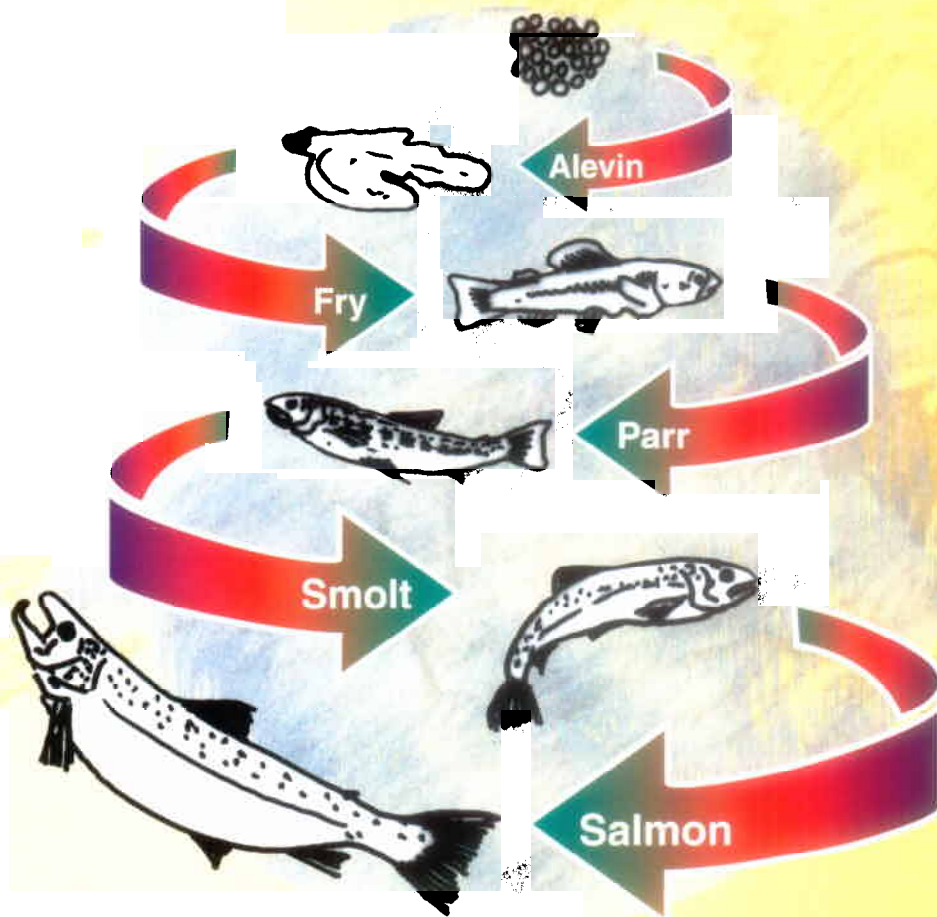


Advisory Leaflet Number 1
THE EVALUATION OF HABITAT
for
SALMON AND TROUT

Each stage in the life cycle of salmon and trout has different habitat requirements and it is the natural combination of these (*referred to as a 'habitat unit'*) which is vital in maintaining fish stocks in our rivers and streams. Within any scheme aimed at improving fish stocks, it is important to look at the river bed to determine the ability of the habitat present to produce and hold fish. Before an evaluation of habitat can begin it is useful to understand what type of habitat best suits each life cycle stage of salmon and trout and their connection within the habitat unit.



HOLDING AREA – ADULTS

HOLDING pools occur frequently in nature, often on the bends of meandering rivers, and are essential to adult fish because they :

- allow a staged ascent or descent of the river.
- offer a secure resting area where the minimum energy is required to stay on station and for salmon which do not eat while in the river this is especially important.
- their location close to spawning areas is required because of the length of time (sometimes several days) to build a redd.



SPAWNING AREA – OVA

GRAVEL or spawning areas are the connecting link within the habitat unit and it is here that the life cycle begins when the foundation for the next generation is laid down as

eggs in the gravel. It is the quality and quantity of gravel that dictates the size and number of fish which spawn at the site and the following features are important for trout and salmon spawning :



- The proximity of a good holding pool to the spawning area.
- Gravel size and gravel depth exert a strong influence on spawning. The size of gravel that can be shifted during the digging of a redd and the depth of that redd is closely related to the body size of the fish. Smaller trout will normally spawn on gravel 4 – 65 mm size and the depth of the redd will be in the 50 – 150 mm range. Salmon and larger trout will normally

spawn on gravel 30 – 80 mm size and the depth of the redd will be in the 200 – 500 mm range. The presence of large quantities of silt along with the gravel can not only cause compaction of the gravel, making redd construction more difficult it can also reduce the oxygen supply to the eggs.



Adequate water depth and flow are also essential so that at all times the redd is covered by water and the flow of water is sufficient to keep the eggs well oxygenated. The tail of a pool is a favoured location for spawning because it is here that water conditions are often just right, ie, good flow and a moderate depth.



A good nursery area is required downstream of the spawning area.

NURSERY AREA – FRY



THE hatched eggs are called 'alevins' and they obtain nourishment from their yolk sac for up to eight weeks while they are still in the gravel. After this period they move generally no more than 200 – 300m downstream from the spawning area. Here they have to look after themselves and, inevitably, high losses occur at this stage but good habitat can help to improve the number that survive. Ideal fry habitat can be summarised as having the following features :



A well stoned bed (70% coverage of stones 150 – 500mm size) provides good shelter from predators and creates more territory space allowing it to accommodate more fry. This stable environment has a ready made source of food by virtue of the invertebrates living on the surface of the stones. Tree and shrub cover in these areas can enhance the food supply available by insects dropping of the branches into the water.



Shallow, fast flowing water (ideally less than 250 mm) makes the fry less vulnerable to predation, not only from older fish because of the shallow water, but also the rippling of the water surface makes them less easily seen by birds. The action of the water over the stones creates a well oxygenated area for the fry to live in over the summer, after which being larger and more mobile, they can move to other areas.

HABITAT UNIT

THE habitat unit represents the basic component for fish production in a river or stream and it is the combination of these units throughout the river that determines the strength of the fish population within it.



HABITAT SURVEYS

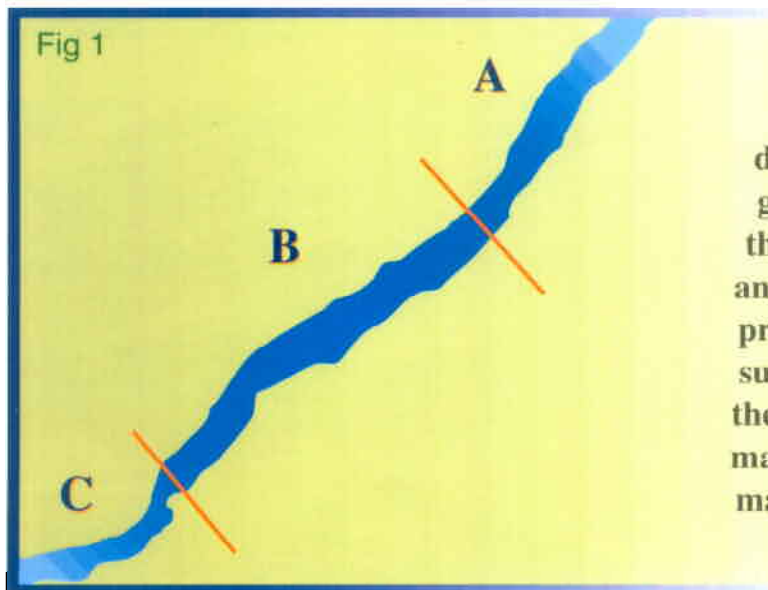


GOOD habitat is the basis for a strong fish population and, when trying to improve fish stocks as previously stated it is necessary to inspect the river bed to identify if any problems exist in the habitat available for fish to use. A habitat survey will identify not only where these habitat units occur and which require any attention but also where they are incomplete for example, due to a lack of nursery or spawning habitat. With this information habitat problems can be properly identified and the solutions applied. This habitat information linked with an electrofishing survey and water quality data (*including invertebrates*) will help to give a fuller picture of the general health of the river and its fish stocks.

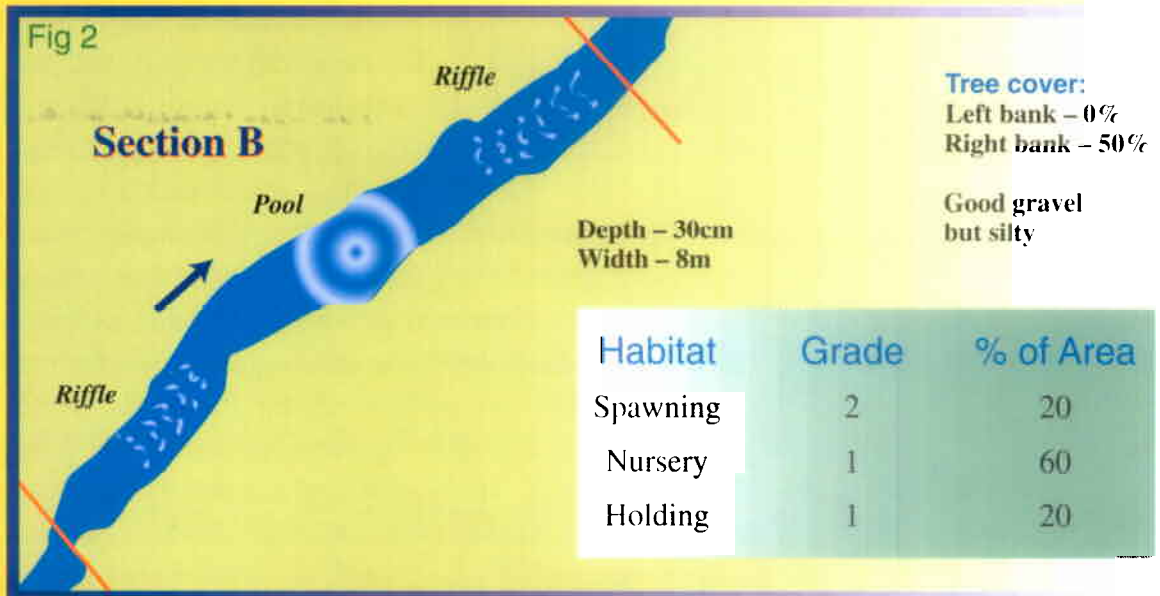
HOW DO I CARRY OUT A HABITAT SURVEY

THE essentials of a habitat survey are to divide the river system up into manageable sections, normally of about 100m paced out, and to grade the river bed in the section as to its suitability for holding, nursery and spawning. Obviously it is important that all those grading the habitat use the same method of assessment and to this end, the criteria used are based on the essential components of each habitat area. These can be seen in Annex 1.

The simplest way forward is to appoint two people to survey either a main tributary or a main section of the river.



Two people using two cars can walk from bridge to bridge sections without double walking the river. They will also gain a detailed working knowledge of the tributary which will prove useful in any future discussions or enhancement proposals regarding it. Using ordinance survey maps of scale 1:10000 or smaller the paced out 100m sections can then be marked reasonably accurately on the maps as they go along (see fig. 1).



For each 100m section the habitat is then graded according to the criteria in Annex 1. Additional information required, such as river width, tree cover etc., can also be noted as detailed in the example Fig 2

The results from each section can then be summarised in a table such as that in Fig. 3 below.

| River: | | Date: | | | US/DS | | |
|---|-----------|--------|-------|-------|----------------|----|-----------------------|
| Section | Grid Ref. | Length | Width | Depth | Habitat Grades | % | Comments |
| B | 12345 | 100m | 8m | 30cm | S-2 | 20 | Tree cover L/B-0% |
| | 65845 | | | | N-1 | 60 | R/B-50% |
| | | | | | H-1 | 20 | Good gravel but silty |
| | | | | | | | Caddis & stone fly |
| | | | | | | | present |
| Additional information to include: Silt, Tree Cover (L/B, R/B), Other Vegetation, Presence of Invertebrates, Pollution, Weirs, Groynes, Falls, Fish Passes etc. | | | | | | | |



ANNEX 1 HABITAT CLASSIFICATION

NURSERY AREA

GRADE

- 50 — 250mm DEPTH
- 0.5 — 8 % GRADIENT
- STABLE COBBLE/
BOULDER SUBSTRATE >
OR = 70% BED COVER
- PROVIDING ADEQUATE COVER

GRADE 2

MARGINALLY OUTSIDE GRADE 1
ON ONE COUNT ONLY

GRADE 3

WELL OUTSIDE GRADE 1 ON
ONE OR MORE COUNTS

GRADE 4

ABSENT, DEEP, CHANNELISED, SILTY etc.



SPAWNING AREA

GRADE

- FLOW 300 – 600 mm/s
- WATER DEPTH 150 – 700 mm
- 70% SUBSTRATE 30 – 80mm DIAMETER
- GRAVEL DEPTH :
TROUT = 50 – 150 mm
SALMON = 200 – 500 mm



GRADES 2 4

FAILING AS FOR NURSERY HABITAT ABOVE



HOLDING AREA

GRADE 1

DEPTH MINIMUM 1m IDEALLY > OR = 2 m
SUITABLE COVER: BANKSIDE/SUBSTRATE
STABILITY

GRADES 2 4

FAILING AS FOR NURSERY HABITAT ABOVE

