

# COASTAL STEELHEAD SPAWNING SURVEY

## PROCEDURES MANUAL

2011



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 is based solely on redd counts. This is because steelhead spend only a short time on spawning beds. In addition, fish not actively spawning are elusive and hard to count and steelhead do not usually die near where they spawn. Also, the winter steelhead spawning period is protracted, lasting up to 6 months. Steelheads also have a basin wide spawning distribution, spawning in higher gradient headwater streams as well as larger tributaries and main stem areas.

The 2011 survey season will be the eighth year of coast wide random steelhead adult sampling. 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 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. Survey effort 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. The two DPS's assessed include the Oregon Coast and Klamath Mountains Province.

## SURVEYOR SUPPLY LIST

### Forms:

1. Repeat Survey Landowner Contact Forms.
2. Coho Survey Landowner Contact Forms.
3. Spawning Survey Evaluation Form.
4. Description Change Forms.
5. List of Survey Location Descriptions.
6. 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 shoes  
Knee Pads (optional)  
Wading staff/Gaff  
Polarized sunglasses  
Coastal Steelhead Spawning Survey Procedures Manual  
Scale envelopes  
Measuring tape (in millimeters)  
Tweezers  
Knife  
Pencils  
Permanent markers  
Survey boundary signs and aluminum nails  
Machete  
C.B. radio  
GPS unit and charger  
PDA unit and charger  
Cell phone and charger

## SURVEY PROCEDURES

### Organizing work

Each crew (two members) will have a list of up to 45 surveys. Some surveys will require floating and others walking. Each survey should be conducted every 7-14 days. Though it may not be possible to survey large water surveys at the start of the season an effort should be made to get into float surveys as soon as possible. Group surveys into daily work schedules that fit into 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 the 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 pontoon boat. Boating safety is an important part of the job covered in more detail on pages 23-28.

Each crew 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 parking on any private property.

To increase the level of safety and maximize the area covered, **float surveys are always conducted in pairs.** Crews lacking boating experience should conduct initial floats on potentially dangerous surveys with crew chiefs. 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 chief. 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. The boats are made with a hard floor that allows one to stand while floating in the slower sections. When approaching high density redd areas, standing in the boats will greatly increase your ability to identify redds and live fish. 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. Plan on giving yourself extra time for float surveys. This is especially true early in the season as you are getting familiar with these floats and as redd density increases.

We often survey areas popular for fishing. Be courteous in how you approach and pass fisherman, 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 are more easily frightened than salmon so take time to identifying fin clips when fish are encountered. Identifying marks on live fish varies between surveyors, but generally crews

<b>Steelhead</b>	
Unmarked STW	0
Tally Unmarked	+1
Marked STW	0
Tally Marked	+1
Unknown STW	0
Tally Unknown	+1
<b>Redd Longevity</b>	
<b>Carcass Sampling</b>	

can determine fin mark status on 30% 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 "Scale Sampling" (page 20) for sampling details. Other species you may encounter include pacific lamprey, brook lamprey, and

cutthroat trout. Pacific lamprey tend to spawn in the larger streams while 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**

Redd Longevity	
Reach ID	50010.00 Seg 12
44° 33.8995 N 123° 14.2890 W	
1/4/08 at 20:10:02 (UTC)	
<input type="button" value="Acquire"/>	
Redd Number	.....
Rock Color	.....
Species	Select one... ↓
Initial Date	1/4/08

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.** Note the GPS coordinates, redd number, rock color, date recorded, and date no longer visible. 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 record a removal date in the Redd Longevity form and remove the flagging. **All flagging and as many of the colored rocks as possible should be removed during the last site visit for the year.** For redds that are still visible during the last site visit, record the date and check the “Still Visible on Last” box in the Redd Longevity form. Removal of flags and as many rocks as possible is critical to maintain good relationships with land owners and ensure continued access to conduct these surveys.

**All visible lamprey redds will be tallied on each visit.** Basically, if it is a lamprey redd, you will 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 use a color which has been agreed on with your crew chief 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 the next week 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 4/5/2011. After walking 100m he finds the first redd of the day at this site. The Redd ID for this redd would be: 7-0405-1 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 7-0405-2 (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).

Pacific Lamprey redds can usually be distinguished from steelhead redds because the rocks will be placed by the fish upstream and to the side of the depression (page 18). 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. Lampreys tend to spawn in the larger tributary and mainstem sections of streams. It is also not uncommon 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 actually see fish on redds. In addition to pacific lamprey you may find brook lamprey in some of the smaller tributaries. This species is much smaller in overall size (~ 6 inch length) and spawns in smaller gravel. The redds are less than a foot in width. Although much smaller, brook lamprey still use the same method of gravel excavation by using their mouth to suction rocks. Similar to the pacific lamprey, rocks will be placed upstream 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 are usually much smaller in size.

### **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 bankful.
- 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

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 date and comment code on the reverse side of the Spawning Survey Evaluation Form.

### Area Surveyed

- 01 Includes tributary to index. (*Used when fish are observed in trib of survey*).
- 02 Holes not surveyed. (*Used when water is too high to survey holes*)
- 03 Survey boundary description change.

### Factors Affecting Fish Abundance

- 40 Poaching.
- 41 Predation / Scavenging.
- 42 Stream low.
- 43 Stream dry.
- 44 In-stream habitat improvement in or near index section.
- 45 Habitat damage in or near survey section.
- 46 Passage barriers below survey area.
- 48 Stream Flow insufficient for adult entry to date.
- 63 Partial count.

### 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.
- 36 Evidence of scouring of streambed.
- 37 Severe stream bank erosion.
- 38 Passable culvert.

### Miscellaneous

- 60 Most carcasses washed out.
- 61 Heavy silt deposition in streambed.
- 62 Counts in holes estimated.
- 64 Exposed redds due to low flow.
- 65 Redds obliterated due to high flow.
- 66 Counts probably higher than observed.
- 67 No new spawning fish observed.
- 68 Coho fry present.
- 69 Coho fry prevalent.
- 70 Coho fry abundant.
- 72 Chinook fry present.
- 73 Chinook fry prevalent.
- 74 Chinook fry abundant.
- 75 Trout fry present.
- 76 Trout fry prevalent.
- 77 Trout fry abundant.
- 78 Unknown fry.
- 79 Yearling Coho Observed.
- 88 Survey not conducted due to impassable road.
- 89 Active Logging
- 99 Placed steelhead carcasses observed.



## SPAWNING SURVEY EVALUATION FORM

<b>REACH ID</b>		<b>SEGMENT #</b>		<b>SURVEY NAME</b>	
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<b>ID # OF SURVEYOR COMPLETING FORM</b>		<b>DATE OF FORM</b>	
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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):**

<u>Category</u>	<u>Description</u>	
None	No Coho Spawning Gravel	<input type="checkbox"/>
Low	>0 and < 20 m <sup>2</sup> Spawning Gravel	<input type="checkbox"/>
Moderate	20 to 100 m <sup>2</sup> Spawning Gravel	<input type="checkbox"/>
High	> 100 m <sup>2</sup> Spawning Gravel	<input type="checkbox"/>

**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)**

## **Spawning Survey Evaluation Form Instructions**

This important form is used to evaluate the spawning habitat for salmon and steelhead in a given 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. For the random Coho sites, make the data as STW specific as possible. Examples include if and when STW were seen in survey, how far up into the survey fish were seen, redd size, and spawning success. 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 (Page 6) 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.

## 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 not 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 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 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 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 chief 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. You may need to modify survey boundaries or drop a survey if this occurs - consult your crew chief. 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.

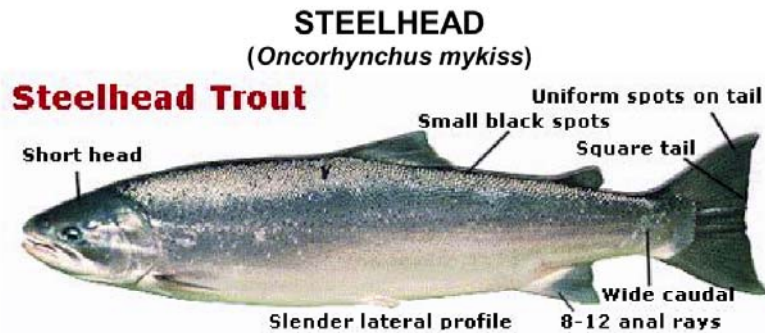
Check the "Comments" section for any special instructions:

- 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!

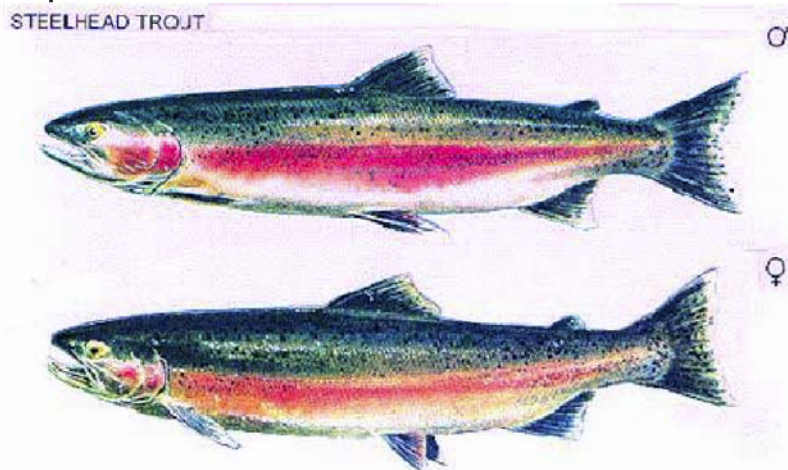
## STEELHEAD IDENTIFICATION



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**

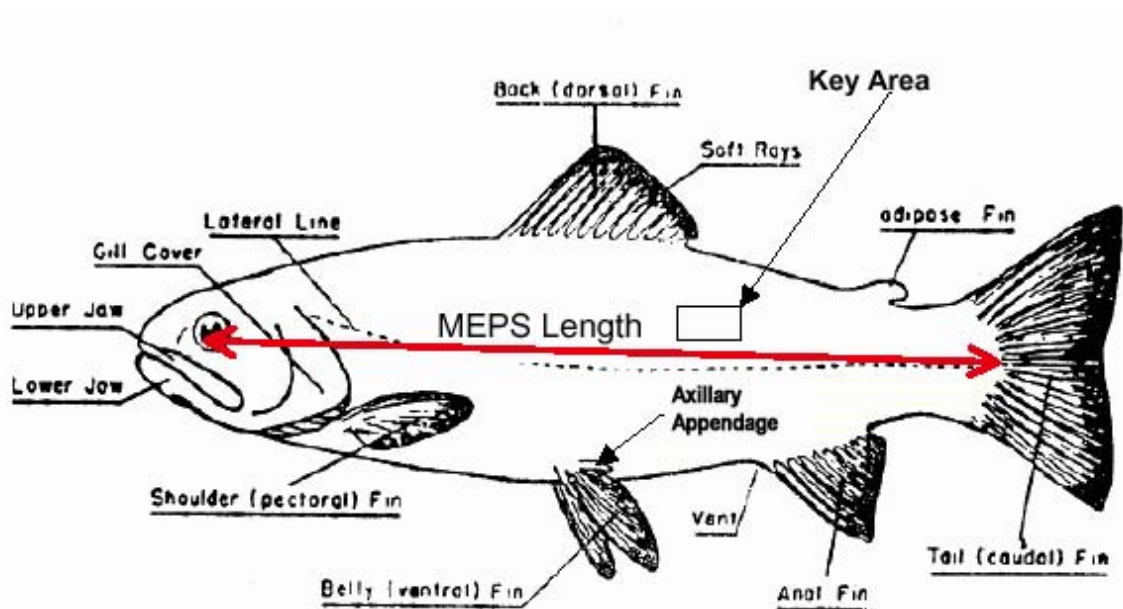


**Steelhead Redd**



**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.

## SCALE SAMPLING

### Carcass Data

Reach ID     50010.00 Seg 12.....

We will scale sample and record in the PDA all steelhead carcasses that we find.

Species        4 - Steelhead ↓

Record MEPS length in mm.

Sex             1 - Male ↓

Length (MEPS)     760.....

Record Reach ID and Segment Number under locality on scale envelope.

Clip            0 - None ↓

Scale #            54632.....

Record fin-clips.

Snout #            .....

Enter Comments on Next Page

Cut-off tail from all fish that are scale 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. You should take about 4 scales from each side of the fish.

Example of a scale envelope with data fields completed

**Sampler** 007    **Date** 02/25/11    **00001**

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

**Reach** 22504.00    **Seg** 2

**Comments:** F, 750 MEPS Un-marked

**OREGON DEPT. OF FISH AND WILDLIFE**

## DISTRICT CONTACTS

NAME	TITLE	NUMBER
OSP Tip Line	Oregon State Police anonymous tip line	1-800-452-7888
Motorpool questions	Oregon motor pool accidents/maintenance	1-800-378-0077
Tom Murtagh	Mid-Columbia/Sauvie District Fish Bio.	(971) 673-6044
Todd Alsbury	North Willamette District Fish Biologist	(971) 673-6011
Ben Walczak	North Willamette Asst. Fish Biologist	(503) 887-2154
Rick Klumph	North Coast District Manager	(503) 842-2741
Chris Knutsen	North Coast District Fish Biologist	(503) 842-2741
Robert Bradley	North Coast Asst. Fish Biologist	(503) 338-0106
Bob Buckman	Mid Coast District Fish Biologist	(541) 867-4741
Derek Wilson	Mid Coast Asst. Fish Biologist Newport	(541) 867-4741
John Spangler	Mid Coast Asst. Fish Biologist Mapleton	(541) 902-1384
Laura Jackson	Umpqua District Fish Biologist	(541) 440-3353
Holly Truemper	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
Todd Confer	South Coast District Biologist	(541) 247 7605
Steve Mazur	South Coast Assistant Fish Biologist	(541) 247 7605
Dan VanDyke	Upper Rogue District Biologist	(541) 826-8774
Dave Haight	Upper Rogue Asst. DB Central Point	(541) 826-8774
Kelly Moore	NW Region Research Program Manager	(541) 757-4263 ext 223
Mark Lewis	OASIS Project Leader	(541) 757-4263 ext 241
Briana Sounhein	OASIS Asst. Project Leader Coastal Coho	(541) 757-4263 ext 227
Matt Weeber	OASIS Asst. Project Leader L. Columbia	(541) 757-4263 ext 248
Eric Brown	OASIS Asst. Project Leader Steelhead	(541) 757-4263 ext 281
Michelle Best	OASIS Project Assistant	(541) 757-4263 ext 226
Brian Riggers	Chinook Studies Project Biologist	(541) 757-4263 ext 265
Lisa Borgerson	Scale Reading Project Leader	(541) 757-4263 ext 232
Alex Neerman	Crew Leader for Lower Columbia	(541) 760-7723
Scott Kirby	Crew Leader for North Coast & Tillamook	(541) 231-1958
Jon Nott	Crew Leader for Mid Coast	(541) 231-3412
Joshua Edwards	Crew Leader for Siuslaw and Umpqua	(541) 760-7525
Pat Burns	Crew Leader, Umpqua, Coos-Coquille South Coast	(541) 760-7768

## **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. In order 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 during the summer, 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 during the summer, 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 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 Chiefs 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 insure 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 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 valves 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 hypolon 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 insure the patch does not catch and tear off; large tears sometimes require stitching the material prior to patching.

*Oars:* Each boat should have three oars (2 + 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 insure 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.

### **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 be given a wide buffer at all times 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 in particular 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 absolutely deadly. Never attempt to run a low head dam, and give all other human-made objects 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 river 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.

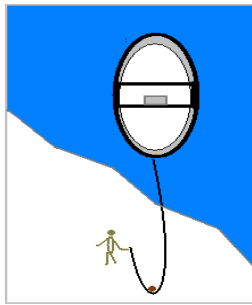
### **Boating Techniques**

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.

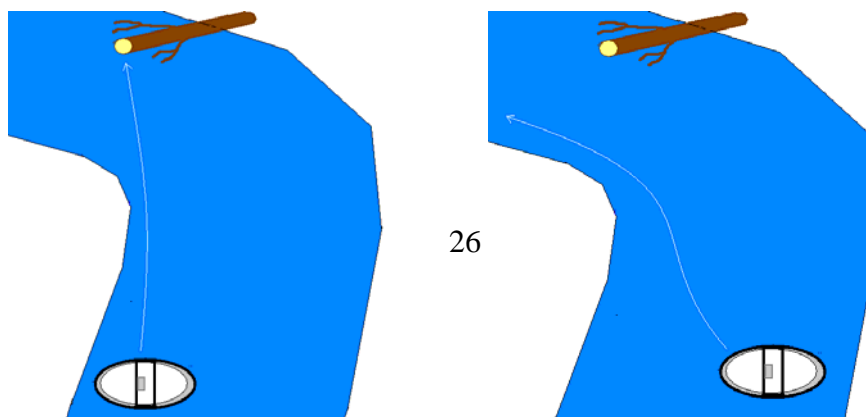
Scouting: Should occur whenever there is doubt about either what lies ahead, or about the safest path through. Features that are obvious from the bank can disappear when viewed from upstream, so always note all trouble spots, and take the time to learn how to identify these features from a low upstream 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 more easily move past the hazard. (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 definitely 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 insure 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://kayak.als.orst.edu/> (also has some run information)

<http://www.nwrfc.noaa.gov/>

<http://or.waterdata.usgs.gov/nwis/current?type=flow>

### **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 of 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 GEAR TO REDUCE SPREAD OF INVASIVE AQUATIC BIOTA**

Background: New Zealand Mud Snails (NZMS) and other invasive biota can spread rapidly among water bodies in the western United States. Dispersal of NZMS is restricted to transport in water or damp media (Hosea and Finlayson 2005), and it is thought that recreational anglers and other water enthusiasts are primary vectors for dispersal. Traits that promote rapid colonization of NZMS include small size (max length ~6 mm), resistance to desiccation (50% survival post 25 days on damp media; Winterbourn 1970), and the ability to reproduce through parthenogenesis (female production of offspring without fertilization). OASIS site selection is randomized across stream reaches in Western Oregon and the Lower Columbia, and because crews wade in multiple streams throughout the field season, it is important we reduce the dispersal threat of NZMS and other invasives by removing them from our gear.

Reducing Mudsnailed Transport Between Basins: Whenever possible, OASIS crews can minimize accidental mudsnail transport across river basins by not sampling in more than one major basin

per day. Crews should sanitize field gear daily when they return to their duty station, or between sites if they must sample in major basins in one day. For purposes here we'll define major basins at the 4<sup>th</sup> Field HUC level (see maps in sample packets). The following chemical protocol to sanitize gear was developed for crews visiting more than one basin per day\*. The protocol is based on research that showed that 100% of snails were killed in 5 minutes with a 1000 ppm concentration of Copper Sulfate (Hosea and Finlayson 2005). The chemical procedure and materials can be adapted by other crews that have nets and other collection gear.

Equipment to be kept in vehicles for site to site sanitation within a day:

- one or two 5-gallon plastic water jugs, filled with fresh tap water
- Spray bottle w/ copper sulfate solution (might need 2-3, depending on number of crew)
- soft bristle brush
- spray-rinse apparatus: pressurized hand pump sprayer (1-3 liter)
- drip tote
- MSDS for Copper Sulfate

Equipment to be stored at duty station

- one 7-gallon plastic jug for Copper Sulfate stock solution (see stock dilution below)\*\*

- 1) Wash/remove mud and large debris from all gear exposed to stream water. (This can be done as a last step before leaving the creek). At vehicle, remove gear and remove insoles from wading boots
- 2) Put gear in drip totes and hand-spray with cleaning solution to point of saturation and runoff. Gently scrub boot grommets, felt soles and wader folds to remove hidden snails. Clamp top of waders closed to avoid getting copper sulfate on inside where it could come in contact with skin. Allow treated gear to sit for a minimum of 5 minutes
- 3) Rinse gear with clean water provided in plastic water jugs. **DO NOT USE STREAM WATER.** Fill pump sprayer with tap water and use it to rinse gear sufficiently. For crews that can return to the duty station a good source of rinse water are outdoor hoses at ODFW offices.

\* If temperature and desiccation treatments can be used between site visits (see protocol developed by Aquatic and Riparian Effectiveness Monitoring Program-AREMP, BLM Corvallis), care should be taken so that neck, wrist, and foot seals of Dry-suits are not damaged.

\*\*Field crews will be given pre-weighed packets of 26.5 g Copper Sulfate to make a 7 gallon stock solution of sufficient strength of the active ingredient (252 mg/l Cu). Use latex gloves to handle copper sulfate and avoid contact with skin. Clearly mark the stock solution container and store in a safe place. Refer to the MSDS sheet for more information.

For photos and more information on mud snails, and maps of documented distributions, go to:

<http://www.esg.montana.edu/aim/mollusca/nzms/>

Literature Cited:

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

## **PERSONNEL POLICIES AND PROCEDURES**

### Work Periods

Your work period is defined by the Fair Labor Standards Act. Accordingly, your normal workweek is 40 hours, beginning on Sunday and ending on Saturday. You will be working a flexible schedule, meaning that the days you work during this period are not fixed. You will be compensated at time and one half for any hours worked in excess of 40 hours during each weekly work schedule. Extensive overtime needs to be pre-approved by your crew chief or Corvallis staff. Fill out weekly Report of Operations Form to record your work hours and general work activities.

### Holidays and Leave

There are two paid Holidays during the steelhead spawning season: Presidents' Day, February 16<sup>th</sup> and Memorial Day, May 25<sup>th</sup>. There is also a mandatory furlough day scheduled for Friday, April 16<sup>th</sup>. Please coordinate with your supervisor as to whether you are required to take the mandatory closure day or if you are on a floating schedule. Some of you may be required to take additional furlough days during the season. In addition, ODFW employees earn 8 hours of vacation and 8 hours of sick leave per month. However, vacation cannot be used until an employee has worked 6 months. Because of the short season and the unpredictable weather and run timing conditions extensive leave is not permitted. Employees will be paid unused vacation leave upon termination.

### Benefits and Insurance

All employees appointed for 90 days or longer receive a monthly insurance contribution that can be applied to a "Cafeteria Style" benefits package. The choice of insurance coverage may result in additional cash back to the employee or additional out of pocket expenses. Benefit packets for enrollment are distributed in October or at the time of hiring. Work related injury or illness is covered through employer provided workers compensation insurance.

### Safety

All employees are required to have an emergency medical form on file. All employees are required to report on-the-job injuries to their supervisor immediately. A Report of Accident form needs to be completed for every on-the-job injury. If medical attention is required a SAIF Workers' Compensation Claim Form 801 needs to be completed and faxed to the Corvallis lab within 24 hours of the accident.

### Uniform Clothing

Newly hired seasonal employees shall be allowed a uniform allowance equal to the purchase of two uniform shirts with logo and one pair of pants. Seasonal employees working continuously for 10 months per fiscal year (June through July) will accrue an allowance of \$25 per month of employment after an initial 6-month grace period. All purchases from this allowance must be

pre-approved by your supervisor. Uniform hats will be supplied to all employees. Employees are required to wear uniforms while working in the field. Uniform items displaying Department logos are not to be worn during personal business or recreation.

#### Purchasing

An itemized, dated and signed receipt is required for all purchases charged to the Agency. These receipts need to be sent to Michelle Best at the Corvallis Research Lab as soon as possible after a purchase is made.

#### Pets and Volunteers

Pets are not allowed to accompany employees during fieldwork. Non-department employees can accompany employees as volunteers for fieldwork. A completed and signed volunteer form needs to be on file prior to any work with volunteers.

#### Weapons

Possession or use of any weapon is strictly prohibited while on ODFW property (including vehicles) or while engaged in official agency business. This applies to both employees and volunteers.

#### Agency Policies Requiring Signatures

All employees are required to read and sign off on the following policies:

- Conflict of Interest and Employee Ethics
- Work Place Harassment
- Software Code of Ethics
- Drug free Workplace

### **State Vehicle Use**

#### For official use only!

Children and pets are not allowed in vehicles.  
Smoking in vehicles is prohibited.

#### Fuel

Use State of Oregon Voyager credit card.  
Make sure vendor will take card prior to purchase, do not pay with cash.  
Vendor needs to record odometer reading for each fuel purchase.

#### Maintenance and Repairs

Have vehicle maintained (oil changes and fluids checked) on schedule (every 5,000 miles).  
Pre-authorize any service or repair by calling 1-800-378-0077 (7:00 am to 6:00 pm M-F).  
Voyager card should not be used for any maintenance or repairs.  
Keep vehicle clean (inside and out). You are permitted to wash your vehicle once a month at the automated car wash using your voyager card.

### Accidents

Vehicle accidents need to be reported to DAS within 24 hrs. An accident form also needs to be filled out. This form is located in the DAS vehicle packet in each vehicle.

### Mileage Report

Record daily trips from the first of the month to the last week of the month.

At the last week of each month give the white copy to your crew chief or send it to Michelle Best at the Corvallis Research Lab.

**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 N fork 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

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# 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	

## SURVEYOR LIST

Location	Name	Surv. ID #	Cell Number
Portland	Alex Neerman	113	760-7723
Astoria	Jim Davis	116	231-1802
Tillamook	Scott Kirby	98	231-1958
	Derrick Wheeler	110	760-7513
Corvallis	Jon Nott	9	231-3412
	Brent Priz	47	231-5432
Newport	Bill Ratliff	34	760-7420
LSWCD	Mark Stone	36	265-2631
	Kip Wood	37	
Eugene	Brent Reed	49	231-1961
	Josh Edwards	7	760-7525
Coos Bay	Joshua Allison	79	231-1803
	Anson Friar	51	207-2415
	Pat Burns	8	760-7768
Gold Beach	Evan Haug	65	760-7441
	Sunny Bourdon	94	760-7772

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
CoosBay	3-MS	Crystal Cr	3984	21534.00	3	Random	05,11	31.00S15.00W 35	Yes
CoosBay	3-MS	Ward Cr	4362	21710.20	1	Random	10,11	29.00S13.00W 22	Yes
CoosBay	3-MS	Axe Cr	4452	21743.00	1	Random	03,10,11	29.00S11.00W 13	Yes
CoosBay	3-MS	Rock Cr	4508	21755.00	6	Random	03,04,05,10,11	30.00S10.00W 19	STWOnly
CoosBay	3-MS	Sandy Cr	4556	21772.90	3	Random	10,11	29.00S10.00W 11	Yes
CoosBay	3-MS	Salmon Cr	4699	21853.70	1	Random	10,11	31.00S12.00W 27	Yes
CoosBay	3-MS	Johns Cr	4794	21946.00	1	Random	03,10,11	29.00S11.00W 7	Yes
CoosBay	3-MS	Coquille R, E Fk	45080	21954.00	3	Random	10,11	28.00S11.00W 15	STWOnly
CoosBay	3-MS	Steel Cr	4851	21957.00	1	Random	03,04,08,09,10,11	28.00S11.00W 12	Yes
CoosBay	3-MS	Middle Cr	4973	22014.00	4	Random	03,10,11	27.00S11.00W 12	STWOnly
CoosBay	3-MS	Middle Cr	5009	22024.00	1	Random	03,10,11	27.00S10.00W 9	STWOnly
CoosBay	3-MS	Hudson Cr	5073	22036.00	4	Random	08,09,10,11	27.00S11.00W 2	Yes
CoosBay	3-MS	Coquille R, N Fk	5091	22037.00	3	Random	03,10,11	27.00S11.00W 5	Yes
CoosBay	3-MS	Wren Smith Cr	5323	22157.00	1	Random	03,09,10,11	26.00S12.00W 13	Yes
CoosBay	3-MS	Bottom Cr	5469	22200.40	1	Random	03,04,05,06,07,10,11	25.00S 9.00W 25	Yes
CoosBay	3-MS	Williams R	45049	22201.50	1	Random	03,07,10,11	26.00S 9.00W 3	STWOnly
CoosBay	3-MS	Cedar Cr	5475	22204.00	1	Random	03,10,11	26.00S 9.00W 12	Yes
CoosBay	3-MS	Williams R	5523	22217.80	1	Random	03,08,09,10,11	27.00S 8.00W 8	STWOnly
CoosBay	3-MS	Packard Cr	5564	22237.00	2	Random	07,10,11	25.00S11.00W 17	Yes
CoosBay	3-MS	Y Cr	5580	22242.30	1	Random	03,04,05,06,07,10,11	24.00S11.00W 21	Yes
CoosBay	3-MS	Millicoma R, E Fk	5638	22273.00	4	Random	03,04,07,10,11	25.00S10.00W 3	Yes
CoosBay	3-MS	Millicoma R, W Fk	45061	22278.00	4	Random	06,10,11	24.00S11.00W 19	STWOnly
CoosBay	3-MS	Millicoma R, W Fk	45045	22284.70	2	Random	03,10,11	24.00S11.00W 10	Yes
CoosBay	3-MS	Deer Cr	45001	22293.00	2	Random	08,09,10,11	23.00S11.00W 2	Yes
CoosBay	3-MS	Fish Cr	5750	22299.00	1	Random	03,09,10,11	23.00S10.00W 7	Yes
CoosBay	3-MS	Millicoma R, W Fk	5752	22300.00	1	Random	03,04,05,06,07,10,11	23.00S10.00W 7	Yes
CoosBay	3-MS	Johnson Cr	45016	22357.70	2	Random	10,11	23.00S11.00W 31	Yes
CoosBay	3-MS	Benson Cr	5942	22359.00	6	Random	06,07,10,11	23.00S11.00W 17	Yes
CoosBay	4-UMP	Camp Cr	6848	22653.00	4	Random	03,04,05,07,10,11	22.00S 9.00W 32	Yes
CoosBay	4-UMP	Lutsinger Cr	6915	22688.00	3	Random	03,06,07,08,09,10,11	22.00S 9.00W 25	Yes

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
GoldBeach	5-SC	Winchuck R	505369	20002.00	1	Random	09,10,11	41.00S13.00W24	STWOnly
GoldBeach	5-SC	Winchuck R	505253	20004.00	4	Random	09,10,11	41.00S12.00W 5	STWOnly
GoldBeach	5-SC	Salmon Cr	505189	20009.00	1	Random	05,10,11	41.00S12.00W 9	STWOnly
GoldBeach	5-SC	Fourth Of July Cr, trib 3	505357	20018.30	1	Random	09,10,11	40.00S11.00W30	STWOnly
GoldBeach	5-SC	Fourth Of July Cr	505237	20018.50	3	Random	09,10,11	41.00S11.00W 6	STWOnly
GoldBeach	5-SC	Chetco R	505373	20052.00	1	Random	09,10,11	40.00S13.00W13	STWOnly
GoldBeach	5-SC	Chetco R	505217	20066.00	1	Random	09,10,11	39.00S12.00W17	STWOnly
GoldBeach	5-SC	Quail Prairie Cr	505287	20068.00	1	Random	06,09,10,11	39.00S12.00W10	STWOnly
GoldBeach	5-SC	Chetco R, S Fk	505233	20075.00	1	Random	09,10,11	39.00S11.00W30	STWOnly
GoldBeach	5-SC	Whalehead Cr, N Fk	505362	20151.00	1	Random	03,09,10,11	40.00S14.00W 3	STWOnly
GoldBeach	5-SC	Pistol R, S Fk	505278	20163.90	2	Random	03,09,10,11	39.00S13.00W 9	STWOnly
GoldBeach	5-SC	Hunter Cr	505266	20178.00	2	Random	03,04,09,10,11	37.00S14.00W27	STWOnly
GoldBeach	5-SC	Euchre Cr	505239	21471.00	1	Random	09,10,11	35.00S14.00W 3	STWOnly
GoldBeach	5-SC	Euchre Cr	505320	21473.00	1	Random	09,10,11	34.00S14.00W35	STWOnly
GoldBeach	5-SC	Hubbard Cr	505223	21489.70	1	Random	09,11	33.00S15.00W10	STWOnly
GoldBeach	5-SC	Elk R	505314	21491.70	1	Random	06,09,10,11	32.00S15.00W16	STWOnly
GoldBeach	5-SC	Elk R	505255	21509.00	1	Random	09,10,11	33.00S14.00W16	STWOnly
GoldBeach	3-MS	Sixes R	45018	21533.00	1	Random	04,10,11	32.00S15.00W 9	STWOnly
GoldBeach	3-MS	Sixes R	4006	21547.00	1	Random	03,08,09,10,11	32.00S14.00W 12	STWOnly
GoldBeach	3-MS	Sixes R, M Fk	45143	21552.75	1	Random	10,11	32.00S13.00W 13	Yes
GoldBeach	3-MS	Sixes R	45083	21555.00	1	Random	10,11	32.00S13.00W 1	Yes
GoldBeach	3-MS	Sixes R	45008	21558.30	1	Random	10,11	31.00S13.00W 36	Yes
GoldBeach	3-MS	Fourmile Cr	4054	21560.76	1	Random	10,11	30.00S14.00W 11	Yes
GoldBeach	3-MS	Boulder Cr	3928	21583.00	3	Random	10,11	31.00S15.00W 28	Yes
GoldBeach	3-MS	Bill Cr	4172	21613.00	3	Random	03,10,11	29.00S14.00W 3	Yes
GoldBeach	3-MS	Bear Cr	4203	21620.00	2	Random	10,11	29.00S14.00W 13	Yes

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
Eugene	4-UMP	Cedar Cr	55034	22464.00	1	Random	03,11	19.00S10.00W 35	STWOnly
Eugene	4-UMP	Smith R, W Fk	405201	22503.30	1	Random	07,10,11	20.00S 9.00W 11	Yes
Eugene	4-UMP	Beaver Cr	6621	22517.00	1	Random	00,01,02,03,06,07,10,11	20.00S 8.00W 30	STWOnly
Eugene	4-UMP	N Sister Cr	6647	22526.00	2	Random	00,01,02,03,05,07,10,11	20.00S 8.00W 8	Yes
Eugene	4-UMP	N Sister Cr	6657	22530.00	1	Random	00,01,02,03,04,05,06,07,10,11	20.00S 8.00W 16	Yes
Eugene	4-UMP	Marsh Cr	6673	22537.50	1	Random	08,10,11	20.00S 8.00W 33	Yes
Eugene	4-UMP	Mosetown Cr, E Fk, Trib A	6700	22546.30	1	Random	00,01,02,03,06,10,11	21.00S 8.00W 22	Yes
Eugene	4-UMP	Panther Cr	6739	22577.00	2	Random	07,10,11	20.00S 7.00W 24	Yes
Eugene	4-UMP	Spring Cr	55027	22609.00	1	Random	01,11	21.00S 5.00W 8	STWOnly
Eugene	4-UMP	Elk Cr	55262	22728.00	1	Random	10,11	22.00S 6.00W 17	STWOnly
Eugene	4-UMP	Hardscrabble Cr	7038	22735.00	1	Random	03,04,05,07,10,11	22.00S 6.00W 12	Yes
Eugene	4-UMP	Sand Cr	7063	22756.00	1	Random	03,06,07,10,11	21.00S 5.00W 34	Yes
Eugene	4-UMP	Curtis Cr	7165	22807.00	1	Random	03,06,07,10,11	22.00S 4.00W 8	Yes
Eugene	4-UMP	Elk Cr	7178	22810.00	2	Random	05,07,08,09,10,11	23.00S 4.00W 6	Yes
Eugene	4-UMP	Wolf Cr	7285	22862.00	1	Random	03,04,05,06,07,08,09,10,11	24.00S 8.00W 26	Yes
Eugene	4-UMP	Hubbard Cr	7327	22876.00	1	Random	03,07,10,11	26.00S 8.00W 1	Yes
Eugene	4-UMP	Cabin Cr	7369	22899.00	1	Random	10,11	24.00S 5.00W 0	Yes
Eugene	4-UMP	Deer Cr, N Fk	7494	22999.00	1	Random	03,04,05,06,07,10,11	27.00S 5.00W 24	Yes
Eugene	4-UMP	Roberts Cr	7514	23001.40	2	Random	03,07,11	28.00S 5.00W 20	STWOnly
Eugene	4-UMP	Lookingglass Cr	55121	23005.00	1	Random	08,09,10,11	28.00S 6.00W 20	STWOnly
Eugene	4-UMP	Lookingglass Cr	55185	23005.00	2	Random	06,10,11	28.00S 6.00W 19	STWOnly
Eugene	4-UMP	Lookingglass Cr (Morgan Cr)	7579	23041.00	5	Random	10,11	27.00S 7.00W 32	Yes
Eugene	4-UMP	Bilger Cr	7736	23108.00	3	Random	06,07,10,11	28.00S 5.00W 36	STWOnly
Eugene	4-UMP	Riser Cr	7765	23121.00	1	Random	03,06,10,11	28.00S 4.00W 26	STWOnly
Eugene	4-UMP	Ash Cr	55237	23140.00	3	Random	10,11	30.00S 6.00W 26	STWOnly
Eugene	4-UMP	Elk Valley Cr, E Fk	7891	23209.30	1	Random	03,06,10,11	31.00S 9.00W 25	Yes
Eugene	4-UMP	Cow Cr, W Fk	7909	23222.00	1	Random	04,05,06,11	31.00S 9.00W 33	Yes
Eugene	4-UMP	Middle Cr	7944	23255.00	1	Random	04,05,06,07,11	31.00S 7.00W 25	STWOnly
Eugene	4-UMP	Wood Cr	7999	23299.00	2	Random	03,06,10,11	32.00S 6.00W 22	Yes
Eugene	4-UMP	Bull Run Cr	8033	23313.00	1	Random	03,04,05,07,08,09,10,11	32.00S 5.00W 25	Yes
Eugene	4-UMP	Clear Cr	8056	23332.00	2	Random	03,10,11	32.00S 5.00W 13	Yes
Eugene	4-UMP	S Umpqua R	55189	23420.00	1	Random	10,11	30.00S 4.00W 8	STWOnly
Eugene	4-UMP	S Umpqua R	55243	23520.00	1	Random	10,11	30.00S 2.00W 33	STWOnly
Eugene	4-UMP	S Umpqua R	55131	23524.70	1	Random	08,09,10,11	30.00S 2.00W 13	STWOnly

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
Eugene	4-UMP	Black Canyon Cr	8266	23552.00	2	Random	08,09,10,11	30.00S 1.00E 22	Yes
Eugene	4-UMP	Falcon Cr	8275	23562.00	1	Random	03,09,10,11	30.00S 2.00E 2	Yes
Eugene	4-UMP	Boulder Cr	8306	23589.00	2	Random	03,09,10,11	29.00S 1.00W 12	Yes
Eugene	2-MC	Clay Cr	2556	24373.00	1	Random	03,04,05,06,07,08,09,10,11	19.00S 7.00W 19	Yes
Eugene	2-MC	Siuslaw R	35031	24384.00	1	Random	06,07,10,11	19.00S 7.00W 27	STWOnly
Eugene	2-MC	Bear Cr	2576	24393.00	1	Random	04,10,11	20.00S 7.00W 10	STWOnly
Eugene	2-MC	Buck Cr	2617	24421.00	1	Random	03,06,07,10,11	20.00S 6.00W 15	Yes
Eugene	2-MC	Russell Cr	2630	24425.00	1	Random	03,04,05,06,07,08,09,10,11	20.00S 6.00W 1	Yes
Eugene	2-MC	Russell Cr	2631	24425.00	1	Random	03,04,05,06,07,08,09,10,11	20.00S 6.00W 1	Yes

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?	
LSWCD	2-MC	Yachats R		24552.00	1.1	Standard	00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Yachats R, N Fk		24577.00	1	Standard	97,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Yachats R		24596.00	1	Standard	97,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Yachats R		24596.00	2	Standard	07,10,11	15.00S10.00W 17	Yes	
LSWCD	2-MC	Yachats R	2850	24596.00	2	Random	07,10,11	15.00S10.00W 17	Yes	
LSWCD	2-MC	Drift Cr		24641.00	4	Standard	01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Fall Cr		24797.00	2	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Fall Cr		24799.00	1	Standard	00,01,02,03,04,05,07,08,09,10,11			
LSWCD	2-MC	Fall Cr		24801.00	2.1	Standard	02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Elkhorn Cr	3234	24919.00	4	Random	03,10,11	12.00S11.00W 26	Yes	
LSWCD	2-MC	Beaver Cr, N Fk		24924.00	3.1	Standard	97,00,01,02,03,04,05,07,08,09,10,11			
LSWCD	2-MC	Beaver Cr, N Fk		24924.70	3.1	Standard	97,99,00,01,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Cedar Cr		25102.50	1	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Euchre Cr		25105.00	1	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Drift Cr		25235.00	7	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Drift Cr		25237.00	1	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Salmon R		25289.00	0.1	Standard	99,00,01,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Trout Cr		25299.70	1	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
LSWCD	2-MC	Salmon R		25311.00	1.1	Standard	99,00,01,02,03,04,05,06,07,08,09,10,11			
Newport	2-MC	Big Cr		2738	24510.00	2	Random	08,09,10,11	16.00S12.00W 15	Yes
Newport	2-MC	Big Cr			24510.70	1	Standard	07,08,09,10,11		
Newport	2-MC	Cummins Cr	2796	24544.00	2	Random	05,06,07,08,09,10,11	15.00S11.00W 7	Yes	
Newport	2-MC	Bear Cr	2934	24670.00	2	Random	02,03,10,11	14.00S11.00W 1	Yes	

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
Corvallis	3-MS	Bear Cr	6077	23968.00	1	Random	03,06,11	19.00S11.00W 27	Yes
Corvallis	3-MS	Schrum Cr	305064	23981.90	1	Random	11	19.00S11.00W 18	Yes
Corvallis	2-MC	Siuslaw R, N Fk	35039	24024.00	3	Random	10,11	17.00S11.00W 26	STWOnly
Corvallis	2-MC	Wilhelm Cr	205026	24031.60	1	Random	07,10,11	16.00S11.00W 36	STWOnly
Corvallis	2-MC	Sam Cr	205019	24038.70	1	Random	07,10,11	16.00S11.00W 24	STWOnly
Corvallis	2-MC	Hollenbeck Cr	2093	24086.00	1	Random	03,04,05,06,07,10,11	18.00S10.00W 2	STWOnly
Corvallis	2-MC	Knowles Cr	35003	24100.90	1	Random	10,11	18.00S 9.00W 26	Yes
Corvallis	2-MC	Rogers Cr	2161	24135.00	1	Random	08,09,10,11	16.00S10.00W 22	Yes
Corvallis	2-MC	Indian Cr, N Fk, Trib D	2195	24149.60	1	Random	10,11	15.00S10.00W 34	Yes
Corvallis	2-MC	Green Cr	2207	24151.20	1	Random	10,11	17.00S 9.00W 4	STWOnly
Corvallis	2-MC	Misery Cr	2226	24159.00	1	Random	03,04,05,06,07,10,11	16.00S 9.00W 22	STWOnly
Corvallis	2-MC	Panther Cr, N Fk	2252	24177.00	3	Random	10,11	15.00S 9.00W 26	Yes
Corvallis	2-MC	Siuslaw R	35035	24262.00	1	Random	10,11	18.00S 8.00W 18	STWOnly
Corvallis	2-MC	Wildcat Cr	35059	24263.00	4	Random	04,06,10,11	18.00S 8.00W 23	STWOnly
Corvallis	2-MC	Knapp Cr	2407	24288.10	1	Random	03,04,05,06,07,10,11	17.00S 7.00W 18	STWOnly
Corvallis	2-MC	Esmond Cr	35007	24359.00	1	Random	10,11	19.00S 8.00W 28	Yes
Corvallis	2-MC	Siuslaw R	35012	24363.10	1	Random	04,05,10,11	19.00S 8.00W 11	STWOnly
Corvallis	2-MC	Lobster Cr		24744.00	2	Standard	03,04,05,06,07,08,11		
Corvallis	2-MC	Green R	3090	24776.20	1	Random	09,10,11	15.00S10.00W 26	Yes
Corvallis	2-MC	Five Rivers	3099	24783.00	2	Random	02,03,04,07,10,11	15.00S 9.00W 27	Yes
Corvallis	2-MC	Skunk Cr	205036	24796.00	1	Random	07,10,11	13.00S 9.00W 36	Yes
Corvallis	2-MC	Alea R	35004	24820.00	2	Random	04,07,08,09,10,11	14.00S 8.00W 17	STWOnly
Corvallis	2-MC	Crooked Cr	3157	24850.00	1	Random	02,03,06,07,08,09,10,11	13.00S 7.00W 21	Yes
Corvallis	2-MC	Swamp Cr	3189	24882.80	1	Random	03,04,05,06,07,10,11	14.00S 8.00W 35	Yes
Corvallis	2-MC	Alea R, S Fk	35021	24896.00	1	Random	04,10,11	14.00S 7.00W 22	STWOnly
Corvallis	2-MC	Montgomery Cr	1955	24938.40	2	Random	10,11	11.00S10.00W 29	Yes
Corvallis	2-MC	Wolf Cr, Trib C	35015	24968.80	1	Random	10,11	11.00S 8.00W 30	Yes
Corvallis	2-MC	Savage Cr	35006	24971.00	3	Random	10,11	12.00S 9.00W 23	Yes
Corvallis	2-MC	Spout Cr	3336	24976.40	1	Random	06,07,08,09,10,11	12.00S 8.00W 5	Yes
Corvallis	2-MC	Elk Cr	35017	24981.70	1	Random	10,11	12.00S 8.00W 15	Yes
Corvallis	2-MC	Oglesby Cr	3390	25024.70	2	Random	10,11	11.00S 9.00W 1	Yes
Corvallis	2-MC	Yaquina R		25046.00	3.1	Standard	04,06,07,08,09,10,11		
Corvallis	2-MC	Ojalla Cr	3514	25111.00	1	Random	03,04,05,07,10,11	9.00S10.00W 29	Yes
Corvallis	2-MC	Sam Cr	3543	25131.70	3	Random	10,11	10.00S 9.00W 9	Yes

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
Corvallis	2-MC	Mill Cr, N Fk	3597	25151.00	1	Random	10,11	9.00S 9.00W 26	Yes
Corvallis	2-MC	Buck Cr	3602	25159.00	1	Random	03,04,05,06,07,10,11	9.00S 9.00W 3	Yes
Corvallis	2-MC	Panther Cr	3786	25292.00	1	Random	03,04,05,06,07,10,11	6.00S10.00W 34	Yes
Corvallis	2-MC	Slick Rock Cr	3803	25300.00	1	Random	03,10,11	7.00S10.00W 1	Yes

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
Tillamook	1-NC	Butte Cr	16053	25331.00	1	Random	10,11	5.00S10.00W 30	Yes
Tillamook	1-NC	Little Nestucca R	165	25377.00	1	Random	03,04,05,06,07,08,10,11	5.00S 9.00W 28	Yes
Tillamook	1-NC	Three Rivers	233	25426.00	1	Random	01,02,03,04,05,06,07,08,11	5.00S 9.00W 4	Yes
Tillamook	1-NC	E Beaver Cr	275	25451.00	6	Random	03,04,05,06,07,08,10,11	3.00S 9.00W 11	Yes
Tillamook	1-NC	Nestucca R	16029	25458.00	3	Random	01,02,03,08,09,10,11	3.00S 9.00W 28	STWOnly
Tillamook	1-NC	Powder Cr	335	25482.50	1	Random	01,02,03,04,05,06,07,08,10,11	4.00S 8.00W 8	Yes
Tillamook	1-NC	Elk Cr	16010	25505.00	1	Random	08,09,10,11	3.00S 7.00W 27	Yes
Tillamook	1-NC	Trask R	16101	25604.00	1	Random	04,10,11	1.00S 8.00W 26	STWOnly
Tillamook	1-NC	Boundry Cr	545	25608.30	1	Random	03,04,05,06,07,08,09,10,11	2.00S 7.00W 33	Yes
Tillamook	1-NC	Bill Cr	16017	25616.00	2	Random	10,11	2.00S 8.00W 26	Yes
Tillamook	1-NC	Jordan Cr	16069	25675.00	3	Random	10,11	1.00N 7.00W 33	Yes
Tillamook	1-NC	Jordan Cr	664	25675.50	4	Random	03,10,11	1.00N 7.00W 24	Yes
Tillamook	1-NC	Wilson R, N Fk, W Fk	706	25688.70	1	Random	04,11	2.00N 7.00W 20	Yes
Tillamook	1-NC	Ben Smith Cr	715	25695.00	1	Random	03,04,05,06,07,08,09,10,11	1.00N 7.00W 11	Yes
Tillamook	1-NC	Elk Cr	16036	25703.00	2	Random	10,11	2.00N 6.00W 29	Yes
Tillamook	1-NC	Kilchis R	16038	25748.00	1	Random	03,10,11	1.00N 9.00W 28	STWOnly
Tillamook	1-NC	Kilchis R, N Fk	823	25763.00	2	Random	03,06,07,10,11	2.00N 8.00W 32	Yes
Tillamook	1-NC	Jacoby Cr	16061	25774.30	1	Random	10,11	1.00N10.00W 35	Yes
Tillamook	1-NC	Foley Cr	1033	25889.00	1	Random	03,06,10,11	2.00N 9.00W 7	Yes
Tillamook	1-NC	Salmonberry R	16040	25953.00	1	Random	05,10,11	3.00N 6.00W 28	Yes
Tillamook	1-NC	W Humbug Cr	1183	25985.00	1	Random	03,10,11	5.00N 8.00W 26	Yes

Crew	GCG	Reach	IDNum	ReachID	Segment	Type	YearsSurveyed	TRS	Coho Survey?
Tillamook	1-NC	George Cr	16039	25993.00	1	Random	10,11	5.00N 7.00W 29	Yes
Tillamook	1-NC	Stanley Cr	16075	26006.00	2	Random	10,11	5.00N 6.00W 28	STWOnly
Tillamook	1-NC	Beneke Cr	16087	26012.00	1	Random	10,11	5.00N 7.00W 2	STWOnly
Tillamook	1-NC	Hamilton Cr	1295	26024.70	1	Random	08,09,11	6.00N 7.00W 28	Yes
Tillamook	1-NC	Nehalem R	16115	26036.00	1	Random	10,11	6.00N 6.00W 23	STWOnly
Tillamook	1-NC	Deep Cr	16055	26039.00	4	Random	04,10,11	5.00N 5.00W 4	STWOnly
Tillamook	1-NC	Deep Cr	16027	26043.00	7	Random	10,11	5.00N 5.00W 19	Yes
Tillamook	1-NC	Lundgren Cr	1420	26061.70	1	Random	10,11	6.00N 4.00W 8	Yes
Tillamook	1-NC	Nehalem R	16030	26062.00	1	Random	08,09,10,11	6.00N 5.00W 24	STWOnly
Tillamook	1-NC	Nehalem R	16067	26070.00	3	Random	04,10,11	6.00N 4.00W 28	STWOnly
Tillamook	1-NC	Crooked Cr	1488	26081.00	2	Random	03,06,10,11	5.00N 4.00W 16	Yes
Tillamook	1-NC	Nehalem R, E Fk	1536	26093.70	1	Random	03,04,05,06,07,09,10,11	4.00N 3.00W 17	Yes
Tillamook	1-NC	Rock Cr, S Fk	1616	26117.00	2	Random	03,08,09,10,11	3.00N 6.00W 4	Yes
Tillamook	1-NC	Short Sand Cr	16064	26162.00	1	Random	11	3.00N10.00W 5	Yes
Tillamook	1-NC	Little Muddy Cr	1805	26196.00	2	Random	09,10,11	6.00N10.00W 32	Yes
Tillamook	1-NC	Beerman Cr	16043	26198.00	2	Random	11	6.00N10.00W 34	Yes
Tillamook	1-NC	Circle Cr	1820	26204.00	2	Random	03,04,05,06,07,10,11	5.00N10.00W 16	Yes
Tillamook	1-NC	Joe Cr	1881	26239.00	1	Random	03,06,10,11	5.00N 9.00W 25	Yes