NATIONAL RIVERS AUTHORITY
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WELSH REGION
RHANBARTH CYMRU

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NRA

Guardians of the Water Environment
Diogelwyr Amgylchedd Dŵr

GUIDELINES FOR RIVER CORRIDOR SURVEYS IN THE NRA

FEBRUARY 1992
(draft #3)

SECTION 1: DETAILED METHODOLOGY FOR HABITAT SURVEYS OF RIVER CORRIDORS

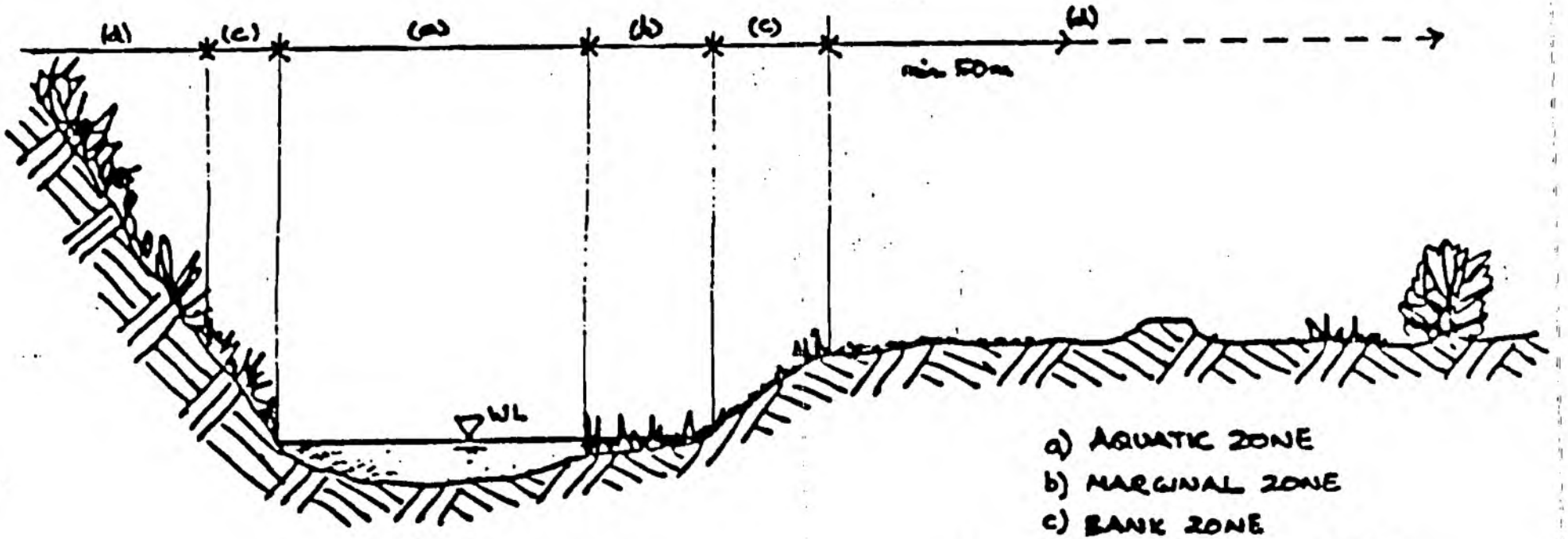
1.1 Introduction

This document details recommended techniques for carrying our the basic ecological survey of habitats along a river corridor for strategic purposes. The methodology is derived from that developed by the Nature Conservancy Council in the early 1980's and published as "Surveys of Wildlife in River Corridors, Draft Methodology" (1984). It should be noted that, for a full river corridor survey, other factors need to be taken into account.

The ecological survey methodology is a habitat based approach, essentially recording details of vegetation and physical structure rather than comprehensive species accounts. It involves mapping defined stretches of river of approximately 500 metres length. Base maps will be derived from Ordnance Surveys maps at 1:2500 scale or other scales, as appropriate. Surveys will cover both banks of smaller rivers, but only one bank at a time of large rivers or embanked watercourses.

The definition of the river corridor for the habitat module shall be taken as the four riparian zones:- aquatic zone, marginal zone, bank zone and adjacent land zone. The width of the river corridor and these zones will vary and for guidance, examples are shown in Figure 1.

Figure 1


(d)
(c)
(a)
(b)
(c)
(d)
min 50m
WL
a) AQUATIC ZONE
b) MARGINAL ZONE
c) BANK ZONE
d) ADJACENT LAND ZONE

P. Jones
Llanrwst

MEMORANDUM

Tel: Cardiff (0222) 770088
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NATIONAL RIVERS AUTHORITY

WELSH REGION,
Plas-yr-Afon,
ST MELLONS,
Cardiff CF3 0LT

17 MAR 1992

TO: Resource Officers,
Snr Env Appraisal
Officers

FROM: Richard Howell

DATE:March 13, 1992

OUR REF:FC/AW/8 YOUR REF:

SUBJECT: River Corridor Survey Guidelines.

I enclose, for information, a copy of the nationally agreed RCS Survey Guidelines, for use when carrying out Habitat level surveys. These will be the basis on which contractors are invited to tender for the current years survey programme.

Head Office are intending to have the guidelines professionally printed and typeset, to include a waterproof key to the symbols, in the near future.

Richard Howell.

Richard Howell
Conservation and Recreation Officer

Enc.

To M. Hall / Richard ✓

Re. info & ~~file~~ notes in library → J. Titmus.

The adjacent land zone should encompass a corridor of a minimum 50 metres either side of the river; where the adjacent land use has a particularly significant effect upon the character of the river and vice versa, it may be necessary to record the land use to a further distance from the river.

1.2 The Survey

Surveys should be carried out in the period when vegetation types are readily observed, generally between April and October inclusive. This will be dependent on seasonal variations and geographical location.

Survey preparation should include:-

a) Definition of 500m reaches of survey

b) Preparation of base maps for fieldwork

c) Arrangements for obtaining access permission as necessary.

The survey comprises production of an annotated map, supporting textual description (and record card where required) for each 500 metres of river. Selection of survey reaches is carried out using Ordnance Survey maps and should be approximately 500 metres in length. For reactive surveys other lengths may be appropriate.

The 500 metre plans may be based directly on photocopies of the Ordnance Survey base maps or on redrawn maps detailing the channel form and significant associated features only.

The 500 metre stretches should be mapped conventionally with the flow running from bottom to top of the page (i.e. so that right bank is on right-hand side of the page, left bank on left). Survey sections should be numbered and arranged in order from downstream to upstream.

The channel should normally be as on the Ordnance Survey base map, but channel width may be exaggerated on the plans, in order that all details can be readily plotted. Each map should include the following details: the name of river and reach reference number; surveyor's name; date of survey; north orientation point; six-figure grid reference of the upstream and downstream limit of the stretch; arrow showing direction of flow; note on channel exaggerations should be noted. Maps should be prepared in black and white, not colour, for ease of photocopying.

Annotations of the plans should be in clearly legible handwriting, upper case except for scientific names of species. Critical areas (i.e. those easily damaged and not easily recreatable) should be highlighted on the maps using an asterisk (*).

For each 500 metre stretch, the following features should be noted and mapped in the field:-

(a) Aquatic zone - plant communities
flow features
substrate and physical features

(b) Marginal zone - plant communities
substrate and physical features

(c) Bankside zone - tree species
other plant communities
physical features

(d) Adjacent riparian zone -
habitat types (for semi-natural areas) and land use as defined by NCC phase 1 survey methodology

The scale of recording is to be appropriate to the size of the river and the integrity of the features to be recorded.

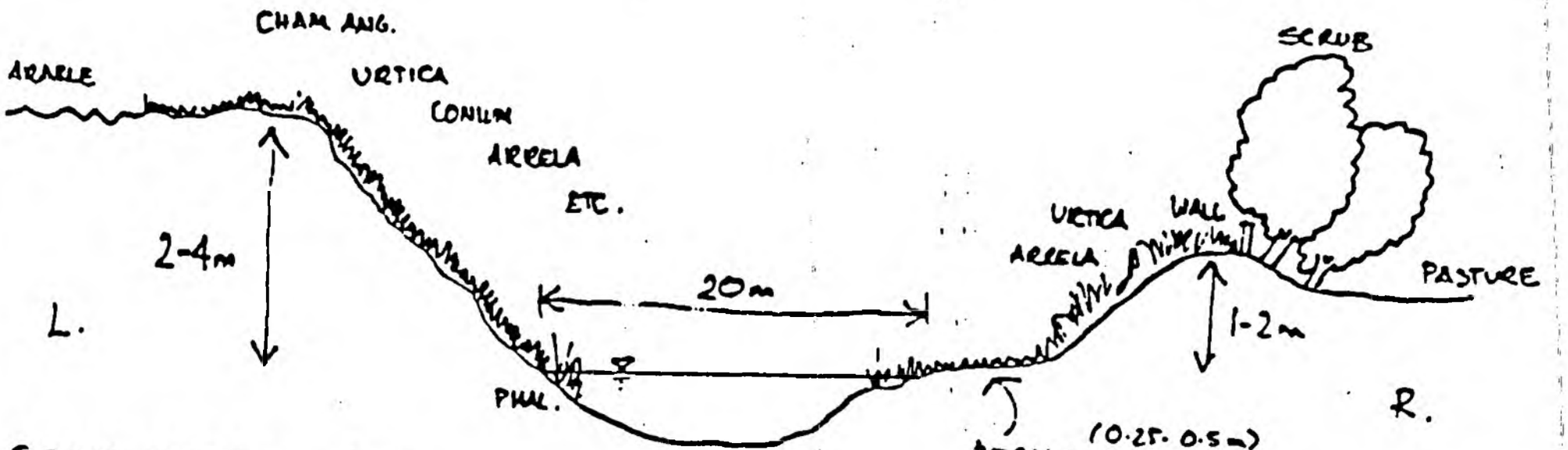
A comprehensive list of symbols and abbreviations to be used in mapping these features is given in Section 1.4.

When mapping vegetation types in the aquatic, marginal and bank zones, visually dominant species should be noted, as well as species of conservation significance i.e. locally rare, alien, invasive, legally protected and sensitive to disturbance.

In the adjacent land zone, a NCC "Phase 1" survey of habitat/land use is required. In general, species composition is not required, though in contiguous hydrological areas e.g. marsh wetlands, oxbows, etc, habitat/species detail should be recorded to the same details as the channel.

Sketch cross-sections through the river between bank tops (or through flood banks and into the adjacent riparian zone where appropriate) should be prepared, one representative sketch for each 500 metre stretch, or more frequently where the profile changes significantly. These should illustrate bed width, water depth, bank height and slope, flood bank height and width, present water levels, etc as shown in Figure 2.

Figure 2



CROSS-SECTION A-A

Accompanying each map should be a summary description of the 500 metre stretch in textual form, giving details of:-

a) conditions on day of survey e.g. normal flow, in spate etc
b) aquatic habitats and features) additional to
c) marginal vegetation - left bank and right bank) details shown on
d) bank zone habitats and features - left bank and right bank) the map, where appropriate
e) adjacent riparian zone - land use
f) observations of note - including records of birds and other animals, recreation features, etc
g) Management observations - pollarding, mowing, etc
h) potential threats, which may include - spray drift, mowing, scrub invasion, hedgerow removal, dumping of refuse etc
i) enhancement suggestions - see 3.1
j) habitats which should be retained intact
k) means of achieving (j)

1.3 Definitions

Measurement Required

1.3.1 Aquatic Zone

1.3.1.1 Depth:

Indicate on cross-sections

1.3.1.2 Width:

Indicate on cross-sections

1.3.1.3 Substrate: % of area of section

Silt/Mud	Unlike fine sands, these should be of a soft texture and not abrasive to the hands if rubbed. A fine layer of silt through which gravel, rocks etc can be seen should be typed according to underlying substrate, with a covering note.
Clay	Reserved for solid surfaces where flow does not remove the substrate.
Sand	Includes coarse and fine sands, the former merging into fine gravel and the latter merging into mud and silt (<2mm).
Fine gravel	2-16mm
Coarse gravel	16-64mm (conker to half-fist size)
Cobbles	64-256mm (half-fist to approximately a very large head size)
Boulders	Any rocks larger than 256mm in diameter and up to 4 metres in diameter.
Bed rock	Solid rock which is firmly positioned on the river bed and larger than a boulder (Diameter measured across longest axis).
Peat	Reserved for pure peat, not fine peaty deposits over more substantial substrates.
Artificial	Any artificial materials covering the river bed e.g. concrete, brick, timber, etc.

	Flow:	% of length of the section
	Pool	A distinct, deeper area of slow flowing water, often with an eddying flow, between faster flowing stretch.
	Slack	Area of deep or shallow water where the velocity is slow due to a very shallow slope in the river or natural artificial ponding. There is no widespread eddying and as river levels rise the water velocity increases much quicker than areas recorded as "pool".
	Riffle	Fast flowing; shallow water with a distinctly broken or disturbed surface.
	Run	Fast or moderate flowing, deeper water with a surface generally undisturbed except for occasional swirls and eddies.
	Rapids	Rapid water velocity with a severely broken surface, deeper than a riffle.
	Waterfall	Solid rock falls exposed causing a + vertical (>1m) drop in the river water. If large, in some cases it may be appropriate to record separately.
	Protruding rocks	In upland rivers boulders are frequently visible above the water level. These provide important habitats for several plant and animal species and the area within a 500m length occupied by them should be indicated by a percentage record.

1.3.2 Marginal Zone

1.3.2.1 Width:

Indicate on cross-sections

1.3.2.2 Substrate:

Mud	Flat areas of mud in slow-flowing stretches often occuring in the river directly adjacent to steep banks.
Sand	As above but formed of sand, not mud.

	Bare gravel/ cobbles	Loose material thrown up by the river as a temporary habitat and liable to be re-contoured by each flood.
	Vegetated gravel/cobbles	More permanent shallow marginal area which is constantly being inundated and exposed by variations in flow levels. It should be distinct from the bank yet not forming an island.
	Rock	Areas of natural rock normally under a shallow depth of water and only exposed by the lowest flows.
	Artificial	As above, but of artificial substrates.

Flora:

Islands:

1.3.3 Bankside

1.3.3.1 Height:

Indicate on cross-sections

1.3.3.2 Width:

Indicate on cross-sections

1.3.3.3 Slope:

Indicate on cross-sections

1.3.3.4 Bank characteristics: % of length of section

1.3.3.5 Trees: number per section

This refers to numbers of individual trees where these can be identified (i.e. not woodland, which will be noted under "Bank characteristics").

1.3.4 Flood/Adjacent Land Zone

1.3.4.1 Semi-Natural Habitats:

Map as per NCC Phase 1

A Woodland

Vegetation dominated by trees forming a distinct, though sometimes open, canopy.

Broadleaved - <10% conifers
Coniferous - <10% broadleaved

Mixed - 10-90% either broadleaved or conifer (note approximate proportion)
Scrub - woody species <5cm tall
Carr - Willows or alders with a marshy understorey
Open - scattered trees with pasture below (trees <30%)

B Grassland

Vegetation dominated by grasses

Unimproved - generally species rich, browner, rougher growth
Improved - generally species poor, lush green, even texture
Marshy - wet grassland with purple moorgrass, rushes, and marsh species

C Tall Herb/Fern

Vegetation dominated by ferns, tall wasteland species such as nettles and willowherb or other tall plants

Bracken

Other tall vegetation

D Heathlands

Vegetation dominated by heathers, gorse, or lichens, bryophytes

Lowland: heather-dominated areas in the uplands, often on sandy soils

Upland Moor: heather-dominated areas in the uplands, often on peat

E Mire

Wet habitats developing upon peat

Bog - moss-dominated habitats on acid peat
Fen - marsh species growing on basic peat

F Swamp

Wet habitats, with the watertable generally above the ground surface

Single species swamp - >90% of one species of read, sedge, etc

Mixed swamp - mixture of emergent species, no one dominant

G **Open Water**

Habitats of open water, either running or still

H **Rock**

Largely unvegetated rock, either natural or artificial (i.e. quarries)

Cliff - solid rock faces

Scree broken rock at the foot of a cliff

I **Other**

Including buildings, bare ground, etc

Note that each flood/adjacent land zone should be recorded both in terms of the semi-natural habitats and the land use i.e. a football pitch will be both "improved grassland" and "amenity grassland".

ABBREVIATED PLANT NAMES

All plants should be recorded using an abbreviated version of the latin name. The following list is indicative; additions should be abbreviated using the convention of the first letter of the generic name and the first three letters of the species name. Duplicate abbreviations thus created should be clarified by using the BSBI abbreviation or code number. Plants not i/d to species should be recorded using initial of generic name and (sp) in brackets.

Trees

Willow - Crack	Sfra
- White	Salb
- Gray	Scin
- Goat	Scap
- Weeping	Sbab
Alder	Aglu
Oak	Qrob
Ash	Fexe
Blackthorn	Pspi
Hawthorn	Cmon
Elder	Snig
Field Maple	Acam
Elm	Vgla
Poplar - White	Palb
- Black	Pnig
Sycamore	Apse
Scots Pine	Psyl
Bramble	Rfru

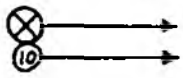
Herbs and Monocots

Sweet Rush	- Acal
Reed Canary Grass	- Paru
Common/Norfolk Reed	- Pcom
Sedge - Common	- Cnig
- Gt Pond	- Crip
Rush - hard	- Jinf
- soft	- Jeff
Reed Sweet Grass	- Gmax
Bulrush	- Slac
Reed Mace	- Tlat
Water Mint	- Maqu
Water Cress	- Rnas
Water forget-me-not	- Vana
Water Crowfoot	- Rflu
Common Waterlily	- Nlut
Pondweed	- Pnat
Pondweed - Fennel leaved	- Ppec
Amphibious - Bistort	- Pper

1.4 Standard Symbols for use in River Corridor Surveys

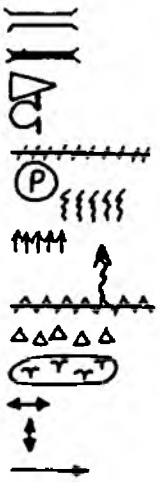
SURVEY INFORMATION

Direction of survey/bank used
Photograph



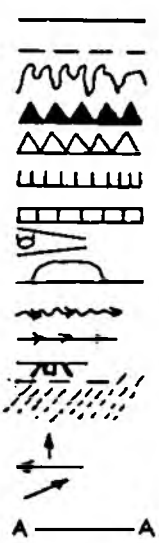
CHANNEL FEATURES

Bridge (road/track)
Footbridge
Lock
Inlet
Weir
Pool
Riffle
Rapids
Run
Waterfall
Protruding rock
Island (with vegetation)
Width) with figure
Depth) in metres
Direction of flow



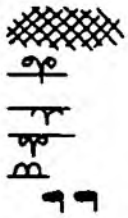
BANK FEATURES

Base of bank
Top of bank
Slump
Stable earthcliff
Eroding earthcliff
Rock cliff
Artificial bank protection
Cattle drink
Shelf/berm
Spring/flush
Inflow stream
Outfall
Dredgings
Height) with figure
Width) in metres
Slope
Cross section



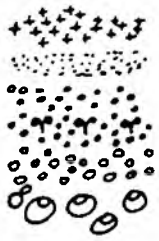
CHANNEL VEGETATION

Emergent Monocots
Emergent Dicots
Submerged Monocots
Submerged Dicots
Bryophytes
Floating leaves



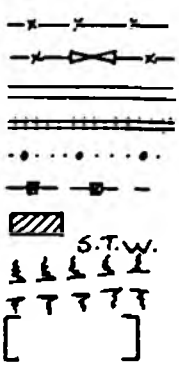
SUBSTRATE

Mud
Sand
Bare shingle
Vegetated shingle
Cobbles
Boulders



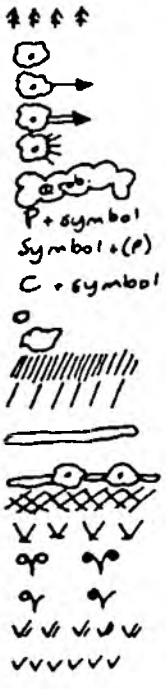
ADJACENT LAND FEATURES

Fence
Gate
Road/track
Railway
Footpath
Power lines
Building
Sewage works
Flood bank
Land use category
Defined name/phase 1 code



ADJACENT LAND/BANK VEGETATION

Conifer
Broadleaf
- overhanging
- fallen
- exposed roots
Woodland + symbol for type
Pollarded tree
Tree needs pollarding
Coppiced tree/shrub
Sapling
Shrub (single)
Thick shrubs
Sparse shrubs
Hedgerow
Hedgerow with trees
Reed/sedge
Tall grass
Tall herb/ruderal
Tall grass with herbs
Short grass
Mown



1.5 Enhancement Opportunities

In addition to the basic habitat map, suggested opportunities for habitat enhancement and/or management may be recorded on a separate map at the same scale. Examples are areas that would benefit from the creation of instream features, tree planting, possibilities for creating new wetlands or extending adjacent habitat features such as heathland, wildflower meadows, etc. Enhancement proposals should be highlighted to distinguish them from existing features - by placing text in a box and indicating the actual position with an arrow. Notes in the summary description may be referenced to the map by using a number in a box.

1.6 Photographs

During the survey, a colour photograph (print) should be taken which is representative of the river for every 500 metre stretch, with additional photographs to illustrate particular ecological or physical features of interest, or highlight points where the landscape changes. Prints should be included in the copy of the final report. The position and direction of the photographs should be indicated on the habitat survey maps, by a number and arrow.

1.7 Fieldwork

All fieldwork must be undertaken in accordance with the general guidance given on Health and Safety (2.2) and Access (2.3).

All surveyors must report direct to the appropriate NRA office any incidents of obvious or suspected pollution, fish kills, river blockages, etc.

1.8 The Report

The survey report should be in A4 format, bound for easy dismantling to permit photocopying. It should commence with a contents page, introduction and location plan showing individual, numbered, survey sections.

This should be followed by a typed summary of the ecological and physiographical interest of the total length surveyed. The text should highlight (assisted by the use of maps, if necessary) sections which are, in the opinion of the surveyor, of particular ecological importance, of special sensitivity or offer reasonable scope for enhancement.

There should then follow, for each 500m section surveyed:-

(i) A section map, prepared using information from the field survey maps.

(ii) Typed summary paragraphs describing the ecological and physiographical interests of the section.

(iii) A typed summary paragraph outlining the routine management operations which could be recommended in order to protect and further the conservation of flora and fauna.

(iv) A typed summary paragraph outlining and recommending appropriate habitat enhancement works.

A copy of the key to symbols should be incorporated. It is suggested that this could be reproduced on A3 paper folded to permit use in conjunction with section maps.

It is recommended that the photographic record associated with the habitat survey does not form part of a bound survey report. A separate means of storing the photographic prints, comprehensively cross-referenced and indexed to the main report, would improve the ease with which additional copies of the report, or part thereof, can be produced.

SECTION 2: GUIDELINES FOR SURVEY SUPERVISORS

2.1 Recommended Measures for Quality Control of R.C.S.

In order to ensure effective utilisation of survey information for the benefit of conservation, both within and outside the NRA, it is essential that the quality of the survey information is of the highest standard. Once the type of survey and level of detail has been established and defined in the survey specifications it is the responsibility of the survey supervisor or manager to ensure that the necessary quality of survey work and reporting is achieved.

The NRA considers that it is essential to develop and adopt appropriate mechanisms for ensuring that the quality of R.C.S. survey, data and reporting are maintained at a satisfactorily high standard throughout England and Wales. The present range of measures for ensuring control of quality will be incorporated in a proposed quality control module.

The critical requirements for quality control which have been identified are:-

(1) Detailed specifications for surveyors.
(2) Timing and allocation of resources for field survey work.
(3) Training of surveyors (to ensure technical competence and common understanding).
(4) Resolution of technical issues re: survey and i/d.

2.1.1 Survey Specifications

It is essential that the full requirements for the level of survey to be undertaken are specified at the outset. The locations, timing, level of detail and survey components must be clearly stated; together with requirements for quality control and reporting. In order to achieve this and ensure effective standardisation, of particular importance where surveys are commissioned from consultants with national coverage, a draft Model Contract for River Corridor Surveys has been prepared.

2.1.2 Timing and Resources for Field Work

In general survey work should be undertaken at the recommended time of year. However there may be a requirement to undertake reactive surveys at other times of year; if this is so then survey information must be considered accordingly and, at

the first opportunity, a resurvey should be carried out at the recommended time (provided river works have not already been undertaken).

Adequate time must be allocated for undertaking surveys to the required level of detail. For example, a trained habitat surveyor should be able to complete 4 or 5 500m sections per day. This figure will clearly vary according to habitat, terrain and ease of access and will be greater for straight, highly maintained for drains and less for heavily wooded, meandering large rivers.

Ideally, in terms of both health and safety and effective identification of habitat types, species, etc, surveyors should work in pairs; with one surveying each bank. However, this may often not be a cost-effective use of resources and it is recognised that surveyors may often be working alone. Sufficient survey staff must be employed to cover the survey reach having devoted adequate time to survey and recording of details without overlooking features of interest or being tempted to cut corners.

2.1.3 Training for Survey Staff

All surveyors must be trained to a high standard in the recognition of the environmental features they are surveying. Surveyors should have considerable experience of field survey work or should be employed under the close supervision of an experienced person until they become competent.

Training for survey staff must ensure that they are aware of the reasons for undertaking surveys and the use to which the information collected will be put. They should be provided with on-site training, in a group if more than one surveyor is to be used, in field surveying techniques. Guidance should also be given regarding the format and content expected in the written survey report. Experienced surveyors, who have previously undertaken RCS should be provided with "refresher" sessions.

The NRA will have available a training video for use in training sessions with surveyors. This will assist in ensuring consistency of training standards throughout the NRA. In future this may be supplemented with recognition of field surveyor ability and expertise by means of a NVC qualification.

2.1.4 Dealing with Technical Difficulties in Survey and Identification

All surveyors and their supervisors must be encouraged to seek advice when problems are found in understanding the survey methodologies. This advice should be obtained from the relevant NRA Conservation Officer.

Problems with species identification may be more difficult to resolve and appropriate expertise may not be available in NRA. Generally, advice should be sought from the nearest acknowledged source of expertise; e.g. RSPB/BTO local contact, for birds, BSBI county recorder, for plants, etc. Wherever rare or endangered species are recorded their identification should be verified by an appropriate expert; if such verification is not possible this fact must be recorded in the survey report.

2.2 Health and Safety

All activites which take place adjacent to watercourses are inherently dangerous, environmental surveys are no exception. It is the responsibility of the survey supervisor to ensure that all field staff are aware of the potential dangers and of actions to take in the event of an accident. This should form an important component of the training sessions which all surveyors attend.

Every effort should be made to minimise the likelihood of an accident occurring in the field. This can often be achieved by the application of common sense:-

(i) steep, unstable or eroding banks should be avoided;
(ii) the channel should not be entered if the bed is not visible;
(iii) if the channel needs to be crossed, by wading, surveyors should work in pairs;
(iv) extra care should be taken, in urban areas and waste disposal sites, for example, to avoid treading or falling on metal or broken glass;
(v) if food is to be consumed on-site care should be taken to avoid contact with river water and low bankside vegetation, etc;
(vi) clothing appropriate to the location and season should be worn;
(vii) a basic first aid kit (antiseptic cream, plasters) should be carried.

It is recommended that all surveyors establish a reporting-in procedure with a home-base so that at the end of each days field work, all survey staff are known to be off-site. This is essential if surveyors are working alone. A suitable format would be for each surveyor to agree a survey timetable with their supervisor, perhaps on a weekly basis; for the surveyor to notify the supervisor if they are not going on site as scheduled and for each surveyor to report in (by phone) at the end of field work each day. Should a surveyor fail to report-in the supervisor will know the general location of working and can then institute a search.

2.3 Access

All RCS will involve considerable access to privately owned land. In theory surveyors should contact all landowners on a survey reach and obtain permission prior to undertaking field work. In practice, however, it is recognised that this may not always be feasible. In such situations it is recommended that surveyors attempt to obtain permission whilst on site if there is an obvious person to approach, e.g. a riverside house, a farmer working in adjacent fields, etc.

If permission is not obtained and a surveyor is approached by a person with rights over that land (i.e. owner or tenant) it is recommended that the surveyor:-

(i) Identifies himself clearly; a "letter of introduction" from the commissioning body could assist.

(ii) Explains what he is doing, why and how long he needs to be there; perhaps offers the owner a copy of his section(s) of the final report.

(iii) Retires gracefully to the nearest public access point if the landowner becomes aggressive or threatening; then reports to the survey supervisor.

Surveyors should endeavour to be courteous to landowners and river users at all times and must abide by the County Code.