recording removal dates, as Survey123 does not allow redd longevity records to be edited after they have been sent. Likely, we will periodically (perhaps weekly) send out a list of recorded redds for your tracking needs. You will then record the removal dates on that list and submit those to Corvallis staff. More specifics will be shared as we establish a plan.*** For redds that are still visible during the last site visit, record the date of the last survey and note as still visible on last survey. **All flagging and as many of the colored rocks as possible should be removed during the last site visit for the year.** Removal of flags and as many rocks as possible is critical to maintain good relationships with landowners and ensure continued access to conduct these surveys.



**All visible lamprey redds will be tallied on each visit and tallied separately by lamprey species.** Basically, if it is a lamprey redd, then tally it, regardless of whether it was tallied on a previous visit. **Lamprey redds will not be recorded on the Redd Longevity form.** They need not be marked with colored rocks, but if marking a lamprey redd, then use a color which has been agreed on with your crew leader as lamprey-only.

Steelhead redds are typically 3 to 4 feet wide and 6 to 8 feet long (page 18). Fresh individual redds are usually easy to identify because the overturned gravel will be lighter in color compared to adjacent substrate. Preferred sites for redds are located in gravel beds at the tail end of pools or the head end of riffles (tail-outs). This description is an example of what to look for in a perfect situation, but steelhead will spawn in areas that are far from typical. It will be important to look for steelhead in all areas of the stream. An example of an atypical spawning site would be areas that are less than 2 m<sup>2</sup> in total area. This can occur in tributary as well as the larger water surveys. You will also find fish spawning in areas where the gravel depth is less than eight inches. Fish encountered spawning at higher stream flows is another issue. This can occur during some of the float surveys when fish are seen spawning but you are unable to get a rock effectively in the bowl of the redd. The best method in these situations is to put a flag on the bank and make note of the redd. If you are unsure of a redd you can always mark it and then have the option of taking it out of your data, if after checking it on the next visit it is determined to not be a redd. You will encounter these situations as well as other cases in which steelhead seem to be defying our conventional definitions.

All steelhead redds will be given a unique ID code. The proper naming convention for redds is as follows: **surveyor #-date-redd number for that day and survey.** For example; Surveyor number 7 is performing a survey on 4/5/2022. After walking 100m she finds the first redd of the day at this site. The Redd ID for this redd would be: 7-0405-01 since it is surveyor 7 on 0405 (April 5<sup>th</sup>) and the first redd of the day at that site. The second redd seen during this survey would be 7-0405-02 (and so on). It is important that the date component of this code include four digits so there is no confusion between dates (e.g., 112 could be Jan 12, or Nov 2).

In 2016, we added a new field to the redd longevity form to record redd confidence. The field is a popup list called “Confidence” and is located after Rock Color and prior to Removal Date on the redd longevity form. It is intended to be used as a way of grading how confident you are in your redd call. The pop-up list allows you to choose one of three options: 1 = Confident, 2 = Probable, or 3 = Uncertain.

- 1 - “Confident” call means you are certain the redd is fish made with well-defined pot and/or tail spill edges.
- 2 - “Probable” call means you are fairly certain the redd was fish made, but the pot and/or tail spill edges might not be very well defined.
- 3 - “Uncertain” call means you see some sort of substrate alteration that is likely fish made; however, you are tentative as to whether it is an actual redd, test-dig, or the beginnings of a redd.

With all subjective data, there is going to be some ambiguity; the important part is that you make your redd confidence calls consistently. We don't intend to use this field as a filter, but rather as a way of assessing the proportion of redds on the landscape that we are confident in. Thus, a redd with Confidence=3 will be treated the same in our data summaries and estimates as a redd with Confidence=1 or Confidence=2. This ranking system might help to identify streams or areas where making redd calls is more difficult.

Pacific Lamprey redds can usually be distinguished from steelhead redds because the rocks will be placed by the fish upstream, downstream and to the sides of the depression (page 18). Pacific Lamprey redds are typically about 24 inches in diameter and have a neat round appearance. Much of the time you will find lamprey redds in clusters within nice tail-out sections, and it is not uncommon to see more than a few lamprey on a redd. Pacific Lamprey tend to spawn in the larger tributary and mainstem sections of streams. It is also common to find lamprey spawning inside of an existing steelhead redd. The most effective method in these cases is to first identify areas with high densities of both species. It would be helpful if during these situations you are able to decrease the amount of time between survey dates. It would be better to get back to this survey in a week to increase your chances to see fish on redds. In addition to Pacific Lamprey you may find Western Brook Lamprey in some of the smaller tributaries. This species is much smaller in overall size (~ 6 inches length) and spawns in smaller gravel. The redds are less than a foot in width. Although much smaller, Western Brook Lamprey still use the same method of gravel excavation by using their mouth to suction rocks. Similarly to the Pacific Lamprey, rocks will be placed upstream, downstream and to the side of the redd, something that will not be seen in steelhead or cutthroat redds. Cutthroat redds are typically found in the smaller tributary streams, and while similar in shape to a steelhead redd, they are usually much smaller in size and excavated in areas of smaller gravel.

### **Steelhead Survey Data Form Codes**

#### **WEATHER**

Describe the weather as:

- C - Clear
- O - Overcast
- F - Foggy
- R - Rain
- S - Snow
- P - Partly Cloudy

#### **FLOW**

Describe the stream flow as:

- L – Low or Dry - Stream does not cover nearly all of the stream bed.
- M – Moderate - Stream covers nearly all or all of the stream bed.
- H – High - Stream width approaches or reaches active channel width and stream height approaches bank full.
- F – Flooding - Stream is out of its banks.

## VISIBILITY

Describe stream visibility as:

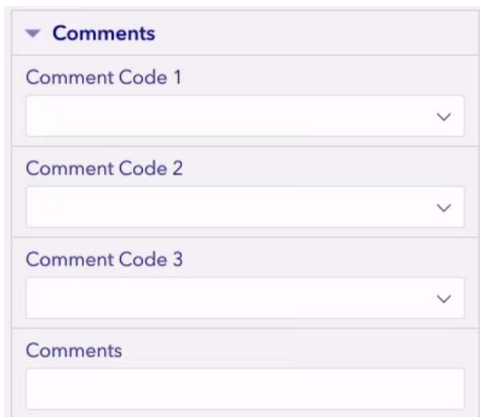
- 1 - Can see bottom of riffles and pools.
- 2 - Can see bottom of riffles, but not pools.
- 3 - Cannot see bottom of riffles or pools.

## LIVE FISH ACTIVITY

Overall live fish activity of each species observed must be recorded.

- 13 - Most fish spawned out.
- 14 - Most fish holding in pools (prior to spawning).
- 15 - Most fish migrating through survey area.
- 16 - Most fish actively spawning (as demonstrated by courtship behavior, excavation of redds, competition for mates, and guarding of redds).

## COMMENT CODES



The image shows a screenshot of a survey form. It features a section titled "Comments" with a dropdown arrow. Below this are three separate dropdown menus labeled "Comment Code 1", "Comment Code 2", and "Comment Code 3". At the bottom of this section is a text input field labeled "Comments".

Use comment codes from the following list. There is room for three comments per survey. Prioritize comments on the Steelhead Survey Form according to the priority of the categories listed below. If further comments would be useful, record the comment code number (i.e. CC-64) or type in text comments in the Comments field below the comment code dropdown boxes.

### Area Surveyed

- 01 Includes tributary to index. (*Used when recorded data includes trib of survey*).
- 02 Holes not surveyed. (*Used when water is too high or murky to survey holes*)

### Factors Affecting Fish Abundance

- 48 Stream Flow insufficient for adult entry to date. (*Still need to walk every survey*)
- 49 Possible Passage barrier below survey. (*Let your crew leader know*)

### Viewing Conditions

- 20 Dark (pertains to the light source, not the water clarity).
- 21 Dark in pools (pertains to water quality, often tannins).
- 22 High glare.
- 23 Partly frozen.
- 24 Not surveyable (stream too high and/or turbid, counts will be disqualified).

### Stream Conditions within the Survey Area

- 31 Impassable logjam.
- 32 Passable logjam.
- 33 Impassable beaver dam.
- 34 Passable beaver dam.
- 35 Impassable culvert.
- 38 Passable culvert.

### Miscellaneous

- 52 Live tagged fish observed.
- 57 Live fin clip (non-adipose) fish observed.
- 60 Most carcasses washed out.
- 64 Exposed redds due to low flow.
- 66 Counts probably higher than observed.
- 71 Redds estimated-high density.
- 88 Survey not conducted due to impassable road.
- 99 Placed steelhead carcasses observed.

### **Spawning Survey Evaluation Form Instructions**

This important form is used to evaluate the spawning habitat for salmon and steelhead in a given season and survey segment. It is also used to note any factors that may influence our ability to obtain accurate estimates of spawner abundance in the survey segment. One form is to be completed for each survey segment at or near the end of the spawning season. The surveyor who is most familiar with the survey being evaluated should complete this form. Use input from other surveyors as needed. Please make sure to fill in the Surveyor ID on every form. The Reach ID, Segment, and Survey Name should be preprinted on the form.

#### DATE OF FORM

Enter the date on which the form was completed.

#### PROBLEMS WITH SURVEYING THIS STREAM SEGMENT

List any major problems that prevented the survey from being conducted or caused the survey to be difficult (road conditions, extended high stream flows and/or turbidity, problems with access through private land, etc.). Identify any factors related to the condition of the survey segment that may have hindered your ability to make accurate counts of salmon (water clarity, structure in the stream channel, viewing conditions, etc.). Note if and when the stream became too low for STW passage. Make a special note of exposed redds.

#### BARRIERS TO UPSTREAM MIGRATION

List up to three potential barriers to upstream migration; this may include barriers which formed during the course of the spawning season. Barriers are best identified by the presence of adults

immediately downstream from an obstacle but not upstream of the obstacle. Record the approximate location of the barrier from the survey starting point (nearest 0.1 miles from the start), nature of the barrier (i.e. beaver dam, culvert, log jam, waterfall, etc.), and the date when the barrier became passable (date when fish were first observed upstream from the barrier or when high flows removed the barrier). It should also be noted if barriers develop later in the season due to lower flows. If you feel the barrier prevented fish passage for the entire season, note as such. If the endpoint of the survey is a barrier, mention that too.

## ESTIMATES OF SPAWNING GRAVEL QUANTITY

This estimate should be done at the end of the season but should reflect spawning gravel quantities throughout the season. This is a rough quantitative estimate within large ranges of gravel abundance. See the description of typical steelhead spawning gravel and spawning locations (page 7) to help determine the quantity present in each survey.

## DISTRIBUTION OF SPAWNING GRAVEL

Estimate the proportion of spawning gravel in each quarter of the survey to the nearest 1%.

## DISTRIBUTION OF SPAWNING FISH

Estimate the proportion of spawning fish in each quarter of the survey to the nearest 1%. Remember to indicate whether fish or redds were used to make the estimate.

## HABITAT RANKING

Please circle the most appropriate ranking based on the description of the perfect spawning habitat in relation to gravel size, quantity, abundance, tail outs, and gradient.

## GENERAL COMMENTS

Use the reverse side of the form to record observations that will help you complete the evaluation. List any comments that will help in interpreting your responses and list any other noteworthy features of the survey segment. Some possible questions to consider include: What are your impressions of the habitat? Did the habitat significantly change during the season, and if so, how? Are spawning habitat improvement structures present, and are they functioning to improve spawning habitat? If no adults were seen, do you have any idea why? Were there any tributaries within the segment that steelhead use for spawning? Were the names, addresses, and/or phone numbers of landowners mentioned in the description correct? Was this survey unusual compared to other surveys you have done? Attach additional sheets as necessary. In many cases you will see certain sections of a stream more than any other person. You may end up learning things about a stream that no one else knows. If you feel that you have information that would increase the quality of data, correct possible errors in the stream database, or increase our understanding of a certain stream, the survey evaluation form is where that information should go.

FORM



## SPAWNING SURVEY EVALUATION FORM

REACH ID		SEGMENT #		SURVEY NAME	
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ID # OF SURVEYOR COMPLETING FORM		DATE OF FORM	
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**PROBLEMS WITH SURVEYING THIS STREAM SEGMENT:**

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**BARRIERS TO UPSTREAM MIGRATION:**

APPROX. LOCATION (0.1 MILE)	NATURE OF BARRIER	DID IT BECOME PASSABLE? WHEN (DATE)?	WERE SALMON OBSERVED UPSTREAM FROM IT

**RANKING OF SPAWNING GRAVEL QUANTITY (check one):**

**Category**

- None
- Low
- Moderate
- High

**Description**

- No Spawning Gravel
- >0 and < 20 m<sup>2</sup> Spawning Gravel
- 20 to 100 m<sup>2</sup> Spawning Gravel
- > 100 m<sup>2</sup> Spawning Gravel


**DISTRIBUTION OF SPAWNING GRAVEL (% OF TOTAL):**

DOWN-STREAM BOUNDARY	LOCATION WITHIN SURVEY SEGMENT				UP-STREAM BOUNDARY
	START TO 1/4	1/4 TO 1/2	1/2 TO 3/4	3/4 TO END	

**DISTRIBUTION OF SPAWNING FISH (% OF TOTAL):**

DOWN-STREAM BOUNDARY	LOCATION WITHIN SURVEY SEGMENT				UP-STREAM BOUNDARY
	START TO 1/4	1/4 TO 1/2	1/2 TO 3/4	3/4 TO END	
<i>FISH DISTRIBUTION BASED ON: FISH REDDS (CIRCLE ONE)</i>					

**HABITAT RANKING (circle):** NO HABITAT    VERY POOR    POOR    OK    GOOD    VERY GOOD    EXCELLENT

**GENERAL COMMENTS AND ADDITIONAL CODED COMMENTS (USE REVERSE SIDE)**

## DESCRIPTION CHANGES

Survey descriptions sometimes contain outdated or incorrect information which must be updated. Common description changes include (but are not limited to) correcting UTM coordinates, revising driving directions, updating information about access gates or keys, or moving sign locations. Record these changes on the **Description Change Form**. Your survey notebook contains a pre-printed description change form for each survey on your rotation. Fill out the form completely. When writing a description, be detailed and precise. If minor changes are to be made, highlight the area being altered in the existing description, and indicate changes on the lines below. Proper grammar and legibility are important. Read the descriptions to your surveys to get an idea of what makes a good description. If no changes need to be made, simply check the box for No Changes.

## LANDOWNER CONTACTS

We contact landowners for permission before conducting surveys that are located on private land. You will be given pre-printed Landowner Contact forms for all steelhead surveys that have also been surveyed for Coho or newly set up this year. In most cases, permission for steelhead walking surveys has been established during the Coho survey season; you should verify this with your crew leader and the landowners if necessary. The information printed on these forms represents our best information about who the property owners are along the survey route. The preprinted information often needs updating, for example when property is sold or transferred to new landowners, or if the landowners have relocated. There may also be forms where most of the landowners were contacted but one or two do not have a current OK date. Please make sure that you contact those landowners and get permission. **Steelhead surveys that were setup in previous years or have not been done for Coho will require you to obtain permission and document the landowner contacts.** Ask landowners if there are specific stipulations or conditions that they want to establish prior to allowing access and be sure to record these in the comments section of the Landowner Contact Form and include these comments on the survey description change form. Complete the form by verifying tax lot, address, phone no., and record the date permission was granted or denied by the landowner.

When you contact landowners, introduce yourself in a professional manner and identify that you work for ODFW. Briefly describe the purpose of the survey and emphasize that ODFW is using the information to better manage fisheries and monitor the status of large scale steelhead populations, not to evaluate fish in relation to conditions on their property. Explain your reason for being there, and be clear on your intent, methods, and the frequency of your visits. Inform landowners that surveys will be conducted through May to accommodate steelhead spawn timing. Be aware that some landowners may have been contacted previously by other projects.

An information pamphlet discussing the Oregon Plan for Salmon and Watersheds is also available for the landowner's information. This pamphlet gives an overview of the goals of the Oregon Plan and also explains the three ODFW monitoring projects: adult, juvenile, and habitat surveys that are conducted as part of the Oregon Plan. Pamphlets may be obtained from your

crew leader. Be sure to check the box next to the Adult Salmon Spawning Surveys section of the pamphlet prior to handing it out and include your name and cell phone number.

On large streams that are commonly floated for public fishing, permission from every landowner is not required but all landowners should be notified that we will be placing rocks and flagging. If a landowner denies permission, you may still be able to float through that portion of the stream, but do not mark redds or sample fish. Consult with your crew leader in these situations and make sure you clearly mark on the landowner sheet that you are skirting that property. Also, landowners at the access points (put in and take out) will have to be contacted. Use your best judgment and talk to your crew leader if there are any questions about landowner contacts.

**Inform all landowners about the use of flagging and colored rocks to mark redds.** Obtain permission to attach flagging to streamside vegetation when it may be in view of the landowner. Obtain *specific* permission for the use of flagging. Be sure they know that flagging will be removed at the end of the season. If access to the survey is through private property, obtain permission and post Survey Signs if the landowner approves.

ODFW is sensitive to landowner concerns regarding access to their property and all ODFW employees must be respectful of landowner property rights. The following general guidance is designed to help us conduct surveys as efficiently as possible, while providing assurance and documentation that we have made appropriate landowner contacts.

Overall, never question a landowner's statements about their property rights. Issues of navigability, prior use, location of property lines, etc. are all secondary to what the landowner understands to be their property rights. Under no circumstances should you question or dispute landowner claims. Instead, respect their instructions in all cases – it is better to modify a survey or drop it altogether than to engage in a dispute with a landowner. Keep your crew leader apprised of conflicts if they arise.

Often, the best source of information about landowners along your surveys will be the ODFW District Biologists, their staff, and your crew leader. Review your survey plans with district staff prior to beginning the survey season. Make special note of staff concerns or advice they may have regarding each survey reach.

Surveyors are expected to be professional at all times during landowner contacts. Wear your uniform. Be courteous and brief. Introduce yourself; explain the project, survey activities and how long you expect to be surveying the site. Honor and document all landowner requests, within reason. Ask prior to putting up signs. If you plan on using the property as an access point, be sure that the landowner understands this and grants specific permission. **Be sure to remove all flagging and colored rocks we placed by the end of the season.**

#### Using the Landowner Contact Form

- Record all contacts on the Landowner Contact Form.
- Write in any additional landowners that don't appear on the form with as much contact data as you can obtain (address, phone, tax plot, ok date, etc.).
- Edit and highlight any landowner information that is incorrect.
- If there are many corrections or edits it is better to start over with a new Contact Form.



- If there is a landowner on the Landowner Contact Form that is not needed, please mark through it with a red pen and indicate that it is not needed. Remember that there might be additional landowners on the sheet that are needed for access points only and may not be along the stream. Some of these landowners may be on the contact sheet because they request data.

Verify the information:

- Make sure the names, complete address, and phone number(s) (including area code) are all correct.
- If this information is incorrect, record the correct information on the landowner contact form and highlight them so they may be updated in our database.
- If the landowner lives offsite, record that address in the comments section.
- Obtain the tax lot information if it is not provided.

Check the most recent OK date:

- Landowners that gave permission during survey verifications this summer or Coho surveys this fall do not need to be contacted again unless there are specific instructions to do so in the landowner comments or the survey description.
- If the list does not indicate that a corporate landowner has been contacted, obtain permission from the crew leader before conducting the survey.
- If the contact person is different from the owner or organization name, their name and phone number will either be in the Contact Details section or in the Comments section.

Record the date landowners were contacted:

- Once a landowner has given permission, fill in the date under "New OK date". **Do NOT just checkmark the box, write "yes" or "no", or leave blank!**
- If a landowner denies permission, note this under "Comments" with the date of the denial and do not trespass on their property. A denial can result in modifying the survey boundaries or dropping the survey. Consult your crew leader about denials so we can determine our best option. If skirting property, please indicate this in the comments section.

Enter "Yes" or "No" in the "Data Requested" column:

- Do NOT enter a check mark or leave this column blank!
- If "Yes", make sure you have the current address of the owner (including the zip code).
- Please highlight this area if they are requesting data.

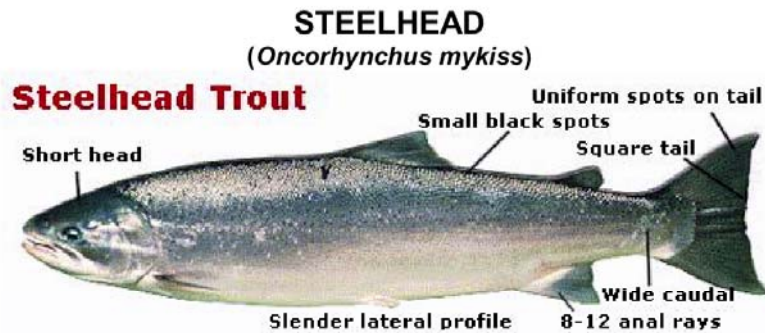
Check the "Comments" section for any special instructions:

- Accommodate any special requests and write them down (e.g., the owner requests that surveyors not park in the driveway). You can't have too much information!
- If the landowner requests to be contacted before every survey, make sure you attempt to call them and leave a message with the specific day that you will be conducting the survey.

Submit the Form to your Crew Leader:

- When you have obtained all the necessary permissions, write your surveyor ID in the "Contacts Complete by Surveyor ID" checkbox.
- Complete this part of the form even when there are no landowner contacts that need to be made (for example, if the survey falls entirely on public land).
- Do not wait to turn this in!

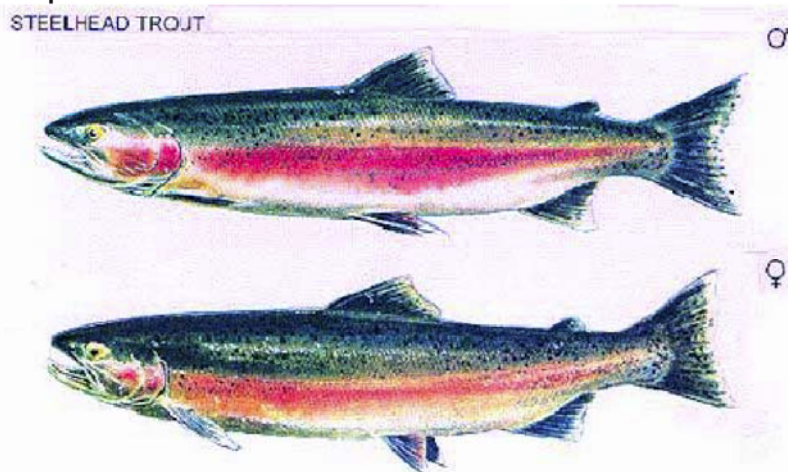
## STEELHEAD IDENTIFICATION



Steelhead trout take habitat in tidal waters of estuaries and near shore. Adults prey on squid, euphausiids, amphipods and fishes; young eat insects, copepods, amphipods and other crustaceans and young fishes (e.g. sand lance, eulachon, herring). Steelhead predators are a variety of fish, birds and marine mammals.

Steelhead trout spawn in larger streams and rivers; localized and extensive Pacific Ocean feeding migrations. Mature adults enter rivers and larger streams year round, but generally concentrated as winter (November to May) and summer (May to October) runs. Steelhead may spawn more than once (3-40% of population). Eggs laid in gravel redds prepared by female in tributary stream or inlet/outlet of nursery lake from January to June. Eggs hatch in 4-7 weeks and fry emerge from gravel from mid-June to mid-August. Juveniles rear in freshwater for 2-4 years prior to migrating to sea as smolts from April to June. Only remain in estuary for a short period of time before moving offshore. Adults usually complete extensive feeding migrations in the Pacific Ocean before returning to spawn after 2-3 summers (range 1-4) in the ocean. Adults live to 6-8 years and may reach 1140 mm or 19 kg.

### Spawning Comparison:



Steelhead Carcass Photos



**Redd Photos**

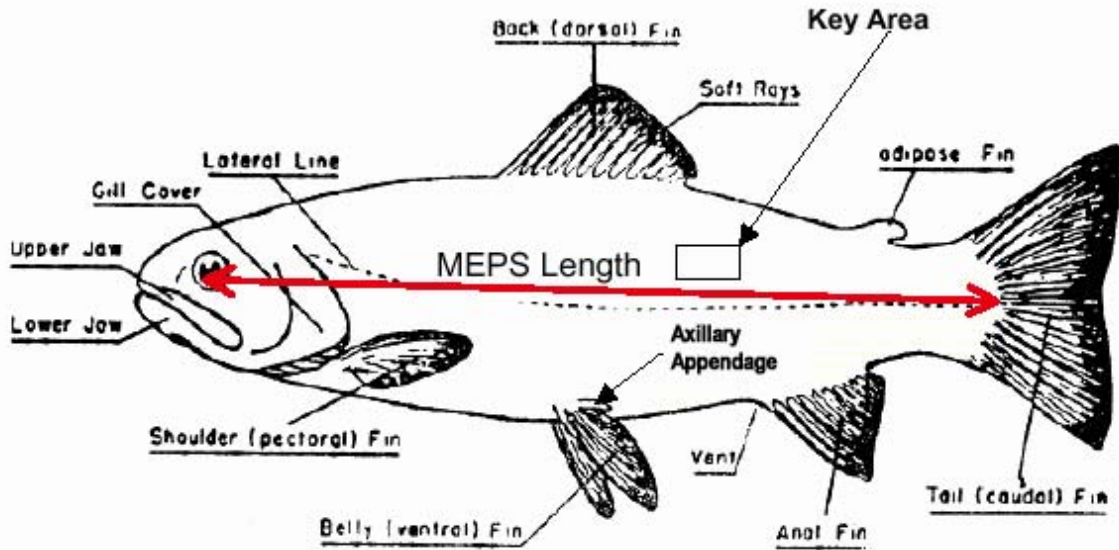


**Steelhead Redd**



**Lamprey Redd**

Fin Nomenclature



Schematic of a salmon identifying fin names, location of Key Area for scale sampling and location of start and end points for measuring MEPS (mid-eye to posterior scale) lengths.

## CARCASS SAMPLING

We will bio-sample and record in the PDA all steelhead and lamprey carcasses that we find. Scales will be sampled from all steelhead carcasses. *See next page for further instructions for lamprey sampling.*

The screenshot shows a PDA application interface for 'ODFW SGS Surveys'. The main section is titled 'Carcass Data' and contains several input fields:

- Species \*
- Sex \*
- MEPS Length (mm)
- Clip \*
- Scale #
- Snout # 21P-
- L Opercular Punch
- R Opercular Punch
- Otolith Vial Number
- DNA Fin Clipped
- DNA Vial Number

- Record species and sex of the fish.
- Record MEPS length in mm.
- Record any fin-clips.
- Cut-off tail from all fish that are bio-sampled to avoid re-sampling.
- Sample scales from the key area. The key area is located just above the lateral line on both sides of an imaginary line drawn from the anterior margin of the anal fin to the posterior margin of the dorsal fin. (See Fin Nomenclature figure on page 19). You should take about four scales from each side of the fish and place them in the scale envelope insert.
- Record Surveyor ID (Sampler), Date, Species, Basin, Reach ID and Segment on scale envelope.

### Example of a scale envelope with data fields completed

The diagram shows a scale envelope with the following handwritten data:

**Sampler** 007 **Date** 02/25/22 **No.** 00001

**Species** 4 (stw) **Basin** Siuslaw



**Reach** 22504.00 **Seg** 2

**Comments:** *Female, 750 MEPS, Un-marked, no tags*

Lamprey Sampling Protocol

Enter bio-sampling data from all dead lamprey into the carcass sampling records. Record the total length (TL) in mm in the comments section. Record any codes that may be pertinent to your sample (scavenging, etc) in the three comment code fields.



Comment Code 1
<input type="text"/>
Comment Code 2
<input type="text"/>
Comment Code 3
<input type="text"/>
Comments
<input type="text"/>
 1 of 1 

## PUBLIC RELATIONS AND SAFETY

When you are conducting surveys, you are personally representing the Oregon Department of Fish and Wildlife to landowners, anglers, and the general public. To insure continuing public cooperation with our efforts, it is essential that we maintain a positive image and relationship with the public.

If a landowner challenges your right to conduct surveys on their land, explain your understanding that permission was obtained prior to you starting to conduct surveys, apologize for the misunderstanding, and request permission to continue the survey. **Under no circumstances should you conduct a survey if the landowner denies permission.** If someone other than a landowner challenges your right to conduct a survey, explain your understanding that permission was obtained from the landowner, and tell him or her that you will seek confirmation of permission through your supervisor. **Under no circumstances conduct a survey if you feel that it is unsafe to do so.**

Always treat members of the public with respect. It is not uncommon to encounter a person who has complaints about ODFW or other fish and wildlife management issues. **If you encounter an angry person, end the encounter if you feel unsafe.** Otherwise, repeating or paraphrasing back what the person says will help you gain that person's trust by letting them know that you hear and understand what they are saying. Find a point of agreement and end the conversation. Avoid prolonged discussions; your time and skills as a surveyor are valuable.

Respect traffic, especially on logging roads. Generally, emergency vehicles, low boys, log trucks, and pick-ups have the right-of-way in that order. Use your CB radio when you are on industrial forest roads! An example of how you might use your CB to warn unseen vehicles of your approach is "Milepost 17 up the Eighty-one Fifty-five Road". You cannot count on other vehicles using their CBs.

Respect your limits when conducting a survey. Don't push your luck when crossing strong streams, slick rocks or bedrock, and slick, unstable, or rotten logs. Keep all of your senses aware at all times (that bear needs that salmon more than we need the data).

**KEEP SAFETY IN THE FOREFRONT OF YOUR MIND  
AT ALL TIMES**



## BOAT SAFETY AND TECHNIQUES

Float surveys are a safe and effective method for conducting steelhead surveys on large streams. The boats we use are well suited to this task, but the performance of the boat must be matched with safe boating technique and good judgment on the part of the surveyor. As with foot surveys, it is ultimately the responsibility of each surveyor to use their own judgment to safely conduct all surveys. If the surveyor is unsure of a situation, then the more conservative choice should be made. This may mean that the survey is not done at all. As the survey season progresses each surveyor's river skills will improve. This new confidence will bring increased comfort and efficiency on the water, but it can also be misleading. Even the most benign sections of a river have features that can be deceptive, or even dangerous. In addition, rivers can change quickly, even within the same day. Landslides, falling trees, variable flows, and human intervention can all impact the safety of floating a given section of river.

Safe conduct of float surveys depends on maintaining gear in good condition, appropriate clothing, effective communication among survey partners, boating skill, knowing stream conditions for each float, and good decision-making processes. Training and practice are the best methods for learning float survey safety and boating techniques. Surveyors will receive direct instruction and evaluation by crew leaders before they will be asked to conduct surveys on their own. The following sections provide some basic guidance for this process.

### *Gear Care and Preparation*

*Transporting Boats:* Preventing damage to equipment during transport is key to overall care of the equipment. More damage occurs during transportation than on the river. Use straps or rope to tie down boats on vehicles regardless of the relative length of travel. Running rope through the frame is a good idea to ensure that the boat cannot work loose from the tie-downs. Stacking boats works well when a single vehicle transports more than one boat. A common method used when boats have frames is to place the first boat in upright with the bow facing forward, then turn the second boat upside down and face the bow to the rear of the truck, place it on top of the first boat, running rope through both boat's frames. Another method is to turn the boats on their sides, bottoms together. A third (and safest) method removes one boat's frame then stacks the boats together with the removed frame tied into the top boat.

*Inflation:* Boats with too little pressure will be unstable and sluggish on the water. Boats with too much pressure are likely to blow out. A correctly inflated boat's shape will bend slightly if lifted from one end but will not sag. Temperature greatly influences boat pressure, and it is important to monitor inflation throughout the day. Cold water will cause pressure to decrease, sun exposure will cause it to rise. If leaving the boat in the sun for a time, pressure should be reduced to avoid blowing out tubes. The most common cause of boat damage is over inflation associated with boats left on vehicles on warm days. Reduce raft inflation any time boats are being carried or transported in a vehicle and monitor the pressure throughout the day. It only takes a moment to top off a soft boat, but patching blowouts is often difficult or impossible.

*Air Pump Maintenance:* The tube pumps provided are relatively quick and durable, but some maintenance is required. If pumps become sticky, or if they fail to move air, unscrew the top cap

(near the handle) and pull the plunger out. Lubricate lightly with automotive grease and place the plunger back as it was. If the pump is failing and no grease is available, use water or any other available lubricant in the same manner, and clean and grease the plunger later upon return to your workstation. Adapters are often provided with the pumps but may not fit the various valve types on individual boats. If no appropriate adapter is available, use a 2 cm wide strip of duct tape, and wind the tape around the hose or undersized adapter until it fits snugly in the boat's valve.

*Patching:* The boats are made from sturdy material but should never be dragged over the ground. Nevertheless, punctures and abrasions are inevitable from normal use, and should be patched immediately. Quick patches can be made with duct tape, but more lasting repairs require adhesives and several hour drying times. Each boat has a patch kit and instructions inside a dry-bag. The boats are made of a PVC material, which responds only to special glue (Staybond), so please do not use adhesives meant for hypalon or other rubber materials. Each boat has two main components, the outer shell and the inner bladder, and each of these uses different patching material, but the same glue. Access the bladder by unzipping the shell walls. Hints for successful patching include using rubbing alcohol to thoroughly clean surfaces, lightly sanding the surface material, round the corners of all patches, and once the patch is in place apply and sustain pressure on the patch overnight. When a boat blows out due to over inflation the rupture typically occurs near the ends of the bladder. This hole is usually too large to patch but can sometimes be fixed. Twist the end of the bladder as if you were wringing out a rag, twisting past the blowout area. Use a strap, rope, flagging or zip-tie and tightly tie off the twisted area, like a tourniquet. If leaking persists, place another tourniquet a few inches below the first. A tear of the boat's outer shell should be repaired by placing a patch on the inside of the shell to ensure the patch does not catch and tear off; large tears sometimes require stitching the material prior to patching.

*Oars and Paddles:* Each oar boat should have three oars (two, plus one spare). Each oar has a plastic sleeve that is locked down by an oar-stop plastic collar (sometimes called a donut). All three oars should have the sleeves and collars in the same relative location on the shaft to ensure that the oars fit with the same balance on the frame and oarlocks. To adjust this balance, loosen the screws on the collar and slide the donut and sleeve as necessary to properly fit in the oarlocks. Once adjusted, tighten the screw to clamp the system down. Oars set at different lengths will make for very poor performance. Kayak paddles typically have adjustments for either flat blades, or control by either left or right hand. These settings are based on personal preference, though there are some tradeoffs between flat and angled blade settings. Basically, the angled settings provide relief from headwinds, but can lead to some wrist fatigue, while the flat orientation is easier to learn.

### **Common Dangers and Concerns**

*Gear:* Improperly set up or damaged gear is a common cause or contributor to boating accidents. Maintain proper boat pressure, insure oars are correct size and configuration, and bring a repair kit and pump at all times. A spare oar and oarlock should always be carried on floats. Secure these items in the boat; if they fall out, they will be of no use. If wearing waders, use a waist belt, a spray jacket, and always wear your lifejacket (**no exceptions**). Dress

appropriately and bring a dry bag with spare clothes if the float will be long or isolated. Keep boats well maintained. Ropes should be safely wrapped and away from feet but ensure that they are easily accessible.

*Logs:* Downed logs and logs partially suspended over the channel (strainers and sweepers) are one of the more common and dangerous features found on Oregon streams. Strainers should always be given a wide buffer because hidden portions of the tree are often present below the water surface. Sweepers and brush along the stream banks can be equally dangerous, particularly when positioned on corners where the current moves towards the hazard. Keep track of where the current wants to take you and never place yourself or your boat upstream of sweepers or brush.

*Blind Turns, Blind Drops and Canyons:* Never proceed downriver without a safe, easy route to shore. If the river bends or drops in a way that obscures your vision, stop a safe distance from the bend or drop and scout on foot. Always leave yourself an out. If the river enters a canyon, do not enter unless visibility is clear to the next easy access point. Logs can move or fall in and create sweepers at any time, so scout blind spots on each visit.

*Walking, Scouting, and Portaging:* Most injuries on rivers are related to scouting or portaging boats, not from floating and rowing. The transition from sitting in the boat to walking around objects can be difficult. Take some time to “get your land legs working” and use appropriate care when wading or carrying the equipment.

*Man Made Objects:* Aside from sweepers, the most common and dangerous river features are often created by humans. Bridge abutments, cement walls with rebar, fish traps, habitat abutments, and fences all pose relatively common threats to boaters. One of the most innocent looking and yet deadly river features are low-head dams, often used near hatcheries or for irrigation diversion projects. Dams as small as one foot tall can create hydraulics which look insignificant but can hold you and your boat underwater indefinitely. **This can be deadly. Never attempt to run a low head dam and give all other human-made objects a wide berth.**

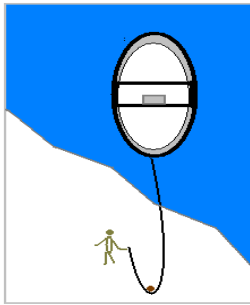
*Stream Flow:* When river flow goes up or down, the character of that river may change as well. Having done a survey at a moderate flow does not predict the difficulty of floating that same section at higher flows. In most cases higher flows will make individual rapids more difficult and dangerous, but at times this trend may reverse, with individual rapids becoming more difficult as flow reduces. The bottom line is that care should be taken when floating sections of rivers at varying flows. Treat blind spots and canyons as if you have never floated them before, and scout often. High flows are particularly dangerous because the speed of the river gives the boater much less time to react to sweepers or blind spots. Often, high flows correspond with poor visibility and the survey should not be done. However, there are times where extended periods of higher flows may allow streams to clear, and a survey can be carefully done under such conditions. Keep track of stream gauge readings, and check flows prior to launching. **If the stream is clear but high, use caution, and if there are doubts about the safety of a float at high flows the survey should not be conducted.**

## Boating Techniques

The most reliable approach to boat safety combines a respect for the river with good understanding of one's own abilities. Pay attention and acknowledge your own limitations. Also, **ask yourself three questions:** 1) "Is it possible that I might mess up or get hung up on an object", 2) "What will happen if I blow it?," and 3) "How will I get myself out of a bad situation if it occurs?" If you are even slightly uncomfortable with the answer to any of these questions it is time to either scout, portage, or not put-in at all.

One of the best ways to avoid having to make such decisions is to pay attention when setting up new floating surveys. In cases where roads follow along the stream, the boundaries of a survey may be moved to an access point just above or below a threatening river section. Most of our streams are not particularly threatening, but in some cases, there are individual river features that should be avoided.

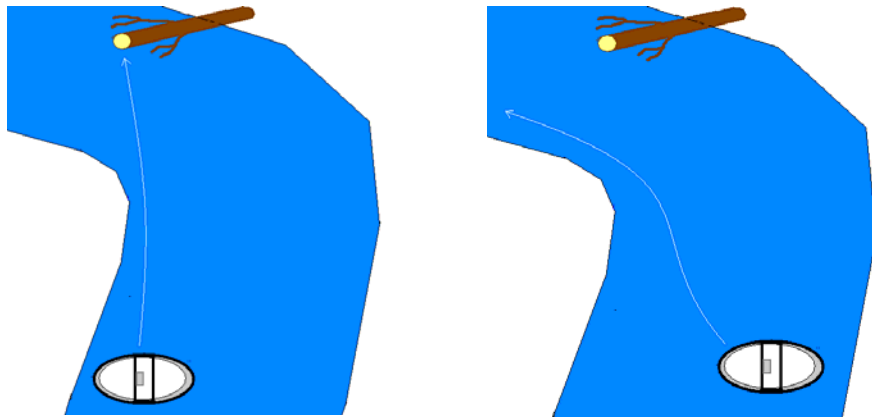
Scouting: Should occur whenever there is doubt about either what lies ahead, or about the safest path through. Features that are obvious from the bank can disappear when viewed from upstream, so always note all trouble spots, and take the time to learn how to identify these features from a low upstream vantage point. Also remember that the scale of a rapid or river feature can be diminished when viewed from a distance or from above. That hydraulic or boulder that looks insignificant from the bank could be large enough to be a danger when encountered in the boat. Sometimes scouting reveals no clear safe path and a portage is



necessary. Often lining the boat, or using ropes to float the boat near the stream edges, is the best technique. Use as long a section of rope as possible, and if lining over drops or fast chutes, use a rock or log to create friction, as seen in the image at left. In this way the strong pull of a boat in heavy water can be belayed safely and easily. **If portaging is necessary, please do not drag the boats.** Dragging boats on dry land wears or punctures these boats quickly. In the end it will be you who goes for a swim if your equipment wears out.

Several basic boating tactics will help you get down the river comfortably. Using eddies to slow your progress in fast sections is referred to as eddy hopping. Once in an eddy, pick your path, searching for the next eddy, and then proceed to that eddy. In this way you can effectively scout a rapid without getting out of the boat, but remember, this tactic is more dangerous than helpful if: 1) there is any chance that you might miss the target eddy, and 2) You cannot get out to scout or portage from that eddy. Always leave yourself an escape, and if you can't see, scout.

Sharp turns are common, often with brush or sweepers guarding the outside of the turn. There is a tendency to hug the inside of the turn, but this technique often has limitations. A better method is to start more in the center of the current, and then pull across toward the inside of the turn, timing your lateral momentum to reach the inside of the turn at the apex, and using built up momentum to move past the hazard more easily. (See illustration below).



Hitting rocks is a normal part of floating rivers and the added attention that surveying requires makes this event even more common. Some rocks are worse than others, but the proper response to hitting a rock is always the same - "High Side!" High siding is a technique used to balance the boat, and it means exactly what it would seem. If one side of the boat dips, then the boater should lean (or climb) to the side that is higher, thus balancing the boat and keeping a flip in check. If your boat hits a rock, you should always lean INTO the rock. In some cases, the boater may even be able to climb onto the rock and help guide the boat around, just remember to climb back in the boat before it leaves. Striking a log is more serious than hitting a rock because you can become trapped by the current or even pulled beneath the log. If your boat becomes stuck on a log, attempt to climb onto the log right away. Once you are on the log and in a stable position you can then attempt to guide the boat over or around the log. Never stay in the boat if it is in contact upstream of a log in current.

Rowing the boats is best learned through practice, but there are several important tips. Ensure that the oars are an appropriate length and balanced and adjust the seat location to fit your preference. When rowing, the single most common mistake is failure to place the whole blade in the water prior to pulling. If the oar is splashing or slapping water, it needs to be inserted into the water a little deeper. If the oar is digging in or washing out of the water, you need to adjust your grip on the handles to ensure that the blade goes into the water perpendicular to the surface or "square". Also, engage your legs, stomach, and lower back into the stroke, pulling the oars with your arms straight until the very end of the stroke. "Reefing" on the oars, extremely hard pulling in long strokes should be avoided. Short, quick strokes that maintain the momentum of the boat are usually more effective for keeping control.

It is more powerful to pull away from undesirable features than it is to push. Face the object you wish to avoid and pull your boat away from it. Pulling away at an angle will allow the current to move your boat away from the obstruction. When pushing your boat to avoid obstructions the current will often move you toward the object faster than anticipated.

Several resources are available to aid in researching river sections. The best guidebook for Oregon Rivers is Soggy Sneakers guide to Oregon Rivers. Further information is available on the web. Several flow websites are helpful with stream flows. Some of the better ones are:

<http://levels.wkcc.org/?P=Oregon.html> (also has some run information)  
<http://www.nwrfc.noaa.gov/>  
<http://or.waterdata.usgs.gov/nwis/current?type=flow>  
[https://apps.wrd.state.or.us/apps/sw/hydro\\_near\\_real\\_time/](https://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/)

### **What to do if you go for a swim**

Falling out of the boat or flipping the boat is uncommon, but surveyors should always be prepared for the possibility of taking a swim – assume that it is likely to happen eventually. The best preparation for these events is to wear the proper clothes (wader belt, spray jacket, life jacket) and have all loose items tied into the boat. Also, remember to keep the PDA in a secure pocket in your life jacket attached with a lanyard.

If you end up in that water, float as if you were sitting in a chair, but with feet on the surface and in front of you while facing downstream. Arching your back will help float you a little higher. Relax, and time breaths between waves. Use your feet to push off rocks on the surface. Never try to stand up in fast water deeper than your knees. Foot entrapment in fast water is very dangerous, and surprisingly common, so rather than standing, work your way to shore using your hands to guide you. If there are no immediate threats, you can climb back into or onto the boat, but if there are dangers approaching simply swim to shore.

Surveyor safety comes first, so once you are ashore, first make sure you are OK, then check your personal gear and data, and then retrieve the boat. If your clothing becomes soaked and hypothermia is a possibility, terminate the survey and get back to the truck as quickly and safely as possible. Let your survey partner know the situation, determine if you need assistance, and do not hesitate to ask for help. Work together as a team to ensure that each surveyor stays safe.

## SANITIZING SAMPLING GEAR

### Disinfecting Field Gear to Reduce the Spread of Invasive Snails and Fish Pathogens ODFW / Oregon Adult Salmonid Inventory and Sampling Project (OASIS)

#### Background

Aquatic pathogens such as bacteria, viruses and parasites, and invasive species such as New Zealand Mud Snails (NZMS) can adhere to or be trapped in field gear such as boots, waders, drysuits, nets, coolers, boats etc. New Zealand mudsnails (*Potamopyrgus antipodarum*) are an introduced species spreading rapidly among rivers and streams in the western United States. Since they were reported in the Snake River in Idaho in the 1980's, the snails have been discovered in at least ten western states. New Zealand mudsnails are parthenogenic, so a single introduced snail has the potential to start a new population. In Oregon, mudsnails have been found in tributaries of the lower Columbia River, Devil's Lake on the central coast, Garrison Lake near Port Orford, and several sites in the Snake River basin.

Researchers believe wading by recreational anglers may be a primary vector by which mudsnails are transported among streams. The ODFW Fish Health Management Policy (635-007-0965) states that it is the Department's responsibility to restrict the introduction, amplification and dissemination of disease agents in the natural environment. Because OASIS spawning survey crews wade in multiple watersheds during the field season, it is important that the Project take measures to minimize the spread of invasive snails and other pathogens. Mudsnails are resistant to desiccation and may survive for days out of water on moist waders and sampling gear.



In the western U.S., mudsnails can reach a max. length of 6mm.

#### Preventing Mudsnail Transport Between Watersheds

Whenever possible, OASIS crews should avoid surveying in more than one major river basin (e.g. Alsea, Yaquina, Siletz) per day. To avoid mudsnail and pathogen transport among basins, crews should sanitize waders and boots daily when they return to their duty station (ODFW office) or between sites if they must survey in two major basins during one day. The sanitization procedure listed below effectively kills New Zealand mudsnails with minimal damage to wading gear (Hosea and Finlayson, 2005).

Required equipment:

- scrub brush
- dishwashing gloves

- Formula 409® (100% solution)
  - clean water supply (not stream water)
1. Remove waders, boots, drysuits, and when possible, remove insoles from wading boots.
  2. Use the scrub brush to clean loose dirt or mud off boots, waders, and field gear.
  3. Using a spray bottle of Formula 409® cleaning solution (do not dilute), spray waders, wading boots, boot insoles and the streambed contact end of wading staff with the cleaning solution to the point of saturation. Be sure to treat the inside of the wading boots as well as the outside, paying special attention to bootlace grommets, seams, felt soles, and any other places where mudsnails might cling.
  4. Allow treated gear to sit for ten minutes.
  5. Rinse gear in clean water. **DO NOT USE STREAM WATER.** Ideal rinse stations are outdoor hoses at ODFW offices. When sanitizing gear in the field a separate spray bottle filled with tap water should be used for rinsing, and the process should occur at least 100m from any waterway or runoff-drain.
  6. When possible, store wading gear in a dry location for later use.

Crews should wear gloves while handling Formula 409® to minimize contact with skin.

#### Literature Cited

Hosea, R.C. and B. Finlayson. 2005. Controlling the spread of New Zealand Mudsnails on wading gear. California Department of Fish and Game Administrative Report 2005-02.



## REPORT OF OPERATIONS

Please complete daily to log activities and record work hours. An example is provided below as well as a blank form for you to copy.

### OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT OF OPERATIONS



Prepared by L. WILKINSON 12

Location ASTORIA/SEASIDE For the Week Ending 12/07/97

Date	Activities
MONDAY Month: 12 Date: 01	0800-1600 Foley upper, mid, lower + E fork Foley / paperwork in office
TUESDAY Month: 12 Date: 02	0800-1600 Miami upper + lower, Priority 1+2 mess 1+2, + Peterson
WEDNESDAY Month: 12 Date: 03	0800-1600 Nfork Nehalem, Soapstone 1+2 Sally, Sweethome + Gats Valley
THURSDAY Month: 12 Date: 04	0800-1600 ECOLA - tribA, Wfork 2+4 Arch Cape Short Sands - car trade w/ Joe - hatchery vehicle
FRIDAY Month: 12 Date: 05	0700-1500 Coal CR, Wfork Coal 1+2, Bobs + Anderson
SATURDAY Month: 12 Date: 06	OFF
SUNDAY Month: 12 Date: 07	OFF

60

# REPORT OF OPERATION



Location \_\_\_\_\_

For week ending \_\_\_\_\_ 19\_\_\_\_

Prepared by \_\_\_\_\_ For attention of \_\_\_\_\_  
(name of person or dept.)

SUNDAY	
Month	
Date	
MONDAY	
Month	
Date	
TUESDAY	
Month	
Date	
WEDNESDAY	
Month	
Date	
THURSDAY	
Month	
Date	
FRIDAY	
Month	
Date	
SATURDAY	
Month	
Date	

# PDA APPLICATIONS & PROGRAMS

## Backcountry Navigator Tutorial



**A) GPS icon >** "My Location" centers map on current GPS location, if satellites are available.

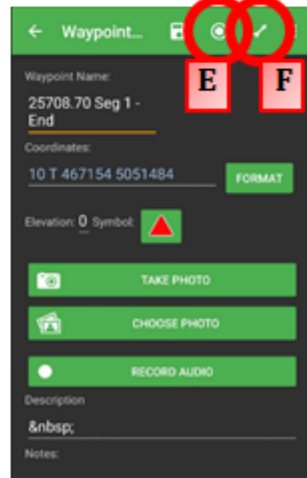
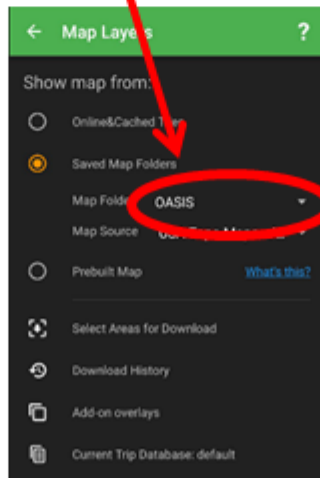
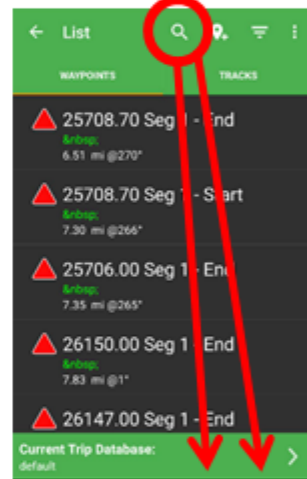
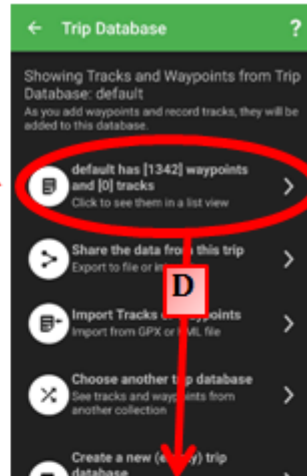
**B) Map Layers icon >** select base mapfile, file "OASIS" should be pre-loaded.

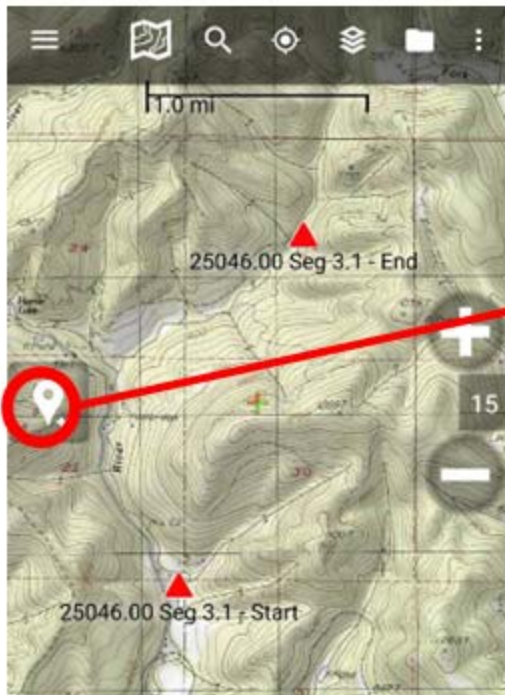
**C) Trip Database >** waypoints for start & end points of surveys, should be pre-loaded.

**D) Waypoints List >** lists all waypoints in the database file. You can search waypoints by reach ID to find the site you are looking for. Click on a waypoint to view details.

**E) Center on Waypoint >** Click the circle to center on the waypoint you selected.

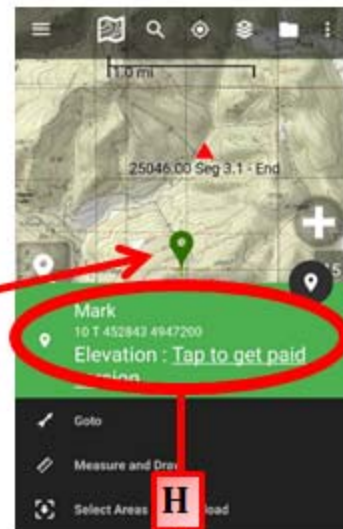
**F) Go-To Waypoint >** Click the arrow to start a Go-To to show distance and direction to selected waypoint from your current location.





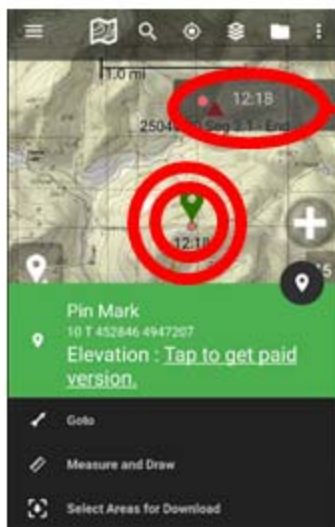
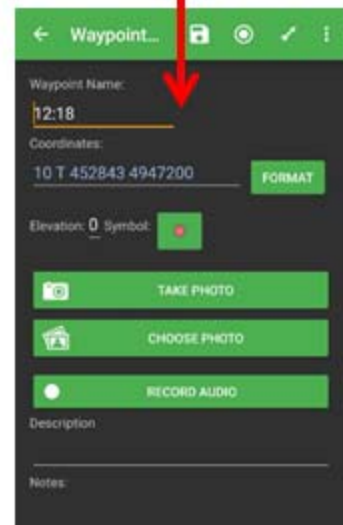
**G) Create Waypoint >** Click waypoint button to create a new waypoint at the crosshairs at the center of the screen.

**G**



**H) Edit Waypoint >** Click the green bar to take you to the waypoint details, where you can edit the name and coordinates of the waypoint, as well as save, center on and start a Go-To.

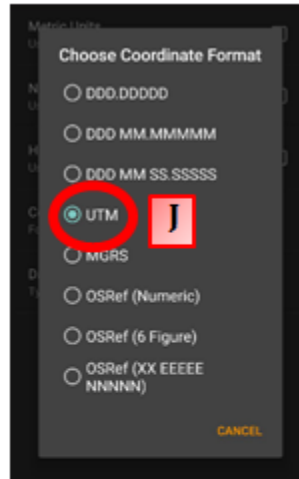
**H**



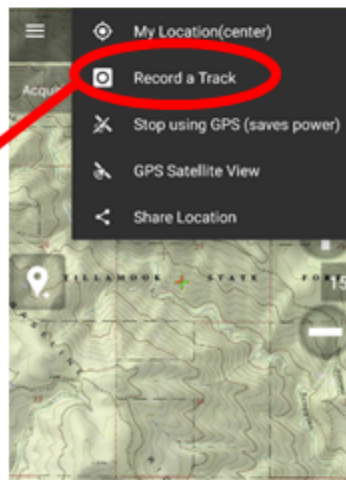
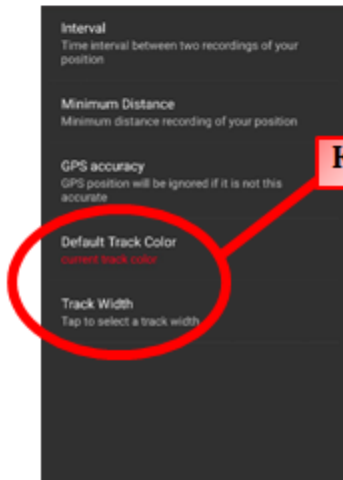
**I**



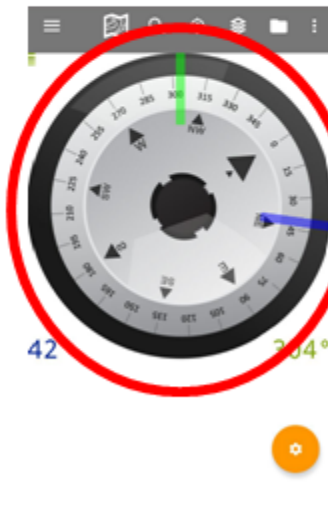
**I) Select Waypoint from Map >** Hold down on an existing waypoint on the map to view the waypoint details, center screen on waypoint, or start a Go-To to the waypoint.



**J) Coordinate Format >** From the main screen, click on the Menu, Settings, Coordinate Options, Coordinate Format, and select **UTM**. Likewise, datum type can be selected from Menu, Settings, Coordinate Options, Datum Type, and select **WGS84/NAD83**. These settings should already be in place, but it is good to know how to access them.



**K) Track >** To record a track (a record of where you hiked and/or drove), go to Menu, Settings, Track Options, select a Default Track Color and select a Track Width. Then click on the GPS icon and select "Record a Track".



**L) GPS and Stats >** Under the Menu, there are two screens with additional resources. Compass screen uses the phone compass, and as with GPS location, should not be fully relied upon as it does sometimes malfunction. The other is the Stats screen which shows a variety of stats including current GPS coordinates, etc. A simplified version of these two resources can be accessed by dragging up from the bottom of the main map screen.

## DISTRICT CONTACTS

NAME	TITLE	NUMBER
OSP Tip Line	Oregon State Police anonymous tip line	1-800-452-7888
Motor pool questions	Oregon motor pool accidents/maintenance	1-800-378-0077
Mac Barr	North Willamette Coast Range District Fish Biologist	(971) 673-6044
Kevin Stertz	North Willamette Coast Range Asst. Fish Biologist	(971) 673-2040
Ben Walczak	North Willamette Cascade Unit District Fish Biologist	(971) 673-6013
Michael Hayworth	North Willamette Cascade Unit Asst. Fish Biologist	(971) 673-6011
Chris Knutsen	North Coast District Manager	(503) 842-2741
Robert Bradley	North Coast District Fish Biologist	(503) 842-2741
Michael Sinnott	North Coast Asst. Fish Biologist	(503) 338-0106
John Spangler	Mid Coast District Fish Biologist	(541) 265-8306
Paul Olmsted	Mid Coast Asst. Fish Biologist	(541) 265-8306
Greg Huchko	Umpqua District Fish Biologist	(541) 440-3353
Evan Leonetti	Umpqua Asst. Fish Biologist	(541) 440-3353
Mike Gray	Coos-Coquille District Fish Biologist	(541) 888-5515
Gary Vonderohe	Coos-Coquille Asst. Fish Biologist	(541) 888-5515
Steve Mazur	South Coast District Biologist	(541) 247 7605
Laura Green	South Coast Asst. Fish Biologist	(541) 247 7605
Dan VanDyke	Upper Rogue District Biologist	(541) 826-8774
Pete Samarin	Upper Rogue Asst. Fish Biologist	(541) 826-8774
Dave Jepsen	NW Region Research Program Manager	(541) 757-5148
Kerrie Tarkinton	Corvallis Research Lab Office Manager	(541) 757-5101
Briana Sounhein	OASIS Project Leader Oregon Coast	(541) 757-5136
Eric Brown	OASIS Project Leader Lower Columbia	(541) 757-5133
Matt Weeber	OASIS Project Analyst	(541) 757-5120
Alex Neerman	OASIS Assistant Project Leader - Lower Columbia	(541) 760-7723
Jon Nott	OASIS Assistant Project Leader - Oregon Coast	(541) 231-3412
Michelle Best	OASIS Project Assistant	(541) 757-5134
Erik Suring	Life Cycle Monitoring (LCM) Project Leader	(541) 286-5328
Peggy Kavanagh	Aquatic Inventories (AQI) Project Leader	(541) 757-5124
Brian Riggers	CCRMP Project Biologist	(541) 757-5132
Fred Monzyk	CCRMP & Scale Reading Project Leader	(541) 757-5119
Aaron Truesdell	Crew Leader for Lower Columbia (West) – Astoria	(541) 452-3670
Ricky Hays	Crew Leader for Lower Columbia (East) – Clackamas	(541) 223-4366
Scott Kirby	Crew Leader for North Coast – Tillamook	(541) 231-1958
Ryan Emig	Crew Leader for Mid Coast – Corvallis	(541) 760-7746
Joshua Edwards	Crew Leader for Umpqua – Roseburg	(541) 760-7525
Peter Cole	Crew Leader for Mid-South Coast – Coos Bay	(541) 231-1802

## 2022 STW SPAWNING SURVEY LIST

### 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>North Coast</b>								
Tillamook	Necanicum River	Mainstem	26196.00	2	Little Muddy Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.79
Tillamook	Necanicum River	Mainstem	26239.00	1	Joe Cr	Repeat	22	0.75
Tillamook	Necanicum River	Mainstem	26241.00	1	Little Joe Cr	Repeat	04,07,16,19,22	0.57
Tillamook	Ecola Creek	North Fork	26183.00	2	Ecola Cr, N Fk	Repeat	22	1.02
Tillamook	Nehalem River	Mainstem	25976.00	1	Alder Cr	Repeat	05,19,22	0.43
Tillamook	Nehalem River	Mainstem	25980.00	1	E Humbug Cr	Repeat	03,22	0.94
Tillamook	Nehalem River	Mainstem	25980.70	1	E Humbug Cr	Repeat	07,16,22	0.20
Tillamook	Nehalem River	Mainstem	25986.00	1	Nehalem R	Repeat	22	1.73
Tillamook	Nehalem River	Mainstem	25993.00	1	George Cr	Repeat	13,15,16,17,18,19,20,21,22,23	0.44
Tillamook	Nehalem River	Mainstem	26012.00	2	Beneke Cr	Repeat	07,16,19,22	1.46
Tillamook	Nehalem River	Mainstem	26024.70	1	Hamilton Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.61
Tillamook	Nehalem River	Mainstem	26039.00	3	Deep Cr	Repeat	22	0.70
Tillamook	Nehalem River	Mainstem	26043.00	7	Deep Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.35
Tillamook	Nehalem River	Mainstem	26051.30	1	Fishhawk Trib C	Repeat	22	0.82
Tillamook	Nehalem River	Mainstem	26061.00	3	Lundgren Cr	Repeat	03,04,06,22	1.07
Tillamook	Nehalem River	Mainstem	26062.00	1	Nehalem R	Repeat	Annual	1.91
Tillamook	Nehalem River	Mainstem	26062.00	1	Nehalem R	Repeat	14,15,16,17,18,19,20,21,22,23	1.91
Tillamook	Nehalem River	Mainstem	26065.30	1	Mud Fork Battle Cr	Repeat	18,19,20,21,22,23	0.49
Tillamook	Nehalem River	Mainstem	26069.00	1	Deer Cr	Repeat	19,22	1.27
Tillamook	Nehalem River	Mainstem	26070.00	3	Nehalem R	Repeat	04,10,11,12,13,15,22	1.10
Tillamook	Nehalem River	Mainstem	26073.00	1.2	Cedar Cr	Repeat	22	1.05
Tillamook	Nehalem River	Mainstem	26077.00	1	Oak Ranch Cr	Repeat	03,04,05,07,16,19,22	1.51
Tillamook	Nehalem River	Mainstem	26081.00	2	Crooked Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.19
Tillamook	Nehalem River	Mainstem	26093.70	1	Nehalem R, E Fk	Repeat	14,15,16,17,18,19,20,21,22,23	0.92
Tillamook	Nehalem River	Mainstem	26126.00	1	Dell Cr	Repeat	04,07,16,19,22	0.95
Tillamook	Nehalem River	Mainstem	26129.00	1	Pebble Cr	Repeat	22	1.28
Tillamook	Nehalem River	Mainstem	26135.70	1	Cedar Cr	Repeat	16,19,22	0.55
Tillamook	Nehalem River	Mainstem	26139.30	1	Robinson Cr, Trib A	Repeat	04,16,19,22	0.58
Tillamook	Nehalem River	Mainstem	26143.00	1	Wolf Cr	Repeat	16,19,22	0.71
Tillamook	Nehalem River	North Fork	25863.00	3	Nehalem R, N Fk	Repeat	22	0.30
Tillamook	Nehalem River	Salmonberry River	25953.00	1	Salmonberry R	Repeat	11,12,13,17,18,19,20,21,22,23	1.55
Tillamook	Nehalem River	Rock Creek	26114.00	2	Military Cr	New	22	0.63

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Tillamook	Nehalem River	Rock Creek	26117.00	2	Rock Cr, S Fk	Repeat	13,14,16,17,18,19,20,21,22,23	1.03
<b>Tillamook</b>								
Tillamook	Miami River	Mainstem	25798.00	1	Miami R	Repeat	05,06,16,19,22	1.21
Tillamook	Miami River	Mainstem	25802.00	1	Miami R	Repeat	22	0.57
Tillamook	Kilchis River	Mainstem	25748.00	1	Kilchis R	Repeat	14,15,16,17,18,19,20,21,22,23	1.55
Tillamook	Kilchis River	Mainstem	25748.00	1	Kilchis R	Repeat	Annual	1.55
Tillamook	Kilchis River	Mainstem	25762.50	1	French Cr	Repeat	22	0.55
Tillamook	Kilchis River	Mainstem	25763.00	1	Kilchis R, N Fk	Repeat	19,22	0.68
Tillamook	Wilson River	Mainstem	25636.00	1.2	Wilson R	Repeat	22	2.48
Tillamook	Wilson River	Mainstem	25675.50	4	Jordan Cr	Repeat	13,14,16,17,18,19,20,21,22,23	0.92
Tillamook	Wilson River	Mainstem	25695.00	1	Ben Smith Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.38
Tillamook	Wilson River	Mainstem	25700.00	1	Wilson R	New	22	1.29
Tillamook	Wilson River	Mainstem	25703.00	2	Elk Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.35
Tillamook	Trask River	North Fork	25619.00	2	Hembre Cr (Clear Cr, #1)	Repeat	16,19,22	0.76
Tillamook	Trask River	South Fork	25605.00	1	Trask R, S Fk	Repeat	03,22	1.53
Tillamook	Trask River	South Fork	25608.30	1	Boundary Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.60
Tillamook	Trask River	South Fork	25616.00	2	Bill Cr	Repeat	13,14,16,17,18,19,20,21,22,23	0.77
Tillamook	Tillamook River	Mainstem	25563.00	4	Fawcett Cr	Repeat	22	0.74
Tillamook	Netarts Bay	Mainstem	25546.00	3	O'Hara Cr	Repeat	22	0.60
Tillamook	Nestucca River	Mainstem And Bay	25458.00	3	Nestucca R (3rd Bridge to Wolfe	Repeat	14,15,16,17,18,19,20,21,22,23	0.92
Tillamook	Nestucca River	Mainstem And Bay	25472.00	2	Nestucca R	Repeat	05,19,22	0.87
Tillamook	Nestucca River	Mainstem And Bay	25474.80	2	East Cr	Repeat	19,22	0.43
Tillamook	Nestucca River	Mainstem And Bay	25505.00	1	Elk Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.53
Tillamook	Nestucca River	Mainstem And Bay	25510.00	4	Nestucca R	Repeat	01,03,05,17,22	0.57
Tillamook	Nestucca River	Three Rivers	25427.00	1	Crazy Cr	Repeat	01,04,07,16,19,22	0.71
Tillamook	Nestucca River	Beaver Creek	25451.00	7	E Beaver Cr		Annual	0.92
Tillamook	Nestucca River	Little Nestucca	25377.00	1	Little Nestucca R	Repeat	11,12,13,17,18,19,20,21,22,23	0.72
Tillamook	Neskowin Creek	Mainstem	25331.00	1	Butte Cr	Repeat	22	0.38



## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>Lincoln</b>								
Corvallis	Salmon River	Mainstem And Bay	25289.00	1	Salmon R	Repeat	22	1.27
Corvallis	Salmon River	Mainstem And Bay	25310.00	1	Deer Cr	Repeat	16,19,22	0.98
Corvallis	Salmon River	Mainstem And Bay	25324.00	1	Salmon R, Trib G	Repeat	16,19,22	0.49
Corvallis	Siletz River	Mainstem	25101.00	2	Jaybird Cr	Repeat	06,19,22	1.13
Corvallis	Siletz River	Mainstem	25102.50	1	Cedar Cr	Repeat	22	1.76
Corvallis	Siletz River	Mainstem	25102.54	2	Cedar Cr	Repeat	22	1.22
Corvallis	Siletz River	Mainstem	25131.70	3	Sam Cr	Repeat	10,11,12,13,19,20,21,22,23	0.90
Corvallis	Siletz River	Mainstem	25131.90	1	Sam Cr	Repeat	16,19,22	0.74
Corvallis	Siletz River	Mainstem	25132.70	1	Siletz R	Repeat	03,05,22,23	2.69
Corvallis	Siletz River	Mainstem	25151.00	1	Mill Cr, N Fk (Forks to A)	Repeat	14,15,16,17,18,19,20,21,22,23	0.53
Corvallis	Siletz River	Mainstem	25166.00	1	Deer Cr	Repeat	16,19,22	0.19
Newport District	Siletz River	Drift Creek	25235.00	7	Drift Cr (up to North Cr)		Annual	0.96
Newport District	Siletz River	Drift Creek	25237.00	1	Drift Cr (North Cr up)	Repeat	Annual	0.98
Corvallis	Yaquina River	Mainstem And Bay	24953.80	2	Mill Cr, E Fk		14,15,16,17,18,19,20,21,22,23	1.31
Corvallis	Yaquina River	Mainstem And Bay	24953.85	1	Mill Cr (W Fk), Trib B		14,15,16,17,18,19,20,21,22,23	0.18
Corvallis	Yaquina River	Mainstem And Bay	24953.90	1	Mill Cr (W Fk)		14,15,16,17,18,19,20,21,22,23	1.09
Corvallis	Yaquina River	Mainstem And Bay	24953.93	1	Mill Cr, Trib C		15,16,17,18,19,20,21,22,23	0.22
Corvallis	Yaquina River	Mainstem And Bay	24953.97	1	Mill Cr (W Fk)		15,16,17,18,19,20,21,22,23	0.10
Corvallis	Yaquina River	Mainstem And Bay	25046.00	3.1	Yaquina R		Annual	2.37
Corvallis	Yaquina River	Mainstem And Bay	25046.00	3.1	Yaquina R		Annual	2.37
Corvallis	Yaquina River	Elk Creek	24964.00	1	Deer Cr	Repeat	16,19,22	0.43
Corvallis	Yaquina River	Elk Creek	24964.10	1	Deer Cr	Repeat	22	0.30
Corvallis	Yaquina River	Elk Creek	24971.00	1.1	Savage Cr		14,15,16,17,18,19,20,21,22,23	1.40
Corvallis	Yaquina River	Elk Creek	24971.00	3	Savage Cr	Repeat	13,14,15,17,18,19,20,21,22,23	0.30
Corvallis	Yaquina River	Elk Creek	24972.00	1	Grant Cr		14,15,16,17,18,19,20,21,22,23	1.09
Corvallis	Yaquina River	Elk Creek	24974.70	2	Feagles Cr		14,15,16,17,18,19,20,21,22,23	0.49
Corvallis	Yaquina River	Elk Creek	24976.40	1	Spout Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.55
Corvallis	Alsea River	Mainstem And Bay	24797.00	2	Fall Cr		Annual	1.19
Corvallis	Alsea River	Mainstem And Bay	24797.00	2	Fall Cr		Annual	1.19
Corvallis	Alsea River	Mainstem And Bay	24807.70	1	Fall Cr	Repeat	22	0.79
Corvallis	Alsea River	Mainstem And Bay	24813.00	1	Benner Cr	Repeat	07,16,19,22	0.65
Corvallis	Alsea River	Mainstem And Bay	24820.00	2	Alsea R	Repeat	Annual	1.28

### 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Corvallis	Alsea River	Mainstem And Bay	24820.00	2	Alsea R	Repeat	14,15,16,17,18,19,20,21,22,23	1.28
Corvallis	Alsea River	Drift Creek	24630.00	3	Trout Cr	Repeat	16,19,22	0.52
Corvallis	Alsea River	Five Rivers	24745.00	2	Lobster Cr, E. Fk	Repeat	07,16,19,22	1.30
Corvallis	Alsea River	Five Rivers	24769.00	1	Five Rivers	Repeat	02,03,08,14,15,16,17,22,23	0.84
Corvallis	Alsea River	Five Rivers	24774.00	1	Green R	Repeat	22	0.94
Corvallis	Alsea River	Five Rivers	24776.20	1	Green R	Repeat	14,15,16,17,18,19,20,21,22,23	0.64
Corvallis	Alsea River	North Fork	24850.00	2	Crooked Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.00

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>Siuslaw</b>								
Corvallis	Yachats River	Mainstem	24596.00	1	Yachats R	Repeat	16,19,22	0.95
Corvallis	Cummins Cr	Mainstem	24544.00	2	Cummins Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.14
Corvallis	Tenmile Creek	Mainstem	24527.00	4	Mill Cr	Repeat	15,16,17,18,19,20,21,22,23	1.03
Corvallis	Tenmile Creek	Mainstem	24528.00	5	Tenmile Cr	Repeat	22	0.43
Corvallis	Big Creek	Mainstem & S Fk	24510.00	2	Big Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.15
Corvallis	Siuslaw River	Mainstem	24050.00	2	Hanson Cr	Repeat	22	0.44
Corvallis	Siuslaw River	Mainstem	24094.00	1	Knowles Cr	Repeat	04,07,19,22	0.91
Corvallis	Siuslaw River	Mainstem	24100.90	1	Knowles Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.40
Corvallis	Siuslaw River	Mainstem	24252.00	1	Siuslaw R	Repeat	03,22	0.94
Corvallis	Siuslaw River	Mainstem	24261.30	1	Waite Cr, Trib A	Repeat	16,19,22	0.29
Corvallis	Siuslaw River	Mainstem	24359.00	1	Esmond Cr	Repeat	17,18,19,20,21,22,23	0.26
Corvallis	Siuslaw River	Mainstem	24363.10	1	Siuslaw R	Repeat	04,05,10,11,12,13,16,19,22	2.05
Corvallis	Siuslaw River	Mainstem	24373.00	1	Clay Cr	Repeat	17,18,19,20,21,22,23	0.64
Corvallis	Siuslaw River	Mainstem	24384.00	1	Siuslaw R	Repeat	06,07,10,11,12,13,16,19,21,22	4.36
Corvallis	Siuslaw River	Mainstem	24395.70	1	Haight Cr	Repeat	16,19,22	0.34
Corvallis	Siuslaw River	Mainstem	24399.30	1	Camp Cr, Trib A	New	22	0.34
Corvallis	Siuslaw River	Mainstem	24425.00	1	Russell Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.87
Corvallis	Siuslaw River	Mainstem	24440.00	2	Letz Cr, Trib B	New	22	0.37
Corvallis	Siuslaw River	North Fork	24025.00	2	Mcleod Cr	Repeat	22	0.83
Corvallis	Siuslaw River	North Fork	24033.74	1	Porter Cr	Repeat	07,16,19,22	0.42
Corvallis	Siuslaw River	Lake Creek	24135.00	1	Rogers Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.66
Corvallis	Siuslaw River	Lake Creek	24140.00	1	Indian Cr, W Fk	New	22	1.21
Corvallis	Siuslaw River	Lake Creek	24149.60	1	Indian Cr, N Fk, Trib D	Repeat	13,14,15,17,18,19,20,21,22,23	0.48
Corvallis	Siuslaw River	Lake Creek	24177.00	3	Panther Cr, N Fk	Repeat	10,11,12,13,19,20,21,22,23	0.98
Corvallis	Siuslaw River	Lake Creek	24185.00	1.1	Hula Cr	Repeat	22	0.88
Corvallis	Siuslaw River	Lake Creek	24203.00	3	Greenleaf Cr		14,15,16,17,18,19,20,21,22,23	1.25
Corvallis	Siuslaw River	Lake Creek	24207.50	2	Fish Cr		14,15,16,17,18,19,20,21,22,23	0.63
Corvallis	Siuslaw River	Lake Creek	24235.40	1	Lake Cr	Repeat	19,22	1.16
Corvallis	Siuslaw River	Wolf Creek	24321.40	1	Oat Cr, Trib C	Repeat	19,22	0.29

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>Umpqua</b>								
Coos Bay	Umpqua River	Mainstem And Bay	22624.20	2	Dean Cr	Repeat	07,22	1.20
Coos Bay	Umpqua River	Mainstem And Bay	22653.00	5	Camp Cr	Repeat	20,21,22,23	0.57
Roseburg	Umpqua River	Mainstem And Bay	22686.00	2	Weatherly Cr	Repeat	03,06,07,15,16,18,19,21,22	0.96
Roseburg	Umpqua River	Mainstem And Bay	22688.00	3	Lutsinger Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.41
Roseburg	Umpqua River	Mainstem And Bay	22700.00	2	Paradise Cr	Repeat	07,22	0.70
Roseburg	Umpqua River	Mainstem And Bay	22702.00	4	Sawyer Cr	Repeat	07,22	0.33
Roseburg	Umpqua River	Mainstem And Bay	22824.00	3	Mehl Cr	New	22	1.11
Roseburg	Umpqua River	Mainstem And Bay	22862.00	1	Wolf Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.05
Roseburg	Umpqua River	Mainstem And Bay	22876.00	1	Hubbard Cr	Repeat	10,11,12,17,18,19,20,21,22,23	0.78
Roseburg	Umpqua River	Mainstem And Bay	22884.15	1	Mill Cr	Repeat	16,19,22	0.68
Roseburg	Umpqua River	Mainstem And Bay	22973.60	1	Turkey Cr	Repeat	07,16,19,22	0.51
Coos Bay	Umpqua River	Smith River	22462.00	1	Smith R, N Fk, W Br	Repeat	07,22	0.89
Roseburg	Umpqua River	Smith River	22486.30	1	Spencer Cr, W Fk, Trib A	Repeat	07,16,19,22	0.48
Roseburg	Umpqua River	Smith River	22497.07	1	Vincent Cr	New	22	1.37
LCM Charleston	Umpqua River	Smith River	22503.30	1	Smith R, W Fk	Repeat	14,15,16,17,18,19,20,21,22,23	0.40
Roseburg	Umpqua River	Smith River	22511.00	1	Blackwell Cr	Repeat	01,02,04,07,16,19,22	0.83
Roseburg	Umpqua River	Smith River	22521.00	2	S Sister Cr	Repeat	01,07,16,19,22	0.95
Roseburg	Umpqua River	Smith River	22526.00	2	N Sister Cr	Repeat	Annual	0.93
Roseburg	Umpqua River	Smith River	22526.00	2	N Sister Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.93
Roseburg	Umpqua River	Smith River	22530.00	1	N Sister Cr	Repeat	05,06,07,10,11,12,13,20,22,23	0.93
Roseburg	Umpqua River	Smith River	22537.50	1	Marsh Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.31
Roseburg	Umpqua River	Smith River	22546.60	1	Mosetown Cr, E Fk, Trib A	Repeat	13,17,18,19,20,21,22,23	0.35
Roseburg	Umpqua River	Smith River	22585.00	2	Smith R, S Fk	Repeat	03,22	0.96
Roseburg	Umpqua River	Elk Creek	22724.00	1	Elk Cr	Repeat	16,19,22	1.16
Roseburg	Umpqua River	Elk Creek	22727.00	1	Lancaster Cr	New	22	0.53
Roseburg	Umpqua River	Elk Creek	22807.00	2	Curtis Cr	Repeat	12,13,15,17,18,19,20,21,22,23	0.81
Roseburg	Umpqua River	Elk Creek	22816.40	1	Elk Cr	Repeat	16,19,22	1.26
Roseburg	Umpqua River	South Umpqua	22999.00	1	Deer Cr, N Fk	Repeat	14,15,16,17,18,19,20,21,22,23	0.15
Roseburg	Umpqua River	South Umpqua	23035.00	3	Thompson Cr	New	22	0.68
Roseburg	Umpqua River	South Umpqua	23043.00	1	Lookingglass Cr	New	22	0.43
Roseburg	Umpqua River	South Umpqua	23063.40	2	Rice Cr	Repeat	22	0.32
Roseburg	Umpqua River	South Umpqua	23095.00	1	Weaver Cr	Repeat	04,16,22	0.93

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Roseburg	Umpqua River	South Umpqua	23108.00	3	Bilger Cr	Zero	06,07,10,11,12,19,21,22	0.33
Roseburg	Umpqua River	South Umpqua	23111.00	2	N Myrtle Cr	Repeat	16,19,22	0.50
Roseburg	Umpqua River	South Umpqua	23117.00	2	Frozen Cr, Left Fk	New	22	0.40
Roseburg	Umpqua River	South Umpqua	23121.00	1	Riser Cr	Repeat	11,12,13,17,18,19,20,21,22,23	0.74
Roseburg	Umpqua River	South Umpqua	23124.00	1.1	Lee Cr	Repeat	22	0.80
Roseburg	Umpqua River	South Umpqua	23191.00	3	Bear Cr	Repeat	22	0.95
Roseburg	Umpqua River	South Umpqua	23209.30	1	Elk Valley Cr, E Fk	Repeat	14,15,16,17,18,19,20,21,22,23	0.90
Roseburg	Umpqua River	South Umpqua	23299.00	2	Wood Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.85
Roseburg	Umpqua River	South Umpqua	23313.00	1	Bull Run Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.25
Roseburg	Umpqua River	South Umpqua	23332.00	2	Clear Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.26
Roseburg	Umpqua River	South Umpqua	23389.00	1	Canyon Cr	Repeat	08,14,17,20,22,23	0.66
Roseburg	Umpqua River	South Umpqua	23414.00	1	Umpqua R, S Fk	Repeat	22	0.90
Roseburg	Umpqua River	South Umpqua	23431.00	1	Days Cr	Repeat	07,16,19,22	0.52
Roseburg	Umpqua River	South Umpqua	23475.00	1	Stouts Cr, W Fk	Repeat	22	0.65
Roseburg	Umpqua River	South Umpqua	23552.30	2	Black Canyon Cr	Repeat	17,18,19,20,21,22,23	0.61
Roseburg	Umpqua River	South Umpqua	23562.00	1	Falcon Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.72
Roseburg	Umpqua River	Calapooya Creek	22899.00	1	Cabin Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.61
Roseburg	Umpqua River	Calapooya Creek	22905.70	1	Pollock Cr	Repeat	07,17,22	1.12

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>Coos-Coquille</b>								
Coos Bay	Coos River	Mainstem	22144.00	3	Catching Cr	Repeat	04,07,16,19,22	0.73
Coos Bay	Coos River	Millicoma River	22237.50	2	Packard Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.44
Coos Bay	Coos River	Millicoma River	22240.00	2	Woodruff Cr	Repeat	09,16,19,22	0.92
Coos Bay	Coos River	Millicoma River	22273.00	4	Millicoma R, E Fk	Repeat	14,15,16,17,18,19,20,21,22,23	0.93
Coos Bay	Coos River	Millicoma River	22278.00	4	Millicoma R, W Fk		14,15,16,17,18,19,20,21,22,23	1.66
Coos Bay	Coos River	Millicoma River	22278.00	4	Millicoma R, W Fk		Annual	1.66
Coos Bay	Coos River	Millicoma River	22290.00	1	Millicoma R, W Fk	Repeat	22	0.79
Coos Bay	Coos River	Millicoma River	22293.00	2	Deer Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.81
Coos Bay	Coos River	Millicoma River	22299.00	1	Fish Cr	Repeat	11,12,13,17,18,19,20,21,22,23	1.44
Coos Bay	Coos River	Millicoma River	22301.00	1	Panther Cr	Repeat	22	0.83
Coos Bay	Coos River	Millicoma River	22305.00	1	Cougar Cr	Repeat	22	0.58
Coos Bay	Coos River	South Fork	22157.00	1	Wren Smith Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.27
Coos Bay	Coos River	South Fork	22181.00	1	Coos R, S Fk	Repeat	05,18,22	1.21
Roseburg	Coos River	South Fork	22199.00	1	Bottom Cr, N Fk	Repeat	04,07,16,19,22	1.08
Roseburg	Coos River	South Fork	22204.00	1	Cedar Cr		14,15,16,17,18,19,20,21,22,23	1.20
Roseburg	Coos River	South Fork	22204.00	1	Cedar Cr		Annual	1.20
Roseburg	Coos River	South Fork	22206.00	1	Cedar Cr	Repeat	16,18,19,22	1.45
Roseburg	Coos River	South Fork	22207.80	2	Lake Cr	Repeat	16,22	1.10
Roseburg	Coos River	South Fork	22217.60	1	Panther Cr	Repeat	22	0.99
Roseburg	Coos River	South Fork	22217.80	1	Williams R	Repeat	Annual	1.13
Roseburg	Coos River	South Fork	22217.80	1	Williams R	Repeat	14,15,16,17,18,19,20,21,22,23	1.13
Roseburg	Coos River	South Fork	22226.00	1	Little Cow Cr	Repeat	22	1.11
Coos Bay	Coquille River	Mainstem And Bay	21620.00	3	Bear Cr	Repeat	13,15,16,17,18,19,20,21,22,23	0.66
Coos Bay	Coquille River	Mainstem And Bay	21681.00	2	Rollan Cr	Repeat	16,22	0.54
Coos Bay	Coquille River	North Fork	21946.40	1	Johns Cr	Repeat	15,16,17,18,19,20,21,22,23	0.33
Coos Bay	Coquille River	North Fork	22006.30	2	Middle Cr, Trib A	Repeat	14,22	0.92
Coos Bay	Coquille River	North Fork	22014.00	5	Middle Cr	Repeat	04,22	0.54
Coos Bay	Coquille River	North Fork	22024.00	2	Middle Cr	Repeat	16,19,22	0.69
Coos Bay	Coquille River	North Fork	22031.00	1	Coquille R, N Fk	Repeat	03,09,19,21,22	1.66
Coos Bay	Coquille River	North Fork	22036.00	4	Hudson Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.12
Coos Bay	Coquille River	North Fork	22037.00	3	Coquille R, N Fk	Repeat	14,15,16,17,18,19,20,21,22,23	1.05
Coos Bay	Coquille River	North Fork	22046.00	1	Coquille R, N Fk, Trib Y	Repeat	05,06,07,17,18,19,20,21,22,23	0.53

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Coos Bay	Coquille River	East Fork	21949.00	2	Weekly Cr	Repeat	16,19,22	0.25
Coos Bay	Coquille River	East Fork	21951.50	1	Elk Cr, S Fk	Repeat	16,19,22	0.92
Coos Bay	Coquille River	East Fork	21953.00	2	Yankee Run Cr	Repeat	15,22	1.18
Coos Bay	Coquille River	East Fork	21957.00	1.1	Steel Cr	Repeat	22,23	0.19
Coos Bay	Coquille River	Middle Fork	21743.00	1	Axe Cr	Repeat	03,10,11,12,13,22,23	1.12
Coos Bay	Coquille River	Middle Fork	21773.00	2	Sandy Cr	Repeat	12,13,15,17,18,19,20,21,22,23	0.98
Coos Bay	Coquille River	Middle Fork	21773.90	1	Coquille R, M Fk	Repeat	22	0.15
Coos Bay	Coquille River	South Fork	21710.20	1	Ward Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.47
Coos Bay	Coquille River	South Fork	21840.00	2	Coquille R, S Fk	Repeat	16,22	1.21
Coos Bay	Coquille River	South Fork	21853.70	1	Salmon Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.42
Coos Bay	Coquille River	South Fork	21882.00	1	Coquille R, S Fk	New	22	0.53
Coos Bay	Coquille River	South Fork	21909.00	1	Rock Cr	Repeat	16,19,22	0.68
<b>South Coast</b>								
Coos Bay	Fourmile Cr	Mainstem	21560.76	2	Fourmile Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.21
Coos Bay	Floras Creek	Mainstem	21570.00	3	Floras Cr	Repeat	16,19,22	1.66
Coos Bay	Floras Creek	Mainstem	21570.60	4	Floras Cr	Repeat	05,16,19,22	0.84
Coos Bay	Floras Creek	Mainstem	21570.60	10	Floras Cr	Repeat	16,19,22	0.74
Coos Bay	Floras Creek	Floras Lake	21583.00	3	Boulder Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.58
Coos Bay	Floras Creek	North Fork	21577.80	1	Floras Cr, E Fk	Repeat	22	0.71
Coos Bay	Sixes River	Mainstem	21547.00	1	Sixes R	Repeat	14,15,16,17,18,19,20,21,22,23	0.90
Coos Bay	Sixes River	Mainstem	21551.00	3.2	Sixes R	Repeat	22	0.98
Coos Bay	Sixes River	Mainstem	21555.00	1	Sixes R	Repeat	10,11,12,13,16,19,22	0.80
Coos Bay	Sixes River	Mainstem	21558.30	1	Sixes R	Repeat	11,12,13,17,18,19,20,21,22,23	0.44

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>Lower Willamette</b>								
Sauvie	Lower Willamette (Canby)	Mainstem	30790.00	1	McCarthy Cr	Repeat	22,23	1.03
Clackamas	Lower Willamette (Canby)	Mainstem	30863.00	2	Mt Scott Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.31
Clackamas	Lower Willamette (Canby)	Mainstem	30864.00	1	Kellogg Cr		22,23	
Clackamas	Lower Willamette (Canby)	Mainstem	30865.60	1	Nettle Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.45
Clackamas	Lower Willamette (Canby)	Mainstem	30865.70	1	Tryon Cr	Repeat	04,13,16,19,22	0.79
Clackamas	Lower Willamette (Canby)	Mainstem	31200.00	1.1	Abernathy Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.07
Clackamas	Lower Willamette (Canby)	Mainstem	31200.10	1	Thimble Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.49
Clackamas	Lower Willamette (Canby)	Mainstem	31200.45	1	Abernathy Cr	Repeat	13,14,15,16,17,18,19,21,22,23	1.24
Clackamas	Lower Willamette (Canby)	Mainstem	31200.75	1	Abernathy Cr	Repeat	16,17,18,19,21,22,23	0.68
Clackamas	Lower Willamette (Canby)	Mainstem	31200.75	2	Abernathy Cr	Repeat	13,16,17,19,22	0.85
Sauvie	Lower Willamette (Canby)	Milton Creek	30795.00	2	Milton Cr	Repeat	13,15,16,17,18,19,20,21,22,23	0.88
Sauvie	Lower Willamette (Canby)	Milton Creek	30797.50	2	Milton Cr	Repeat	13,19,20,22	0.75
Sauvie	Lower Willamette (Canby)	Milton Creek	30799.00	1	Milton Cr	Repeat	04,13,16,17,22,23	1.39
Sauvie	Lower Willamette (Canby)	Milton Creek	30800.00	3	Cox Cr	Repeat	15,16,17,18,19,20,21,22,23	0.36
Sauvie	Lower Willamette (Canby)	Milton Creek	30800.00	4	Cox Cr	Repeat	04,13,16,17,19,22	0.98
Sauvie	Lower Willamette (Canby)	Milton Creek	30801.00	1	Milton Cr	Repeat	13,15,16,17,18,19,20,21,22,23	0.66
Sauvie	Lower Willamette (Canby)	Milton Creek	30803.00	2	Milton Cr	Repeat	13,17,22,22	0.89
Sauvie	Lower Willamette (Canby)	Milton Creek	30803.00	3	Milton Cr	Repeat	12,17,18,22,23	1.23
Sauvie	Lower Willamette (Canby)	Milton Creek	30807.00	1	Milton Cr	Repeat	15,18,22	0.90
Sauvie	Lower Willamette (Canby)	Milton Creek	30809.00	1	Milton Cr	Repeat	04,13,16,17,18,19,20,22,23	1.17



## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Sauvie	(Canby) Lower Willamette (Canby)	Milton Creek	30809.00	2	Milton Cr	Repeat	13,22,23	1.01
Clackamas	Lower Willamette (Canby)	Johnson Creek	30858.00	4	Johnson Cr	New	22	0.94
Clackamas	Lower Willamette (Canby)	Johnson Creek	30858.00	8	Johnson Cr	Repeat	16,19,22	0.80
Clackamas	Lower Willamette (Canby)	Johnson Creek	30858.00	9	Johnson Cr	Repeat	15,16,17,18,19,20,21,22,23	1.11
Clackamas	Lower Willamette (Canby)	Johnson Creek	30858.70	1	Johnson Cr	Repeat	22	1.19
Clackamas	Lower Willamette (Canby)	Johnson Creek	30858.70	4	Johnson Cr	Repeat	12,13,16,19,22	1.20
Clackamas	Lower Willamette (Canby)	Johnson Creek	30858.70	5	Johnson Cr	Repeat	13,22	0.64
Sauvie	Scappoose Creek	Mainstem	30812.00	6	McNulty Cr	Repeat	22	0.35
Sauvie	Scappoose Creek	Mainstem	30812.00	6.2	McNulty Cr	Denied	22,23	0.60
Sauvie	Scappoose Creek	Mainstem	30818.40	1	Honeyman, Trib A	New	22	0.22
Sauvie	Scappoose Creek	Mainstem	30818.50	2	Honeyman Cr.	Repeat	13,15,17,18,21,22,23	0.87
Sauvie	Scappoose Creek	Mainstem	30819.00	1	Sly Cr	Repeat	12,13,15,17,18,20,22,23	1.26
Sauvie	Scappoose Creek	South Scappoose Creek	30826.90	1	Gourlay Cr	Repeat	13,16,19,22	0.29
Sauvie	Scappoose Creek	South Scappoose Creek	30829.00	1	S Scappoose Cr	Repeat	18,22,23	0.19
Sauvie	Scappoose Creek	South Scappoose Creek	30829.80	2	S Scappoose Cr	New	22	0.42
Sauvie	Scappoose Creek	North Scappoose Creek	30830.00	1	N Scappoose Cr	New	22	0.23
Sauvie	Scappoose Creek	North Scappoose Creek	30832.00	3	N Scappoose Cr	Dropped	15,18,22	0.33
Sauvie	Scappoose Creek	North Scappoose Creek	30832.00	4	N Scappoose Cr	Denied	22	0.32
Sauvie	Scappoose Creek	North Scappoose Creek	30834.00	1	N. Scappoose Creek	New	22	1.31
Sauvie	Scappoose Creek	North Scappoose Creek	30838.30	2	Lizzie Cr	New	22	0.90
Clackamas	Clackamas River	Mainstem	30867.00	3	Clackamas R	Repeat	14,15,16,17,18,19,20,21,22,23	1.93
Clackamas	Clackamas River	Mainstem	30885.00	1	Richardson Cr	Repeat	13,14,16,17,18,19,20,21,22,23	1.35
Clackamas	Clackamas River	Mainstem	30887.00	3	Foster Cr	Repeat	21,22,23	0.89

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Clackamas	Clackamas River	Mainstem	30892.00	4	Deep Cr, N Fk	Repeat	22	1.10
Clackamas	Clackamas River	Mainstem	30895.30	1	Deep Cr, Trib A	New	22	0.96
Clackamas	Clackamas River	Mainstem	30895.30	2	Deep Cr, Trib A	New	22	1.40
Clackamas	Clackamas River	Mainstem	30900.27	4	Tickle Cr	Repeat	16,19,22	1.01
Clackamas	Clackamas River	Mainstem	30900.70	1	Tickle Cr	Repeat	07,13,16,19,22	1.31
Clackamas	Clackamas River	Mainstem	30902.00	1	Clackamas R	Repeat	04,06,12,14,15,18,20,21,22,23	1.16
Clackamas	Clackamas River	Mainstem	30902.00	2	Clackamas R	Repeat	13,14,15,16,17,18,19,20,22,23	1.50
Clackamas	Clackamas River	Mainstem	30903.00	1	Goose Cr	Repeat	22	1.70
Clackamas	Clackamas River	Mainstem	30904.00	1	Clackamas R	Repeat	04,06,07,11,13,16,19,22	2.14
Clackamas	Clackamas River	Clear Creek	30871.00	1	Bargfeld Cr	Denied	11,12,13,14,15,16,17,18,19,22	0.49
Clackamas	Clackamas River	Clear Creek	30872.00	4	Clear Cr	Repeat	14,15,16,17,18,19,20,21,22,23	0.48
Clackamas	Clackamas River	Clear Creek	30874.00	2	Mosier Cr (Trestle Cr)	Repeat	04,13,15,22	0.77
Clackamas	Clackamas River	Clear Creek	30875.10	2	Clear Cr	Repeat	11,12,13,15,20,22	1.53
Clackamas	Clackamas River	Clear Creek	30875.10	3	Clear Cr	Repeat	12,13,15,16,18,19,21,22	1.08
Clackamas	Clackamas River	Clear Creek	30875.30	1	Clear Cr	Repeat	07,13,15,17,22,23	1.70
Clackamas	Clackamas River	Clear Creek	30876.00	1	Clear Cr	Repeat	12,13,14,15,17,18,20,21,22,23	0.43
Clackamas	Clackamas River	Clear Creek	30878.00	1	Clear Cr	Denied	11,12,13,14,15,16,17,18,22,23	0.91
Clackamas	Clackamas River	Clear Creek	30880.00	1	Clear Cr	Repeat	07,13,15,16,19,22	1.16
Clackamas	Clackamas River	Clear Creek	30880.00	2	Clear Cr	Repeat	13,15,22	0.98
Clackamas	Clackamas River	Eagle Creek	30906.00	1	Curriu Cr	New	22	1.27
Clackamas	Clackamas River	Eagle Creek	30907.00	2	Eagle Cr	Repeat	22	0.83
Clackamas	Clackamas River	Eagle Creek	30907.00	4	Eagle Cr	Denied	13,15,22	0.83
Clackamas	Clackamas River	Eagle Creek	30915.00	2	Little Eagle Cr	Repeat	15,16,21,22,23	1.16
Clackamas	Clackamas River	Eagle Creek	30915.30	1	Little Eagle Cr., Trib A	New	22	0.80
Clackamas	Clackamas River	Eagle Creek	30919.00	2	Trout Cr	Repeat	13,16,18,19,22	1.10
Clackamas	Clackamas River	Eagle Creek	30920.00	1	Eagle Cr, N Fk	Repeat	11,13,14,16,17,20,22,23	1.52
Clackamas	Clackamas River	Eagle Creek	30921.00	2	Eagle Cr	Repeat	13,14,16,17,18,19,20,21,22,23	1.22
Clackamas	Clackamas River	Eagle Creek	30922.00	2	Delph Cr	Repeat	13,16,19,22	1.24
Clack Extra	Clackamas River	Eagle Creek	30922.70	2	Delph Cr	Repeat	22	1.23
Clackamas	Clackamas River	Eagle Creek	30922.70	5	Delph Cr		22	
Sandy Hike	Sandy River	Mainstem	33393.00	2	Beaver Cr	Repeat	13,22	0.54
Sandy Hike	Sandy River	Mainstem	33396.00	1	Beaver Cr, S Fk	Repeat	13,22	0.93
Sandy Float	Sandy River	Mainstem	33400.00	1	Sandy R	Repeat	14,15,16,17,18,19,20,21,22,23	1.56
Sandy Float	Sandy River	Mainstem	33400.00	3	Sandy R	Repeat	14,15,16,17,18,19,20,21,22,23	1.31

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Sandy Float	Sandy River	Mainstem	33400.00	4	Sandy R	Repeat	10,11,13,14,16,19,22,23	1.65
Sandy Float	Sandy River	Mainstem	33400.00	5	Sandy R	Repeat	12,13,22	1.27
Sandy Float	Sandy River	Mainstem	33404.00	1	Sandy R	Repeat	07,10,11,13,15,16,20,22	2.22
Sandy Float	Sandy River	Mainstem	33404.00	2	Sandy R	Repeat	12,13,15,18,19,21,22	0.63
Sandy Hike	Sandy River	Mainstem	33407.00	3	Gordon Cr	Repeat	07,13,22	0.54
Sandy Float	Sandy River	Mainstem	33419.00	1	Trout Cr	Repeat	15,16,17,18,19,20,21,21,22,23	0.16
Sandy Float	Sandy River	Mainstem	33420.00	1	Sandy R	Repeat	14,15,16,17,18,19,20,21,22,23	2.22
Sandy Float	Sandy River	Mainstem	33422.00	1	Sandy R	Repeat	11,14,15,17,18,20,22,23	2.54
Sandy Hike	Sandy River	Mainstem	33474.00	1	Cedar Cr	Repeat	10,13,15,16,18,22	0.65
Sandy Float	Sandy River	Mainstem	33479.00	1	Sandy R	Repeat	14,15,16,17,18,19,20,21,22,23	2.23
Sandy Float	Sandy River	Mainstem	33483.70	1	Sandy R	Repeat	14,15,16,17,18,19,20,21,22,23	0.81
Sandy Hike	Sandy River	Mainstem	33484.00	3	Alder Cr		10,16,19,22	1.13
Sandy Float	Sandy River	Mainstem	33487.00	1	Sandy R	Repeat	11,13,14,15,16,17,18,19,22,23	2.39
Sandy Float	Sandy River	Mainstem	33487.70	1	Sandy R	Repeat	04,06,11,13,14,17,20,22,22,23	0.89
Sandy Float	Sandy River	Mainstem	33537.00	1	Sandy R	Repeat	04,06,07,12,13,22,23	3.68
Sandy Float	Sandy River	Mainstem	33563.00	1	Sandy R	Repeat	16,17,18,19,20,22,23	0.68
Sandy Hike	Sandy River	Mainstem	33564.00	1	Clear Cr	Repeat	07,10,13,16,19,22,23	0.87
Sandy Hike	Sandy River	Mainstem	33566.60	1	Clear Cr	Repeat	07,10,13,15,19,22	0.68
Sandy Hike	Sandy River	Mainstem	33568.70	1	Horseshoe Cr	Repeat	13,22	0.31
Sandy Hike	Sandy River	Mainstem	33572.00	1	Lost Cr	Repeat	10,13,14,18,19,20,22,23	1.42
Sandy Float	Bull Run River	Mainstem	33437.00	1	Bull Run R	Inaccessibl	06,12,13,14,15,17,22,23	0.92
Sandy Hike	Bull Run River	Little Sandy River	33430.00	4	Little Sandy R	Inaccessibl	22,23	0.80
Sandy Hike	Salmon River	Mainstem	33490.00	1	Salmon R	New	07,22	0.95
Sandy Hike	Salmon River	Mainstem	33496.00	1	Little Cheeney Cr	New	10,13,16,17,19,22	0.54
Sandy Hike	Salmon River	Mainstem	33498.00	2	Salmon R	Repeat	14,15,16,17,18,19,20,21,22,23	1.04
Sandy Hike	Salmon River	Mainstem	33498.50	2	Salmon R	Repeat	14,15,16,17,18,19,20,21,22,23	0.91
Sandy Hike	Salmon River	Mainstem	33501.00	1	Salmon R, S Fk	inaccessibl	22	1.58
Sandy Hike	Salmon River	Mainstem	33504.00	1	Salmon R	Repeat	13,22	0.97
Sandy Hike	Zigzag River	Mainstem	33546.00	1	Zigzag R	Repeat	10,13,16,19,22	0.30
Sandy Hike	Zigzag River	Mainstem	33555.00	2	Camp Cr	Repeat	10,13,16,19,22	0.62
Sandy Hike	Zigzag River	Mainstem	33560.00	1	Zigzag R	Repeat	12,13,14,15,18,19,20,21,22,23	0.70
Sandy Hike	Zigzag River	Still Creek	33547.00	3	Still Cr	Repeat	15,16,17,18,13,19,20,21,22,23	1.13
Sandy Hike	Zigzag River	Still Creek	33549.00	2	Still Cr	Repeat	06,07,22	0.76
Sandy Hike	Zigzag River	Still Creek	33549.70	3	Still Cr	Repeat	14,15,16,17,18,19,20,21,22,23	1.28

## 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
<b>Lower Columbia</b>								
Astoria	Lewis and Clark River	Mainstem	30059.03	1	Lewis and Clark R, Trib 1		22	0.54
Astoria	Lewis and Clark River	Mainstem	30059.06	1.1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	1.30
Astoria	Lewis and Clark River	Mainstem	30059.07	1	Lewis and Clark R, Trib 3		22	0.44
Astoria	Lewis and Clark River	Mainstem	30059.08	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.95
Astoria	Lewis and Clark River	Mainstem	30059.09	1	Lewis and Clark R, Trib 4		22	0.19
Astoria	Lewis and Clark River	Mainstem	30059.10	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.79
Astoria	Lewis and Clark River	Mainstem	30059.11	1	Lewis and Clark R, Trib 5		13,14,15,16,17,18,19,20,21,22	0.50
Astoria	Lewis and Clark River	Mainstem	30059.13	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.79
Astoria	Lewis and Clark River	Mainstem	30059.15	1	Lewis and Clark R, Trib 6		22	0.47
Astoria	Lewis and Clark River	Mainstem	30059.16	1	Lewis and Clark R, Trib 7		22	0.68
Astoria	Lewis and Clark River	Mainstem	30059.18	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	1.41
Astoria	Lewis and Clark River	Mainstem	30059.21	1	Lewis and Clark R, Trib 8		22	0.63
Astoria	Lewis and Clark River	Mainstem	30059.23	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.20
Astoria	Lewis and Clark River	Mainstem	30059.26	1	Lewis and Clark R, Trib 9		13,14,15,16,17,18,19,20,21,22	0.66
Astoria	Lewis and Clark River	Mainstem	30059.28	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.55
Astoria	Lewis and Clark River	Mainstem	30059.30	1	Lewis and Clark R, Trib 10		22	0.34
Astoria	Lewis and Clark River	Mainstem	30059.40	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.41
Astoria	Lewis and Clark River	Mainstem	30059.60	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	1.28
Astoria	Lewis and Clark River	Mainstem	30059.80	1	Lewis and Clark R		13,14,15,16,17,18,19,20,21,22	0.34
Sauvie	Westport Slough	Mainstem	30239.00	2	Plympton Cr	Repeat	13,15,16,17,18,19,20,21,22,23	1.03
Sauvie	Westport Slough	Mainstem	30259.00	1	Tandy Cr	Repeat	19,22	0.88
Sauvie	Clatskanie River	Mainstem	30274.70	1	Conyers Cr	Repeat	04,13,16,17,19,22	0.66
Sauvie	Clatskanie River	Mainstem	30283.00	1	Clatskanie R	Repeat	Annual	0.99
Sauvie	Clatskanie River	Mainstem	30283.00	1	Clatskanie R	Repeat	13,15,16,17,18,19,20,21,22,23	0.99
Sauvie	Clatskanie River	Mainstem	30286.00	2	Perkins Cr	Repeat	13,16,19,20,22	0.96
Sauvie	Clatskanie River	Mainstem	30288.00	1.1	Keystone Cr	Repeat	20,22	1.08
Sauvie	Clatskanie River	Mainstem	30292.00	1	Miller Cr	Repeat	13,14,15,16,17,19,20,22,23	1.02
Sauvie	Clatskanie River	Mainstem	30298.50	1	Clatskanie R	Repeat	13,15,17,20,22,23	1.01
Sauvie	Clatskanie River	Mainstem	30299.00	1	Clatskanie R, N Fk	Repeat	13,22	0.89
Sauvie	Clatskanie River	Mainstem	30301.00	1	Carcus Cr	Repeat	12,13,15,16,18,19,22	1.37
Sauvie	Clatskanie River	Mainstem	30301.00	2	Carcus Cr	Repeat	13,15,16,17,18,19,20,21,22,23	1.10
Sauvie	Clatskanie River	Mainstem	30306.00	2	Clatskanie R	Repeat	13,15,16,17,18,19,20,21,22,23	0.72

### 2022 Winter Steelhead Spawning Surveys

Crew	Basin	Subbasin	Reach ID	Seg.	Survey Name	Status	Year(s) Surv.	Miles
Sauvie	Clatskanie River	Mainstem	30306.00	5	Clatskanie R	Repeat	13,15,16,17,18,19,20,21,22,23	1.09
Sauvie	Clatskanie River	Mainstem	30307.00	1	Little Clatskanie R	Repeat	04,12,13,21,22	1.09
Sauvie	Clatskanie River	Mainstem	30308.00	3	Clatskanie R	Repeat	15,16,17,18,19,20,21,22,23	0.70
Sauvie	Clatskanie River	Mainstem	30308.20	1	Clatskanie R	Repeat	13,16,19,22	0.60
Sauvie	Clatskanie River	Mainstem	30308.20	2	Clatskanie R	Repeat	13,17,20,22,23	1.49
Sauvie	Clatskanie River	Mainstem	30308.30	1	Dribble Cr	Repeat	13,15,16,17,18,19,20,21,22,23	0.14
Sauvie	Clatskanie River	Mainstem	30308.50	1	Clatskanie R	Repeat	13,15,16,17,18,19,20,21,22,23	0.31
Sauvie	Clatskanie River	Mainstem	30308.50	2	Upper Clatskanie R, Wilark Unit	Repeat	12,13,15,21,22	0.75
Sauvie	Clatskanie River	Mainstem	30308.70	1	Clatskanie R, Trib 1	Repeat	04,12,13,15,16,18,19,21,22	0.99
Sauvie	Dobbins Slough	Beaver Creek	30335.00	1	Stewart Cr	Repeat	13,22	0.82
Sauvie	Goble Creek	Mainstem	30652.00	2	Goble Cr, S Fk	Repeat	04,13,16,22	1.22
Sauvie	Goble Creek	Mainstem	30653.50	1	Goble Cr	Repeat	15,16,17,18,19,20,22,23	0.44
Sauvie	Tide Creek	Mainstem	30656.60	2	Merrill Cr	Repeat	04,15,22	0.93
Sauvie	Tide Creek	Mainstem	30656.63	3	Merrill Cr, Trib A	Repeat	15,16,17,18,13,19,20,21,22,23	0.17

