US HAB-CTI

UNIVERSITY OF MARYLAND

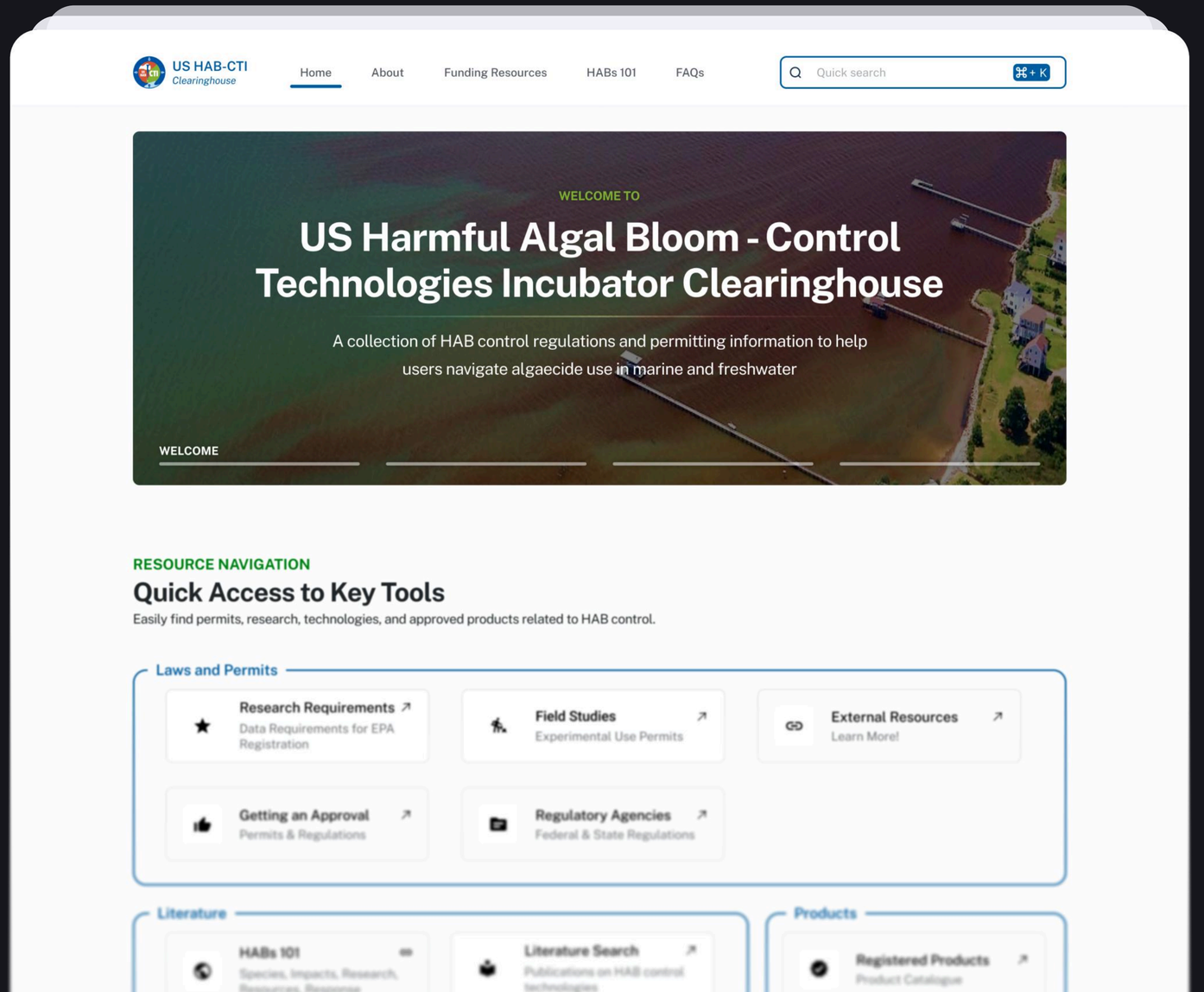
Hrushikesh Ingale & Team Presents

in collaboration with

NOAA

MOTE MARINE LABORATORY & AQUARIUM

IMET Institute of Marine and Environmental Technology



Overview

Problem Statement

How can we improve the discoverability of scattered algal bloom mitigation guidelines to boost search success rate and reduce information access time for stakeholders?

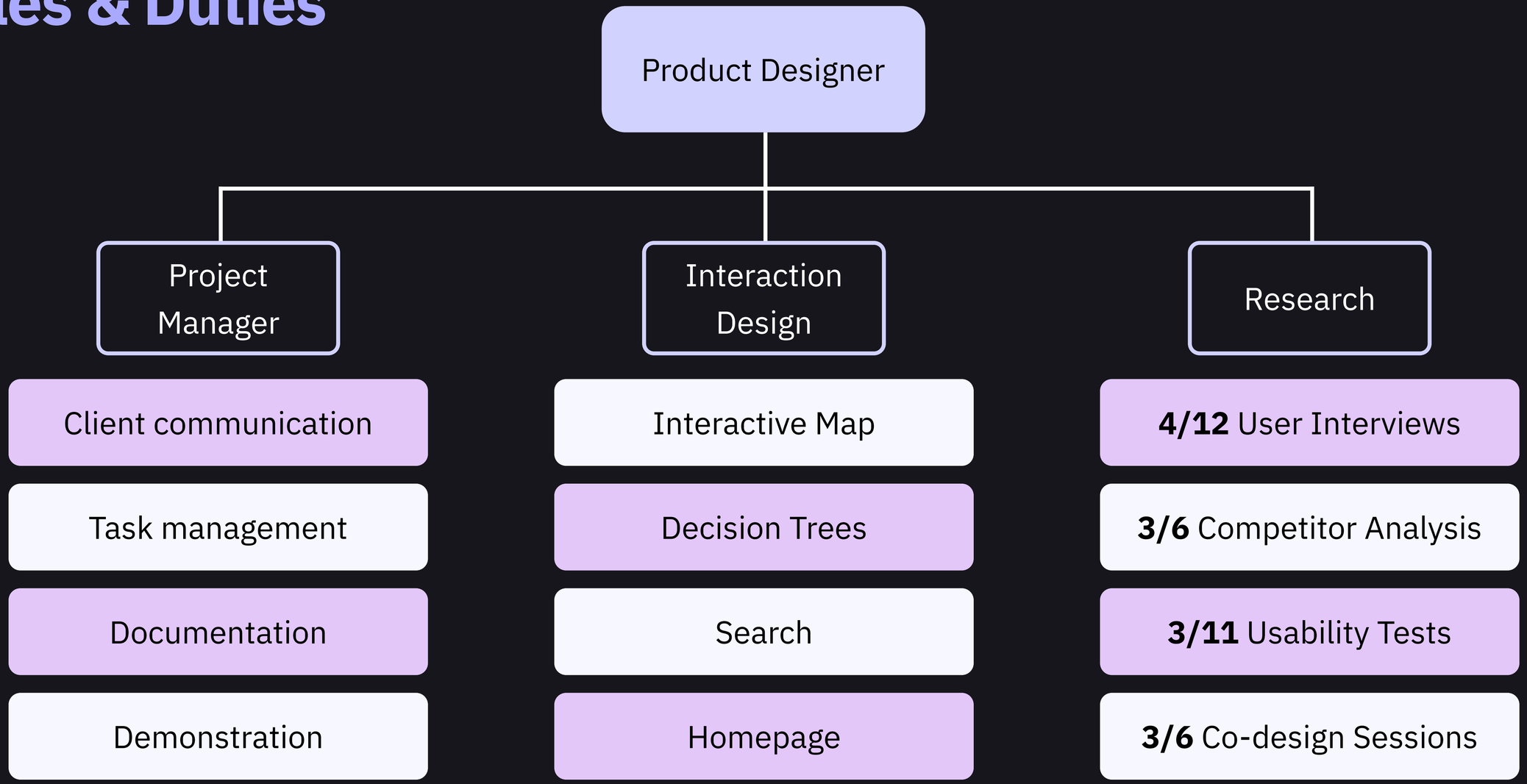
Impact

Permits Repository	120+
Task Success Rate	40%
User Bounce Rate	58%
Search Time	30%

Strategy

- Building a Regulatory Clearinghouse Website
- Aggregate Searchable Records from Multiple Agencies
- Design an Interactive Map for State-Specific Guidelines
- Map Federal Permit Requirements via Decision Trees

Roles & Duties



Process

Field Study

Competitive Analysis

Research

SME Interviews

Ideation

Low-Fidelity Wireframing

Design

High Fidelity Wireframing

Testing

Supervised Usability Study

Deploy

Front-End Development Team

Research

Competitive Analysis

EPA has depth but lacks focused usability for HAB-specific technologies.

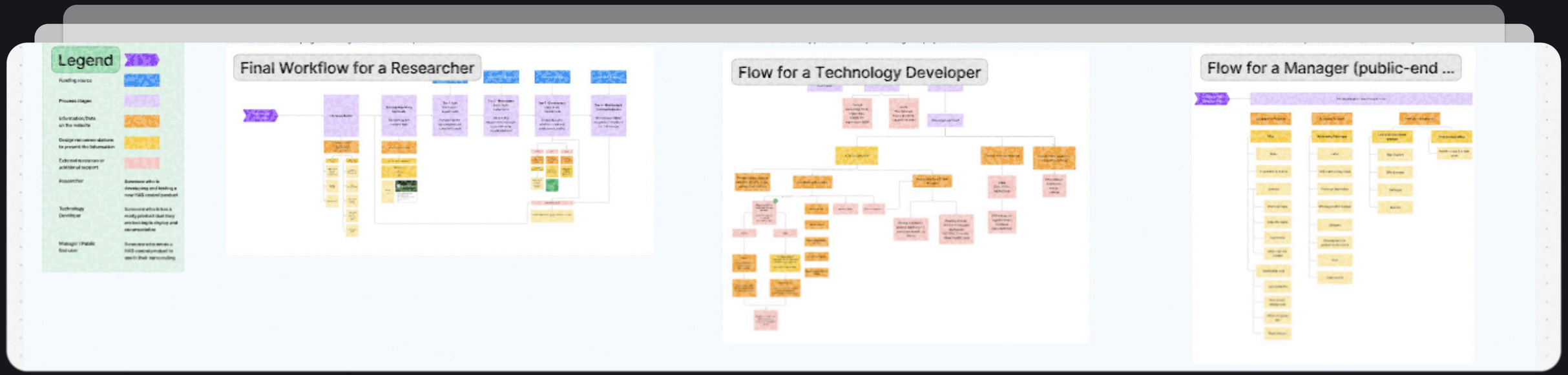
ITRC offers the best user-aligned experience for tech developers and regulators, with clear, structured guidance and tools.

WISE is more aligned with EU policy frameworks and academic research, not practical deployment or permitting processes.

Research

User Interviews/Co-design Sessions

Interviewed 12 candidates including executives of several federal permitting agencies like NOAA, MOTE, CMU, Sudoc.



Research

Pain Points

Researchers

Scattered regulatory resources

Manual literature and data search

Unclear early compliance status

Technology Developer

Complex multi-agency approvals

High compliance costs

Unclear permit decision steps

Manager

Hard to compare products

Varying state permit processes

Limited quick decision tools

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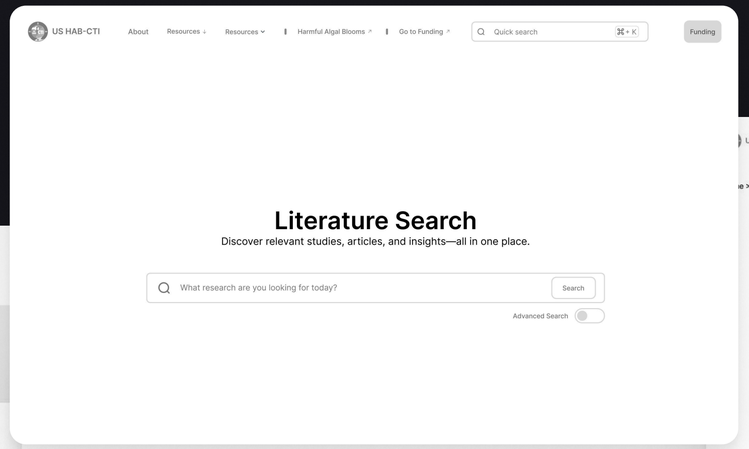
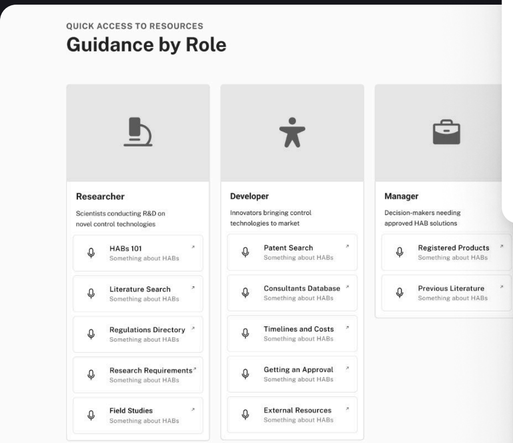
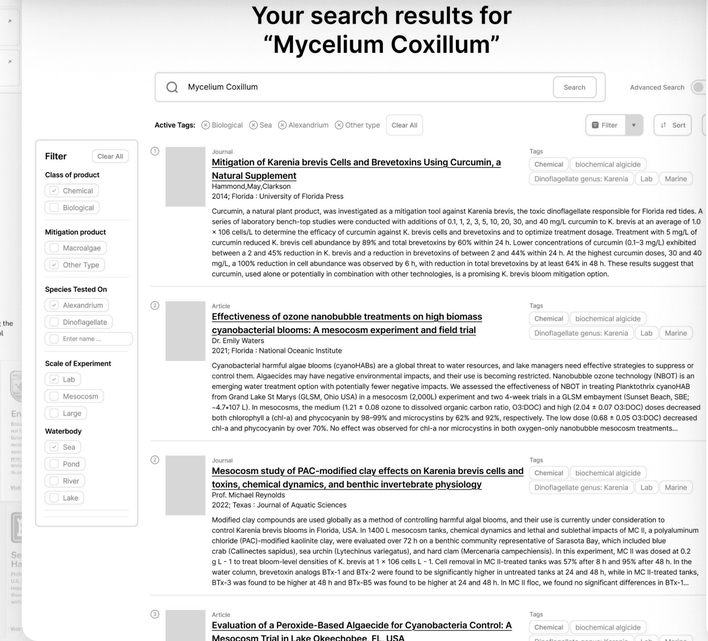
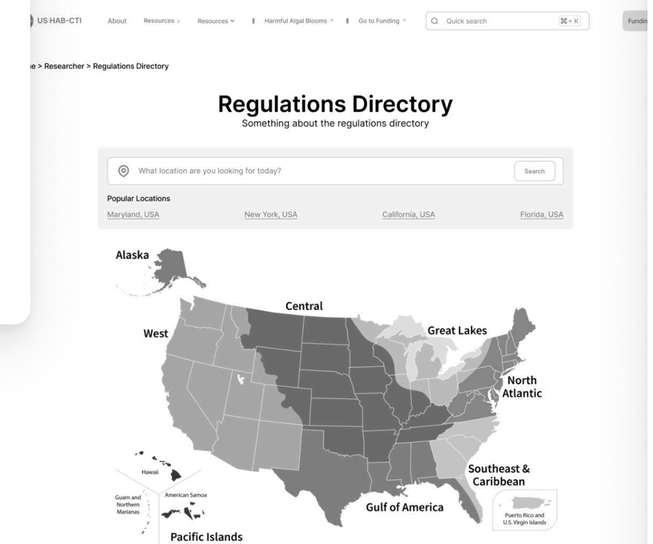
Wireframe [Figma]

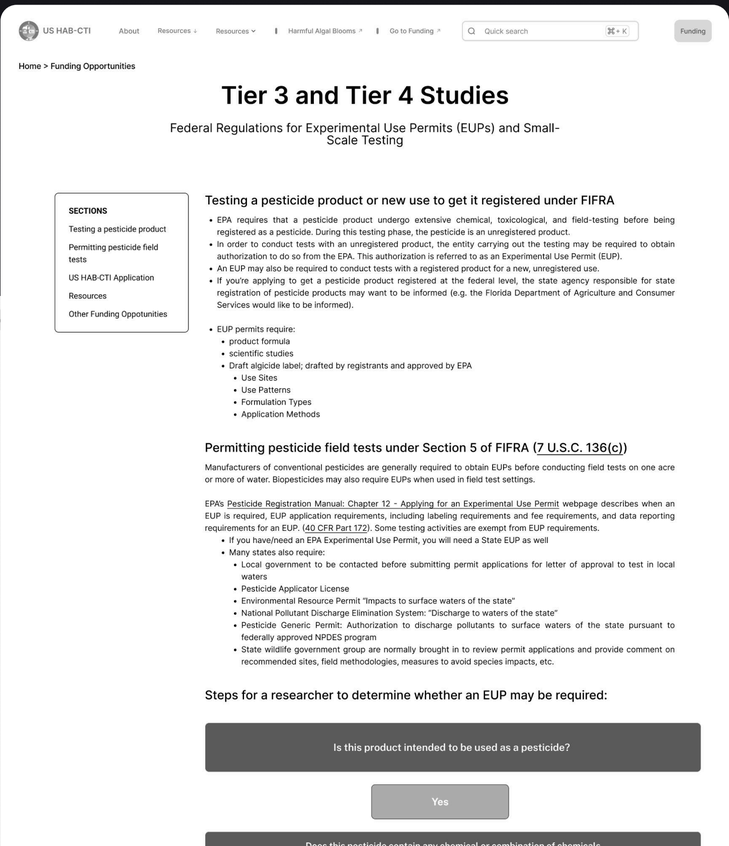








NOAA Region	States/ Territories	State Agencies for HABs					
		Water/ Environment	Natural Resources/Fish and Wildlife (STATE)	Department of Ag, Pesticides-Registration	Dept of Ag, Pesticides--Applicator License	Pesticides--Regulations for Applying Aquatic Pesticides	Additional Resouces/Notes
		Search (State) "water permits" or "division of water" or "water resources"	Search (State) "Fish and Wildlife"	Search (State) "pesticides registration"	Search (State) "pesticides applicator license"	Search (State) "aquatic weed control pesticides"	
						Can link through dept of ag site	
Pacific Islands							
	Guam	Guam Environmental Protection Agency (GEPA), Programs	(Intentionally left blank--do not see official info on this)	Guam Environmental Protection Agency (GEPA), Pesticides	Guam Environmental Protection Agency (GEPA), Pesticides	(Intentionally left blank--do not see official info on this)	
		Visit page		Visit page	Visit page		



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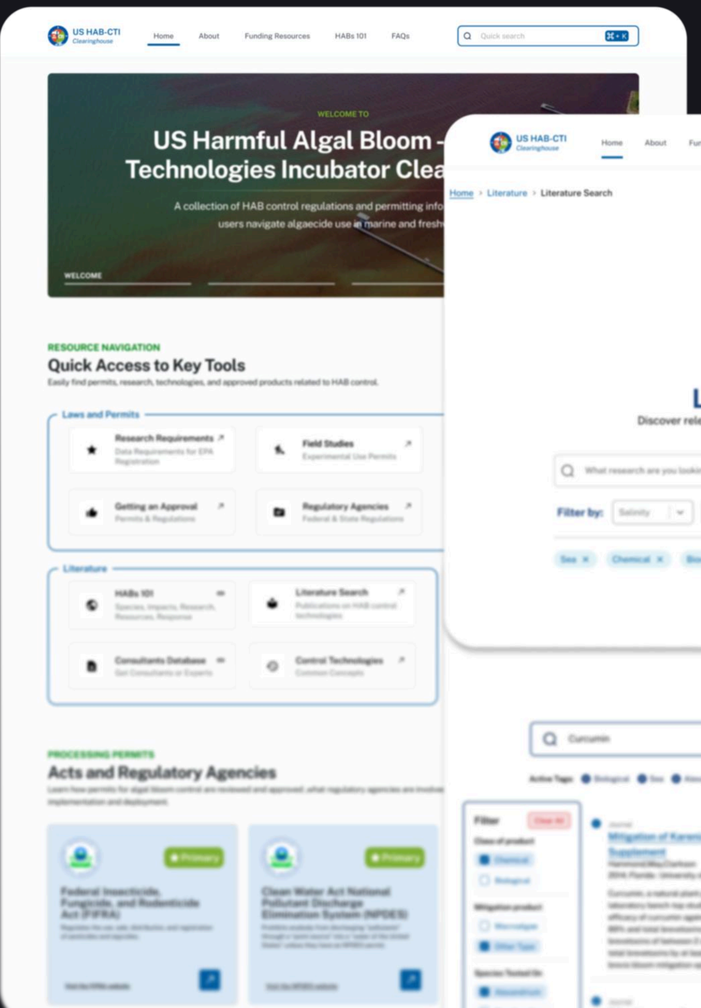
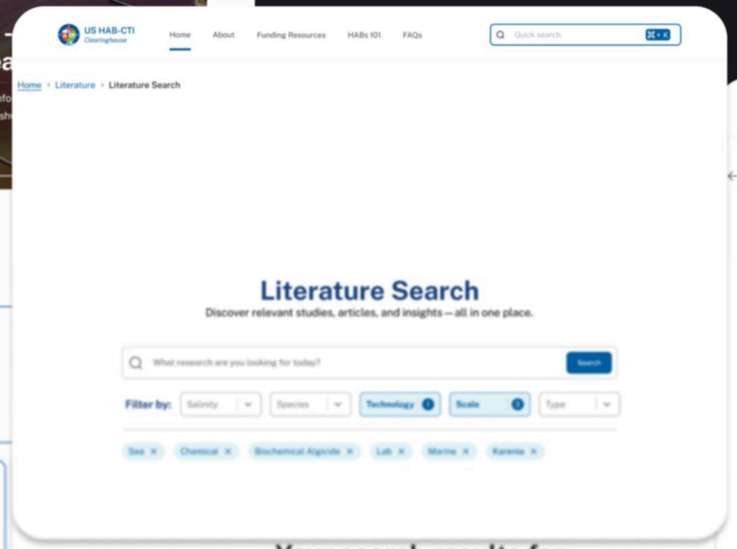
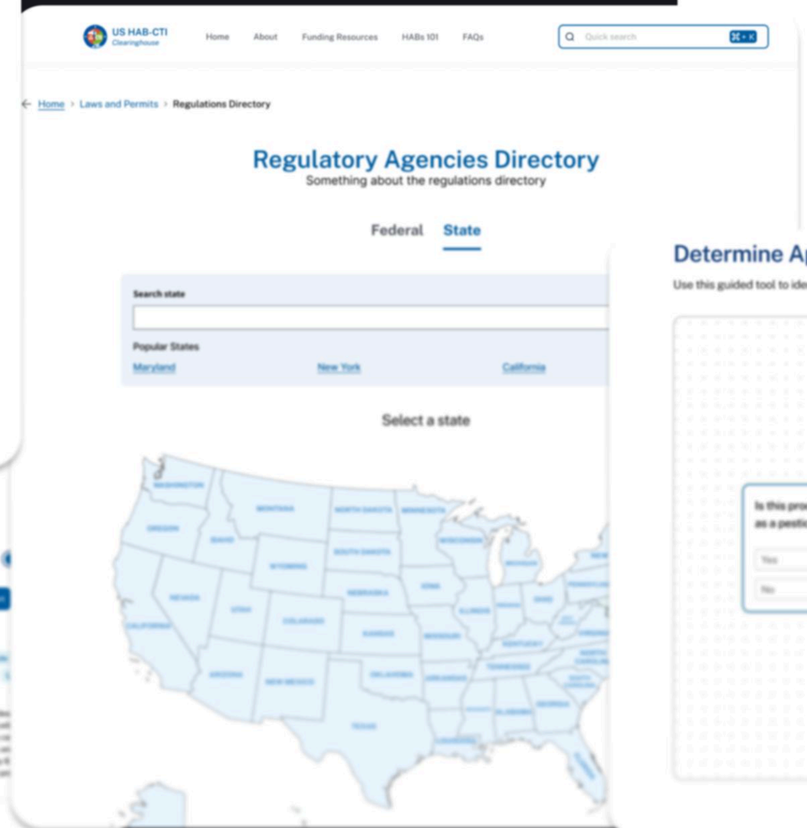
Wireframe [Figma]

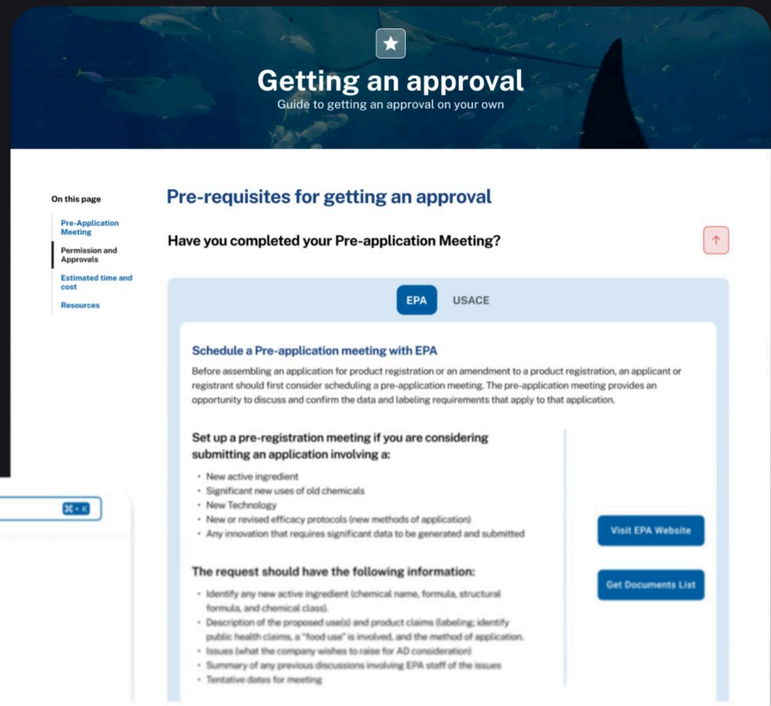
USWDS

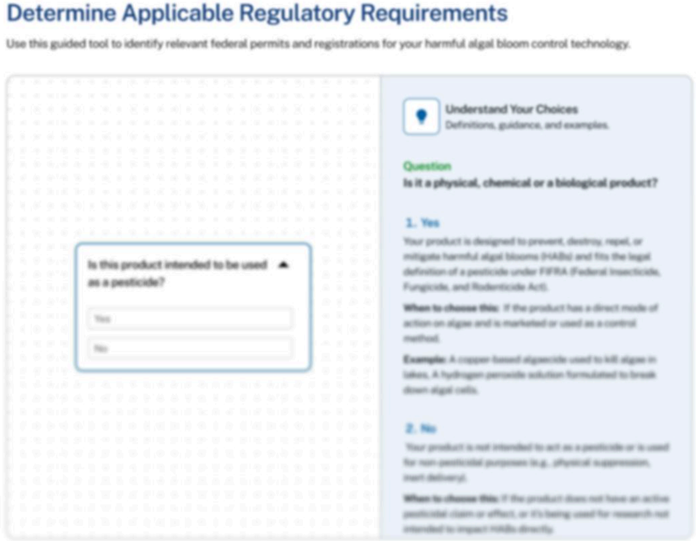
U.S. Web Design System











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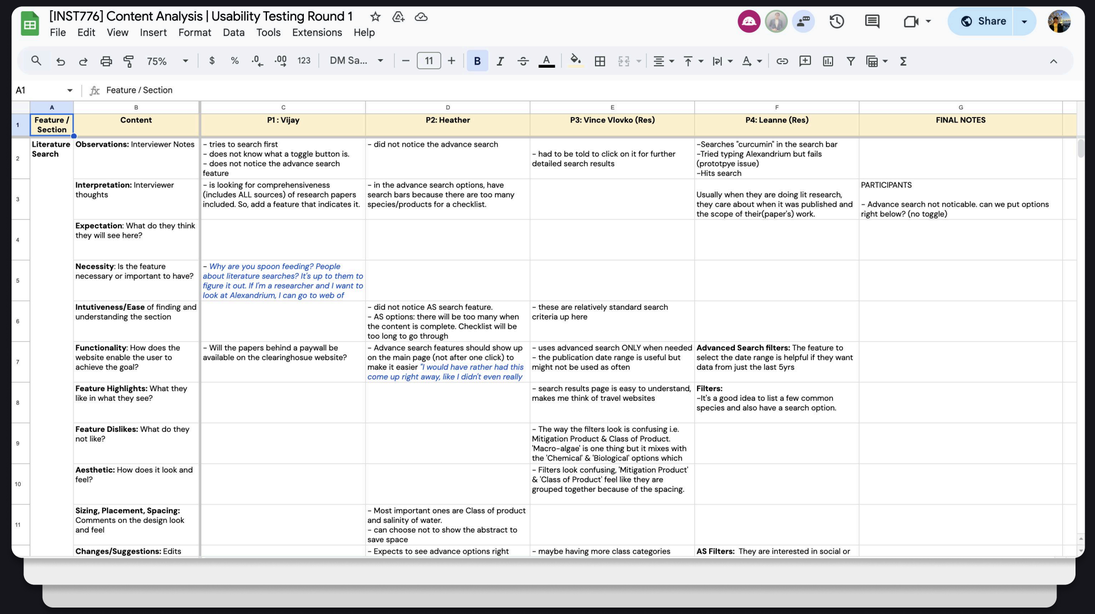
Usability Testing

2 Rounds!



Feature / Section	Content	P1 : Vijay	P2: Heather	P3: Vince Vlovko (Res)	P4: Leanne (Res)	FINAL NOTES
Literature Search	**Observations:** Interviewer Notes	- tries to search first - does not know what a toggle button is. - does not notice the advance search feature	- did not notice the advance search	- had to be told to click on it for further detailed search results	-Searches "curcumin" in the search bar -Tried typing Alexandrium but fails (prototpye issue) -Hits search	
	Interpretation: Interviewer thoughts	- is looking for comprehensiveness (includes ALL sources) of research papers included. So, add a feature that indicates it.	- in the advance search options, have search bars because there are too many species/products for a checklist.		Usually when they are doing lit research, they care about when it was published and the scope of their(paper's) work.	PARTICIPANTS - Advance search not noticable. can we put options right below? (no toggle)
	Expectation: What do they think they will see here?					
	Necessity: Is the feature necessary or important to have?	- *Why are you spoon feeding? People about literature searches? It's up to them to figure it out. If I'm a researcher and I want to look at Alexandrium, I can go to web of*				
	Intuitiveness/Ease of finding and understanding the section		- did not notice AS search feature. - AS options: there will be too many when the content is complete. Checklist will be too long to go through	- these are relatively standard search criteria up here		
	Functionality: How does the website enable the user to achieve the goal?	- Will the papers behind a paywall be available on the clearinghosue website?	- Advance search features should show up on the main page (not after one click) to make it easier *"I would have rather had this come up right away, like I didn't even really*	- uses advanced search ONLY when needed - the publication date range is useful but might not be used as often	**Advanced Search filters:** The feature to select the date range is helpful if they want data from just the last 5yrs	
	Feature Highlights: What they like in what they see?			- search results page is easy to understand, makes me think of travel websites	**Filters:** -It's a good idea to list a few common species and also have a search option.	
	Feature Dislikes: What do they not like?			- The way the filters look is confusing i.e. Mitigation Product & Class of Product. 'Macro-algae' is one thing but it mixes with the 'Chemical' & 'Biological' options which		
	Aesthetic: How does it look and feel?			- Filters look confusing, 'Mitigation Product' & 'Class of Product' feel like they are grouped together because of the spacing.		
	Sizing, Placement, Spacing: Comments on the design look and feel		- Most important ones are Class of product and salinity of water. - can choose not to show the abstract to save space			
	Changes/Suggestions: Edits		- Expects to see advance options right	- maybe having more class categories	**AS Filters:** They are interested in social or	

8 Interviews

\+ **3** Co-working Sessions

\+ ∞ Hours of Data Interpretation

Observations | Interpretation | Expectation

Necessity | Intuitiveness/Ease | Functionality

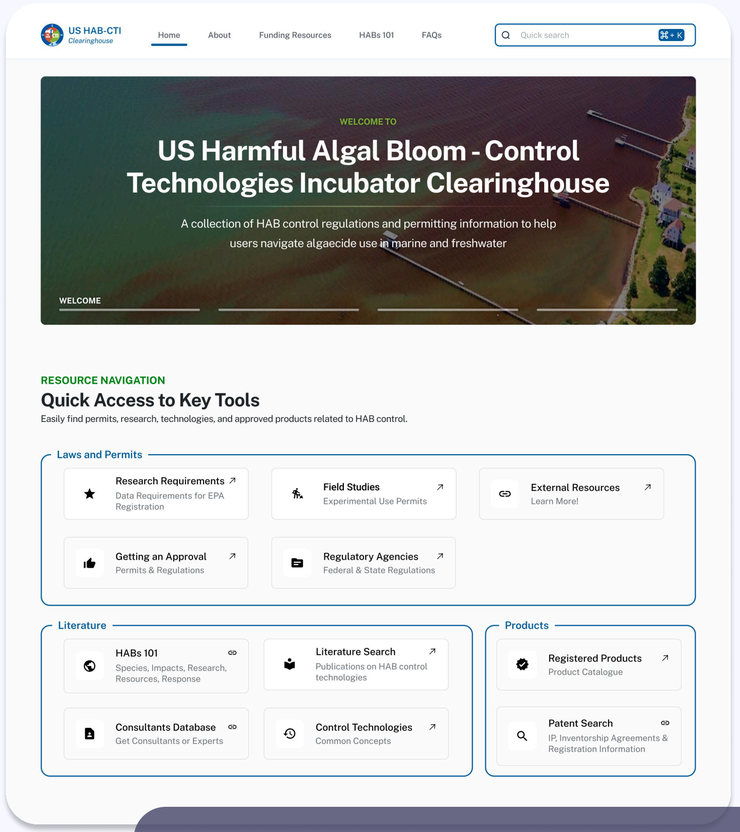
Feature Highlights | Feature Dislikes | Aesthetic

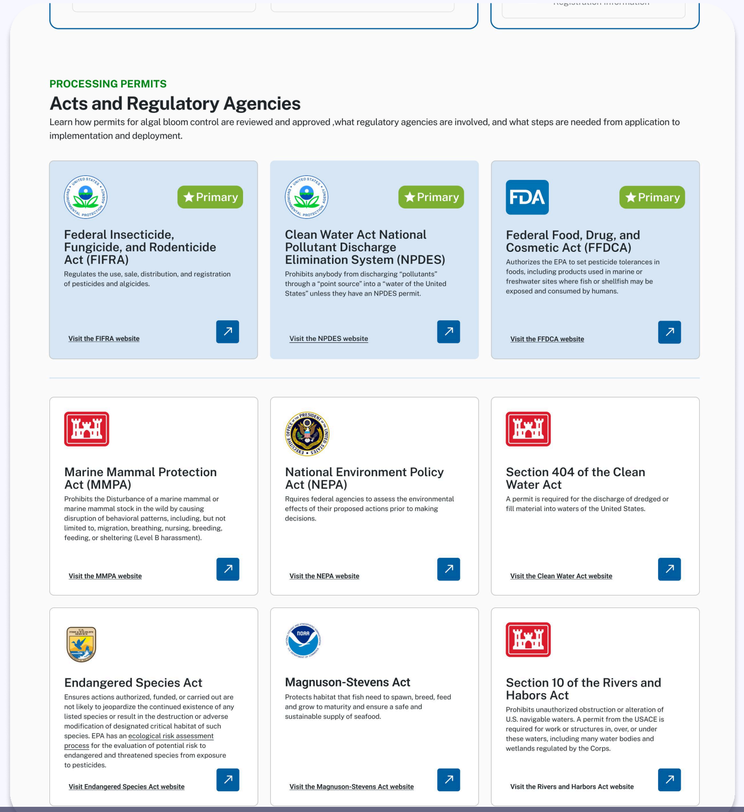
Sizing, Placement, Spacing | Changes/Suggestions

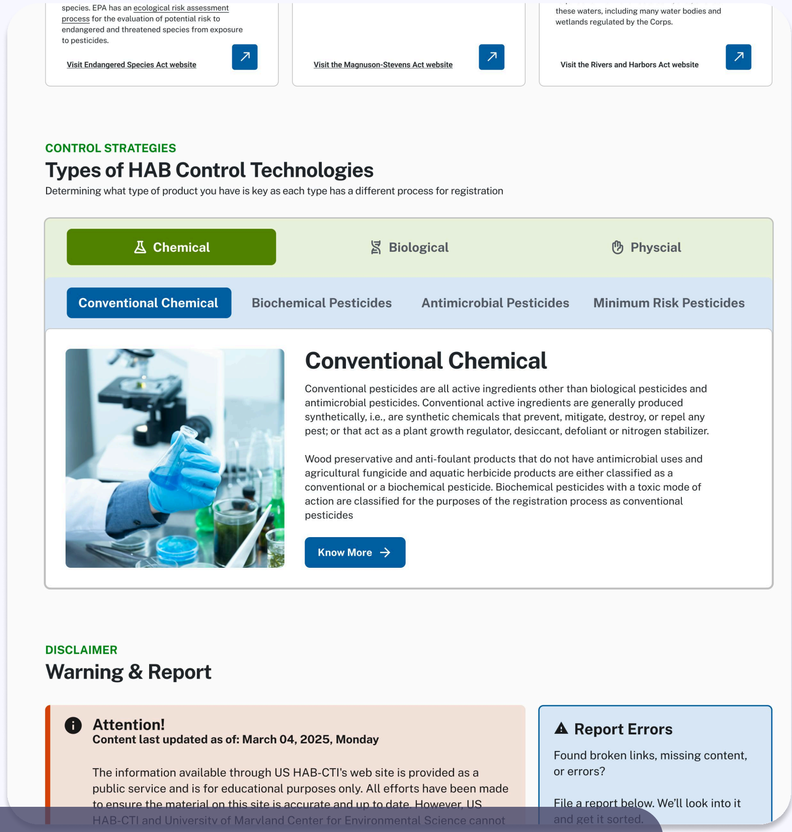
Notes/Questions for the Content Team

Focus Areas

List of Agencies/Homepage (Try it here!)





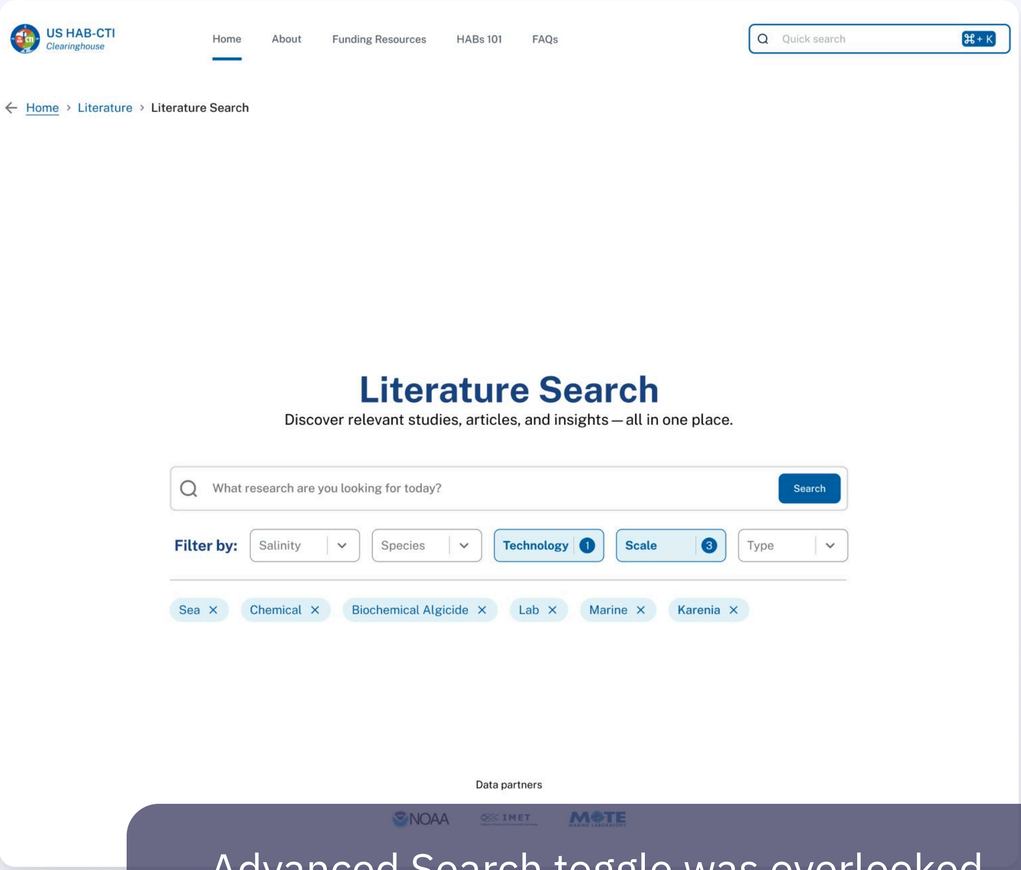


Original categorized features confused users

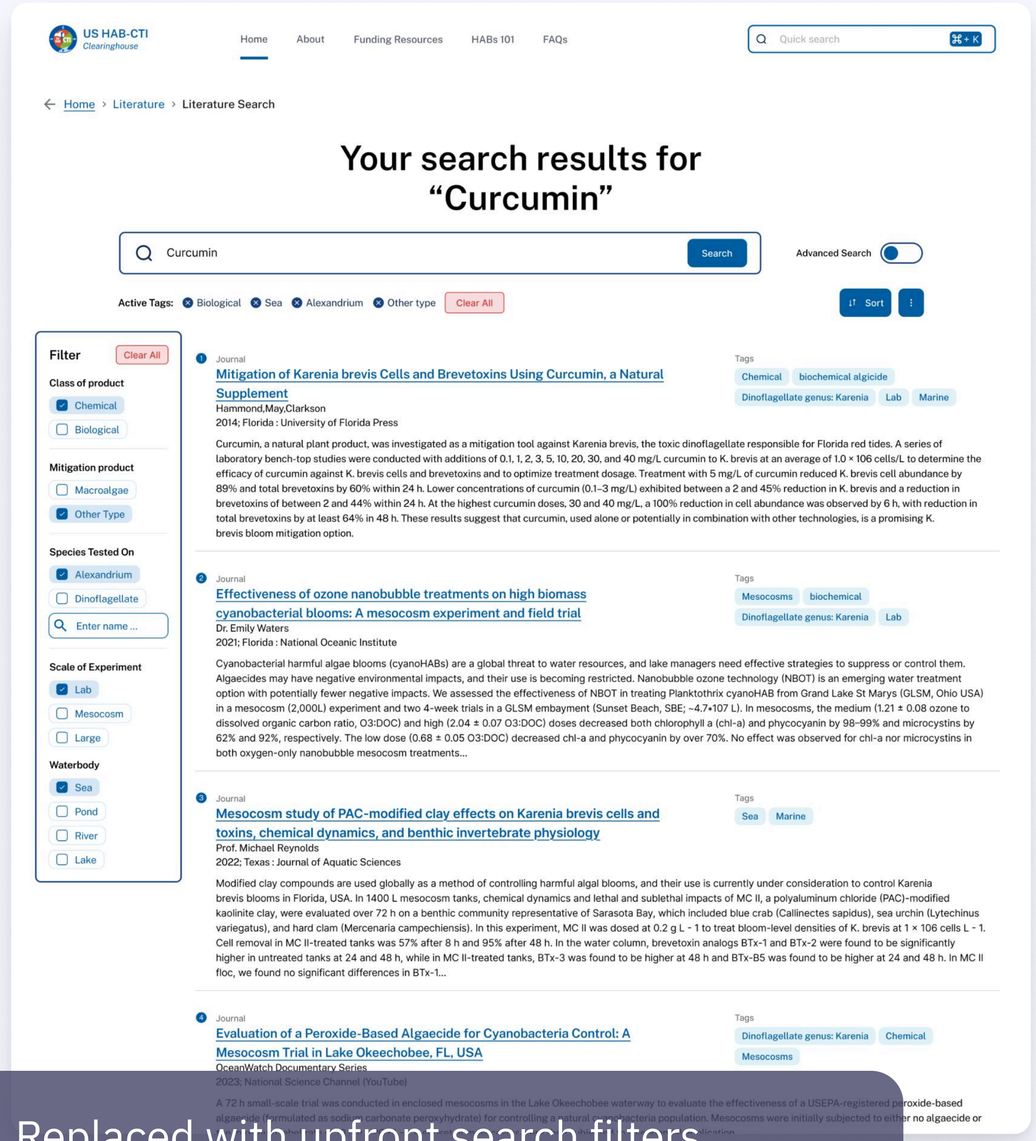
Shifted to a generalized layout so all users can easily access any feature

Focus Areas

Literature Search (Try it here!)



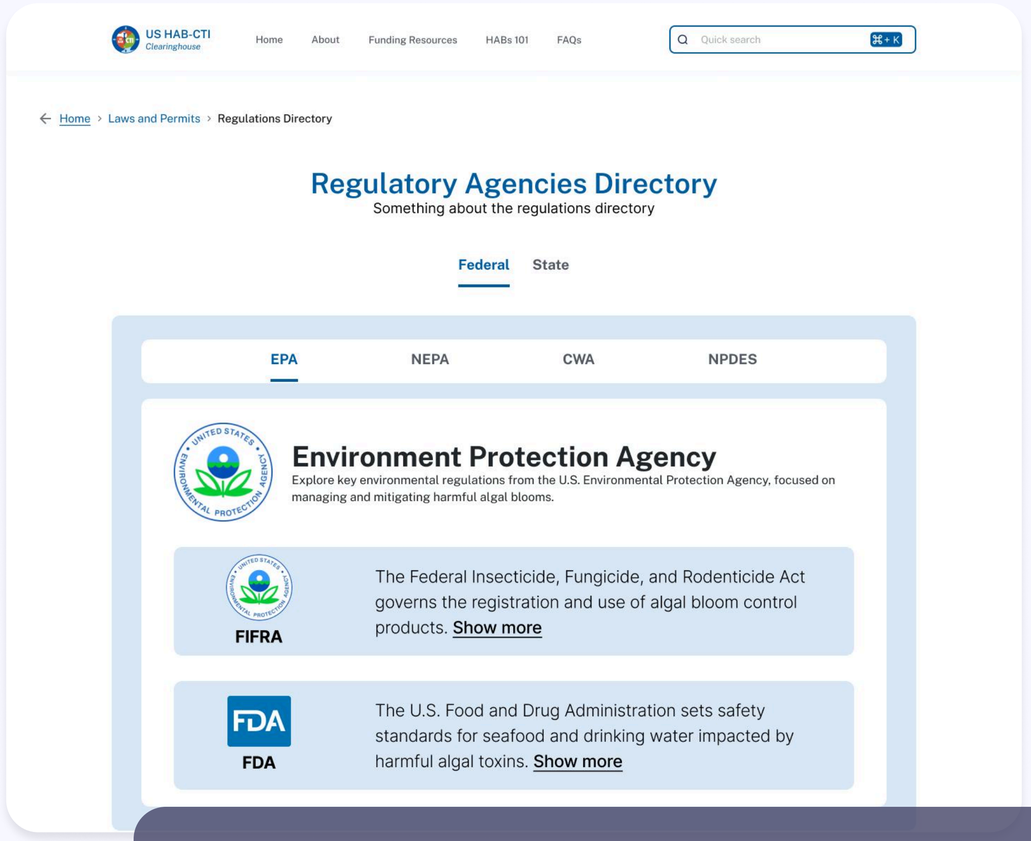
Advanced Search toggle was overlooked and unclear

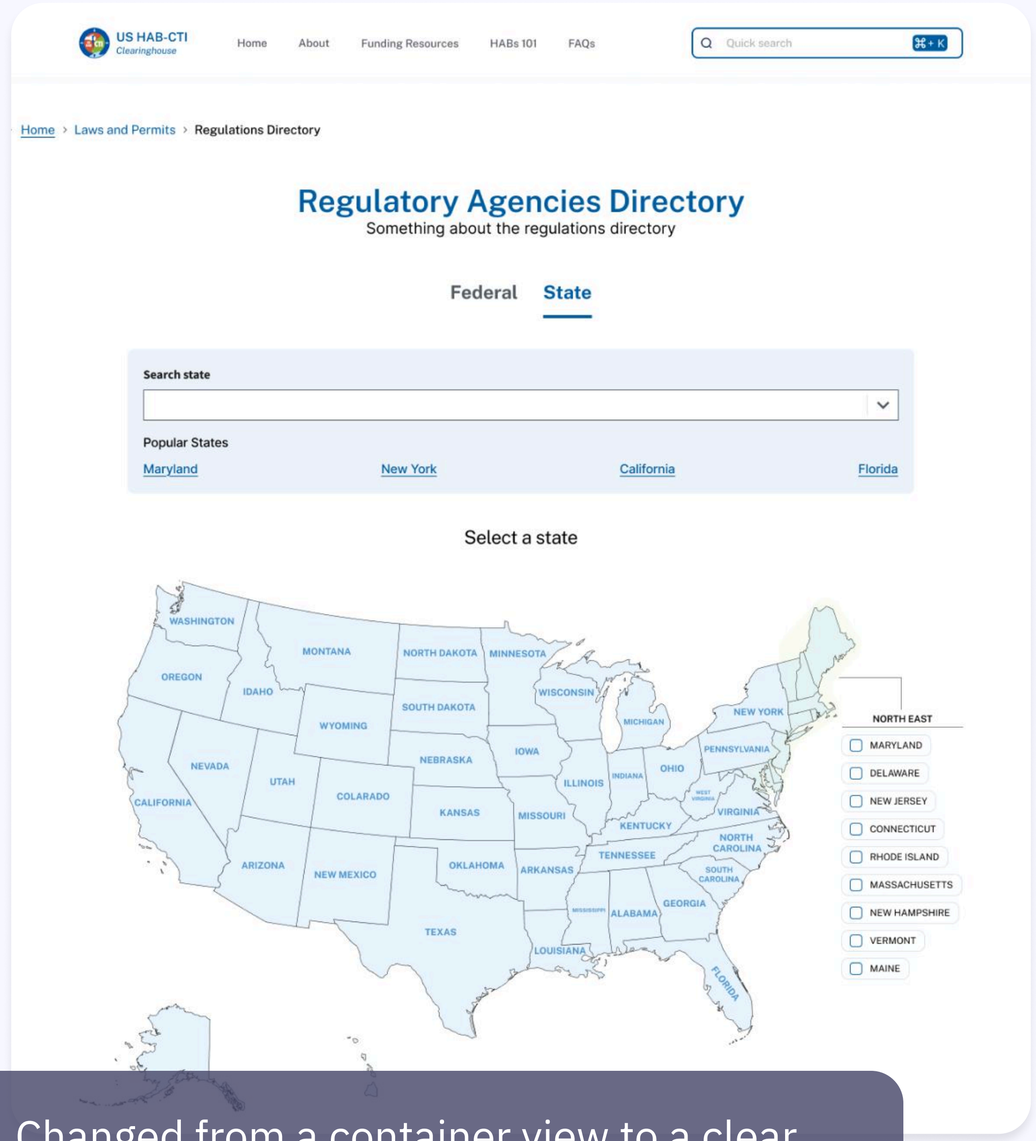


Replaced with upfront search filters beside the main search bar

Focus Areas

State-wise Permit Information (Try it here!)



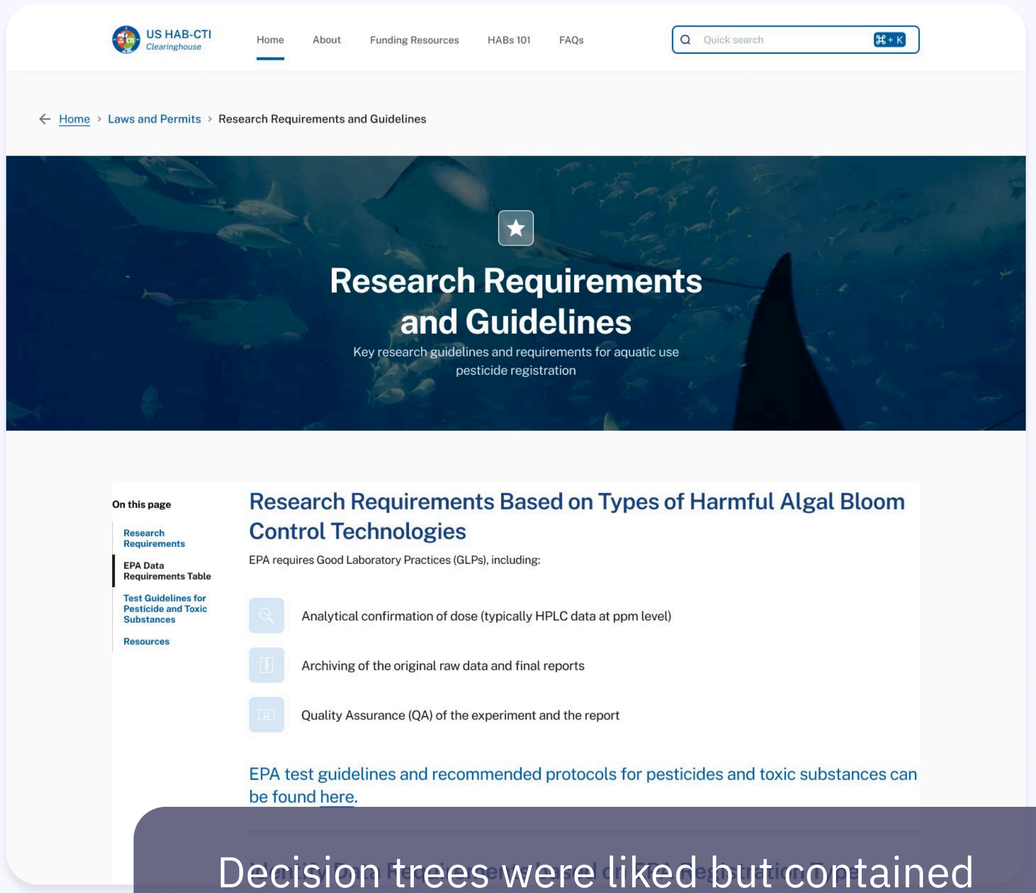


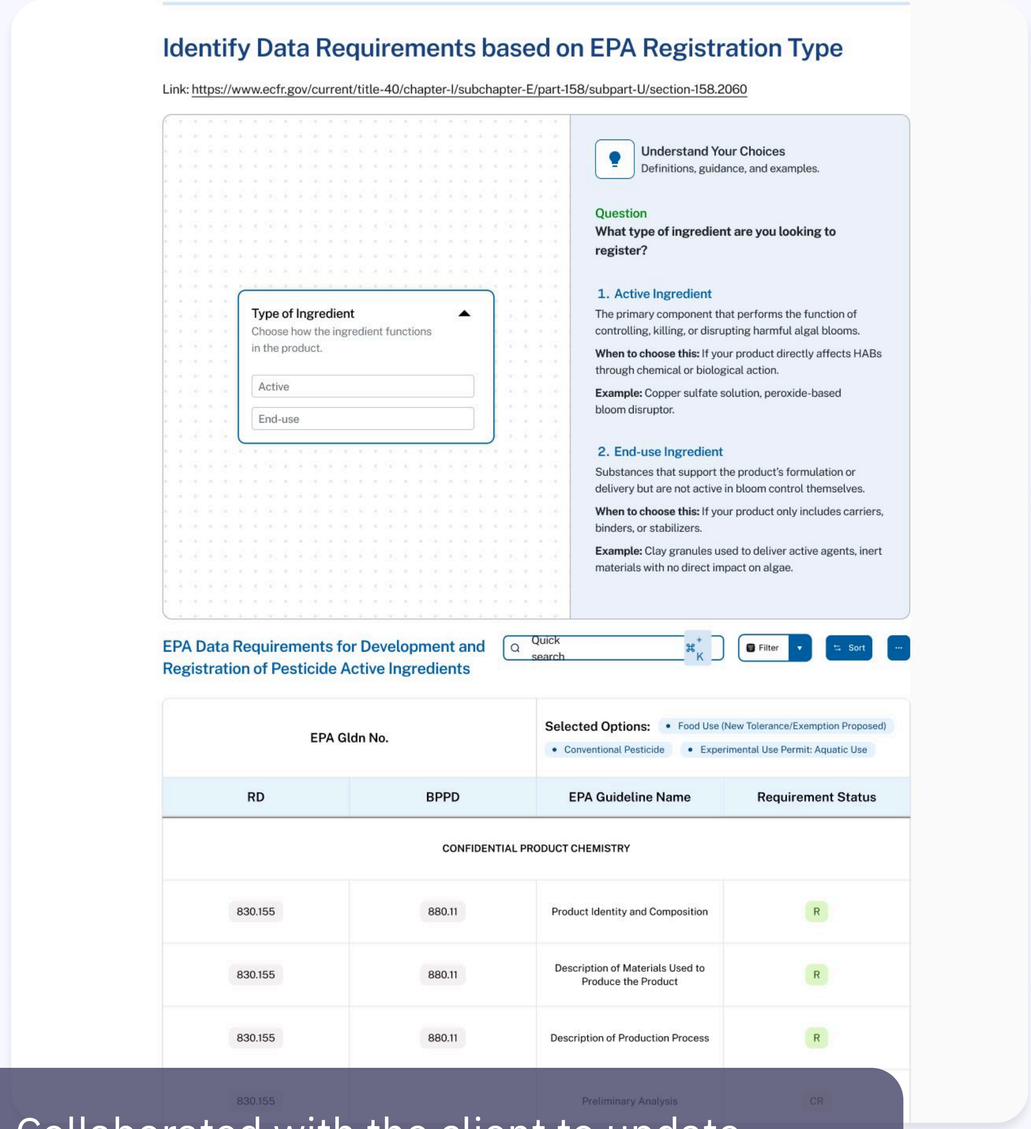
Interactive map worked, but users preferred tables

Changed from a container view to a clear, tabular format for better readability

Focus Areas

Decision Tree for Approval (Try it here!)





Decision trees were liked but contained inaccuracies

Collaborated with the client to update and validate the content

Impact

120+

Permits Repository

40% ▲

Task Success Rate

58% ▼

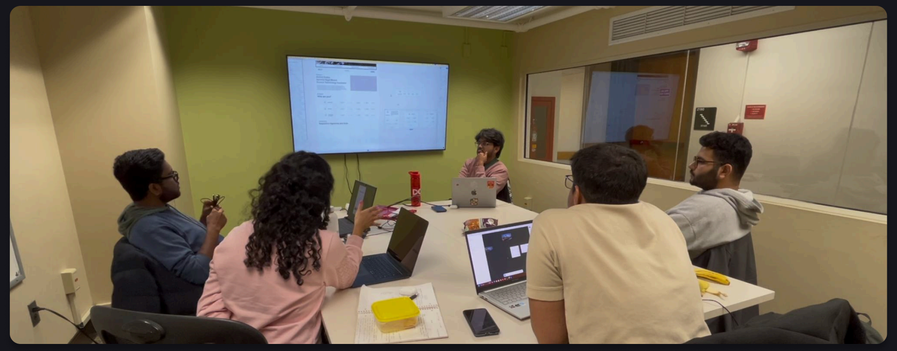
User Bounce Rate

30% ▼

Search Time

What worked!

Great teamwork! 🎉



- Agile-UX → ***5 Sprints***
- Co-designing Sessions
- Task Management
- Rapid Prototyping
- Content is KING!