

Final Report

Project ER04

Development of site relevant critical loads for APIS

June 2011



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Research contractor

This document was produced by:

Centre for Ecology and Hydrology
Bush Estate
PENICUIK EH 26 0QB
United Kingdom

SNIFFER's project manager

SNIFFER's project manager for this contract is:

Rebecca Glos Williams, SNIFFER

SNIFFER's technical advisory group members for this project are:

Scot Mathieson, Scottish Environment Protection Agency – *Principal technical co-advisor*
Clare Whitfield, Joint Nature Conservation Committee – *Principal technical co-advisor*
Nicola Barnfather, Environment Agency
Simon Bareham, Environment Agency
Zoe Russell, Natural England
Ian Strachan, Scottish Natural Heritage
Colin Powlesland, Countryside Council for Wales

SNIFFER

**First Floor, Greenside House
25 Greenside Place
EDINBURGH EH1 3AA
Scotland
UK**

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Executive Summary

ER04: Development of site relevant critical loads for APIS (June 2011)

Project funders/partners: SNIFFER, Scottish Environment Protection Agency, Joint Nature Conservation Committee, Environment Agency, Natural England, Scottish Natural Heritage, Countryside Council for Wales, Northern Ireland Environment Agency

Background to research

Project ER04 is the culmination of three phases of work undertaken over the last four years and includes: the generation of new deposition datasets for 2005 and 2020 with source attribution, the addition of A/SSSI sites, revised critical loads for nutrient nitrogen (2010) and acidity (2004) and the redevelopment of the Site Relevant Critical Loads tool for the APIS website.

Objectives of research

The key objectives of the project were to:

1. Develop, test and deliver an online interactive interface for presenting site-relevant critical loads and providing deposition and source attribution data for UK SACs, SPAs and SSSIs/ASSIs.
2. Update the existing "Search by Source" on APIS, which allows the user to look up a pollution source and the top 50 sites to which it contributes in terms of critical loads exceedance for acidification and nutrient nitrogen.

Key activities

A user survey of the existing tool showed that in general the current tool was very useful for assessing critical loads at user specific sites, but that the functionality and guidance were key areas to be addressed in the new system. These were summarised and are outlined below:

- A better, less cluttered, results page
- Improved graphics
- The ability to rank features by sensitivity in the 'select a feature' select box
- Better guidance on use and interpretation
- More transparency of source/emissions data

Designated features were assessed for their sensitivity to acidification and eutrophication at each site and were linked to critical loads. Six broad habitats for acidity were used in the assignment of critical loads of acidity (acid grassland, calcareous grassland, dwarf shrub heath, bog, montane, unmanaged coniferous and broadleaved woodland). Critical loads of acidity for these habitat classes were mapped for the whole of the UK at a resolution of 1 km. Empirical critical loads for nitrogen were based on the revised 2010 Noordwijkerhout workshop and allocated according to habitat type.

The Fine Resolution Atmospheric Multi-pollutant Exchange model (FRAME) was applied to assess the magnitude and spatial distribution of individual deposition footprints of sulphur and nitrogen associated with gaseous emissions from 156 different point sources and background sources. The analysis was performed for a recent emissions year (2005) and for the UEP30 future emissions scenario year (2020). The 156 emissions sources considered in the study included:

- SO₂ and NO_x emissions from 100 individual point sources
- SO₂ and NO_x emissions from eight background emissions sectors
- Three NH₃ emissions sectors: livestock, fertiliser, and non-agricultural
- Emissions from international shipping
- Long-range transport from European and background sources

A revised database structure was developed to take account of the addition of the A/SSSI sites and the new linkages. New deposition year tables were created. Existing tables (e.g. EUNIS classification, Nitrogen and acidity critical load tables) were updated.

The interface was re-designed making use of PHP and Ajax coding to provide a more user-friendly navigation experience for the user. The wizard type navigation based on the current system was retained but improved. Tabbed content was introduced to handle the Results page so users could easily obtain the information without unnecessary cluster and scrolling.

Extra steps were inserted to handle A/SSSI features so the user could make sensible selections of their habitat before the results page was reached.

The 'Search by Source' tool was revised to include the top 50 most affected interest features at a site in the UK for a chosen source. These could be filtered by nitrogen or acidity sensitivity.

Testing was carried out by individuals from the Technical Advisory Group and others in the agencies. System bugs were fixed and re-tested in-house. Any changes to the look and feel of the interface were also implemented.

An online User Guide was produced together with four online tutorials providing a walkthrough and guidance on using the new system.

Keywords: Air pollution, Nitrogen deposition, Acid deposition, Critical Loads, Natura 2000, SSSI, Atmospheric modelling.

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Introduction

The UK's environmental protection agencies and other regulators are required to undertake environmental assessments, including Appropriate Assessments under the Habitats Directive, to determine the potential impacts associated with atmospheric emissions from regulated industries on designated sites. The UK's conservation agencies, as statutory consultees in such cases, are required to provide scientific advice to the regulators. There is a need for a simple, user-friendly system that will provide a more site-relevant critical load for determining potential impacts on designated sites associated with regulated emissions. The designated sites covered by this tool include SACs, SPAs and A/SSSIs.

The Site Relevant Critical Loads (SRCL) tool on APIS has been used for over five years and has had three main phases of development:

1. Phase 1 – first development of SAC/SPA SRCL tool for deposition years 2003 and 2010

Under Phase 1, modelling of nitrogen and sulphur deposition using the FRAME model was carried out by CEH to produce datasets for 2003 and 2010 for 134 sources/source groups in the UK. The 5km gridded deposition data and 1km acidity critical load data was overlaid on the SAC/SPA GIS boundary data to form 'site specific' deposition data. Deposition footprints were separately modelled for each source for each site, with the total deposition to a site being the sum of all the source footprints. The further linking of site designated features to their relevant critical loads for nutrient nitrogen and acidity made it possible to produce a source – receptor matrix of attribution and potential exceedances of the critical loads.

2. Phase 2 – extension and update to include A/SSSI and revised SAC/SPA information for deposition years 2005 and 2020

Under Phase 2, modelling was carried out as above but for the emission years 2005 and 2020 and for 156 sources in the UK. In addition to SAC/SPA boundaries, A/SSSI site boundaries across the UK were also used to produce site specific deposition data. As in Phase 1 deposition footprints were separately modelled for each source for each site, with the total deposition to a site being the sum of all the source footprints. Site designated features were linked to their relevant critical loads for

nutrient nitrogen and acidity to produce a source- receptor matrix of pollutant attribution, including potential exceedances of the critical loads.

3. Phase 3 - extension/update onto APIS

Under Phase 3, the SNIFFER contract ER04, datasets and feature linkages to critical loads were added to the APIS database and then produced into a revised online SRCL tool. This tool enables users to look up sites (SAC, SPA or SSSI) and features and obtain information on:

- Deposition of nitrogen and sulphur to a site
- Proportion of sources that make up the deposition at a site (source attribution)
- Critical loads for each designated feature at the site
- Graphical representations showing critical loads for nutrient nitrogen and acidity and potential exceedances

This report mainly focuses on the outputs of Phase 3: extension of the tool to APIS. For information on the methodology of linking critical load to designated features, and the methodology behind the source attribution modelling and the FRAME model, please see the report “SNIFFER AQ02: Source attribution and critical loads assessment” (http://www.sniffer.org.uk/Resources/AQ02/Layout_Default/0.aspx?backurl=http%).

Project objectives

The project objective was to develop and implement a simple user-interface on APIS to provide site-relevant critical loads and source attribution data for protected sites to assist SEPA, the Environment Agency and other government agencies, developers and other APIS users in environmental risk assessments. The specific objectives were to:

1. Develop, test and deliver an online interactive interface for presenting site-relevant critical loads and providing deposition and source attribution data for UK SACs, SPAs and SSSIs/ ASSIs (provided from Phase 2 of the over-arching project). This will replace the existing SAC/SPA SRCL tool.
2. Update the existing separate “Search by Source” tool (originally funded by SEPA) on APIS which allows the user to look up a source and the top 50 sites to which it contributes in terms of critical loads exceedance for acidification and nutrient nitrogen (i.e. where its contribution is the highest % of a Critical Load on a site).

-
-
3. Enhance the ability of public bodies to deliver on their responsibility for and commitment to the protection of the UK's environment.

Task 1 – User survey

Before starting development of the new system, a survey of the current system was performed to obtain from users any issues, feature requests and ease of use.

This was carried out by setting up a survey form online asking users to give their reactions to the existing tool, their needs, features requests, and any clarification on guidance. This took the form of an online web-form where the results were stored in a database, and were extracted into an excel file.

The responses were collated, sorted and prioritised into common requests, and interesting ideas for further enhancement and usability. The outcomes were reported in the Interim Report.

Summary of survey results¹

29 users took part in the survey and these were broken down into the following organisations: 5 SEPA; 8 CCW; 1 JNCC; 9 Environment Agency; 4 Natural England; 1 SNH; 1 Other.

Generally, the system was well received. Below are the key areas that were surveyed and a summary of the key or common comments received.

Personal Info

Q4 – Q6: The majority of respondents were from staff spread across all UK agencies. The SRCL tool is used mainly in IPPC applications, but is also used in other assessments including planning applications, SEA and Habitats Regulations Assessments, and also for Core Management Plans. Six respondents use the SRCL tool more than once a week, seven use it every month, with the majority using it occasionally throughout the year.

Navigation and general look and feel

Q7-11: 26 reported the tool as good, 2 felt it was excellent, while only 1 said it was poor. This respondent failed to say why it was poor although they said the navigation was difficult and slow, which may indicate a first time user. The remaining 28 respondents said the navigation was easy, with half saying it was easy but slow. Most people would like to

¹ The full survey results are provided in Appendix 1.

be able to search a site and feature in one go (15) without using the 'wizard' approach. Most use the grid reference tool (22) and find it useful.

Results page for SRCL

Q12-13: The majority (20) found the Results page understandable, but most (16) thought the display of results could be improved.

Q14-16: A number of improvements were suggested for the results page based on the interpretation of the results, the layout and the graphs. The following are some of the common comments:

- More information on sources of the data, emission, etc
- More guidance on using the grid reference look-up (i.e. why use it?)
- Tick boxes instead of drop-down menus for the years
- More guidance on how to interpret the results and the critical load (CL) function
- Problems of having sites with many features and the need to keep going back to 'load' a new feature
- Can the features be ranked by sensitivity
- More coherent presentation of results....too noisy
- Larger graphics
- Wider columns to incorporate data
- See data for all years and all graphs rather than having to select individually
- Improve graphics, make bigger, improve scales
- Pie charts - Actual contribution to a site rather than percentages

Q17: A number of useful suggestions were given for improving the pie charts:

- Ability to see all graphs at the same time
- Useful to be able to plot the process contribution (PC) for installations and for creating a CL function
- Better information on source sectors

Q18-20:

Most respondents (15) have tried plotting different years and sources. Very few (23) make print outs of the results. However, many made a request (28) for being able to download the results to a summary file.

Select a Source tool

Q21-23. Only half the respondents (14) have used the select a source tool, while the same number do not understand its use. The tool was thought to be potentially useful for future work (19).

Q24: There were a number of good suggestions for improving the 'select a source' tool:

- Further explanation and guidance
- Alphabetical listing of sources
- Visibility of full source name and its location
- Explanation of emissions data

Guidance

Q25-26: 18 respondents found the home page gave enough information on how to use the tool. Extra guidance was suggested for:

- More guidance on CL function tool for acidity
- Clearer definition of terms on results page
- An easy to follow tutorial
- More background references

Q27-29: 23 respondents would like examples or case studies as part of the tool. 18 would like to see a screencast as well, although only 10 had used one on the web before.

Further needs and feature requests?

Q30-Q31: A number of features and general suggestions were made to improve the SRCL tool. These included:

- Explicit emissions data
- Critical loads for SSSIs
- Critical loads for freshwater sites
- Inclusion of Ramsar sites
- Have a forum installed for registered members
- Fill in gaps where there are no critical loads
- Keep deposition data up to date with emissions
- Provide the habitat together with the feature for SPAs

Recommendations:

Based on the survey results a brief summary of the key areas which were addressed in the new system are outlined below:

1. A better, less cluttered, results page
 2. Improved graphics
 3. The ability to rank features by sensitivity in the 'select a feature' select box.
 4. Better guidance
 5. More transparency of source/emissions data
-
1. **Results page** – the results page was redesigned to make the information more understandable and reduce the experience of data 'noise'. This was achieved by separating the results content into 2-3 tabs - General Info, Critical Loads, and Graphs. It was also noted that the width of the current APIS page can now be increased due to the wider use of bigger monitors (i.e. >15 inches).

 2. **Graphing tools** – to the graphing used in APIS was changed to make use of php graphing tool software. This improved the visual experience and provide bigger graphics.
 - Pie charts included actual contributions in addition to showing percentages
 - Graphs of both acidity and nutrient nitrogen were plotted together for comparison
 - Source names were made clearly visible in the pie charts and graphs

 3. **Filtering sensitive features** – the ability to select a site and then be given the list of designated features, but ranked by sensitivity was required as a new tool feature.

However, due to the tool assessing nutrient nitrogen and acidity it was deemed difficult to produce a ranked list of features that take into account both these pollutant issues. However this was overcome by using a filter option that the user can choose to rank a feature's sensitivity by nutrient nitrogen or acidity.

 4. **Guidance** – There was a requirement to provide further guidance to improve understanding of the SRCL tool. This was addressed in the system by having:
 - 4 online tutorials (video screencast) describing how to use the tool and providing guidance on critical load graphs and pie-charts.

- Better information on source sectors, how they were modelled, and what they mean.
 - An online User Guide
 - Tool-tips for quick access
5. **Emissions data** – emissions data for each point source and sector was reported in a simple table (Tab 4) showing the emission of sulphur and nitrogen in tonnes for each source or source-group. For year 2020 the emission scenario for each sector was also given.

Task 2a – Critical loads and feature linkages

To be able to estimate the impacts of air pollutants on designated sites, interest features need to be assigned the most relevant critical load. Site-relevant critical load is the name given to the process of allocating the most relevant critical load to every interest feature at a designated site.

Under this work, a judgment was made for all interest features as to whether they are potentially sensitivity to nitrogen deposition or acid deposition. Where this is the case the relevant critical loads for both acidity and nutrient nitrogen are assigned to each interest feature.

Critical loads for nutrient nitrogen are set under the auspices of the UNECE Convention on Long-Range Transboundary Air Pollution. They are based on empirical evidence, mainly observations from experiments and targeted gradient studies. These empirical critical loads are assigned to habitat classes of the European Nature Information System (EUNIS) to enable consistency of habitat terminology and understanding across Europe. In order to assign the relevant critical load to Annex I features, A/SSSI habitat features, or habitats of Annex II/SPA features, habitat correspondence tables are used to determine the relationship between the EUNIS classes for which nitrogen critical loads are set and the interest features.

Critical loads of acidity are based on soil and habitat types. They are set for six Broad Habitats; acid grassland, calcareous grassland, dwarf shrub heath, bogs, montane, unmanaged coniferous and broadleaved woodland (UK Biodiversity Action Plan, 1994;) see Hall et al., 2003 for full explanation) (acidity critical loads are also set for freshwater and managed woodland but these are not used in SRCL). [Habitats correspondence tables](#) are used to assign the most appropriate Broad Habitats for which acidity critical loads are set to the Annex I features (e.g. habitats listed on Annex I of the Directive), A/SSSI habitat features, or habitats of Annex II/SPA features.

Under this project the critical loads were updated from those used in Phase 1; revised nutrient nitrogen critical loads are based on Bobbink and Hettelingh (2011). For acidity critical loads the 2004 datasets were used.

For fuller details of the process of allocating critical loads to SAC and SPAs, please see section “3.1 Assigning Relevant Critical Loads to designated features” of Source attribution and critical loads assessment for Special Areas of Conservation and Special Protection Areas in the UK (2007).

(http://www.sniffer.org.uk/Resources/AQ02/Layout_Default/0.aspx?backurl=http%).

Phase 2 of the SRCL project included the addition of the A/SSSI network across the UK. Due to difference in how countries define their interest features it has been necessary to use a common nomenclature for habitat interest features. Therefore ‘reporting categories’ used by JNCC in the 2006 A/SSSI Common Standards Monitoring 6 Year Report have been used (JNCC, 2006). A process similar to that described for Annex 1 habitats in the SNIFFER 2007 report was used with reporting categories being corresponded with broad and priority BAP habitats, and then to the EUNIS classification and finally allocated with a relevant nitrogen or acidity critical load class. Further information on reporting categories and BAP and critical load linkages has been outlined in the [‘Background to assigning critical loads to A/SSSI habitat interest features’](#) page on the APIS website. It should be noted that we have been unable to match species interest features at A/SSSI to critical loads under this work. However, species may be sensitive to nitrogen deposition and/or acidification and should be considered in any impact assessment. This assessment should consider the potential impacts of air pollution on the habitat supporting the species and consider the implications of changes to the habitat in response to nitrogen or acid deposition and how this may affect the species. To help with this deposition estimates are still provided.

Task 2b – FRAME modelling

The Fine Resolution Atmospheric Multi-pollutant Exchange model (FRAME) was applied to assess the magnitude and spatial distribution of individual deposition footprints of sulphur and nitrogen associated with gaseous emissions from 156 different point sources and background sources. The analysis was performed for a recent emissions year (2005) and for a future emissions scenario year (2020).²

Emissions from the National Atmospheric Emissions Inventory (NAEI) were used for the year 2005 to rank the top 100 point sources for annual emissions of sulphur and nitrogen.

² Appendix 2 provides the full list of sources, grouping and emission values for 2005 and 2020.

The data included, where available, information on stack height, diameter, and temperature and exit velocity of emissions. The remaining point sources were combined into source sectors and were also organised by country. Where stack parameters were missing, typical default values were assigned to these point sources (height (m) : 80; velocity (m/s): 15; temp (K): 400; diameter (m): 4).

As well as point sources, gridded background emissions for different SNAP codes (Selected Nomenclature for Air Pollution) were calculated. These categories were: Energy production and transformation; Commercial, institutional and residential combustion; Industrial combustion; Industrial processes; Production and distribution of fossil fuels; Road transport; Other transport; Waste treatment and disposal.

The input of ammonia emissions to the model used the 2005 spatial AENEID (Atmospheric Emissions for National Environmental Impacts Determination) inventory that separately calculates spatial emissions from cattle, pigs, poultry, sheep (combined as 'Livestock'); crops and grassland; and non-agricultural sources. Further emissions of international shipping and background emissions (non UK emissions) were also used.

The emissions scenario for the year 2020 was generated using the UK energy scenarios based on modelling by DECC. UEP30 (Updated Energy Projection 30) was an energy scenario used by AEA in their NAEI projections to 2020 undertaken in 2008. This energy scenario for large point sources assumes a uniform sulphur content of 0.8% and that all coal fired power stations are fitted with Flue Gas Desulphurisation in 2020.

A description of the FRAME model and how it is used to calculate individual footprints is contained in Section 3.1 and 3.2 of Source attribution and critical loads assessment for Special Areas of Conservation and Special Protection Areas in the UK (2007)

http://www.sniffer.org.uk/Resources/AQ02/Layout_Default/0.aspx?backurl=http%

Task 2c – Database development

The existing SAC/SPA database was updated for the revised habitat linkages, including the addition of new sites (table SRCL_Sites) and features (table SRCL_Interest), new years of deposition data (2005/2020) (table SRCL_SiteDeposition), and new revised critical loads for acidity (table SRCL_CLstats). A/SSSI sites and their corresponding habitat features were appended to these tables. All the data is stored in Oracle (10g).

In most cases existing table structures were used from the existing SAC/SPA set up including the acidity and nitrogen classes and their justification tables. A new feature linkage table was created to hold all the interest features and their linkage codes.

All data was uploaded into the database by first exporting out of Access using queries and then uploading to the Oracle database using SQL-loader.

The database structure of the main tables and their relationships is shown in Figure 1. The SRCL_Feature_Linkages table holds most of the necessary information and linking codes for each designated feature. The connections between the sites and the interest features are made in the SRCL_Site_Features table linked by the SiteCode and InterestCode.

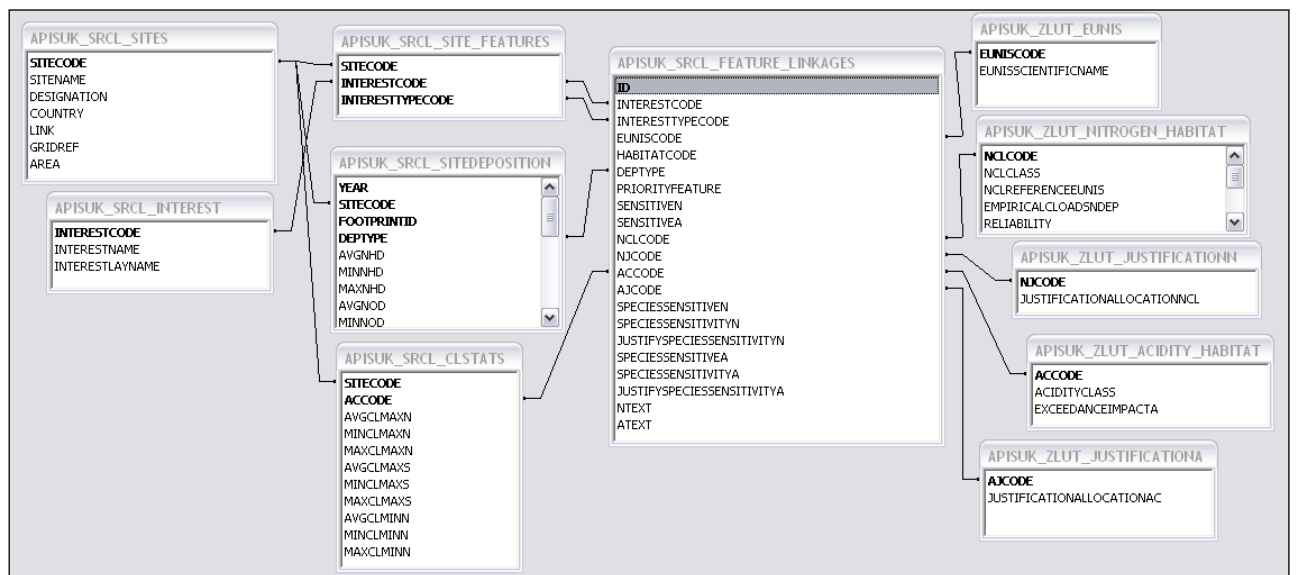


Figure 1: Main SRCL database tables and relationships

Task 2d – Interface design and development

The basic navigational functionality, selecting a site, then selecting a feature was maintained for the new development. This ‘wizard’ navigation approach (select - click ‘next’) was seen as an easy and understandable approach to progress to the results page. The navigational flow diagram is shown in Figure 2.

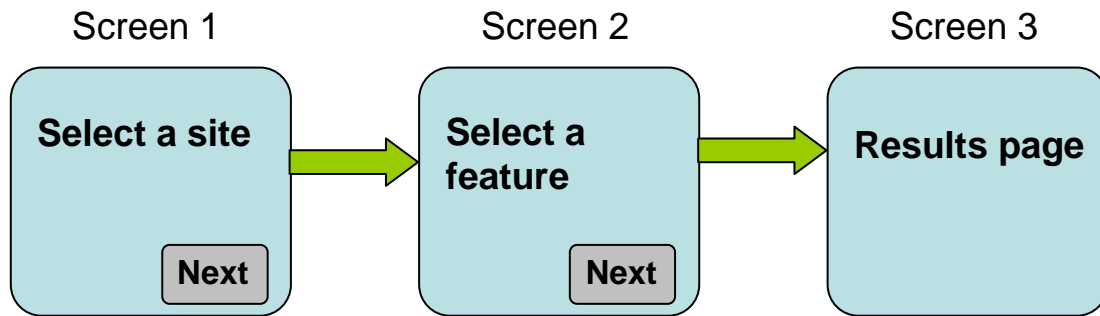


Figure 2: Wizard navigation for SRCL

The main programming tasks involved the re-coding of existing queries from Perl to PHP. This provides more flexibility and the ability to make use of the PHP graphing software. New routines were also written for handling the A/SSSI feature selection processes. The new development also made use of Ajax routines to improve functionality and user experience by returning results in an instance instead of refreshing the whole page. These Ajax routines enabled us to improve functionality for:

- Searching sites by keyword
- Filtering sites by country
- Filtering features by sensitivity
- Filtering by deposition year
- Filtering results by EUNIS and broad habitat category
- Filtering by source type

Handling multi-choice options of user input and results page

Very often features have more than one critical load, one or more reporting categories in the case of A/SSSIs, and for SPA birds features there is often more than one habitat. For SPAs this was easily handled by offering the user the option of selecting the relevant broad habitat in which the bird resided at their chosen site as shown in Figure 3 below.

Site/Feature Information

Site Code: UK9002561
 Site Name: Abernethy Forest
 Interest Code: A094
 Interest Name: Osprey - *Pandion haliaetus* (Breeding)

The 'Osprey' is found in more than one broad habitat (i.e different habitats for feeding, nesting or roosting). Please select the broad habitat that best fits the habitat in which this species occurs at this site.

Broad Habitat: Standing open water and canals

[Note: Habitats in the select menu above may give the same nitrogen and acidity values]

Figure 3: Choosing a broad habitat for SPAs

For A/SSSIs, since the habitat features are very broad, users have to go through an additional set of habitat filters to pinpoint their required habitat feature during the 'Select a feature' select box. Since conservation agencies across the UK use differing habitat nomenclatures, the reporting categories (with some modifications) used by JNCC in the 2006 A/SSSI Common Standards Monitoring 6 Year Report have been used (JNCC, 2006). The reporting categories used to define habitat interest features are fairly broad and may contain habitats with a range of sensitivity to nitrogen deposition and/or acidity. Fortunately, the database tables that support the A/SSSI features (from Phase 2) have classified all the relations between reporting category, broad habitat, priority habitat, EUNIS, and critical load categories.

Figure 4 below shows the Select a Feature page for handling SSSIs. The top box is first populated with the reporting categories of each habitat found at a particular site. The reporting categories are linked in the database to the UK's Broad and Priority habitats which are shown in the lower box in Figure 4. These habitats are also sorted by sensitivity to nutrient nitrogen or acidity. By default they are sorted by nutrient nitrogen. The user selects one of these habitats to move on to the results page.

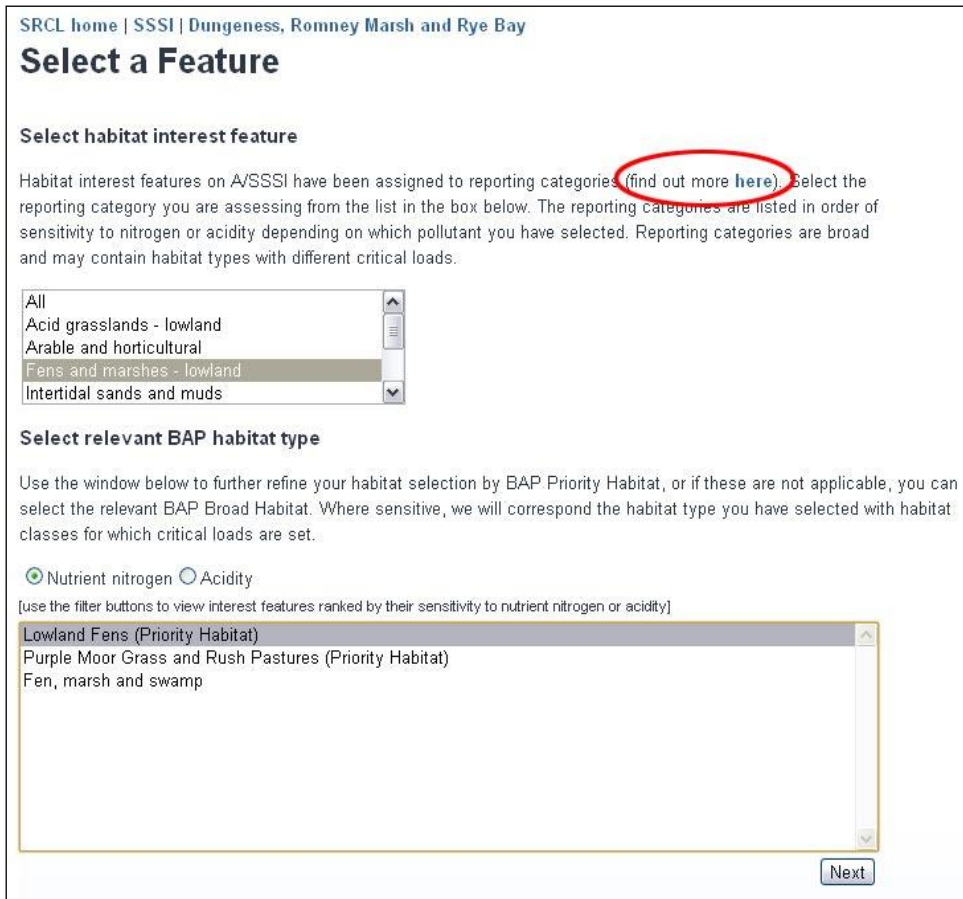


Figure 4: A/SSSI Select a Feature screen

Task 3 – Testing and bug fixing

Testing was carried out by individuals from the Technical Advisory Group and others. System bugs were fixed and re-tested in-house. Any changes to the look and feel of the interface were also implemented.

Task 4 – Search by Source tool

The Search by Source tool provides the user with the ability to start at the source end of a request and find which sites and features are worst affected by that chosen source. The user is able to select any of the 156 sources that were run in the FRAME scenarios. By selecting a source the user can choose from the top 50 sites-feature combinations ranked by percentage of the critical load. The user can also view the top 50 sites-features by pollutant type (Figure 5 highlighted red). Selecting the site-feature combination leads the

user to the normal Results page. Figure 5 shows an example of a top 50 site-feature page with pollutant filter (in red).

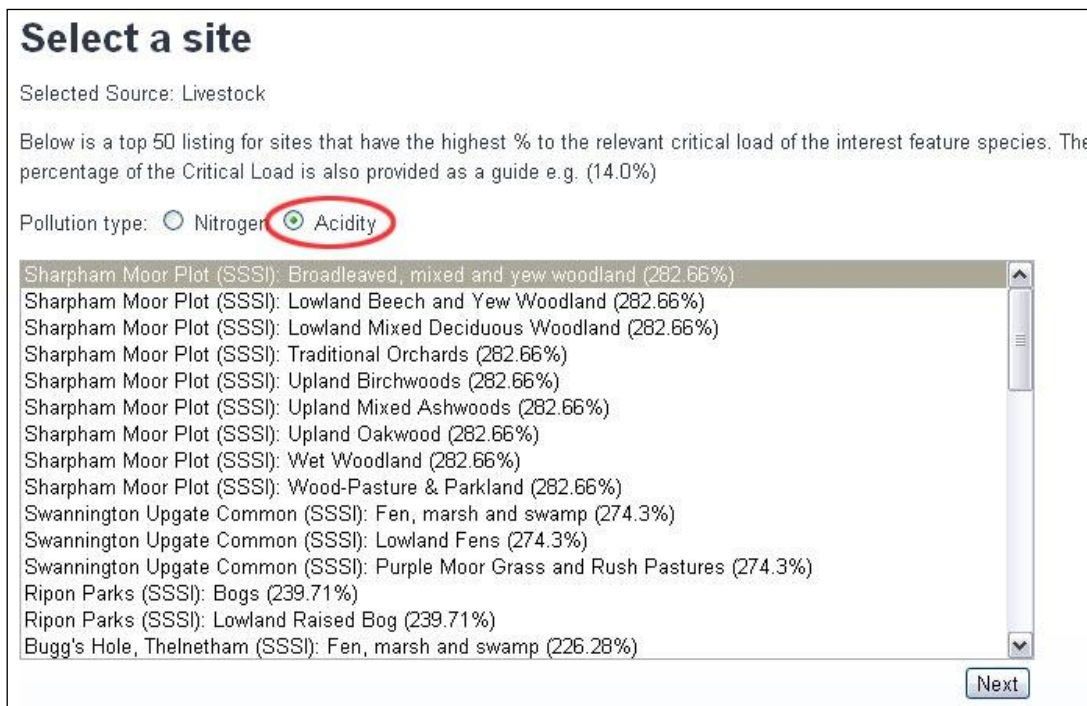


Figure 5: Search by source top 50 results

TASK 5 – APIS user guide & screen-cast tutorial

A revised User Guide was produced and can be found at the [following link](#). To provide a walkthrough of the system a video screen cast was made that highlighted the navigational path for carrying out a site-feature search whilst also giving some guidance on what the results mean. The tutorials can be [found here](#).

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Appendix 1: User survey results & recommendations

There were 29 responses to the APIS SRCL survey. Table 1 shows the responses for each question.

Table 1: APIS SRCL Survey responses

Q RESPONSES

4	What organisation do you work for?	
	SEPA	5
	Natural England	4
	CCW	8
	SNH	1
	EA	9
	Other	2
	Total	29
5	What do you use the tool for?	
	IPPC Applications (EPR/PPC)	20
	Planning Applications for agriculture	8
	Planning Applications for industry	8
	Road Assessments	3
	Other – please state below	12
	<ul style="list-style-type: none"> • Assessing a wide variety of land use plans mainly for HRA and SEA • Previously all of above, but much less now as do not do casework. So only use for site specific queries + use UK summary stats • Informing CCW Conservation Objectives in our Natura 2000 site Core Management Plans • only used to see how it works, to understand the sort of information colleagues will be getting from APIS • I am coordination Review of Consents for all Local Authorities in Wales. APIS links and tools are distributed to participants. • As a basis of information for air policy development • In the assessment of the likely significant effect of new and existing Environment Agency permits with potential AQ effects. • Pollution levels in relation to protected sites. • Casework in relation to protected sites • General information on air pollution impacts for talks, training events etc • Policy and advisory work in relation to the above • Regulation for wildlife sites legislation 	

Q RESPONSES

6 How often do you use the 'search by Site Relevant Critical Load (SRCL)' tool?

More than once a week	6
Never	1
Occasionally throughout the year	15
Once a month	7

7 In general, how would you rate the ease of use of the system?

Excellent	2
Good	26
Poor	1

8 The SRCL tool uses a 'wizard' system: users select options and click 'Next'. How do you find this navigation method?

Difficult & Slow	1
Easy & Quick	14
Easy but not Quick	14

9 Would you prefer to select everything in one go (on one page)?

I don't mind	11
No	2
Yes	15

10 Do you use the add a grid reference for your site?

No	7
Yes	22

11 Is it useful?

I don't use it so can't say	5
Yes	23

12 Is the results page understandable?

No	1
Not always	8
Yes	20

13 Is the information presented in a coherent way?

It could be improved	11
No	2
Yes	16

Q RESPONSES

14 Please add comments if you answered 'no' or 'could be improved'

Left Blank 13

User entered value 16

- When there are blanks, it is not clear whether this means no data available or feature is not sensitive.
- It isn't obvious where the data is sourced from, and the limitations of it beyond what is written on the 'warnings' page that pops up sometimes e.g. for the East Lothian area, the second biggest emitter of SO2 in Scotland is not listed as a point source, but this is not clear unless you know to expect it and search all the way through the list of point sources to find if it is listed. Also no way of checking if the FRAME model input data for the sources listed was actually correct(ish).
- Its a minor point but having to accept the terms and conditions pop up can be frustrating.
- Just more clarity in the message and a easier to read format
- I'm familiar with the output and basis of the data so it is clear to me but I think probably not to others. The use of "i" buttons to provide further info is good. A few suggestions: give more information on why you might want to input a grid ref; provide the user guide on first page; the uncertain of CL "i" button needs to make clear it relates to the CL/EUNIS and there may be further uncertainties in "matching" to the Annex I.
- Further explanation of critical levels / loads; background data ; charts and figures would be useful for officers who do not use the system regularly
- Not always easy to see the total deposition (red cross) of the critical load function graph if near the origin and writing is a bit small..
- Perhaps the info could be presented a little simpler, or with some clarification/explanation, to help the non-air quality specialist
- More guidance on how to interpret the results
- Instead of drop-down menus it might better to have tick boxes or something similar for the year and CL exceedance so that more than one of each can be selected and so users have the option to compare the different data and graphs at the same time.
- More understandable terms and descriptions would be useful.
- I am unsure how up-to-date the references are. Many are from the 1990s; few from the late 2000s.
- The problem occurs when a site has numerous designated features (e.g. many of the SPAs), then it is very time consuming to look up each one. I don't know if it is possible but having some sort of summary of the data for all the features or a simple way of identifying the most and least sensitive features would be really helpful;.
- Quite visually "noisy" - a more coherent presentation of the acid and nitrogen results together would be useful. Pie charts function for source apportionment is a bit clunky. It would be good to have a tabulated option for these as well or instead. And to be able to output a report on the sources information for a search result.
- So far, I haven't used the detailed content of the SRCL tool sufficiently frequently to provide detailed and fully valid feedback. Have previously used the more generic search and 'information obtaining facility' of the general Apis website. As well as providing more detailed and comprehensive information, the SRCL tool provides a 'feeling of greater confidence' - because it presents information on a more relevant and specific basis for real features and conditions relevant to the site.

Q RESPONSES

- It is only understandable for someone who knows something about air pollution, it is not very easy if you don't know what you are looking at. Links to an explanation about the critical load function so they can understand what this shows would be useful. Some explanation as to the maximum and minimum CL values would be helpful and how these should be used and interpreted.

15 Can the layout be improved? If yes, please tell us how.

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User entered value	12

- Can look a bit squashed up and complicated - may be just spreading it out over a longer page?
- Less information but clearer message
- It is not always clear which year is being showed. When you select a source and get results specific to this source it is not always clear that the data are all specific to the source i.e. better perhaps to open new window and be able to compare with totals.
- No, layout is fine.
- I feel the layout is fine as it stands.
- Might be useful to be able to see the graph as a separate (larger) window (I bit like you can have for the pie chart graphic... i.e. "(Click on image to enlarge and view source names)")
- the site relevant figures could be more obvious, as it often appears embedded within a body of text.
- Rather than having two narrow columns (Site... and Sensitivities... on the left and Depositions... and Source... on the right) it would be more sensible to have the results in one single, wider column. This would allow the pie graphs and charts to be displayed side by side.
- It is quite clear. Perhaps use more headlines which expand when clicked on them, so all the headlines are visible at the beginning and then the reader can zoom-in whatever is most relevant...
- Layout for each feature is very clear but cross comparison between designated features is time consuming.
- I noticed that someone has said: ""Not always easy to see the total deposition (red cross) of the critical load function graph if near the origin and writing is a bit small."" - I would agree with this.
- Needs to be more obvious that you can change the year and plot N and acid deposition. In fact it would be useful if you could see all these at once if possible or at least the different years so you can compare them.

16 Can the graphics (e.g. pie charts, critical loads graph) be improved?

Left Blank	16
User entered value	13

- Are these really necessary or could the page have a link to them?
- Very useful to have these Explain the min CI and max CL for acidity (i.e. it represents variation over the site where >1km² etc.
- N CI graph - improve scale on x axis.
- Again, more explanation of what they show would be useful
- Actual contributions to deposition from sources, rather than % contribution to deposition if possible.

Q RESPONSES

- See above (Might be useful to be able to see the graph as a separate (larger) window (I bit like you can have for the pie chart graphic... ie "(Click on image to enlarge and view source names)")
- Yes they could have the option of viewing on a larger pop up window.
- Perhaps have the legends appear next to the pie charts by default, without having to click on them first.
- I can't remember now, I think they were fine. (it would have been good to have a link to an example from the questionnaire...)
- A key upfront without having to click on the pie chart would make it easier.

17 What new graphics/statistics features would you like to see?

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User entered value 9

- Calculate PC as % of acidity CL function! - but perhaps a stand alone tool out with of SRCL pages.
- Ability to see 2003 and 2010 graphs for CL and current deposition, at the same time possibly?
- Would be useful if could plot PC for installation assessing and create the CL function graph with any other sources included if needed. Figures for beyond 2010 would now be helpful - projected figures for 2016 with opt-out of LCPD?
- An understanding of what "other point sources" and "other transport" in "plot top sources" really means!
- The up to date records if possible instead of only the predicted 2010 ones.
- Maps indicating where the value boundary is, if at all possible...
- Can't think of any.
- "Would be useful if could plot PC for installation assessing and create the CL function graph with any other sources included if needed" - that sounds useful!
- "Include simple 'Map Graphic' for the site under investigation and a link to a more detailed map of the site identifying spread of interest features/site segments for users who interrogate by Grid Reference.
- In time can data/information for cSAC's also be included? As we consider these to be fully protected sites.

18 Have you tried plotting the Critical Loads Function graph for different years or sources?

I didn't know this was possible 6

No 7

Yes 15

19 Do you print the pages for future reference?

No 23

Yes 6

20 Would the ability to download the results be useful into a summary file?

No 1

Yes 28

Q RESPONSES

21 Do you use the 'Search by Source' tool?

No	15
Yes	14

22 Do you understand its use?

No	2
Not completely	12
Yes	15

23 Is this tool potentially useful to you?

I don't use it so can't say	7
No	2
Yes	19

24 How can the select source tool be improved?

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User entered value	12

- See comments above about it not being obvious where data comes from/ how generated & not obvious why only certain sources are there - this is a common query to me for Scottish sites.
- A map showing estimated dispersal?
- Not of use to me as I no longer do casework but I can see it's potential use but have some questions. Since all 'big' existing installations have been subject to Reg 48 assessment when they got their PPC/EPR permit any new casework on these existing installations will be a result of a variation which could change emissions - the tool then becomes redundant because the emissions are incorrect - unless you provide a scaling tool. Also a local air dispersion model would be required to consider local impacts. So what is the application of the tool?
- Further explanation of the features / sites would be good - or alternately, ensure that they match up to the information provided in NE / CCW and JNCC citations. It is often difficult to match what each citation says to the feature list provided.
- When searching for impacts of a particular source the results page does not seem automatically to display the information relevant to the source you're interested in, as in some cases on selecting an SAC the source doesn't then appear to be listed as an impact on that site - very frustrating when you're primarily interested in finding out what SACs are affected by the source you're looking at. Please note though that I've only used the system to see how it works, not for real, so am maybe not familiar enough with it to have formed an understanding.
- The features list needs to be more comprehensive and match Annex 1 habitats more closely.
- The sources in the selection menu could be listed in alphabetical order rather than by numbers.
- The order of sources in the menu hasn't been explained and the full name of each source is not visible so it is not so easy to search through them or to see what they all are.
- It would be great if the whole name and location of the source could be visible. With

Q RESPONSES

my browser at least I can see only the number and a couple of words from the name, but I have no clue where they are. A map could be more useful, if I am interested in sources near a particular site, but I don't know the name of the potential source.

- Perhaps presenting the results tabulated into three columns, also being able to output to a file would be helpful
- I understand some of the potential of the 'select source' search facility of the tool, but I am more concerned in establishing true and realistic 'total background' values when assessing impacts from new proposals/applications.

25 Does the SRCL homepage provide enough information and guidance on how to use the tool?

No	8
Yes	18

26 Where would extra guidance be most helpful?

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User entered value	11

- Clear definitions for the terms used on the results page
- Perhaps an easy to follow tutorial on the intro page?
- See earlier comments. All the information is there, but up front link to instructions would be good.
- It is perhaps not immediately evident what is required from APIS' homepage in order to bring up a site relevant critical load. A first time user may not be familiar with this term even though this is the info they are after. Some more info may be useful therefore, in order to inform first time users.
- More background... references, other information sources etc.
- How are the 30 sites top-listed when selecting e.g. SAC/SPA and a source (e.g. livestock emissions)? Why I can't see any lowland heathlands sites for either acidification or eutrophication? If it is not possible to select both SAC/SPA AND a source, this should be made clear. Interpretation of some of the charts (e.g. CL exceedance)
- Extra guidance on the acidity critical load function, how the site relevant critical loads were derived and how the background deposition data for different years was produced would be useful as these areas seem to generate lots of questions from our staff and external customers.
- Yes for me but we need to consider whether occasional and new users have enough information and guidance.
- I need to use it more frequently to provide more accurate feedback, but guidance and available 'help links' seem quite comprehensive.
- (Personally I need to develop a better understanding of the S to N limiting plots for Acidification assessment - but this is not a fault of the Tool).
- Links to an explanation about the critical load function so they can understand what this shows would be useful. Some explanation as to the maximum and minimum CL values would be helpful and how these should be used and interpreted.

27 Would examples or case studies be useful?

No	4
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Q RESPONSES

	Yes	23
28	Have you ever used a video screencast tutorial on the web?	
	No	19
	Yes	10
29	Would the use of a screencast walk-through be useful?	
	It would be a nice feature, but not essential	18
	No	3
	Yes	8
30	In general what further information or features would you like the Site Relevant Critical Load tool to provide?	
	Left Blank	18
	User entered value	11
	<ul style="list-style-type: none"> Expand the biomonitoring section with case studies. SSSI data. UK BAP habitats designated County Wildlife Sites Second Tier sites etc More explicit emissions data and guidance/caution on using 2020 data. Critical loads for SSSI sites would be very useful as would critical loads for freshwater habitats. A little bit more info on impacts of N and Acid deposition on each habitat type would also be useful. I would like to see it cover Ramsar sites, not all are European sites and some have different features, and SSSIs (am aware that this in the process of happening). Useful to have a forum for some registered members(ie Local Authorities) to discuss problems and exchange ideas More site relevant, i.e. should be compared to the sites most sensitive feature. the categories do not mesh well with the annex 1 categories, and it is very awkward fitting it to NVC categories. It would be extremely useful if it could be extended to include SSSIs and their features, as not all SSSIs have an overlapping N2k site, nor are their features necessarily the same. The whole text is not visible once I selected a SAC and a site (eg Breckland) Site relevant critical loads for SSSIs and Ramsars, as well as SACs and SPAs. Site relevant critical levels too. Need to fill in the gaps for those habitats / species what are sensitive but can't give an CL for yet e.g. freshwater habitats and species. 	
31	Any other comments on the Site Relevant Critical Load tool?	
	Left Blank	18
	User entered value	11
	<ul style="list-style-type: none"> Really useful starting point for habitats assessment work, to enable consistency across UK. probably wouldn't want to add too much more or it could become very complicated/ confusing to use. Drop down lists e.g. for habitats could appear as screen icons that you just click on to save scrolling down the list. Keep up to date deposition runs (i.e on most recent emission data as becomes 	

Q RESPONSES

- available). Update N CL following review this year.
- No, useful but extra explanations would be helpful.
- We use APIS a lot in CCW and are happy with it. I think the interface is good and focus should be on quality of the data within rather than the interface itself, which is very useable.
- I find the SCRL tool to be difficult to use for SPAs - it takes time going through the species to find those sensitive to deposition, and then finding the lowest critical loads for use in assessments. It would possibly be easier to have the habitat types up front with the associated features, rather than the other way round. This is why I have selected 'easy but not quick' above. Its fine for SACs.
- Carrying on from above comment, an extension to the habitat grouping section indicating (where possible) which NVC and Annex 1 category fits to the corresponding Apis Category.
- This is a very useful tool and my colleagues and I have found it indispensable in our day to day work. Any further developments to expand its scope and user-friendliness would be very welcome.
- It is a fantastic tool.
- Just to say that it is really useful. Is there a way to update the information on specific sites following ground truthing? e.g. where APIS says sensitivity is site-specific or problems with the information (e.g. habitat allocation) have been detected. It would be really helpful if APIS could include a tool to calculate PC as a % of the acidity critical load function.

32 Any other comments on APIS in general?

Left Blank	14
User entered value	15

- Really useful and informative tool, not sure what we would do without it now.
- Useful tool and look forward to seeing its functionality further improved
- Very useful and easy to use website.
- Thanks for this useful resource!
- Overall APIS is incredibly useful, I encourage others to use it as often as I can.
- SSSI critical loads would be useful (I understand these are in preparation)
- overall a very useful system - in the past I frequently searched for impacts by pollutant or habitat/species and found it straightforward and uncomplicated. Am out of practice these days, but the increased functionality will I'm sure benefit colleagues.
- Useful.. but we need local authorities to actually use it at planning application or pre planning (pref).. along with other tools such as SCAIL to help assess impact of new (and existing) intensive agricultural (and potentially other) projects on protected sites.
- Very useful, the site relevant critical loads could need updating with more specific information and SSSI (which i understand are in the pipeline) could be added also.
- It would be useful to develop APIS to facilitate GIS-based display of critical loads and levels for different air pollutants, and to possibly use APIS to host and display the air classification of ecosystems (SNIFFER project ER07).
- I would like to be able to search for protected sites, or place names.
- Very useful and easy to use.
- How to rationalise that APIS predicted Background N Deposition values are invariably 300 - 400% of indicated N Deposition Critical Load values, for the majority of Woodland Habitat sites in England and Wales. It makes it difficult to

Q RESPONSES

explain/rationalise to Applicants from some industry sectors.

Main Site. Depending on the 'Search tree path' you take, you can end up with different outcomes (or no outcome) when searching for background values of pollutants. Perhaps an overview search guide for different potential user groups?

- Can the grid resolution be increased to 1km x 1km?

Appendix 2: Source Emissions

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
0	Base Run	630.49	490.20	361.79	332.89	179.66	338.71	UK	Total deposition	Total deposition
1	PointSource	6.68	15.83	0.00	0.58	0.82	0.00	England	Ferrybridge C	Power station
2	PointSource	5.51	14.05	0.00	0.58	0.82	0.00	England	Fiddlers Ferry	Power station
3	PointSource	17.44	12.76	0.00	5.14	2.44	0.00	England	Drax	Power station
4	PointSource	0.56	0.29	0.00	0.35	0.40	0.00	Wales	Fifoots Point	Power station
5	PointSource	2.17	11.90	0.00	2.09	8.26	0.00	England	Ashington	Other industrial combustion
6	PointSource	0.82	2.63	0.00	0.84	1.90	0.00	England	Coryton	Refinery
7	PointSource	5.70	14.43	0.00	1.67	0.82	0.00	England	Eggborough	Power station
8	PointSource	0.06	0.26	0.11	0.06	0.19	0.11	England	Cantley	Other industrial combustion
9	PointSource	0.00	0.00	0.49	0.00	0.00	0.49	England	Lostock	Chemical industry - ammonia use
10	PointSource	0.00	0.00	0.53	0.00	0.00	0.53	England	Winnington	Chemical industry - ammonia use
11	PointSource	0.12	0.85	0.00	0.04	0.83	0.00	England	South Wirral	Chemical industry - carbon black
12	PointSource	0.02	0.17	0.00	0.02	0.12	0.00	England	Tilbury	Other industrial combustion
13	PointSource	0.94	2.87	0.00	0.97	2.08	0.00	England	South Killingholme	Refinery
14	PointSource	5.97	18.85	0.00	0.58	0.82	0.00	England	Cottam	Power station
15	PointSource	0.00	0.20	0.00	0.00	0.20	0.00	England	Grimsby	Solid smokeless fuel production
16	PointSource	0.42	0.00	0.00	0.68	0.00	0.00	England	Damhead Creek	Power station
17	PointSource	0.34	0.01	0.00	0.54	0.00	0.00	Wales	Deeside	Power station

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
18	PointSource	0.69	0.94	0.03	0.71	0.68	0.03	Wales	Milford Haven	Refinery
19	PointSource	1.50	0.01	0.00	2.41	0.00	0.00	England	Greystones	Power station
20	PointSource	1.30	2.98	0.00	1.25	2.07	0.00	England	Wilton	Other industrial combustion
21	PointSource	2.13	10.41	0.00	2.19	7.53	0.00	England	Fawley	Refineries - combustion
22	PointSource	0.90	0.00	0.00	1.45	0.00	0.00	England	South Humber	Power station
23	PointSource	0.31	0.00	0.00	0.50	0.00	0.00	England	Little Barford	Power station
24	PointSource	5.01	7.05	0.00	1.28	1.09	0.00	England	Tilbury B	Power station
25	PointSource	0.16	0.34	0.00	0.26	0.13	0.00	England	Fawley	Power station
26	PointSource	0.27	0.50	0.00	0.43	0.20	0.00	England	Littlebrook D	Power station
27	PointSource	5.48	11.65	0.00	1.38	1.57	0.00	England	Didcot A	Power station
28	PointSource	0.72	0.00	0.00	1.15	0.00	0.00	England	Didcot B	Power station
29	PointSource	6.30	13.11	0.00	0.86	1.22	0.00	Wales	Aberthaw B	Power station
30	PointSource	0.09	0.00	1.80	0.12	0.00	1.80	England	Ince	Chemical industry - ammonia based fertilizer
31	PointSource	0.55	0.00	0.00	0.88	0.00	0.00	England	Killingholme	Power station
32	PointSource	0.60	5.00	0.01	0.62	3.62	0.01	England	Killingholme	Refinery
33	PointSource	0.17	0.70	0.02	0.18	0.50	0.02	England	North Tees	Refinery
34	PointSource	6.66	6.22	0.00	0.52	0.73	0.00	England	Ratcliffe on Soar	Power station
35	PointSource	6.21	16.64	0.00	1.53	2.08	0.00	England	Kingsnorth	Power station
36	PointSource	0.36	0.95	0.00	0.57	0.38	0.00	England	Grain	Power station
37	PointSource	0.38	0.01	0.00	0.61	0.00	0.00	Wales	Connahs Quay	Power station

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
38	PointSource	6.35	12.15	0.00	0.29	0.41	0.00	England	Rugeley B	Power station
39	PointSource	0.57	0.01	0.00	0.91	0.00	0.00	England	Saltend	Power station
40	PointSource	0.39	0.01	0.00	0.62	0.00	0.00	England	Rye House	Power station
41	PointSource	0.12	0.85	0.00	0.04	0.82	0.00	England	Avonmouth	Chemical industry - carbon black
42	PointSource	1.63	7.07	0.00	1.68	5.12	0.00	England	Stanlow	Refinery
43	PointSource	0.30	0.00	0.00	0.48	0.00	0.00	England	Sutton Bridge	Power station
44	PointSource	1.00	4.96	0.00	1.02	3.59	0.00	Wales	Pembroke	Refinery
45	PointSource	6.36	6.20	0.00	1.15	1.63	0.00	England	West Burton	Power station
46	PointSource	2.72	8.77	0.00	0.80	1.27	0.00	England	Ironbridge	Power station
47	PointSource	0.01	0.25	0.00	0.01	0.24	0.00	England	Bridgwater	Chemical industry - general
48	PointSource	0.46	0.08	0.02	0.21	0.07	0.02	Northern Ireland	Cookstown	Cement - non-decarbonising
49	PointSource	0.52	2.84	0.02	0.23	2.62	0.02	Scotland	Dunbar	Cement - non-decarbonising
50	PointSource	0.00	0.36	0.00	0.00	0.35	0.00	Scotland	Lochaber	Primary aluminium production - general
51	PointSource	3.47	8.00	0.00	0.96	1.19	0.00	Scotland	Cockenzie	Power station
52	PointSource	5.81	15.87	0.00	2.22	1.22	0.00	Scotland	Longannet	Power station
53	PointSource	1.59	6.02	0.00	0.29	0.41	0.00	Northern Ireland	Kilroot	Power station
54	PointSource	0.77	0.65	0.00	1.23	0.26	0.00	Northern Ireland	Ballylumford	Power station
55	PointSource	0.65	0.72	0.00	0.37	0.44	0.00	Scotland	Peterhead	Power station

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
56	PointSource	0.59	0.23	0.00	0.95	0.09	0.00	Scotland	Lerwick	Power station
57	PointSource	1.08	1.80	0.00	1.11	1.30	0.00	Scotland	Grangemouth	Refinery
58	PointSource	0.19	0.52	0.00	0.18	0.36	0.00	Scotland	Glenrothes	Other industrial combustion
59	PointSource	0.24	0.28	0.00	0.23	0.19	0.00	Scotland	Alloa	Other industrial combustion
60	PointSource	0.40	0.00	0.00	0.39	0.00	0.00	Scotland	Grangemouth	Other industrial combustion
61	PointSource	0.12	0.35	0.00	0.12	0.24	0.00	Northern Ireland	Maydown	Other industrial combustion
62	PointSource	0.49	0.00	0.00	0.47	0.00	0.00	Scotland	Mossmorren	Other industrial combustion
63	PointSource	0.41	0.00	0.00	0.22	0.00	0.00	England	Barrow North	Offshore oil and gas - own gas combustion
64	PointSource	0.84	0.00	0.00	0.46	0.00	0.00	England	Theddlethorpe	Shipping - coastal
65	PointSource	0.57	0.14	0.00	0.26	0.13	0.00	England	Barrington	Cement - non-decarbonising
66	PointSource	0.11	1.23	0.00	0.04	1.19	0.00	England	Barnsley	Coke production
67	PointSource	0.05	0.21	0.00	0.05	0.14	0.00	England	Oughtibridge	Other industrial combustion
68	PointSource	0.54	0.43	0.01	0.25	0.40	0.01	England	South Ferriby	Cement - non-decarbonising
69	PointSource	0.97	0.03	0.00	0.44	0.03	0.00	England	Ketton	Cement - non-decarbonising
70	PointSource	0.32	0.31	0.00	0.52	0.12	0.00	Northern Ireland	Coolkeeragh	Power station
71	PointSource	0.08	1.57	0.00	0.03	1.52	0.00	England	Lynemouth	Primary aluminium production - anode baking
72	PointSource	0.03	1.05	0.00	0.01	1.02	0.00	Wales	Holyhead	Primary aluminium production - general

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
73	PointSource	0.45	0.22	0.01	0.20	0.20	0.01	Wales	Aberthaw	Cement - non-decarbonising
74	PointSource	0.03	0.19	0.00	0.01	0.18	0.00	England	Barnstone	Cement - non-decarbonising
75	PointSource	0.59	0.19	0.06	0.27	0.18	0.06	England	Cauldon	Cement - non-decarbonising
76	PointSource	1.26	1.57	0.06	0.57	1.45	0.06	England	Hope	Cement - non-decarbonising
77	PointSource	0.77	0.57	0.01	0.35	0.53	0.01	England	Westbury	Cement - non-decarbonising
78	PointSource	0.48	1.06	0.02	0.22	0.98	0.02	England	Clitheroe	Cement - non-decarbonising
79	PointSource	0.30	0.00	0.00	0.29	0.00	0.00	England	Wilton	Other industrial combustion
80	PointSource	0.45	0.25	0.00	0.69	0.39	0.00	England	Thrislington	Lime production - non decarbonising
81	PointSource	0.53	0.06	0.00	0.24	0.06	0.00	England	New Rugby	Cement - non-decarbonising
82	PointSource	0.79	0.11	0.00	0.66	0.07	0.00	Scotland	St Fergus	Other industrial combustion
83	PointSource	0.48	0.00	0.00	0.78	0.00	0.00	England	Immingham	Power station
84	PointSource	1.44	4.03	0.02	1.35	4.55	0.02	England	Teesside	Blast furnace
85	PointSource	0.30	0.33	0.00	0.14	0.30	0.00	England	Tunstead	Cement - non-decarbonising
86	PointSource	0.33	0.21	0.02	0.15	0.19	0.02	Wales	Padeswood	Cement - non-decarbonising
87	PointSource	0.77	0.19	0.00	1.18	0.30	0.00	England	Whitwell	Lime production - non decarbonising
88	PointSource	1.65	3.04	0.04	2.21	3.75	0.04	England	Scunthorpe	Blast furnace
89	PointSource	1.18	1.83	0.01	0.42	1.78	0.01	Wales	Port Talbot	Blast furnace
90	PointSource	0.05	0.22	0.00	0.04	0.15	0.00	Wales	Chwilog	Other industrial combustion
91	PointSource	2.08	0.36	0.01	0.94	0.33	0.01	England	Northfleet	Cement - non-decarbonising

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
92	PointSource	0.00	0.53	0.00	0.00	0.64	0.00	England	Gravesend	Secondary lead production
93	PointSource	0.62	0.00	0.00	0.59	0.00	0.00	England	Seal Sands	Other industrial combustion
94	PointSource	0.30	0.83	0.00	0.29	0.80	0.00	England	Port Clarence	Chemical industry - general
95	PointSource	0.00	4.91	0.00	0.00	4.77	0.00	England	Stewartby	Brick manufacture - Fletton
96	PointSource	0.00	3.77	0.00	0.00	3.77	0.00	England	Whittlesey	Brick manufacture - Fletton
97	PointSource	0.14	0.14	0.00	0.14	0.10	0.00	Scotland	Irvine	Other industrial combustion
98	PointSource	0.42	0.00	0.09	0.59	0.00	0.09	England	Billingham	Ammonia production
99	PointSource	0.24	0.22	0.00	0.08	0.22	0.00	England	Runcorn	Sulphuric acid production
100	PointSource	0.22	0.02	0.00	0.21	0.01	0.00	Northern Ireland	Derrylin	Glass - hollow glass
101	CombinedPointSource	1.39	0.13	0.00	0.66	0.11	0.00	England	Incineration & Crematoria	Combined Point Sources
102	CombinedPointSource	0.05	0.01	0.00	0.03	0.00	0.00	Scotland	Incineration & Crematoria	Combined Point Sources
103	CombinedPointSource	0.01	0.00	0.00	0.01	0.00	0.00	Wales	Incineration & Crematoria	Combined Point Sources
104	CombinedPointSource	0.00	0.00	0.00	0.00	0.00	0.00	Northern Ireland	Incineration & Crematoria	Combined Point Sources
105	CombinedPointSource	4.57	1.56	0.00	4.23	1.37	0.00	England	Industry	Combined Point Sources
106	CombinedPointSource	1.26	0.58	0.00	1.21	0.41	0.00	Scotland	Industry	Combined Point Sources
107	CombinedPointSource	0.40	0.20	0.00	0.37	0.17	0.00	Wales	Industry	Combined Point Sources
108	CombinedPointSource	0.44	0.00	0.00	0.83	0.00	0.00	England	Landfill & sewage gas combustion	Combined Point Sources

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
109	CombinedPointSource	0.02	0.00	0.00	0.05	0.00	0.00	Scotland	Landfill & sewage gas combustion	Combined Point Sources
110	CombinedPointSource	0.02	0.00	0.00	0.04	0.00	0.00	Wales	Landfill & sewage gas combustion	Combined Point Sources
111	CombinedPointSource	0.81	0.05	0.00	0.44	0.04	0.00	England	Offshore oil and gas	Combined Point Sources
112	CombinedPointSource	0.76	0.22	0.00	0.41	0.13	0.00	Scotland	Offshore oil and gas	Combined Point Sources
113	CombinedPointSource	3.49	0.46	0.00	5.61	0.18	0.00	England	Power stations	Combined Point Sources
114	CombinedPointSource	0.26	0.21	0.00	0.42	0.08	0.00	Scotland	Power stations	Combined Point Sources
115	CombinedPointSource	0.28	0.00	0.00	0.45	0.00	0.00	Wales	Power stations	Combined Point Sources
116	CombinedPointSource	0.01	0.00	0.00	0.00	0.00	0.00	England	Shipping - coastal	Combined Point Sources
117	CombinedPointSource	0.05	0.03	0.00	0.03	0.02	0.00	Scotland	Shipping - coastal	Combined Point Sources
118	CombinedPointSource	0.03	0.00	0.00	0.03	0.00	0.00	England	Other	Combined Point Sources
119	CombinedPointSource	0.00	0.00	1.19	0.00	0.00	1.19	England	NH3 point sources	Combined Point Sources
120	CombinedPointSource	0.00	0.00	0.18	0.00	0.00	0.18	Scotland	NH3 point sources	Combined Point Sources
121	CombinedPointSource	0.00	0.00	0.13	0.00	0.00	0.13	Wales	NH3 point sources	Combined Point Sources
122-125	AreaSources	3.96	0.15	0.00	2.47	0.14	0.00	UK	Energy Production & Transformation	e.g. Coke Production, Power Stations & Refineries
126-129	AreaSources	12.09	6.75	0.00	8.12	3.45	0.00	UK	Commercial & Residential Combustion	e.g. Domestic & Non-Industrial Combustion
130-133	AreaSources	7.82	13.15	0.00	8.01	10.50	0.00	UK	Industrial Combustion	e.g. Cement & Lime Production, Iron and Steel, Aluminium Smelting
134-137	AreaSources	50.87	0.75	0.00	19.74	0.36	0.00	UK	Road Transport	e.g. Buses, Cars, HGVs, LGVs

ID	SOURCE TYPE	NOx 2005 kt N	SO2 2005 Kt S	NH3 2005 Kt N	NOx 2020 Kt N	SO2 2020 Kt S	NH3 2020 Kt N	REGION	SITE	SOURCENAME
138-141	AreaSources	31.48	18.10	0.00	17.03	10.28	0.00	UK	Other Transport	e.g. Aircraft Take-Off and Landing, Shipping (up to 12 km), Railways
142-145	AreaSources	1.07	0.80	0.00	0.67	0.60	0.00	UK	Offshore/Waste-treatment/Natural Sources	Combined Sources
151-154	AreaSources	0.00		24.29	0.00	0.00	22.15	UK	Fertiliser	Ammonia source
155-158	AreaSources	0.00	0.00	37.43	0.00	0.00	30.96	UK	Non-agricultural	Ammonia source
159	International Shipping	89.10	93.70	0.00	51.80	13.40	0.00	UK	International Shipping	International Shipping
160	Imported Emissions	35.30	35.00	93.90	19.81	20.06	95.51	UK	Imported Emissions	e.g emissions from Europe & Ireland
161	AreaSources	0.00	0.00	154.85	0.00	0.00	143.13	UK	Livestock	Ammonia source