

GLANSIS User Experience Research Report: Comparative Evaluation

Jades Research Team

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Executive Summary

The following report outlines the method and criteria for Comparative Evaluation of GLANSIS, as well as our findings and recommendations. Five comparative products were chosen for comparison with GLANSIS based on [Criteria for Selecting Comparators](#). Those comparators were sorted into Tier 1, Tier2, and Niche competitors based on Goodman's Taxonomy. We analyzed each comparator based on our key criteria, [Criteria to Compare Comparators](#).

From our Comparative Evaluation, GLANSIS is one of the biggest database systems for searching aquatic nonindigenous species and providing valuable resources. However, it falls short in some areas regarding functions and design. First, it does not provide a simple searching process on the website. GLANSIS could benefit from providing an intuitive searching bar on the top of the website. Secondly, GLANSIS could improve the UX by redesigning the navigation modules on the main body to make it more functional.

Introduction

Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) is a database that contains information relating to aquatic invasive species in the Great Lakes area. The website also has tools such as profiles, map explorer, risk clearinghouse and references. The team at GLANSIS now wants to move beyond the higher level analysis and focus on targeted user bases and particular features. For this reason our team is conducting a study focused on educators that use GLANSIS for literary purposes.

Primary User Groups

- Researchers
- Local/State Managers
- Educators

Project Goal

- Serving as a one-stop-shop serving all citizens of the Great Lakes region who need information on aquatic nonindigenous species.
- Building an 'educator hub' for undergraduate education.

Research Goals and Questions

We conducted a comparative analysis in order to gain a better insight on what our focused users might be using as an alternative to GLANSIS, as well as improving the features and capabilities of GLANSIS based on this insight.

The research questions that guided our study:

- 1. What are the most used features of the comparators?**
- 2. How do other competitors allow users to search information?**
- 3. How do these competitors present their information?**

Methods

Criteria for Selecting Comparators

For our comparators, our team strived to find databases about invasive species that reach similar audiences as GLANSIS. In addition, it was ideal to find databases that compile data and reports from several sources, just as GLANSIS does for its database. To accomplish this, our team went to the GLANSIS database to find additional resources. Through the website, we found partners that they work with to compile their database (see Figure 1). After exploring partner resources, we chose four comparators offering similar services to varied audiences. In addition, we chose a fifth comparator that is not specific to invasive species but is a database that compiles information from various sources.

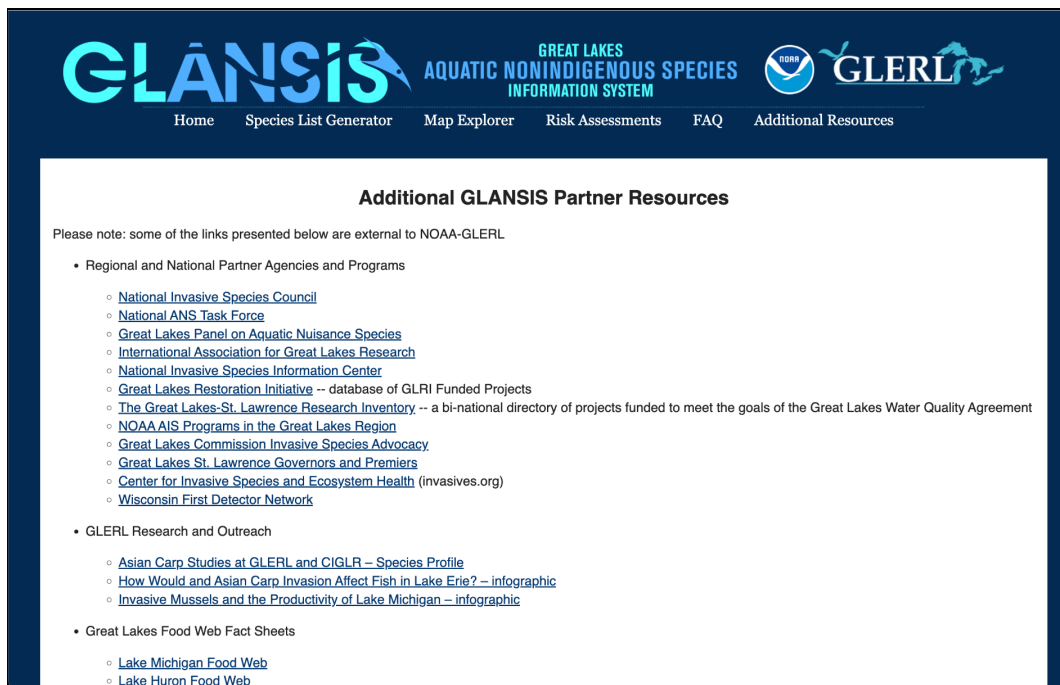


Figure 1. GLANSIS's Partner Resources page [4].

Selected Comparators

Because GLANSIS is a nonprofit organization, our team utilized **Goodman's taxonomy** for the comparative evaluation. Goodman's taxonomy utilizes tiers to profile comparators [2]. We selected five comparators as our comparators and sorted them in table 1.

Tier 1	• Database system focusing on invasive species. • Primary user targets are researchers and educators.	• NAS • NEMESIS • GISD
Tier 2	• Database system focusing on invasive species. • Coverage of the different areas.	• iMapInvasives
Niche	• Database system. • Providing various information beyond invasive species. • Different target users.	• University of Michigan's Library

Table 1. Selected comparators.

The first comparator is the [Nonindigenous Aquatic Species \(NAS\)](#). NAS is a tier 1 comparator because it directly competes with the information available on GLANSIS. NAS is an invasive species database that has information on a national scale. GLANSIS pulls information directly from NAS, but adds location-specific information for the Great Lakes area. This comparator will be helpful to analyze, as the target audience can directly overlap for both GLANSIS and NAS.

The second comparator is the [National Exotic Marine and Estuarine Species Information System \(NEMESIS\)](#). NEMESIS is a tier 1 comparator because it focuses on gathering data regarding invasive species on a national level, similar to NAS. The target audience for both NEMESIS and GLANSIS can also directly overlap, as both provide information on invasive species for a given area.

The third comparator is the [Global Invasive Species Database \(GISD\)](#). GISD is a tier 1 comparator because it also directly competes with the information available on GLANSIS, focusing on invasive species on a global scale. The target audience for both NEMESIS and GLANSIS can directly overlap, depending on the user's location or area of interest.

The fourth comparator is the [iMapInvasives](#). iMapInvasives is a tier 2 comparator because it has similar information to GLANSIS regarding invasive species, but focuses on Arizona, Maine, Oregon, New York, Pennsylvania, and Saskatchewan in Canada. GLANSIS specifically focuses on invasive species in the Great Lakes region, which partially overlaps with iMapInvasive's audience (New York and Pennsylvania).

The fifth and final comparator is the [University of Michigan's library](#). Online U of M's library is a niche comparator. Users can look up information on invasive species in any region on this database. However, the target audience is specifically students, faculty, and staff at the U of M. It also offers various resources on subjects beyond invasive species. This database can offer insights into how to structure information-based databases.

Criteria to Compare Comparators

We have four main criteria that we are looking at for the comparative evaluation, shown in Table 2.

Criteria	Details
Search Function	● Learning curve for new users ● Difficulty of use after learning how to use it ● Detailed search criteria functionality ● Map search functionality
Content of Search Results	● Amount and relevancy of information ● Credibility
Contribute Function	● Learning curve for new users ● Difficulty of use after learning how to use it
User Interface	● homepage guidance ● Readability

Table 2. Main criteria and details.

Findings and Recommendations

Summary of Results

The summary of the comparative evaluation results can be seen below in Table 3.

Criteria	NAS	NEMESIS	GISD	iMap Invasives	UofM Library
Search Function	Overwhelming for new users. Very detailed search criteria. Animated map that shows target species over timeline.	Search function is simple to use and understand. Only simple searches available, not advanced search functionality. Includes distribution map and occurrence map for each species.	Search function is easy to understand. Advanced search has a format that is easy for new users to use. No map function available.	Two types of search functions: location search using a map and advanced, filtered search. Both easy to use for new users. Map interface is well-designed to see relevant info.	Understandable format for simple and advanced search functions. No map function available for invasive species.
Content of Search Results	Detailed information on species page. Plenty of references that show credibility of info.	Species pages are well-organized and easy to read. Inclusion of references make info credible. Not many search results for a given simple search.	Species pages are very detailed and well-categorized. Numerous references to show credibility of info.	Species page available, but not many details included. Mainly shows quantity of species reports in a given area.	Great keyword association for simple search. Organizes search results by source type. Scholarly articles that show credibility of info.
Contribute Function	Located on home page. Form-filling is intuitive.	Not available.	Email manager directly to contribute data/reports.	Informal reporting of info.	Not available.
User Interface	Search not visible on home page. Species profile contains overwhelming amounts of info, which makes readability low.	Well-designed and organized. Easy to digest large amounts of information.	Easy to use. Search function is very obvious on home page. Lacks proper visualization to increase readability.	Search functions visible on home page. Interactive maps allow for	Dynamic categories and resources allow for easy navigation and readability throughout the website.

Table 3. Detailed comparative evaluation table.

Key Findings

NAS: NAS covers invasive species and related reports records all over the country, but it is relatively hard to use (see Figure 2). For every single species profile, NAS utilizes numerous references to ensure information accuracy. The animated map shows the target species spreading across the country along a timeline. Once users get into the detailed species information page or the report page, the information provided by the NAS database will not disappoint researchers. However, the UI of the NAS database website is relatively bad. The homepage does not have any search area to do a quick search, so users should find out how to get to the search page to start searching. The search page link and the text/style of the navigation bar are not noticeable on the homepage, making it difficult for new users to find these functionalities. After entering the search page, there are numerous detailed search tools, which can make new users confused. Though the species profile provides detailed information for a single species, the page organization is very rough, which makes the readability of the page low. The contribute function is better compared to the search function since it is obvious on the navigation bar, and form-filling is intuitive. The NAS database focuses on invasive species on a national scale.

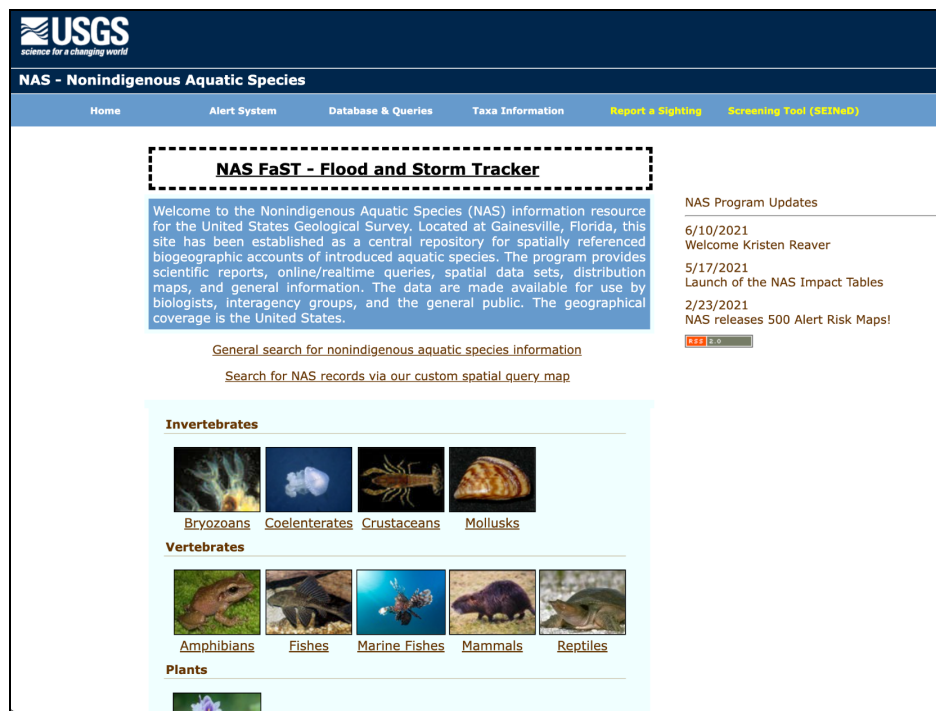


Figure 2. NAS homepage [5].

NEMESIS: NEMESIS is a well-designed database on searching marine and estuarine species (see Figure 3). It focuses on both invasive species and species introduction in different regions. The UI looks well organized, so even new users can easily start searching through the search form located on the top right corner on the homepage. However, unlike other similar databases, NEMESIS does not provide any advanced search functionality, so the only search that users can do is the simple search. For every single species, the profile page is well categorized, and references are enough to ensure the information accuracy. The distribution map and occurrence map for each species are separated to show the species distribution and the invasion event, which is a good design for visually showing the species invasion. Though the species profile has good credits, NEMESIS seems to have less information compared to GLANSIS database. In the comparison process, a random species was picked to do an information search on both databases. The result shows GLANSIS has over 50 records while NEMESIS records none. The distribution maps are similar, so it is rational to assume that the NEMESIS database lacks a reporting function. In fact, NEMESIS has no reporting or distribution function on the website.

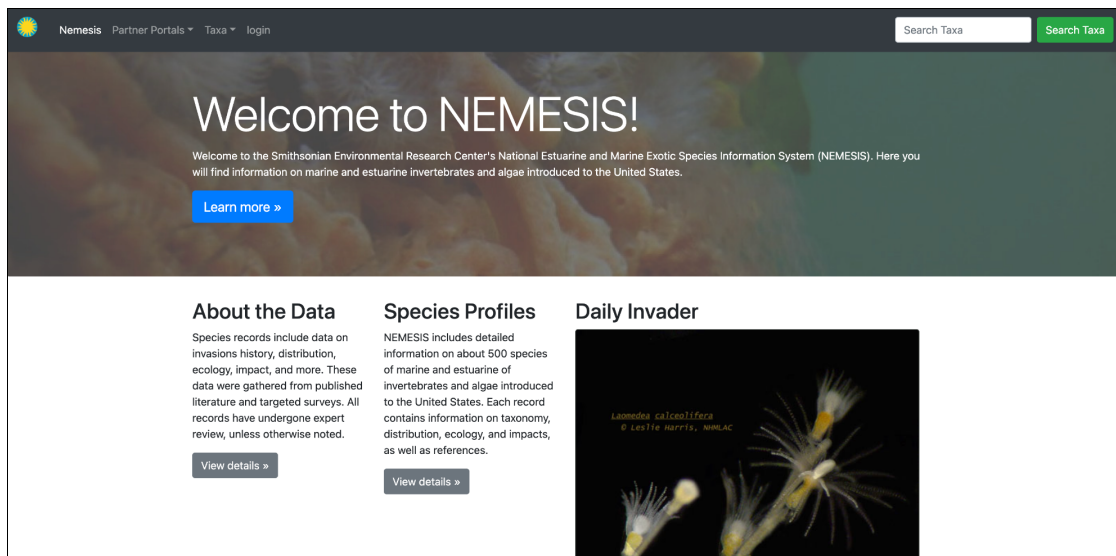


Figure 3. NEMESIS homepage [7].

GISD: GISD records alien or invasive species all over the world. The overall impression of the website is easy to use, but lack of visualization to increase readability (see Figure 4). The homepage of GISD is simple but functional because of the big obvious search bar and the navigation bar. However, the search function is the only function of GISD, and the links on the navigation bar are different paragraphs of “about us” in common. The advanced search function provides many different criterias for users to make complicated searches, and it does not require users to do any keyboard input because it’s basically a category filter, so no typo issues will interfere with the searching results. The species profile page gives out a very detailed article recording different information about the species, including distribution, impact, and invasion management, and all of them are well categorized. References quantity is enough to ensure the credits of the information in the database. The distribution page records the species distribution in text paragraphs, and records in different areas are categorized by region, but unlike GLANSIS, GISD has no map to show the distribution information visually. The only contributing function that GISD provides is to email the manager directly, which is not efficient compared to GLANSIS.

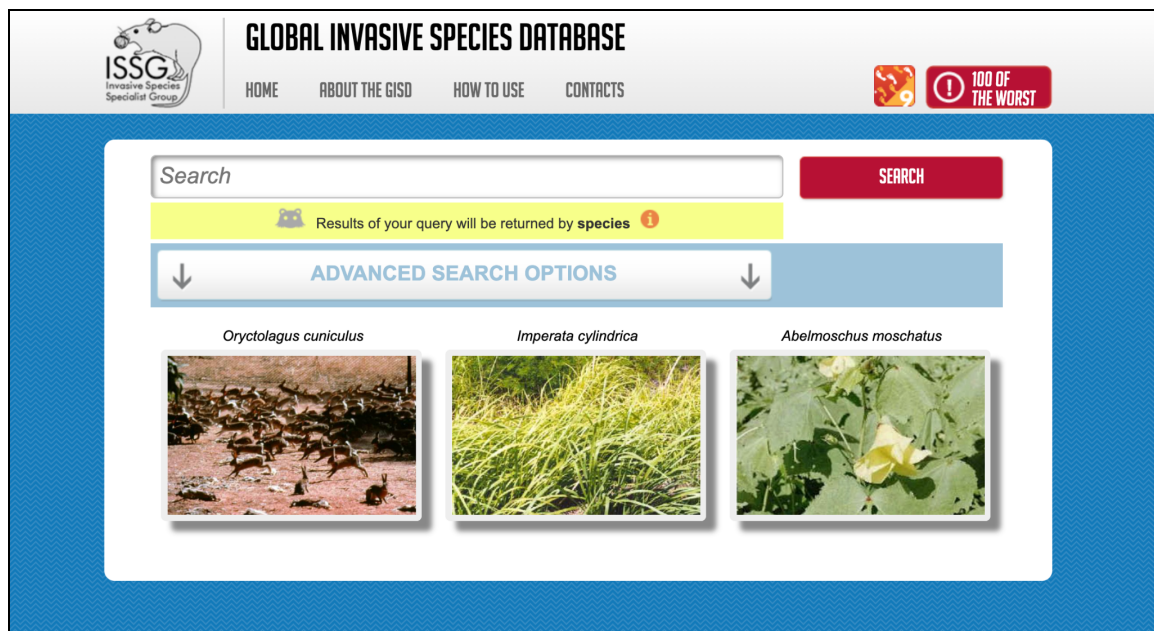


Figure 4. GISD homepage [1].

iMapInvasives: iMapInvasives is an interactive web application which shows invasion records on an interactive map (see Figure 5). iMapInvasives only has records of very limited areas, which does not have a big overlay with the Great Lakes area. The map has two separated searching options. The first one is located on the top left corner of the map, which is a location-based map search. The second one is located on the top right corner called “Filter Records”. It’s like an advanced search so users can find invasion records under specific criterias. The map interface is well designed, so it’s easy to see how many invasion records and where the invasion happens on the map very clearly. However, it’s hard to access every single record through the map directly. Users need to enlarge the map to see every single record on the map so they can click the record to check the report. If users click on the hexagon area on the map, iMapInvasives will only show how many records are found in that area. iMapInvasives provides a species profile search function called Jurisdiction Species List, but the detailed information of the species is very limited. However, it provides a link to the NAS species profile page as an external info page. To contribute information on invasive species, the website has a “Report an Invasive Species” button that allows users to create an account/log-in to their account and informally report an invasive species in a particular area.



Figure 5. iMapInvasives homepage [3].

University of Michigan Library: The University of Michigan (U of M) Library website provides online library services for everyone, but only U of M staff and students can access full contents of any articles or books in the database. The search function is on the most obvious position of the homepage, and the search result is well categorized for users to find out the target information. The navigation bar includes all different services that the U of M library provides, which is different from its comparators. On the right side of the navigation bar, a quick search function is provided. The quick search response with the user's typing simultaneously, and shows brief results in a dynamic list. This function helps users search with fuzzy keywords to correct the search terms multiple times in a short amount of time. No distribution function is available, which is understandable for a library website.

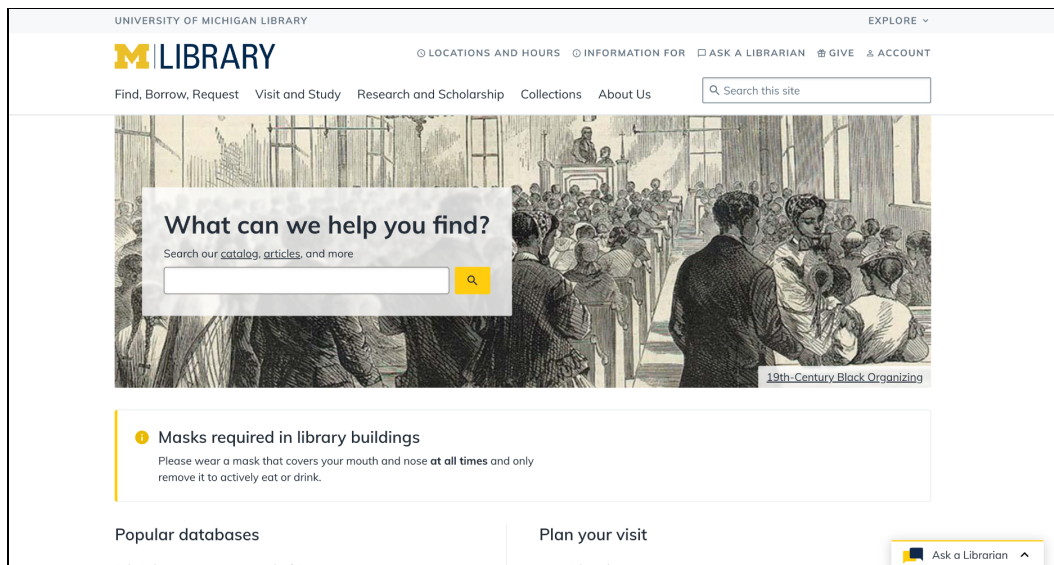


Figure 6. University of Michigan Library homepage [6].

Recommendations

We suggest putting a simple search function on GLANSIS's homepage. The basic requirement for many users of a database is to search for a specific query, so it is reasonable to put the most-used function on the homepage to improve efficiency. Most of the competitors above have a search bar on their homepage, so we assume that's a mature design for a database website. We suggest developing a simple species search function based on the current species list generator to help new users properly utilize GLANSIS faster. Based on the comparators, we found that it is more intuitive to start a search by a simple search bar like Google, and it's helpful for new users to learn how to use more complicated search functions. And sometimes even experienced users want to do some simple search by just typing in some keywords and hitting the search button.

Other than a search bar on the homepage, the navigation modules on the main body can be redesigned to make the homepage more functional. The navigation bar can be more obvious so the main body of the homepage can be used to put other useful information like usage introduction. The species profile page can be categorized to increase the readability. A good example here is the species profile page of NEMESIS or GISD.

Discussion

We conducted Comparative Evaluation for five comparators. While this evaluation offered us an insight of what other alternatives are available against GLANSIS and what can be improved regarding the features and design aspects, there were several limitations in the process.

The specified and narrow target users of GLANSIS prevented us from discovering diverse competitors for the comparative analysis. We referred to the contributors of GLANSIS for the comparators. Finding more comparators and analyzing in diverse directions would have provided us deeper insights and viewpoints. In addition, it was not easy to pinpoint the importance of each feature on the website since we have a limited background for invasive species and a database system. The website is designed to target professional researchers and educators.

In our heuristic evaluation and usability testing, we will conduct deeper analysis on GLANSIS's current features and design. We hope to get a holistic and more professional view of improving the system from primary users of the website.

Conclusion

In this comparative evaluation, we have compared five different comparators for getting deeper insights and better understanding the possible improvement for the GLANSIS system. By conducting this evaluation, we were able to get to know how

important it is to present a vast amount of information in an efficient way. In addition, compared to its comparators, GLANSIS website does not have an intuitive searching function and interface for the users. Therefore, our team recommends redesigning the search function and UI for efficiency.

References

- [1] *Global Invasive Species Database (GISD)*. GISD. (n.d.). Retrieved February 21, 2022, from <http://www.iucngisd.org/gisd/>
- [2] Goodman, E., Kuniavsky, M., and Moed, A. 2012. *Observing the User Experience. Second Edition: A Practitioner's Guide to User Research*. San Francisco: Morgan Kaufmann.
- [3] *iMapInvasives Network*. iMapInvasives. (n.d.). Retrieved February 21, 2022, from <https://www.imapinvasives.org/>
- [4] NOAA. (n.d.). *GLANSIS*. GLANSIS: NOAA Great Lakes Environmental Research Laboratory. Retrieved February 21, 2022, from <https://www.glerl.noaa.gov/glansis/index.html>
- [5] U.S. Department of the Interior. (n.d.). *Nonindigenous Aquatic Species (NAS)*. Nonindigenous Aquatic Species. Retrieved February 21, 2022, from <https://nas.er.usgs.gov/>
- [6] *University of Michigan Library - Home Page*. University of Michigan Library. (n.d.). Retrieved February 21, 2022, from <https://www.lib.umich.edu/>
- [7] *Welcome to NEMESIS!* Marine Invasions Research at the Smithsonian Environmental Research Center. (n.d.). Retrieved February 21, 2022, from <https://invasions.si.edu/nemesis/>

Appendices

Appendix 1. Comparative Matrix

						
Homepage Search	No	No	Yes	No	Yes	Yes
Simple Search	No	No	Yes	No	Yes	Yes
Advanced Search	Yes	Yes	No	Yes	Yes	No
Quick Search	No	No	No	No	No	Yes
Distribution/ Report	Yes	Yes	No	No	Yes	No
Quick Report Form	Yes	Yes	No	No	No	No
Categorized Result Page	No	No	Yes	No	Yes	Yes
References	Yes	Yes	Yes	No	Yes	Yes

Appendix 2. 2x2 Graph that Shows Readability and Information Quantity/Quality for All Comparators

