Maintenance of the Oregon Vascular Plant Atlas:  
A Business Perspective

Applied Systematics Professional Masters Program  
Internship Business Report

Prepared for: Dr. Aaron Liston, Oregon State University Herbarium Director  
Dr. Linda Hardison, Oregon Flora Project Coordinator

Prepared by: Michelle Buonopane, Oregon State University Herbarium Intern

Botany and Plant Pathology  
Oregon State University  
Corvallis, OR

August, 2005
Table of Contents

Executive Summary.................................................................1
The Oregon Vascular Plant Atlas and the Future.................................3
Value Proposition..........................................................................3
A Brief History of the Plant Atlas...................................................5
Technology Description..............................................................6
Target Market................................................................................7
Marketing......................................................................................8
Conclusions and Recommendations................................................9
References..................................................................................10

List of Figures

Figure 1. Oregon Flora Project funding by source over ten years..............1
Figure 2. An example of a map produced by the interactive Oregon Vascular Plant Atlas provided on a Vascular Plant Atlas specimen label..................5
Figure 3. Oregon State University vascular plant specimen database progress chart......6

List of Tables

Table 1. A sample of online plant atlases from around the United States........4
Executive Summary

In March 2005 the Oregon Flora Project launched its new, free online Oregon Vascular Plant Atlas for public use. This Atlas allows users to access information about and map over 385,000 vascular plant specimen and observation records in the state of Oregon. These records can be accessed through a simple search engine, and different background maps can be selected, making the online Atlas interactive and dynamic. The potential applications of such spatial information are almost limitless; users can examine the spatial relationships between plants and a variety of environmental variables within plant communities (precipitation, ecoregion, landform etc.). The Atlas allows users to access information without powerful computers or knowledge of advanced computer programs.

The Vascular Plant Atlas is the product of over ten years of work databasing and georeferencing the Oregon State University Herbarium specimens and hundreds of thousands of plant observations from numerous sources. The Atlas has become a means of providing plant information to a diverse audience of people interested in the state’s flora, from amateur gardeners to trained botanists. While the value of the Atlas is of little doubt, continued maintenance and operation of the Atlas is economically uncertain despite a heavy reliance on volunteers (Hardison 2005).

Currently the majority of ongoing Atlas support comes from private donations and grants from small societies, such as the Native Plant Society of Oregon. Federal funding which supported the initial growth of the Atlas database will not sustain the operation, maintenance and further growth of the online Atlas. Private donations equaled 76% of the total amount of federal funding over almost ten years (Figure 1). So while federal funding has been critical, it has been virtually matched by private donations.

Figure 1. Oregon Flora Project funding by source over ten years. NSF = National Science Foundation; BLM = Bureau of Land Management; PRIVATE = individual private donors and small society grants.
Continued support for the Vascular Plant Atlas is likely to come from such small donations as have sustained it in the past. These depend on widespread use of the Atlas, as well as a clear understanding that continued access to this important tool is not guaranteed. An understanding of how many people are using the Atlas, whether the Atlas has successfully reached the full breadth of the audience it hopes to target in all areas of the state, and feedback on ways to improve the Atlas are all important pieces of information for Atlas managers. While web statistics such as the number of new visitors and repeat visitors, as well as the percentage of visits from different cities in the state, will provide some information about the target market, more detailed surveys are needed. The Vascular Plant Atlas staff must develop ways to understand the users of the Atlas and think like a successful business. Atlas managers must understand the tie between the number of users and continued financial support for maintenance and operation of the Atlas.

Finally, strategic marketing of the Vascular Plant Atlas is necessary to both increase knowledge about the Atlas and broaden its user base. The more people who use and value the Atlas, the more likely they will be to donate money to support its maintenance and operation. Without a plan to access information already available about Atlas users (i.e. web counters), a strategy to understand what job the Atlas performs, and development of methods to reach new users, the Oregon Vascular Plant Atlas will always be dependent on inconsistent funding sources.
The Oregon Vascular Plant Atlas offers an important tool to those studying vascular plants within the state of Oregon. Public access to such a large and growing database is unusual and its value to botanists and land managers is virtually limitless. Despite the importance of such a searchable database, maintenance and growth of the Vascular Plant Atlas is dependent on funding sources that are not consistent. No hard money is currently allocated to the maintenance and operation of the Plant Atlas. Just as its public online launch is announced, the future of the Atlas is uncertain. The majority of current funding comes from private donations and small-society grants. Therefore the long-term success of the Oregon Vascular Plant Atlas depends on widespread use of the Atlas. As its value to land managers, botanists, foresters and others becomes clear, users will have a greater interest in helping to guarantee future public availability of its resources. The Oregon Vascular Plant Atlas staff and volunteers must actively market the value of this free resource.

Value Proposition

The power and value of the Oregon Plant Atlas resides in its ability to allow users to become map-makers. Many online plant atlases only allow for users to select pre-made maps displaying species distributions at the county or ecoregion level (Table 1). The Oregon Plant Atlas allows users to search the database of over 385,000 plant records and select species of interest, as well as choose the background map on which the points are displayed (Figure2). The resulting maps are also interactive. By clicking on a mapped plant record or dot, the user can call up information about that record. Many state electronic atlas programs are...
simply limited to highlighting counties or ecoregions in which a species has been reported, thus providing simple presence/absence maps (Table 1). The Oregon Plant Atlas combines many levels of information mapping all known records for the entirety of the vascular plant flora.

Table 1. A sample of online plant atlases from around the United States. Table denotes whether an atlas is interactive, provides the ability for the user to become the map maker, contains a species list search engine, provides a county checklist, provides information at the county or ecoregion level, creates distribution maps (at any level), presents all of the known records, and presents the entire vascular plant flora.

<table>
<thead>
<tr>
<th>Online Atlas</th>
<th>Interactive</th>
<th>map-maker</th>
<th>search engine</th>
<th>county-level</th>
<th>ecoregion-level</th>
<th>distribution</th>
<th>all records</th>
<th>entire flora</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlas of Florida Vascular Plants</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Electronic Atlas of the Plants of Britain Colombia</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Invasive Plant Atlas of New England</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Jepson Flora Project</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Nevada Rare Plant Atlas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>New York Flora Atlas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Oregon Vascular Plant Atlas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>South Carolina Plant Atlas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tennessee Vascular Plants Atlas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

1 http://www.plantatlas.usf.edu/
2 http://eflora.bc.ca/
3 http://invasives.eeb.uconn.edu/ipane/
4 http://ucjeps.berkeley.edu/jepson_flora_project.html
5 http://heritage.nv.gov/atlas/atlasndx.htm
6 http://atlas.nyflora.org/
7 http://www.oregonflora.org/OFP/atlas.htm
8 http://cricket.biol.sc.edu/herb/
9 http://tenn.bio.utk.edu/vascular/vascular.html

The value of this information is virtually limitless. Not only can users learn about the known distributions of Oregon’s plant species, distribution data may be combined with precipitation maps or landforms which help elucidate important patterns. The Vascular Plant Atlas also has the potential for allowing botanists to determine the distributional, as well as elevational range of a specific taxon within Oregon, and to determine areas of Oregon which require more extensive plant collections and surveys. Public access to the data alone makes the Vascular Plant Atlas an important new resource. Of course all users will not value the same features of the Plant Atlas. Timber companies may value specific rare plant information or invasive weed distributions. Defining the true value of the Atlas is highly dependent on the user, and this is important to recognize when attracting new sources of funding.
Figure 2. An example of a map produced by the interactive Oregon Vascular Plant Atlas. All known specimen and observation records of *Boykinia occidentalis* (Coast Boykinia) were mapped with Oregon’s ecoregions. The map clearly shows the species is limited to areas west of the Cascades mountain range.

A Brief History of the Plant Atlas

The Oregon Vascular Plant Atlas began as an outgrowth of the Oregon Flora Project (Hardison *personal communication*), which was initiated to create a one-volume flora for the state of Oregon to replace the currently outdated Manual of the Higher Plants of Oregon (Peck 1961). The published Flora would be an updated technical guide for identification of the flora of the state, with limited appeal to non-botanists. As this project proceeded it became clear that an online mapping program utilizing the spatial information of the Flora’s plant database offered a tangible, dynamic resource which would appeal to both technical and non-technical people. Unlike the Flora which would be produced both in printed form and electronically, the mapping program (which came to be known as the Vascular Plant Atlas) was only feasible electronically allowing for a database which was current, constantly updated and verified, and available to all individuals with varying levels of technical interest in the flora of Oregon.

The database driving the Oregon Plant Atlas started in the early 1990s with entry of specimens of *Carex* and *Senecio*, type specimens and invasive plants (Liston 2005). In 2001 the Bureau of Land Management (BLM) funded the inclusion of one specimen in each
county in each taxon in Oregon (Figure 3). At this point over 55,000 specimens were catalogued in the Flora Project database. In 2003 the National Science Foundation (NSF) added considerable funding to continue databasing the remaining plant specimens. By 2005 the Atlas database contained over 100,000 records. With the addition of observation records provided by the Oregon Natural Heritage Information Center (ORNHIC), the Native Plant Society of Oregon, the U.S. Forest Service and other sources, the Atlas database contains over 385,000 records.

Figure 3. Oregon State University vascular plant specimen database progress chart. Reprinted from http://oregonstate.edu/dept/botany/herbarium/db/databasegrowth.gif.

Technology Description

The Oregon Vascular Plant Atlas is driven by a series of databases managed by the Oregon Flora Project. The specimen data are also maintained as a stand-alone, searchable database accessible through the Herbarium website. These databases house information about the vascular plant specimens stored in the herbarium, as well as observation records about plant species occurring within Oregon. Herbarium staff enter all of the information contained on an herbarium specimen label into a computer database including collector name, collection location and date, and associated species. The database is not, however, limited to collection information. Each specimen is also georeferenced, meaning latitudinal and longitudinal coordinates are assigned based on the location information on the label. By assigning specific coordinates to each specimen, the location of each specimen can be mapped.
Once spatial coordinates are assigned, these records can be mapped with specialized software programs, called Geographic Information Systems (GIS), designed to manage and analyze spatial information. GIS allows users to develop different maps based on spatial coordinates such as plant locations, ecoregions, precipitation, elevation, soils and more. These different maps can be combined so a map of plant records can overlay a map of precipitation. Once these maps are combined, GIS can analyze relationships between attributes in one map and those in another.

GIS programs are complicated and require computers with large memory and processing speed. Most individuals do not have access to such specialized software nor the computing power necessary for their use. The Oregon Vascular Plant Atlas allows users to access this type of mapping software in a simplified online form. A simple search engine allows users to select plant species of interest and select options on a map form to generate the same types of maps as GIS. Users have access to the herbarium databases and the information about specific records and thus become mapmakers.

Target Market

The Oregon Vascular Plant Atlas is available to any individual with access to the internet. The Atlas is designed to appeal to both technically and non-technically trained people interested in Oregon’s flora. The online search engines are easy to use, and no special software is required to create the maps. Vascular plant names are searchable in Latin with links to common names provided for non-technical users. The Atlas is targeted to anyone interested in plant distributions in the state.

There are currently no systems in place to monitor whether the Atlas is reaching the full breadth of its target audience. Atlas managers have no quantitative data on who uses the Atlas. The online nature of the Atlas does, however, allow for the analysis of web counter statistics, or click-stream analysis. The number of first-time visitors and repeat visitors can be counted and these counts can be monitored over time to measure if a website’s user base is growing or stagnating. These web statistics also can monitor which search terms and search engines are being used to find the site, and if a link was used to access the site. This could be important information as web pages can be designed to increase the likelihood they will be picked up by search engine robots through the use of key words, and could help Atlas managers understand if links from related websites are directing users to the Atlas. Web statistics also allow managers to monitor the number or percentage of users from a country, state or city (www.statcounter.com). This has the potential of helping Atlas managers understand if they are adequately targeting all parts of the state of Oregon. In addition, web statistics can measure the length of time a visitor used the website, such as the percentage of visitors who spent less than five seconds or between five and twenty minutes. This will allow Atlas staff to understand if visitors are fully utilizing the capabilities of the online Atlas.

More detailed information about users, such as whether they are affiliated with a land management agency or are simply interested in native plant gardening, would require survey questions. This type of information could come in the form of a login system maintaining
the free nature of the Atlas but requiring users to create a login name and password and provide personal information. Alternatively, a pop-up window survey with a few short questions could be designed, requesting the user’s cooperation in order to better manage the Atlas. These windows could pop-up once a user begins the process of mapping a plant taxon, thus eliminating the need for a login system.

If the Oregon Flora Project were not a non-profit organization and charged a fee for each map printed, profits would be clearly tied to Atlas use. While profits are not the goal here, dissemination of information and the long-term viability of the online Atlas are important. Thus the success of the Atlas is tied to its use. The assumed business model on which the Oregon Flora Project operates is that of a standard non-profit. The more valuable the Atlas is to its user, the more likely companies, non-profits and individuals will donate money to support it. In order to ensure its value, the Atlas must meet the needs of its user, or in business parlance customers hire the Atlas to do a specific “job” (Christensen and Raynor 2003). If the Atlas does not adequately meet this need, customers will not use it. While the Atlas does not compete as a traditional business would, and Atlas users cannot turn elsewhere for similar information, it is valuable to ask whether the Atlas can be improved to meet a user’s needs. The Vascular Plant Atlas may not have competition in the mapping of Oregon’s flora but it does have competition in the world of limited finances. In order to secure donors the Atlas must meet the user’s needs.

Just as a for-profit business seeks out information to better understand its customers, the Vascular Plant Atlas must understand which initial users will most likely become the solid foundation on which to build a securely funded Atlas. Thus it is critically important that Atlas managers establish ways to understand the circumstances driving “customers” to use the Atlas (Christensen and Raynor 2003). The Atlas can be improved if necessary to meet those circumstances.

It is important to emphasize the importance of this customer analysis. Information in this analysis could lead the Flora Project to develop a different business model. Perhaps many Atlas users are seeking additional capabilities and information not currently provided. This may present an opportunity to engage in a different business model, with a non-profit sector providing the Atlas free to users, and another sector offering a subscription service to agencies and businesses for advanced functionality. Understanding the jobs customers need to have done is critical to the development of a successful business model even for non-profit ventures.

Marketing

Marketing of the Oregon Vascular Plant Atlas has been limited to announcements of its launch and articles in newsletters. Costly marketing plans are not an option given the Flora Project’s financial limitations, but there are low-cost methods available to market the Atlas. First the Flora Project must take advantage of current relationships with agencies and societies. For example, the Native Plant Society has contributed sizable donations to the Vascular Plant Atlas, but no link to the Atlas is available on their website. The BLM also contributed a sizeable grant to jump-start the Atlas, and any agency newsletters or email lists
could be used to announce or remind agency staff of the Atlas launch. Most professional organizations, such as the Ecological Society of America, also maintain email lists where messages can be posted announcing the value of the Vascular Plant Atlas to a wide audience. If a logon option was chosen for survey purposes, then this contact information could serve as a source of individuals to receive newsletters and updates.

The options for low-cost marketing are numerous, and it is not my goal here to give an exhaustive list. Instead, the focus is to develop a strategy to market. Analysis of Atlas user behavior is linked to developing market strategies, and may present new and overlooked opportunities for low-cost marketing.

Conclusions and Recommendations

The Oregon Vascular Plant Atlas is an incredibly valuable tool, unique in its capacity to be interactive, dynamic, useful to people with varying levels of interest in Oregon's flora, and easy to use. Yet while the launch of the Atlas is a product of ten years of hard work, the future of the Atlas is uncertain. The very nature of the Atlas requires continual maintenance, updates, additions and quality control. While the funding to this point has resulted in a tangible product, future funding is necessary for the daily operations of the Atlas.

Based on the past history of funding (see Figure 1), in order for the Oregon Flora Project to increase financial support, it must also increase the number of users and potential private donors. This will require both a combination of marketing as well as analysis of current users. Atlas managers must understand who is using the Atlas and who is not, and whether the Atlas meets the needs of its users; is it getting the job done? The Oregon Vascular Plant Atlas does not have the luxury of long-term consistent funding. It is therefore pushed into a struggle for donations and grants; it is pushed into marketing itself. The Flora Project will be unable to secure future funding if it cannot prove the value the Atlas offers to the community, and it will be unable to prove its value if it does not know who is using the Atlas.

Atlas staff must therefore first take advantage of the data already available to them in the form of web statistics. This could provide exceptionally important early information which may guide their marketing efforts and development of a business model. Secondly, Atlas managers should develop systematic ways of monitoring Atlas users’ experiences, specifically what job they hope to get done by accessing the Plant Atlas. Thirdly, Atlas managers must market the Atlas. The choice of marketing strategy may be dependent on what web statistics reveal, and may involve ways of increasing knowledge about the Atlas outside of Native Plant Society Networks and professional journals. Utilization of established relationships with federal and state agencies, non-profits and private businesses would be a useful first step. Successful marketing requires definition of the Atlas’ value, which in turn depends on a thorough understanding of its target audience, which requires knowledge of who is using the Atlas. At this time the Flora Project lacks sufficient information on its potential and current user base. A well-crafted business strategy incorporating this valuable information will allow the Oregon Vascular Plant Atlas to remain an important tool for the long-term.
References


