GLANSIS User Experience Research Report: Heuristic Evaluation

Jades Research Team
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Executive Summary

Great Lakes Aquatic Nonindigenous Species Information System, GLANSIS is a database with information on aquatic nonindigenous species for the Great Lakes. This report goes over the heuristic evaluation conducted for the web pages of GLANSIS using Jakob Nielsen's Usability Heuristics. Six heuristics were used to analyze four main aspects of the website: overall website guidance, the Species List Generator feature, the Species Profile page, and the Risk Assessment Clearinghouse menus.

Each team member completed an individual heuristic evaluation, each focusing on three heuristics and going through the GLANSIS database multiple times. Special care was given to the usability, accessibility and efficiency of the main features and the process of obtaining information through the database.

After collaboratively analyzing the data, the team came to these findings:

- The choice of icon and the modules on the homepage of GLANSIS is highly recognizable for both new users and experienced users
- There is no indication of necessary input labels.
- The title's on Species List Generator are not linked appropriately.
- The species profile page contains a lot of information, but poorly formatted.
- Poor aesthetics and redundancy on the homepage.
- Poor readability on the tool page.
- No page title for the functional pages
- No navigation back to the home page from the species page.
- Redundancy with instructional information.

These are the following recommendations:

- Use a placeholder within the text entry box.
- Put the columns of scientific name and common name before the columns of taxonomic group and family.
- Categorize different information of a species and make information blocks.
- Make efficient use of the navigation bar.
- The information in all the pages could also be synchronized and follow a similar hierarchy.
- Every page should have the page title on the top corner.
- Only the functional page should have a link to instructions for each function.

We can conduct more analysis in the future on the features with usability testing with target users.

Introduction

Great Lakes Aquatic Nonindigenous Species Information System, GLANSIS is a database that aims to improve access to information on aquatic nonindigenous species for the Great Lakes. What started just as a database has now developed newer tools after conducting a series of interviews with educators and other users of the database. The website has tools such as profiles, map explorer, risk clearinghouse and references.

The team at GLANSIS plans to move beyond the higher level analysis and focus on targeted users and particular features. In this report, our focus is on the usability features of the website. We therefore conducted a heuristic evaluation to analyze the features of this website with a metric and to then identify issues that users might be facing.

Throughout the heuristic evaluation, we focused on these criteria:

1. **How the users reach their desired information in the database and what aspects of the web work well**
2. **What features of the web might not be working efficiently and hence would need further work or research on**

The main purpose of the study is to get a better understanding of one set of user bases as well as the main features of the database. By focusing on these aspects in our evaluation we would uncover the best possible user flows to get to the intended information while also focusing on the functionality and aesthetic of the features.

Methods

Overall Process of Evaluation

We focused our process on the main aspects of the GLANSIS database. The heuristic evaluation is based on the recommendation of Nielson's usability heuristics. We chose six heuristics out of ten that we could apply to the GLANSIS database. Each team member completed an individual heuristic evaluation. Through a group discussion, the team synthesized the results to create one team heuristic evaluation. We analyzed the severity of each problem and worked to find solutions that could mitigate the issues.

Sections of the Product Selected

From the GLANSIS database, we focused on four main aspects: **overall website guidance, the Species List Generator feature, the Species Profile page, and the Risk Assessment Clearinghouse menus**. These features are most likely to be used by our target user group: undergraduate biology and ecology educators.

Overall website guidance involved the cohesiveness of the website structure. The Species List Generator feature proves beneficial to educators that want to look up a particular type of invasive species. The Species Profile page is a feature that gives the full background of a particular invasive species. The Risk Assessment Clearinghouse function can provide

insights as to how much of a risk a certain invasive species can pose to a given area.

Heuristics

Based on team discussion, we decided to use six heuristics from Nielson's recommendations, as seen in Figure 1. The team scanned each page of the database to see which heuristics were most important. We were able to provide context as to why each heuristic is important to improve the usability of the GLANSIS database.

Heuristic	Definition	GLANSIS Context
Match between system and the real world	The system should speak the users' language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.	Since this is a scientific database about endangered species, it is very important to make sure that users who might not have any experience with it are able to understand the material on main pages.
Consistency and standards	Users should not have to wonder whether different words, situations, or actions mean the same thing.	For the consistent user experience during the research on the database system, consistency and standards are needed for the website.
Recognition rather than recall	Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one prat of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.	When users are using this database to find info, it is important to lessen the load from them and let the website do the majority of the work.
Aesthetic and minimalist design	The system presents the information in a way which is easily consumable to the user and not overload the user with information.	The text of the search result of GLANSIS is often long, and includes much information without visualization, so it's necessary to make the readability of the site high with interface design.
Help users recognize, diagnose, and recover from errors	Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.	Since this is database where users also might contribute information to, it's important to have clear error messaging in case a step/information is not need
Help and documentation	Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.	It might be helpful to have extra information to guide user's to where they want to be since there are multiple features for this website/database.

Figure 1*. Set of six heuristics chosen by the team, their definitions (Nielsen, 1995), and the connection to the GLANSIS database.*

Process of Combining Results and Assessing Severity

The team individually completed heuristic evaluation of the GLANSIS database. We came together as a group to discuss the problems that we found, as well as aspects of the database that work well. We consolidated similar issues and highlighted the most important ones that would affect undergraduate educators. The team boiled down the most pertinent heuristic issues and explored solutions that mitigated the issues we found.

Findings and Recommendations

The sets of findings and recommendations in this section were collectively agreed upon by the team after rating each heuristic through the severity scale and how many times the problem surfaced in each of the team member's individual analyses.

Recognition Rather Than Recall

Key Finding #1: Intuitive usage of icons

The choice of icon and the modules on the homepage of GLANSIS is highly recognizable for both new users and experienced users. Even for people who do not know biology terms, it's still easy to tell that Species List Generator is a search engine.

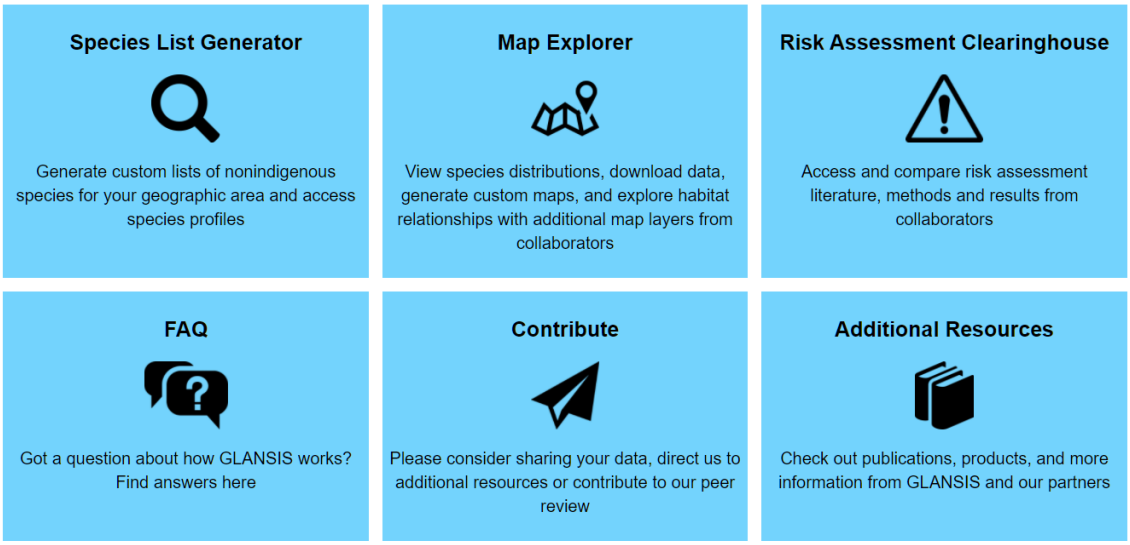


Figure 2. GLANSIS homepage module

Key Finding #2: No indication of necessary input labels

For every page that contains data entry forms, inputting lines and labels are always together, and the formatting is clear enough for users to not get confused with two inputting options.

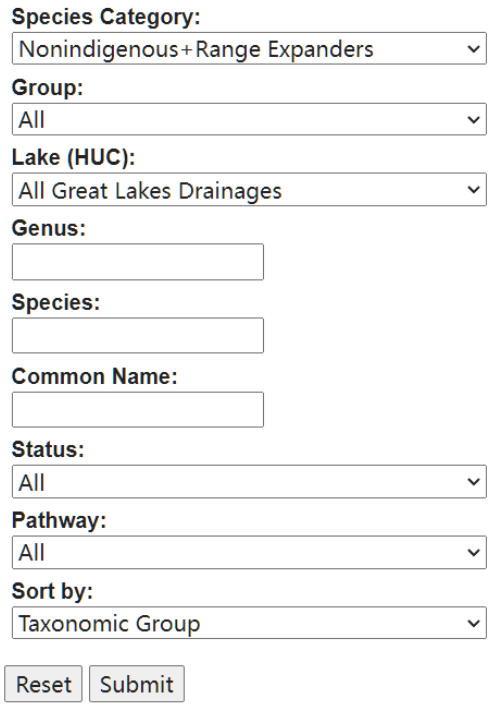


Figure 3. Species List Generator search filter

However, there is nothing around the data entry boxes to indicate what is necessary for users to start a search, or generate a species list. Based on the test by our team, none of the boxes is necessary to begin a search since a list of species will be generated with the default settings, so it's hard to decide if it's necessary to have an indicator to tell users which box is necessary or not.

Recommendation #2:

We see all drop-down menu filters have a default option, so we think this is enough to indicate to users that you don't have to change this if you don't have specific requirements on these options. The text entry box can do a similar thing by placing a placeholder in each box. The placeholder does not mean any real input or default value, but to tell users that this box is ok to be empty.

Key Finding #3: Counterintuitive table listing invasive species

The list of species generated by Species List Generator has a clear overall formatting, and different information is distinguished by chart borders. However, if users want to click and check the detailed information of any species, they should only click the scientific name to enter the species profile page, which is counter intuitive. For our team members, all of us click the species photo at the first time performing the search to enter the species profile, and then figure it out after a few seconds because the color of clickable links is also not obvious compared to the normal black paragraph text.

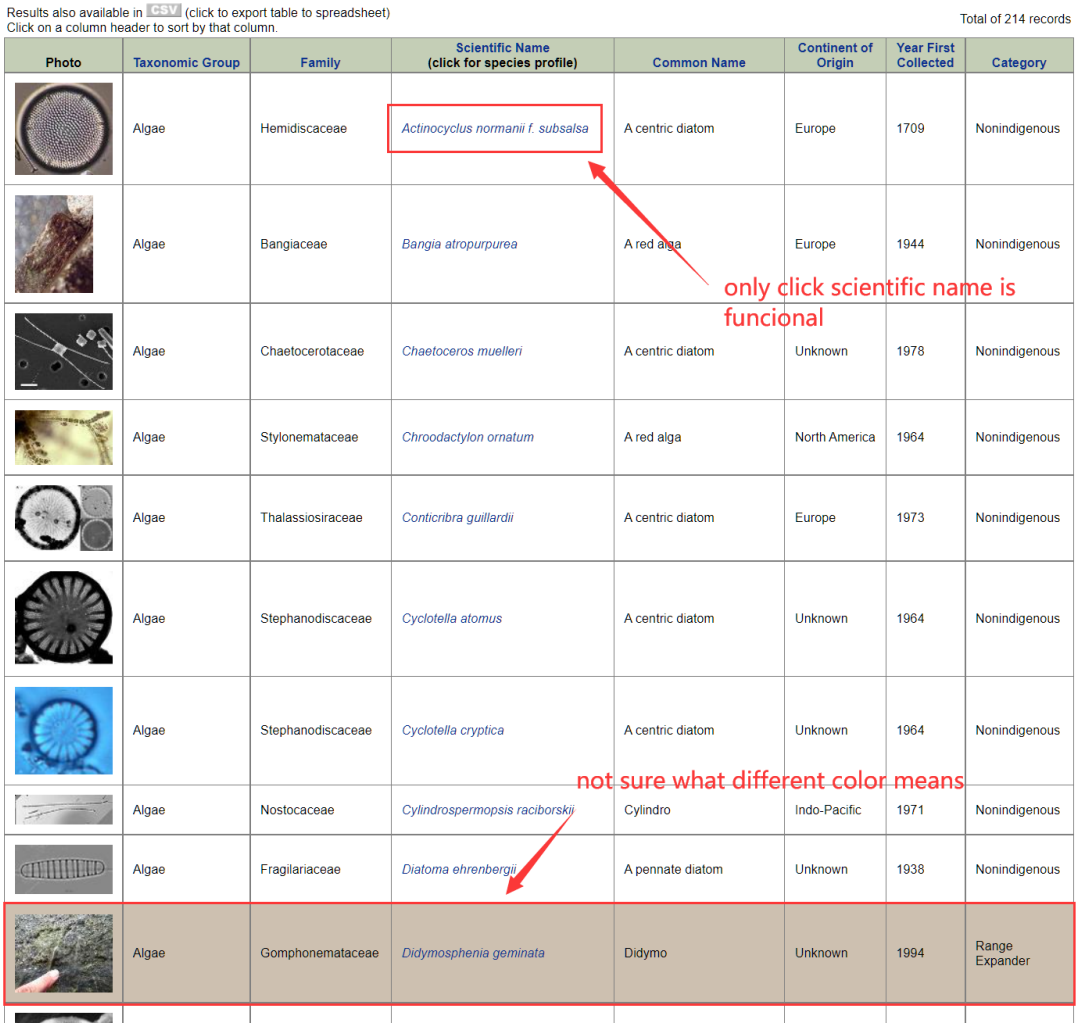


Photo	Taxonomic Group	Family	Scientific Name (click for species profile)	Common Name	Continent of Origin	Year First Collected	Category
	Algae	Hemidiscaceae	*Actinocyclus normanii f. subsalsa*	A centric diatom	Europe	1709	Nonindigenous
	Algae	Bangiaceae	*Bangia atropurpurea*	A red alga	Europe	1944	Nonindigenous
	Algae	Chaetocerotaceae	*Chaetoceros muelleri*	A centric diatom	Unknown	1978	Nonindigenous
	Algae	Stylonemataceae	*Chroodactylon ornatum*	A red alga	North America	1964	Nonindigenous
	Algae	Thalassiosiraceae	*Conticribra guillardii*	A centric diatom	Europe	1973	Nonindigenous
	Algae	Stephanodiscaceae	*Cyclotella atomus*	A centric diatom	Unknown	1964	Nonindigenous
	Algae	Stephanodiscaceae	*Cyclotella cryptica*	A centric diatom	Unknown	1964	Nonindigenous
	Algae	Nostocaceae	*Cylindrospermopsis raciborskii*	Cylindro	Indo-Pacific	1971	Nonindigenous
	Algae	Fragilariaceae	*Diatoma ehrenbergii*	A pennate diatom	Unknown	1938	Nonindigenous
	Algae	Gomphonemataceae	*Didymosphenia geminata*	Didymo	Unknown	1994	Range Expander

Figure 4. List of species

<u>Recommendation #3:</u>

A recommended solution is to put the columns of scientific name and common name before the columns of taxonomic group and family, and make species photo, scientific name, and common name all clickable and guide users to the species profile page. The three elements should have an obvious change when it's hovered, focused, or activated, so users will know what they are doing with the elements.

This solution can also save the spaces for other information on one species. If other columns can be clickable and will guide users to pages other than species profile pages in the future, this will be compatible.

Aesthetic and Minimal Design

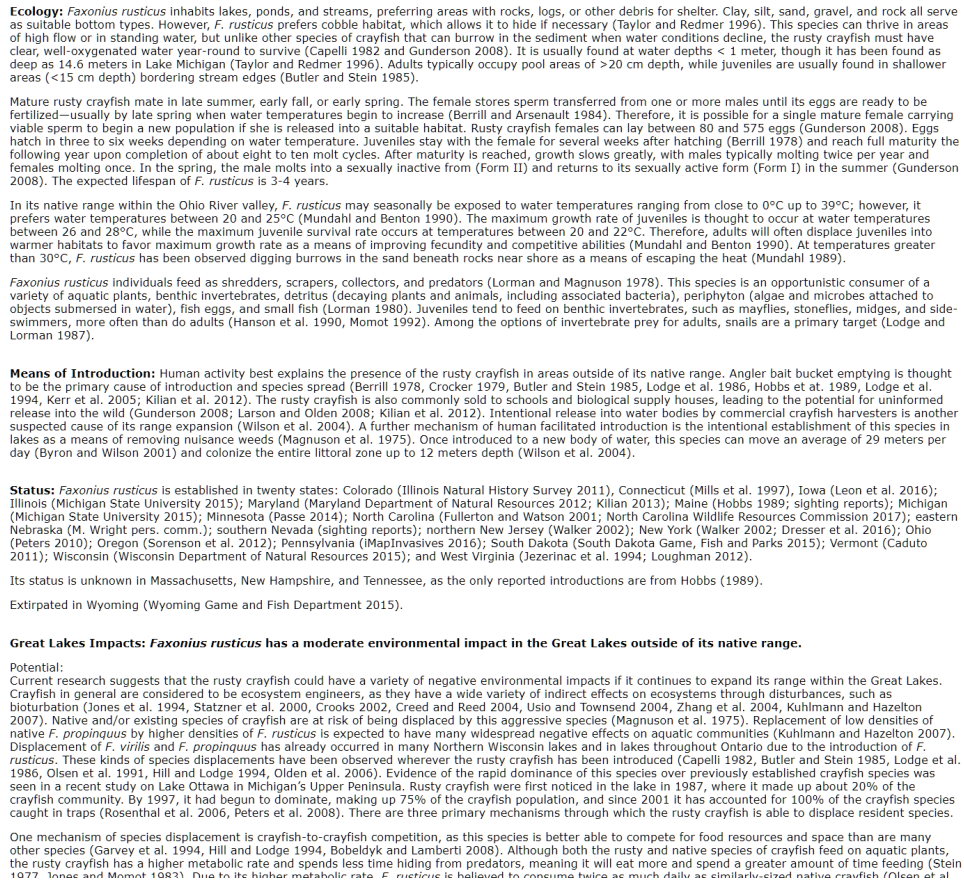
Key Finding #4: Poor aesthetics and redundancy on the homepage
For modern websites on top of performing their intended task, it is also important that they are efficient and effective. Design is an aspect that helps with these factors. The main page of GLANSIS is clean in design and portrays all the relevant information. The purpose of this page is to display all the critical features of the database and it does so by differentiating the feature tabs from the background.

While assessing the aesthetics of the web pages and correlating it with the accessibility of the page, we found that the main page, as well as the corresponding pages, objects, fonts and lines are clearly visible, however some white space may be needed to differentiate the material. The links are not differentiated from the normal text and that might not make it accessible to all. These links are also placed twice on the home page, once on the navigation bar and then again on the page. This may not need to be displayed twice.

Figure 6. Screenshot of home.

Recommendation #4:
Redundancy can be reduced by making efficient use of the navigation bar. Since the main features are on the navigation bar, the home page could have other information on it that may be relevant and visually appealing. The text in the navigation bar can also be differentiated using font style or color in order to make the function prominent to the user.

Key Finding #5: Poor readability (too much text, white space)
For the Species Page, Map Explorer and any of the 'How to' tool pages, the analysis revealed that these pages are text-heavy. There is no proper use of information hierarchy or grouping. There are less icons in use as well. The Species Profile page contains a lot of information, but poorly formatted. GLANSIS does work on CSS formatting on the page, but still, the whole page looks like the original html format. Only line breaks and change of font weight are used to distinguish different information. This makes the page have poor readability, and users can hardly pinpoint the information they are looking for in a short time.



Ecology: *Faxonius rusticus* inhabits lakes, ponds, and streams, preferring areas with rocks, logs, or other debris for shelter. Clay, silt, sand, gravel, and rock all serve as suitable bottom types. However, *F. rusticus* prefers cobble habitat, which allows it to hide if necessary (Taylor and Redmer 1996). This species can thrive in areas of high flow or in standing water, but unlike other species of crayfish that can burrow in the sediment when water conditions decline, the rusty crayfish must have clear, well-oxygenated water year-round to survive (Capelli 1982 and Gunderson 2008). It is usually found at water depths < 1 meter, though it has been found as deep as 14.6 meters in Lake Michigan (Taylor and Redmer 1996). Adults typically occupy pool areas of >20 cm depth, while juveniles are usually found in shallower areas (<15 cm depth) bordering stream edges (Butler and Stein 1985).

Mature rusty crayfish mate in late summer, early fall, or early spring. The female stores sperm transferred from one or more males until its eggs are ready to be fertilized—usually by late spring when water temperatures begin to increase (Berrill and Arsenault 1984). Therefore, it is possible for a single mature female carrying viable sperm to begin a new population if she is released into a suitable habitat. Rusty crayfish females can lay between 80 and 575 eggs (Gunderson 2008). Eggs hatch in three to six weeks depending on water temperature. Juveniles stay with the female for several weeks after hatching (Berrill 1978) and reach full maturity the following year upon completion of about eight to ten molt cycles. After maturity is reached, growth slows greatly, with males typically molting twice per year and females molting once. In the spring, the male molts into a sexually inactive from (Form II) and returns to its sexually active form (Form I) in the summer (Gunderson 2008). The expected lifespan of *F. rusticus* is 3-4 years.

In its native range within the Ohio River valley, *F. rusticus* may seasonally be exposed to water temperatures ranging from close to 0°C up to 39°C; however, it prefers water temperatures between 20 and 25°C (Mundahl and Benton 1990). The maximum growth rate of juveniles is thought to occur at water temperatures between 26 and 28°C, while the maximum juvenile survival rate occurs at temperatures between 20 and 22°C. Therefore, adults will often displace juveniles into warmer habitats to favor maximum growth rate as a means of improving fecundity and competitive abilities (Mundahl and Benton 1990). At temperatures greater than 30°C, *F. rusticus* has been observed digging burrows in the sand beneath rocks near shore as a means of escaping the heat (Mundahl 1989).

Faxonius rusticus individuals feed as shredders, scrapers, collectors, and predators (Lorman and Magnuson 1978). This species is an opportunistic consumer of a variety of aquatic plants, benthic invertebrates, detritus (decaying plants and animals, including associated bacteria), periphyton (algae and microbes attached to objects submersed in water), fish eggs, and small fish (Lorman 1980). Juveniles tend to feed on benthic invertebrates, such as mayflies, stoneflies, midges, and side-swimmers, more often than do adults (Hanson et al. 1990, Momot 1992). Among the options of invertebrate prey for adults, snails are a primary target (Lodge and Lorman 1987).

Means of Introduction: Human activity best explains the presence of the rusty crayfish in areas outside of its native range. Angler bait bucket emptying is thought to be the primary cause of introduction and species spread (Berrill 1978, Crocker 1979, Butler and Stein 1985, Lodge et al. 1986, Hobbs et at. 1989, Lodge et al. 1994, Kerr et al. 2005; Kilian et al. 2012). The rusty crayfish is also commonly sold to schools and biological supply houses, leading to the potential for uninformed release into the wild (Gunderson 2008; Larson and Olden 2008; Kilian et al. 2012). Intentional release into water bodies by commercial crayfish harvesters is another suspected cause of its range expansion (Wilson et al. 2004). A further mechanism of human facilitated introduction is the intentional establishment of this species in lakes as a means of removing nuisance weeds (Magnuson et al. 1975). Once introduced to a new body of water, this species can move an average of 29 meters per day (Byron and Wilson 2001) and colonize the entire littoral zone up to 12 meters depth (Wilson et al. 2004).

Status: *Faxonius rusticus* is established in twenty states: Colorado (Illinois Natural History Survey 2011), Connecticut (Mills et al. 1997), Iowa (Leon et al. 2016); Illinois (Michigan State University 2015); Maryland (Maryland Department of Natural Resources 2012; Kilian 2013); Maine (Hobbs 1989; sighting reports); Michigan (Michigan State University 2015); Minnesota (Passe 2014); North Carolina (Fullerton and Watson 2001; North Carolina Wildlife Resources Commission 2017); eastern Nebraska (M. Wright pers. comm.); southern Nevada (sighting reports); northern New Jersey (Walker 2002); New York (Walker 2002; Dresser et al. 2016); Ohio (Peters 2010); Oregon (Sorenson et al. 2012); Pennsylvania (iMapInvasives 2016); South Dakota (South Dakota Game, Fish and Parks 2015); Vermont (Caduto 2011); Wisconsin (Wisconsin Department of Natural Resources 2015); and West Virginia (Jezerinac et al. 1994; Loughman 2012).

Its status is unknown in Massachusetts, New Hampshire, and Tennessee, as the only reported introductions are from Hobbs (1989).

Extirpated in Wyoming (Wyoming Game and Fish Department 2015).

Great Lakes Impacts: *Faxonius rusticus* has a moderate environmental impact in the Great Lakes outside of its native range.

Potential:
Current research suggests that the rusty crayfish could have a variety of negative environmental impacts if it continues to expand its range within the Great Lakes. Crayfish in general are considered to be ecosystem engineers, as they have a wide variety of indirect effects on ecosystems through disturbances, such as bioturbation (Jones et al. 1994, Statzner et al. 2000, Crooks 2002, Creed and Reed 2004, Usio and Townsend 2004, Zhang et al. 2004, Kuhlmann and Hazelton 2007). Native and/or existing species of crayfish are at risk of being displaced by this aggressive species (Magnuson et al. 1975). Replacement of low densities of native *F. propinquus* by higher densities of *F. rusticus* is expected to have many widespread negative effects on aquatic communities (Kuhlmann and Hazelton 2007). Displacement of *F. virilis* and *F. propinquus* has already occurred in many Northern Wisconsin lakes and in lakes throughout Ontario due to the introduction of *F. rusticus*. These kinds of species displacements have been observed wherever the rusty crayfish has been introduced (Capelli 1982, Butler and Stein 1985, Lodge et al. 1986, Olsen et al. 1991, Hill and Lodge 1994, Olden et al. 2006). Evidence of the rapid dominance of this species over previously established crayfish species was seen in a recent study on Lake Ottawa in Michigan's Upper Peninsula. Rusty crayfish were first noticed in the lake in 1987, where it made up about 20% of the crayfish community. By 1997, it had begun to dominate, making up 75% of the crayfish population, and since 2001 it has accounted for 100% of the crayfish species caught in traps (Rosenthal et al. 2006, Peters et al. 2008). There are three primary mechanisms through which the rusty crayfish is able to displace resident species.

One mechanism of species displacement is crayfish-to-crayfish competition, as this species is better able to compete for food resources and space than are many other species (Garvey et al. 1994, Hill and Lodge 1994, Bobeldyk and Lamberti 2008). Although both the rusty and native species of crayfish feed on aquatic plants, the rusty crayfish has a higher metabolic rate and spends less time hiding from predators, meaning it will eat more and spend a greater amount of time feeding (Stein 1977, Jones and Momot 1983). Due to its higher metabolic rate, *F. rusticus* is believed to consume twice as much daily as similarly-sized native crayfish (Olsen et al.

Figure 5. Screenshot of paragraphs on Rusty Crayfish species profile.

Recommendation #5:

The corresponding pages can also be streamlined in their instructions and other information that may not be vital to every user can be linked through those pages. This would help in reducing the amount of text information on the page and make the information easier to read. The information in all the pages could also be synchronized and follow a similar hierarchy so that it is easier for the user to follow. More images could be used to make the page less cluttered. For the species page, our recommendation is to categorize different information of a species and make information blocks. Different information should be well categorized, so users can go to the category where the information is located. Even if users want to read all the text in the species profile page, paragraph blocks can also increase the overall readability of the page, so users will not get lost during the reading.

Consistency & Standards

Key Finding #6: No page title

For all pages, there should be a title to let users intuitively know where they are at now. However, some functional pages either do not include the title or do have it but not the same as the menu title so that it's not intuitive. For example, when the user clicks the Species List Generator, the title says "Generate a customized non-indegenous species list and access profiles," which is different from the title and rather description of the page's function.

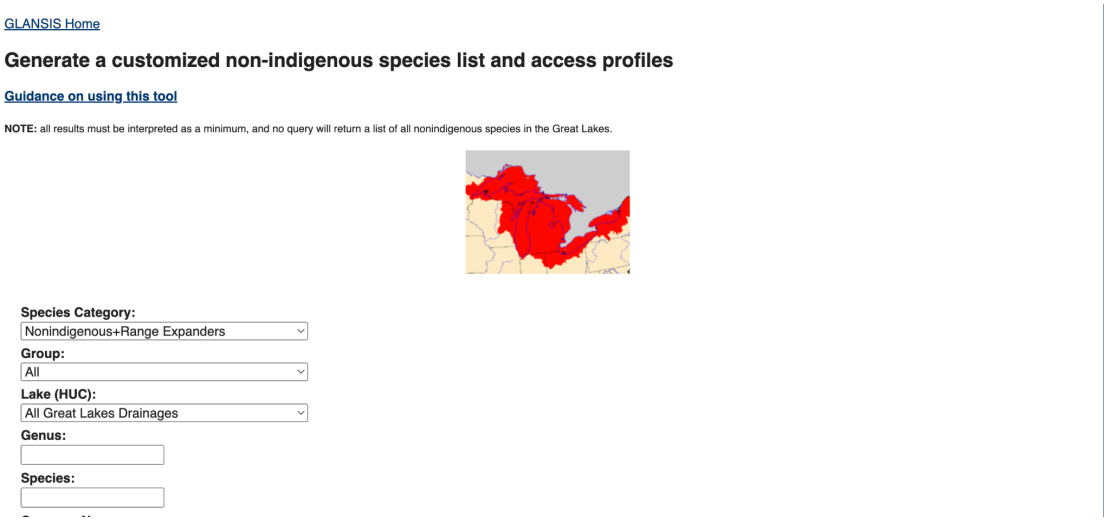


Figure 7. Screenshot of Species List Generator.

Recommendation #6:

Every page should have the page title on the top corner. It should be corresponding to the title of the menu so that the user can intuitively know what menu they just clicked. The title should be distinguishable from both description and contents of the page, so it could be a different typeface and bold-typed.

Key Finding #7: No Back button

In the Species page, there is no way to go back to the home page. It's a very severe problem since the user should be able to easily navigate the menu on any page and to go back to the homepage whenever they want.

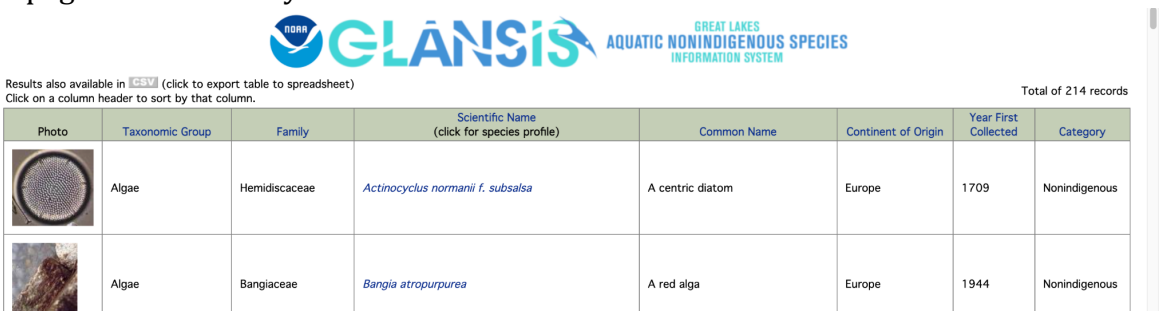


Figure 8. Screenshot of species list.

Recommendation #7:
There should be a back button on the top left of the page or a clear navigation on the top which includes the home menu.

Discussion

While we believe we successfully completed our Heuristic Evaluation on GLANSIS website, there were some limitations. Our findings were from each teammate's knowledge and experience rather than the user's perspectives. Especially, given that the biggest user group of GLANSIS is researchers and educators who are professionals, there were some limitations that we could not figure out the exact strength and weakness of the features in the website with the student's perspectives. Without the user validation, we cannot guarantee that our findings and recommendations are accurate and meaningful. Therefore, the next step of our research is to conduct a Usability Test with the target users. Doing so will confirm that our findings and recommendations are meaningful or need to be edited.

Conclusion

We conducted Heuristic Evaluation of GLANSIS website based on our prior studies. Through Heuristic Evaluation, we were able to identify the weaknesses and strengths of the current website. Eventually, we found that there are some weaknesses especially on the perspectives of Recognition rather than recall, Consistency & Standards, and Aesthetic and Minimal Design. While we prioritize our findings and recommendations based on the heuristic standpoints, there are still more of them that can be discussed. As part of our future research, we can conduct more heuristic reviews on the features with usability testing with target users. This will provide a more positive user experience for users.

References

Nielsen, J. (1995) *Heuristic Evaluation.* In J. Nielsen. & R. L. Mack (Eds) Usability Inspection Methods. New York, NY: John Wiley & Sons.

Weiss, E., Nielsen, J., & Mack, R. (1995). *Heuristic Evaluation - A System Checklist* [PDF]. Xerox Co.

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Appendices

Heuristic Evaluation Template

Heuristic Analysis					
	Link to product website				
	Login credentials				
	Heuristics to be used				
	Reviewer Names:				
#	**Screen**	**Problem Identified**	**Heuristic Used**	**Severity**	**Mentioned By**

Group Heuristic Evaluation Table

Heuristic Analysis					
	Link to product website	https://www.glerl.noaa.gov/glansis/			
	Login credentials	No login needed			
	Heuristics to be used	Nielson's Recommendation			
	Reviewer Names:	Swathi Kumar, Dongyu Zhu, Jiyoon Ko, Zaahra Ali			
#	**Screen**	**Problem Identified**	**Heuristic Used**	**Severity**	**Mentioned By**
1	Risk Assessment	The Risk Assessment Clearing house includes some function tags which should appear on home page only	Match between system and the real world	1 - Cosmetic problem, low priority	Dongyu
2	All pages	No page title for every functional pages	Consistency and standards	3 - Major usability, important to fix	Dongyu
3	Species Page	No way to go back to the home page.	Consistency and standards	4 - Usability catastrophe: imperative to fix this before product can be released	Zaahra
4	Instructions for Tool Use	Each instruction doesn't need to be written down here. each instruction can be in each menu	Consistency and standards	3 - Major usability, important to fix	Jiyoon
5	Species list generator & Methods Explorer & Species result explorer	It seems that all entry boxes are optional because result list can be generated even if nothing is inputted in any box	Recognition rather than recall	1 - Cosmetic problem, low priority	Dongyu
6	Species Page & Species List	The formating of the page looks like html default format, hard for reader to recognize contents in big amount of words	Recognition rather than recall	3 - Major usability, important to fix	Dongyu
7	Species Page	paragraphs are not grouped or the group is not separated into logical zones	Recognition rather than recall	3 - Major usability, important to fix	Dongyu
8	Home page, Species List Generator, Risk Assessment Clearinghouse	redundant function links	Recognition rather than recall	2 - Minor problem, fix as time allows	Jiyoon
9	Any "How to Use" tool pages	Entire page is filled with text	Aesthetic and minimalist design	1 - Cosmetic problem, low priority	Swathi

10	Home page	Multiple links above 6 main buttons are in "regular text" as links	Aesthetic and minimalist design	2 - Minor problem, fix as time allows	Swathi
11	Species Page	too much text and no icons used	Aesthetic and minimalist design	2 - Minor problem, fix as time allows	Jiyoon
12	Home Page	Some icons seem redundant and are placed twice.	Aesthetic and minimalist design	1 - Cosmetic problem, low priority	Zaahra
13	Home Page	Objects, fonts and lines are clearly visible, however some white space may be needed to differentiate the material.	Aesthetic and minimalist design	1 - Cosmetic problem, low priority	Zaahra
14	Home Page	Navigation links do not stand out as links	Aesthetic and minimalist design	1 - Cosmetic problem, low priority	Zaahra
15	Map Explorer	Needs instructions on the page	Aesthetic and minimalist design	2 - Minor problem, fix as time allows	Zaahra
16	Species List Generator	Too much white space and no hierarchy	Aesthetic and minimalist design	2 - Minor problem, fix as time allows	Jiyoon
17	About GLANSIS	poor grouping and hierarchy	Aesthetic and minimalist design	3 - Major usability, important to fix	Jiyoon
18	Home page	6 of card menus are redundant with the navigation bar	Aesthetic and minimalist design	2 - Minor problem, fix as time allows	Jiyoon
19	Species List Generator page	Search terms without results yield error after submitting entire form	Help users recognize, diagnose, and recover from errors	3 - Major usability problem, important to fix	Swathi
20	Contribute	Need clearer instructions on the page of the functions	Help users recognize, diagnose, and recover from errors	2 - Minor problem, fix as time allows	Zaahra
21	Contribute	Could have contribution forms incorporated into the page.	Help users recognize, diagnose, and recover from errors	2 - Minor problem, fix as time allows	Zaahra
22	"Species List Generator" page versus "Species Level Risk Assessments Explorer" page	Both search pages are similar but used for different reasons	Help and documentation	2 - Minor usability problem, fix as time allows	Swathi

Personal Heuristic Evaluation Tables

Swathi Kumar

Heuristic Analysis				
	Link to product website	https://www.glerl.noaa.gov/glansis/		
	Login credentials	No login needed		
	Heuristics to be used	Nielson's Recommendation		
	Reviewer Names:	Swathi		
#	**Screen**	**Problem Identified**	**Heuristic Used**	**Severity**
1	Home page	Large buttons repeat options in top menu	Aesthetic and minimalist design	2 - Minor problem, fix as time allows
2	Home page	Large buttons cause the user to scroll down to see all options	Aesthetic and minimalist design	1 - Cosmetic problem, low priority
3	Home page	Multiple links above 6 main buttons are in "regular text"	Aesthetic and minimalist design	2 - Minor problem, fix as time allows
4	"Species List Generator" page	Search terms without results yield error after submitting entire form	Help users recognize, diagnose, and recover from errors	3 - Major usability problem, important to fix
5	"Great Lakes Risk Assessment Explorer" page	Instructions not included as to what options are required. When submission button is clicked with errors, no message is given as to the presence of an error nor the solution to fixing the error	Help users recognize, diagnose, and recover from errors	2 - Minor usability problem, fix as time allows
6	"Species List Generator" page versus "Species Level Risk Assessments Explorer" page	Both search pages are similar but used for different reasons	Help and documentation	2 - Minor usability problem, fix as time allows
7	Any "How to Use" tool pages	Entire page is filled with text	Aesthetic and minimalist design	1 - Cosmetic problem, low priority

Dongyu Zhu

Heuristic Analysis				
	Link to product website	https://www.glerl.noaa.gov/glansis/		
	Login credentials	No login needed		
	Heuristics to be used	Nielson's Recommendation		
	Reviewer Names:	Dongyu		
#	**Screen**	**Problem Identified**	**Heuristic Used**	**Severity**
1	Risk Assessment	The Risk Assessment Clearing house includes some function tags which should appear on home page only	Match between system and the real world	1 - Cosmetic problem, low priority
2	All pages	No page title for every functional pages	Consistency and standards	3 - Major usability, important to fix
3	All pages	Pages does not have a global backwards or go home button	Consistency and standards	3 - Major usability, important to fix
4	Species list generator & Methods Explorer & Species result explorer	It seems that all entry boxes are optional because result list can be generated even if nothing is inputted in any box	Recognition rather than recall	1 - Cosmetic problem, low priority
5	Species Page	paragraphs are not grouped or the group is not separated into logical zones	Recognition rather than recall	3 - Major usability, important to fix
6	Species Page	The formating of the page looks like html default format, hard for reader to recognize contents in big amount of words	Recognition rather than recall	3 - Major usability, important to fix

Jiyoon Ko

Heuristic Analysis				
	Link to product website	https://www.glerl.noaa.gov/glansis/		
	Login credentials	No login needed		
	Heuristics to be used	Nielson's Recommendation		
	Reviewer Names:	Jiyoon		
#	**Screen**	**Problem Identified**	**Heuristic Used**	**Severity**
1	Instructions for Tool Use	each instruction doesn't need to be written down here. each instruction can be in each menu	Consistency and standards	3 - Major usability, important to fix
2	Home page, Species List Generator, Risk Assessment Clearinghouse	redundant function links	Recognition rather than recall	2 - Minor problem, fix as time allows
3	Species Page	too much text and no icons used	Aesthetic and minimalist design	2 - Minor problem, fix as time allows
4	Species List Generator	Too much white space and no hierarchy	Aesthetic and minimalist design	2 - Minor problem, fix as time allows
5	About GLANSIS	poor grouping and hierarchy	Aesthetic and minimalist design	3 - Major usability, important to fix
6	Home page	6 of card menus are redundant with the navigation bar	Aesthetic and minimalist design	2 - Minor problem, fix as time allows

Zaahra Ali

Heuristic Analysis				
	Link to product website	https://www.glerl.noaa.gov/glansis/		
	Login credentials	No login needed		
	Heuristics to be used	Nielson's Recommendation		
	Reviewer Names:	Zaahra		
#	**Screen**	**Problem Identified**	**Heuristic Used**	**Severity**
1	Home Page	Some icons seem redundant and are placed twice.	Aesthetic and minimalist design	1 - Cosmetic problem, low priority
2	Home Page	Objects, fonts and lines are clearly visible, however some white space may be needed to differentiate the material.	Aesthetic and minimalist design	1 - Cosmetic problem, low priority
3	Home Page	Navigation links do not stand out as links	Aesthetic and minimalist design	1 - Cosmetic problem, low priority
4	Map Explorer	Needs instructions on the page	Aesthetic and minimalist design	2 - Minor problem, fix as time allows
5	Contribute	Need clearer instructions on the page of the functions	Help users recognize, diagnose, and recover from errors	2 - Minor problem, fix as time allows
6	Species Page	No way to go back to the home page.	Consistency and standards	4 - Usability catastrophe: imperative to fix this before product can be released
7	Contribute	Could have contribution forms incorporated into the page.	Help users recognize, diagnose, and recover from errors	2 - Minor problem, fix as time allows