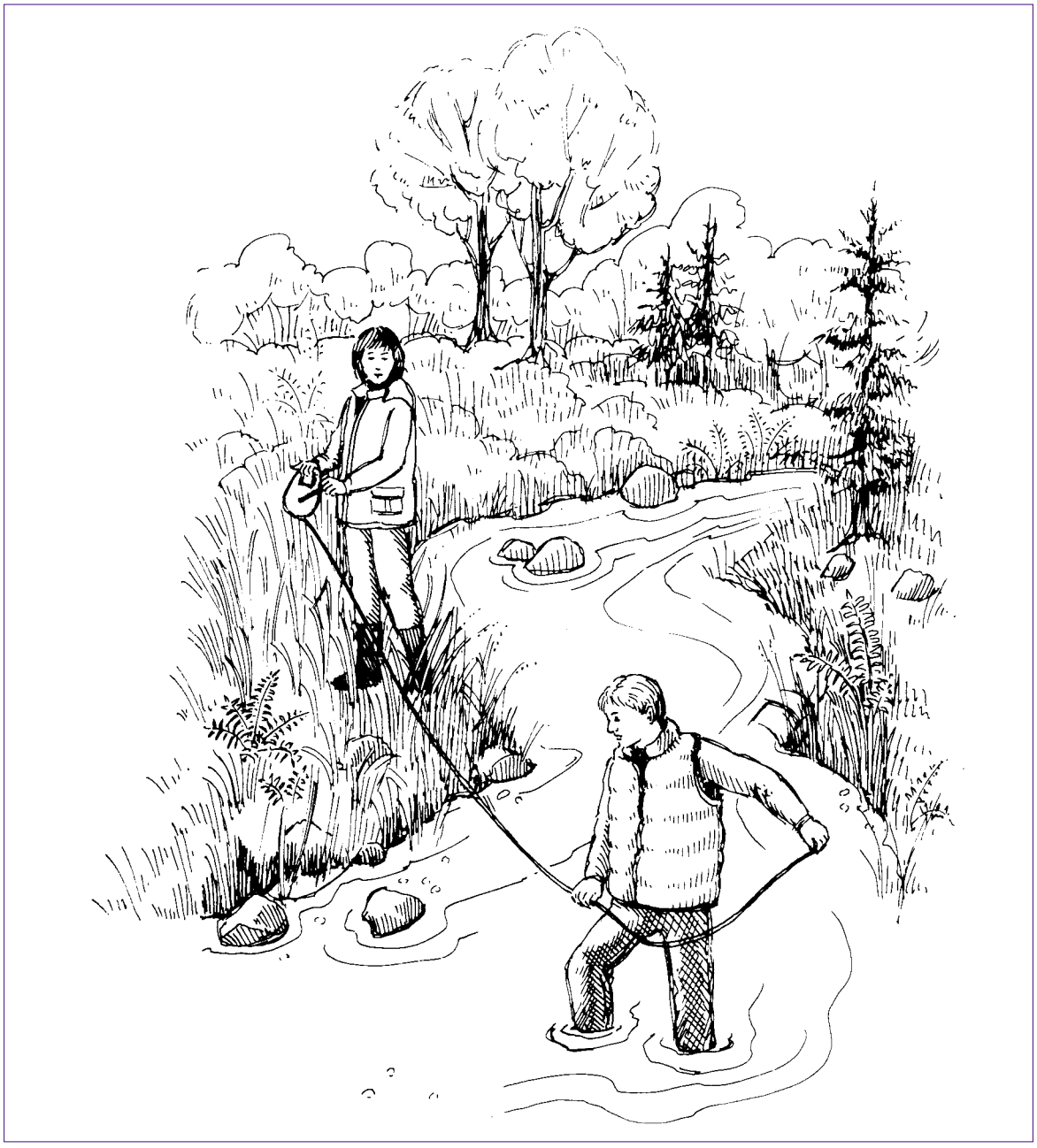
The **Stewardship** Series

The Streamkeepers Handbook

A Practical Guide To Stream And Wetland Care



Canada

Province of British Columbia

STREAMKEEPERS

Module 12
Salmonid Spawner Survey

Project Approval Required	Training	Time Commitment (per year)	Number of People	Time of Year
no	Not necessary	1 day or more	2 or more	Spring through fall

Fisheries and Oceans Pêches et Océans

Canada

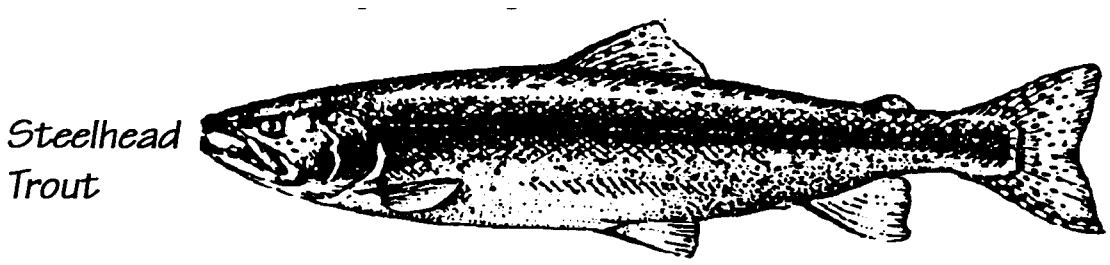
MODULE 12

Salmonid Spawner Survey

Welcome to the Streamkeepers Program! The Department of Fisheries and Oceans Community Involvement Program provides these Streamkeepers training modules. These modules encourage "hands on" environmental activities in watersheds in British Columbia. Volunteer groups, schools, and individuals are using this material to monitor and restore local waterways. Your local Fisheries and Oceans Community Advisor can provide more information.

Acknowledgments

Sandie MacLaurin, Community Advisor with the Department of Fisheries and Oceans, organized the material for this module. DFO fisheries officers and contract field staff on the central coast provided information, as well. Material was taken from training guides developed for the Aboriginal Fisheries Division Guardian Training Program and the Community Economic Development Program.



Project Activity and Purpose

You will count adult salmon, trout, or char that have returned to your stream to spawn. This involves walking the banks of a stream several times during the spawning season, counting the fish, and observing their condition. This kind of survey is known as a foot survey. You will complete a data sheet each time you do a survey. At the end of the season, you will use all the results to estimate the size of the spawning population. You can compare these numbers with data from previous years or with fisheries management targets.

Fisheries officers prepare annual reports of salmon streams, known as BC 16 reports, from the survey data. These reports are used to assess trends in fish populations. Volunteer groups carrying out

enhancement or habitat improvement projects can use spawner survey results to assess the success of their projects.

Introduction

Spawner surveys provide information about the number of adult salmonids that reach the spawning grounds, and the proportion that spawn successfully. Fisheries managers use the term escapement to describe the number of fish that escape the various fisheries.

The size of harvests taken by various fisheries is the major factor affecting the number of fish that return to spawn. Habitat damage also reduces fish numbers. Enhancement or habitat improvement projects can help more fish reach the spawning grounds. Information about stream habitat, such as obstructions, changes in stream beds, pollution, and other potential problems are recorded as part of the survey. All these factors interact to affect the escapement in a single year, or over many years. The results of previous surveys can help you recognize trends in relative abundance of various fish populations. For some streams, records go back many years.

Counting spawning fish is easier in some streams than others. Some species, like coho, are elusive and very difficult to count. Fisheries biologists sometimes use an easily surveyed stream as an indicator or "index" stream for a general area, when other streams are too difficult to survey.

There are times during the spawning season when stream conditions will not be suitable for a survey. Often, there are high flows or floods during the spawning season. Walking the banks then can be dangerous, and fish are hard to see when water clarity is poor. However, high water flows trigger most species to begin migrating to spawning grounds. For many salmon runs, the best time to do the first count is right after the first freshet, as water levels begin to drop and visibility improves.

The timing of salmonid migration and spawning depends on the species, the run, and the geographic location of the stream (north, south, inland, coastal). Adults may migrate to the spawning grounds weeks or months before they begin to spawn. Spawners of various species can be found in streams throughout the year. The period of peak spawning usually occurs during the times listed in Table 1, but there are exceptions.

An enhancement project can be assessed using a spawner survey. Hatchery staff usually mark a proportion of the fry they release. When fish return to spawn, dead spawners can be recovered, data recorded from the marked ones, and data used to estimate survival rates for the various groups. Shaw (1994) describes the sampling techniques.

Table 1
Timing of the Spawning Period for Salmonid Species

SPECIES	SPAWNING PERIOD
pink salmon	August through September
chum salmon	EARLY RUN: late July through late September LATE RUN: late September through November
chinook salmon	EARLY RUN: July through August or early September LATE RUN: mid-September through mid-November
coho salmon	EARLY RUN: late August through December LATE RUN: January through February
sockeye salmon	August through October
kokanee	September through November
cutthroat trout	December through June
steelhead trout	March through May
rainbow trout	April through June
dolly varden/ bull trout	September through November

The foot survey described in this module involves counting fish in defined sections of a stream. This method is simple, does not take much time, and works well on small to mid-sized streams with good water visibility. This method has some limitations and shortcomings, but used consistently, you can compare results from year to year. There are other methods more suitable for other situations.

Project Guidance and Approval

You need no project approval for a spawner survey, unless you plan to collect samples or tags. However, you should contact local property owners if you need to cross their property to get to your stream. Contact your local Community Advisor, Department of Fisheries and Oceans office, or Ministry of Environment, Lands, and Parks office before starting a survey. Staff from these agencies can tell you about previous spawner studies on the stream, methods used, and results obtained. They can tell you whether or not a foot survey is suitable for your stream, review the technique and data forms with you, and advise you on recovering tags from marked fish. They also can provide practical information about timing, access points, danger areas, and maps.

Level of Effort

Two people can walk the banks of a stream once during the spawning season and obtain useful information. However, for a complete spawner survey, you should walk the entire stream every five to twenty days during the spawning season. You may wish to divide a long stream into manageable sections, with several teams of two sharing the work. If so, make sure you coordinate the survey so that everyone goes out simultaneously. This way, you can compare data and add results to get a stream total. The time involved can range from two hours to an entire day, depending on the length of stream surveyed and the stamina of the volunteers.

Time of Year and Working Conditions

Do a foot survey when fish return to the stream to spawn. Check Table 1 for the general time of year to expect them in your stream. You may be surveying in the middle of winter, or the in heat of the summer, depending on the fish stock.

Do not do a spawner survey during high water or floods. Travel along stream banks can be extremely dangerous at those times. In addition, heavy silt loads during floods reduce water visibility, making fish difficult to see. The survey involves walking long distances along the stream banks and some wading across streams. There may be bears or other potentially dangerous wildlife on the stream.

Safety

PERSONAL SAFETY

Concern for personal safety is essential when working outdoors. Always tell someone where you are going and when you will return. Work in pairs, never alone. Carry emergency phone numbers for police and ambulance.

Do not attempt to wade fast water or water deeper than your knees. Watch out for slippery stream beds, undercut banks, waterfalls, and fast flowing areas. Log jams can be unstable, so take care to walk around them.

Get permission to cross or use private property. Beware of domestic animals and wildlife.

HEALTH

Do not drink stream water. Although it may look pristine, it can harbour bacteria or parasites that will make you sick. Do not expose cuts and wounds to stream water. Know the symptoms and treatment for hypothermia.

EQUIPMENT

Carry a first aid kit. When working in isolated areas, carry a survival kit containing at least a lighter, fire starter, candle, flares, compass and a portable radio telephone or cellular phone. You may wish to bring a whistle to call for help if you are injured.

CLOTHING

Dress for the weather and stream conditions. Wear highly visible clothing. Wear a personal flotation device (PFD) when working near larger streams.

WILDLIFE AWARENESS AND SAFETY

Bears, wolves, and other predators may be common and bold around streams during the spawning season. Reduce your chances of encounter by making lots of noise, so animals will avoid you. Keep food in airtight containers and leave no food scraps behind. Walk downwind, if possible, so that bears can smell you and leave the area. Avoid confined areas such as overgrown side channels when you see tracks and other signs of wildlife use. Take bear spray for additional protection.

Materials and Equipment

waterproof paper
data sheets
waders or boots
thermometer
tally counters
bear spray
notebook or clipboard
polarized sunglasses
pencils
map
safety equipment
compass
machete or sawduik brushing device (for bushwhacking)
measuring tape (yellow with black numbers, for turbidity measurements)

optional:

rubber gloves
wading stick
camera
knife

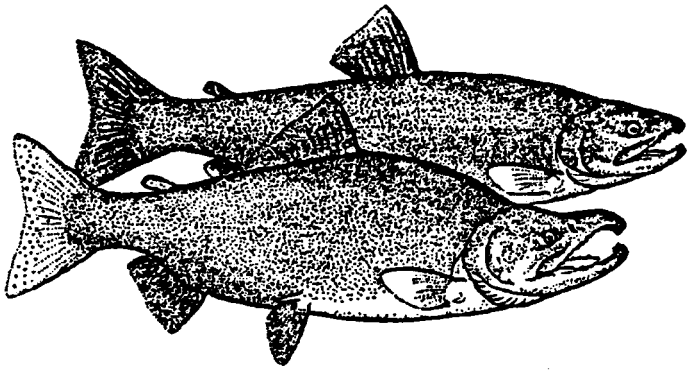
Background Information

In large watersheds, people often focus on specific streams or segments of streams where they can count spawners accurately and consistently from year to year. Some spawning areas are not accessible, so you may be limited to counting fish in key holding areas of a stream.

THE SET INTERVAL SURVEY METHOD

The foot survey described in this module is based on the set interval method. Spawning grounds are surveyed several times during the spawning season. The frequency with which you survey should coincide with the residency time of the spawners. Residency time or turnover rate is the time it takes for one group of fish to spawn and die before the next group starts to spawn. This time varies from five to twenty days and depends on location, species, run type (summer, fall), and stream conditions. Counts of live and dead fish are combined to produce an estimate of total numbers for the season.

Sometimes fish start migrating earlier or later than expected and part of a run may be missed. If the residency or turnover time is different from expected, the interval used between survey dates may be too great. Sometimes the count includes fish that are not spawning in the area, but are migrating through. All these factors affect the accuracy of the count, and should be considered when designing a survey.



Sockeye Salmon

OTHER METHODS

Spawner numbers can be estimated using other methods described by Cousens et al. (1982) and summarized here. Many are variations on the set interval method. Some yield more accurate results than others and some provide only an estimate of relative abundance. The method used is based on stream size, access, size of spawning areas, fish species, amounts of data needed, previous method used, and human resources available.

The **single count survey** is a count of live fish during the spawning period before any fish die, or a count of live plus dead fish at or just after the peak of spawning activity. The **adjusted frequent survey** is an intensive survey of spawning areas to count live and dead fish during the peak of the season, sometimes daily. The **factor five method** involves surveying shallow riffle spawning areas several times to count live fish, then using a formula to estimate numbers from counts, turnover rate, and number of survey days. With **strip surveys**, spawners are counted in one metre wide strips in a spawning area and

results are extrapolated for other spawning areas. The **dead pitch or carcass count** involves removing and counting all dead fish within reach of the shore, every three days or less.

FACTORS TO CONSIDER WHEN PLANNING THE SURVEY

Weather

Plan to do the survey on a bright day when water clarity is good. Fish are very difficult to see on rainy days. Although you need good visibility, you do not want glare off the water or the sun in your eyes, so consider which side of the stream is best for reducing glare

Time of day

Midday usually is the best time of day to see and count fish because the sun is directly overhead and not shining in your eyes. Time of day can affect fish distribution. Sometimes fish spawn at night or in the early morning, and stay in deeper pools during the day. You also may need to time the survey to avoid contact with potentially dangerous wildlife. Ask local fisheries or conservation staff about safe times of day in your area.

Potentially large number of fish

If you expect many spawners, make the survey sections small enough to allow accurate counts in a reasonable amount of time. Use hand-held tally counters to record fish numbers

More than one salmonid species in the stream

The spawning periods of two or more species may overlap. Use the key in Appendix 1 to distinguish the species. Have each person count only one species, and keep the counts separate.

Choosing to do the survey walking upstream or downstream

Decide the direction based on access, terrain, potential wildlife encounters, and angle of the sun. Do not try to survey with the sun in your eyes. If you have a choice, walk upstream. Spooked fish generally turn around and swim downstream, so you will be less likely to count them twice.

Procedure

1. COLLECT AND REVIEW EXISTING DATA

Obtain a large scale topographic map (1:20,000 TRIM map) from Maps BC (387-1441, Victoria). You may wish to use aerial photographs, also available at Maps BC, to locate important features such as canyons, waterfalls, and access points. These maps also are used in Module 1, Introductory Stream Habitat Survey.

Contact your Community Advisor or local DFO office for information about salmon species listed in the Stream Inventory Summary System (SISS) database. Contact the local WLAP office for information about other species. Look at the historic spawner records and stream reports for information about typical run timing, spawner abundance, and previous survey methods used.

2. ESTABLISH SURVEY AREAS OR SECTIONS

Make an extra copy of the TRIM map and any working sketches from previous spawner surveys. Update the map with information on vehicle access points, changes in stream channel, and other useful information from the SISS database.

Divide the system into workable survey sections and mark them on the map. Consider the terrain, physical abilities of the volunteers, and time commitment when you set up the survey sections. Some sections of your stream may be difficult to survey. Make the sections short if you expect lots of spawners. Reasonable access by vehicle or short hike is important. Use landmarks such as bridges, roads, and barriers as the start and finish points of a section whenever possible.

3. DEVELOP A COORDINATED PLAN AND TRAIN THE SURVEYORS

The details of your plan depend on the size of the survey, the number of teams, and the number of survey days. Always send two people to survey a section. Decide how often to survey using information from previous surveys.

Arrange transportation to and from the survey locations. Set up a central first aid and emergency response location. Ensure that everyone is familiar with emergency procedures, methods, and survey locations. Also make sure they know how to read the maps and sketches and how to record data. Arrange to collect the completed forms and go over the results with team members.

Make up a simple schedule, like that in Table 2. Keep this schedule as part of your survey records. Prepare a large map for the coordinator, showing all the survey sections and team members.

Table 2 Spawner Survey Schedule		
Date, Time	**Stream Section**	**Team members**

4. DO THE SURVEY

a) At the start

Record information at the stream using waterproof paper, then transfer it to the Field Data Sheet when you have finished the day's survey. Record exact survey location, weather, water temperature, turbidity, percent bankfull, and fish countability. Measure turbidity in a deep pool area, using the tape measure. Turbidity is the maximum depth in centimetres that you see the "one" at the end of the tape. Estimate the percent bankfull: the amount of water compared with the bankfull channel size. The boundaries of the bankfull channel are defined by the edge of perennial vegetation growth. Fish countability is affected by weather conditions (wind or rain disturbs the water surface), turbidity (generally or locally, from a turbid tributary), and water colour. When these conditions are poor, they reduce your ability to see and count fish.

Walk the stream bank and look for fish. Do not walk in the water to count, because that will disturb spawning fish and their habitat. Both members of a team should count spawners and compare results. If there are two or more species present, have each person count a different species. Use the Appendix key to identify the species, if necessary.

Confirm with your partner where to stop first to compare numbers. Natural features such as changes from riffle to pool, or bends in the stream are good places to stop. Stop frequently to make sketches and enter data. This helps reduce inconsistencies in the count. Record the convenient stopping places so you can use them again in your next survey of that section.

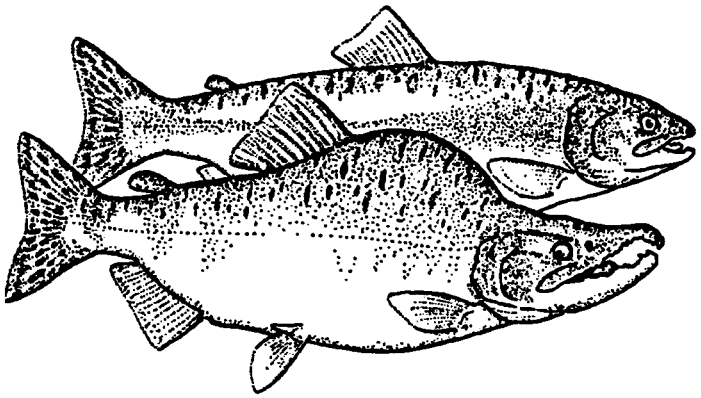
b) Finding fish

Consider fish behaviour when you look for fish. Some species lie in shallow riffles and are easy to see. Others, like coho, hide in deep pools or under cutbanks and logs, and can be very difficult to find.

Sometimes fish congregate at the confluence of a tributary, so check those locations carefully. If fish are difficult to see, toss a rock or poke a stick into an area, then watch for movement. Polarized sunglasses reduce glare and make it easier to see into the water. Some determined surveyors use a snorkel and mask so they can look into pools from an overhang or pool edge.

c) Counting fish

Count both live and dead fish during the first survey. In later surveys, count live fish and estimate the percent that have arrived since the last survey. New fish are in much better shape, appear cleaner, and do not have white blotches and scars.



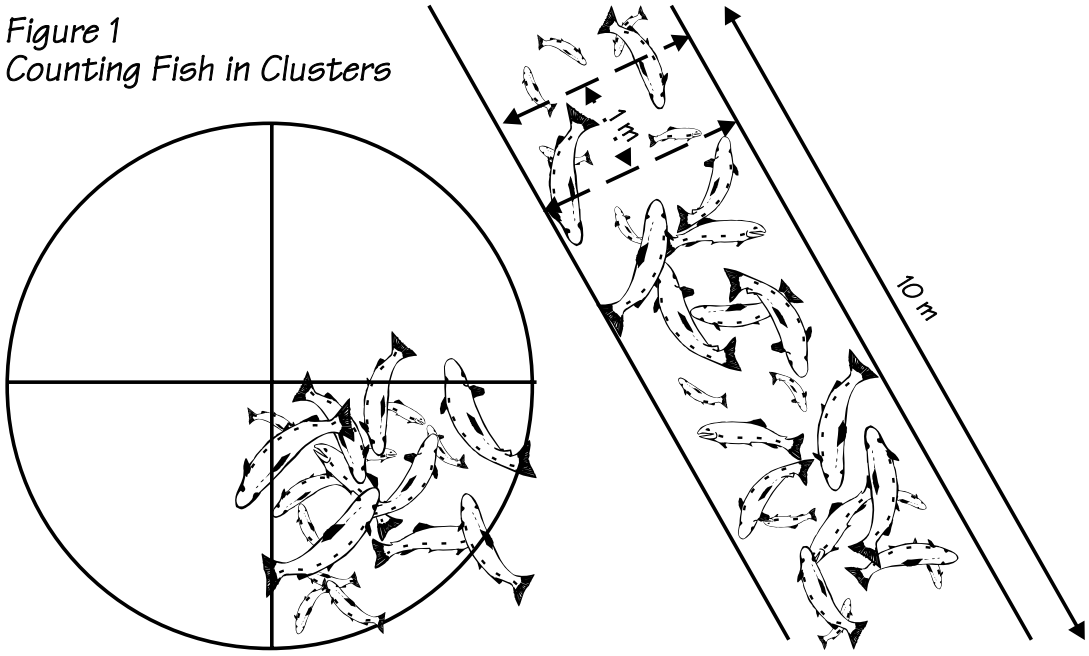
Pink Salmon

You will have little difficulty counting fish when numbers are low or when they are evenly spread out. However, when fish are clustered or densely packed, you will need to count them in groups. For example, one click of the tally counter may represent one hundred fish. Decide early in the survey whether to count in ones, tens, hundreds, or more, based on the abundance and density of the fish.

Fish can be distributed evenly or in clusters. When fish are distributed evenly throughout a riffle, for example, divide the riffle into imaginary strips and calculate the average number of fish in a strip. Then extrapolate the number per strip into a count for the whole riffle. When fish are clustered, you can imagine the cluster as a square or circle. Count the number of fish in a part of the cluster (one quarter, one eighth, etc.), and extrapolate to a total number (Figure 1).

Counting fish in large deep pools where fish are many layers deep can be difficult. Toss in a stone to get the fish to move around. Divide the pool into imaginary divisions, consider the depth of fish, and extrapolate the results. If it seems impossible to estimate numbers, compare the size of this pool to a smaller pool where you have counted fish already, and adjust the numbers upward.

Figure 1
Counting Fish in Clusters



d) Collecting data from tag studies

You may be able to help recover data if tagging studies have been done for fish in your stream. Contact your Community Advisor or local DFO or WLAP office for guidance.

e) Recording the data

Write the spawner counts on waterproof paper while you are in the field. Later, fill out the Field Data Sheet, using a separate data sheet for each survey section and for each species. Add data for that survey section as the spawning season progresses. Include general stream conditions for each date. Save any sketches and notes you make during the surveys.

Record the total number of live and dead fish observed for each species counted during the first survey. Enter the sum of these two figures in the "new total to date (TTD)" space on the Field Data Sheet.

The number of pre-spawning deaths can be counted. This number is important, because in some years conditions may be poor (e.g., low water, high temperatures) and pre-spawning mortality may be significant. The dead fish often appear fresh, unscarred, and with a full belly. The body cavities of females contain many eggs, and males have intact sperm sacs.

Estimate the percentage of fish that are actively spawning. These fish will be paired up, sitting over or near redds, or found in shallow riffle areas. Their tails often appear ragged. Fish milling around in deep pools are usually not actively spawning.

Count only the live fish in the second and subsequent surveys. Record the total number of live fish and use your own judgment to estimate the percent new fish since you last walked the stream. Record the number of new fish on the spawning grounds. New fish look fresher and lack the white blotchy scars of older spawners. For example, if you count 1000 live fish in the second survey and estimate that 30% of them are new, the number of new fish is 300. Add the number of new fish to the previous TTD to get the new TTD estimate. Data from the surveys might look like this:

SPECIES: Chum	**first survey**	**second survey**	**third survey**	**fourth survey**	**fifth survey**
# live fish	860	1000	400		
# dead fish	10	n/a	n/a		
% new	n/a	30%	10%		
# new fish	n/a	300	40		
previous TTD	n/a	870	1170		
new TTD	870	1170	1210		
# pre-spawning mortalities					
% active spawners	75%	100%	100%		

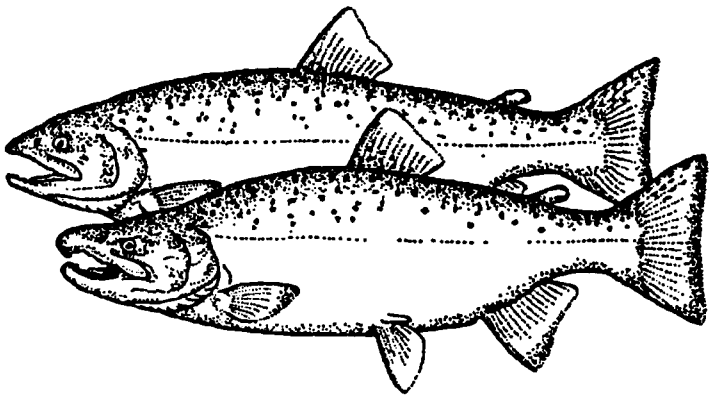
After the final survey, summarize the results of all the spawner surveys on the Summary Data Sheet. Use a separate summary sheet for each species. Include a sketch of the spawner distribution on the back of the summary sheet. If you surveyed the whole stream, you can add all the results from individual sections to get the total spawner population for the stream. If you surveyed only some parts of the stream, there is no reliable way to extrapolate these results to the whole stream. Make sure you indicate on the Summary Data Sheet whether you surveyed the entire stream or only a portion of it. If you surveyed only a portion, clearly identify the location of the start and end points.

Collecting, Evaluating, and Reporting Information

Send copies of your completed field and summary data sheets to the Streamkeepers database. The current address is in the Handbook. Also, send copies to any fisheries staff who helped you with the project. They can help you prepare a BC 16 report, the Annual Report of Salmon Streams, or use your data to prepare the report themselves. Compare your survey data with historical spawner counts to assess the health of the population. If you have been involved in a stream enhancement project, you can use the data to learn how the population has responded to your enhancement efforts.

Public Relations

You can clean up streams, monitor their condition, and undertake enhancement projects, but you need the support of your community for these projects to succeed. Talk about your project with others whenever and wherever you can, including at schools and public meetings. Place signs at visible projects. Contact newspapers, radio stations and television stations. Module 10 contains specific information about increasing community awareness and working with the media.



Coho Salmon

References

Anon. 1993. *Counting Salmon Module 1-6*. Aboriginal Fisheries Guardian Training, Trainers Guide. Fisheries and Oceans.

Cousens, N.B.F., G.A. Thoms, C.G. Swann, and M.C. Healey. 1982. *A Review of Salmon Escapement Estimation Techniques*. Can. Tech. Rep. Fish. and Aquat. Sci. No. 1108.

Lofthouse, D. and D.J. Davies Ltd. *Spawner Assessment Technique* of Salmonid Enhancement Training Program Mini Course Series #1, for use with Community Economic Development Program.

McPhail, J.D. and R. Carveth. 1995. *Field Key to the Freshwater Fishes of British Columbia.* Prepared for the Aquatic Inventory Task Force of the Resource Inventory Committee, Victoria, BC, 233 pp.

Shaw, W. 1994. *Biological Sampling Manual for Salmonids: A Standardized Approach for the Pacific Region*. Can. Tech. Rep. Fish. Aquat. Sci. 1998, 167 pp.

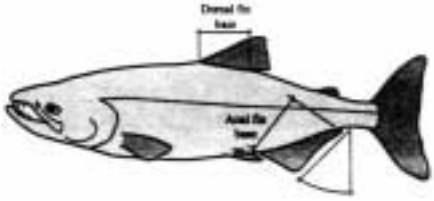
APPENDIX 1. Key to Adult Salmonids

(source: McPhail and Carveth, 1995)

Appendix 1
Key to Adult Salmon, Trout and Char

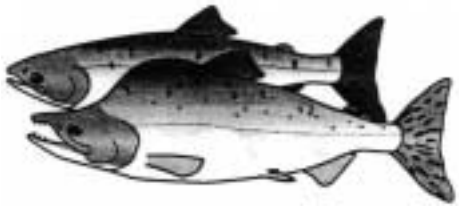
(from McPhail and Carveth, 1995)

Family Salmonidae (subfamily Salmoninae)



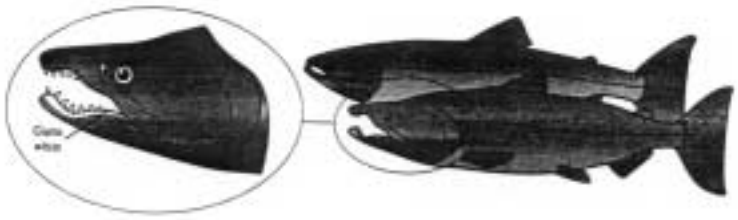
1 (10) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards (not vertical). 2

2 (7) Distinct spots on tail 3

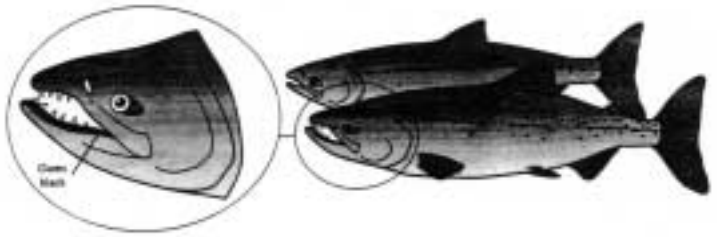


3 (4) Tail spots oblong (not round) . . . . . PINK SALMON (Oncorhynchus gorbuscha)

4 (3) Tail spots round (not oblong) 5

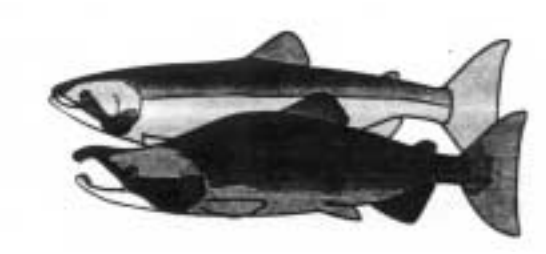


5 (6) Tail spotted on upper half; gums at base of teeth in lower jaw white. . . . . COHO SALMON (Oncorhynchus kisutch



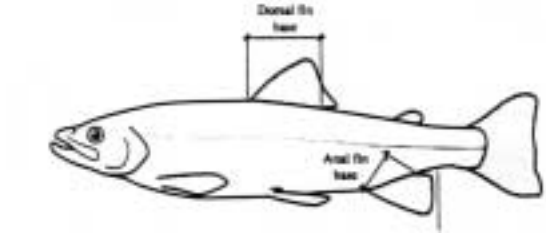
6 (5) Tail spotted on both upper and lower halves; gums at base of teeth in lower jaw black. . . . . CHINOOK SALMON (Oncorhynchus tshawytsch)

7 (2) No spots on tail, but occasionally some fine speckles 8



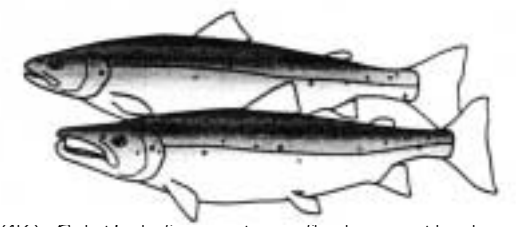
8 (9) Adults occur in fresh water both as migratory spawners (Sockeye) and as residents (Kokanee); flanks are uniformly coloured (silver in non-breeding Kokanee, usually red in breeding Sockeye and Kokanee). . . . . SOCKEYE SALMON/KOKANEE . . . . . (Oncorhynchus nerka)

9 (8) Adults in freshwater only as spawners; flanks in males pale with irregular red and black blotches, females with a purplish lateral strip. . . . . CHUM SALMON (Oncorhynchus keta)



10 (1) Base of dorsal fin equal to, or longer than, anal fin base; in profile, hind margin of anal fin is vertical (no backward slant). 11

11 (18) Background colour on flanks light (silver or golden) with dark spots 12

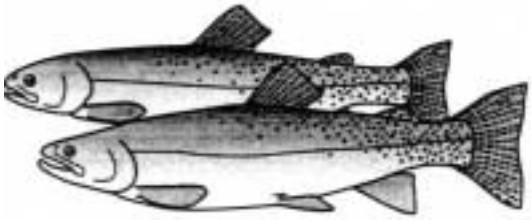


12 (13) Relatively few spots on flanks, mostly above lateral line, some spots x-shaped; caudal fin usually without spots; spawning males with conspicuously hooked lower jaw . ATLANTIC SALMON (Salmo salar)

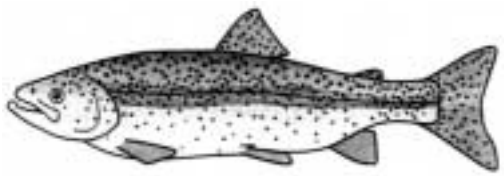
13 (12) Spots on back and sides more numerous; none x-shaped; caudal fin usually heavily spotted. 14

14 (17) Red or orange slash under lower jaw; upper jaw extends back past hind margin of eye; tail usually yellowish with black spots 15

15 (16) Anterior flanks heavily spotted above and below lateral line, anal fin usually with spots
. . . . . COASTAL CUTTHROAT TROUT
. . . . . (Oncorhynchus clarki clarki)

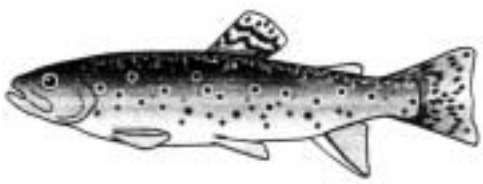


16 (15) Anterior flanks lightly spotted (mostly above lateral line), anal fin usually without spots
. . . . . WESTSLOPE CUTTHROAT TROUT
. . . . . (Oncorhynchus clarki lewisi)



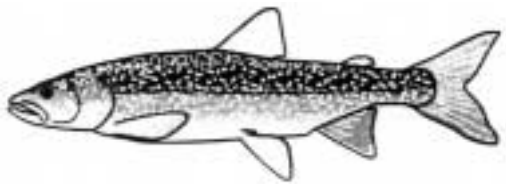
17 (14) No red or orange slash under lower jaw; except in spawning males upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; tail dusky with dark spots. . . . . RAINBOW TROUT (Oncorhynchus mykiss)

18 (11) background colour on sides dark with light or coloured spots 19



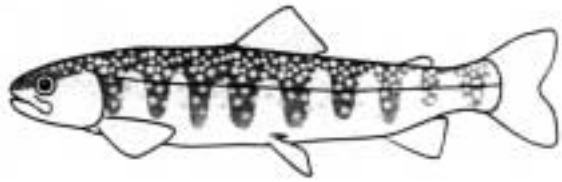
19 (20) Dorsal fin yellowish, with bold black streaks; red spots on flanks surrounded by blue haloes
. . . . . BROOK TROUT (Salvelinus fontinalis)

20 (19) Dorsal fin dusky and without bold black marks; spots on sides not surrounded by light haloes. . . . 21



21 (22) Tail deeply forked, light coloured spots on both halves of tail; head and body covered in light irregular spots . . . . . LAKE TROUT (Salvelinus namaycush)

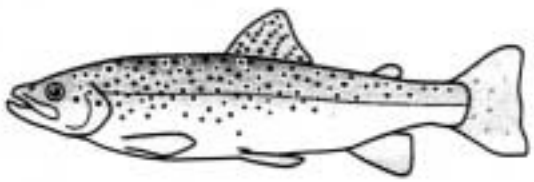
22 (21) Tail not deeply forked; spots if present only on upper half of tail 23



23 (24) When viewed from the side snout is blunt; upper jaw short (barely reaches hind margin of eye)
. . . . . DOLLY VARDEN (Salvelinus malma)*

24 (23) When viewed from the side snout is more pointed; upper jaw long (reaches well past hind margin of eye) BULL TROUT (Salvelinus confluentus)*

25 (26) Background colour on back and flanks light (silver or golden) with dark spots 26



26 (25) Spots on flanks mostly dark surrounded by conspicuous light haloes; some spots along side are red. . . . . BROWN TROUT (Salmo trutta)

** This species pair is difficult to distinguish unless you have both in hand.*

send the data to the Streamkeepers Database

MODULE 12:
SPAWNER SURVEY FIELD DATA SHEET

(use a new data sheet for each survey section and species)

Stream Name		**Date**
Watershed code		**NTS Map#**
Organization name		**Crew size**
Contact name		**Phone#**
Upstream boundary of survey (directions, distance to known landmark)		
Downstream boundary of survey (directions, distance to known landmark)		
Survey method used		

SPECIES _____	**GENERAL STREAM CONDITIONS**				
date					
weather					
water temperature (^{0}C)					
% bankfull					
water turbidity (cm)					
***fish countability**					
	SPAWNER INFORMATION				
# of live fish					
# of dead fish		**n/a**	**n/a**	**n/a**	**n/a**
% new fish	**n/a**				
# of new fish	**n/a**				
# prespawning deaths					
% active spawners					
****previous TTD**	**n/a**				
****new TTD**					

*** fish countability = nil, poor, fair, good, or excellent ** TTD = Total To Date**

send the data to the Streamkeepers Database

MODULE 12:
SPAWNER SURVEY SUMMARY DATA SHEET

(use a separate summary sheet for each species)

Stream Name	**Date**
Watershed code	**NTS Map#**
Survey method used	**Organization name**
Contact name	**Phone#**
If this estimate is not for the whole stream, define the section surveyed	

SPECIES			
***total number of spawners**		**# of survey dates**	
spawning start date		**spawning end date**	
spawning peak period			
fish distribution			
number of prespawning deaths, cause of death			
****habitat problems**			
COMMENTS			
make a sketch of fish distribution and spawning areas on the back of the data sheet			

***(add all the TTD numbers from the last survey date for each survey section)**

**** HABITAT PROBLEMS: obstructions (type, severity, location, recommended action, silting, erosion, pollution)**