SMALL STREAMS CHARACTERISATION SYSTEM

Training Guide

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BACKGROUND AND INTRODUCTION

Evolved following a number of workshops / meetings held between 2011 and 2013.

Recognised the need for greater attention to be paid to small streams and the role they play in the health of the wider aquatic ecosystem and of fish populations throughout river catchments. The importance of these small waters and the problems they often encounter should be discussed.

Identified the role that "Citizen Science" could play in gathering data on the physical and biological characteristics of small streams.

(Definition of Citizen Science: "the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists")

In 2014 the SSCS stream survey manual was prepared by Martin McGarrigle based on a system used successfully in Ireland for almost a decade.

Manual is designed to provide volunteers with skills to monitor small streams using the SSC System and includes:

- Macro invertebrate sampling
- Macro invertebrate identification
- Aquatic weed identification
- Identification of obstructions to passage of fish
- Data recording and analysis

The System takes a new approach and is structured and designed to allow relative non experts to accurately gauge the balance between pollution sensitive and pollution tolerant species of macro invertebrates within a stream and use the data to place it within one of three categories (At Risk, Intermediate, Not at Risk).

The project has been designed to involve volunteers who may have limited previous experience in invertebrate identification. Volunteers could potentially come from a wide range of interests such as school children, anglers and wildlife interest groups.

It is important to ensure there is consistency in the quality of the data collected so all volunteers involved in this project must go through the training programme. By ensuring that only high quality data is collected then it will give confidence in all parties to be confident in the results found.

The training of volunteers should only be undertaken by individuals who have a good understanding of the techniques involved in the surveys and the data analysis required. The training bodies are also expected, in most cases, to be involved in the storage of the data collected during the project. It is expected that relevant government agency staff, fishery trust staff and / or wildlife wardens will be running the training programmes.

HEALTH AND SAFETY

Critical that Health and Safety issues are fully explained to volunteer trainees.

Trainers may wish to incorporate / make use of their own in house systems and adopt to suit, supported by own generic and dynamic risk assessment paperwork.

Include discussion covering page 6 of the Manual and some illustration of risks.

Devise an exercise illustrating completion of risk assessment sheets which could be used with a trainees.

Discuss / consider general first aid issues.

Important that Health and Safety is seen as integral part of the task and not ignored. Need to ensure trainees are taking it on board as routine.

Inform volunteers that Health and Safety is covered in the course assessment.

BIOSECURITY

Important to ensure volunteers understand general concerns associated with Invasive Non-Native Species (INNS) and need for robust biosecurity measures. Volunteers will have different amounts of knowledge / attitude to invasive species and their potential impact.

Main species of concern: list / illustrate and discuss the main local species of concern (Page 7 of the Manual).

Main precautions: list / illustrate and discuss (based on what the local species of concern are).

Need to discuss equipment used as well as PPE. How will equipment be stored / issued / managed etc.

Discuss the Check – Clean – Dry campaign. Lots of leaflets / posters available which could be handed out at the training.

SAMPLING STRATEGY

It is essential to put some thought into the sampling strategy to be undertaken as it is expected that this will vary across different areas depending on exactly what the questions are to be answered, what other monitoring programmes are occurring and the available resources. We would advise that the training organisation is clear on exactly how the data will be used and designs an appropriate sampling strategy. Where are sites going to be and how often should they be sampled are important considerations.

There are also general issues relating to the management of volunteers after their training relating to sampling. Will they be closely or loosely managed?

It is also important to consider who should organise the permissions to sample.

SAMPLING EQUIPMENT AND MAINTENANCE

May be a need to labour some of points as you are dealing with volunteers which may not have used some of the equipment types before? Some volunteers will be familiar with the practical aspects but may be less comfortable with GPS / map reading.

There are some Smartphone Apps for giving grid references.

Describe / illustrate / show equipment that will be used in the field. Highlight critical aspects and dimensions.

Discuss and agree issues of maintenance and storage of equipment i.e. is the equipment given to the volunteers or loaned to them?

Discuss general purpose of items (for trainees).

Discuss / illustrate (links) sourcing and costs of equipment.

Create basic checklists for volunteer staff?

STREAM CHARACTERISTIC SAMPLING

Volunteers are expected to observe / measure and record a relatively wide range of stream characteristics at the sites they sample.

It is clearly important that volunteers fully understand the terminology / definitions used within the Manual (Pages 10 and 11) and use clear and correct recording of their measurements / observations.

Trainers must provide guidance on filling in a field sheet for volunteers to clarify what is expected and to highlight areas of potential confusion and error.

Where possible include diagrams and pictures to illustrate and encourage discussion.

None of these affect the SSCS but are important information for the trainer organisation.

Main area to check if volunteers are competent is map reading and grid references.

MACRO-INVERTEBRATE SAMPLING TECHNIQUES

The macroinvertebrate sampling technique employed in SSCS is broadly similar to that used by various government organisations and involves taking a 3 minute kick sample at different locations within the selected sample site (Traditionally 6 x 30 second kick locations).

Illustrate with pictures and a demonstration. Sampling should concentrate on riffled cobbled or stony areas (and scrubbing of some cobbles as well).

Discuss the transfer of sample from net into tray and the cleaning of the sample.

Emphasise areas of potential error (net angle / time / location) and importance of effectively cleaning of the sample to allow accurate ID and counting.

MACRO-INVERTEBRATE IDENTIFICATION

The SSCS is based on the identification of macroinvertebrate species in five groups organised by their tolerance to pollution. The groups are:

Mayflies
Stoneflies
Caddis flies
A group (GOLD+) including snails, worms, dipteran flies, flatworms and leeches
A group containing only one representative the water louse Asellus.

Increasing tolerance of pollution

Certain commonly found invertebrates are deliberately omitted from the scheme (Baetids Gammarus and beetle larvae).

The system can be used to effectively categorise a stream by accurately identifying the number of different types (and their abundance) of macro inverts in each of the five groups (without having to formally identify any). However, as keys will have to be used to some degree if only to place macroinvertebrates into the major groups, it is likely that operatives will need to be familiar with the identification process.

Operatives should ideally be aware of the scientific terminology that will appear in some keys to facilitate their use, for example outline of taxonomic groups and their scientific names and support with the basic anatomy (body parts) used for ID purposes.

List of groups / sub groups and scientific names

Concentrate on main differences (as Manual does) and move into more detailed ID as confidence grows.

Use pictures and diagrams to illustrate

Follow examples in key / keys

Discuss counting of individuals / broad number categories / how this relates to flow chart for score calculation

Emphasise volunteer side of data gathering and analysis and how best to ensure reliable consistent data

Discuss potential sources of error and how to minimise

Look at expertise required of trainers. Needs to be a level above volunteers ideally.

CALCULATION OF SCORE

Invertebrate types identified must be placed into the field sheets by groups.

Relatively straightforward, can be illustrated by example(s).

Show completion of each group sheet and use of flow chart to derive group sub-score.

Calculate final score using the manual technique.

Move onto use of Spreadsheet and care needed to complete.

Use same examples to arrive at scores and a final score.

Highlight areas of potential error.

Discuss risk categories and boundaries.

Emphasise non-linear nature of scheme relate to sampling and ID skills required.

AQUATIC PLANTS

Aquatic plants can also play a role as indicators of conditions within a stream which may result from pollution (due to elevation of nutrient levels and or increase in siltation).

Worth gathering information from the sample site for managers. Does not affect score but may be valuable. Photographic evidence valuable in this situation.

Outline broad groups included in field sheet and include lichens as well

Outline conditions which will encourage weed growth other than enrichment.

Use photographs.

HYDROMORPHOLOGY – OBSTRUCTIONS TO FISH PASSAGE

The “sampling approach” to obstructions will be different, presumably undertaken as a walk over survey or directed rather than opportunist in relation to invertebrate work.

Volunteers should be familiar with the broad range of obstructions types:

- Natural – water falls, wind blow etc
- Man-made – sluices, dams, weirs, culverts etc

Volunteers will need to understand:

- Different discharges will have an impact on the severity of the obstruction.
- The impact of flow velocity, water depth and water temperatures on fish passage.
- Significance of water (pool) depths below obstructions

Discuss and explain the critical things that must be measured for completion of field sheets:

- Difference in upstream and downstream water levels (head)
- Length of weir face
- Culvert shape and dimensions, length, drop, etc