



iDigBio Impact Evaluation



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This report was produced by Inform Evaluation & Research for iDigBio in April 2023.

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KEY TAKEAWAYS

iDigBio Impact Evaluation

iDigBio is seen as the clear leader in the biological specimens digitization effort in the U.S.

Interview and survey data suggest that without the efforts of iDigBio over the past decade, the U.S. digitization effort would be far behind where it is today. Respondents repeatedly noted that iDigBio has led the way in the United States for promoting and creating standards for digitization.



iDigBio is seen as the backbone organization for a thriving community focused on collections digitization.

In survey and interview data, a more robust and connected professional community was the most frequently cited benefit of engaging with iDigBio and the most frequently cited impact of iDigBio on the wider field.

iDigBio has vastly increased the accessibility of biological specimens data.

Researchers noted how there was now a “one stop shop” for biological specimens, whereas previously they would have needed to search for information in multiple places and travel to access collections data. As a result, researchers said they are now able to ask different kinds of questions simply because so much more data is now available.



Users see an important, continuing role for iDigBio.

Users were unified around one key message: iDigBio should continue to provide support and resources to the biological specimens collections community. They also said that the field and digitization efforts would be adversely affected if iDigBio were to cease or scale back operations.



Project Background

iDigBio is an NSF-supported project in which more than 130 million specimen records with more than 45 million associated media objects are made available in digitized format for the research community, government agencies, students, educators, and the general public. iDigBio also works with partners by providing training and support services, and with the public through community science initiatives. The project has previously benefited from evaluations led by an internal evaluator. However, after more than a decade of activities, iDigBio was interested in pursuing an impact evaluation led by an external firm. Inform Evaluation & Research designed and led an evaluation approach to better understand how adjacent professional communities have used iDigBio and what the overall impact of the project has been.

What Were We Trying to Learn?

Two overarching evaluation questions guided this project:

1. *What use and benefits has iDigBio provided to participating individuals and institutions?*
2. *What can iDigBio do to best position itself for future growth, sustainability, and impact?*

What Data Did We Collect?

Methods used for this evaluation are summarized in Table 1. Instruments used for data collection are included in [Appendix A](#). Institutional demographic data for survey respondents and interviewees is included in [Appendix B](#).

Table 1: Evaluation Methods Summary.

Method	Sample	Analysis
iDigBio community survey	n=221	Open coding for open-ended questions; descriptive statistics for closed-ended questions.
Semi-structured interviews (30 minutes each)	n=38	Open coding to identify emergent themes.

What Did We Learn?

In the rest of this report, we present findings that emerged from both data sources. The findings are divided into two sections: (1) findings related to use and benefits of iDigBio; and (2) findings related to future growth and sustainability.



Section 1: Use and Benefits Findings

Finding #1: iDigBio is seen as the clear leader in the biological specimens digitization effort in the U.S. and has a strong presence globally.

Interview and survey data suggest that without the efforts of iDigBio over the past decade, the U.S. digitization effort would be far behind where it is today. Respondents repeatedly noted that iDigBio has led the way in the United States for promoting and creating standards for digitization.

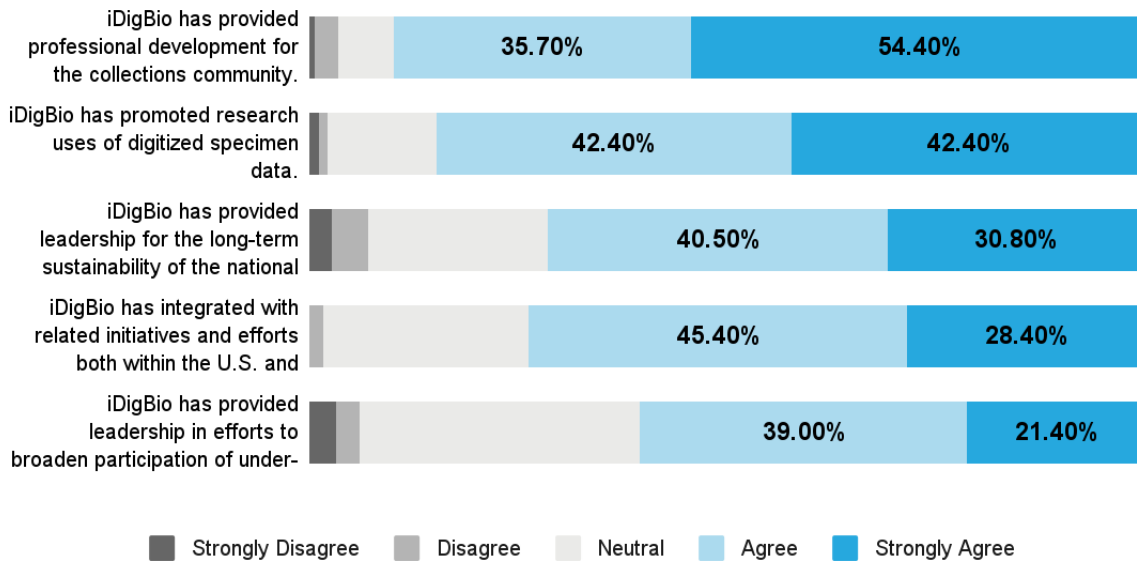
“I don’t think we would be where we are at all if they [iDigBio] hadn’t been there from the beginning. I’ve said that many times to many people. I just don’t know what any of this would have looked like without iDigBio. I don’t think it would exist not in this sort of cohesive context, where there’s this portal and there’s the Wiki pages. They worked really hard to keep everybody organized. They put a lot of time and effort into that.”

“[Without iDigBio] I think we would’ve kept moving towards digitization, but it would’ve been more fragmented and happened a lot more slowly.”

“I would say they [iDigBio] really have mobilized digitization in a way that we never would have. This is true of any field, but we all operate in silos, and they’ve really kind of created a network, and created the tools and community to move forward and make collections accessible.”

Critical to this impact has been wide uptake of iDigBio training, professional development and networking opportunities. (See Figure 1.) On an agreement scale from strongly disagree (1) to strongly agree (5), 90% (n=164) respondents agreed that iDigBio has provided professional development for this community, and 85% (n=154) respondents agreed that iDigBio promoted research uses.

Figure 1: iDigBio has bolstered professional development within the collections community and expanded research uses of digitized data. (n=182)



These offerings have enabled and empowered collections professionals and researchers to take advantage of iDigBio tools, advance digitization at their own institutions, and use digitized collections in their research and teaching.

“I think taking that class [public participation in the digitization of biodiversity collections] was really helpful because I was able to put together a whole project proposal in a matter of several weeks, and I probably wouldn’t have done that otherwise had I not been prompted to by the teachers of that class. And my institution and my department, we do serve collections data to iDigBio as well. But for me personally, I think just learning more about different crowdsourcing platforms and how to set up a crowdsourcing project, and what types of projects are out there was really helpful for my professional development.”

“Just by going to their meetings and discussions, I’ve learned so much about digitization in a way that you could never learn from a museum studies degree. For example, the Museum Studies Masters or things that are out there, they don’t get into the level of how do you actually do this stuff? But the iDigBio resources have.”

“Whether it’s training and project management or training on communication or the more nuts and bolts sort of brick and mortar training on the technology, I feel like iDigBio has always been approachable and accessible. Sort of like ‘there’s no such thing as a dumb question’ kind of group.”

These efforts have also raised the profile of and built support for the collections community and digitization, in particular.

“I think they reach people who would otherwise not know about collections. That’s really important because that builds support for collections as a whole and digitization as a whole. Because now, we’re able to go to our administrators in the museum. We’re able to go to NSF and say, ‘Digitization is important.’”

“It’s helped my students form a new and greater appreciation for national history collections and their value and their uses.... It gives them a user-friendly interface for finding out information that wasn’t accessible before iDigBio.”

“They provide a website and information that’s available to people outside of the collections community, say administrators at universities and museums who are not intimately involved in collections. It’s a place they can go and understand more about what we do and how the information is important and used. So it’s sort of a go-to place for the non-expert to learn about it.”

“The name iDigBio carries a lot of weight. It’s something that broader communities, and administrators know who you’re talking about when you say iDigBio. As an example at my organization, I told you that we have these annual and quarterly reports that we use for all different kinds of things, tracking activity, but also letting donors know what we’re up to and for marketing purposes and all of that. We received some money for our operating budget each year from the county because the county’s collections are in our care, even though we’re not a county employee. But when we receive money, how much we get depends on how many visitors and contacts we have each year. We are able to include these sorts of virtual contacts. When folks download data that we have put up on Gevis and iDigBio, we get to report on those numbers. That’s how I use the website a lot now is I pull the data viewed versus data downloaded for the different collections.”

Finally, while iDigBio’s efforts have focused primarily on the United States, the data suggest that iDigBio’s impacts extend globally—again through setting standards for digitization and connecting the collections community.

“So apart from being curator in our collection, I’m also a board member of the [country] initiative to digitize natural history collections. And in these boards we discussed how we should set up this national initiative.... When we had to argue towards the government and towards external people, we always mentioned iDigBio as the example and the thing we want to reach as well in [country].... We just said, ‘Look at the U.S. They have iDigBio, and they paid so much, and they had great results.’ So iDigBio helped us to motivate external people to do the same in [country].”

Finding #2: iDigBio is seen as the backbone organization for a thriving collections community focused on the digitization of biological specimens.

In survey and interview data, a more robust and connected professional community was the most frequently cited benefit of engaging with iDigBio (Table 2) and the most frequently cited impact of iDigBio on the wider field (Table 3).

Table 2: Top five benefits of engaging with iDigBio (n=134)

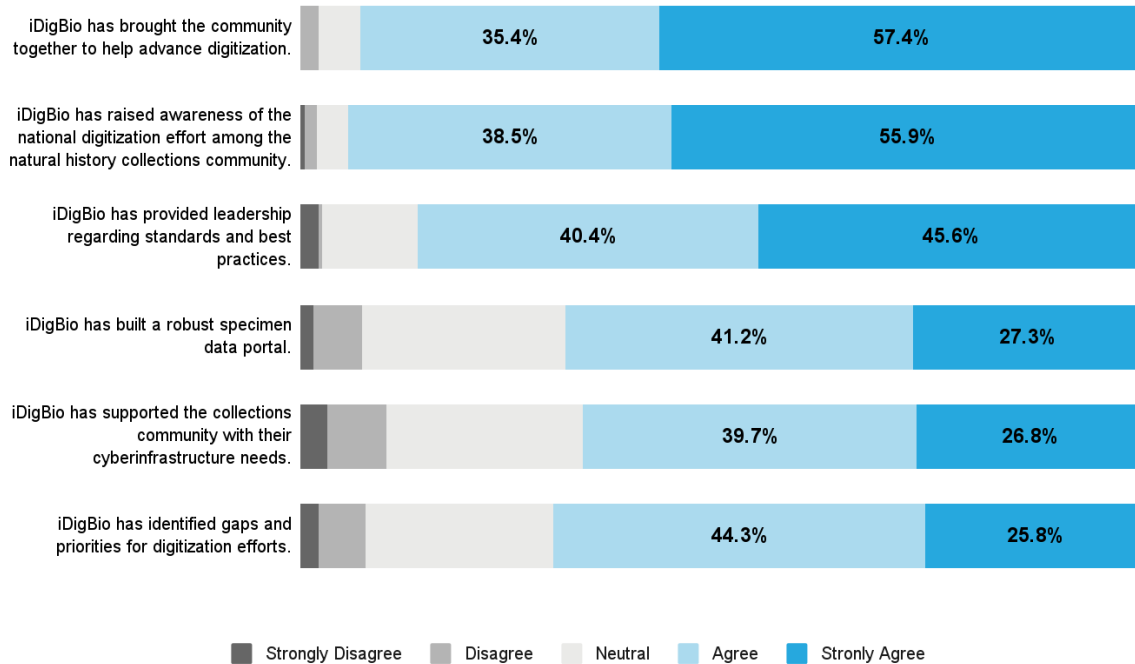
Value	n	%
Connecting to larger community	30	22%
Resources and tools for digitization	18	13%
Trainings and workshops	17	13%
Access to data	14	10%
Best practices for digitization	11	8%

Table 3: Top five impacts of iDigBio on wider field (n=139)

Value	n	%
Community building	36	26%
Trainings and workshops	28	20%
Building awareness of collections and digitization	28	20%
Accessibility of collections data	15	11%
Creating a platform/portal	11	8%

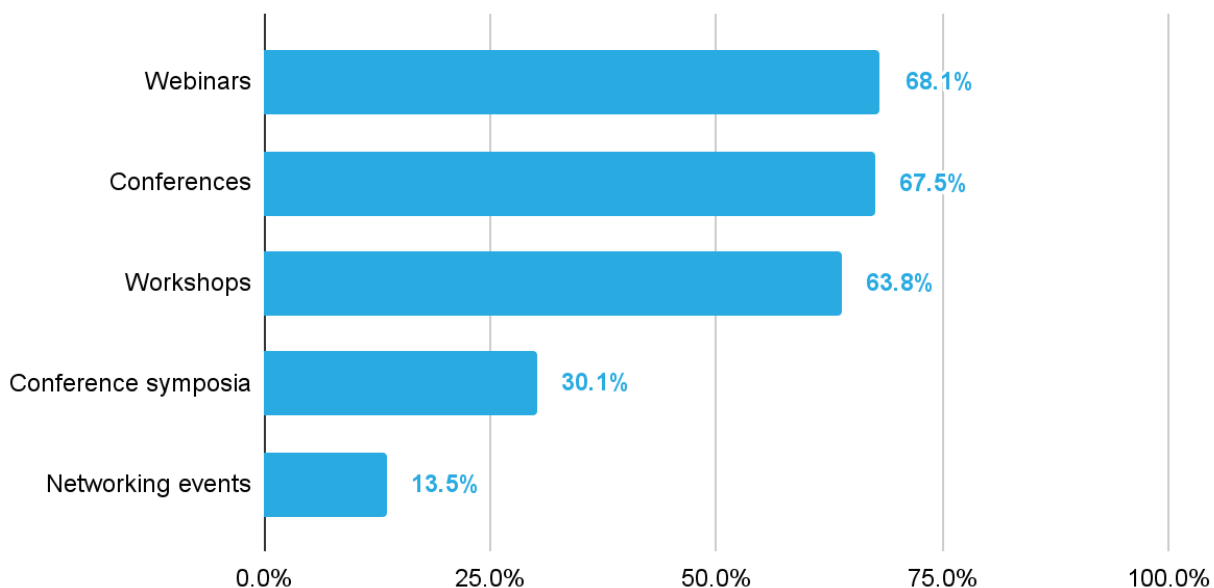
Additionally, more than 90% (n=176) of survey respondents agreed that iDigBio had successfully fostered a community in order to advance digitization and raise awareness of digitization efforts. (See Figure 2.)

Figure 2: Survey respondents overwhelmingly agreed that iDigBio had fostered a robust community to advance digitization (n=195).



Formal community building mechanisms such as large-scale events, workshops, and funding opportunities were instrumental to these benefits and impacts. For example, two-thirds of survey respondents had participated in an iDigBio event or conference. (See Figure 3).

Figure 3: Two-thirds of respondents had participated in iDigBio webinars, conferences and workshops. (n=163)



These events, in turn, enabled participants to meet new colleagues and continue to reconnect with other professionals at subsequent events over the years.

“I think the strength has been creating a community of people for me, rather than the actual output and website and data platform. So it’s been a way to make sure that this small group of people is coming together every year, multiple times a year to be the backbone of all these other digitization grants and support them. And so in that way, from my perspective and the data I use and the stuff I do, it’s been creating community that has been the biggest thing.”

“We’ve been able to connect with other collections and institutions and see how they do things, and compare and contrast how we do things and they do things.... It also elevates the status of our institution being able to publish all of our data to iDigBio and making it available to the community. So all of those kinds of things have certainly elevated the way that we interact with the community and the kinds of things that we can do.”

“[Without iDigBio’s focus on community], it would just be everybody trying to put their data in GBIF, but there’s no community engagement around digitization around aggregating data or around doing research with museums, or doing outreach about museums and things like that. And I think it’s done such a good job of rallying people into using museums and participating in museum-based stuff that wouldn’t have happened without it.”

“I think the other thing for me is networking opportunities, so connections to other people and other kinds of collections who have overlapping challenges and concerns and needs. iDigBio is sort of the, I don’t know, the middle man to bring us all together. I wouldn’t even know some of these people. So iDigBio has really helped bring together a community of research collections that wouldn’t necessarily be as connected with each other if it weren’t for iDigBio.”

Interview respondents regularly called out individual connections and relationships that were established specifically because an iDigBio staff member facilitated an introduction.

“I was between undergrad and grad school. I was a little nervous to talk to these people who I’d heard of in the research community. But there were a few iDigBio staff members who came over for this event, and it was sort of almost magical the way that they were like, ‘Come over to our table at the social and meet all these top people in your field,’ and made it feel very natural, especially for someone who’s an early career researcher. So I think that they’re really good at bringing people into the fold, so to speak, and making connections happen that otherwise may not have happened.”

Survey and interview respondents also highlighted how iDigBio had actively worked to build cross-disciplinary connections and break down silos.

“One of the things that has generally been true is that the plant people know the plant people, the fish people know the fish people, the butterfly people know the butterfly people, but what we didn’t know were each other.... And through iDigBio, we’ve been able to have a much broader dialogue bringing different types of collections professionals, staff and faculty together. So both across tasks of our jobs, but also across organisms. And so we realize we have a much bigger and much richer community than we ever knew before.”

“iDigBio has been very good at... promoting the interests of working like a community rather than working in silos. And I think that’s been one of the major benefits that iDigBio’s had is trying to get the community to think as one rather than many.”

“[iDigBio has] helped to bring collections-oriented staff, faculty, students, and postdocs together in ways that the community was never connected before. And so we’ve been able to be much more coherent and cohesive in making arguments for what’s needed for the future, for understanding what limitations and potentials might be. So we have this longstanding view that the collections community was not effective at speaking with one voice, that different parts of the community were saying different things. And so nobody was listening. And now, it’s still not totally solved, but we’re a much more unified community across different organizations, different organisms.... And I think it makes the collections community much stronger.... And nationally, the collections community is also seen as a vibrant and effective part of the biological sciences.”

Finally, iDigBio’s activities and resources have helped to cultivate the next generation of collections professionals through mentoring, research support, and even forging new career specializations.

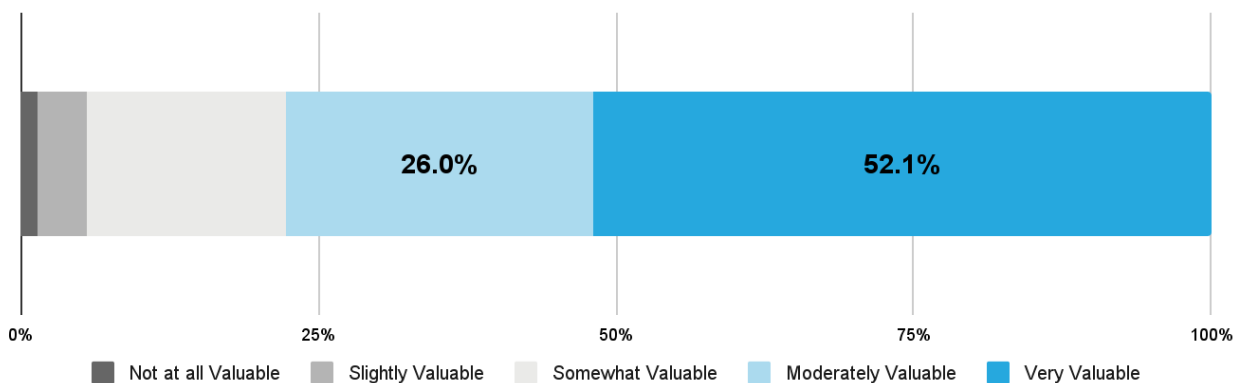
“I don’t know that I’d be here without having worked with the iDigBio team. They really helped me with confidence and project management and just a lot of really, really useful discussion over the years. It’s kind of evolved over time from more nuts and bolts digitization to how do you be successful running a large digitization project and how do you sustain that work once the funding is run out. I really appreciate that.”

“One of the things that has been really important about this professional community development is that, at least in paleo, it really engaged a lot of young women who were in positions where they do not normally have a lot of authority. Because a lot of museums are set up where there is a curator, usually male, and then there’s someone working in collections who’s usually female. And what became very clear as these iDigBio programs developed is that they did not care about the people who had status, they cared about the people who got things done. And so that created these networking opportunities for people who do not normally get to have them.”

Finding #3: iDigBio has vastly increased the accessibility of biological specimens data in the U.S. and globally.

By accelerating the pace of collections digitization, iDigBio has in turn made biological specimens data more accessible to researchers in the U.S. and around the world. For example, 57% (n=100) of survey respondents said they had used the digitized biodiversity data in iDigBio as part of their work, and of these, the vast majority (78%, n=75) said this data was valuable to their work. (See Figure 4.)

Figure 4: Three-quarters of respondents said that digitized biodiversity data in iDigBio was moderately or very valuable to their work. (n=96)



Researchers noted how there was now a “one stop shop” for biological specimens, whereas previously they would have needed to search for information in multiple places and travel to access collections data.

“One of the big benefits of iDigBio is making it possible for collections to get the material out where others can get at it without having to just necessarily visit the collection or ask what we might have, and then we’d have to provide what we have.... As a researcher, I now have access to essentially millions of specimens by just sitting in my chair and hitting the computer. And knowing where to go, I can get at a lot of material that I might not have even known it existed otherwise. And that’s been a huge benefit to, I think, researchers in a number of fields.”

“First of all, for the most part, the data would not have been digitized... And even if the specimens had been digitized, there wouldn’t have been any place for collections people to put the data other than perhaps in GBIF. And at the time when iDigBio started, GBIF didn’t take images. GBIF still doesn’t take some of the same fields that iDigBio has. So we can actually obtain, I would say, richer data in many cases, from iDigBio than from any other resources. So without... iDigBio specifically, I wouldn’t be able to access all of the data points that we actually use.”

“So when it comes to the research aspect, I know that when I look up specimens and collections as opposed to something like GBIF or another data aggregator, I know that every specimen is tied to an actual voucher that’s in a museum somewhere. And if I have any questions about it, I could always contact that museum or go to that museum and look at it.”

As a result, researchers said they are now able to ask different kinds of questions simply because so much more data is now available.

“So without iDigBio, a lot of really important questions can’t even begin to be addressed. The way that we think about diversity through time, so something lived at a certain place at a certain time, and we can track that information. If you are interested in species distribution on long time scales like hundreds of millions of years, the way to do it before was to go through papers and tally it up. And now you can extract mass amounts of information and do it really quickly.”

“There’s just nowhere else I can go to get specimen-based data. And for my line of work, that’s the gold standard, is a specimen. I wouldn’t be able to do the invasive species research project that I’m currently doing that will result in a peer-reviewed manuscript and is supporting undergraduate education research training. I wouldn’t be able to do that without iDigBio. We just don’t have a comprehensive-enough data set. We could cobble it together, but it would have been so hard.... To me, that’s what iDigBio allows you to... It makes certain research questions tractable.”

“We’ve been able to access many more specimen records from other places in the world. You can’t just start contacting your friends, other collections and say, ‘Could you please send me your database?’ Or something like that. It just wouldn’t work across a larger scale. So it’s allowed us to do some global analyses. It allowed us to do a comprehensive analysis of the plants of North America. So just things that we never could have done before.”

Smaller collections, oftentimes in far-flung locations, also noted that iDigBio has enabled more researchers to access their connections which would have been extremely costly previously.

“In the Herbarium community, some of the most interesting records are often in smaller collections, and many researchers never would’ve seen otherwise. And so if we can get access to some of those collections as well as the big places, it improves all of the resources for the field.”

“You have to justify the resources that go into maintaining a collection.... Usage is one way. So that’s a big thing, especially for smaller collections that aren’t well known. Like the American Museum of Natural History, everyone knows that one, everyone knows the Smithsonian. But these small collections are really important, especially if you want to do a regional study or really understand the range of a local species. And without iDigBio, people wouldn’t know they existed or wouldn’t know what we have.”

Additionally, increasing the accessibility of biological specimens has had a democratizing effect on the research/data community by removing barriers to who could access data and, in many cases, by “returning” data to global communities where specimens were originally collected.

“I think something too, that is really meaningful for me, is that we have a lot of collections that represent colonial interests of the United States in very specific ways. Our museum did research in Australia and in South America and in South Africa in the ’40s... Because of this, we have specimens that there’s no way a Brazilian researcher can readily come up here and visit. And so what’s really great is we’re starting to do 3D scans and CT scans of some of this data, and just putting it out there and making it available.”

Finding #4: iDigBio has set globally recognized standards and best practices for biological specimen digitization.

Survey and interview data strongly suggested that iDigBio’s workflows and best practices are now the standard for biological specimens digitization in the United States.

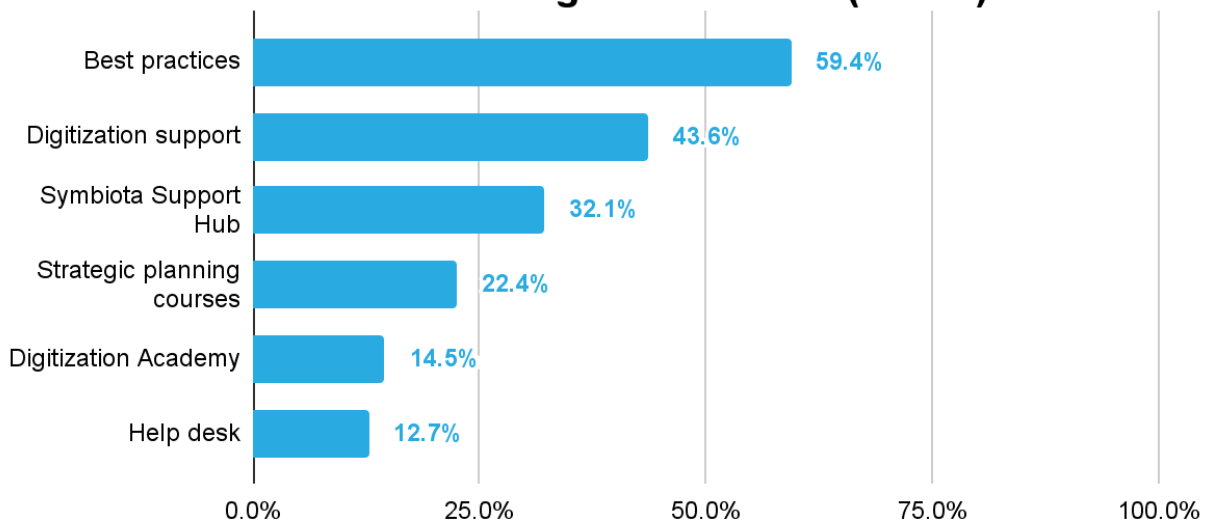
“I think the information that iDigBio provides to the collection management community in terms of those best practices and standards and workflows for a lot less reinvention of the wheel in terms of people can use those workflows and best practices to their advantage rather than having to start from scratch. And so a lot of those resources are extremely important to the collections community, and I think we would be a lot worse off if those resources were not there.”

“[Without iDigBio], it would be the Wild West. There’d be no rules, people would be doing things on their own. And what iDigBio has done is brought some order to the chaos and helped develop best practices and best principles for how to digitize and preserve digital assets, so that they’re preserved and discoverable.”

“Before iDigBio, digitization was happening very piecemeal across the collections community.... Now afterwards, it kind of makes sure that everyone is reaching some minimum standard as to how we digitize, make data available and also push the envelope as to the kinds of things that we were doing. Originally, we might have just been typing stuff into a computer and now we’re doing CT scanning and 3D imaging and all these other things in large coordinated efforts, where that probably would not have been possible without iDigBio.”

Additionally, best practice information and digitization support were the two most accessed iDigBio services, according to survey data. (See Figure 5.)

Figure 5: Best practices and digitization support were the most accessed iDigBio services. (n=165)



As noted earlier, smaller collections, in particular, may have benefited most from the vast resources iDigBio has created and made available. Without iDigBio, these collections simply would not have the capacity to create similar systems on their own (and therefore they would not be digitizing their collections to the same degree). Also noted earlier, the standards and best practices set by iDigBio have influenced global digitization systems. Researchers and collections managers in other countries point to iDigBio’s work as an exemplar when trying to build support and create systems for digitization within their own countries, governments or institutions.

Finding #5: Users typically accessed a variety of different iDigBio resources.

At the beginning of this evaluation, we hypothesized that we would be able to develop a set of iDigBio user “personas.” We imagined that users would fall into bounded categories such as “researcher,” “educator” or “collections manager.” However, the survey and interview data suggest a much fuzzier picture of the typical user. While individuals may rely on iDigBio heavily for research purposes, for example, they still frequently access other tools, events and resources provided by iDigBio. The iDigBio community appears to be clearly defined and targeted, and users see value in a range of resources no matter their primary professional roles and/or responsibilities.

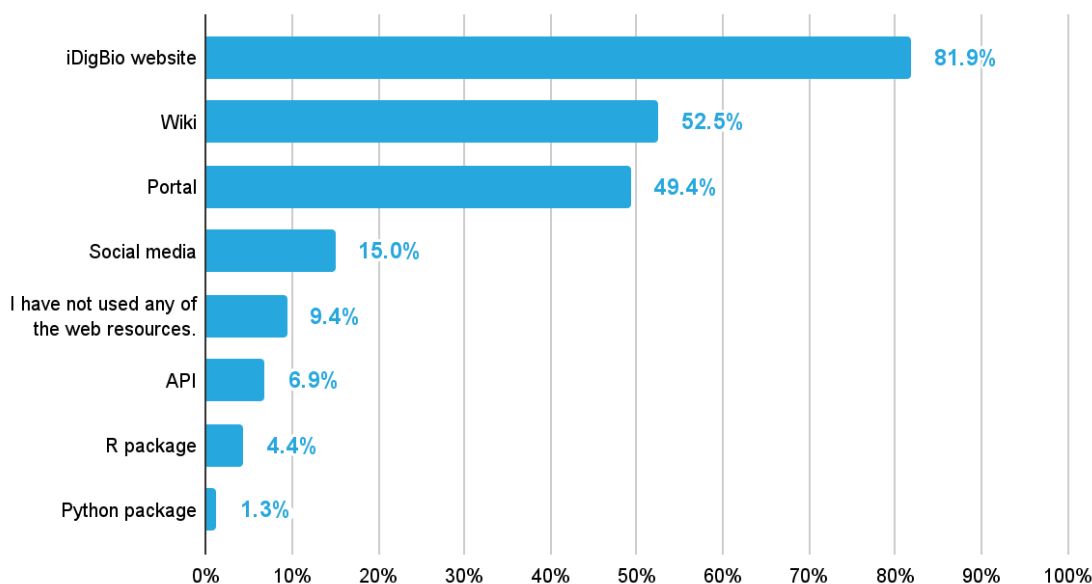
“It’s not actually using the data itself, it’s more about learning good practice. I have to say, I really highlight the Wiki pages that they do. The iDigBio Wiki, to me, is the most valuable part of the project. I would highlight, in particular, pages like geo-referencing, but everything, barcodes, all the different workflows and so forth. They’ve done, I think, a really good job in pulling together such valuable reference material.”

Across all users, events and training, as well as web resources, were the most heavily accessed resources. Table 4 summarizes the top five responses to an open-ended survey question about how respondents had used or interacted with iDigBio, while Figure 6 shows usage levels for iDigBio’s web and electronic resources.

Table 4: Top uses of/interactions with iDigBio (n=140)

Value	n	%
Courses, workshops, trainings, or webinars	69	49%
Conferences	36	26%
Portal and search functions	24	17%
Wiki	23	16%
Collections management	20	14%

Figure 6: A majority of respondents had used the iDigBio website and wiki. (n=160)



While the portal was a notable resource for some respondents, there were others who said specifically that they *did not* use the iDigBio portal and used other options instead.

“I think iDigBio needs to determine what it is really trying to achieve and cut the fat on things that are sucking up a lot of money but not being used by the community. Perhaps coordinate more with GBIF on a data portal? I don't know of too many people who use the iDigBio portal, to be honest.”

“I'm not sure why there is an iDigBio portal, when all specimens must go through GBIF first; the process for how records go from GBIF to iDigBio is still opaque to me (even though we have thousands of records that have made this journey, from our own internal database), and I'm not sure why resources are going to another portal when the GBIF portal is more user friendly. I wish iDigBio focused on the logistics and provided assistance with GBIF, documenting standards, rather than also managing an online portal.”

Finding #5: While iDigBio has created resources for education, it is less clear what impact those efforts have had.

More than half of survey respondents (56%, n=92) said they had not used iDigBio education, outreach, or DEAI initiatives such as WeDigBio, working groups and education module development. (See Figure 6.) In interviews, some respondents did cite use of iDigBio in their classrooms or curricula, but these references were outweighed heavily by research and

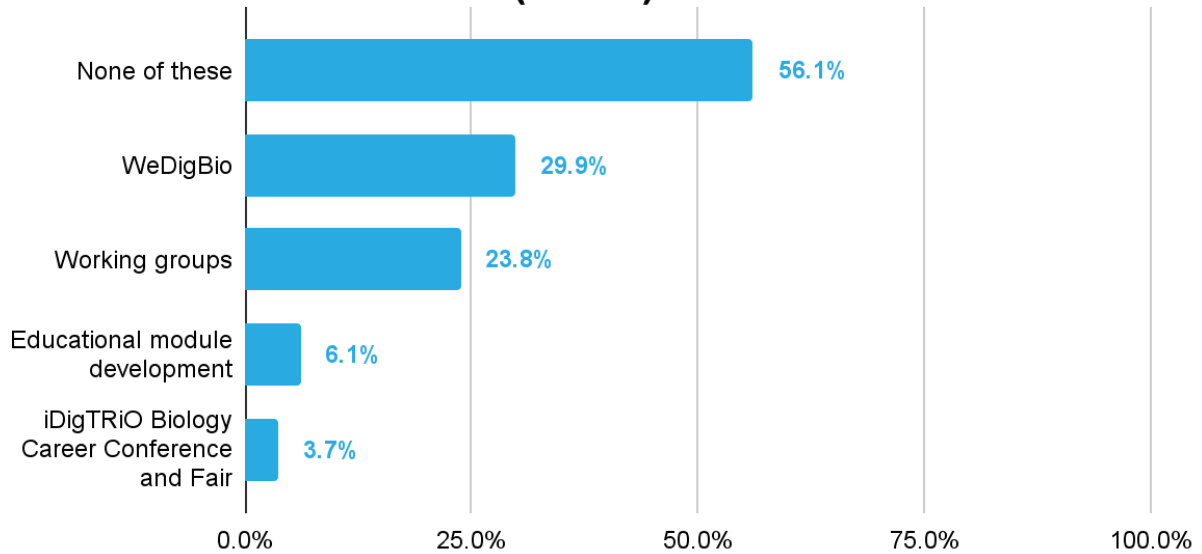
collections management uses. In the survey, for those who did use these resources, they said they brought value to their work by expanding or engaging new audiences.

“Participation in WeDigBio has helped us engage with the citizen scientist community in ways that we would not otherwise have been able to do. It has also allowed us to build stronger relationships with other institutions.”

“WeDigBio is an event that helps our institution feel like something bigger, and we have been able to recruit longer term volunteers from WeDigBio events.”

“They have helped me engage students in ways that get them to know about and excited about specimens and specimen digitization.”

Figure 7: More than half of respondents had not used iDigBio's education, outreach or DEAI programs/initiatives. (n=164)





Section 2: Future Growth and Impact Findings

Finding #7: Users see an important, continuing role for iDigBio.

Survey and interview respondents did not always have specific recommendations on the future *strategic* direction for iDigBio (though they did have more specific recommendations, detailed in a subsequent finding). However, they were unified around one key message: iDigBio should continue to provide support and resources to the biological specimens collections community. They also said that the field and digitization efforts would be adversely affected if iDigBio were to cease or scale back operations.

“I hope some things don’t stop getting done because maybe usage isn’t high. You could say that it’s all about impact, and if you are somebody who needs that resource and that’s the only place you’re going to get it, and that is the difference between you and things not working, things going away, saving a lot of time, then, man, if there’s funding, having all these resources available is super helpful.”

In the survey, respondents were asked in an open-ended question what were the most important iDigBio activities or services that should be continued. Overwhelmingly, the most frequent responses focused on events and training. (See Table 5.)

Table 5: Most important iDigBio activities to continue (n=131)

Value	n	%
Trainings and workshops	62	47%
Conference and meetings	17	13%
Portal	15	11%
Resources and Wiki	14	11%
Community building and communication	11	8%

No matter what iDigBio’s future looks like, however, community members said they wanted to be kept informed of what is being planned. Some interview respondents commented that they had noticed a shift in iDigBio’s presence more recently (e.g., appearing at fewer events). They said these changes might be a natural part of the project’s evolution, but they would like to know what to expect for the future.

Finding #8: Respondents recommended a host of actions or improvements for iDigBio to consider.

Interview and survey respondents generated a large number of recommendations for iDigBio to consider. Many of these were fine-grained, but could have tremendous value. [Appendix C](#) lists all recommendations made by iDigBio users. However, some of the higher-level themes that emerged from data analysis are summarized in Table 6.

Table 6: Summary of most frequent recommendations.

Recommendation	Representative Quotes
Focus on small collections	<p><i>“We would benefit from additional resources on how to get started with digitization for small museum collections, especially how to make assessments of which portions of the collection should be prioritized for sharing out via iDigBio.”</i></p> <p><i>“I think it’s been absolutely transformative and very impactful for iDigBio to have been around for so long.... There have been just enough people that have been talking about iDigBio for long enough that it’s trickled down to the harder-to-reach collections that are just a single faculty member doing this in their spare time as a service project for their department. So in order for those people that are doing this 5% effort to be able to leverage some of these resources, the approachability and knowledge of iDigBio and the network and resources that they provide need to be supported for a little bit longer so that they can trickle down.”</i></p>
Continue emphasis on interdisciplinary connections	<p><i>“A lot of times [the workshops] are themed, but they’re themed broadly. So there have been vertebrate specific workshops, but sometimes it’s just imaging fluid collections, and then you’re interacting with someone who manages insects or something that I would never really cross paths with. And I think that’s where great ideas are generated when you’re really getting that cross discipline perspective, and gleaning standards that different disciplines are using, and you can kind of borrow and exchange ideas.”</i></p> <p><i>“I’m always surprised at how few or how unknown iDigBio is to other biology groups outside of the collections community. I think iDigBio could be more beneficial if it somehow developed</i></p>

	<i>and implemented a plan to increase their visibility to just not the Natural History Collections group.”</i>
Bring more organization to the website and Wiki	<p><i>“I don’t think it’s a secret that it’s hard to find things on the website if you don’t know they’re there because it’s just got so much content.... It is a problem that I think is partly because you have to know a certain amount of the language to be able to search for things. And so for people who don’t know anything about the subject who are really just starting out, finding the information they want on the iDigBio website would be super challenging. And maybe there need to be some even more entry-level kinds of interfaces to let people know if you’re just starting out, here’s where you go.”</i></p> <p><i>“I think sometimes I just get really overwhelmed by the website. I know iDigBio is a big fan of Wiki pages and using Wiki pages for pretty much everything. And I feel like that works well for the most part, but sometimes it can be overwhelming or sometimes I feel like it’s just a little challenging to navigate the website, like where do I go to look for this certain thing.”</i></p>
Improve search and image functionality within the portal	<i>“Their data portal and their resources for access to data are probably not the best. Those could certainly be improved, but there are alternative ways to access data. We can go to GBIF and other networks for grabbing the data. Other than that, the data-serving aspect of iDigBio has probably been the only thing I would say has been less than stellar.... there are other alternatives like GBIF and so, whether or not that even needs to be iDigBio’s mission, I guess that’s a decision up to them, whether they want to continue data serving, if you will. Yeah, that’s up to them.</i>

Additionally, in response to an open-ended question, survey respondents (n=32) offered the following suggestions for improving web resources: improving navigation and search functions (n=13); keeping information and links up to date (n=7); creating a better portal interface (n=5); and metadata functions (n=5).

Finding #9: Target training opportunities for experienced *and* new users.

As highlighted multiple times in this report, training and professional development opportunities were highly valued. More experienced professionals, however, noted that there were fewer opportunities at their level and that training opportunities appeared to be in somewhat of a repeat cycle. These professionals were able to find additional valuable ways to continue engagement, but also wondered if there might be more targeted, advanced-level professional development they could take part in. Similarly, a number of interview respondents recommended creating an “iDigBio for Beginners” suite of resources and trainings, clearly marked and easily accessible. Newer users (including students) noted that they sometimes felt like they were behind much of the rest of the community and that it was sometimes difficult for them to “catch up.”

Finding #10: Funding and staff capacity were the biggest barriers to digitization going forward.

When asked in an open-ended question what their institutions needed to take their digitization efforts to the next level, survey respondents most often cited funding (40%, n=62) and staff capacity (40%, n=62). Other barriers such as training (n=9), workflow support (n=8), and administrative support (n=7) were cited by much smaller numbers.

“Funding for people. We have permanent staff with expertise, but not enough support staff to move forward at the pace we could with even small amounts of funding for digitization staff.... We are in good shape on digitization, we just need the people to get the work done.”

“We need a dedicated team at our museum responsible for data management and infrastructure. Right now, each collecting department (8) manages their own data as best they can. We need more collections staff who can help with digitization.”

Finding #11: While not a predominant theme, a few respondents raised concerns about staffing and turnover at iDigBio.

While not widespread, it is important to raise a few concerns that emerged in the evaluation data. A few interview respondents noted what they perceived to be substantial staff turnover at iDigBio in recent years. They were concerned about the loss of institutional knowledge given the tenure and “on-the-ground” nature of some of these positions.

“I know that... there have been some interpersonal and working barriers in terms of getting things done or even harboring negative feelings or not understanding what’s going on because the leaders are not on the ground floor with the actual staff helping coordinate events or organized data. So there’s a disconnect in what’s going on, which I think led to probably why a lot of people have left.”

“So I feel like the leadership at iDigBio in the past, there’s just too many cooks in the kitchen. There’s all these PIs. Some of them had varying different levels of involvement, and it kind of muddled up how people were able to push the boundaries to make things better. So a lot of the people working with education and outreach, people that weren’t PIs, but people working for iDigBio, would come up with all these really good ideas or really good plans, and it would just get stifled by the leadership, or the leadership would make certain judgment calls that, in my opinion, made things less amazing or whatever than they could have been.”

Another concern was raised by a few respondents who noted that the responsiveness of iDigBio staff to questions or requests had waned in recent years. One respondent even questioned whether they would continue to engage with iDigBio as a result.

“We’ve been waiting for three and a half, four years for them to actually update our museum information with multiple asks that they do it, and it’s not happening. So I really see a drop off in the collections commitment of iDigBio. And I think we actually have to seriously consider looking for another venue for public access to our data.”



Appendices

Appendix A: Evaluation Instruments

2022 iDigBio Community Survey

INTRODUCTION

iDigBio is interested in learning more about how you have used our services and any value you may have derived from those services. Feedback from you helps us better understand areas in which we need to improve and provides guidance on priorities and activities. Depending on your level of involvement with iDigBio, the survey should take about 10-15 minutes to complete. Your responses to this survey will be confidential. This survey is being administered by Inform Evaluation & Research, an external evaluation firm working on behalf of iDigBio. If you have questions about this survey, please contact Dr. Brian Johnson, brian@informeval.com.

SECTION ONE: ABOUT YOU AND YOUR INSTITUTION

iDigBio reaches a broad range of audiences. This first set of questions asks about your current roles and affiliations in relation to your interest in biodiversity, collections, and/or digitization.

1. Which of the following institution types best describes your primary affiliation?
 - a) A museum, herbarium, or similar collections-based organization
 - b) College or university academic department
 - c) Government agency
 - d) Nonprofit organization
 - e) K-12 institution
 - f) Other (please specify)

2. What is your **primary** role at your institution?
 - a) Manager or Director
 - b) Administration
 - c) Researcher
 - d) Faculty or Educator
 - e) Student
 - f) Volunteer
 - g) Other (please specify)

3. Which of the following collection types are you affiliated with? Check all that apply.
 - a) Algae
 - b) Animal recordings
 - c) Anthropology
 - d) Archeology

- e) Arthropods
- f) Invertebrates, terrestrial (other than arthropods and mollusks)
- g) Bryophytes
- h) Fungi including lichens
- i) Genetic resources
- j) Herpetology
- k) Ichthyology (fishes)
- l) Invertebrate Paleontology
- m) Malacology (mollusks)
- n) Mammalogy
- o) Marine invertebrates
- p) Minerals or Geology
- q) Mollusks
- r) Ornithology
- s) Paleobotany & Palynology
- t) Vascular plants
- u) Vertebrate paleontology)
- v) Other (please describe) _____
- w) I am not affiliated with a collection. (skip to Q5)

4. What is the size of your collection?
 - a) Less than 100,000 specimens
 - b) Between 100,000 and 500,000 specimens
 - c) Between 500,000 and 1,000,000 specimens
 - d) Between 1,00,000 and 5,000,000 specimens
 - e) More than 5 million specimens
 - f) Unsure

5. What does your organization need to move your digitization efforts to the next level? How might iDigBio help you accomplish this?

SECTION TWO: iDigBio OUTCOMES AND IMPACTS

The questions in this section ask you about your perception of iDigBio’s overall impacts on the collections and collections-based research communities.

6. To what extent do you agree or disagree with each of the following statements? [5-point scale, strongly disagree to strongly agree]

- a) iDigBio has raised awareness of the national digitization effort among the natural history collections community.
- b) iDigBio has brought the community together to help advance digitization.
- c) iDigBio has provided leadership regarding standards and best practices.
- d) iDigBio has identified gaps and priorities for digitization efforts.
- e) iDigBio has supported the collections community with their cyberinfrastructure needs.
- f) iDigBio has built a robust specimen data portal.
- g) iDigBio has provided professional development for the collections community.
- h) iDigBio has integrated with related initiatives and efforts both within the U.S. and internationally.
- i) iDigBio has promoted research uses of digitized specimen data.
- j) iDigBio has provided leadership for the long-term sustainability of the national digitization effort.
- k) iDigBio has provided leadership in efforts to broaden participation of under-represented groups.

- 7. From your perspective, in what area(s) has iDigBio achieved the greatest impact?
- 8. In what areas or ways could iDigBio have a greater impact?
- 9. In your opinion, what are iDigBio's most important activities that should be continued?

SECTION THREE: EXPERIENCE WITH IDIGBIO

In this section, we ask you to describe your previous experience and/or interactions with iDigBio.

- 10. How would you describe the ways you have interacted with iDigBio or used iDigBio's services, events, or resources?
- 11. What is the greatest value that iDigBio has brought to your work?
- 12. In what other ways has iDigBio been valuable to your work?

SECTION FOUR: RESEARCH

In this section, we ask questions about your use of the digitized biodiversity data in iDigBio.

- 13. Have you used the digitized biodiversity data in iDigBio as part of your work?
 - a) Yes
 - b) No [skip to Q18]
 - c) I don't know [skip to Q18]

14. In what ways have you used the digitized biodiversity data in iDigBio in your work?
15. How valuable have the digitized biodiversity data in iDigBio been to your work?
- a) Not at all valuable [skip to Q17]
 - b) Slightly valuable
 - c) Somewhat valuable
 - d) Moderately valuable
 - e) Very valuable
16. Please describe the ways that the digitized biodiversity data in iDigBio have been valuable to your work?
17. What, if anything, would have made the digitized biodiversity data in iDigBio more valuable to your work?

SECTION FIVE: SERVICES

In this section, we ask questions about your use of iDigBio's services.

18. Which of the following iDigBio services have you used? Check all that apply.
- a) Digitization support
 - b) Best practices
 - c) Symbiota Support Hub
 - d) Digitization Academy
 - e) Strategic planning courses
 - f) Help desk
 - g) I have not used any of these iDigBio services. [skip to Q20]
19. In what ways have you used iDigBio's services?
20. How valuable have iDigBio's services been to your work?
- a) Not at all valuable [skip to Q19]
 - b) Slightly valuable
 - c) Somewhat valuable
 - d) Moderately valuable
 - e) Very valuable
21. Please describe the ways that iDigBio's services have been valuable to your work?
22. What, if anything, would have made iDigBio's services more valuable to your work?

SECTION SIX: EDUCATION, OUTREACH, AND DEAI

In this section, we ask questions about your use of iDigBio's education, outreach, and DEAI programs and initiatives.

23. Which of the following iDigBio's education, outreach, or DEAI programs and initiatives have you engaged with? Check all that apply.
- a) iDigTRiO Biology Career Conference and Fair
 - b) WeDigBio
 - c) Working groups
 - d) Educational module development
 - e) I have not engaged with any of these programs/initiatives. [skip to Q25]
24. In what ways have you used iDigBio's education, outreach, or DEAI programs and initiatives in your work?
25. How valuable have iDigBio's education, outreach, or DEAI programs and initiatives been to your work?
- a) Not at all valuable [skip to Q24]
 - b) Slightly valuable
 - c) Somewhat valuable
 - d) Moderately valuable
 - e) Very valuable
26. Please describe the ways that iDigBio's education, outreach, or DEAI programs and initiatives have been valuable to your work?
27. What, if anything, would have made iDigBio's education, outreach, or DEAI programs and initiatives more valuable to your work?

SECTION SEVEN: EVENTS

In this section, we ask questions about your participation in iDigBio events.

28. Which of the following iDigBio events have you participated in? Check all that apply.
- a) Webinars
 - b) Workshops
 - c) Networking events
 - d) Conferences (e.g., Digital Data in Biodiversity Research Conference, Biodiversity Digitization Conference)
 - e) Conference symposia
 - f) I have not participated in any of these events. [skip to Q30]
29. In what ways have you used iDigBio's events in your work?

30. How valuable have iDigBio's events been to your work?

- a) Not at all valuable [skip to Q29]
- b) Slightly valuable
- c) Somewhat valuable
- d) Moderately valuable
- e) Very valuable

31. Please describe the ways that iDigBio's events have been valuable to your work?

32. What, if anything, would have made iDigBio's events more valuable to your work?

SECTION EIGHT: NETWORKS

33. Which of the following iDigBio networks have you been involved with? Check all that apply.

- a) Small Collections Network
- b) Paleo digitization working group
- c) EODI working group
- d) Workshop planning/organizing teams
- e) Other user group, interest group, or working group (please specify).
- f) I have not been involved in any of the networks. [skip to Q35]

34. In what ways have you used iDigBio's networks in your work?

35. How valuable have iDigBio's networks been to your work?

- a) Not at all valuable [skip to Q34]
- b) Slightly valuable
- c) Somewhat valuable
- d) Moderately valuable
- e) Very valuable

36. Please describe the ways that iDigBio's networks have been valuable to your work?

37. What, if anything, would have made iDigBio's networks more valuable to your work?

SECTION NINE: WEB RESOURCES

38. Which of the following iDigBio web resources have you used? Check all that apply.

- a) iDigBio website
- b) Wiki
- c) Portal
- d) API (Application Programming Interfaces)
- e) R package
- f) Python package

- g) Social media
- h) I have not used any of the web resources. [skip to Q40]

39. In what ways have you used iDigBio's web resources in your work?

40. How valuable have iDigBio's web resources been to your work?

- a) Not at all valuable [skip to Q39]
- b) Slightly valuable
- c) Somewhat valuable
- d) Moderately valuable
- e) Very valuable

41. Please describe the ways that iDigBio's web resources have been valuable to your work?

42. What, if anything, would have made iDigBio's web resources more valuable to your work?

SECTION TEN: OTHER RESOURCES OR SERVICES

43. Have you accessed any other iDigBio resources or services that we haven't asked about?

- a) Yes (please describe)
- b) No [skip to Q44]

44. In what ways have you used these other iDigBio resources or services?

45. Please describe the ways that these other iDigBio resources or services have been valuable to your work?

46. What, if anything, would have made these other iDigBio resources or services more valuable to your work?

SECTION ELEVEN: THANK YOU DRAWING

47. Would you like to be entered into a drawing for a \$200 electronic gift card?

- a) Yes
- b) No [skip to Q50]

48. Please provide your name and email address. We will notify you if you are a winner!

2022 iDigBio Interview Protocol

Introduction

Thank you for taking the time to meet with me about your use of iDigBio.

- My name is _____, and I'm an evaluator with Inform Evaluation & Research. We're working with iDigBio to carry out an impact evaluation of the project. We are specifically interested in understanding any value iDigBio has added to your work.
- If it's easier for you to reference, here is the link to the iDigBio website: [iDigBio Website](#)
- This interview will take no more than 30 minutes. Your participation is completely voluntary, and you may quit at any time.
- Your responses are confidential and anonymous, and will only be used by us for reporting purposes. We may use direct quotes in our reporting, but no identifying information will be shared.
- There are no explicit risks or benefits to engaging in the interview.
- I would like to record this interview. Afterward, the interview will be transcribed and the recording will be destroyed. Is it okay if I record this interview? (If no, interviewer will take as thorough notes as possible.)
- Any questions?
- Are you okay to proceed?

Questions

1. Tell me about how you have used or interacted with iDigBio?
 - a. Are there specific resources or events that you have used most?
 - b. Did you use iDigBio primarily for research, collections management, or education purposes, or something else?
2. What were you able to accomplish that you may not have been able to without iDigBio?
3. What is the most significant impact or influence that iDigBio has had on your work?
 - a. Why is this the most significant impact or influence?
 - b. What would have happened in this area without support from iDigBio?
4. What other benefits has iDigBio provided you and/or your institution?
 - a. Were there any benefits you were hoping to gain from iDigBio, but didn't?
5. From a recent survey we conducted, one of the benefits of iDigBio noted by respondents was a more connected professional community. If at all, how did iDigBio help you connect with others in your professional community?
 - a. How important have these professional community connections been to your work or institution?
 - b. How have these connections impacted your work and/or your institution?

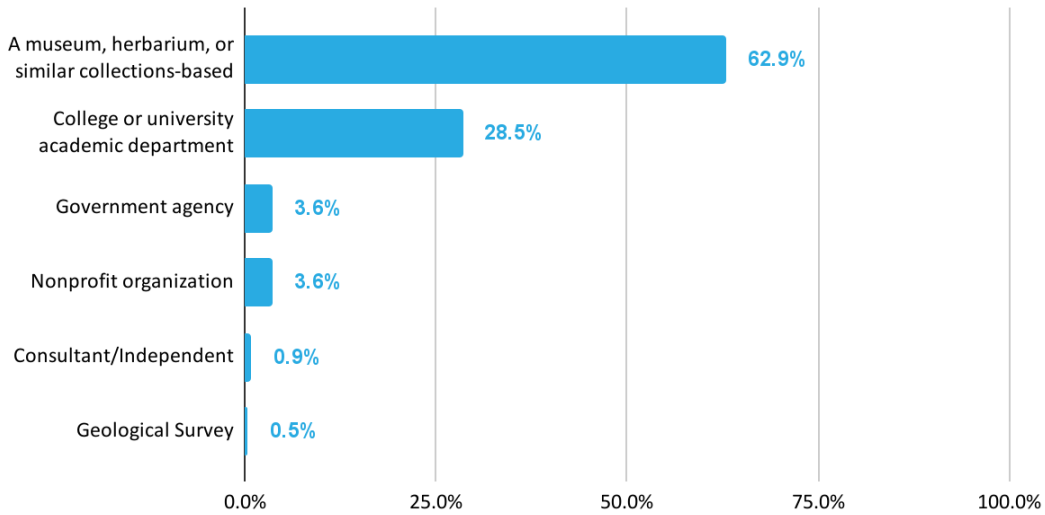
6. How would you describe the overall impacts of iDigBio in the wider professional community?
7. Did you encounter any barriers or problems when using or interacting with iDigBio?
 - a. What would you recommend to avoid this issue in the future?
8. What ideas or recommendations do you have for iDigBio to better serve you in the future?
 - a. What is the single most useful improvement that could be made to the iDigBio website or portal?
 - b. What is the single most useful improvement that could be made to the wiki?
 - c. Are there any events that you would like to see iDigBio offer?
 - d. Are there any other resources that iDigBio could provide to help you or your institution?
9. Is there anything else you'd like to tell me about your experience with iDigBio?

We will be sending you a \$10 gift card as a thank you for your time today. Is the email we have on file the best email to send that to? The e-gift card will be delivered from a service called Rewards Genius, and you will have the option to select a gift card from a wide range of companies. You will receive the email within the next two weeks.

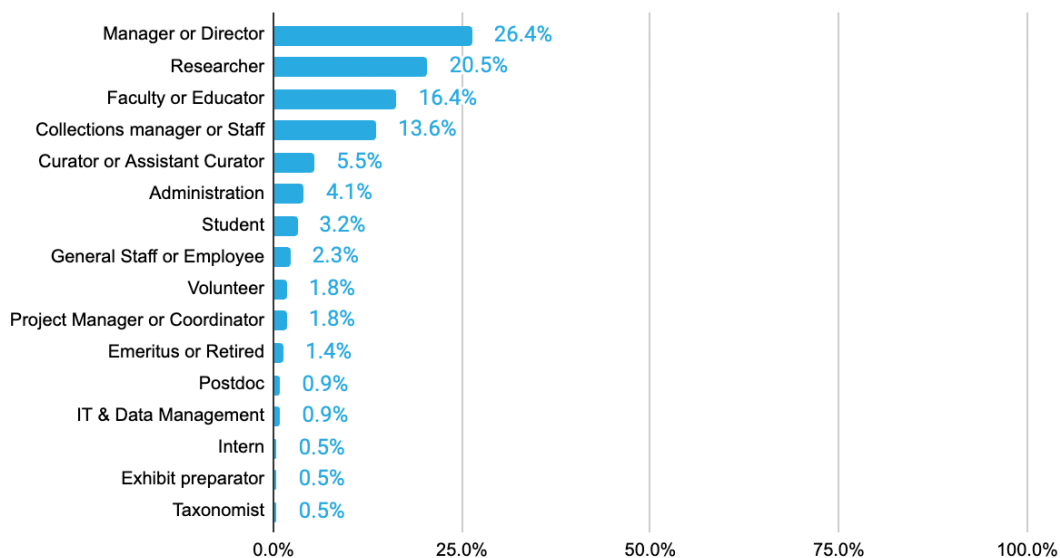
Appendix B: Sample Demographics

Survey Sample

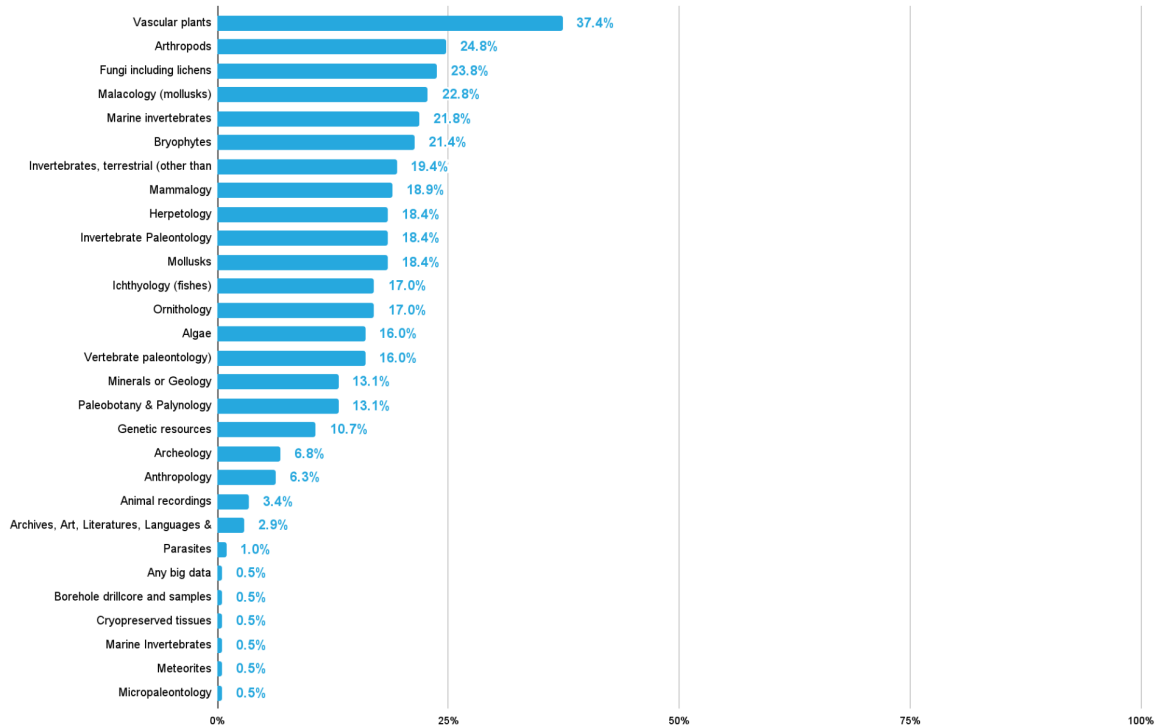
Which of the following institution types best describes your primary affiliation? (n=221)



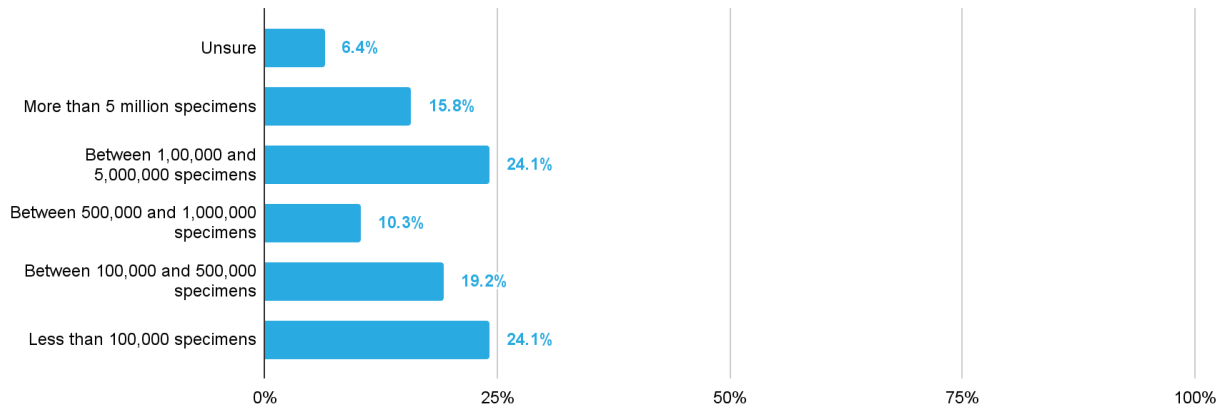
What is your primary role at your institution? (n=220)



Which of the following collection types are you affiliated with? Check all that apply. (n=206)



What is the size of your collection? (n=203)



Interview Sample

Table B1. Interviewee Institutional Affiliations (n=38)

Institution Type	n	%
A museum, herbarium, or similar collections-based organization	16	42%
College or university academic department	7	18%
Government agency holding biological research collections.	1	2%
Non profit organization	1	2%
Other	13	34%

Table B2. Interviewee Institutional Collection Size (n=38)

Collection Size	n	%
More than 5 million specimens	5	13%
Between 1,00,000 and 5,000,000 specimens	9	24%
Between 500,000 and 1,000,000 specimens	5	13%
Between 100,000 and 500,000 specimens	2	5%
Less than 100,000 specimens	4	10%
Unclassified	13	34%

Appendix C: Detailed List of Recommendations

Survey Recommendations

Raise Awareness

- Outreach to executive directors. Collections staff are already on board, but our bosses aren't convinced this is worthwhile. I know so many (especially small, non-profit) organizations where this is the case. We want to get to work on digitization but if the administration isn't convinced no time or funds will be allocated to these efforts.
- Incentives for the administration: to build digitization infrastructure, e.g., hiring data/bioinformatics staff as a condition to get more grants
- Making others aware of the impact of participation
- Perhaps more focus on broader impacts beyond the TCNs
- Working to get federal and state support to allow for greater public storage and access to archived images. iDigBio has cut off their curation support due to lack of funding.
- Long-term sustainability of digitization efforts. Once we are no longer funded to digitize (and thus lose grant staffing) it will be a challenge to continue to digitize all new acquisitions. Thus it would be good for iDigBio to reach out to museum administrators to lobby for increasing permanent staffing levels. We are ALL being asked to do more with less, which does not lead to sustainability of effort.
- Facilitating public outreach and citizen Science engagement
- More outreach to related work and those who do it
- More outreach to citizen science (school etc)
- Further highlighting research impacts from digitized collections
- Increasing the visibility and elevating the importance of natural history collections within institutions.
- Sharing and promoting the research use of digitization of collections, as well as how to better encourage and require researchers to cite and support the museums' who provide the data that they use.
- Sustainability of projects is a must, and I think it directly connects to institutional support. A proactive approach, such as an accreditation program, would go a long way to encouraging administrators to support the necessary IT needs for collections.

Digitization 101

- More user-friendly documentation, perhaps a "digitization for dummies" guide for those of us who are not data scientists. More outreach at meetings of collections professionals, e.g. Entomological Collections Network? Are small grants possible?
- Entry level training (virtual live and recorded videos) in the use of digitized collections records in research projects. This would greatly help expand the population of new users, including faculty, graduate students, and undergraduates.
- I think there's too much info and we could use some basics - like simple videos to explain to the public and to beginning students or people just entering the field. Its overwhelming.
- Making it easier for collections staff to understand how iDigBio, VertNet, and GBIF relate to each other, and how to share our digitized records with one or all of those.

- The website has almost too much information. It can be overwhelming for a new user. Some simplification would invite more participation.

Facilitator/Convener

- Taking less of a center stage role, and facilitating the adoption of digitization into the community in existing channels that already have long term sustainability, such as museums and societies.
- Advocating collaboration between institutions and calling for grant proposal with multi-institution participation
- Coordination of town halls and open forum settings to facilitate collaboration among potential organizers of collaborative proposal submissions to NSF.
- Collaborate with researchers, ask their needs, actually host the multimedia files on their hot storage
- Keep building on your role as a convener.
- I miss in person events and unexpected conversations with new people.
- Facilitate improvements in the Symbiota software in coordination with the Symbiota developer at ASU
- Create more "Happy Hour" like groups that meet at least once a month to work on "pressing" or challenging complications to collections work similar to the Paleo "Happy Hour" to continue not just teaching about digitization but working to "mutual" solutions that are cross-museums, cross-database manufactures and cross-disiplines...we need a facilitators to do this and iDigBio has been able to discover someone that can impact the community as a whole if they get involved in leading or assisting leaders in the community...continue finding them and elevating them and helping them reach other so that we all benefit.

Broaden Participation

- It could do more to promote diversity in the natural sciences.
- Inclusion of diverse/different kinds of institutions/collections
- Truly Broadening Participation in collections based research. Not just with including females, rural and low socioeconomic people but racial diversity looking at the statistics of who uses collections and who actually participates in iDigBio events.
- More funding for Under-privilaged students
- Incorporate more foreign data
- Integration of international efforts.
- I believe iDigBio could continue to engage both with collections in the US and also support work internationally to ensure participation is broadened to include under represented groups. For example reaching out to traditionally Black colleges in the States that have natural history collections, empowering everyone to reuse the data and images generated by digitisation to highlight historically overlooked contributors to natural history.
- Becoming more international
- Being international -- and this is an issue for many aggregators, possibly especially with language and custom differences.
- There has been a lot of emphasis on creating opportunities for smaller collections. It would be nice for iDigBio to do more with medium to larger collections.
- Working with smaller institutions and MSIs to actually help increase visibility and broaden participation.

Support

- Perhaps provide collections with an audit of their procedures? Take a look at how they are doing things now, and offer specific advice for improvement. Each museum is so different that often specific solutions are not offered at training events to keep the topics broad enough to meet everyone's needs. Yet, in many cases everyone's needs are very different.
- If they could provide a framework that requires institutions to support the digitization efforts and related research beyond the grant period. This is the biggest shortcoming of the program and why ultimately it will fail.
- Providing guidance to individual institutions' administrators to aid in augmenting digitization funding initiatives from non-NSF/non-traditional sources.
- Help to secure funding for additional digitization projects
- Channel more of their money and resources toward digitizing undigitized collections, rather than funding next steps for already digitized collections.
- Assist collections with interpretation of data flags, more like was done in the very first years when reports were sent from iDigBio to providers.
- Support and fund the digitization of smaller specimen collections.
- Support small collections by helping get their data into the portal. Most do not have the manpower or IT ability to handle the data migration however, if it is in excel perhaps someone could help transition it.
- Perhaps do the heavy lifting... data entry and georeferencing for small collections.
- Perhaps in helping small collections navigate basic logistics, such as, where can I host my images for free or low-cost? Things are in flux right now with CyVerse and Symbiota and it is a bit confusing for new users.
- Creation of opportunities for small-scale digitization projects that are outside an active TCN (but which may augment older TCNs or RCNs). Right now, IMLS is really the only place to go for those.
- Continued training for institutional staff on digitization and mobilization. Often smaller institutions have staff that are curators but not experts on these workflows. As a result they don't always know how to navigate issues that arise. Trainings are helpful but sometimes even these are overly technical. It can feel intimidating to ask questions of technical staff when one does not feel like they can even use the proper terminology to communicate their issue. So, continued training at all levels of user knowledge and experience would be great.

Portal Improvements

- The main data portal is not dynamic and seems to lack in purpose, direction and communications thereof.
- The idigbio portal is not that good and should be abandoned in lue of other networks that are thriving, like SeiNet.
- I'm not sure why there is an iDigBio portal, when all specimens must go through GBIF first; the process for how records go from GBIF to iDigBio is still opaque to me (even though we have thousands of records that have made this journey, from our own internal database) and I'm not sure why resources are going to another portal when the GBIF portal is more user friendly. I wish iDigBio focused on the logistics and provided assistance with GBIF, documenting standards rather than also managing an online portal. why does iDigBio keep a separate set of collections/institutions when GBIF

already does this? it feels like a waste of time for a small unit like mine to have to check data in both places

- I have heard some researchers complain that the data portal doesn't provide the data in ways that it is needed. Would also be helpful to have more support for helping small collections connect--almost like a circuit rider who could come out and advise. Sort of like the MAP/CAP programs that are available for museums.
- Better search functions in portal.
- A more user friendly search function within the specimen record portal.
- Search tool that is more easily refinable by category (mammal, invert, fossil, modern). Also a search tool that is good for kids
- Make searches more user friendly
- 1) Sustainability; and 2) improving the iDigBio portal user experience (I can't put my finger on it, but it feels "clunky").

Additional Features/Functions

- Could be a great platform to share 3D images of museum specimens
- Global alignment of aggregator infrastructure to simplify and standardize data publishing
- Cyberinfrastructure for and use/impact of collections is an area for continued growth. Gap identification is an important area to explore moving forward
- As an exhibitions person, I'm interested in exhibition uses of data, and think that could be impactful even if the main purpose is research focused. Exhibitions are a way to engage public support for research after all.
- Providing data back to data providers (eg. # of clicks on our data, connections created between specimens in different collections).
- iDigBio could definitely have a greater impact in genomics.
- Provide better ways to access images and associated data.
- Guides to DIY areas of digitization such as imaging solutions. Providing a resource linking to verified products or protocols for such projects all in one place.
- Providing detailed instructions on importing data
- Better integration with existing collections data portals / systems like Arctos, Specify, Emu.
- Make the linkages among database systems more seamless (GBIF, Sybiota, iDigBio, etc.)
- I realize protocols are not a one size fits all, but honestly utilizing pre-made protocols are most helpful and we could use more of them.
- Human Computer Interaction
- Support for online data delivery and downstream use.
- Include identity of floral resources with databased specimens.
- Request and share out an even wider variety of digitization resources created by the community (and iDigBio staff). For example, it doesn't seem like every TCN shares documentation via the iDigBio web pages and wikis. In some cases it would be helpful to divide workflows and guides into specimen types (plants, arthropods, other taxa).

Interviews

AI/Machine Learning

- With AI being such a big thing that's happening, they could do events related to maybe use of AI in collections or just training. How do you create a model and things like that, or how do you utilize existing resources? Like I said, those are things that are always changing and that's what I think iDigBio needs to do, is kind of stay current and whatever are the needs within the community, they identify and then they have outreach and training and that kind of facilities for it.
- The one thing we've been looking at is the use of artificial intelligence and machine learning. There's really a lot of scope there for what we could do in the future. I think, as a community, we are just sort of behind the curve a bit on that, and we really haven't figured it out. The good thing about all this artificial intelligence is you can do things in bulk. You can't do things in bulk at the moment with a lot of the way we keep images, because all the image collections all the way around North America, and in Europe, and stuff like this. Every institution has their images in a different place, and a different format, and a different structure separated from the data. We need to find ways to put these all together.

Website Improvements

- The website's really busy. It's a really busy website, there's a lot of stuff going on there. And even though I go to the portal not infrequently, I don't go super regularly. So when I get to the website, I have a moment of, "Right, how do I get to the portal?" So yeah, there's clearly a lot of important stuff on there, but it will take me a hot second to find it.
- I know some of the stuff is on the website, some of the stuff is on the Wiki, and it's sometimes difficult to navigate all of that material and find what you're looking for. So maybe some method of making it a little more, more navigable and a little easier to get to would probably be something that I would encourage.

Cross-Disciplinary

- A lot of times [the workshops] are themed, but they're themed broadly. So there have been vertebrate specific workshops, but sometimes it's just imaging fluid collections, and then you're interacting with someone who manages insects or something that I would never really cross paths with. And I think that's where great ideas are generated when you're really getting that cross discipline perspectives, and gleaning standards that different disciplines are using, and you can kind of borrow and exchange ideas.

Training

- Remembering that it's good to offer that basic training, especially for new people, but also people in really small institutions that don't have access to a lot of resources.
- I think we need an iDigBio for beginners from a user perspective as a researcher and then someone trying to give them data, so using the data and accessing the portal is one thing, which is super complicated in its own right, but then the sharing data is almost like a completely different topic because the audience is going to be totally different.

Additional Features/Functions

- I would really like to see some programming that is a little bit more Paleontology focused because we do have a different set of needs than you have in a herbarium or a natural history collection because we are functionally working with rocks, but not quite. And so I think that is something that would be, I would find really beneficial.
- One thing that I would really love is if they can make the maps even more editable. Say put up borders for states or geographical units or do weather maps. No, not really weather maps, that wouldn't really be useful, but here's a boreal zone and be able to map that on there. I need boreal area insects from North America and that sort of thing. I think right now it's really you're searching it from specific locality information, and I think a lot of researchers might actually find it useful to get, and I don't even know how feasible this would be, but the... The kind of environment that things are found in. This is a temperate Neotropical insects or Neotemperate and temperate insect, this is found in swamps. I want to find something that is found in bog areas.
- One of the most frustrating things with dealing with data that you can get from the portal is the fact that taxonomic names change over time. And so if there was some taxonomic backbone, or even when people submit data, there's like minor misspellings in the names. I think if there was something to flag that and then collapse it all to what it thinks the best match is, that'd be great. Doing that for not only names, but also the names of states. Because currently I think you have to search Pennsylvania spelled out, and then PA as well to make sure you get everything. So some sort of better query, smarter query to say, "Okay, when I type in Pennsylvania, I also mean things within PA, which are in the US."