Guana Estuary Data Dashboard Needs Assessment: Survey Results

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Final draft

Project: Using collaborative open science tools to improve engagement with the ecology of the Guana River Estuary

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The University of Florida and Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR) are partnering with the local community and broader science community to develop a web-based, public-facing, interactive dashboard to provide access to Guana Estuary datasets. The aim of this work is to support open science and to increase diverse engagement with the Guana Estuary within the GTMNERR by making the data available interactively, using visualization tools.

To this end, the project team sought feedback from those who have been involved with the Guana Estuary to help them to better understand their needs. This document summarizes the results of an online survey that was made available via email, social media, and QR code.

1. Response rate

We received responses from 51 individuals. Out of these, 14 surveys were unfinished. For this report, we also took the unfinished surveys into account. Most results are shown as percentages of respondents picking certain options or answers. Since the total number of responses varies, due to those unfinished surveys, all results show the total number of people (*N*) that answered a question with *N* =.

47 respondents filled in the survey based on a link received via email, 3 via social media, 0 via the QR code available at the GTMNERR Welcome Center, and 1 via the QR code available at the kiosk at the dam.

2. Introductory questions

The survey started with asking respondents about their connection to the Guana Estuary, how often they engage with the Guana Estuary, what data they would be interested in, and whether or not they ever accessed data associated with the Guana Estuary.

For the purposes of this project, and this survey, "Guana Estuary" refers to the Guana Lake and Guana River: the area north and south of the Guana Dam, from Micklers Road to the Tolomato River / intracoastal.

2.1 Guana Estuary connection

We asked respondents about their connection with the Guana Estuary. The figure below summarizes the responses, but note that people could pick more than 1 option. This is why the sum of all percentages adds up to more than 100%.

In total there were 111 connections chosen. E.g. a little over 60% of respondents do recreational activities at the Guana Estuary, and almost 50% collect data or use data for scientific purposes - and these choices are not mutually exclusive! Someone could collect data and *also* enjoy the Guana Estuary recreationally. Or volunteer and *also* use the Guana Estuary for educational purposes.
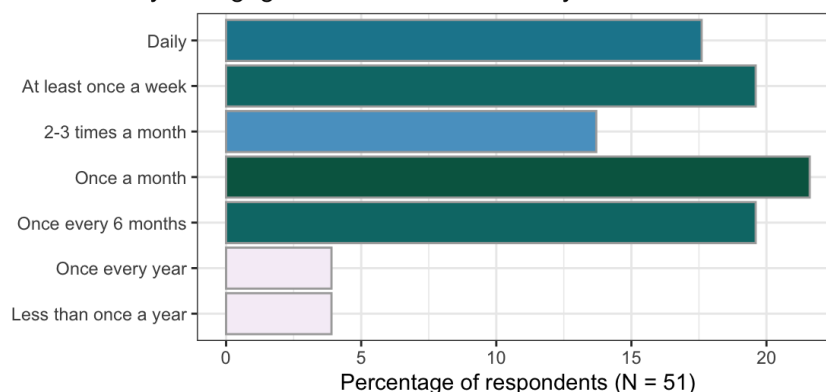

How are you connected to the Guana Estuary?
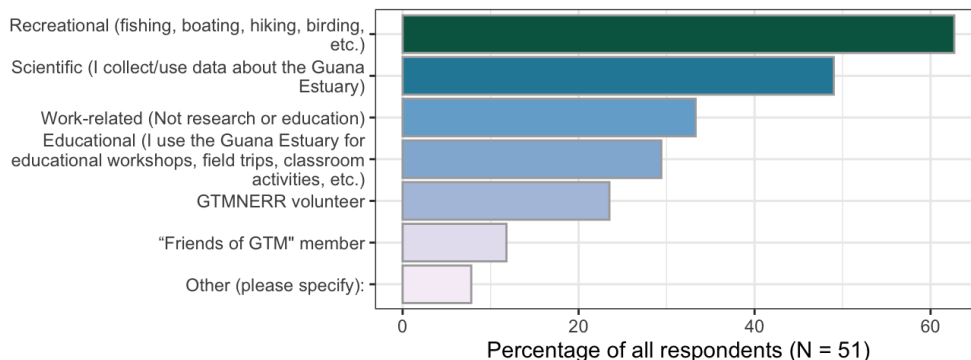
Under "Other", respondents answered:

- Lake management - FWC
- Health
- GTM-NERR MAG member
- Sometimes bring international visitors for professional conversations (am retired now).

2.2 Level of engagement

How often do you engage with the Guana Estuary?



Percentage of respondents (N = 51)

2.3 Data of interest (in general)

We asked respondents what Guana Estuary data they would be interested in, regardless of whether or not they currently have access to these data. Respondents were also asked to rank these datasets, with 1 being the data they are most interested in. They could pick as many or few as they wanted.

The figure below shows the percentage of respondents that picked a particular dataset being of interest to them. E.g. over 80% of respondents picked water quality data. The colors indicate how they ranked it: for instance, almost 40% of all respondents ranked water quality data as their number 1 dataset of interest.

What datasets are you interested in?
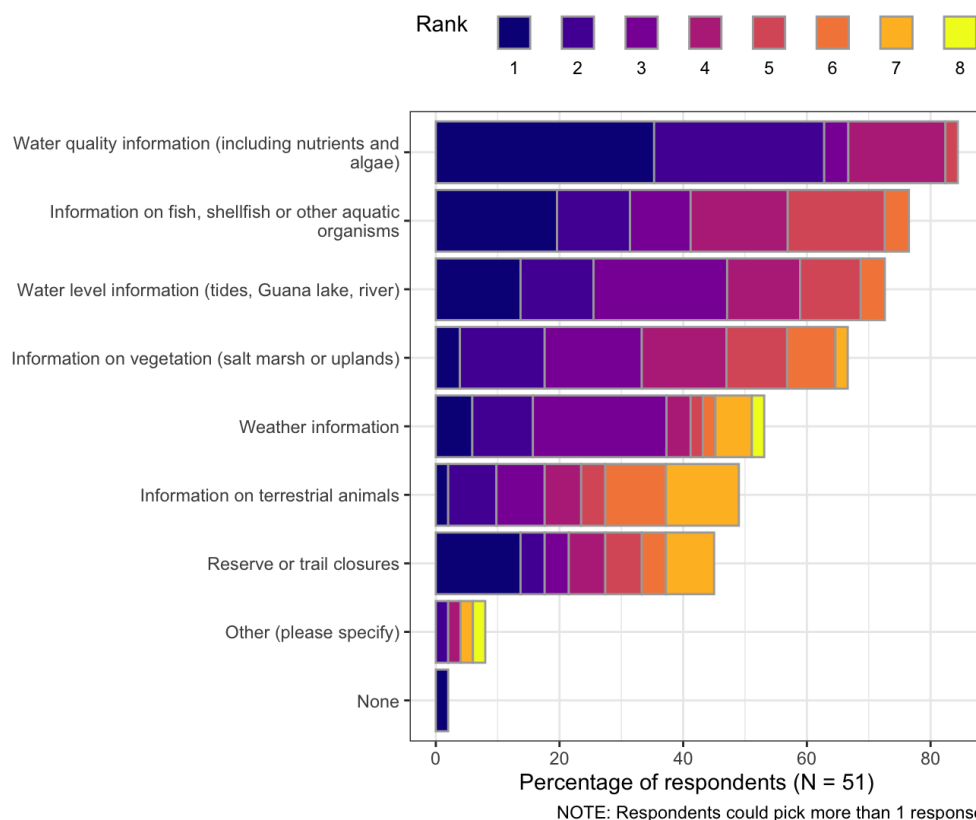
Percentage of respondents (N = 51)

NOTE: Respondents could pick more than 1 response

Under "Other", the 4 types of datasets mentioned were: **historical maps**, **water fowl**, **dam operations**, **natural resource management practices/techniques/results**.

2.4 Previous experience with accessing data associated with Guana Estuary

The survey asked respondents whether they had accessed data before, and by "data", we meant "information, especially facts or numbers, collected to be examined and considered and used to help decision-making; or information in an electronic form that can be stored and used by a computer" for instance spreadsheets, databases, graphs, and maps."

Have you accessed data before?
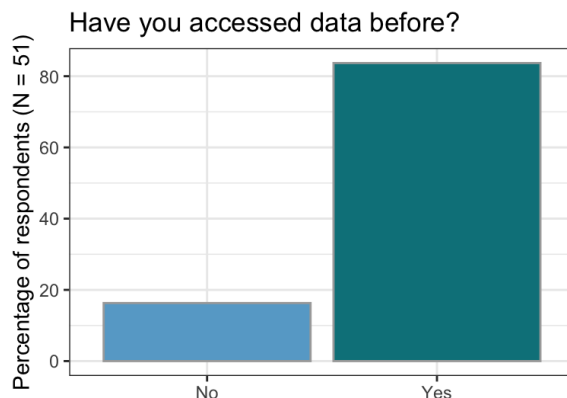
Based on their response whether or not they had accessed data, respondents answered different sets of questions. The results are summarized in the next two sections.


Take home messages

- The majority of respondents use the Guana Estuary recreationally (62.7%) and almost half (49%) collect or use data for scientific purposes. In third and fourth place are other work-related and educational connections (resp. 33.3% and 29.4%).
- Engagement with the Guana Estuary is mostly once a month (21.6% of respondents), with a tie (19.6%) for once a week and once every 6 months. Daily engagement was indicated by 17.6% of respondents.
- The top 4 datasets of interest, chosen by more than 60% of the respondents, are: water quality information, information on shellfish, fish and other aquatic organisms, water level information, and information on vegetation.
- The majority of respondents (83.7%) has accessed data before.

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3. Feedback from respondents that had not accessed data before

For respondents that had not (yet) accessed data (N = 8), the figure below summarizes their answers from section 2.3 (datasets of interest). In this figure, the datasets are ordered according to their average ranking, once again 1 being the dataset of most interest.

This paints an interesting picture, as, for instance, water quality data were picked by most respondents, but in terms of average ranking it comes in 4th (3rd) place. Only one person responded they were not interested in any data ("None"), hence this item ranks first, as the average of 1 is 1… We can essentially disregard this item. The 3 datasets that have rankings between 2 and 3 are water level information, reserve or trail closures, and water quality information. However, information on vegetation, and information on fish, shellfish and other aquatic organisms was also picked by more than 60% (5 respondents) - but it was ranked lower on average.

What datasets are you interested in?

NOTE: Respondents could pick more than 1 response
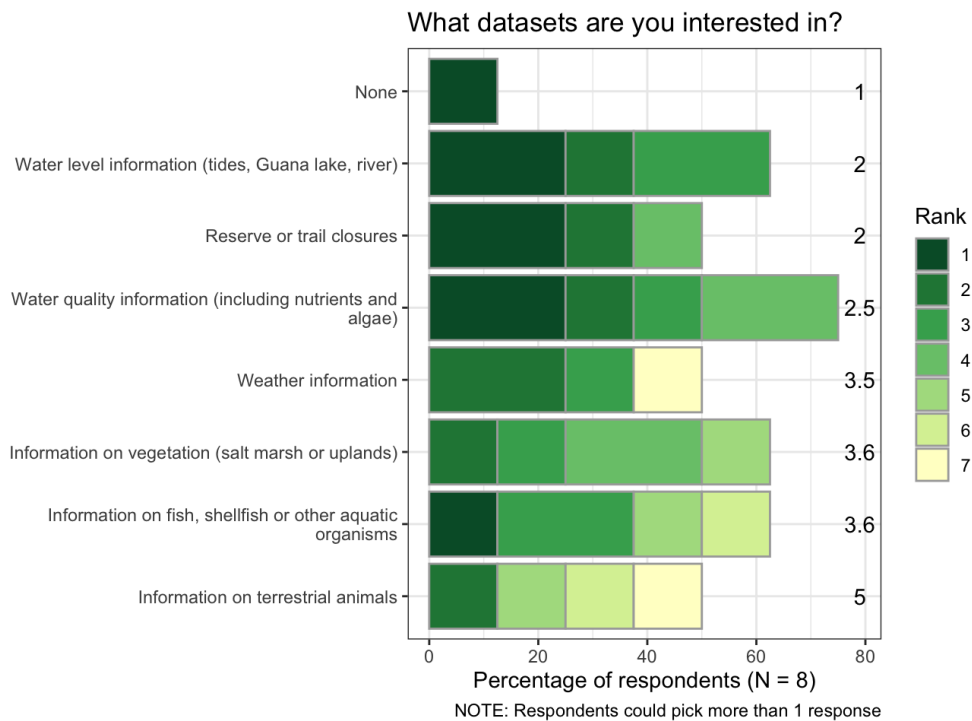
The survey asked these respondents broad questions on how often they would access these data, and what they would use them for.

The figure below shows that 25% (2 respondents) were not interested in accessing data, and that about half of the respondents would either access data either once a month or once a year (25% each).

If you had the opportunity to access data in the future, how often would you access or obtain these data?
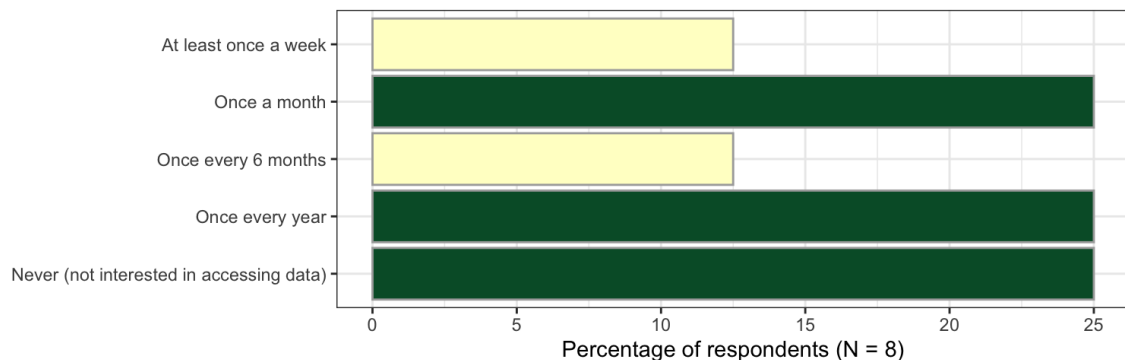
In terms of what people would use data for, the majority would use it for (non-research / non-educational) work-related purposes and decision making, as per the figure below. Also here, respondents could pick more than one answer, so the sum of all percentages is more than 100%.

If you had the opportunity to access data in the future, what would you use these data for?

NOTE: Respondents could pick more than 1 response
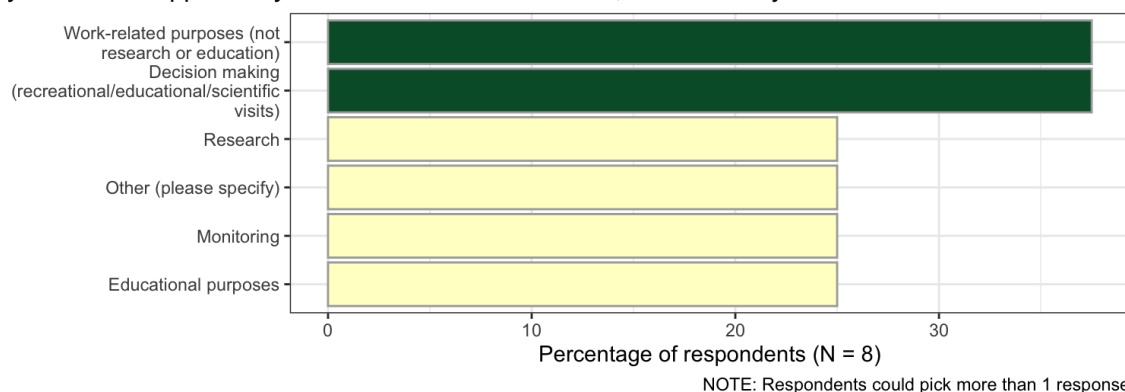
Under "Other", respondents listed **environmental impacts** and **resilience planning**.

4. Feedback from respondents that have accessed data before

For respondents that have accessed data before (N = 40), the figure below summarizes their answers from section 2.3 (datasets of interest - regardless of whether respondents can or have accessed these data). In this figure, the datasets are ordered according to their average ranking, once again 1 being the dataset of most interest.

The top 3 data of interest are water quality information, information on shellfish, fish and other aquatic organisms, and water level information: both in terms of average ranking and the percentage of respondents picking these. Interestingly, more than half the respondents chose weather information and vegetation information as data of interest, but their rankings are relatively low.
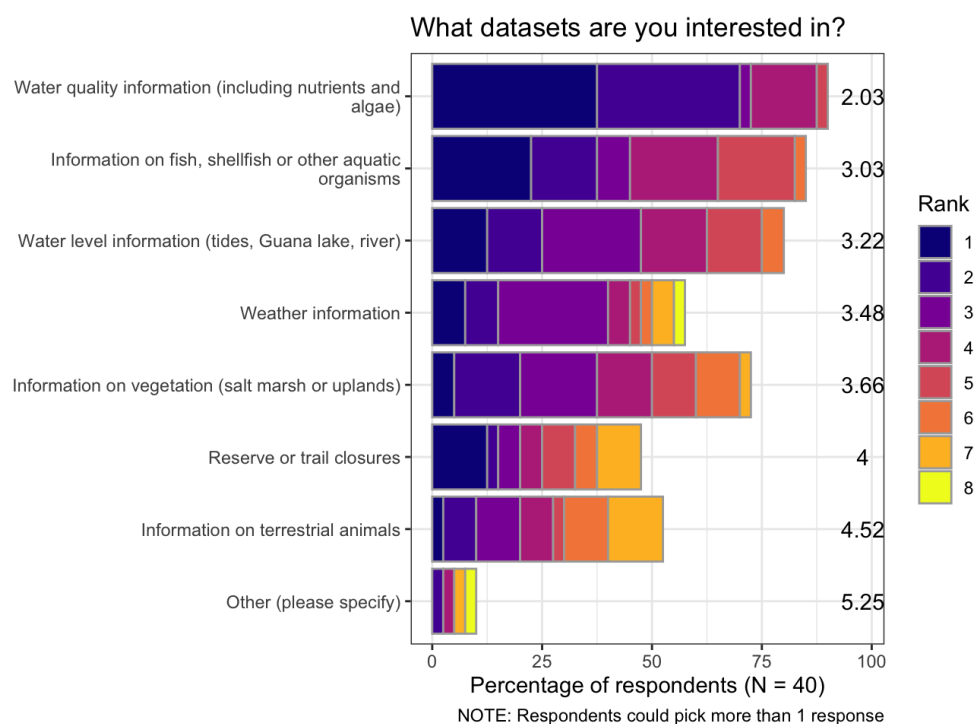
What datasets are you interested in?

NOTE: Respondents could pick more than 1 response

Under "Other", the 4 types of datasets mentioned were: **historical maps**, **water fowl**, **dam operations**, **natural resource management practices/techniques/results**.

In the section for respondents that have/had accessed data before, the survey asked which datasets they had accessed, and a number of detailed questions about their experiences related to how they accessed these data, the advantages and disadvantages of this access, the frequency of access, the usage of the data, and respondents' satisfaction with these data (for their needs).

What Guana Estuary data do you currently use, or have you used in the past?

Percentage of respondents (N = 40)

NOTE: Respondents could pick more than 1 response
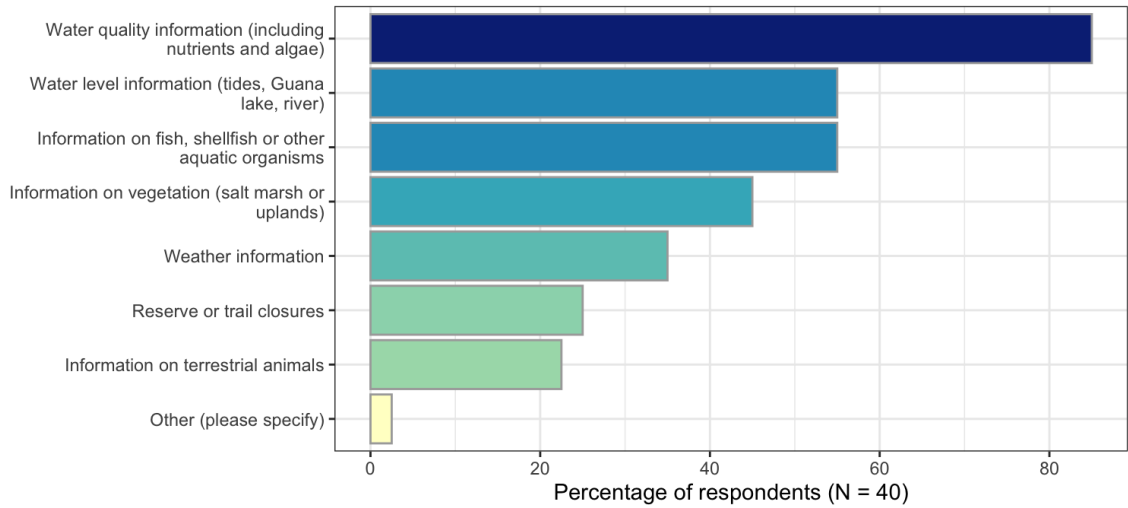
There was an option "Other", to which there was one response: **LiDAR data**.

When comparing the datasets respondents would like to access (regardless whether they can or have - section 2.3) and the datasets they have actually accessed, there is a clear discrepancy, see figure below.

Difference between the percentage of respondents that would like to access these data and those that actually have

While not mapped 1:1 for each respondent, from the figure it appears that for almost all data (aside from water quality information, and "Other") 22.5 - 30% of respondents have not accessed or are not accessing data they would like to access.

The following table summarizes the detailed questions per dataset. The numbers represent the percentage of respondents that chose that answer. Questions that allowed multiple answers are indicated in the table with an asterisk, * : these percentages can add up to more than 100%.

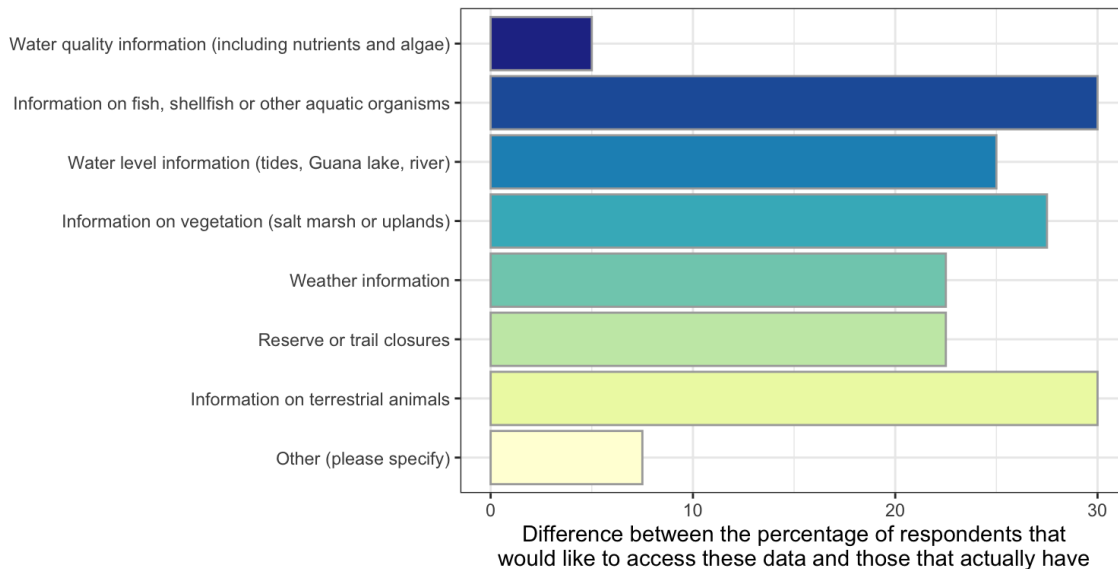***Re-assess colors? The black text on dark blue is not well-readable.***

Question	Water quality information (including nutrients and algae)	Information on fish, shellfish or other aquatic organisms	Water level information (tides, Guana lake, river)	Information on vegetation (salt marsh or uplands)	Weather information	Reserve or trail closures	Information on terrestrial animals	LiDAR
How do you most frequently obtain or access these data?								
Request from a GTMNERR staff member by email	54.8	55	40	42.9	0.0	22.2	28.6	0
Download from website (If so, what website?)	25.8	35	30	35.7	75.0	55.6	57.1	100

Question	Water quality information (including nutrients and algae)	Information on fish, shellfish or other aquatic organisms	Water level information (tides, Guana lake, river)	Information on vegetation (salt marsh or uplands)	Weather information	Reserve or trail closures	Information on terrestrial animals	LiDAR
Other (please specify)	19.4	10	30	21.4	25.0	11.1	14.3	0
Pick-up paper copy in person	0.0	0	0	0.0	0.0	11.1	0.0	0
What are the advantages of this primary method of accessing or obtaining these data?*								
Easy/convenient to access	61.3	60	65	71.4	75.0	55.6	57.1	100
The format the data are delivered / accessed in is useful	41.9	55	40	35.7	33.3	22.2	42.9	100
Data is received quickly after request	32.3	45	25	21.4	16.7	33.3	0.0	0
Requesting the data is quick	32.3	30	20	21.4	33.3	22.2	28.6	100
There are no advantages	6.5	5	10	21.4	16.7	22.2	14.3	0
Other (please specify)	3.2	15	0	0.0	0.0	22.2	0.0	0
What are the disadvantages of the primary method of accessing or obtaining these data?*								
There are no disadvantages	45.2	45	40	42.9	41.7	66.7	28.6	100
Other (please specify)	29.0	20	20	21.4	33.3	33.3	42.9	0
The format the data are delivered / accessed in is not user-friendly	12.9	15	15	21.4	8.3	0.0	0.0	0
Time consuming to request	12.9	15	10	14.3	8.3	0.0	42.9	0
Difficult/Complicated to access	9.7	15	10	14.3	25.0	11.1	14.3	0
Slow to receive	6.5	5	10	7.1	16.7	0.0	14.3	0
How often do/did you access or obtain these data?								
Daily	27.6	35	30	7.7	16.7	57.1	28.6	0
At least once a week	24.1	5	0	23.1	8.3	14.3	0.0	0
2-3 times a month	17.2	15	20	15.4	0.0	0.0	0.0	100
Once a month	17.2	20	20	23.1	50.0	14.3	42.9	0
Once every 6 months	10.3	20	5	23.1	8.3	0.0	14.3	0
Once every year	3.4	0	15	0.0	8.3	0.0	0.0	0
Less than once a year	0.0	5	10	7.7	8.3	14.3	14.3	0
What do you typically use these data for?*								
Research	58.6	65	55	46.2	50.0	28.6	28.6	100
Monitoring	27.6	25	15	23.1	8.3	14.3	42.9	0
Work-related purposes (not research or education)	27.6	25	30	30.8	50.0	14.3	28.6	0
Educational purposes	24.1	40	25	38.5	33.3	42.9	57.1	0
Decision making (for recreational/educational/scientific visits)	20.7	15	30	23.1	33.3	42.9	42.9	0
Other (please specify)	6.9	0	10	15.4	16.7	14.3	14.3	0
How well do these data generally satisfy your need(s)?								
Slightly well	41.4	45	55	46.2	25.0	28.6	42.9	0
Moderately well	41.4	35	25	53.8	41.7	57.1	14.3	100
Very well	13.8	15	15	0.0	25.0	0.0	28.6	0
Extremely well	3.4	5	5	0.0	8.3	14.3	14.3	0

Maybe also add colors to the headers in the tables below? Haven't been able to figure out how yet.

The tables below list the text answers that were provided by respondents to the "free text" questions above. These text answers are the original, unaltered responses.

The websites that respondents used to obtain data were:

Water quality information (including nutrients and algae)

swmp
GTMNERR.org
https://cdmo.baruch.sc.edu// (https://cdmo.baruch.sc.edu//)
CDMO
UF IFAS and FL DEP
https://www.st.nmfs.noaa.gov/copepod/time-series/us-60109-001/ (https://www.st.nmfs.noaa.gov/copepod/time-series/us-60109-001/)

Information on fish, shellfish or other aquatic organisms

>   SEACAR
>   swmp; seacar
>   UF IFAS and Florida DEP
>   inaturalist.org
>   SEACAR

Water level information (tides, Guana lake, river)

>   National Weather Service Tide Data
>   gtmnerr.org
>   CDMO
>   https://www.windfinder.com/tide/south_ponte_vedra_beach (https://www.windfinder.com/tide/south_ponte_vedra_beach)
>   https://www.surf-forecast.com/breaks/South-Ponte-Vedra-Beach/tides/latest (https://www.surf-forecast.com/breaks/South-Ponte-Vedra-Beach/tides/latest)

Information on vegetation (salt marsh or uplands)

>   SEACAR
>   GTMNERR.org
>   UF IFAS and FL DEP
>   inaturalist.org

Weather information

>   johnson county weather stations
>   weather.com
>   Research Reserve Website
>   https://cdmo.baruch.sc.edu// (https://cdmo.baruch.sc.edu//)
>   CDMO
>   https://www.weather.gov/jax/fire (https://www.weather.gov/jax/fire)
>   weather.gov
>   https://gtmnerr.org/research/weather-and-water-quality/ (https://gtmnerr.org/research/weather-and-water-quality/)

Reserve or trail closures

>   gtmnerr.org
>   GTM website
>   https://gtmnerr.org/visit/ (https://gtmnerr.org/visit/)
>   gtmnerr.org
>   GTM error

Information on terrestrial animals

>   Florida DEP
>   inaturalist.org
>   Park website, white papers/presentations and state of the reserve reporting

LiDAR

>   NOAA Digital Coast

The answers "CDMO" refer to the National Estuarine Research Reserve System Centralized Data Management Office: https://cdmo.baruch.sc.edu/ (https://cdmo.baruch.sc.edu/)

"SEACAR" is the Statewide Ecosystem Assessment of Coastal and Aquatic Resources by the Florida Department of Environmental Protection: https://data.florida-seacar.org/ (https://data.florida-seacar.org/)

"SWMP" is the NERR System-Wide Monitoring Program: https://coast.noaa.gov/digitalcoast/data/nerr.html (https://coast.noaa.gov/digitalcoast/data/nerr.html)

"Other" avenues for accessing data were:

Water quality information (including nutrients and algae)

>   get from GTM files (I am an employee)
>   View on website (no download)
>   Attending state of the reserve presentations.
>   FWC data
>   Spot monitoring of salinity each week
>   SWMP CDMO or email

Information on fish, shellfish or other aquatic organisms

>   FWC Data
>   State sites

Water level information (tides, Guana lake, river)

>   get from GTM servers (I am an employee)
>   FWC
>   call the Visitor center
>   NOAA
>   noaa tide charts, personal observation and study
>   Research

Information on vegetation (salt marsh or uplands)

FieldMaps, Survey123 apps using GTM Staff Access

Attending GTM info sessions or obtaining info from newsletter

Internal database

Weather information

Weather Channel App

Google

SWMP CDMO or email

Reserve or trail closures

I don't generally obtain data. I'm not sure this question makes sense to me

Information on terrestrial animals

Newsletter info or directly ask staff

Some of these answers could fall under the option "Websites", but without downloading. Some notable options for people to access data are: state of the preserve presentations, internal databases (for employees), FWC (data has to be requested from FWC, it is generally not available on websites), calling the Visitor Center, personal observations, and the newsletter.

Advantages listed by respondents under "Other" were: (link to main way of getting data?)

Water quality information (including nutrients and algae)

already have the data

Information on fish, shellfish or other aquatic organisms

one stop shop, right now data is across so many websites…

Done as part of oyster monitoring volunteering

already have data

Reserve or trail closures

It would be easier to go online and find out what's open or closed

na

Disdvantages listed by respondents under "Other" were: (link to main way of getting data?)

Water quality information (including nutrients and algae)

various formats

Not current; hard to find on website (although once found, easy to access)

Ths was a one-off special case

Only available when presented by the staff.

Not as accurate as other salinity measuring techniques

Website to download/access is cumbersome otherwise I'd do it myself. Want to make sure I am getting the latest data and I trust staff

easier if online

Lots of data, lots out of date, doesn't address current situation

Not all data is available on SWMP CDMO

Information on fish, shellfish or other aquatic organisms

Being a pain to the researchers

would be easier if online

Multiple sources required to find info

Would be nice to have a public database

Water level information (tides, Guana lake, river)

Not easy to view on mobile devices.

Not directly representative of the Guana System

Not familiar with how to access it on my own

Need to call during hours of operation

Information on vegetation (salt marsh or uplands)

Again, somewhat haphazard

easier if online

Have to go to multiple places to get data

Weather information

There is no method to access weather data in the Guana Estuary currently.

SPOT weather forecast not available to general public

Sometimes inaccurate

Not all guana data is available in SWMP CDMO

Reserve or trail closures

the info might not always be up to date

may have a plan on visit but then can't do what you planned

na

Information on terrestrial animals

login required

It's a bit haphazard, almost anecdotal

Some information available in all trails from a user perspective not from the actual reserve

While a large number of people indicated there were no disadvantages, the "free text" answers provide insight in some drawbacks people identified. The "Take home messages" box at the end of this section summarizes these.

In terms of usage of data, respondents added the following under "Other":

Water quality information (including nutrients and algae)
Personal interest
Vegetation management on lake

Water level information (tides, Guana lake, river)
Guana Dam management
I would access it more if I knew how to get to the data

Information on vegetation (salt marsh or uplands)
Monitoring of invasive plant species sites for re-ocurrence / growth
Personal use, plus is helpful during some of the volunteer programs

Weather information
Recreation
Prescribed fire weather forecasts

Reserve or trail closures
Leisure

Information on terrestrial animals
Personal interest; useful in some of my volunteer activities

Generally, the three usages mentioned here most are personal use, volunteer activities, and management purposes (vegetation / invasive plants, prescribed fire).

Take home messages

- The majority of people that have accessed data before did so for **water quality information**: 85%.
- **Water level information** and **information on fish, shellfish or other aquatic organisms** were accessed by 55% of the respondents, and 45% had accessed **information on vegetation**. All the other datasets were accessed by fewer than 40% of respondents.
- Comparing this to the information on the data people *would like* to access (regardless of whether they have in the past or can do so), the number people that would like to access data on fish, shellfish, or other aquatic organisms, water levels, weather, vegetation, and terrestrial animals is larger than those who have actually accessed those data. Only for water quality data there is a small discrepancy between the number of people wanting to access those data, and the number who have.

- For the 4 most popular types of datasets (bolded above), the majority of respondents obtain these data by requesting it from GTMNERR staff (by email) and also the majority finds the way they access data easy and convenient. In addition, 35-55% find the format in which they get the data useful. While 40-45% of respondents say there are no disadvantages in accessing these datasets, these results show that GTMNERR staff probably spend considerable time providing these data (and do an excellent job!).
- About 70 to 85% of people access these data at least once a month, with most more frequent than that.
- The majority of respondents use these data for research purposes, but a considerable number of people also use them for other purposes such as education or other work-related purposes (not research/education).
- For all these 4 data, 80 to 100% of respondents indicate that they satisfy their needs slightly to moderately well.

- In contrast, the other 4 types of information (weather, reserve or trail closures, terrestrial animals and LiDAR) are mostly accessed through websites - but also here, respondents feel data access is easy / convenient, and the format is useful.
- Also for these data, respondents feel that there are not many disadvantages, though they did highlight difficulty in accessing weather data (25%) and the time it takes to request information on terrestrial animals (42.9%).
- In terms frequency of accessing these data, most people either access these data once month (weather, and terrestrial animals) or daily (reserve and trail closures, and terrestrial animals).
- The usage of these data fairly evenly distributed across the options that were provided - as well as how well the data satisfied people's needs.

Below are some highlights of the disadvantages of the current manner in which people access data:

- It would be easier if data was accessible online (not having to bother researchers or having to make phone calls) - but then for some data that *is* available online, they are hard to find and/or cumbersome to access or download;
- Data are not always up-to-date;
- Data are supplied in various formats;
- Not all datasets that people are interested in are available online;

- People have to go to various / multiple places (online) to gather data;
- Some data is not specifically for the Guana Estuary (e.g. water level and weather information).
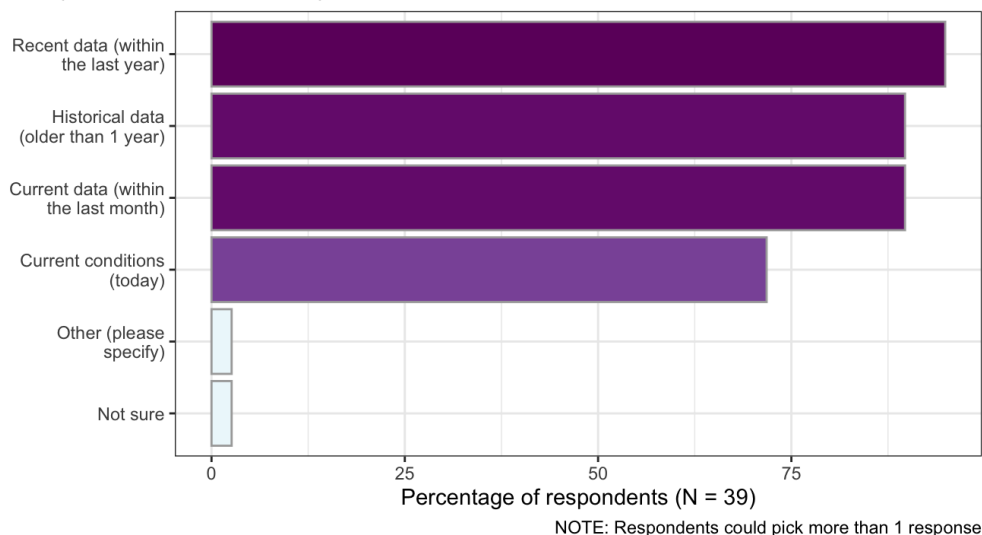
5. Dashboard preferences

The survey asked respondents about their preferences regarding dashboard features (type and format of information, data delivery mode) and how they would access the dashboard.

By "dashboard" we meant a user interface on a computer display that presents (up-to-date) information with visualization tools such as graphs, charts, and tables - in a dynamic and interactive way.
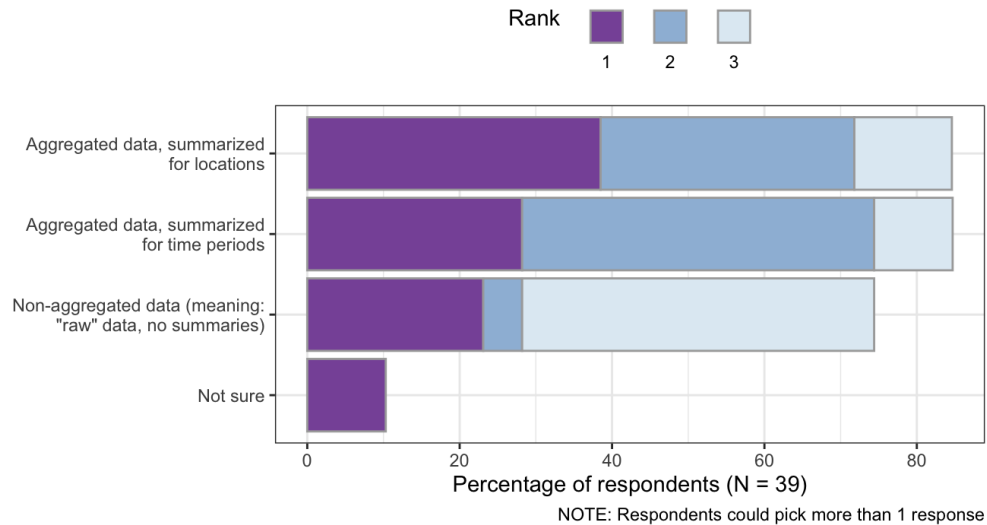
How would you prefer to access data?

Percentage of respondents (N = 39)
NOTE: Respondents could pick more than 1 response
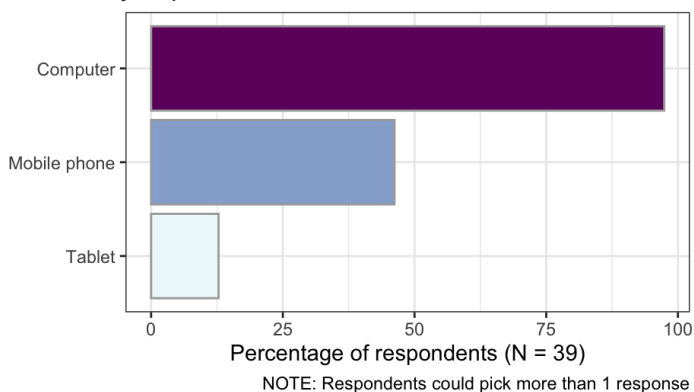
What type of information do you prefer?

Percentage of respondents (N = 39)
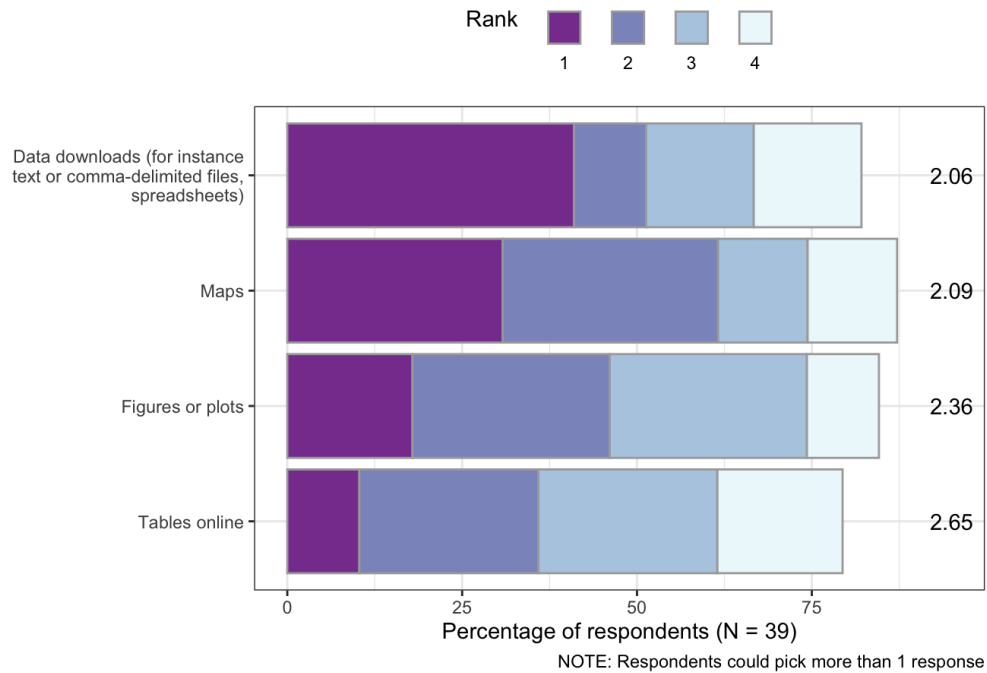NOTE: Respondents could pick more than 1 response

The response in the category "Other" is **projections**.

When asked about the form of information and the format of data delivery, respondents were also asked to rank their choices. They did not have to rank all options: only those they were interested in.

What form of information do you prefer?

Rank: 1, 2, 3

Percentage of respondents (N = 39)

- Aggregated data, summarized for locations
- Aggregated data, summarized for time periods
- Non-aggregated data (meaning: "raw" data, no summaries)
- Not sure

NOTE: Respondents could pick more than 1 response

What format of data delivery would suit your needs best?

Rank: 1, 2, 3, 4

- Data downloads (for instance text or comma-delimited files, spreadsheets) — 2.06
- Maps — 2.09
- Figures or plots — 2.36
- Tables online — 2.65

Percentage of respondents (N = 39)

NOTE: Respondents could pick more than 1 response

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Take home messages

- The overwhelming majority of respondents prefers to access a data dashboard on their computer. Slightly less than 50% would (also) want to access it on a cellphone.
- The type of information respondents would like to access is firstly recent data (from the past year), chosen by almost 95% of respondents. In a shared second place (almost 90% each) came historical data and current data (from the past month). Data representing current conditions was also chosen by just over 70% of the respondents.
- In terms of providing aggregated data through the dashboard, an equal number of respondents is interested in data aggregated by location as well as for time periods. Aggregation by location is ranked slightly higher by most respondents (1.7 vs 1.8 for time periods; again, lower values indicate higher preference/higher ranking).
- A relatively large number of people are also interested in non-aggregated ("raw") data: almost 75%.
- All data delivery formats suggested in the survey were popular with the respondents. While data downloads did not get the most votes in absolute numbers, almost half of those who picked this format ranked it their number 1 format: it has the best (lowest) average ranking. Maps and figures were about equally popular, both in absolute numbers as well as rankings. And while online tables came in "last" place, more than 75% of people would like to see this data format.
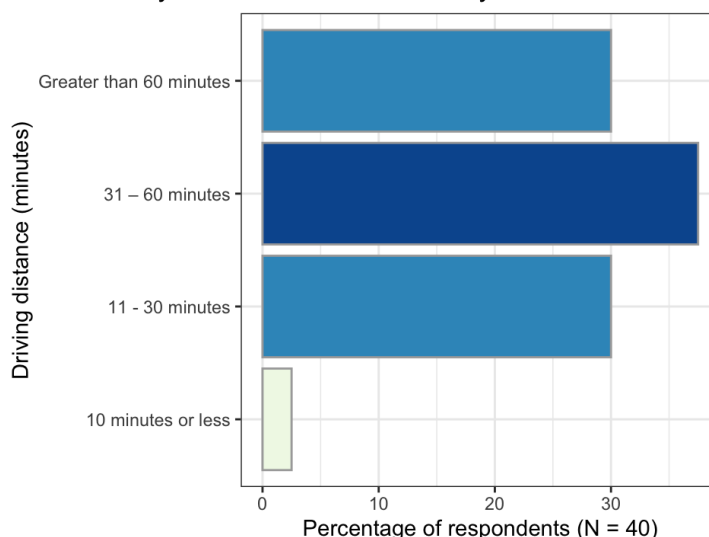
6. Characteristics of respondents

Finally, the survey requested demographic information from respondents. This helps the project team get a better understanding of the dashboard's target audience.

6.1 Age and gender
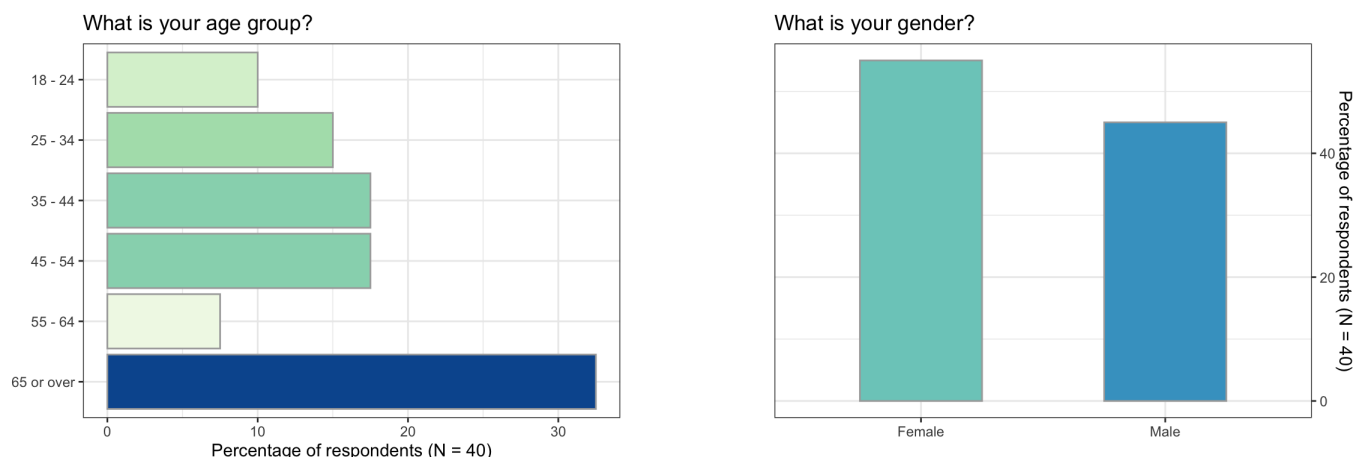
6.2 Distance from the Guana Estuary

Take home messages

- Slightly more respondents were female (55%) than male (45%).
- Most respondents were 65 or over (32.5%), but the two age groups 35-44 and 45-54 combined made up 35% of the respondents: there is a balance between respondents that are retired and that are mid- to senior-level working professionals (we assume).
- Most people live 31-60 minutes driving distance away from the Guana Estuary, which (together with the 11-30 minute driving distance option) probably corresponds to the nearest towns (Ponte Vedra, St Augustine). Those two categories made up 67.5% of the responses, meaning that the majority of the respondents has strong local connections to the area. 30% of respondents live further away (greater than 60 minutes driving distance), which most likely represents (visiting) scientists.

Next steps

Based on this report (and previous workshops), the project team will develop dashboard design recommendations and considerations. Work is already underway on a draft dashboard, and the project team will be in touch before the end of September 2023 about further steps on these, and to inform you of upcoming participation and discussion opportunities.

To access the code that created this document, the survey result data, or jpg versions of the figures, go to https://github.com/GTMNERR-Science-Transfer/Survey-results (https://github.com/GTMNERR-Science-Transfer/Survey-results).

Suggestions and comments on this draft report are very welcome; please email Dr. Geraldine Klarenberg at gklarenberg@ufl.edu (mailto:gklarenberg@ufl.edu), or leave an "Issue" on the above linked GitHub repository.