Shropshire Botanical Society Online Flora Web application Specification

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25th November 2020

Overview

The Shropshire Botanical Society is seeking to renew it's Online Flora web application. This specification out lines the hoped for functionality together with the technical and development constraints of the work.

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1 Background

The Shropshire Botanical Society has been dedicated to promoting the enjoyment, understanding and conservation of the flora of Shropshire since the 18th century. One of the principle activities of the Society is to collect and maintain records of plant sightings within the historical boundaries of the county of Shropshire. Since 2003 the Society has made these records freely available online via a bespoke web application or Online Flora. This original Online Flora was written using PHP and the Codelgniter Web Framework backed by a MySql database. The web application is still available at captain-blue.azurewebsites.net but unfortunately the data is now many years out of date.

Maintaining and updating the database has proved to be challenging. Additionally the application was conceived prior to the introduction of the iPhone and it not suited to mobile use. Hence the Society seeks to renew the web application, to provide a more modern mobile interface and to use up to date data stored by the National Biodiversity Network Atlas. Currently all the Society's records are submitted to the National Biodiversity Network Atlas and since 2017 the Society's records have been available via a web service at the NBN Web service API. Using the NBN Web service for maintaining and updating the Society's records.

2 Objective

To replicate the functionality of the original Online Flora in a responsive mobile design using data sourced from the NBN Web service API.

The Online Flora is to be used for searching the Society's records but not for entering new records. Maintaining and updating the data is conducted via a separate manual process. Searches of the database are conducted for three different geographical scenarios.

3 Context

3.1 Users and Usage

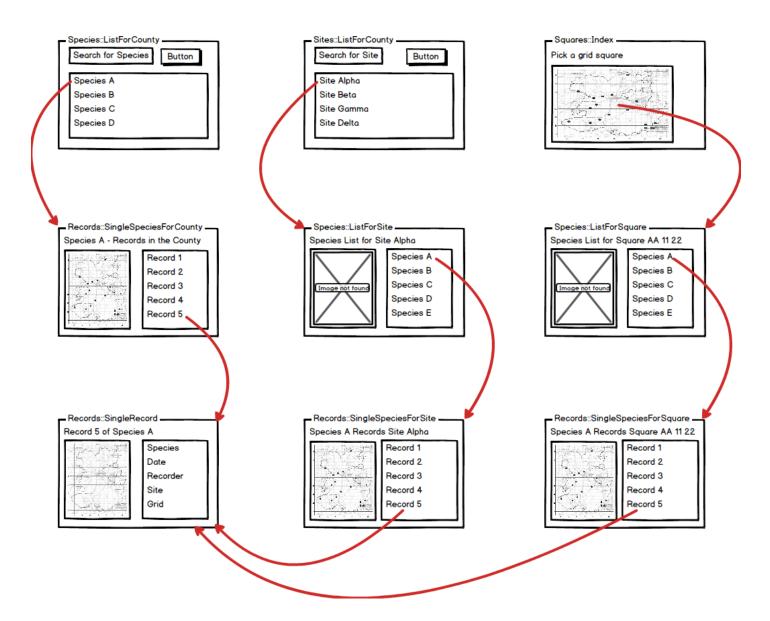
Users of the Online Flora are typically members of the Society and as such are often very experienced botanists. In a typical scenario a member of the Society (intending to visit a location) would search for a list of species that have previously been sighted at a location. It is the community or suite of species at a location that is of most interest. For an experienced botanist a species list for a location can provide information about the ecology, geology and history of a location, but will also indicate what other species might be present but have not yet been observed. Ideally the member of the Society would also wish to drill down to see individual records of species sightings, with dates, attributions and further details. This background will give a

botanist some insight about how much weight or credence can be given to individual sightings.

The Online Flora will serve three scenarios for searching for species lists.

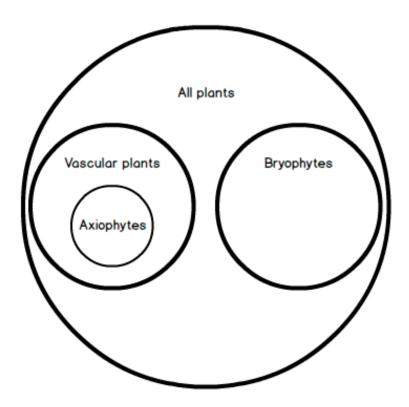
- **Search Shropshire:** searching all the records of based on the name of the plant. Allowing the user to drill down to a single sighting record or showing a map of grid squares with records for a named plant.
- **Search by Site:** searching for a named site, then listing the names of plants for that named site. Again allowing the user to drill down to a single sighting record.
- **Search by Monad or Grid Square:** Selecting a 1 km grid square within the county of Shropshire, then listing the names of plants for that named site. Again allowing the user to drill down to a single sighting record.

These three scenarios are shown in the diagram below.



3.2 Categories of Plants

Gaining experience identifying plants is a lifetimes work and members of the Society will often focus their attention on one category of plants. So the Society's observation records are separated into **vascular plants** and **bryophytes**, (two categories within the kingdom of all plants). A member of the Society will often wish to limit their searches to the category of plants they are most interested in.



For the vascular plants the concept of indicator species is highlighted by a sub group of vascular plants (referred to as **axiophytes**) These are plants that are archetypical or axiomatic for a particular ecological environment. So a member of the Society interested in vascular plants will often wish to see only the axiophytes to gain a better understanding of the ecological environment at a particular site.

3.3 Data Storage

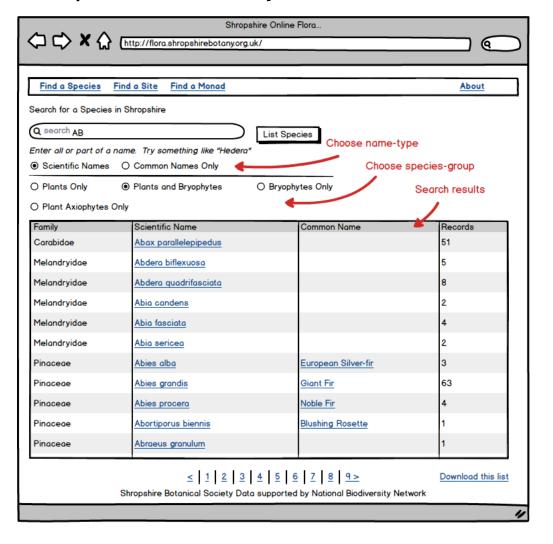
The National Biodiversity Network Atlas (NBN) provides a service to maintain and distribute biological records for the United kingdom. The Shropshire Botanical Society contributes records to the NBN via the Shropshire Ecological Data Network (SEDN). So all the botanical records for Shropshire are contained within the SEDN dataset on the NBN service (dataset 782). There is a regular(ish) process in place for passing updates to the NBN so new records are added every 6 months or so.

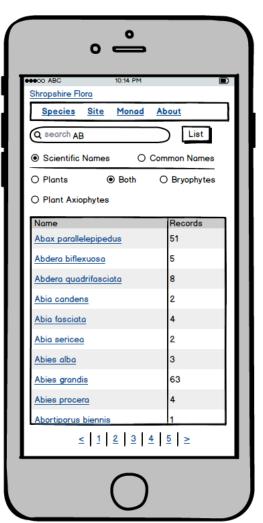
The NBN provides a specialized API to query these data which is based on Apache Solr. A primer for how to use the API is provided in the appendix (see NBN Atlas Query Primer).

Cache NBN data for a month, if valid json. Data turn over is slow the the NBN API can be laggy.

4 Search the County

4.1 Species List for County

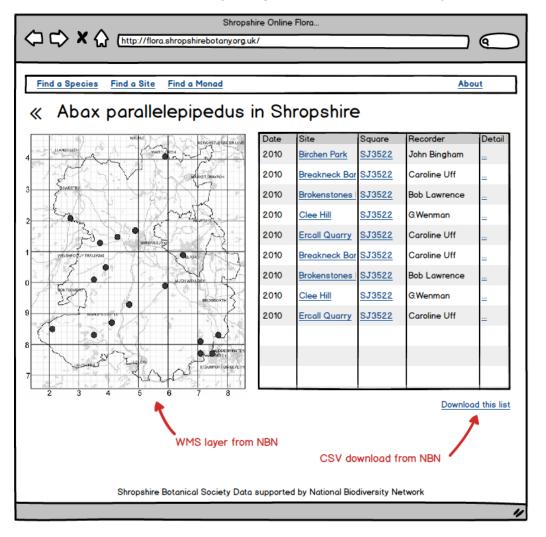




The 'landing' page for the application is the search of the entire dataset for the county. Initially the search output should be empty.
On landing the selected list is empty.
By default the Scientific name selected first. favour identifying plant species via the scientific name.
If Common set a cookie to retain the user's choice of naming type.
Also set a cookie for the user's choice of plant group
The characters entered in the search box are used to search for names beginning with those letters, not within the names.
Clicking on list or pressing return on the desktop list will fill the list.
If Common is selected, only the species with common names will be searched and shown.
If Axiophytes a limited static list of scientific names will be searched and shown.
Changing the radio button will reset the search and blank the list.
e.g. ¹

 $^{^1} https://records-ws.nbnatlas.org/explore/group/Plants?fq=data `resource `uid:dr782+AND+taxon `name:B^* and the control of the control of$

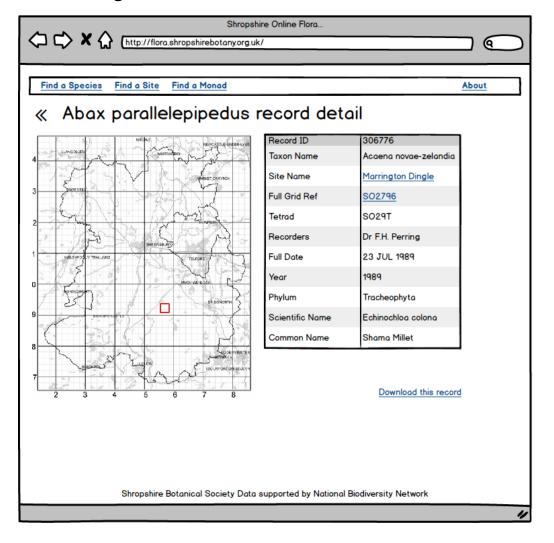
4.2 Records for a Single Species in the County

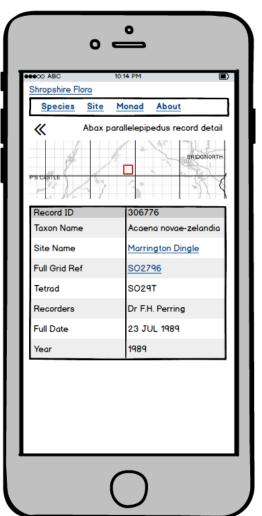




Clicking on a species name will show details for the			
Collapse the map? Retain state in cookie			
Page the records?			
☐ Site link goes to what?			

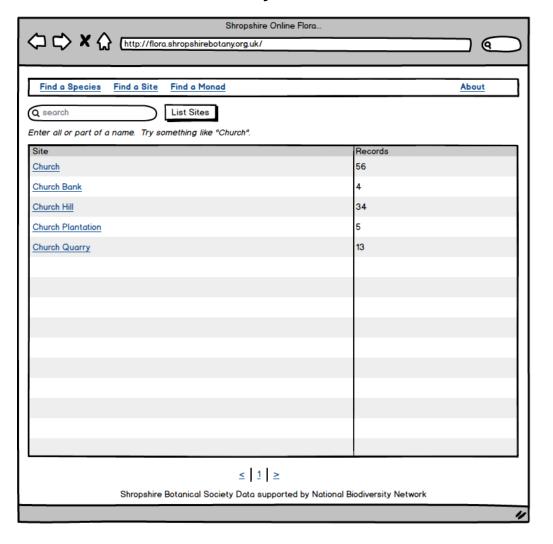
4.3 A Single Record





5 Search in a Site

5.1 Site List for the County

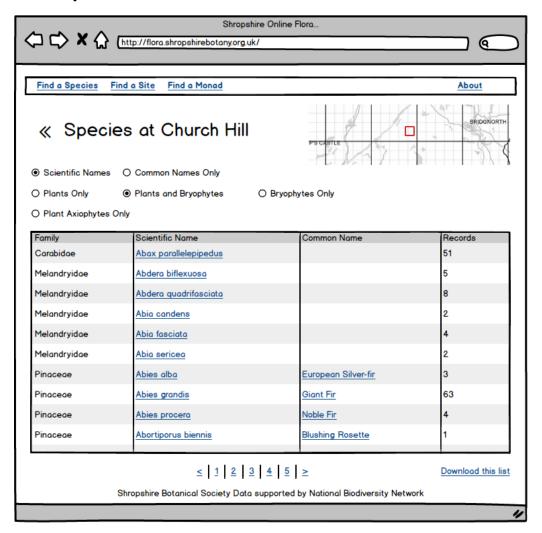


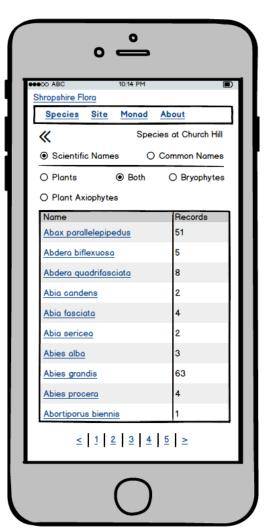


• List is empty, actually is this necessary?

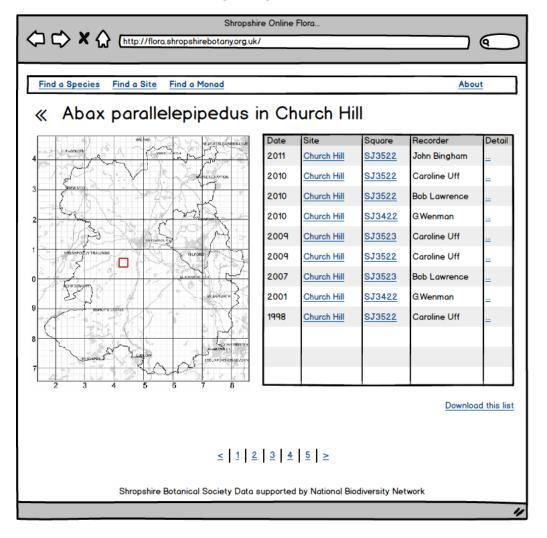
e.g. https://records-ws.nbnatlas.org/occurrences/search?
fq=location_id:[Church%20T0%20*]&fq=data_resource_uid:
dr782&facets=location_id&facet=on&pageSize=0

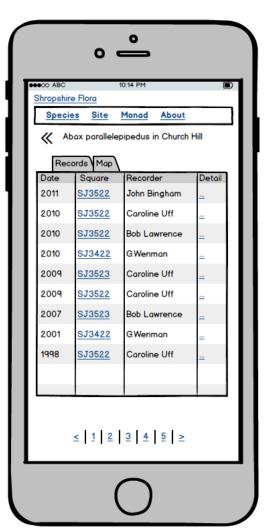
5.2 Species List for a Site





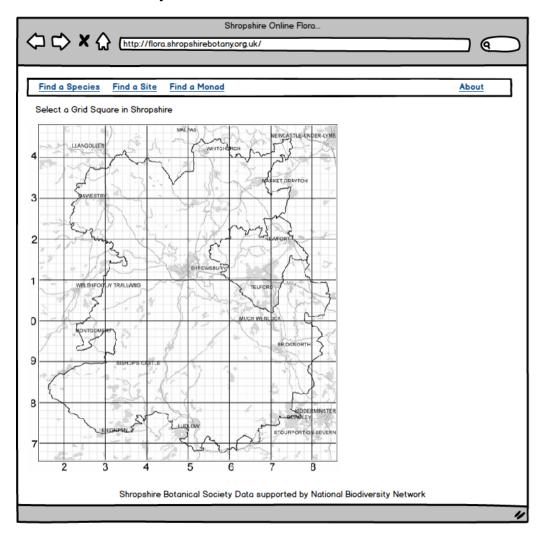
5.3 Records for a Single Species at a Site

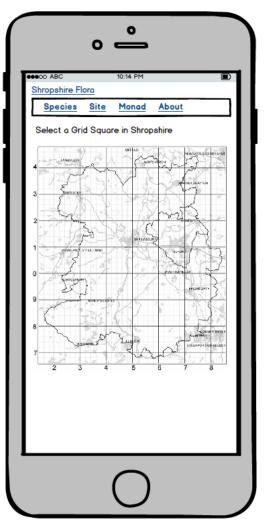




6 Search in a Square

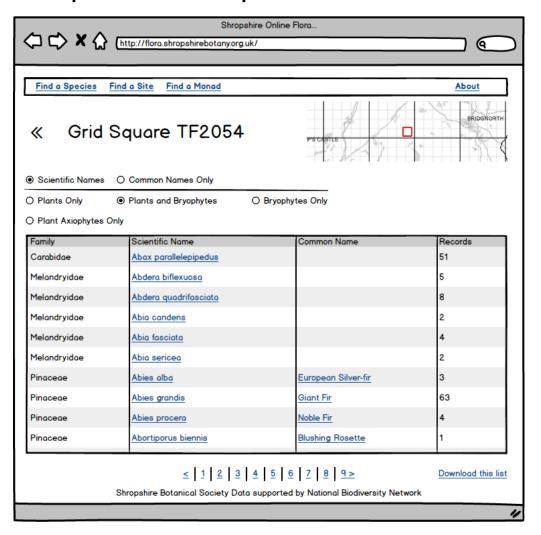
6.1 Select a Square





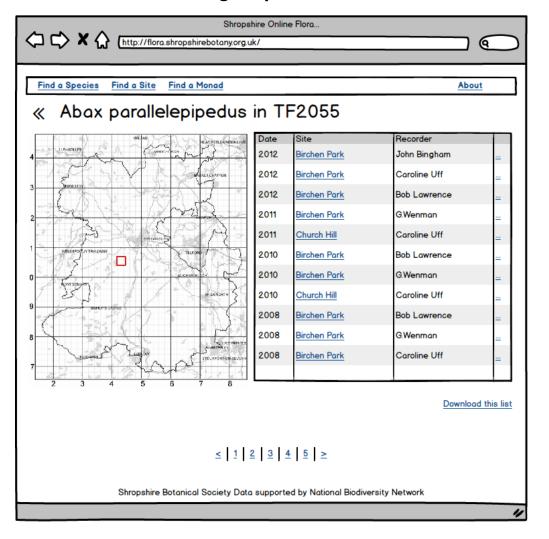
- Zoom in and select.
- Graticule

6.2 Species List for a Square





6.3 Records for a Single Species at a Site





7 Technical Constraints

The Botanical Society has limited means and wishes to ensure that the results of any programming effort can be maintained and supported into the future, either via an open source project or via the efforts of members of the Society. To facilitate these possibilities the technical environment for the projects is intended to provide a low barrier to contributions.

PHP 7.3 for deployment to Google App Engine for free hosting.

Codelgniter 4.0.4 has been used successfully in the past and provides convenient caching should it be required.

Twitter Bootstrap 4.5.2 for responsive layout.

Leaflet 1.6.0 should be used to provide mapping services,

Style Sheet is taken from https://www.shropshirebotany.org.uk/. The Online Flora is to be consistent with this website, so should where possible reuse the same CSS classes and styles.

No database should be used other than the NBN Web service API, to keep down maintenance costs. Any static data (such as the list of axiophytes) should be hard coded into the application. there are examples at https://github.com/DuncanRowland/NBNMapOverlayExamples.

Commits to Github since the Society will retain the intellectual property rights over any code produced. So all branching should be on the repository at at https://github.com/joejcollins/captain-magenta.git.

CI/CD the develop branch deploys to https://captain-magenta.azurewebsites.net/ on Azure and the master branch deploys to http://flora.shropshirebotany.org.uk/ on GCP. These URLs will be used to review progress.