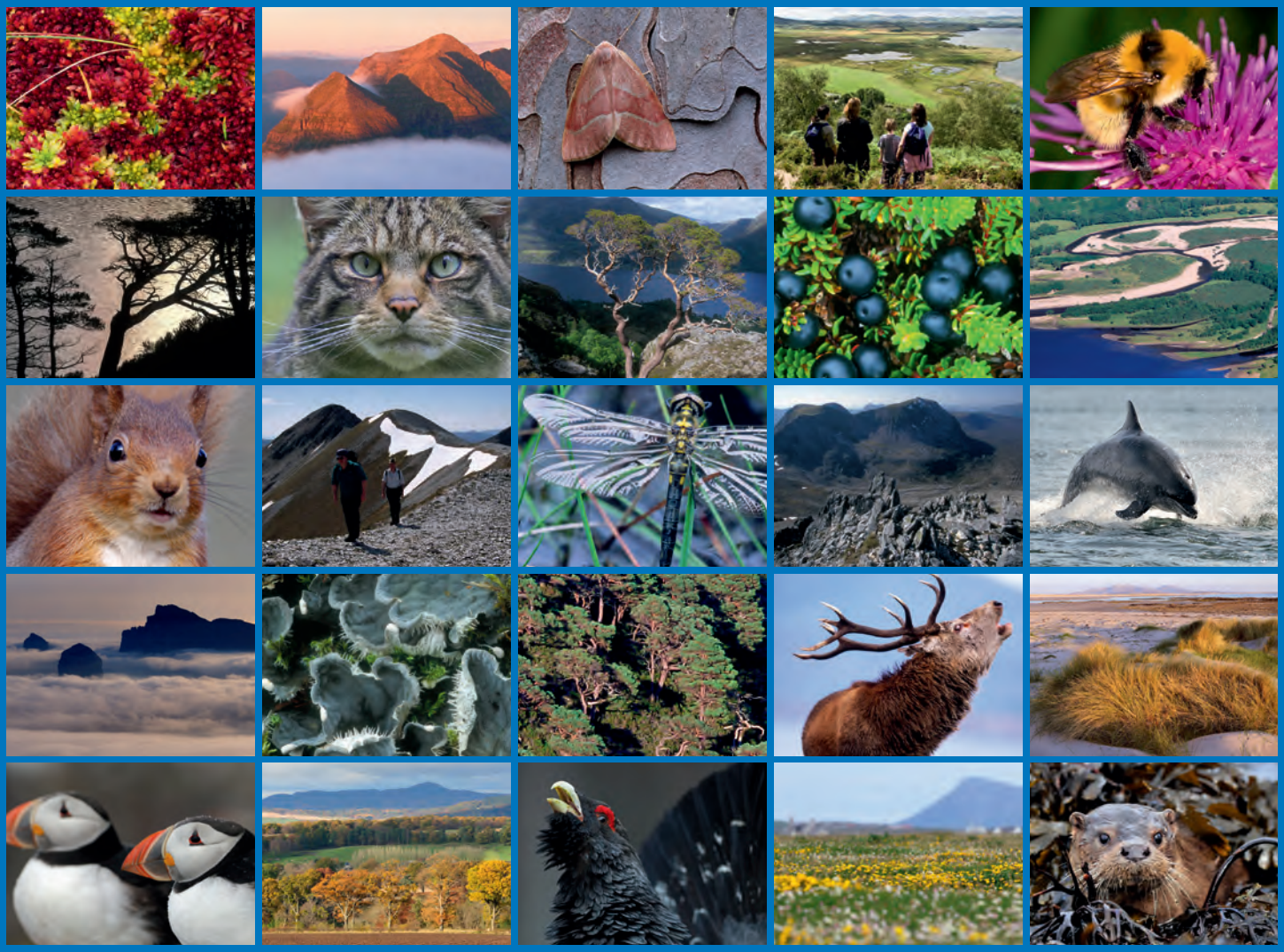
Scottish Natural Heritage
Commissioned Report No. 472

Loch Lomond and the Trossachs biodiversity habitat audit and methodology report



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LOCH LOMOND & THE TROSSACHS NATIONAL PARK

COMMISSIONED REPORT

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Loch Lomond and the Trossachs biodiversity habitat audit methodology report

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COMMISSIONED REPORT

Summary

Loch Lomond and the Trossachs Biodiversity Habitat Audit Methodology Report

Commissioned Report No. 472 (*iBids and Project n*^{o} **5978)**
Contractor: Land Use Consultants, 37 Otago Street, Glasgow G12 8JJ
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Background

Loch Lomond and the Trossachs National Park is one of only two National Parks in Scotland. Its location within the central belt of Scotland, and straddling many upland, lowland, freshwater and coastal habitats makes it important, not only to species and habitats, but also to many of Scotland's human population – *c.*70% of whom live within one hour drive of the park. The park became fully operational in 2002, with a *State of the Park Report* based on the interim committee area being produced in 2005. However, the data were collated prior to the final park boundary being set, and so did not include large areas of Cowal, Strathfillan and Glen Dochart, Loch Earn and Lake of Menteith. Therefore, there is incomplete coverage of data for the Park in its current form.

In order to further develop the National Park Biodiversity Action Plan (NPBAP) for the park and for use in planning the Park Authority needed up-to-date, comprehensive biodiversity information and data. The following report describes an audit to establish a baseline and repeatable methodology for long term monitoring of UKBAP habitats that occur in the National Park. In addition a species checklist was also collated.

Main findings

- The audit identified 38 BAP priority habitats and 206 UK BAP priority species reported within the National Park
- In addition 307 Scottish Biodiversity List species, 59 Wildlife and Countryside Act species and 30 Habitats Directive species have been listed.
- BAP habitat maps were generated from earlier surveys that used different methods e.g. Birks and Ratcliffe; Phase 1 habitat mapping; and NVC.
- The conversion methodology described herein provides a prototype for future habitat audits.

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1 INTRODUCTION

In October 2009 Land Use Consultants was appointed by the Loch Lomond and the Trossachs National Park Authority (LLTNPA) to carry out a Biodiversity Audit of habitats and species within the Loch Lomond and the Trossachs National Park (LLTNP).

The purpose of this project was to provide an up-to-date biodiversity audit of the LLTNP. An audit was previously carried out in 2001 and formed the basis for the State of the Park Report, produced in 2005, which provided baseline information about the park.

The 2001 audit of the National Park Interim Committee was completed prior to the National Park boundary being set, and consequently large areas of Cowal, Strathfillan and Glen Dochart, as well as Loch Earn and the Lake of Menteith which were later included within the National Park boundary were not included in the original audit. The overarching aim of the present project was to re-visit the geographical area and data sets covered in the 2001 data audit to bring together a more comprehensive data set which considers the revision of the UK Biodiversity Action Plan (BAP) in 2007 which included new species and habitats.

The project originally had three key aims:

1. Production of standardised and clean habitat and species datasets with known provenance as a baseline for current and future biodiversity work.

2. Confirm which UK BAP and Scottish Biodiversity List habitats and species occur in the National park and report on their distribution and extent.

3. Produce a comprehensive baseline audit of UKBAP priority habitats and species occurring in the National Park and a biodiversity audit report showing the methodology and results.

There were a number of separate objectives and sub-tasks associated with these key aims.

1.1 Objective 1: Collation, review and cleansing of existing data to produce standardised habitat data and the derivation of a Phase I habitat dataset for the whole of the National Park and a comprehensive dataset of UKBAP priority habitats within the Park.

Through a series of sub-tasks, this objective forms the 'backbone' of the habitat audit for the National Park. Based on a total of 38 Phase I Habitat data sets, 38 National Vegetation Classification (NVC) data sets and two Birks and Ratcliffe (B&R) datasets, the following tasks were included in the original objective:

- derivation of an Index file and associated metadata file for each habitat survey type to show the overall coverage of the existing data sets;

- derivation of an agreed digital file structure for each habitat survey type and subsequent restructuring of the files to this agreed structure to allow subsequent amalgamation/integration of individual files into one larger file.

- derivation of a 'master' Phase 1 habitat survey file from the raw survey files, a 'master' NVC survey file from the raw survey files, and a 'master' B&R survey file from the raw survey files provided by the LLTNPA through a process of assigning confidence levels to individual files and resolving overlaps between individual files to allow them to be merged;

- devise a 'look-up' method for converting NVC and B&R habitat type codes to Phase I habitat codes and create an over-arching Phase I Habitat survey file from all 78 files;

- devise a 'look-up' method for converting Phase I Habitat, NVC and B&R habitat type codes to their associated UK BAP Priority habitat types and create an over-arching UK BAP survey file from all 78 files;.

- devise a method for allocating Phase I Habitat and UK BAP priority habitat types to un-surveyed parts of the National Park using other data sets including Forestry Commission Scotland (FCS) data, LCS88 and aerial imaging, to derive and comprehensive Phase I and UK BAP priority habitat map of the entire National Park Boundary.

These objectives evolved over the life time of the project in recognition of the technical constraints, time constraints, geographical coverage and anticipated usage of the objective outputs by the National Park Authority and SNH. A decision was made to remove the subtask of converting all data (NVC, B&R, LCS88 Land Cover of Scotland 1988 (LCS88), FSC and aerial imaging) to Phase I Habitat mapping of the National Park. Given the time constraints of the project it was considered that this task would not produce a useful output and would in certain situations 'dumb down' the available habitat information. Subsequently, following individual amalgamation of the different survey type files, the key task was to derive a 'conversion' method for presenting these data and background data (LCS88, FSC data) as UK BAP priority habitats. The detailed method for this work is described in Chapter 2 of this report, with the outputs and limitations of the work provided and discussed in Chapter 3.

1.2 Objective 2: Collation, review and cleansing of existing data to produce standardised species datasets and the production of comprehensive UKBAP and SBS priority species audit occurring within the National Park.

Due to time constraints, and a decision to focus on the habitat audit, this objective was removed in its entirety from the project. Its original focus had been to collate and review all species data sources for the National Park, including sources currently held by the LLTNPA and other organisations. Through a similar process to the habitat audit, species records for all individual UK BAP and Scottish Biodiversity Strategy (SBS) species would have been amalgamated into separate maps with associated confidence levels and index files to show survey coverage.

1.3 Objective 3: Production of a Biodiversity Audit report on habitats with associated mapping.

The aim of this objective was to fully document the audit methodology used for the 2010 habitat audit and production of the biodiversity checklist, so that future audits can follow or build on the methodology, allowing consistency and continual improvement in data sources for future audits. This report and its appendices provide the detailed methodology and approach to the habitat audit and the production of a biodiversity checklist (see below).

1.4 Objective 4: Production of a National Park Biodiversity checklist which sets out the habitats and species of importance for the conservation and enhancement of biodiversity in a handy check-list that summarises the legal conservation status of each one.

The final objective to produce a National Park Biodiversity checklist, would, in effect, summarise the outputs of the habitat and species audit. As the species audit was dis-continued at an early stage of the project, a new approach was agreed for production of the species checklist.

A detailed review of National Biodiversity Network data was carried out on the 31 Ordnance Survey 10km x 10km grid squares which cover the National Park. This review was restricted to UK BAP and SBS species and was used to compile a species list for each grid square within the National Park, as well as an overall species list indicating the conservation status

of each species. The methodology for this audit is provided in Chapter 4 and the species checklist is provided as Appendix 11.

Chapter 5 at the end of the report provides a conclusion to the audit process, and in combination with Chapter 3 these sections provide a discussion of the limitations associated with the audit process, and the potential focus for future studies and development of the audit methodology.

2 METHODS

This chapter details habitat audit methodologies adopted by LUC in agreement with LLTNPA and SNH.

2.1 Original data

The raw habitat data files were provided by the LLTNPA, SNH and Forestry Commission Scotland in electronic format and included the following:

- 38 Phase 1 habitat survey shapefiles falling fully or partially within the National Park;
- 38 NVC survey shapefiles falling fully or partially within the National Park;
- two Birks and Ratcliffe survey shapefiles from within the National Park;
- a metadata spreadsheet containing information relating to the above surveys;
- a digital file containing the FCS woodland inventory;
- point shapefiles containing species information for the area of the National Park;
- a shapefile showing the National Park boundary;
- a shapefile containing the OS MasterMap (OS MM) waterbodies and watercourses within the National Park; and,
- a shapefile containing the Land Cover Scotland 1988 (LCS88) survey (broad-brush habitat survey) of Scotland.

Additional data provided by the LLTNPA and used in this project included aerial photography tiles, SEPA's Indicative Flood Data and Ordnance Survey (OS) 1:10K base map tiles covering the area of the LLTNP.

In addition to the above habitat and mapping data, various documents related to the previous audit work carried out by Forth Valley GIS were provided for reference.

2.2 Step 1: index file

An Index file was produced to determine the coverage of available habitat information within the National Park per survey type. The index file also highlighted areas within the National Park not covered by any survey, which would require to be resolved using supplementary data sources such as the FCS woodland inventory file, LCS88 and OS MM water features datasets. Surveys that were found to have overlapping coverage were removed from the index file (further information is provided at Step 3).

The detailed survey information contained in each survey file was not relevant to generating the index file, since the required outcome of this exercise was to illustrate the extent of the coverage of the available survey information within the National Park.

The index-file was created by dissolving all of the individual polygons within each survey file. Gaps were resolved and the resulting polygons (one for each survey) were merged to create coverage of the National Park.

All raw survey files (phase 1 habitat survey, NVC survey and B&R survey) were listed in a base table and each survey was given a specific ID code (SURVEY_ID field) which would be its unique code for the remainder of the project and which would allow uniform naming for surveys and individual polygons within each survey and all data to be traceable to its original survey in later stages of the project. The base table is provided in Appendix 1 of this report.

In addition to the unique survey code, the base table was also populated with metadata information about the raw survey files provided by the LLTNPA, including (where available) survey year/date, surveyor, survey commissioning organisation, survey scale and any other relevant information, including the comments from the LLTNPA related to the earlier biodiversity audit carried out by the Forth Valley GIS.

The base table also comprised information added by LUC, including confidence levels of individual surveys, information on whether survey files should be included in/excluded from further analysis and justification of these decisions (described further in Steps 2 and 3).

2.3 Step 2: individual survey confidence levels

Each individual survey file was assigned a confidence level to provide a broad-brush indication of the quality of the data provided by the survey files. There was considerable variation in the survey files in terms of their age and provenance, as well as instances of data duplication. Some of the survey files had been created by merging other survey files or by selective extraction of information (e.g. selection by attributes) from other survey files.

It was therefore important to determine the confidence levels for each survey, which would be a key factor to be considered later in the audit process where overlaps between merged surveys would need to be resolved.

Determination of confidence levels for individual surveys was based on the available survey metadata information and the confidence levels were assigned according to the guidance shown in Table 1 below.

Table 1 Matrix for determination of survey confidence levels.

	Data from Yr2000 or more recent	**Data from between 1990 - 1999**	**Data from 1989 or older**	**Unknown Date**
Surveyor known	HIGH	MEDIUM	MEDIUM	LOW
Surveyor unknown	MEDIUM	MEDIUM	LOW	LOW

The following examples highlight the assignation of confidence levels to individual files:

- High confidence: where the date of the surveys is Year 2000 or more recent and where both the survey originator and the surveyor are known (e.g. ‘benlomond_nvc_d2’ – 2005/NTS/CES/1:10K);

- Medium confidence: where the survey date is between 1990 - 1999, and where both the survey originator and the surveyor are known (e.g. ‘AUCTGLEN’ - 1998/SAC/J. Holland/1:10K) or surveys originating from the same period but with unknown surveyor (e.g. ‘darleithmuir_ph1’- 1999/SNH/UNKNOWN);

- Low confidence: where the survey date and/or survey originator/surveyor is unknown (e.g. ‘menteith’ – UNKNOWN/UNKNOWN/UNKNOWN/1:25K) or surveys of unknown provenance originating prior to 1990 (e.g. ‘ben more’- 1986/SNH/UNKNOWN).

The ‘confidence levels’ field in the base table was populated for all listed surveys and a ‘Justification’ field was added, which explains the reasoning behind the derivation of confidence levels for each survey file.

2.4 Step 3: data exclusion

To enable the file amalgamation and creation of the overall Phase 1 Habitat, NVC and B&R survey files, it was necessary to exclude any redundant or duplicated survey files, removal of

which from the audit process would not result in a loss of any survey information. Some areas of the National park were covered by either two or more overlapping or duplicated surveys (possibly done on different dates and by different surveyors). A rules-based approach was used to determine which of the files were to be used for the audit and which were to be dropped from the audit. Dropping surveys did not affect the overall coverage of habitat surveys across the National Park.

In general, the following principles were applied to determine which files could be excluded:

- survey files for exclusion were considered separately for each survey type despite instances of geographical overlap of surveys of different type i.e. a phase I file and NVC file covering the same area. Consideration of overlaps between different survey types was carried out later in the process, after the BAP Habitat conversions and the rules based approach to this is described at Step 8;

- survey files were only removed from the audit process, if they were geographically fully covered by another survey file of the same type and of higher confidence level.

A log of files excluded/removed from the original audit process undertaken by SNH/Forth Valley GIS was used as an aid in the decision making process. However, all decisions to exclude individual files were made independently from this log and were based on robust justifications. A log of the decisions made to exclude/remove survey files from the audit process is provided in Appendix 2.

In total, eight Phase 1 Habitat survey files and five NVC survey files were excluded from the audit process, comprising:

- A004 ‘benan’;
- A008 ‘conichill;
- A010 ‘darleithmuir_ph1’;
- A013 ‘dumbartonmoor_ph1’;
- A017 ‘gfalloch’;
- A018 ‘glen falloch woods’;
- A027 ‘lochdoine’;
- A030 ‘menteith’;
- B007 ‘av299nvc’;
- B009 ‘benheas’;
- B014 ‘coille chriche’;
- B020 ‘heasnvc’; and
- B034 ‘scatter’.

None of the B&R survey files were discarded from the survey file pool.

2.5 Step 4: internal overlap resolution

In the next stage of the project, internal overlaps between polygons within the individual survey files were resolved. Most overlaps were a result of inaccurate digitising of the survey

files and required to be resolved to enable straightforward 'translation' into priority BAP habitats. A number of gaps also exist within the files as a result of inaccurate digitising. However, it was agreed at a project review meeting in January 2010, that due to project time constraints, the current gap level would be accepted (as it has no implications for habitat type conversions due to the small area of these gaps).

The majority of internal overlaps were relatively small boundary misalignments, likely to be a result of digitising errors. Such overlaps were resolved automatically by merging the overlapping area with the polygon with which the area of overlap shared the longest boundary.

Prior to automatic overlap resolution, manual overlap resolution was carried out for larger overlaps. Manual resolution was required where:

- the areas of overlap were clearly of the shape and size of an intended 'habitat polygon' (as opposed to boundary misalignments), indicating that as a result of inaccurate digitising, two habitat polygons were on the top of each other (e.g. an 'island' polygon where the surrounding area is not covered by a 'donut' polygon but by a continuous polygon that also covers the island);

- where the polygon boundary overlaps were of a sufficient extent to grant manual resolution (generally >100m2).

In the process of manual overlap resolution, the correct priority habitat area was selected using the aid of aerial photography and the OS base maps. Subsequently the overlaying polygon was clipped back to the boundary of the selected correct priority habitat area.

Following the manual and automatic overlap resolution, all internal overlaps in the individual survey files were resolved and files were ready for the next stage of the project.

2.6 Step 5: overlap resolution

Previously identified files to be excluded were not included in the work described from this step onwards. To allow file amalgamation a number of survey file overlaps were required to be resolved; for each area covered by two or more surveys, the preferred survey to be maintained in the amalgamated cover had to be selected. This was necessary to achieve 'single survey' coverage of the National Park by the available survey information by removing duplication of survey data in overlapping areas. Overlap resolution was carried out separately for NVC and Phase I Habitat files. No overlap resolution was required for B&R survey files, since these survey files do not overlap geographically.

For NVC and Phase I Habitat surveys a single shapefile was created by 'Union' from all single survey files. By using the 'Union' tool within the ArcMap software, the resulting file retained the individual polygon boundaries of the original survey files. This enabled determination of areas where individual surveys overlapped and identification of habitats within the overlapping areas.

A number of overlaps were identified in the Union Phase 1 Habitat survey file, as follows:

- 27 instances of two surveys overlapping;

- four instances of three surveys overlapping.

A number of overlaps were identified in the Union NVC survey file, as follows:

- 52 instances of two surveys overlapping;

- 34 instances of three surveys overlapping;

- 16 instances of four surveys overlapping;

- four instances of five surveys overlapping.

Recent aerial photography as well as 10K OS base maps were used to aid the decision making and selection of 'a priority survey' in all instances where two or more surveys covered the same area. These aids were useful for cross-checking the habitat types and boundaries (aerial photography) as well as likelihood of habitat occurrence as a result of the local topography, geomorphological features and other captured features (OS base maps). In addition to these resources, ecological experience and knowledge of habitats, particularly of the Scottish uplands was used to guide the decision making, as well as the original confidence levels attributed to individual survey files (Step 2).

During the process of priority survey selection it transpired that some of the survey overlaps could be resolved more confidently than others. Therefore, to distinguish between straightforward overlap resolution and resolution which involved more detailed data examination, confidence levels in individual overlap resolution decisions were assigned using a 'traffic light' system:

- **Green** (high confidence) decisions were simple decisions where logic combined with survey confidence levels, aerial photography and general ecological knowledge made the overlap resolution straightforward;

- **Amber** (medium confidence) decisions were slightly more complicated and often had to be resolved on the basis of the decision hierarchy described in paragraph 2.33. Ground truthing would be useful but not essential to confirm these decisions;

- **Red** (low confidence) decisions involving overlaps which cannot or can only be tentatively determined and therefore either require an understanding that they are based on low confidence or ground truthing to confirm which survey displays the most accurate results.

Green confidence decisions were decided easily on the basis of recent aerial photos indicating that one survey was apparently correct. This was often supported by the confidence levels of the survey – i.e. one had a much higher confidence level than the other.

When determining the priority survey for amber confidence overlaps, the following list of rules were applied:

- where the only difference between the survey files is their assigned confidence levels and the area of overlap is reasonably small but the habitat mapping and coding is not vastly different within the area of overlap and the aerial photo does not provide relevant information, the decision has simply been made on confidence level – i.e. the survey file with the highest confidence level is the selected file;

- where there is no difference in survey date or confidence level and the overlaps are very small or have very similar polygons (in terms of shape and/or habitat type) the decision has been based on which file has the least internal digitising errors (gaps) – i.e. the file which has the best digital structure is the selected file,

- long thin overlaps (for example1km or more long, but generally less than 20m wide) were commonly encountered between overlapping surveys and required determination of the position of the boundary between them. As the actual area of overlap was quite small, the decision was based on the confidence level of individual files where possible and where this was not possible, on the number of internal digitising errors within the individual survey files;

- in a number of instances the decision was made on polygon numbers (survey resolution) and survey effort (e.g. number of NVC codes listed). Some surveys contain large

polygons with only one Phase 1/NVC code listed which, when compared to the aerial photo is considered unlikely. Therefore, where confidence levels or digitising errors could not be used, the preference was generally for surveys containing more polygons and/or more detailed mosaics.

In the case of the red (low confidence) overlaps, priority survey could not be selected with any confidence, despite using aerial photography, OS base map data and ecological expertise. However, it was necessary to remove any duplication for file amalgamation and therefore priority surveys in these cases were selected pragmatically, though the confidence in the robustness of these decisions is low.

A log of priority survey selection and the decision making procedure for Phase 1 habitat survey overlaps and NVC survey overlaps is provided in Appendices 4 and 5.

2.7 Step 6: standard file structure and files restructuring

Standard file structure was applied to all cleaned survey files remaining in the audit to enable amalgamation of these files whilst retaining all original survey information contained in the survey files attribute tables.

Information about the contents of attribute tables of all survey files was collated in three spreadsheets (one for each survey type). The aim of this task was to examine the existing structure of the survey files in terms of their attribute fields, formats and variation of the terminology used in the description of the field names.

The above data was examined and a standard file structure was proposed for each survey type, based on:

- review of the structure of the raw survey files provided;
- revision of the standard file structure proposed in the 2008 data audit conducted by the Forth Valley GIS (Phase 1 habitat survey only); and
- comments on the proposed standard file structure received from SNH and LLTNPA.

Final standard file structures were approved by SNH and LLTNPA and are shown in Tables 2 - 4 below.

Table 2 Standard file structure of Phase 1 habitat survey files.

FIELD NAME	TYPE (LENGTH)	DESCRIPTION
ID	OID (4)	ESRI feature ID (generated automatically).
SHAPE	GEOMETRY	ESRI geometry (generated automatically).
SURVEYTYPE	TEXT (3)	Listing the type of habitat survey: (Phase 1) PHA, (National Vegetation Classification) NVC, (Birks & Ratcliffe) BAR.
SURVEY_ID	TEXT (3)	Listing the ID of the survey, e.g. 001.
POLY_ID	TEXT(4)	Listing the ID of individual polygons, e.g. 0001.
UNIQUE_ID	TEXT (10)	A 10 digit number (comprising survey type code (PHA, NVC or BAR1), survey number (three digits per each survey to allow for addition of future surveys) and polygon number (four digits per polygon)). This number will be unique for every polygon. E.g. the first polygon of the first survey which is a Phase I survey will have a unique number of PHA0010001. This number combines the content of the previous three fields (SURVEYTYPE, SURVEY_ID and POLY_ID) in one cell.
PHA_CODE	TEXT (10)	Phase 1 habitat codes according to the JNCC habitat classification2. In accordance with this classification, alphanumerical codes will be in format X0.0.0, separated by dots (except after the first character), and without any spaces. (e.g. A1.1.1 = Broadleaved semi-natural woodland).
PHA_DESC	TEXT (50)	Description of habitats in accordance with the Appendix 2 of the JNCC habitat classification handbook. The format of the text will be as per the following examples: Broadleaved semi-natural woodland, Scattered scrub, Acid dry dwarf shrub heath etc. The list of all Phase I habitat categories with formatting to be adopted for this project is provided in Appendix 3.
DOMINANT_S	TEXT (50)	List of dominant species recorded. Populated sparsely in the raw data files, but including important information. The formatting of the dominant species names will be as per following examples: Abbreviations of names will be derived from species Latin names (nomenclature according to Stace (1997) New flora of the British Isles), extracting the first two letters of the genus name and first three letters from the species name, separated by a space.

[1] In addition to PHA, NVC and BAR, other codes – LUP/LUN/LUB will be used for polygons which were created by LUC by means of filling in the gaps, hence are not derived directly from any existing survey information. The last letters (P, N, B) will indicate which existing survey type was used for derivation of new habitat information.

[2] JNCC (1990): Handbook for the Phase 1 Habitat Survey – a technique for environmental audit. A standard habitat survey and classification guidance. Comprises survey methodology and descriptions of habitats which are grouped into broad habitat types A- J, e.g. A = Woodlands and scrub, B= Grasslands etc.

		First letter of the genus name will be capitalised. E.g. Ag cap (Agrostis capillaris), Po pra (Poa pratensis). Individual species will be separated by comma followed by space. Since this field is to list only the dominant species, field length of 50 is considered appropriate.
COMMENT	TEXT (max 254)	Any additional information contained within the original survey files, but which does not fit into any of the fields of the proposed standard file structure.
AREA_M2	LONG INTEGER (Precision 9)	Area of the Habitat area in square metres.

Table 3 Standard file structure of NVC survey files.

FIELD NAME	TYPE (LENGTH)	DESCRIPTION
FID	OID (4)	ESRI feature ID (generated automatically).
SHAPE	GEOMETRY	ESRI geometry (generated automatically).
SURVEYTYPE	TEXT (3)	Listing the type of habitat survey, e. g. NVC.
SURVEY_ID	TEXT (3)	Listing the ID of the survey, e.g. 001.
POLY_ID	TEXT(4)	Listing the ID of individual polygons, e.g. 0001.
UNIQUE_ID	TEXT (10)	A 10 digit number (comprising survey type code (PHA, NVC or BAR3), survey number (three digits per each survey to allow for adding of surveys in the future) and polygon number (four digits per polygon)). This number will be unique for every polygon. E.g. the first polygon of the first survey which is an NVC survey will have a unique number of NVC0010001. This number combines the content of previous three fields (SURVEYTYPE, SURVEY_ID and POLY_ID) in one cell.
NVC_CODE	TEXT (8) per column	Classification of habitats in accordance with NVC communities' classification. This will include separate columns NVC_CODE1 – NVC_CODE8 in which fields are filled in a decreasing order of community cover within the polygon. NVC community codes are in the format X0x (with the maximum code length of 8 characters (XX00xiii) and full list of all NVC habitat codes can be found in Rodwell et al.: British Plant Communities (Volumes 1-5). Examples: MG6a, M7a, CG1a.
NVC_P	SHORT INTEGER (Precision 4)	Percentage cover of individual NVC communities recorded within the same polygon. This will include separate columns NVC_P1 – NVC_P8 in which fields are filled in a decreasing percentage cover of

[3] In addition to PHA, NVC and BAR, other codes – LUP/LUN/LUB will be used for polygons which were created by LUC by means of filling in the gaps, hence are not derived directly from any existing survey information. The last letters (P, N, B) will indicate which existing survey type was used for derivation of new habitat information.

		communities within the polygon.
NVC_DESC	TEXT (100)	All communities recorded within the survey polygon listed cumulatively in one cell. Community codes will be separated by forward slash (/) without any gaps.
PATTERN	TEXT (10)	Listing spatial distribution of communities within polygons (e.g. mosaics etc.). This field will be populated by either a one or two letter code4 where only one broad vegetation community category is recorded within the polygon (e.g. W= woodlands, S= swamps and tall herb fens), or by a word 'Mosaic' where communities of various broad categories are found within one polygon (e.g. woodlands as well as swamps). Hence field length of 10 characters is considered appropriate.
SSSI_CODE	TEXT (10)	Identification code of all sites that have an SSSI designation.
COMMENT	TEXT (max 254)	Any additional information derived from the original survey files, which does not fit into any of the fields of the proposed standard file structure. This field will also include information about NVC codes for shapefiles with NVC fields extending beyond NVC 8 (e.g. 'glenfyne' shp).
AREA_M2	LONG INTEGER (Precision 9)	Will be calculated automatically by running a script. Habitat areas will be calculated correctly at the time of project delivery.
PHA_EQUIV	TEXT (50)	Area of the Habitat area in square metres.

[4]Codes listed below occur in the existing survey information data:
Blank cell - Polygon does not contain any information in the 'PATTERN' field
A - Polygon contains only aquatic community/communities (NVC category 'A')
CG - Polygon contains only calcicolous grassland community/communities (NVC category 'CG')
H – Polygon contains only heath community/communities (NVC category 'H')
M – Polygon contains only mire community/communities (NVC category 'M')
Mosaic – Polygon contains a mosaic of broad NVC categories, e.g. M, H, A
N/A – Unknown
S – Polygon contains only swamp and tall herb fen community/communities (NVC category 'S')
U – Polygon contains only calcifugous grassland and montane community/communities (NVC category 'U')
W - Polygon contains woodland communities (NVC category 'W')

Table 4 Standard file structure of B&R survey files.

FIELD NAME	TYPE (LENGTH)	DESCRIPTION
FID	OID (4)	ESRI feature ID (generated automatically).
SHAPE	GEOMETRY	ESRI geometry (generated automatically).
SURVEYTYPE	TEXT (3)	Listing the type of habitat survey, e. g. B&R.
SURVEY_ID	TEXT (3)	Listing the ID of the survey, e.g. 001.
POLY_ID	TEXT(4)	Listing the ID of individual polygons, e.g. 0001.
UNIQUE_ID	TEXT (10)	A 10 digit number (comprising survey type code (PHA, NVC or BAR), survey number (three digits per each survey to allow for addition of future surveys) and polygon number (four digits per polygon)). This number will be unique for every polygon. E.g. the first polygon of the first survey which is a B&R survey will have a unique number of BAR0010001. This number combines the content of previous three fields (SURVEYTYPE, SURVEY_ID and POLY_ID) in one cell.
BAR_CODE	TEXT (10)	This will include separate columns BAR 1 – BAR 8 in which fields are filled in a decreasing order of cover of certain habitat type within the polygon. B&R vegetation description codes are in a format of X0(x) (with the maximum code length of 6 characters (X0xiii) and full list of Birks and Ratcliffe upland habitat classification codes (and descriptions) can be found at http://www.jncc.gov.uk/pdf/sssi_ptC9.pdf. Example: B1a (Calluna dry heath), A4 (Ulex europeaus scrub).
BAR_DESC	TEXT (50)	All B&R habitat categories recorded within the survey polygon listed cumulatively in one cell. B&R habitat codes will be separated by forward slash (/) without any gaps.
COMMENT	TEXT (max 254)	Any additional information derived from the original survey files, which does not fit into any of the fields of the proposed standard file structure.
AREA_M2	LONG INTEGER (Precision 9)	Area of the Habitat area in square metres.

Re-formatted attribute tables were populated with the original survey information as appropriate. Information from the fields of the original attribute tables, which directly corresponded to the fields of the new file structure were automatically transferred to these fields. Information from the fields of the original attribute tables, which were not included in the new standard file structure was transferred into 'COMMENTS' field created for this purpose to prevent any original survey data loss. Potential data in this field is always preceded by the field name(s) of the original survey.

Population of the re-structured files with the original survey information was done automatically by running a script with manual checks carried out following completion of this process for quality assurance purposes. Re-structured survey files with identical attribute table format were then merged to create a single survey file for each habitat survey type, without loss of any survey information from the original individual survey files.

2.8 Step 7: survey file amalgamation

After completion of the overlap assessment and selection process described in Step 5, the survey ID of selected survey data for each overlap area was added in a separate field in the two 'Union' shapefiles (Phase 1 and NVC). For all areas covered by a single survey this field contained the respective survey ID. By performing a 'dissolve' operation using this selected survey ID field, a new shapefile was created containing one single polygon per retained survey just covering exactly the area for which its data was selected to be retained.

This shapefile was used to clip each survey to just the area to be retained. This was done by running a script that first selected each survey polygon and then clipped the respective standardised survey shapefile. Subsequently all individual clipped surveys were amalgamated by a 'merge' operation for both Phase 1 and NVC surveys separate. Because the original B&R survey had no overlap areas, no 'clip' operation was required and the amalgamated B&R files was created by simply merging the standardised B&R single surveys.

2.9 Step 8: derivation of UK BAP priority habitats

Habitat data contained in the overall amalgamated Phase 1 Habitat, NVC and B&R survey file was translated into corresponding Priority BAP habitats. Conversion methods were devised for each of the three data types and the resultant conversion tables are presented in Appendices 6 - 8.

Conversion tables were generated through a step-wise process:

1. All of the individual habitat codes (NVC, Phase I and B&R) that were present within the existing survey data files were used to populate three spreadsheets (one for each of the survey types).

2. Use was made of an outline habitat conversion table created by the JNCC for conversion of Phase I Habitat and NVC codes to Priority BAP Habitat types. This outline table does not cover all habitat codes used within the LLTNP survey data. Where the relevant NVC or Phase I habitat codes were present in this table, the corresponding Priority BAP Habitats were entered in the spreadsheets, along with the relationship to that habitat. For example some NVC codes directly correspond to Priority BAP Habitat types in which case the relationship was described as xx NVC type 'is contained in' or 'is equal to' xx Priority BAP Habitat type. In other cases the relationship is not so direct and terms such as 'may overlap with' or 'may be contained in' are used to describe the relationship between the habitat classifications. All relationships between all Phase I habitat types and Priority BAP habitat types were described as 'potentially overlaps with'. B&R habitat conversions are not included in the JNCC table and possible conversion Priority BAP habitat types were based on NVC codes encompassed by the B&R habitat types and the potential conversions of these NVC codes. The types of 'relationships' between NVC types and Priority BAP Habitat types and implications for confidence in the habitat conversions are described further at point 4 of this method.

3. The draft LLTNPA Habitat conversion tables were then interrogated using a variety of sources including the Phase I Habitat survey manual the NVC volumes , the JNCC Guide to Upland Vegetation and the original B&R habitat descriptions to fully understand the vegetation types encompassed within the individual habitat codes. These were then compared to UK Priority BAP habitat descriptions . In the case of some habitats the UK Priority BAP habitat descriptions specifically listed NVC, Phase I or B&R codes which were included in that priority habitat types, in other cases the links were made much more tentatively, based on comparison of descriptions. In such a way the draft tables were refined, with some potential conversions being

added and some removed until each code type had a full list of potential UK Priority BAP habitat types.

4. Confidence levels were then assigned to conversions. Confidence levels were based on a number of factors including; whether the NVC/Phase I/B&R code was wholly contained in an individual Priority BAP habitat type (high confidence), whether a code was potentially contained in one or two Priority BAP habitat types but was definitely likely to be contained in one or both of them (medium confidence), or where an individual code could possibly correspond to numerous Priority BAP habitat types but there was no confident link between any of the habitat descriptions (low confidence). The JNCC 'relationships' were used to assist in assigning confidence levels for NVC habitat types as shown in Table 5 below:

Table 5: Confidence levels in habitat conversions

JNCC Relationship	**Interpretation of relationship for this study**	**Implications for confidence in conversions**
Is equal to	Directly correlate to and is the only NVC type contained within the pBAP description	*High confidence in conversions*.
Is contained in	The full range of this NVC type (whether it be community or sub-community) is wholly included within the pBAP type. Other NVC types may also be included in the pBAP type.	*High confidence in conversions*.
Maybe contained in	This relationship is only used to describe the potential inclusion of certain woodland NVC sub-communities in upland mixed ashwoods. The NVC type is only contained under the pBAP habitat type, if certain botanical characteristics are present.	*Conversions are generally carried out with medium or low confidence.*
Maybe included in	Inclusion of the NVC type within the pBAP type is dependent on its geographical positioning (upland or lowland, floodplain etc) or presence of topographical features (limestone pavement, sand dunes). Depending on the positioning or presence of features the habitat may or may not be included in the BAP habitat type(s).	*Confidence variable and can be improved by use of GIS tools (upland/lowland masks, floodplain boundaries) – confidence assigned by professional judgement.*
Overlaps with	Inclusion in any pBAP habitat types is dependent on specific topographical situations. Often used to describe the relationships between woodland habitats or mire habitats, where the specific type of pBAP habitat is dependent on its geographical positioning and hydrological conditions. There is a high	*Confidence is variable and can be improved by use of GIS tools to make logical inferences about the most likely pBAP type that a polygon can be assigned to. However, due to the often large number of habitats included under overlaps, confidence has*

	probability that the NVC type is definitely *at least* one of the pBAP habitat types and often in the case of overlaps, could be included in more than one pBAP habitat type.	*remained low for some NVC types with habitats still potentially being assigned to a number of pBAP types because not enough information is known. Successful use of GIS tools has increased confidences to high or medium in some instances.*
May overlap with	Not only is inclusion of the NVC type dependent on the specific topographical situations, but in addition, the range of species specific variation seen within the NVC type (including sub-communities) adds an increased level of uncertainty, meaning that even if the habitat is located in a specific geographical location (for example upland) it still may not be any of the listed pBAP types if it does not have the correct botanical characteristics.	*Often assigned low confidence to numerous BAP types due to lack of information. The number of BAP types a polygon can be assigned to can be reduced down, by use of GIS tools, but confidence cannot be increased without detailed habitat and species information.*

Some codes were also identified as not being Priority BAP habitat types with high confidence.

5. The draft conversion tables were then refined to include a number of automated check tools which could be used to further narrow down Priority BAP habitat type options. Discussions with SNH and LLTNPA identified that a number of GIS 'tools' could be used to allocate Priority BAP habitats more confidently. These included:

    - Upland/lowland context mask – to separate out upland and lowland Priority BAP habitats (for example upland and lowland heathland). This also includes the 600m AOD montane zone mask;

    - SEPA flood risk data – to identify potential areas likely to support coastal and floodplain grazing marsh Priority BAP habitat;

    - a 500m buffer of coastal areas to identify potential priority coastal habitats.

Confidence levels for allocating polygons to Priority BAP habitats were then further refined to take into account the use of GIS tools for allocating polygons with higher confidence as indicated in Table 5.

The Upland HAP context mask is a well recognised, used and tested tool for assigning upland and lowland areas on the basis of a number of topographical factors. It is a dataset providing a boundary between the upland and lowland environment. Due to the fact the Upland/Lowland data is derived by direct conversion to vector of a height grid with a resolution of 50m, application of this mask to the habitats within the LLTNP area resulted in a creation of unnatural 'jagged' boundaries where the upland/lowland mask split the polygons and resulted in different Priority BAP habitats. These jagged lines were not edited subsequently, except for where the two (or more) polygons created by the split corresponded to the same Priority BAP habitat, in which case such polygons were merged,

removing the jagged line. The other 'tools' were used to narrow down the numbers of polygons that could be allocated to habitats which were highly unlikely given their geographical locations. For example:

- Some heathland types could potentially code as both upland heathland and mountain heath and willow scrub Priority BAP habitat types. A pragmatic approach was therefore adopted whereby the HAP context mask was used to identify areas of upland heath, and then a 600m altitude dividing line was used to select areas above which would be more likely to be montane habitats . The method as described above for removal of pixelisation was applied in this process too.

- The UK BAP priority habitat description suggests that maritime cliff and slope may occur as far as the limit of maritime influence, which in some cases could continue for up to 500m inland . This 'buffer' of coastal areas was therefore used to limit the number of polygons potentially coded as this habitat type.

- Without some level of geographical filter, large numbers of grassland coded polygons could potentially be coded as coastal and floodplain grazing marsh priority habitats (as well as other habitat types) if automatic 'unfiltered' conversions were run. The SEPA floodplain data set corresponding with all areas that would be affected by 1 in 100 year floods was used to 'limit' the number of polygons potentially converted to coastal and floodplain grazing marsh. It is accepted within the 'confidence' of those conversions that just because areas are within a theoretical floodplain area does not mean that they are definitely floodplain grazing marsh, hence a medium or low confidence would be allocated depending on the individual conversion. Similarly there may be areas outwith those identified by floodplain map which could potentially correspond with floodplain grazing marsh.

Completed conversion tables were used as lookup tables to allow conversion of the amalgamated survey files for each type to BAP habitat. Some polygons, particularly those in amalgamated NVC files contained habitat mosaics, i.e. they were labelled with a number of different habitat codes. A strategic decision was made to only convert the first three codes to Priority BAP habitat types, or where percentage data was available, the three codes with the highest percentage coverage. This was a pragmatic decision, which along with its limitations is discussed further in Chapter 3.

In addition, some habitat codes did not have corresponding Priority BAP habitats (15 NVC codes, 6 B&R codes and 23 Phase I codes) and these have been noted in the attributes table and mapped as 'no corresponding Priority BAP habitat'. Further detail on the codes which were not considered to be BAP habitats is found in the conversion tables in the appendices.

Conversion of the original habitat information to Priority BAP habitats was not always possible due to a number of reasons detailed below. In those instances, an exact terminology was devised and approved by the LLTNP, to distinguish between the different reasons preventing the habitat conversion, as follows:

- For standard Phase 1/NVC/B&R codes that do not have a corresponding Priority BAP habitat - 'no corresponding Priority BAP habitat' was used.

- For blanks cells in the standardized original survey data - 'no data' was used.

The process of habitat conversion was carried out by creation of new fields within the attribute table of the three amalgamated survey files, which were then populated with the corresponding Priority BAP habitats according to the habitat conversion tables. The number of the new fields added was dependent on the number of Priority BAP habitats into which the original habitat information in any given survey polygon could be translated and the number of original habitat types listed in any of the amalgamated survey polygons.

In the instances when more than one habitat type was identified within individual polygons, all possible Priority BAP habitats were listed in separate fields, to enable visual display of the habitat conversions. In addition to likely Priority BAP habitats which the original habit data correspond with, new fields were added detailing the confidence of conversions from the original habitat code to Priority BAP habitat.

2.10 Step 9: amalgamation of all derived UK BAP data

Following derivation of three BAP Priority Habitat datasets (one each derived from Phase I, NVC and B&R) data amalgamation was carried out. A similar process to that described at Steps 5 - 7 was carried out in terms of overlap resolution and file amalgamation. Overlap resolution was a simple process – the priority survey file would always be the survey with the highest confidence level attached to it, and where surveys had the same confidence level, the Priority BAP habitat data derived from NVC survey files rather than Phase I survey files would automatically be selected, as generally the NVC derived data had higher confidence levels.

2.11 Step 10: estimating priority BAP habitats in unsurveyed areas

Three datasets were used to fill in habitats within un-surveyed areas of the National Park:

- LCS88 Landscape Character shapefile;
- Forestry Commission Scotland Datasets;
- LLTNPA waterbodies shapefile (OS MM water features).

The FCS dataset was always used as the priority file to fill un-surveyed areas as this file was based on some level of ground survey undertaken by the Forestry Commission and/or their contractors. The majority of habitat coding within the FCS files was listed as either Broad or Priority BAP Habitat types and so for the majority of polygons no conversion was necessary. All polygons coded as coniferous forest were stripped out as non-Priority BAP habitats, whilst for a few polygons translation into Priority BAP habitats was required but was very simple, and the relevant conversion table is shown in Appendix 9.

Where areas were not covered by the LLTNPA survey files, or the FCS data, the LCS88 dataset was used to gap fill. A draft habitat conversion file was used to determine the potential Priority BAP habitat types which related to LCS88 broad habitat types. This table is provided in Appendix 10. Due to the broad classification of habitats under the LCS88 system, many habitat types corresponded to numerous potential Priority BAP habitats, for example: the smooth grass/rushes habitat type could potentially be considered to be any one of six Priority BAP habitat types including several grassland habitat types. It was decided that due to the low confidence in the LCS88 data sets that it would only be used to:

- Convert polygons which directly translated to non-Priority BAP habitat types (a total of 14 habitat categories as shown in Appendix 10).
- Convert polygons which could only be translated as one or two Priority BAP habitats with medium confidence – this only included all polygons coded as blanket bog, dry heather moor, montane vegetation and undifferentiated mixed woodland.

Any remaining blank areas from this process were coded as ‘potential BAP habitats, unsurveyed’ or were filled using the waterbodies shapefile to complete the coverage.

The OS MasterMap water features file which contains data of high resolution, was used in a following way:

- The file was unionised with the amalgamated BAP shapefile created from the amalgamated UK Priority BAP habitat file, FCS dataset and LCS88 dataset.

- For the areas where the OS MM waterfeatures were overlaying with converted survey areas containing a valid Priority BAP habitat, this classification was retained.

- Where the OS MM data was overlaying with converted survey areas that did not contain a valid Priority BAP habitat classification, the areas were classified as ‘water’.

- Where the OS MM data was overlaying with areas not covered by any of the original habitat surveys, the areas were classified as ‘water’.

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3 RESULTS

Results of the UKBAP Priority Habitat Audit are provided as digital files to LLTNPA. These figures show the distribution of individual priority habitats based on the conversions carried out on Phase I, NVC and B&R datasets (as shown in the habitat conversion tables in Appendices 6 - 8).

Attribute tables of polygons list the confidence in that particular polygons habitat conversion – i.e. the confidence that the habitat type within that polygon fits that particular BAP Habitat type. Some polygons are coded for multiple habitats (i.e. are present on several of the habitat maps). This is a result of the original conversion methods table indicating that the original Phase I Habitat type, NVC or B&R Habitat type could potentially be one of a number of BAP Habitat types, or, alternatively, especially in NVC files it may be a result of a mosaic of habitat types being present in a single polygon.

3.1 Confidence in results

3.1.1 Confidence in Individual Files

Six NVC files (out of 33 files), seven Phase I files (out of 30 files) and both B&R files were considered to be 'low confidence' datasets. For all of the Phase I, NVC and B&R files with low confidence this has been attributed on the basis of unknown provenance and/or date of data and may be no reflection on the actual quality of that data or how current it is (i.e. if metadata had been available for these files they may actually have high confidence. For example the B&R files are held in hard copy by SNH and further project time researching these files could in the future give information on provenance and result in confidence levels for these files being high).

All other Phase I files were assigned medium confidence. Fifteen of the files originated from the mid 1980s, often making them over twenty years out of date. As a data set the remaining NVC files were much more recent with many originating from the late 1990s and early 2000. Depending on the habitats covered by the surveys, the age of the data may have significant bearing on whether the habitat data is considered to be current. For those habitats which change more rapidly either due to natural succession or management, files originating from the 1980s would be priorities for re-survey as is discussed further in Chapter 5.

3.1.2 Confidence in Overlap Resolution

Overlap resolution was carried out with varying confidence levels in the decisions made, as described in Chapter 2 and documented in Appendix 4 and 5. Of the 30 overlap resolutions carried out to amalgamate the Phase I files a total of 15 were carried out with high confidence, 12 with medium confidence and only three with low confidence. Of the 106 overlap resolutions carried out to amalgamate NVC files, 62 were carried out with high confidence, 31 with medium confidence and 13 with low confidence.

It is considered that as the vast majority of overlaps were resolved with high or medium confidence that they would not significantly affect the confidence in the data set produced. However, low confidence overlaps may be priorities for ground truthing work as discussed further in Chapter 5.

3.1.3 Confidence in Habitat Conversion

Confidence levels in habitat conversions are variable and are shown clearly in the habitat conversion tables in Appendices 6 - 8. Generally, due to the higher level of detail provided by B&R and NVC datasets, these habitat types can be converted to UK BAP priority habitats with a higher level of confidence than the Phase I data sets. The numbers of Phase I, B&R, NVC code conversions and their different confidences are shown in Table 6.

Table 6 Confidence levels of habitat conversions per survey type.

Habitat and Survey Type	High Confidence	Medium	Low	No corresponding BAP Habitat Type
NVC Survey				
Calcareous grassland	9 (53%)	4 (23.5%)	4 (23.5%)	0
Acid grassland	35 (74.5%)	8 (17%)	4 (8.5%)	15
Swamp communities	0	49 (78%)	14 (22%)	0
Heathland	47 (96%)		2 (4%)	0
Maritime communities	0	4 (80%)	1 (20%)	0
Woodlands	22 (38%)	34 (57%)	2 (5%)	0
Neutral grassland	1 (5%)	4 (19%)	16 (76%)	0
Aquatic communities	3 (50%)	3 (50%0	0	0
Mire communities	82 (45%)	72 (39.5%)	28 (15.5%)	0
Totals	**199 (44.4%)**	**178 (39.7%)**	**71 (15.9%)**	**15**
B&R Surveys				
Heathland	7 (100%)	0	0	0
Grassland	4 (36.4%)	0	7 (63.6%)	5
Scrub	0	1 (100%)	0	1
Montane heath	6 (100%)	0	0	0
Heath and wet heath	9 (50%)	9 (50%)	0	0
Mires	7 (39%)	0	11 (61%)	0
Woodland	0	1 (25%)	3 (75%)	0
Totals	**33 (51%)**	**11 (17%)**	**21 (32%)**	**6**
Phase I Habitat Survey				
Woodland	0	7 (36.8%)	12 (63.2%)	6
Grassland	0	11 (68.7)%	5 (31.3%)	3
Ruderal and Bracken	0	0	0	5
Heaths	7 (53.8%)	6 (46.2%)	0	0
Mires	2 (11.1%)	4 (22.2%)	12 (66.7%)	0
Swamps	0	0	3 (100%)	3
Open water	0	3 (37.5%)	5 (62.5%)	0
Cliffs and other exposures	0	8 (100%)	0	1
Dunes	1 (100%)	0	0	0
Other habitats	0	0	1 (100%)	5
Totals	**10 (11.5%)**	**39 (44.8%)**	**38 (43.7%)**	**23**

Phase I Habitat data conversions were generally carried out at a lower level of confidence with just under 45% of theoretical code conversions occurring with medium confidence and 44% with low confidence. This is due to the broad-brush approach that Phase I Habitat survey takes in its classification of habitats. The only habitats which were assigned with high confidence to priority BAP habitats from Phase I data were heathland, dune and blanket bog habitats.

In contrast, for NVC and B&R surveys 44% and 51% of theoretical code conversions could be carried out with high confidence. The notable exceptions to this in both NVC and B&R data were mire, swamp and woodland habitat codes which as habitats can be variable in their nature, occurrence and species composition and as a result could potentially be classified as a number of BAP habitats, and are therefore converted with lower confidence.

In terms of the actual conversions, a total of 18077 polygons were converted with high confidence, 4687 polygons with medium confidence and 11014 polygons with low confidence.

An added factor which affects confidence in data conversions is the presence of habitat mosaics in polygons. This issue was mainly restricted to NVC surveys, where a significant number of polygons contained multiple habitat codes indicating a mosaic. Due to the automated nature of the habitat conversion methods, only the first three NVC codes were selected for conversion or, where percentage data was available indicating the proportion of the polygon each habitat covered, the three habitat types with the highest levels of coverage were selected. Although there is no precedent, for selection of the first three codes, it was decided that a pragmatic approach was required for dealing with mosaics, and that due to the number of files containing multiple NVC codes that an approach to conversion would be required to avoid loss of large areas of survey information. Three codes was thought to be an acceptable number to select as the majority of polygons had three codes or less. However, this gives rise to three 'errors':

- small areas of priority BAP habitats may have been missed by the audit where these (NVC coded) habitats had very low percentage cover in mosaic polygons;

- whole polygons are coded as a number of different BAP Habitats giving rise to an over-estimation of these habitat types within the park (this was particularly noted for standing water habitats where small lochans may account for a small area of polygons but as the area is unknown the entire polygon is coded as the relevant Priority BAP Habitat type;

- there will be an unknown number of polygons which are classified according to the first three codes listed which are actually dominated by other habitat types whose code was 'discarded' by selecting the first three.

In terms of our confidence in the audit results, the first error will have minimal impact. All priority BAP Habitats which are potentially present in the park are likely to have been picked up in the audit, and those which had a low percentage cover are unlikely to significantly alter the estimated areas of UK BAP priority habitats.

The second error could have an impact on the audit results as in effect it will lead to polygons being double counted. For polygons with multiple NVC codes, all of which could translate to one or more UK BAP priority habitats, the polygon has been coded for each of those habitats. In most cases some, or all of the BAP habitats will be present in the polygon, but the coverage of the habitats is unknown. For the NVC files which have percentage cover data (16 out of 33 files), the polygon area could be broken down to indicate the proportions of coverage of each habitat, however, this would be a manual and extremely time consuming process, and has not been possible in this audit. For those polygons which do not have percentage cover data no breakdown would be possible. Due to the number of files and polygons (5085 polygons out of 21,786) which have multiple NVC codes it was decided to code them to multiple BAP habitats, as not doing this, would result in a significant loss of survey coverage.

Where multiple codes were listed alongside percentage cover, the precedent was to list those with the highest percentage cover first. Therefore, for these files we can be certain that we have captured the dominant habitat types. There was a low proportion of polygons where more than three habitat types were listed (1,172 polygons out of 21,786 NVC polygons (5.4%)) and therefore, even if in these situations if by selecting the first three codes

listed the codes with the highest percentage cover have not been selected, the level of error will be relatively minor in comparison to the overall dataset.

3.1.4 Confidence in Habitat Conversion: Use of GIS tools

A number of GIS tools were used to provide a pragmatic approach to polygon allocation as described in Step 8 of Chapter 2. The use of these tools, was quite often 'limit' coding of certain habitat such as montane, floodplain or coastal habitats to areas with a high geographical probability of these habitats occurring, despite NVC, Phase I or B&R codes which potentially code as montane, floodplain or coastal habitats being present in other areas. For example a Phase I polygon coded as marshy grassland could potentially correspond with floodplain and grazing marsh – however, if the relevant polygon was located in a wet depression on a high altitude slope it is very unlikely to be this type of habitat but may still code as some other habitat type such as Purple moor-grass rush pasture. Therefore a polygon in the floodplain would be coded as floodplain grazing marsh (and any other potential priority habitats) whilst a polygon outwith this area would not be coded as floodplain grazing marsh but would still be coded as the other potential habitats.

This approach allows a pragmatic approach to mapping, however, it is accepted that sometimes its use will result in some polygons being inaccurately coded as floodplain grazing marsh or in some instances not coded as floodplain grazing marsh, when in fact they are. This possibility also applies to montane and coastal habitats which have been separated out using GIS tools.

3.1.5 Confidence in 'Survey Gap Filling'

FCS data was used as the priority survey data for the gap filling exercise, i.e. to estimate priority BAP Habitat types in the areas of the National Park not covered by the Phase I, NVC or B&R files. This data was based on on-the ground survey by FCS staff and their contractors. The purpose of the surveys was to identify BAP habitats between the forestry coups and as a result no habitat conversions were required and the data can be considered to represent BAP Habitats with high confidence, although some habitats were only assigned to 'Broad BAP habitats' and no conversion to priority UK BAP priority habitat types has been possible for these polygons.

After investigating different methods to convert LCS88 data to BAP habitats it was decided that the LCS88 data was too broad-brush to provide habitat conversions with an acceptable confidence level in the majority of cases. Therefore the LCS88 dataset was only used to strip out non-BAP habitats from the dataset, and to determine the handful of medium confidence habitats as described in Chapter 2. As a consequence there are still 145,454ha for which there is no data which can currently be used to establish potential BAP priority habitat coverage.

3.2 Species checklist

The species checklist is provided in Appendix 11. The species checklist was compiled using data from the National Biodiversity Network . A filter was used on the NBN data search to select all protected species, UK BAP priority species and Scottish Biodiversity List species. Data searches were run on a total 31, 10 x 10 km ordnance survey squares, 22 of which fall partly in the National Park and nine of which fall wholly in the National Park boundary.

The first column details all species for which there have previously been records or for which there are currently records in the entire National Park. This is followed by four columns which indicate whether the species are included in the Habitats Directive, Wildlife and Countryside Act, UK BAP priority species list (2007) and / or the Scottish Biodiversity List. Subsequent columns break the National Park down into the 31 individual 10 x 10 km squares. Each column indicates the species which have been recorded in that square and the most recent date which that species was recorded. Sometimes date information was not

available on NBN, in which case the column recorded ‘no date’. In other cases the record was simply recorded as pre- 19xx, where the exact date of the record was not known, or a date range from 19xx – 19xx would be recorded which does NOT indicate that the species was present for this entire period, but that the exact record date is unknown but falls at some point within the listed period.

Where audit squares fell only partly within 10km squares, best efforts were made to distinguish where records actually fell within or outside the boundary, and only records within the boundary were included. Where data resolution was at a low level it was not possible to determine where the record fell within the search area, in which case a precautionary approach was adopted and the species was included on the list.

3.2.1 Limitations

The checklist only considers NBN data, it does not make use of individual species surveys and records held by the LLTNPA and other organisations. It also has no reference to the level of survey effort. Some areas particularly those that are more remote from roads and centres of population have lower recorded species than those which are closer to such areas. This may be due to the levels of survey effort rather than species being absence.

The checklist makes no comment on whether species are currently present in the National Park. The records span a range of dates, and for some species for example water vole or wild cat, the lack of ‘recent’ records potentially indicates that the species is no longer present in the Park. However, as discussed in the section above, the lack of recent records may simply reflect the level of survey effort.

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER WORK

3.3 General conclusions

An audit of habitats and species in the LLTNP has been completed. The audit identified that 38 BAP priority habitats and 206 UK BAP species could potentially be present in the National Park. In addition it was also identified that a total of 307 Scottish Biodiversity List species (although there is overlap between these and the UKBAP list), 59 Wildlife and Countryside Act Species and 30 Habitats Directive species could potentially be present in the National Park. The associated BAP habitat maps and species checklist provide an indication of the geographical spread of these habitats and species within the National Park.

The audit method documented within this report provides a prototype for future audits. As new habitat or species data is collected it can be added to amalgamated files or checklists, to build up the picture of the habitat and species presence within the park. In the process of carrying out the audit a number of areas of further work, or potential options for refining the audit methodology have been highlighted. The remainder of this section presents potential options for further work or refinements to build upon this audit.

3.4 Recommendations for further work

3.4.1 Field work

Any additional survey work should be concentrated on areas of the National Park for which there is currently no survey information (a total of 145454 ha) and areas of the National Park which are only covered by low confidence datasets.

3.4.1.1 Unsurveyed Areas

In the process of the audit it was determined that although survey gaps are covered by both LCS88 datasets and aerial photography, there is very low confidence in any methods that could be used to translate this information into UK BAP priority habitats. The only way to provide a reasonable and useful level of confidence for estimating UK BAP habitats in these areas would be to undertake survey.

Survey in the un-surveyed areas should be concentrated by the strategic priorities of the LLTNPA. Although NVC survey would provide a higher level of botanical data and detail, if the purpose of the survey is purely to estimate BAP habitats within the National Park and to provide a slightly more rapid first survey of an area, it is recommended that Phase I Habitat surveys are carried out, or that the BAP habitat survey method devised by the Forest Enterprise Scotland should be adopted (depending on the exact purpose of the survey). Forest Enterprise Scotland have devised a rapid method of digitally compartmentalising areas of land that they manage and mapping them rapidly and directly to UK BAP habitat types on field computers. If Phase I Habitat survey is conducted, surveyors should make themselves familiar with the method devised by this study for converting Phase I Habitat types to BAP habitat types and should therefore provide additional target notes which help clarify when a Phase I type could be potentially be converted to multiple BAP Habitat types.

3.4.1.2 Low Confidence Datasets

Additional survey effort could be focussed on ground truthing low confidence data sets. This could be done by a combination of desk and field based methods. Initial desk study, overlaying survey data on recent aerial data may highlight areas of individual surveys which apparently still fit with habitats shown on aerial plans. Therefore, as many of the existing surveys cover extensive areas, the area required for update surveys may be reduced down. Surveys from the 1980s are likely to be priorities for re-survey.

3.4.1.3 Low Confidence Overlap Resolutions

Ground truthing and survey work may also be useful for resolving areas of survey overlap where there was very low confidence in the overlap decision – i.e on overlap decisions where it could not be determined which survey was most accurate through use of logic and desk top study alone. However, in comparison to blank survey areas or low confidence survey areas this would have a low impact on overall estimations of habitat present within the National Park.

3.4.1.4 Species Data

It is not for this report or study to recommend further detailed species survey, however it is obvious from the data provided on the NBN that some areas or species have been targeted for survey to great effect. Study of the checklist in combination with the strategic priorities for the National Park may highlight priority areas or species for which record data is urgently required and so may guide future survey objectives. In some cases this may mean commissioning whole surveys in others it may require a focussed drive to obtain more data records from the public, like the nationwide 'Add and Adder' project or simply greater effort to capture individuals records.

3.4.2 Desk Study work and GIS

3.4.2.1 Species Audit and Biodiversity Checklist

The checklist is in a format that it can be built upon over time. The current NBN checklist provides a base table which can be updated with other survey or record information held by LLTNPA and other organisations, i.e. it would form the basis of a future audit where old records from the NBN could potentially be updated with more recent records held by other sources. In parallel with this the checklist could also be adapted to indicate whether each species in each square is considered to be currently or historically present, such that there may be three colour coded categories:

1. Species which are considered to be 'currently' present.

2. Species which may potentially be present.

3. Species which are likely to be absent.

Records for each square could be allocated to one of three categories based on the basis of an agreed cut off date for records which may vary per species group depending on the known level of recording effort for that species group within the National Park. In this way the table could later be directly translated into species audit maps based on colour coded 10 x 10k squares across the National Park. For some species NBN and other data sources will provide higher resolution mapping locations and for key species it may be desirable and possible to produce more detailed mapping depending on usage rules, animal welfare issues and copyright.

3.4.2.2 Habitat Conversion Methodology

The current methodology is seen as a starting point which has allowed a credible audit of BAP Habitats within the LLTNP. It has used a variety of resources including the current NBN/JNCC conversion table, but has rationalised these in a way that makes them more applicable to the National Park's geographical area and which restricts the number of potential BAP habitats that NVC, Phase I and B&R codes are likely to be converted to.

The methods presented here by no means represent a finalised methodology and it is recognised a number of organisations and botanical specialists may wish to comment on and make suggested amendments to the methodology following publication of this report and associated data. Indeed it is recommended that prior to a further audit that the

methodology is distributed to a range of experts and organisations for refinement and comment.

In addition a number of GIS tools including, upland/lowland masks, flood risk data and coastal and montane zones have been used to allocate polygons to certain BAP categories. Further tools may be identified and refined for use in more accurate polygon identification.

3.4.2.3 Gap Filling in Individual Survey Files

Due to the time constraints associated with the project, individual survey files were not fully 'cleaned' as part of the audit. Investigation of individual survey files found that most files had a number of gaps within their digitising and some files had large numbers of gaps (as shown in Appendix 1). Further digitising work could be carried out to resolve these gaps. For larger gaps resolution is likely to require study by an ecologist who could predict the habitats to fill gaps using adjacent data and aerial photography.

Although this work would improve the fine scale quality of the digital data, it is unlikely to resolve any appreciable area which would affect the results of the audit.

3.4.2.4 Creation of a Derived Amalgamated Phase I File

Originally part of the audit project, creation of a derived, amalgamated Phase I file could be completed at a later date. Deriving Phase I data from NVC and B&R files could be regarded as "dumbing down" of the original data. However it would create a fully cohesive data set for all surveyed areas of the National Park which is more readily usable for planning purposes than the often complex NVC datasets. A conversion method as has been created for BAP Habitats would need to be derived, verified and applied.

Appendix I

LLTNP Biodiversity Audit Base Table.

Hyperlink to Excel spreadsheet

Appendix 2

Survey File Discarding Log. 1. Files dropped by FVGIS and proposed to be dropped by LUC

Survey files	FVGIS/LLTNPA Justification	LUC Justification	Gaps	Overlaps
Phase 1 surveys				
A004 'benan'	Same as 'gfalloch' - probably containing amalgamated surveys 'benann2', 'edinapple' and 'blackwater'	This survey file is an amalgamation of three different phase 1 survey files: 'benann2' (medium confidence), 'edinapple' (low confidence) and 'blackwater' (medium confidence). Gap and overlap analysis revealed that this amalgamated file (with medium confidence) contains higher number of gaps and overlaps than the original files. Due to known date and provenance of the original survey files (apart for the file 'edinapple' where the survey year is unknown but can be approximated to the same period due to the same survey originator and surveyor (A. S. Mcmullin)), the decision was made to use the original surveys and drop this survey file.	0	34
A010 'darleithmuir_ph1'	Unknown survey - only a small part within the NP but already covered by the known survey 'regpark'	Only a small area covered by this survey falls within the boundary of the LLTNP and the surveyor and mapping scale is unknown (medium confidence). The part of this survey that falls within the NP boundary is also covered by the other survey 'regpark', which is of a known provenance, comparable date and mapped at a known scale (medium confidence).	0	0
A013 'dumbartonmoor_ph1'	Unknown survey – only a small part within the NP but already covered by the known survey 'regpark'	Only a very small area covered by this survey is within the NP boundary. Metadata about this survey are unknown (low confidence). The area that falls within the park boundary is also covered by 'regpark', with known provenance and year (medium confidence).	0	0

A017 ‘gfalloch’	Same as 'benan' - probably containing amalgamated survyes 'bennan2', 'edinapple' and 'blackwater'	This survey file was given medium confidence. It is an exact copy of 'benan'. 'benan' was discarded due to it being an amalgamation of three other surveys. Survey to be dropped.	11	34
A027 ‘lochdoine’	Unknown survey - covers only half of the loch itself identifying it as G1 (open water).	This survey only covers the area of open water, which was generally omitted by other surveys. Furthermore, metadata about this survey are unknown (low confidence). The area covered by this survey is also covered by ‘mikep1’, survey with known metadata (medium confidence).	0	0
A030 ‘menteith’	Unknown survey - area covered by the more detailed 'lakemetieth_ph1' survey.	There are no known metadata about this survey and therefore it was given a low confidence level. The area covered by this survey is also covered by ‘lakementeith_ph1’ (medium confidence), for which we do have metadata.	2	16
NVC surveys				
B007 ‘av299nvc’	Same as 'nvcces99' for which paper file was received from Alan Bell - same metadata for this	This survey file is an exact copy of another survey file ‘nvcces99’, with exactly the same metadata known about both surveys (medium confidence) Decision to drop this file and retain ‘nvcces99’ is therefore arbitrary.	7	114
B009 ‘benheas’	Area covered by 'heasnvc' which is a newer and identified survey	The area covered by this survey (medium confidence) is in more detail covered by another survey (‘CHREAG’ – high confidence). Metadata are known for both survey files, and ‘CHREAG’ is more recent survey.	0	0
B014 ‘coille chriche’	SSSI paper report in SNHs Stirling Office - almost identical to 'ardvorlich'	This survey (medium confidence) covers the same area as another NVC survey (‘ardvorlich’- medium confidence). Both surveys were carried out in the same year by one surveyor, however, ‘ardvorlich’ appears to be more detailed.	0	0

B020 'heasnvc'	Record received from SNH (2008/01) Seems same as 'Ben Heasgarnich' on SNHs SiteLink webpage	Only a small part of this survey falls within the boundary of the NP and the area contained in the NP is covered by another survey 'CHREAG', of a comparable date, for which more metadata are available (high confidence). 'CHREAG' also appears to be more detailed and was focused on the area within the NP, whereas 'heasnvc' (medium confidence) also covers a large area outside the NP and is less detailed.	0	1
B034 'scatter'	Seems to be extracted from the identified 'nvcces98' survey and same metadata assigned to this one	The area covered by this file is fully covered by another survey 'nvcces98' (medium confidence). Metadata show that the surveys were carried out in the same year and using the same mapping scale. 'scatter' file (medium confidence) appears to have been extracted from 'nvcces98'.	2	0

2. Files not dropped by FVGIS/LLTNPA but proposed to be dropped by LUC

Survey file (both Phase 1)	LUC Justification	Gaps	Overlaps
A008 'conichill	This survey file was given medium confidence level. The area covered by this survey is also covered by two other surveys, 'regpark' and 'lomph1' (both medium confidence). Both of these surveys are more recent than 'conichill' and at least one of them was mapped at higher resolution (1:10,000 as opposed to 1:25,000).	0	5
A018 'glen falloch woods'	This survey file was given medium confidence level. The area covered by this survey is also covered by two other surveys, 'regpark' and 'lomph1' (both medium confidence). Both of these surveys are more recent than 'glen falloch woods' and at least one of them was mapped at higher resolution (1:10,000 as opposed to 1:25,000). This survey will therefore no longer be considered in this project.	0	3

3. Files dropped by FVGIS/LLTNPA but proposed not to be dropped by LUC

Survey file	LUC Justification	Gaps	Overlaps
Phase 1 surveys			
A002 'balquhidder'	Limited metadata is available for this survey, resulting in low confidence. However, it covers area not covered by any other survey and exclusion of this survey file would mean loss of information (even of the information is of a low confidence).	0	0
A003 'ben more'	Appears to have been dropped by FVGIS due to the full coverage of this survey's area by a B&R 'stobinnein_benmore' file. Our approach is not to cross-reference the different survey types at this stage, hence the survey file will be included.	1	1
A011 'dochart'	This file is of medium confidence and is fully contained within another phase 1 survey file 'mikep1' (medium confidence). It has been mapped at a more detailed resolution to 'mikep1' (unless the opposite can be proven as Edith suggested in the meeting on 09/12/09)	4	2
A020 'glenogle'	Medium confidence file. Overlaps significantly (but not fully) with another survey, however, exclusion of this survey file would result in a loss of information.	0	0
A036 'river balvag marshes'	Medium confidence file. Overlaps significantly (but not fully) with another survey, however, exclusion of this survey file would result in a loss of information.	0	0
NVC surveys			
B002 'all loch lomond and stirling woods'	Low confidence file. Overlaps significantly (but not fully) with another survey, however, exclusion of this survey file would result in a loss of information.	12	40
B004 'arrochar'	Low confidence file. Overlaps significantly (but not fully) with another survey, however, exclusion of this survey file would result in a loss of information.	1	0
B023 'loch arklet1'	Medium confidence file. Overlaps significantly (but not fully) with another survey, however, exclusion of this survey file would result in a loss of information.	6	11
B035 'smallsites'	Low confidence file. Consists of several individual polygons that overlap fully with other NVC survey files, however, there are areas which are not covered by any other survey.	31	160
B035 'STIRWOOD'	Low confidence file. Overlaps significantly (but not fully) with two other surveys, however, exclusion of this survey file would result in a loss of information.	0	0
B&R survey			
C001 'benlomond'	Appears to have been dropped by FVGIS due to the full coverage of this survey's area by another survey file of a different type. Our approach is not to cross-reference the different survey types at this stage, hence the survey file will be included.	0	0

Appendix 3

Standard Phase I Habitat Codes and Descriptions.

Phase 1 habitat code	Phase 1 habitat description
A1.1.1	Broadleaved semi-natural woodland
A1.1.2	Broadleaved plantation woodland
A1.2.1	Coniferous semi-natural woodland
A1.2.2	Coniferous plantation woodland
A1.3.1	Mixed semi-natural woodland
A1.3.2	Mixed plantation woodland
A2.1	Dense/continuous scrub
A2.2	Scattered scrub
A3.1	Broad-leaved parkland/scattered trees
A3.2	Coniferous parkland/scattered trees
A3.3	Mixed parkland/scattered trees
A4.1	Broad-leaved recently-felled woodland
A4.2	Coniferous recently-felled woodland
A4.3	Mixed recently-felled woodland
B1.1	Unimproved acid grassland
B1.2	Semi-improved acid grassland
B2.1	Unimproved neutral grassland
B2.2	Semi-improved neutral grassland
B3.1	Unimproved calcareous grassland
B3.2	Semi-improved calcareous grassland
B4	Improved grassland
B5	Marsh/marshy grassland
B6	Poor semi-improved grassland
C1.1	Continuous bracken

C1.2	Scattered bracken
C2	Upland species-rich ledges
C3.1	Other tall herb and fern - ruderal
C3.2	Other tall herb and fern - non ruderal
D1.1	Acid dry dwarf shrub heath
D1.2	Basic dry dwarf shrub heath
D2	Wet dwarf shrub heath
D3	Lichen/bryophyte heath
D4	Montane heath/dwarf herb
D5	Dry heath/acid grassland mosaic
D6	Wet heath/acid grassland mosaic
E1.6.1	Blanket bog
E1.6.2	Raised bog
E1.7	Wet modified bog
E1.8	Dry modified bog
E2.1	Acid/neutral flush/spring
E2.2	Basic flush/spring
E2.3	Bryophyte-dominated spring
E3	Fen
E3.1	Valley mire
E3.2	Basin mire
E3.3	Flood-plain mire
E4	Bare peat
F1	Swamp
F2.1	Marginal vegetation
F2.2	Inundation vegetation
G1.1	Eutrophic standing water

G1.2	Mesotrophic standing water
G1.3	Oligotrophic standing water
G1.4	Dystrophic standing water
G1.5	Standing water - marl
G1.6	Standing water - brackish
G2.1	Eutrophic running water
G2.2	Mesotrophic running water
G2.3	Oligotrophic running water
G2.4	Dystrophic running water
G2.5	Running water - marl
G2.6	Running water - brackish
H1.1.1	Intertidal mud/sand - Zostera beds
H1.1.2	Intertidal mud/sand - green algal beds
H1.1.3	Intertidal mud/sand - brown algal beds
H1.2.1	Intertidal shingles/cobbles - Zostera beds
H1.2.2	Intertidal shingles/cobbles - green algal beds
H1.2.3	Intertidal shingles/cobbles - brown algal beds
H1.3.1	Intertidal boulders/rocks - Zostera beds
H1.3.2	Intertidal boulders/rocks - green algal beds
H1.3.3	Intertidal - boulders/rocks - brown algal beds
H2.3	Saltmarsh/dune interface
H2.4	Saltmarsh - scattered plants
H2.6	Saltmarsh - dense/continuous
H3	Shingle above high tide mark
H4	Boulders/rocks above high tide mark
H5	Strandline vegetation
H6.4	Dune slack

H6.5	Dune grassland
H6.6	Dune heath
H6.7	Dune scrub
H6.8	Open dune
H8.1	Hard cliff
H8.2	Soft cliff
H8.3	Crevice/ledge vegetation
H8.4	Coastal grassland
H8.5	Coastal heathland
I1.1.1	Acid/neutral inland cliff
I1.1.2	Basic inland cliff
I1.2.1	Acid/neutral scree
I1.2.2	Basic scree
I1.3	Limestone pavement
I1.4.1	Acid/neutral other exposure
I1.4.2	Basic other exposure
I1.5	Cave
I2.1	Quarry
I2.2	Spoil
I2.3	Mine
I2.4	Refuse-tip
J1.1	Cultivated/disturbed land - arable
J1.2	Cultivated/disturbed land - amenity grassland
J1.3	Cultivated/disturbed land - ephemeral/short perennial
J1.4	Introduced shrub
J2.1.1	Native species-rich intact hedge
J2.1.2	Species-poor intact hedge
J2.2.1	Native species-rich defunct hedge
J2.2.2	Species-poor defunct hedge

J2.3.1	Native species-rich hedge with trees
J2.3.2	Species-poor hedge with trees
J2.4	Fence
J2.5	Wall
J2.6	Dry ditch
J2.7	Boundary removed
J2.8	Earth bank
J3.4	Caravan site
J3.5	Sea wall
J3.6	Buildings
J4	Bare ground
J5	Other habitat

Appendix 4

Phase I Habitat Survey Overlap Resolution Log

FID	OVERLAP	PRIORITY SURVEY	REASONING
28	A001 A005	A001	Survey more recent, older survey shows heath (both wet and dry) was covering the area of overlap in 1988. Aerial photo from 2005 indicated development of woodland.
30	A001 A006	A001	Survey more recent (1999) compared to 1987. Overlap is very minor and it is not possible to distinguish different habitats from the aerial photographs, since the difference is D2 (A001) and B5/E3.1 (A006).
39	A025 A031	A25	Despite this survey being of an older date (1985 as opposed to 1998), habitat mapping is more detailed and more habitat types are identified in the overlapping area, which in the older survey is coded as B5. It also fits the habitat boundaries on the aerial photography.
40	A021 A031	A021	Despite this survey being of an older date (1986 as opposed to 1998), habitat distribution and boundaries appear to be more accurate. The more recent survey identified one of the overlapping areas as B4, while according to the older survey it is E1.6.1. This appears to be more fitting, since on the aerial photo it looks significantly different than the adjacent field with improved grassland. The area is dissected by drainage ditches and is more likely to be a mire habitat than improved grassland.
41	A011 A031	A031	The survey is of a more recent date (1998 as opposed to 1983). Furthermore, some of the overlapping polygons in A011 are classified as grassland type habitats, yet the aerial photo shows woodlands in these areas. Those areas are coded as woodlands in A031.
44	A022 A032	A022	This survey is marginally more recent (1999 as opposed to 1998). Habitat mapping is more detailed, for the overlapping areas other habitats were identified in addition to coniferous plantation. A032 only identifies this area as two big blocks of coniferous plantation woodland. While the habitat boundaries are not accurately aligned to those on the aerial photo, visually the habitat classification appears to be correct.
45	A009 A032	A009	Despite this survey being of an older date ((1988 as opposed to 1998), habitat mapping is more accurate and aligned with the aerial photo. Visually, blocks that the aerial shows as woodland are also classified as woodland by this survey. In the more recent survey, within the overlapping areas, some of the areas shown as open ground on the aerial are coded as woodlands and vice versa.
49	A022 A032	A022	This survey is marginally more recent (1999 as opposed to 1998). Habitat mapping is more detailed, for the overlapping areas other habitats were identified in addition to coniferous plantation. A032 only identifies this area as two big blocks of coniferous plantation woodland. While the habitat boundaries are not accurately aligned to those on the aerial photo, visually the habitat classification appears to be

FID	OVERLAP	PRIORITY SURVEY	REASONING
			correct.
50	A032 A033	A033	Despite this survey being of an older date (1985 as opposed to 1998) it appears to be more detailed, recognising three different habitats where A032 only identifies one habitat (different to the other three). Habitat boundaries are quite accurately aligned to the boundaries on the aerial photo and visually the habitat types seem to be corresponding.
63	A031 A038	A038	Surveys are of a comparable date (1998 and 1999 respectively). Habitat boundaries in both cases are quite good fit to the boundaries on the aerials. Within the overlapping areas, A038 is a lot more detailed, recognising several habitat types where A031 only identifies one. A038 covers smaller area and hence is more detailed.
67	A001 A039	A001	No metadata are known about A039. Both surveys classify the overlapping area as woodland habitats. According to A039 it is A1.1.1, according to A001 it is A1.3.2. OS base map classifies the overlapping area as mixed woodland.
68	A005 A039	A005	No metadata are known about A039. Overlapping area is large. A005 is much more detailed, identifying small patches of other habitats within large blocks of woodlands. These patches fit with the aerial photo as well. A039 identifies the woodlands as A1.1.1 and A1.1.2, while A005 only identifies A1.1.1. According to the OS base map the overlapping area is non-coniferous woodland.
42	A002 A002 A031	A031	No metadata are known for A002. Overlap between the surveys is minor. Some of the overlap is in the open water area, identified as such by both surveys. Overlap on the ground has code mismatches, however, habitat boundaries of A031 are better fit to the aerial photo.
64	A002 A002 A038	A038	No metadata are known for A002. Overlapping areas are exclusively within the area of open water. A038 is survey of a known provenance and date therefore would be a preferred survey.
69	A001 A005 A039	A001	A001 is the most recent survey, classifying the habitat in the overlapping area as A1.3.2. Older survey shows heath (both wet and dry) was covering the area of overlap in 1988. No metadata known about A039, this survey also suggests woodland habitat is present in the overlapping area. Aerial photo from 2005 indicates development of woodland. OS base map identifies the overlap area as mixed woodland.
37	A001 A022	A022	Both surveys are of medium confidence. A022 is a lot more detailed within the area of overlap and better aligned with the aerial photo.
46	A001 A032	A032	Surveys are dated 1999 and 1998 respectively. Both surveys generally show good match with the

FID	OVERLAP	PRIORITY SURVEY	REASONING
			aerial photo, however, some of the boundaries are not accurate in either case. There are code mismatches, e.g. identical areas coded as E1.6.1 and D2, or B4 and B2. A032 is a more detailed survey.
47	A005 A032	A005	Surveys are of a different date (1988 and 1998 respectively) and both surveys identify the overlapping areas as woodlands. However, the older survey (A005) suggests it is a broad-leaved semi-natural woodland, whereas the more recent survey (A032) identifies it as a coniferous plantation woodland. Overlap is minor. The aerial photo indicates broad-leaved woodland.
48	A006 A032	A032	Surveys are of a different date (1987 and 1998 respectively). A006 is generally a more detailed survey than A032. However, the overlap is minor and A032 appears to have a better fit to the habitat boundaries on the aerial photo.
51	A001 A033	A001	Surveys are of considerably different date (1999 and 1985 respectively). Both surveys only recognise one habitat type within the area of overlap, while there are two habitat types according to the aerial photo. Preference would be for bracken (A001) over woodland (A033), however, the boundaries are not aligned with the aerial in any case.
52	A028 A035	A028	Surveys are classified to be of medium confidence, being dated 1999 and 1993 respectively. A028 appears to be better fit with the aerial photo. However, A035 contains NVC community info for some of the polygons. There are also some code mismatches.
57	A028 A035	A028	Surveys are classified to be of medium confidence, being dated 1999 and 1993 respectively. A028 appears to be better fit with the aerial photo. However, A035 contains NVC community info for some of the polygons. There are also some code mismatches.
58	A028 A035	A028	Surveys are classified to be of medium confidence, being dated 1999 and 1993 respectively. A028 appears to be better fit with the aerial photo. However, A035 contains NVC community info for some of the polygons. There are also some code mismatches.
59	A028 A035	A028	Surveys are classified to be of medium confidence, being dated 1999 and 1993 respectively. A028 appears to be better fit with the aerial photo. However, A035 contains NVC community info for some of the polygons. There are also some code mismatches.
65	A035 A039	A035	No metadata are known about A039. Both surveys appear to be comparably detailed. In the overlapping areas there is a mismatch of codes, and it is not possible to determine which classification is correct due to similar appearance of upland habitats of the open ground. Given the lack of metadata

FID	OVERLAP	PRIORITY SURVEY	REASONING
			for A039, preference would be for A035, which is dated 1993.
66	A032 A039	A032	Both surveys identify the overlapping areas as woodland habitats, however, A039 classifies it as A1.1.1, while A032 classifies it as A1.2.2. According to the OS base map the underlying habitat is coniferous woodland, therefore A032 is more likely to be correct.
70	A005 A032 A039	A032	Os base map shown that the underlying habitat is coniferous woodland. Aerial photo confirms it is a woodland type, however, it is not possible to distinguish whether broad-leaved or coniferous woodland. A005 identifies the overlapping area as A1.1.1, A032 as one large block of A1.2.2 and A039 as A1.1.1.
32	A001 A022	A022	Both surveys are of medium confidence, however, none of them appear to be particularly well aligned with the aerial photo. They are both showing bracken habitats where there is woodland according to the aerial photo. **Decision based on the following overlap of the same surveys.**
60	A031 A037	A031	A031 is dated 1998, date of A037 is unknown. Habitat boundaries in A031 seem to be better aligned to those in the aerial photo. A037 is much more detailed, but boundary matching is not quite as accurate. It shows many small polygons (B2.1, F2.1, F2.2) where the more recent survey only shows one habitat. **Decision is based on the higher confidence of A031, despite its resolution being lower.**
62	A031 A037	A031	A031 is dated 1998, date of A037 is unknown. Habitat boundaries in A031 seem to be better aligned to those in the aerial photo. A037 is much more detailed, but boundary matching is not quite as accurate. It shows many small polygons (B2.1, F2.1, F2.2) where the more recent survey only shows one habitat. **Decision is based on the higher confidence of A031, despite its resolution being lower.**

Appendix 5

NVC Survey Overlap Resolution Log

FID	OVERLAP	PRIORITY SURVEY	REASONING
35	B004 B017	B017	Surveys are almost completely overlapping, however, B004 contains some additional polygons which cover considerably large area. Habitat boundaries are not exactly aligned, they appear to be slightly offset. Habitat codes are generally corresponding. In the overlapping part of the surveys there are marginally more polygons in B017 than there are in B004. No metadata are known about B004, while B017 is of known provenance.
37	B004 B019	B019	No metadata are known about B004, while date and provenance of B019 is known. In the overlapping area, B004 classifies the overlapping habitats as one vegetation community only (M25), while B017 recognises more communities in the same area.
42	B005 B017	B017	While B005 is a very recent survey (2004, as opposed to 1993), one of the overlapping areas was excluded from this survey and the other area contained a woodland community code. The same area contained more detail in B017.
43	B005 B018	B005	No metadata are known about B018, while date and provenance of B005 is known (2004). The overlapping area is in B018 covered by one large polygon which does not have any NVC community code, while the same area in B005 is covered by a number of NVC communities.
49	B005 B033	B005	Overlapping area is very minor. It is by both surveys classified as W11, therefore B005 will be a preferred survey based on this survey being more recent.
53	B006 B022	B006	Both surveys are equally recent (1998 and 1997 respectively) and both identified overlapping area as U10. Therefore the decision which survey should be used is arbitrary.
76	B013 B022	B013	Overlap is minor (2 slivers), overlapping surveys are dated 2000 and 1997 respectively. Slivers are classified as CG11 and M10a by the more recent survey, while both slivers are classified as a mixture of U7/CG11/M11 by the older survey. Mapping within the area of concern appears to be more detailed in case of B013, which is also a more recent survey.
77	B013 B022	B013	Overlap is minor (2 slivers), overlapping surveys are dated 2000 and 1997 respectively. Slivers are classified as CG11 and M10a by the more recent survey, while both slivers are classified as a mixture of U7/CG11/M11 by the older survey. Mapping within the area of concern appears to be more detailed in case of B013, which is also a more recent survey.
85	B012 B035	B012	B012 identifies the overlapping areas as phase 1 habitat codes only (B4 and A2.1), and the same identification was given by B035. No metadata are known about B035, while the date and provenance of B012 is available.

FID	OVERLAP	PRIORITY SURVEY	REASONING
88	B013 B022	B013	Based on the above information about the two surveys (FID 76 and 77), B013 was chosen as a priority survey.
89	B013 B022	B013	Based on the above information about the two surveys (FID 76 and 77), B013 was chosen as a priority survey.
92	B015 B017	B015	Surveys are of a similar age (1992 and 1993 respectively). B017 only recognises one habitat type within the area of overlap (M25), while B015 identifies more habitat types and appears to be more detailed.
100	B018 B033	B033	No metadata available for B018, while full metadata available for B033 (1998). Most of the large overlapping polygons do not have any habitat codes attached to them in B018. B033 shows rather good fit with the aerial photo as well.
102	B018 B035	B035	No metadata available for either of the surveys. The overlapping polygons do not have any habitat codes attached to them in B018, while habitat information is available for B035.
103	B018 B036	B018	No metadata available for either of the surveys. While the overlapping area is identified as 'W' by B036, more habitat types (woodland and open ground) are identified by B018. This is more in correspondence with what the aerial photo shows.
104	B018 B038	B038	No metadata are available for B018, while metadata are known for B038. This survey identifies two different NVC communities within the area of overlap, while the older survey only classifies the area as one community.
111	B023 B026	B026	Surveys are dated 1999 and 2006 respectively. Within the area of overlap B023 only recognises two NVC communities, while B026 is a lot more detailed.
115	B024 B035	B035	No metadata are known about B035, while metadata are available for B024. However, the polygon of the overlapping area does not contain any information in case of B024, while it classifies the habitats within the overlapping area in B035. Fit with the aerial photo is not very accurate though.
118	B026 B033	B026	B026 is a high confidence survey and B033 is a medium confidence survey. In many of the overlapping polygons the habitat classification appears to be identical and in many cases the polygon boundaries are identical too. However, on closer examination B026 appears to be more detailed and better aligned with the aerial photo.
121	B026 B036	B026	B036 is a low confidence survey and within the area of overlap it does not contain any specific NVC

FID	OVERLAP	PRIORITY SURVEY	REASONING
			community codes.
123	B028 B038	B026	B038 is a medium confidence survey, B026 is a high confidence survey. Within the area of overlap, large areas of B038 do not contain any vegetation classification information and it is also less detailed than B026. B026 appears to be a better fit with the aerial photo as well.
129	B030 B036	N/A	Outside of the NP boundary.
132	B031 B036	B031	B031 is a medium confidence survey, while B036 is of a low confidence. B036 classifies the whole area of overlap as felled coniferous plantation, while B031 distinguishes between coniferous plantation and felled coniferous plantation, which is a better fit with the aerial photo.
135	B033 B035	B033	B033 is a medium confidence survey, while B035 is of low confidence. B033 appears to be more detailed within the areas of overlap, particularly so in the large overlapping area in the east, where a large part of the overlap is identified as a phase 1 habitat D1.1 by B035, while a mosaic of different habitats is identified by B033, which is a better fit with the aerial photo.
136	B033 B036	B033	B033 is a medium confidence survey, while B036 is of low confidence. B036 is in some areas of overlap missing any habitat information and in others it does not appear to be detailed enough. B033 provides vegetation classification for all areas of overlap, is more detailed and better aligned with the aerial photo.
140	B035 B036	N/A	Overlapping areas are outside of the NP boundary.
141	B035 B038	B035	B035 is a low confidence survey and B038 is of a medium confidence. However, within the area of overlap, B038 identifies this whole area as one large polygon, without any habitat information assigned to it. On the contrary, B035 identifies many polygons and habitat information is provided.
143	B036 B038	B038	B036 is a low confidence survey and B038 is of a medium confidence. In B036, the area of overlap is part of one large polygon only classified as coniferous woodland. In B038, however, the same area is classified as an open habitat type, which is in line with the aerial photo.
5	B002 B003 B036	B003	B003 is a medium confidence survey while B002 and B036 are of low confidence. Both B002 and B036 identify all areas of overlap as some kind of woodland NVC community. B003 recognises an open ground habitat types in addition to the woodland habitats, which is in line with the aerial photo.
11	B002 B005 B036	B005	Surveys are classified as low, high and low in confidence. Both B002 and B036 identify the overlapping areas as part of one large polygon W17. B005 is more detailed, identifying more woodland types as well as habitats of the open ground within the woodland areas, which is a good match with the aerial

FID	OVERLAP	PRIORITY SURVEY	REASONING
			photo.
14	B002 B011 B036	B011	Surveys are classified as low, medium and low confidence. Both B002 and B036 classify the area of overlap as woodland W18b. However, the aerial photo shows that the areas of concern are covered in habitats of the open ground. B011 identified the overlapping areas as mire habitats, which is in line with what the aerial photo.
15	B002 B035 B036	B035	All surveys are classified as low confidence surveys. B002 and B036 identify the overlapping areas as the same habitats (all woodland codes, one large polygon). B035 identifies several woodland community types and also includes a small area of open ground habitats, which corresponds with the aerial photo.
17	B002 B018 B036	B036	All surveys are classified as low confidence surveys. In B018, overlapping areas do not contain any vegetation classification information. B002 and B036 identify the overlapping areas as the same habitats, both surveys identify the communities within the individual overlapping polygons down to NVC4 level. B036 appears to be a survey with fewer zero gaps or overlaps, therefore this survey was selected to be used.
19	B002 B024 B035	B002	Surveys are classified as low, medium and low in confidence respectively. B035 appears to be the most detailed survey of the three, however, the habitat codes in the overlapping polygons are phase 1 habitat codes as opposed to NVC community codes. Classification of the overlapping areas by B002 and B024 is identical. B002 seems to be the survey with fewer gaps and overlaps and therefore was selected to resolve the overlap.
21	B002 B024 B036	B024	Surveys are classified as low, medium and low in confidence respectively. Classification of the overlapping polygons by B002 and B036 is identical. Medium confidence survey (B024) differs slightly in community codes, yet still classifies the areas as woodland habitats and it is also a good fit with the aerial photo.
23	B002 B026 B036	B026	Surveys are classified as low, high and low confidence respectively. Classification of the overlapping polygons by B002 and B036 is identical. B026 is more detailed survey of recent origin, and is also a better fit with the aerial photo.
41	B005 B012 B035	B005	Surveys are classified as high, medium and low confidence respectively. B012 appears to be more detailed than B005 within the area of overlap, however, some of the overlapping polygons are missing information about vegetation classification or only contain phase 1 equivalent. The same applies to B035, which appears to be identical to B012 within the area of overlap. B005 is the most recent survey

FID	OVERLAP	PRIORITY SURVEY	REASONING
			and is the best fit with the aerial photo.
44	B005 B033 B018	B005	Surveys are classified as high, medium and low in confidence respectively. B018 does not contain any vegetation classification information for the polygons within the area of overlap. B033 appears to be considerably less detailed than B005 and is also of an older date.
46	B005 B018 B035	B005	Surveys are classified as high, low and low confidence respectively. B018 does not contain any vegetation classification information for the polygons within the area of overlap. B035 is a survey of low confidence and despite its reasonable fit with the aerial photo, fit of B005 is better and this survey is also of a very recent date.
50	B005 B033 B035	B005	Surveys are classified as high, medium and low confidence respectively. B035 does not provide NVC community information for the area of overlap, it only gives the phase 1 equivalent. B033 classifies the area of overlap as W17. B005, the most recent survey classifies the area of overlap as W17b.
57	B026 B023 B032	B026	Surveys are classified as high, medium and medium confidence. Within the areas of overlap the polygon boundaries are essentially identical for all three surveys. Within the area of overlap B023 and B032 are identical. There is a minor vegetation code difference in one polygon in B026. Due to the most recent date of this survey, it will be used to resolve the overlap.
71	B032 B035 B038	B032	Surveys are classified as low, medium and medium confidence respectively. Only phase 1 habitat codes are provided by B035. Large areas of the overlap are unclassified by B038. Full vegetation classification description is provided by B032.
84	B012 B018 B035	B012	Surveys are classified as medium, low and low confidence respectively. No data is provided for the area of overlap by B018. B012 and B035 are identical within the area of overlap. B012 is a higher confidence survey, therefore will be used to resolve the overlap.
101	B018 B033 B035	B033	Surveys are classified as low, medium and low confidence respectively. Overlap is very minor. B018 contains no data for the area of overlap. B033 identifies the overlapping areas as W4b, H12a and M15d. B035 identifies the overlapping areas as M25a, H12a and M15d. According to the aerial photo one of the overlaps indeed falls within the area of woodland habitat, and B033 is also the highest confidence survey.
119	B026 B033 B038	B026	Surveys are classified as high, medium and medium. B038 – large areas of overlap are missing vegetation classification codes. B033 and B026 – similarity in distribution of polygons and classification. Due to higher confidence level, B026 will be used to resolve the overlap.

FID	OVERLAP	PRIORITY SURVEY	REASONING
120	B026 B035 B038	B026	Surveys are classified as high, low and medium confidence respectively. Only phase 1 habitat codes are provided for the area of overlap by B035 and the area of overlap is unclassified by B038. B026 will be used to resolve the overlap.
122	B026 B036 B038	B026	Surveys are classified as high, low and medium confidence respectively. No vegetation or habitat codes are provided by B036. Large areas of overlap (B038) are unclassified. B026 will be used to resolve the overlap.
137	B033 B036 B038	B038	Surveys are classified as medium, low and medium confidence respectively. B036 does not inlcude any habitat description codes in the area of overlap. B033 and B038 identify the overlapping areas as the same types of habitats, with B038 provided a bit more detail (sub-communities).
4	B002 B003 B035 B036	B003	Surveys are classified as low, medium, low and low confidence respectively. B002 and B036 are identical in their identification of habitats, however, they are of a low resolution. Distribution and classification of communities in B003 and B035 is very similar, however, B035 is a low confidence survey, therefore B003 will be selected for overlap resolution.
9	B002 B005 B024 B035	B024	Surveys are classified as low, high, medium and low. B005 – area of overlap does not contain any habitat information. B035 – only containing phase 1 habitat codes. B002 and B024 are identical within the area of overlap, with reasonable detail and fit to the aerial photo. B024 is a higher confidence survey therefore will be used for overlap resolution.
10	B002 B005 B035 B036	B005	Surveys are classified as low, high, low and low confidence respectively. B035 only identifies the area of overlap as phase 1 codes. B002 and B036 are identical within the area of overlap, however, not detailed enough. B005 is a high confidence survey with enough detail and good fit with the aerial photo.
13	B002 B011 B035 B036	B011	Surveys are classified as low, medium, low and low confidence respectively. Overlap is minor. B035 only contains phase 1 codes for the area of overlap. B002 and B036 identify the vegetation within the overlapping areas identically, but with low resolution (one large polygon of W18b). The aerial photo does not identify any woodland habitats within the areas of overlap. B011 appears to be the most suitable survey for overlap resolution, identifying several types of mire habitats within the area of overlap.
16	B002 B018 B033 B036	B033	Surveys are classified as low, medium and low confidence respectively. B018 provides no habitat information for the overlapping areas. B002 and B036 are identical within the areas of overlap, but of low resolution, lacking detailed mapping. B033 appears to be the most suitable survey, with most detail

FID	OVERLAP	PRIORITY SURVEY	REASONING
			and reasonable fit with the aerial photo.
24	B002 B026 B036 B038	B026	Surveys are classified as low, high, low and medium confidence respectively. B002 and B036 classify the overlapping areas identically as large polygons of low resolution (W4a, W11c, W11a). B038 contains more detail, however, there are some large overlapping polygons that do not contain any vegetation classification or only contain phase 1 habitat codes. B026 is the most detailed survey, with good fit with the aerial photo and habitat information for all overlapping polygons.
29	B002 B035 B036 B038	B036	Surveys are classified as low, low, low and medium confidence respectively. B038 – no vegetation classification available for the areas of overlap. B035 – classifies the overlapping areas as phase 1 codes only. B002 and B036 – classification of the overlapping areas is identical. Both surveys are low confidence surveys, however, B036 appears to contain fewer internal gaps and overlaps, therefore it will be used for overlap resolution.
40	B005 B012 B018 B035	B005	Surveys are classified as high, medium, low and low confidence respectively. B018 does not provide any vegetation classification for the area of overlap. Classification of habitats within the overlapping area is identical in B012 and B035. B005 appears to me the most detailed survey within the area of overlap and is also the most recent survey of high confidence.
65	B026 B032 B035 B038	B026	Surveys are classified as high, medium, low and medium. B038 is missing information on vegetation classification for the area of overlap. B035 provides only a phase 1 equivalent for the area of overlap. B032 classifies the area of overlap as M19a and B026 classifies the area of overlap as M17a. This is the high confidence survey and therefore will be used to resolve the overlap.
83	B012 B018 B033 B035	B033	Surveys are classified as medium, low, medium and low confidence respectively. B018 des not contain any habitat information for the area of overlap. Classification of the areas of the overlap is identical for B012 and B035. B033 identifies the areas of overlap as H12a and W4b, which appears to be the best fit with the aerial photo.
6	B002 B005 B018 B033 B036	B005	Surveys are classified as low, high, low, medium and low confidence respectively. B018 does not contain any habitat information for the area of overlap. B002 and B036 have an identical classification for the area of overlap (W11/W7). B033 identifies the overlap as W17d and B005 identifies the overlap as W11b. B005 is the high confidence survey and therefore will be used to resolve the overlap.
22	B002 B026 B035 B036 B038	B026	Surveys are classified as low, high, low, low and medium confidence respectively. B035 identifies the area of overlap with phase 1 code and B038 does not contain information about habitat classification. B036 and B002 identify the area of overlap as W11a and the high confidence survey (B026) classifies it

FID	OVERLAP	PRIORITY SURVEY	REASONING
			as W17b.
39	B005 B012 B018 B033 B035	B005	Surveys are classified as high, medium, low, medium and low in confidence. Overlap is minor. The habitat classification differs between the surveys and ranges from woodland habitats to mire habitats. Aerial photo is more in favour of woodland habitat classification. Due to the small size of the overlap, without further consideration the most recent high confidence survey will be used to resolve the overlap.
59	B023 B026 B032 B033 B038	B026	Surveys are classified as medium, high, medium, medium and medium confidence. Polygons of B023, B026 and B032 have within the area of overlap identical boundaries. Polygon boundaries (and vegetation classification) of B033 and B038 are identical, but are slightly different to the other three surveys. B026 will be used to resolve the overlap since it is the high confidence survey and is identical or very similar to all the other surveys.
18	B002 B024	B024	Surveys are classified as low and medium confidence respectively. Within the areas of overlaps surveys appear to be identical, with identical polygon boundaries and community codes. In a spot check area B024 contained 2 more polygons than B002, these two polygons were non-woodland polygons. B024 is a surveys of higher confidence, therefore will be used to resolve the overlaps.
30	B002 B036	B036	Surveys appear to be identical in terms of both habitat boundaries and habitat classification. B036 does not contain any overlaps and gaps.
47	B005 B024	B024	B005 is more recent survey of the two (2004). B024 is dated 1992. Habitat boundaries in B005 appear to be better fit to those on the aerial photo, however, one of the overlapping polygons has no habitat information available, since it was excluded from the survey, while NVC community codes are available for all overlapping areas in B024.
48	B005 B028	B005	The overlap is minor (approx 47m long). B028 identifies the overlapping area as M23, while B005 classifies it as MG6, which appears to be a better fit with the field boundaries on the OS base map. Both surveys are of a recent origin (2004 and 2005 respectively).
51	B005 B035	B005	Surveys are classified as high and low confidence respectively. B035 only provides phase 1 habitat codes within the area of overlap. B005 gives full community codes.
61	B023 B032	B023	Surveys are identical and largely overlap, with identical polygon boundaries and habitat codes. However, either survey covers some areas which are not covered neither by the second survey nor by any other survey. B023 does contain fewer gaps and overlaps within the survey file (internal digitising errors).

FID	OVERLAP	PRIORITY SURVEY	REASONING
70	B032 B035	B032	Surveys are classified as medium and low confidence respectively. B035 only provides phase 1 habitat codes, while B032 provides NVC codes.
72	B032 B038	B038	Both surveys originate in 1999. Within the area of overlap, which is minor, there are code mismatches. The overlap between the surveys is represented by long and narrow strips approximately 3-12m wide. Since this is considered an area of minor extent, B038 was elected on the basis of containing fewer internal gaps and overlaps.
82	B011 B019	B011	Surveys are dated 1998 and 1992 respectively. B011 identifies the overlapping area as M15a, while the older survey classifies the same area as M25. Correct habitat classification is not possible to be inferred from the aerial photo. Aerial and the OS base map don't match, one put the overlapping areas to the north of the river and one to the south. In case of B011 the overlaps fall to the north of the river (which constitutes a boundary between the surveys) on the aerial, hence it makes sense that B011 should be considered as a preferential survey to resolve the overlaps.
95	B017 B019	B017	Surveys are of a similar age (1993 and 1992 respectively). B017 appears to be more detailed survey. Codes in the area of overlap mostly match, however, there are some mismatches, where B017 identifies the area as U4, while B019 identifies the same area as M25.
96	B017 B028	B017	Surveys are dated 1993 and 2005 respectively. While B028 is a more recent survey, B017 appears to be more credible. B028 is digitised poorly, with lots of gaps between the survey polygons. It also shows habitats of the open ground where the aerial photo (dated 2005) shows coniferous woodland. This would require a considerable amount of ground truthing.
98	B018 B026	B026	Surveys are classified as low and high confidence respectively. Overlap is minor and there are code mismatches between the surveys within the area of overlap. B026 is a high confidence survey hence will be used to resolve the overlap.
108	B021 B022	B021	Surveys are of a similar age (1996 and 1997 respectively). B021 is the 'regular polygon shape' survey. However, it actually recognises a higher number of NVC communities within the overlapping areas than B022. Also, this survey is better aligned with the field boundary visible on the aerial photo. Polygons of the B022 extend beyond this boundary, which is unlikely.
112	B023 B032	B023	Surveys are identical and largely overlap, with identical polygon boundaries and habitat codes. However, either of the surveys covers some areas which are not covered neither by the second survey nor by any other survey. B023 does contain fewer gaps and overlaps within the survey file (digitising errors).

FID	OVERLAP	PRIORITY SURVEY	REASONING
128	B030 B031	B030	Both surveys are of medium confidence (dated 2004 and 1998 respectively). Overlap is minor at the edges of both surveys, including upland communities and it cannot be resolved using the aerial photo. There is some discrepancy in classification of vegetation within the areas of overlap. Within the overlapping areas B030 appears to be more detailed, specifying the percentage cover of the main communities with each overlapping polygon. B030 is also a higher confidence survey and will be used to resolve the overlap.
131	B031 B035	B031	B031 is a medium confidence survey and B035 is of low confidence, with unknown metadata. There are classification mismatches within the overlapping areas. Generally, B031 appears to be more suitable, since it is more recent, however, within the overlapping areas some polygons of B031 don't contain any habitat information B035, however, only contains phase 1 habitat codes.
138	B033 B038	B033	Both surveys are of medium confidence (dated 1998 and 1999 respectively). None of habitat classification within the overlapping areas is matching. The overlapping area is minor, comprising a narrow long strip approximately 2m wide.
0	B002 B010 B024	B024	Surveys are classified as low, high and medium confidence. B010 appears to generally be most detailed survey, with good fit with the aerial photo, however, some of the overlapping areas are by this survey classified to phase 1 level as opposed to NVC level and do not seem to be correct when compared with the aerial photo. In some of the overlapping areas B024 appears to be more suitable survey to be used, with correct mapping and inclusion of NVC sub-communities, despite its lower confidence.
8	B002 B005 B024	B024	Surveys are classified as low, high and medium confidence respectively. In B005, no habitat information is available for the areas of overlap. Classification of the areas of overlap by B002 and B024 is identical. B002 lists communities up to NVC 4, while B024 only identifies a maximum of two main communities within each polygon of overlapping areas. However, B002 is considered to be a survey of low confidence.
12	B002 B032 B036	B032	Surveys are classified as low, medium and low in confidence. Both B002 and B036 identify the overlapping areas as identical habitats, however, the identification of a block of what appears to be a coniferous plantation woodland as W4 (*Betula pubescens-Molinia caerulea* woodland) appears to be lacking credibility. B032 identifies the overlapping areas as coniferous plantation woodlands only, giving phase 1 habitat code. None of the surveys match the aerial photo.
27	B002 B033	B033	Surveys are classified as low, medium and low confidence. B033 is the most detailed survey, however,

FID	OVERLAP	PRIORITY SURVEY	REASONING
	B036		some of the polygons have not been classified. It should be used as a preferential survey for overlap resolution.
28	B002 B035 B036	B002	B035 contains only phase 1 habitat codes within the area of overlap. B002 and B036 (both low confidence surveys) are identical within the area of overlap.
31	B002 B036 B038	B038	Surveys are identified as low, low and medium confidence. Classification of overlapping areas by B002 and B036 is identical. B038 appears to be more detailed within the areas of overlap, it identifies open areas within the woodland stands, however, some of the polygons within the area of overlap do not contain any information on vegetation classification, or only contain a phase 1 equivalent.
36	B004 B017 B019	B017	Surveys are classified as low, medium and medium in confidence. Within the overlapping area habitat classification is identical in B004 and B017, however, the polygon boundaries are slightly different. B019 appears to contain more detail within the area of overlap (more vegetation types identified), however, some small polygons are missing information on vegetation classification.
56	B018 B032 B033	B033	Surveys are classified as low, medium and medium confidence. Overlap is minor. B018 does not contain any information about vegetation classification within the area of overlap. B032 classifies the area of overlap as coniferous plantation A1.2.2. B033 classifies the area of overlap as W7c. OS base map shows that the overlap falls within the stream, which is also confirmed by the aerial photo. From the aerial it seems that both banks of the stream are covered in broad-leaved woodland, as opposed to coniferous plantation found to the south of the stream.
63	B023 B032 B038	B023	Surveys are classified as medium confidence. B023 and B032 identification of the overlapping areas is identical. Identification of the overlaps by B038 is very similar, with one discrepancy (M17a given by B038 and M19a given by B023 and B032). B038 is less detailed than the other two surveys. B023 contains fewer internal gaps and overlaps.
66	B026 B032 B038	B026	Surveys are classified as high, medium and medium confidence respectively. All three surveys provide different classification for the area of overlap. B026 appears to be the most detailed survey and it is a survey of a high confidence.
99	B018 B026 B038	B026	Surveys are classified as low, high and medium confidence respectively. All three surveys provide different vegetation classification for the areas of overlap. The overlap is approximately 50-100m wide and all three surveys suggest a mixture of bog and grassland habitats are found within the area of overlap. B026 is the highest confidence survey, therefore will be used for overlap resolution.

FID	OVERLAP	PRIORITY SURVEY	REASONING
45	B005 B018 B033 B035	B005	Surveys are classified as high, low, medium and low confidence. Overlap is minor. B018 does not provide any habitat information for the area of overlap. B035 classifies the area of overlap as communities of the open ground. B033 classifies the area as W4/W11 and B005 as W11b. B033 however gives the percentage cover of each community recorded within individual polygons. Aerial photo suggests the boundary between the woodland and open ground habitats.
58	B023 B026 B032 B033	B026	Surveys are classified as medium, high, medium and high confidence. Overlap is minor. Surveys B023, B026 and B032 are identical in classifying the vegetation within the area of overlap (B026 splits the area to a few more polygons than the other 2). Habitat classification is different in B033, which does not identify any heathland habitats.
60	B023 B026 B032 B038	B026	Surveys are classified as medium, high, medium and medium confidence. Polygon boundaries for all surveys are predominantly identical (particularly B023 and B026), however, there are some discrepancies in all four instances. All surveys appear to be a good fit with the aerial photo. Mapping in B026 is highly accurate, with only a few alterations to 1999 surveys.
2	B001 B035	**B035**	Surveys are classified as medium and low confidence respectively. B001 is dated 1991,while no metadata are known about B035, and this survey has many more cells populated with phase 1 habitat codes than with NVC codes. Fit of the habitat boundaries to those on the aerial photo is much better in B035, particularly the river banks, however, areas shown as wooded on the aerial s are classified as open ground habitats by the survey. B035 also recognises small islands in the middle of the stream, while B001 does not distinguish these. **Survey appears to be more detailed.**
33	B003 B035	**B003**	Surveys are classified as medium and low confidence respectively. Polygon boundaries are very similar, however, the habitat classification differs in some cases, e.g. CG versus U. It is difficult to make a decision about which survey should be used. If the survey datefor both surveys was known, the more recent survey would be selected, since the surveys appear to be based on each other. **B003 appears to be more recent survey of higher confidence.**
54	B010 B032	**B032**	B010 is a very recent survey (2005), while B032 is dated 1999. B032 is, however, more detailed, identifying more habitats in the area of overlap than B010 does. Both surveys are reasonably well aligned with the aerial photo. **B032 appears to be a better fit with the aerial photo.**

FID	OVERLAP	PRIORITY SURVEY	REASONING
55	B018 B032	**B018**	No metadata are available for B018, while date and provenance of B032 is known (1999). The area of overlap is covered by only two NVC types in B032 though, while in the same area, at least 5 different NVC communities are identified in B018. **B018 is more detailed survey, although it is of lower confidence.**
64	B026 B032	**B026**	B026 is very recent survey (2006), and B032 is dated 1999. Within the area of overlap the more recent survey identifies two different communities (M19a, U6d), while the older survey identifies three communities (U7b, U5b, M19). It is not possible to determine which of the classification is correct from the aerial photo. **B026 is higher confidence survey.**
68	B032 B033	**B032**	Overlap between the surveys is minor. Some of the overlapping areas are identified as the same NVC communities by both surveys, but in some cases there are mismatches. Surveys are dates 1999 and 1998 respectively, both are of medium confidence. **Surveys are of the same confidence, however, B032 will result in a more natral boundary line.**
114	B024 B027	**B024**	B027 is of low confidence since the metadata are unknown, B024 is dated 1992, with known metadata. However, mapping in case of B027 appears to be more detailed, also given percentage proportions of woodland communities within the polygons. B024 is solely focused on woodland blocks only, while B027 maps surrounding open ground as well. Within the area of overlap the two surveys classify polygons as different woodland communities (e.g. oak woodland versus wet woodland). **B024 is a higer confidence survey.**
26	B002 B031 B036	**B036**	Surveys are classified as low, medium and low confidence. B031 appears to be a more detailed survey with habitat boundaries matching the aerial photo, however, information about vegetation classification is missing for some of the overlapping polygons, or is provided as phase I habitat code as opposed to NVC code. Classification of the overlapping polygons by B002 and B036 is identical. It would be worth to use the B031 where possible as it contains a good detail and is more recent. However, the gaps would be required to be filled with either B002 or B036. **Decision is arbitrary.**
62	B023 B032 B033	**B033**	All surveys are classifies as medium confidence. Identification of the overlap by B023 and B032 is identical. Habitat classification in B033 differs from the previous two. B033 appears to be better aligned with the topographic features of the terrain and contain s more polygons within the area of

FID	OVERLAP	PRIORITY SURVEY	REASONING
			overlap. Surveys were carried out in a similar time and by reputable surveyors. Habitat classification of completely different and neither of the surveys specifically matches the aerial. **B033 is a better fit with the topography.**
69	B032 B033 B035	**B033**	Surveys are classified as medium, medium and low confidence respectively. Only phase 1 habitat codes are provided by B035. B032 classifies the area of overlap as H12a, B033 as M19. It is not possible to determine the correct habitat type from the aerial photo. Both surveys are of medium confidence, dated 1999 and 1998 respectively. **Decision is arbitrary.**
7	B002 B005 B018 B036	**B005**	Surveys are classified as low, high, low and low confidence respectively. B018 contains no data for the areas of overlap. B002 and B036 are identical in their classification of the overlapping areas (however, mapping is at a low resolution). B005 is the most detailed and recent survey, however, it classifies the overlapping areas as swamp habitats, while according to the aerial photo these fall within the woodlands (with swamp-like habitats adjacent) **B005 is the most recent and high confidence survey.**
20	B002 B024 B035 B036	**B024**	Surveys are classified as low, medium, low and low confidence respectively. B035 only contains phase 1 habitat codes. B002, B024 and B036 identify the overlapping areas identically. Neither B024 nor B036 contain any internal gaps and overlaps, so any of the two surveys can be used to resolve the overlap. **B024 is a survey of higher confidence.**
25	B002 B031 B035 B036	**B036**	Surveys are classified as low, medium, low and low confidence respectively. B035 is detailed enough, but only provides phase 1 habitat codes. B031- majority of the overlap is not covered by any data, with small pockets of U20a and W17c. B002 and B036 classify the area of overlap as W17c. **Decision is arbitrary.**

Appendix 6

Phase I Habitat to UK BAP Priority Habitats Conversion Table.

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
A1.1.1	Broadleaved semi-natural woodland	Lowland Beech and Yew Woodland	Low	Not a common habitat in the national park?	Manual checks could be used to assign areas more likely to be lowland/wet woodland as opposed to upland woodland types	Still low because we don't know exact woodland type, just narrowed down priority BAP habitats that they may be.
		Wood-Pasture and Parkland	Low	Not a common habitat in the national park?		
		Upland Birchwoods	Low	Without manual check has to be low.		
		Upland Mixed Ashwoods	Low	Without manual check has to be low.		
		Upland Oakwood	Low	Without manual check has to be low.		
		Wet Woodland	Low	Without manual check has to be low.		
A1.1.1W	Broadleaved semi-natural woodland (wet)	Wet Woodland				
A1.1.2	Broadleaved plantation woodland	Lowland Beech and Yew Woodland	Low	Not a common habitat in the national park?	Manual checks could be used to assign areas more likely to be lowland/wet woodland as opposed to upland woodland types	Still low because we don't know exact woodland type, just narrowed down priority BAP habitats that they may be
		Wood-Pasture and Parkland	Low	Not a common habitat in the national park?		
		Upland Mixed Ashwoods	Low	Without manual check has to be low.		
		Upland Oakwood	Low	Without manual check has to be		

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
				low.		
		Wet Woodland	Low	Without manual check has to be low.		
A1.2.1	Coniferous semi-natural woodland	Native Pine Woodlands	Medium	Depends on species but only one potential priority BAP category.	Medium	Medium
A1.2.2	Coniferous plantation woodland	No corresponding Priority BAP habitat.				
A1.3.1	Mixed semi-natural woodland	Lowland mixed deciduous woodland	Medium	Depends if habitat corresponds with lowland, but only one priority BAP choice.	General check to see if likely to be lowland.	Medium
A1.3.2	Mixed plantation woodland	Lowland mixed deciduous woodland	Medium	Depends if habitat corresponds with lowland, but only one priority BAP choice.	General check to see if likely to be lowland.	Medium
A2.1	Dense/continuous scrub	No corresponding Priority BAP habitat.				

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
A2.2	Scattered scrub	Mountain Heaths and Willow Scrub	Low	In most areas not likely to be this, but some low potential.	Manual checks could be used to determine if the areas correspond with mountain gullies and valleys likely to support willow scrub. Place all unlikely areas as non-BAP habitats.	Medium
A3.1	Broad-leaved parkland/scattered trees	Wood-Pasture and Parkland	Medium	Not likely to be any of the other woodland types provided a competent phase I surveyor.		Medium
A3.2	Coniferous parkland/scattered trees	Wood-Pasture and Parkland	Medium	Not likely to be any of the other woodland types provided a competent phase I surveyor.		Medium
A3.3	Mixed parkland/scattered trees	Wood-Pasture and Parkland	Medium	Not likely to be any of the other woodland types provided a competent phase I surveyor		Medium
A4, A4.1, A4.2, A4.3	Recently-felled woodland	No corresponding Priority BAP habitat.				

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
B1.1	Unimproved acid grassland	Lowland Dry Acid Grassland	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat additionally two potential habitat types	Two - the upland lowland mask - to determine if it is a lowland grassland. Second apply the 500m coastal buffer check that none is in coastal areas and therefore could be maritime cliff and slope. Attribute anything within 500m to maritime cliff and slope, anything in lowland mask to lowland acid grass, and anything else as non priority BAP habitat.	Medium
		Maritime Cliff and Slopes	Low			Medium
B1.2	Semi-improved acid grassland	Lowland Dry Acid Grassland	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if lowland grassland.	Medium
B2.1	Unimproved neutral grassland	Lowland Meadows	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if lowland grassland	Medium

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
		Upland Hay Meadows	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if upland grassland	Medium
B2.1W	Unimproved neutral grassland (wet)	Lowland Meadows	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if upland grassland	Medium
		Upland Hay Meadows	Low			Medium
B2.2	Semi-improved neutral grassland	Upland Hay Meadows	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if upland grassland	Low (only one specific NVC type which falls into this BAP group).
B3.1	Unimproved calcareous grassland	Lowland Calcareous Grassland	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if lowland grassland.	Medium
		Upland Calcareous Grassland	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if upland grassland.	Medium
B3.2	Semi-improved calcareous grassland	Lowland Calcareous Grassland	Low	Not all grassland will be of the NVC type to qualify as the	Apply upland and lowland mask to determine if lowland grassland.	Medium

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
				priority BAP habitat.		
		Upland Calcareous Grassland	Low	Not all grassland will be of the NVC type to qualify as the priority BAP habitat.	Apply upland and lowland mask to determine if upland grassland.	Medium
B4	Improved Grassland	No corresponding Priority BAP habitat.				
B5	Marsh/marshy grassland	Coastal and Floodplain Grazing Marsh	Low	Three potential categories, plus most marshy grassland even if geographically correct won't necessarily be the correct NVC type.	Use two checks to assign - all marginal type habitats assigned to coastal and floodplain grazing habitats; anything identified in the lowland mask could be purple moor grass and rush pasture or lowland meadows (remains as low confidence) and anything above this purple moor grass and rush pasture only.	Low
		Lowland Meadows	Low			Low
		Purple Moor Grass and Rush Pastures	Low			Low
B6	Poor semi-improved grassland	No corresponding Priority BAP habitat.				

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
C1.1	Continuous bracken	No corresponding Priority BAP habitat.				
C2.1	Scattered bracken	No corresponding Priority BAP habitat.				
C3.1	Other tall herb and fern - ruderal	No corresponding Priority BAP habitat.				
C3.2	Other tall herb and fern - non ruderal	No corresponding Priority BAP habitat.				
D1.1	Acid dry dwarf shrub heath	Lowland Heathland	Medium	Could fall into one of two categories, but more than likely is one of the priority BAP habitats as the definition encompasses most NVC codes.	Apply mask to determine whether to attribute to upland or lowland.	High
		Upland Heathland	Medium			High
D2	Wet dwarf shrub heath	Lowland Heathland	Medium	Could fall into one of two categories, but more than likely is one of the priority BAP habitats as the definition encompasses most NVC	Apply mask to determine whether to attribute to upland or lowland.	High
		Upland Heathland	Medium			High

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
				codes.		
D3	Lichen/bryophyte heath	Lowland Heathland	Medium	Could fall into one of two categories, but more than likely is one of the priorityBAP habitats as the definition encompasses most NVC codes.	Apply mask to determine whether to attribute to montane zone or lowland.	High
		Mountain Heaths and Willow Scrub	Medium			High
D4	Montane heath/dwarf herb	Mountain Heaths and Willow Scrub	High	Classed as mountain heath - more or less certain to be this BAP habitat		High
D5	Dry heath/acid grassland mosaic	Lowland Dry Acid Grassland	Low	A mosaic is present and prior to checks not clear if upland or lowland.	Apply mask - if upland classify whole polygon as upland heathland medium confidence (clearly it is degraded with acid grassland coming in). If lowland apply medium confidence and show the polygon for both lowland grassland and lowland heathland.	Medium
		Lowland Heathland	Low			Medium
		Upland Heathland	Low			Medium
D6	Wet heath/acid	Lowland Dry Acid	Low	A mosaic is	Apply mask - if	Medium

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
	grassland mosaic	Grassland		present and prior to checks not clear if upland or lowland	upland classify whole polygon as upland heathland medium confidence (clearly it is degraded with acid grassland coming in). If lowland apply medium confidence and show the polygon for both lowland grassland and lowland heathland.	
		Lowland Heathland	Low			Medium
		Upland Heathland	Low			Medium
E1.6.1	Blanket bog	Blanket Bog	High	Description of blanket bog in JNCC generally accords with that in the priority BAP descriptions, not classed as modified in anyway and therefore likely to be priority BAP habitat.		High
E1.6.2	Raised bog	Lowland Raised Bog	Medium	Description of raised bog in JNCC generally accords with that in the priority BAP descriptions, not	Check polygons generally appear to be applicable to a lowland area.	High

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
				classed as modified in anyway and therefore likely to be priority BAP habitat.		
E1.7	Wet modified bog	Blanket Bog	Low	Could be one of two habitats, difficult to distinguish them geographically and also the term modified may mean that the habitat is not suitable for inclusion as a priority BAP habitat type due to its degraded status.	Upland / lowland mask - any polygons falling in lowland should be coded for blanket and raised bog, any above this, blanket bog only, low confidence.	Low
		Lowland Raised Bog	Low			Low
E1.8	Dry modified bog	Blanket Bog	Low	Could be one of two habitats, difficult to distinguish them geographically and also the term modified may mean that the habitat is not suitable for inclusion as a priority BAP habitat type due to its degraded	Upland / lowland mask - any polygons falling in lowland should be coded for blanket and raised bog, any above this, blanket bog only, low confidence.	
		Lowland Raised Bog	Low			Low

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
				status.		
E2.1	Acid/neutral flush/spring	Lowland Fens	Low	Could be one of two habitats and NVC type may not be correct as only 'potentially overlaps with'.	Apply upland lowland mask to separate out the two.	Medium
		Upland Flushes, Fens and Swamps	Low			Medium
E2.2	Basic flush/spring	Lowland Fens	Low	Could be one of two habitats and NVC type may not be correct as only 'potentially overlaps with'.	Apply upland lowland mask - apply the lowland mask to separate out the two.	Medium
		Upland Flushes, Fens and Swamps	Low			Medium
E3	Fen	Lowland Fens	Low	Could be one of two habitats, but equally not definitely one of either, depends on NVC type and species composition.	If in the lowland, classify as lowland fens, both lowland and upland can also be purple moor grass and rush pasture.	Low
		Purple Moor Grass and Rush Pastures	Low			Low
E3.1	Valley mire	Lowland Fens	Low	Could be one of two habitats, but equally not definitely one of either, depends on NVC type and species	If in the lowland, classify as lowland fens, both lowland and upland can also be purple moor grass and rush pasture.	Low
		Purple Moor Grass and Rush Pastures	Low			Low

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
				composition.		
E3.2	Basin mire	Lowland Fens	Low	Could be one of two habitats, but equally not definitely one of either, depends on NVC type and species composition.	If in the lowland, classify as lowland fens, both lowland and upland can also be purple moor grass and rush pasture.	Low
		Purple Moor Grass and Rush Pastures	Low			Low
E3.3	Flood-plain mire	Lowland Fens	Low	Could be one of two habitats, but equally not definitely one of either, depends on NVC type and species composition.	If in the lowland, classify as lowland fens, both lowland and upland can also be purple moor grass and rush pasture.	Low
		Purple Moor Grass and Rush Pastures	Low			Low
F1	Swamp	Lowland Fens	Low	Could be one of three habitats and equally could be included in none of them.	Apply upland and lowland mask to split upland and lowland fen, but reedbed should also be coded for all polygons whether in upland or lowland.	Low
		Upland Flushes, Fens and Swamps	Low			Low
		Reedbeds	Low			Low
F2.1	Marginal vegetation	No corresponding Priority BAP habitat.				
F2.2	Inundation vegetation	No corresponding Priority BAP habitat.				
G1	Standing water (unspecified)	Eutrophic Standing Waters	Low	Could be one of three habitats,		Low

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
		Mesotrophic Lakes	Low	but equally not definitely one of either, depends on nutrient status which is unspecified.		Low
		Oligotrophic and Dystrophic Lakes	Low			Low
G1.1	Eutrophic standing water	Eutrophic Standing Waters	Medium	Only one potential habitat, but still some potential uncertainty about trophic status.		Medium
G1.2	Mesotrophic standing water	Mesotrophic Lakes	Medium	Only one potential habitat, but still some potential uncertainty about trophic status.		Medium
G1.3	Oligotrophic standing water	Oligotrophic and Dystrophic Lakes	Medium	Only one potential habitat, but still some potential uncertainty about trophic status.		Medium
G2/ G2.1	Running water (unspecified)/ Eutrophic running water	Rivers - but has to meet very specific criteria.	Low			Low
H6.8	Open dune	Coastal Sand Dunes	High	Only one potential priority BAP habitat.	Not required	High

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
I1.1	Inland cliff (unspecified)	Inland Rock Outcrop and Scree Habitats	Medium	Only one potential habitat but still may not automatically fall into the priority BAP category.		Medium
I1.1.1	Acid/neutral inland cliff	Inland Rock Outcrop and Scree Habitats	Medium	Only one potential habitat but still may not automatically fall into the priority BAP category.		Medium
I1.2.1	Acid/neutral scree	Inland Rock Outcrop and Scree Habitats	Medium	Only one potential habitat but still may not automatically fall into the priority BAP category.		Medium
I1.4.1	Acid/neutral other exposure	Inland Rock Outcrop and Scree Habitats	Medium	Two potential priority BAP habitats.	Apply 500m buffer on the coastline, if falling within, assign to maritime cliff and slopes as well as inland rock.	Medium
		Maritime Cliff and Slopes	Medium			Medium
I1.4.2	Basic other exposure	Inland Rock Outcrop and Scree Habitats	Medium	Three potential priority BAP habitats.	Apply 500m buffer on the coastline, if falling within, assign to maritime cliff and slopes as well as inland rock and limestone pavements.	Medium
		Maritime Cliff and Slopes	Medium			Medium
		Limestone Pavements	Medium			Medium

Phase 1 habitat code	Phase 1 habitat	Priority BAP habitat	Confidence before manual checks	Explanation	Manual Checks?	Confidence after manual checks
I2.1	Quarry	No corresponding Priority BAP habitat.				
J1.1	Cultivated/disturbed land - arable	Arable Field Margins	Low			Low
J1.2	Cultivated/disturbed land - amenity grassland	No corresponding Priority BAP habitat.				
J3.4	Caravan site	No corresponding Priority BAP habitat.				
J3.6	Buildings	No corresponding Priority BAP habitat.				
J4	Bare ground	No corresponding Priority BAP habitat.				
J5	Other habitat	Unkown				
Unknown codes encountered in the survey files which will be coded non priority BAP	I1.4.1, I1.4.2, I 5 E4, E1.3.1 E1.6.7, B6.5			Unknown habitat - Unknown status.		

Appendix 7

NVC to UK BAP Conversion Tables.

NVC Mire Habitats

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Mire Communities						
M1	Sphagnum auriculatum bog pool community	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence levels.
		Overlaps with	Lowland Raised Bog		Medium	
M2, M2a, M2b	Sphagnum cuspidatum/recurvum bog pool community	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence levels.
		Overlaps with	Lowland Raised Bog		Medium	
M3	Eriophorum angustifolium bog pool community	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence levels.
		Overlaps with	Lowland Raised Bog		Medium	
M4	Carex rostrata - Sphagnum recurvum mire	may be included in fens	Upland Flushes, Fens and Swamps	Use upland lowland mask to determine.	High	NVC and BAP community descriptions accord very well, therefore high

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
		may be included in fens	Lowland Fens		High	confidence, particularly once separated out by used of upland and lowland masks.
M5	Carex rostrata - Sphagnum recurvum mire	may be included in fens	Upland Flushes, Fens and Swamps	Use upland lowland mask to determine	High	
		may be included in fens	Lowland Fens		High	
M6, M6a, M6ai, M6aii, M6b, M6bi, M6bii, M6c, M6ci, M6d, M6di, M6dii	Carex echinata - Sphagnum recurvum/auriculatum mire	may be included in fens	Upland Flushes, Fens and Swamps	Use upland lowland mask to determine	High	
		may be included in fens	Lowland Fens		High	
M7, M7b	Carex curta - Sphagnum russowii mire	may be included in fens	Upland Flushes, Fens and Swamps		High	
M9, M9a	Carex rostrata - Calliergon cuspidatum/giganteum mire	may be included in fens	Upland Flushes, Fens and Swamps	Use upland lowland mask to determine	High	
		may be included in fens	Lowland Fens		High	
M10, M10a, M10ai, M10aii	Carex dioica - Pinguicula vulgaris mire	may be included in fens	Upland Flushes, Fens and Swamps	Use upland lowland mask to determine	High	
		may be included in fens	Lowland Fens		High	
M11, M11a, M11b	Carex demissa - Saxifraga aizoides mire	may be included in fens	Upland Flushes, Fens and	Use upland lowland mask to determine	High	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
			Swamps			
		may be included in fens	Lowland Fens		High	
M12	Carex saxatilis mire	may be included in fens	Upland Flushes, Fens and Swamps		High	
M15, M15a, M15b, M15c, M15d	Scirpus cespitosus - Erica tetralix mire	Is contained in	Upland Heathland	Use upland lowland mask to determine	High	NBN table also includes bog habitats but these would fall under mire communities. High confidence of heath habitats using masks.
		Maybe included in	Lowland Heathland			
M16, M16a, M16d	Erica tetralix - Sphagnum compactum wet heath	Is contained in	Upland Heathland	Use upland lowland mask to determine	High	NBN table also includes bog habitats but these would fall under mire communities. High confidence of heath habitats using masks.
		Maybe included in	Lowland Heathland			
M17, M17a, M17b, M17c	Scirpus cespitosus - Eriophorum vaginatum blanket mire	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence levels
		Overlaps with	Lowland Raised Bog		Medium	
M18, M18a, M18b	Erica tetralix - Sphagnum papillosum raised and blanket mire	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
		Overlaps with	Lowland Raised Bog	be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium	levels
M19, M19a, M19b, M19c	Calluna vulgaris - Eriophorum blanket mire	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence levels
		Overlaps with	Lowland Raised Bog		Medium	
M20, M20b	Eriophorum vaginatum blanket and raised mire	Overlaps with	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be both habitats (medium confidence) anything in upland zone could be blanket bog (high confidence)	Medium - High	Some uncertainty as to which mire habitat they fall into reduces the confidence levels
		Overlaps with	Lowland Raised Bog		Medium	
M21, M21a, M21b	Narthecium ossifragum - Sphagnum papillosum valley mire	May be included in	Lowland Fens		Medium	
M23, M23a, M23b	Juncus effusus/acutiflorus - Galium palustre rush pasture	May be included in	Coastal and Floodplain Grazing Marsh	Brief visual check to see if any habitats may fall into coastal or floodplain areas - if so attribute to both polygons. If not, attribute to purple-moor grass rush pasture only.	Medium	NVC and priority BAP descriptions don't directly accord, and some uncertainty regarding which habitat type they fall in to, so remains at medium confidence
			Purple Moor Grass and Rush Pastures		Medium	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
M25, M25a, M25b, M25c	Molinia caerulea - Potentilla erecta mire	May be included in	Coastal and Floodplain Grazing Marsh		Low	Numerous categories which the codes may fall into - attribute all polygons to all categories at a very low confidence.
		May be included in	Upland Flushes, Fens and Swamps		Low	
		May be included in	Lowland Fens		Low	
		May be included in	Purple Moor Grass and Rush Pastures		Low	
		Overlaps with	Blanket Bog		Low	
		Overlaps with	Lowland Raised Bog		Low	
M26	Molinia caerulea - Crepis paludosa mire	May be included in	Lowland Fens	Attribute all polygons to purple moor grass and also to either lowland or upland fens depending on the position within the mask	Medium	NVC and priority BAP descriptions don't directly accord, and some uncertainty regarding which habitat type they fall in to, so remains at medium confidence
		May be included in	Upland Flushes, Fens and Swamps		Medium	
		May be included in	Purple Moor Grass and Rush Pastures		Medium	
M27, M27a, M27c	Filipendula ulmaria - Angelica sylvestris mire	Maybe included in fens	Lowland Fens		Medium	NVC and priority BAP descriptions generally seem to accord but not absolutely - keep at medium confidence
M28, M28a	Iris pseudacorus Filipendula ulmaria mire	Maybe included in fens	Lowland Fens		Medium	
M29	Hypericum elodes - Potamogeton polygonifolius soakway	Not in the NBN table	Upland Flushes, Fens and Swamps	Use upland/lowland mask to separate the habitats	Medium	
		Not in the NBN table	Lowland Fens		Medium	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
M31	Anthelia julacea - Sphagnum auriculatum spring	Not in the NBN table	Upland Flushes, Fens and Swamps		Medium	
M32a, M32b	Philonotis fontana - Saxifraga stellaris spring	Not in the NBN table	Upland Flushes, Fens and Swamps		Medium	
M37	Cratoneuron commutatum - Festuca rubra spring	Not in the NBN table	Upland Flushes, Fens and Swamps	Use upland/lowland mask to separate the habitats	Medium	
		Not in the NBN table	Lowland Fens		Medium	

NVC Neutral Grasslands

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Neutral Grasslands						
MG1b, MG1c, MG1e	Arrhenatherum elatius grassland	Maybe included in	Coastal and Floodplain Grazing Marsh	Use general review of polygon locations to assess likelihood of being coastal or floodplain.	Low	
MG2	Arrehnatherum elatius - Filipendula ulmaria tall-herb grassland	No corresponding priority BAP habitat.				
MG3	Anthoxanthum odoratum- Geranium sylvaticum grassland	Is equal to	Upland Hay Meadows		High	Directly equal to - it is the only NVC code encompassed by this BAP habitat.

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
MG5, MG5a	Cynosurus cristatus - Centaurea nigra grassland	Is contained in	Lowland Meadows		Medium	
		May include	Maritime Cliff and Slopes	Use 500m buffer of coast line to apply likely areas.	Medium	
MG6, MG6a, MG6b	Lolium perenne - Cynosurus cristatus grassland	Maybe included in	Coastal and Floodplain Grazing Marsh	Use general review of polygon locations to assess likelihood.	Low	Fairly low certainty and will only be attributed to polygons in the correct geographical location.
MG9, MG9a, MG9b	Holcus lanatus - Deschampsia cespitosa grassland	Maybe included in	Coastal and Floodplain Grazing Marsh	Use general review of polygon locations to assess likelihood.	Low	
MG10, MG10a	Holcus lanatus - Juncus effusus rush pasturs	Maybe included in	Coastal and Floodplain Grazing Marsh	Use general review of polygon locations to assess likelihood.	Low	
MG11	Festuca rubra - Agrostis stolonifera - Potentilla anserina grassland	Maybe included in	Coastal and Floodplain Grazing Marsh	Use general review of polygon locations to assess likelihood.	Low	
MG13	Agrostis stolonifera - Alopecurus geniculatus grassland	Maybe included in	Coastal and Floodplain Grazing Marsh	Use general review of polygon locations to assess likelihood.	Low	

NVC Heath Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Heath Communities						
H5	Erica vagans - Schoenus nigricans heath	Maybe included in	Lowland Heathland	Use a combination of upland and lowland masks and visual checks to assess if categorisation is correct. All codes are likely to be one of the three heathland priority BAP habitats just need to ensure they are assigned correctly on the basis of geographic location.	Low	Habitat restricted to Cornwall.
H6	Erica vagans - Ulex europaeus heath	Maybe included in	Lowland Heathland		Low	Habitat restricted to Cornwall.
H10, H10a, H10b, H10c, H10d, H10e	Calluna vulgaris - Erica cinerea heath	Maybe included in	Lowland Heathland		High	
		Maybe included in	Upland Heathland		High	
H12, H12a, H12b, H12c	Calluna vulgaris - Vaccinium myrtillus heath	Maybe included in	Lowland Heathland		High	
		Maybe included in	Upland Heathland		High	
H13, H13a, H13b	Calluna vulgaris - Cladonia arbuscula heath	Not in NBN table	Mountain Heaths and Willow Scrub		High	
H14, H14b	Calluna vulgaris - Racomitrium lanuginosum heath	Not in NBN table	Mountain Heaths and Willow Scrub		High	
H17, H17b	Calluna vulgaris - Arctostaphylos alpinus heath	Not in NBN table	Mountain Heaths and Willow Scrub		High	
H18, H18a, H18b, H18c	Vaccinium myrtillus - Deschampsia flexuosa heath	Is contained in	Upland Heathland		High	
H19a, H19c	Vaccinium myrtillus - Cladonia arbuscula heath	Not in NBN table	Montane Heath		High	
H20, H20a, H20b, H20d	Vaccinium myrtillus - Racomitrium	Not in NBN table	Upland Heathland		High	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
	lanuginosum	Not in NBN table	Mountain Heaths and Willow Scrub		High	
H21, H21a,	Calluna vulgaris - Vaccinium myrtillus - Sphagnum capillifolium heath	Maybe included in	Lowland Heathland		High	
		Maybe included in	Upland Heathland		High	
H22, H22a	Vaccinium myrtillus - Rubus chamaemorus heath	Not in NBN table	Mountain Heaths and Willow Scrub		High	

NVC Maritime Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Maritime Communities						
SD17	Potentilla anserina - Carex nigra dune slack community	May be included in	Coastal Sand Dunes	Use general review of polygon locations to assess likelihood.	Low	
SM16, SM16c, SM16d	Festuca rubra saltmarsh community	Not included in the NBN table	Coastal Saltmarsh		Medium	
SM28	Elymus repens saltmarsh community	Not included in the NBN table	Coastal Saltmarsh		Medium	

NVC Swamp Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Swamp Communities						
S1	Carex elata swamp	Maybe included in	Lowland Fens	Check polygons are generally applicable to the lowlands.	Medium	In most situations this community is likely to fall within the Lowland Fen Bap category
S3	Carex paniculata swamp	Maybe included in	Lowland Fens	Check polygons are generally applicable to the lowlands.	Medium	Could also be found on standing waters.
S4, S4a, S4b	Phragmites australis swamp and reedbeds	Maybe included in	Reedbeds		Medium	Could be one of two types depending on size or location.
		Maybe included in	Lowland Fens		Medium	
S7	Carex acutiformis swamp	May be included in	Lowland Fens	Visual check for any polygons associated with the edges of watercourses	Medium	Attribute polygons to Lowland Fens, medium confidence, unless associated with river edges.
		May be included in	Coastal and Floodplain Grazing Marsh		Medium	
S8	Scirpus lacustris swamp	Maybe included in	Lowland Fens		Medium	Could also be found on standing waters.
S9, S9a, S9b	Carex rostrata swamp	Maybe included in	Lowland Fens	Check the community general accords with a lowland or upland situation.	Medium	Two categories, separate out on upland/lowland situation. Still some uncertainty.
		Not in NBN table	Upland Flushes, Fens and Swamps		Medium	
S10, S10a, S10b	Equisetum fluviatile swamp	Maybe included in	Lowland Fens	Check the community general accords with a lowland or upland situation.	Medium	Two categories, separate out on upland/lowland situation. Still some uncertainty.
		Not in NBN table	Upland Flushes, Fens and Swamps		Medium	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
S11, S11a, S11b	Carex vesicaria swamp	May be included in	Lowland Fens	Use upland/lowland mask to split out the two	Medium	Two possible priority BAP categories and the NVC and BAP descriptions don't definitely accord. Medium confidence.
		May be included in	Upland Flushes, Fens and Swamps		Medium	
S14, S14a, S14c	Sparganium erectum swamp	May be included in	Lowland Fens		Medium	Could also be found on standing waters.
S19, S19a, S19c	Eleocharis palustris swamp	May be included in	Upland Flushes, Fens and Swamps	Use the upland/lowland mask to split.	Medium	Two possible priority BAP categories and the NVC and BAP descriptions don't definitely accord. Medium confidence.
		May be included in	Lowland fens		Medium	
S21	Scirpus maritimus swamp	May be included in	Coastal and Floodplain Grazing Marsh	Use general checks to attribute to coastal or lowland situations.	Medium	Two possible priority BAP categories and the NVC and BAP descriptions don't definitely accord. Medium confidence.
		May be included in	Lowland Fens		Medium	
S22	Glyceria fluitans water-margin vegetation	May be included in	Upland Flushes, Fens and Swamps	Check the community general accords with a lowland or upland situation.	Low	Not certain whether this habitat falls within either BAP category description. Low confidence.
		May be included in	Lowland Fens		Low	
S25b	Phragmites australis-Eupatorium canabium tall-herb fen	Maybe included in	Upland Flushes, Fens and Swamps	Code everything as reedbeds and also upland or lowland fens depending on the split within the upland/lowland mask.	Low	Three possible BAP categories and the NVC and BAP descriptions don't definitely accord. Low confidence.
		May be included in	Lowland Fens		Low	
		Possibly included in	Reedbeds		Low	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
S26	Phragmites australis - Urtica dioica	Maybe included in	Reedbeds		Medium	Certain stands may be included in this BAP category.
S27, S27a, S27b	Carex rostrata - Potentilla palustris tall-herb fen	Maybe included in	Upland Flushes, Fens and Swamps	Code everything as reedbeds and also upland or lowland fens depending on the split within the upland/lowland mask.	Low	Three possible BAP categories and the NVC and BAP descriptions don't definitely accord. Low confidence.
		May be included in	Lowland Fens		Low	
		Possibly included in	Reedbeds		Low	
S28, S28a, S28b	Phalaris arudinacea tall-herb fen	May be included in	Upland Flushes, Fens and Swamps	Use upland/lowland mask to split out the two	Medium	Two possible BAP categories and the NVC and BAP descriptions don't definitely accord. Medium confidence.
		May be included in	Lowland Fens		Medium	

NVC Acid Grassland Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Acid Grasslands						
U1	Festuca ovina - Agrostis capillaris - Rumex acetosella grassland	Is contained in	Lowland Dry Acid Grassland	Use mask to check polygons fall in lowland.	High	
U2, U2b	Deschampsia flexuosa grassland, Vaccinium myrtillus sub-community	Is contained in	Lowland Dry Acid Grassland	Use mask to check polygons fall in lowland.	High	
U4, U4a, U4b, U4c, U4d, U4e	Festuca ovina - Agrostis capillaris - Galium saxatile grassland	Is contained in	Lowland Dry Acid Grassland	Use mask to check polygons fall in lowland.	High	
		may overlap with	Maritime Cliff and Slopes	Use 500m buffer on coastal areas to identify potential maritime grassland.	Medium	
U5, U5a, U5b, U5c, U5d, U5e	Nardus stricta - Galium saxatile grassland	No corresponding priority BAP habitat.				
U6, U6a, U6c, U6d	Juncus squarrosus - Festuca ovina grassland	No corresponding priority BAP habitat.				
U7, U7a, U7b, U7c	Nardus stricta - Carex bigelowii	No corresponding priority BAP habitat.				
U8, U8b	Carex bigelowii - Polytrichum alpinum sedge heath	Not included on NBN table	Mountain Heaths and Willow Scrub	Brief visual check for appropriateness	High	Fits comfortably with BAP description.
U10, U10a, U10b, U10c	Carex bigelowii - Racomitrium lanuginosum	Not included on NBN table	Mountain Heaths and Willow Scrub		High	
U11	Polytrichum sexangulare - Kiaeria starkei snow bed	Not included on NBN table	Mountain Heaths and Willow Scrub		High	
U12, U12a, U12b	Salix herbacea - Racomitrium	Not included on NBN table	Mountain Heaths and Willow Scrub		High	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
	heterostichum snow bed					
U13, U13a, U13b	Deschampsia cespitosa - Galium saxatile grassland	Not included on NBN table	Mountain Heaths and Willow Scrub		High	
U14	Alchemilla alpina - Sibbaldia procumbens dwarf herb community	Not included on NBN table	Mountain Heaths and Willow Scrub		High	
U15	Saxifraga aizoides - Alchemilla glabra banks	Not included on NBN table	Mountain Heaths and Willow Scrub		High	
U16, U16a, U16b, U16c	Luzula sylvatica - Vaccinium myrtillus tall-herb community	Not included on NBN table	Inland Rock Outcrop and Scree Habitats		High	
U17, U17a, U17b, U17c, U17d	Luzula sylvatica - Geum rivale	Not included on NBN table	Inland Rock Outcrop and Scree Habitats		High	
U18	Cryptogramma crispa - Athyrium distentifolium snow bed	Not included in NBN table	Mountain Heaths and Willow Scrub		Medium	Could be other habitats but this is the most likely fit.
U19	Thelypteris limbosperma - Blechnum spicant community	Not included on NBN table	Inland Rock Outcrop and Scree Habitats		Medium	Fits comfortably with BAP description, but not included as an NVC code in the list for this habitat.
U20, U20a, U20b, U20c	Pteridium aquilinum - Galium saxatile	May possibly included in maritime cliff and slope	Maritime Cliff and Slopes	Check if falls within a 500m buffer of coastal areas.	Low	
U21	Cryptogramma crispa - Deschampsia flexuosa community	Not included on NBN table	Inland Rock Outcrop and Scree Habitats		High	Fits comfortably with BAP description
U25a	Does not exist…….		Unknown habitat			

NVC Calcareous Grassland Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Calcareous Grasslands						
CG10, CG10a, CG10b, CG10c	Festuca ovina - Agrostis capillaris - Thymus praecox grassland	Is contained in	Upland Calcareous Grassland	No	High	Generally high confidence as most calcareous grassland is a BAP habitat.
		May include	Maritime Cliff and Slopes	Use 500m buffer on coast to check for inclusion.	Medium	
CG11, CG11a, CG11b	Festuca ovina - Agrostis capillaris - Alchemilla alpina grass-heath	Is contained in	Upland Calcareous Grassland		High	
CG12	Festuca ovina - Alchemiclla alpina - Silene acaulis dwarf herb community	Is contained in	Upland Calcareous Grassland		High	
CG14	Dryas octopetala - Silene acaulis ledge community	Is contained in	Upland Calcareous Grassland		High	
CG16b	Does not exist….		Unknown habitat			

NVC Woodland Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Woodland Communities						
W1	Salix-cinerea - Galium palustre woodland	Is contained in	Wet Woodland		High	Wet woodland types - the NVC type is contained in the BAP definition therefore relatively high confidence.
W2	Salix cinerea- Betula pubescens - Phragmites australis woodland	Is contained in	Wet Woodland		High	
W3	Salix petandra - Carex rostrate woodland	Is contained in	Wet Woodland		High	
W4, W4a, W4b	Betula pubescens - Molina caerulea woodland	May overlap with	Upland Birchwoods	Use upland/lowland mask to split - all lowland polygons code as wet woodland and all upland polygons as upland birch wood	Medium	One of two types - assign polygons to both, medium certainty it is one.
		Overlaps with	Wet Woodland		Medium	
W4c	Betula pubescens - Molina caerulea woodland	Is contained in	Wet Woodland		High	Wet woodland types - the NVC type is contained in the BAP definition therefore relatively high confidence.
W5a, W5b	Alnus glutinosa - Carex paniculata woodland	Is contained in	Wet Woodland		High	
W6, W6e	Alnus glutinosa - Urtica dioica woodland	Is contained in	Wet Woodland		High	
W7, W7a, W7b, W7c	Alnus glutinosa - Fraxinus excelsior - Lysimachia nemorum woodland	Overlaps with	Wet Woodland	Use upland/lowland mask to split - all lowland polygons code as wet woodland and all upland polygons as upland ash wood	Medium	All W7 woodland types could fall into either category depending on the dominance (or not) of ash.
		May be contained in	Upland Mixed Ashwoods		Medium	

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
W8	Fraxinus excelsior - Acer campestre - Mercurialis perennis woodland	Overlaps with	Lowland Mixed Deciduous Woodland	Split using upland lowland mask.	Low	An NVC category with much variation and which may or may not fall into five BAP types therefore low confidence for all of them.
		Overlaps with	Upland Mixed Ashwoods		Low	
W9, W9a, W9b	Fraxinus excelsior - Sorbus aucuparia - Mercurialis perennis woodland	Is contained in	Upland Mixed Ashwoods		High	High certainty that most polygons are upland mixed ash woodland but some polygons may be or may contain areas of habitat classed as birch woods.
W10	Quercus robur - Pteridium aquilinum - Rubus fruticosus woodland	Overlaps with	Wood-Pasture and Parkland		Medium	Medium certainty that it is likely to fall into one of the two habitats.
		Overlaps with	Lowland Mixed Deciduous Woodland		Medium	
W10d	Quercus robur - Pteridium aquilinum - Rubus fruticosus woodland	Overlaps with	Lowland Mixed Deciduous Woodland		Medium	Only corresponds to one BAP type but not direct correspondence.
W10e	Quercus robur - Pteridium aquilinum - Rubus fruticosus woodland	May overlap with	Lowland Mixed Deciduous Woodland	Separate upland and Lowland areas using mask.	Medium	Some level of uncertainty as to what woodland BAP types the NVC code could be.
		Overlaps with	Upland Oakwood		Medium	
W11	Quercus petraea - Betula pubescens - Oxalis acetosella	Overlaps with	Wood-Pasture and Parkland	Separate upland and lowland areas using mask.	High	Lowland wood pastures separated out with high confidence, the two upland

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
	woodland	Overlaps with	Upland Oakwood		Medium	woodlands remain at medium confidence.
		Overlaps with	Upland Birchwoods		Medium	
W11a, W11b, W11c, W11d	Quercus petraea - Betula pubescens - Oxalis acetosella woodland	Overlap with	Upland Birchwoods		Medium	Not a direct match between NVC and BAP descriptions, but possible that in some instances these NVC types will fall under Upland Birch wood BAP habitat.
W12	Fagus sylvatica - Mercurialis perennis woodland	Is contained in	Lowland Beech and Yew Woodland			
W14	Fagus sylvatica - Rubus fruticosus woodland	Is contained in	Lowland Beech and Yew Woodland		High	Some possibility of being lowland wood pasture, but beech woodlands are most likely
W15	Fagus sylvatica - Deschampsia flexuosa woodland	Is contained in	Lowland Beech and Yew Woodland		High	Some possibility of being lowland wood pasture, but beech woodlands are most likely
W16	Quercus spp. - Betula spp. - Deschampsia flexuosa woodland	Overlaps with	Upland Oakwood		Medium	NVC description and BAP description broadly accord. Could be upland birch woodland but history of oak production means this is more likely.

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
W8	Fraxinus excelsior - Acer campestre - Mercurialis perennis woodland	Overlaps with	Lowland Mixed Deciduous Woodland	Split using upland lowland mask.	Low	An NVC category with much variation and which may or may not fall into five BAP types therefore low confidence for all of them.
		Overlaps with	Upland Mixed Ashwoods		Low	
W9, W9a, W9b	Fraxinus excelsior - Sorbus aucuparia - Mercurialis perennis woodland	Is contained in	Upland Mixed Ashwoods		High	High certainty that most polygons are upland mixed ash woodland but some polygons may be or may contain areas of habitat classed as birch woods.
W10	Quercus robur - Pteridium aquilinum - Rubus fruticosus woodland	Overlaps with	Wood-Pasture and Parkland		Medium	Medium certainty that it is likely to fall into one of the two habitats.
		Overlaps with	Lowland Mixed Deciduous Woodland		Medium	
W10d	Quercus robur - Pteridium aquilinum - Rubus fruticosus woodland	Overlaps with	Lowland Mixed Deciduous Woodland		Medium	Only corresponds to one BAP type but not direct correspondence.
W10e	Quercus robur - Pteridium aquilinum - Rubus fruticosus woodland	May overlap with	Lowland Mixed Deciduous Woodland	Separate upland and Lowland areas using mask.	Medium	Some level of uncertainty as to what woodland BAP types the NVC code could be.
		Overlaps with	Upland Oakwood		Medium	
W11	Quercus petraea - Betula pubescens - Oxalis acetosella	Overlaps with	Wood-Pasture and Parkland	Separate upland and lowland areas using mask.	High	Lowland wood pastures separated out with high confidence, the two upland

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
	woodland	Overlaps with	Upland Oakwood		Medium	woodlands remain at medium confidence.
		Overlaps with	Upland Birchwoods		Medium	
W11a, W11b, W11c, W11d	Quercus petraea - Betula pubescens - Oxalis acetosella woodland	Overlap with	Upland Birchwoods		Medium	Not a direct match between NVC and BAP descriptions, but possible that in some instances these NVC types will fall under Upland Birch wood BAP habitat.
W12	Fagus sylvatica - Mercurialis perennis woodland	Is contained in	Lowland Beech and Yew Woodland			
W14	Fagus sylvatica - Rubus fruticosus woodland	Is contained in	Lowland Beech and Yew Woodland		High	Some possibility of being lowland wood pasture, but beech woodlands are most likely
W15	Fagus sylvatica - Deschampsia flexuosa woodland	Is contained in	Lowland Beech and Yew Woodland		High	Some possibility of being lowland wood pasture, but beech woodlands are most likely
W16	Quercus spp. - Betula spp. - Deschampsia flexuosa woodland	Overlaps with	Upland Oakwood		Medium	NVC description and BAP description broadly accord. Could be upland birch woodland but history of oak production means this is more likely.

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
W17	Quercus petraea - Betula pubescens - Dicranum majus woodland	Overlaps with	Upland Oakwood		Medium	NVC description and BAP description broadly accord. Could be upland birch woodland but history of oak production means this is more likely.
W17a, W17b, W17c, W17d	Quercus petraea - Betula pubescens - Dicranum majus woodland	Is contained in	Upland Birchwoods		High	NVC description and BAP description broadly accord.
W18, W18b	Pinus sylvestris - Hyclocominum splendens woodland	Is contained in	Native Pine Woodlands		High	NVC description and BAP description broadly accord.
W19	Juniperus communis ssp. communis - acetosella woodland	Not contained in the NBN table	Native Pine Woodlands		High	NVC description and BAP description broadly accord.
W20	Salix lapponum - Luzula sylvatica scrub	Not contained in the NBN table	Mountain Heaths and Willow Scrub	Manual check to ensure that polygons generally accord with mountain areas.	High	NVC description and BAP description broadly accord.
W21	Crataegus monogyna - Hedera helix scrub	May be included in	Maritime Cliff and Slopes	Use 500m buffer of coastline to assign potential polygons	Medium	Polygons within 500m *may* be included in this category.
W23, W23a	Ulex europaeus - Rubus fruticosus scrub	May be included in	Maritime Cliff and Slopes		Medium	
W24	Rubus fruitcosus - Holcus lanatus underscrub	May be included in	Maritime Cliff and Slopes	Use 500m buffer of coastline to assign potential polygons	Medium	Polygons within 500m *may* be included in this category.
W25, W25b	Pteridium aquilinum - Rubus fruitcosus underscrub	May be included in	Maritime Cliff and Slopes		Medium	

NVC Aquatic Communities

NVC Code	NVC Description	Relationship in NBN Table	Priority BAP Habitats	Manual Checks	Confidence	General Comments
Aquatic communities						
A7	*Nymphaea alba* community	Not in table	Oligotrophic and Dystrophic Lakes	Check corresponds with lake polygon	High	BAP and NVC descriptions fit well.
A8	*Nuphar lutea* community		Oligotrophic and Dystrophic Lakes	Check corresponds with lake polygon	Medium	Trophic state not clear.
		Maybe included in	Mesotrophic Lakes		Medium	Trophic state not clear.
A10	*Polygonum amphibium* community	Not in table	Oligotrophic and Dystrophic Lakes	Check corresponds with lake polygon	Medium	Reasonable correspondance between NVC and BAP descriptions.
A20	*Ranunculus peltatus* community	May be included in	Mesotrophic Lakes	Check corresponds with lake polygon	Medium	Trophic state not clear.
		May be included in	Eutrophic Lakes	Check corresponds with lake polygon	Medium	Trophic state not clear.
A22	*Littorella uniflora - Lobelia dortmanna* community	Not in table	Oligotrophic and Dystrophic Lakes	Check corresponds with lake polygon	High	BAP and NVC descriptions fit well.
A23	*Isoetes lacustris/setacea* community	Not in table	Oligotrophic and Dystrophic Lakes	Check corresponds with lake polygon	High	BAP and NVC descriptions fit well.

Appendix 8

Birks and Ratcliffe to UK BAP Conversion Tables.

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
Heathlands							
B1	Sub-montane Calluna vulgaris heaths	H9, H10, H12, H16, H21	D1: Dry dwarf shrub heath	Lowland Heathland Upland Heathland	Separate out using upland/lowland mask	High High	High confidence that these B&R codes are heathland types, just requires the upland/lowland mask to separate out the two.
B1a	Calluna dry heaths	H9, H10, H12	D1: Dry dwarf shrub heath.	Lowland Heathland Upland Heathland	Separate out using upland/lowland mask	High High	
B3a	Southern Vaccinium myrtillus heath	H18 - sub-community a and c	D3: Lichen/bryophyte heath	Upland Heathland	None	High	High confidence that these B&R types are all upland heaths as the B&R, NVC and BAP habitat descriptions all accord well.
B3c	Species rich Vaccinium heath	H18 - sub-community b	D1.1 Dry dwarf shrub heath	Upland Heathland	None	High	
B3e	Vaccinium myrtillus - Empetrum nigrum heaths	H18 - sub-community a and c and H20 sub-community a	D3: Lichen/bryophyte heath	Upland Heathland	None	High	
Grasslands							
C1a	Agrostis canina - A. capillaris grassland	U4 sub-community a,b,c,d and e	B1: Acid grassland either 1.1 or 1.2	Lowland Dry Acid Grassland	Use upland/lowland mask to determine	High	Only polygons assigned to lowland should be classified and can be classified with high confidence.
C1d	Alchemilla- Festuca grassland	CG11 sub-community a and b	B3: Calcareous grassland likely to be B3.2	Upland Calcareous Grassland	None	High	B&R, NVC and BAP descriptions directly accord.
C1f	Northern species rich Agrostis-Festuca grassland	CG10 sub-community c	B3: Calcareous grassland likely to be B3.2	Upland Calcareous Grassland	None	High	B&R, NVC and BAP descriptions directly accord.

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
C2a	Sub-montane Nardus grassland	U5a, b, d and e	B1: Acid grassland likely to be 1.2	No corresponding priority BAP habitat.			Upland acid grassland does not fall into any BAP category.
C2b	Snow bed Nardus grassland	U7a, b and c	B1: Acid grassland likely to be 1.1	No corresponding priority BAP habitat.			
C3a	Species poor Juncus squarrosus grassland	U6b and c	B1: Acid grassland	No corresponding priority BAP habitat.			
C3b	Sphagnum rich Juncus squarrosus grassland	U6a	B1: Acid grassland	No corresponding priority BAP habitat.			
C4a	Species poor Molinia grassland	M25b	B5: Marshy grassland / E1.7 wet modified bog	Coastal and Floodplain Grazing Marsh	All polygons should be ascribed to blanket bog and purple moor grass pastures. Those that fall in the lowlands using the mask should also be ascribed to lowland fens and lowland raised bog. Those identified in the uplands using the mask should also be coded as upland fens. A final check for polygons in the floodplain should then be	Low	A very generic habitat type which may or may not fall into several BAP categories, therefore classification remains at low confidence even following manual checks.
				Lowland Fens		Low	
				Upland Flushes, Fens and Swamps		Low	
				Purple Moor Grass and Rush Pastures		Low	
				Blanket Bog		Low	
				Lowland Raised Bog		Low	

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
					carried out.		
C5a	Species poor Deschampsia grassland	U13a	D4: Montane heath / dwarf herb	No corresponding priority BAP habitat.			
C6	Carex bigelowii snowbed heath	U8a and b	D4: Montane Heath/ dwarf herb	Mountain Heaths and Willow Scrub	None	High	B&R, NVC and BAP descriptions directly accord.
Bracken, Ruderal and Non-Ruderal Patches							
D6b	Betula - herb nodum, fern dominated	U19	C3.2: Other tall herb and fern, non-ruderal	Inland Rock Outcrop and Scree Habitats	None	Medium	Fits comfortably with BAP description, but not included as an NVC code in the list for this habitat.
D7	Pteridium aquilinum communities	U20	C1.1 or C1.2: Bracken (continuous or scattered)	No corresponding priority BAP habitat.			Only potential would be maritime cliff and slope, but the B&R surveys (Ben Lomond and Stobinnien) do not include maritime areas.
Mountain Heaths							
E1	Racomitrium languinosum - carex bigelowii heath	U10, H20	D3: Lichen/bryophyte heath	Mountain Heaths and Willow Scrub	None	High	Very high confidence that these are all montane heaths, as the

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
E1a	Species poor racomitrium heath	U10b	D3: Lichen/bryophyte heath	Mountain Heaths and Willow Scrub		High	B&R, NVC and BAP descriptions accord well.
E1c	Festuca ovina - Deschampsia flexuosa -racomitirium heath	U10a	D3: Lichen/bryophyte heath	Mountain Heaths and Willow Scrub		High	
E1e	Juncus trifidus - racomitirium heath	U10c	D4: Montane heath	Mountain Heaths and Willow Scrub		High	
E2	Rhytiadelphus loreus - Deschampsia cespitosa heaths	U13b	D4: Montane heath / dwarf herb	Mountain Heaths and Willow Scrub		High	
E3	Dicranum starkei snow bed heaths	U11 and U12	D3: Lichen/bryophyte heath	Mountain Heaths and Willow Scrub		High	
Mire Habitats: Wet Heath and Bog							
G2a	Typical Scirpus cespitosus - Calluna vulgaris mire	M15b and M16d	D2: Wet dwarf shrub heath	Lowland Heathland	Separate out using upland/lowland mask	High	High confidence that these B&R codes are heathland types, just requires the upland/lowland mask to separate out the two.
				Upland Heathland		High	
G2d	Scirpus mire	M15b	D2: Wet dwarf shrub heath	Lowland heath		High	
				Upland heath		High	
G3	Molinia caerulea - Calluna vulgaris mire	M15b	D2: Wet dwarf shrub heath	Lowland heath		High	
				Upland heath		High	
G4	Calluna vulgaris - Eriophorum vaginatum mire	M19 blanket mire, M20 blanket and raised mire	E1.6.1: Blanket bog or E1.6.2: Raised bog	Blanket Bog	Use upland and lowland mask to split - anything in lowland zone could be all three habitats (medium confidence) anything in	High - Medium	Requires very careful consideration of location in the upland/lowland system, therefore mostly remains at medium confidence apart from upland areas of blanket bog.
				Lowland Raised Bog		Medium	
				Lowland Fens		Medium	
G4a	Typical Calluna - Eriophorum mire	M19a, b and c	E1.6.1: Blanket bog E1.8 Dry modified bog	Blanket Bog		High - Medium	
				Lowland Raised Bog		Medium	
				Lowland Fens		Medium	

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
G4f	Eriophorum dominated mire	M20a and b	E1.6.1: Blanket bog or E1.6.2: Raised bog	Blanket Bog	upland zone could be blanket bog (high confidence).	High - Medium	
				Lowland Raised Bog		Medium	
				Lowland Fens		Medium	
G6	NO G6 in our list of B&R types			Unknown habitat			
Mire Habitats: Fens, Flushes and Swamps							
H1	Myrica gale - Molinia caerulea mire	M15b and M25a	D2: Wet dwarf shrub heath	Lowland Heathland	Separate out using upland/lowland mask	Low	Though strictly speaking M25 is not heath but because of the sub-community this is where it most closely fits, therefore low confidence.
				Upland Heathland		Low	
H2	Juncus moss mire	M6 and M23	E2.1: Acid/ neutral flush corresponds with M6 whilst B5: Marshy grassland most closely corresponds with M23.	Upland Flushes, Fens and Swamps	Use upland/lowland mask and general review of location. Mask can separate polygons which could be lowland fen or upland fen. All polygons could be purple moor-grass pasture. Then quick review of any polygons apparently in flooplain areas.	Low	Low confidence - this B&R category encompasses two contrasting NVC type and the BAP category is therefore quite uncertain even after some geographical checks.
				Purple Moor Grass and Rush Pastures		Low	
				Lowland Fens		Low	
				Coastal and Floodplain Grazing Marsh		Low	
H2a	Juncus - effusus -	M6c	E2.1: Acid/neutral	Lowland Fens	Use upland	High	High likelihood of being

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
	sphagnum recurvum mire		flush or E3	Upland Flushes, Fens and Swamps	lowland mask to determine	High	one of two BAP types which can be separated out with the upland/lowland mask.
H2b	Juncus -acutiflorus - Sphagnum recurvum mire	M6d	E2.1: Acid/neutral flush or E3	Lowland Fens	Use upland lowland mask to determine	High	High likelihood of being one of two BAP types which can be separated out with the upland/lowland mask.
				Upland Flushes, Fens and Swamps		High	
H3	Carex moss mire	M4, M6, M7, M8, M9, M10, M12 and M15	E2.1: Acid/neutral flush or E3 Valley mire / Basic flush E2.2 or Wet heath M15	Lowland Fens	Use mask to separate out lowland sites which could be all habitats except upland fens and upland sites which could be upland fens or blanket bog.	Low	Despite application of mask, this remains as low confidence as this B&R type encompasses such a wide range of habitat types.
				Upland Flushes, Fens and Swamps		Low	
				Blanket Bog		Low	
				Lowland Raised Bog		Low	
H3f	Sub-montane Carex nigra mire	M10a, b and c	E2.2: Basic flush or E3	Upland Flushes, Fens and Swamps	Use upland lowland mask to determine	High	High likelihood of being one of two BAP types which can be separated out with the upland/lowland mask.
				Lowland Fens		High	
H3h	Montane Carex echinata - Sphagnum recurvum mire	M7	E2.1: Acid/neutral flush	Upland Flushes, Fens and Swamps	None	High	Strong link between B&R code, NVC code and BAP description.
Woodlands							
J2a	Betuletum Oxaleto-Vaccinetum: vaccinium rich birchwood	W11a, b, c and d	A1.1.1 Broad-leaved, semi-natural woodland	Upland Birchwoods	None	Medium	Habitat descriptions don't directly fit with those in the BAP description.
J4	Mixed deciduous	W7 and W9	A1.1.1 Broad-	Wet Woodland	None	Low	A very varied B&R code

B and R Habitat Type		Corresponding NVC Types	Phase I Type	Corresponding BAP Habitat Type	Manual checks	Confidence in BAP Habitat Type	Comment
	woodland		leaved, semi-natural woodland	Upland Mixed Ashwoods		Low	may fit into three BAP types or equally none.
				Upland Birchwoods		Low	
J6	No J6 in list of B&R types			Unknown Habitat			
Unknown Habitats							
R1	No R1 in list of B&R types			Unknown Habitat			
R1a	No R1a in list of B&R types			Unknown Habitat			
R2	No R2 in list of B&R types			Unknown Habitat			
R3	No R3 in list of B&R types			Unknown Habitat			

Appendix 9

Habitat Conversion Look Up Table: FCS Habitat Types – UK BAP Priority Habitats.

FCS Code	Habitat	Priority BAP Habitat	Upland /Lowland Mask	Confidence
NBNSYS0000000001	Not surveyed	Potential BAP habitat		
NBNSYS0000000002	Survey unknown habitat	Potential BAP habitat		
NBNSYS0000004540	Broad-leaved mixed yew woodland	Lowland Beech and Yew Woodland		High
NBNSYS0000004541	Coniferous woodland	Non-priority BAP Habitat		High
NBNSYS0000004548	Bracken	Non-priority BAP Habitat		High
NBNSYS0000004551	Bogs	Blanket Bog		Medium
		Lowland Raised Bog	LL	Medium
NBNSYS0000004552	Standing open water/canal	Eutrophic Standing Waters		Low confidence
		Mesotrophic Lakes		Low confidence
		Oligotrophic and Dystrophic Lakes		Low confidence
NBNSYS0000004555	Inland rock	Limestone Pavements		Low confidence
		Inland Rock Outcrop and Scree Habitats		Low confidence
NBNSYS0000004556	Built up areas and gardens	Non-priority BAP Habitat		High
NBNSYS0000004604	Upland oakwood	Upland Oakwood		High
NBNSYS0000004619	Upland heathland	Upland Heathland		High
NBNSYS000a	Non-HAP native pine	Non-priority BAP Habitat		High
NBNSYS000c	Upland birchwoods	Upland Birchwoods		High

Appendix 10

Habitat Conversion Look UP Table: LCS88 Habitat Type – UK BAP Priority Habitats.

LCS88 Habitat	Corresponding BAP Habitats	Confidence	Comments
Arable	Arable Field Margins	Low	
Bings	Open Mosaic Habitats on Previously Developed Land	Low	
	Calaminarian Grasslands	Low	
Blanket bog/peat. veg.	Blanket Bog	Medium	
	Lowland Raised Bog	Medium	
Built-up	No corresponding priority BAP habitat.		
Caravan sites	No corresponding priority BAP habitat.		
Cliffs	Inland Rock Outcrop and Scree Habitats	Low	
Cloud cover	No corresponding priority BAP habitat.		
Coniferous (plantation)	No corresponding priority BAP habitat.		
Dry heather moor	Upland Heathland	Medium	
	Lowland Heathland	Medium	
	Mountain Heaths and Willow Scrub	Medium	
Estuary	Coastal and Floodplain Grazing Marsh	Low	
	Coastal Saltmarsh	Low	
	Estuarine Rocky Habitats	Low	
	Intertidal Mudflats	Low	
	Sheltered Muddy Gravels	Low	
	Tide-swept Channels	Low	
Factory	No corresponding priority BAP habitat.		
Forestry ripping	No corresponding priority BAP habitat.		
Golf course	No corresponding priority BAP habitat.		Could encompass certain habitats, such as wood pasture and parkland, but would rather not include.
Improved pasture	No corresponding priority BAP habitat.		

LCS88 Habitat	Corresponding BAP Habitats	Confidence	Comments
Montane veg.	Mountain Heaths and Willow Scrub	Medium	
Open canopy (young plantation)	Lowland Beech and Yew Woodland	Low	Most likely to be coniferous plantation, but equally some areas could be broadleaf.
	Lowland Mixed Deciduous Woodland	Low	
	Upland Birchwoods	Low	
	Upland Mixed Ashwoods	Low	
	Upland Oakwood	Low	
	Wet Woodland	Low	
	Wood-Pasture and Parkland	Low	
Quarries	No corresponding priority BAP habitat.		
Recent felling	No corresponding priority BAP habitat.		
Recent ploughing	No corresponding priority BAP habitat.		
Rhododendron	No corresponding priority BAP habitat.		
Smooth grass/low scrub	Lowland Meadows	Low	
	Purple Moor Grass and Rush Pastures	Low	
	Upland Calcareous Grassland	Low	
	Lowland Calcareous Grassland	Low	
	Lowland Dry Acid Grassland	Low	
	Upland Hay Meadows	Low	
Smooth grass/rushes	Lowland Meadows	Low	
	Purple Moor Grass and Rush Pastures	Low	
	Upland Calcareous Grassland	Low	
	Lowland Calcareous Grassland	Low	
	Lowland Dry Acid Grassland	Low	
	Upland Hay Meadows	Low	
Undiff. Nardus/Molinia	Lowland Dry Acid Grassland	Low	
	Purple Moor Grass and Rush Pastures	Low	
Undiff. bracken	No corresponding priority BAP habitat.		
Undiff. broadleaf	Lowland Beech and Yew Woodland	Low	
	Upland Birchwoods	Low	
	Upland Mixed Ashwoods	Low	
	Upland Oakwood	Low	

LCS88 Habitat	Corresponding BAP Habitats	Confidence	Comments
	Wet Woodland	Low	
	Wood-Pasture and Parkland	Low	
Undiff. heather moor	Lowland Heathland	Low	
	Upland Heathland	Low	
	Mountain Heaths and Willow Scrub	Low	
	Blanket Bog	Low	
	Lowland Raised Bog	Low	
Undiff. low scrub	No corresponding priority BAP habitat.		
Undiff. mixed woodland	Lowland Mixed Deciduous Woodland	Medium	
Undiff. smooth grass.	Lowland Meadows	Low	
	Upland Calcareous Grassland	Low	
	Lowland Calcareous Grassland	Low	
	Lowland Dry Acid Grassland	Low	
	Upland Hay Meadows	Low	
Water	Aquifer Fed Naturally Fluctuating Water Bodies	Low	May possibly include rivers and ponds, but unlikely to be coded as whole polygons.
	Eutrophic Standing Waters	Low	
	Mesotrophic Lakes	Low	
	Oligotrophic and Dystrophic Lakes	Low	
Wet heather moor	Lowland Heathland	Low	
	Upland Heathland	Low	
	Mountain Heaths and Willow Scrub	Low	
	Blanket Bog	Low	
	Lowland Raised Bog	Low	
Wetlands	Coastal and Floodplain Grazing Marsh	Low	
	Lowland Fens	Low	
	Reedbeds	Low	
	Upland Flushes, Fens and Swamps	Low	

Appendix 11

LLTNPA Species Checklist

Hyperlink to Excel Spreadsheet

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