Indian River Lagoon Observatory

Connecting Users to IRL Data Initiative: Survey Responses

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Introduction

Proper management, conservation and scientific advancement of the Indian River Lagoon (IRL) system are not possible without critical data. The *Connecting Users to IRL Data* initiative is examining how current scientific data are collected, translated, and shared with users and how to improve those processes.

A workshop to address this topic was convened on December 7, 8, 2015, at Florida Atlantic University Harbor Branch Oceanographic Institute, with primary financial support from Harbor Branch Oceanographic Institute Foundation, Inc. and River Branch Foundation. Participants represented federal, state and local agencies, academia, non-profit entities, elected officials and the business sector, and included estuarine scientists, urban planners, weather forecasters, resource managers, and educators.

Prior to the workshop a regional online survey (see pp. 4-7) was electronically distributed (October 13 to December 5, 2016) to help define questions related to how we collect, use, translate, and share data for the Indian River Lagoon. After making an initial request to participate, we sent up to five additional requests/reminders to participate to those people who had not yet completed a survey. A total of 95 respondents participated, with participants coming from federal, state, and local agencies as well as academia, non-profit entities, and the private sector that work in the IRL region. The participation rate in the survey was 27%.

The *Connecting Users to Indian River Lagoon Data* workshop built on results given by 95 respondents, who provided insight into how scientific data are collected, translated, and shared in the Indian River Lagoon. These results assisted the workshop's Steering Committee with workshop format and panelists to gain further insight into these important findings. Results of the survey revealed what data are available and how to help develop new pathways (e.g., social media, web publishing, file sharing and storage) for more effective data sharing and dissemination to end users.

This report provides findings from the survey participants. Future updates on this initiative will be posted at: http://www.fau.edu/hboi/irlo/irl_data_workshop.php.

The survey drew heavily upon one previously used by SECOORA, with facilitation by Vembu Subramanian and Abbey Wakely. Valuable contributions were also provided by other members of the workshop's Steering Committee: Duane De Freese, Ph.D. (Executive Director, IRL Council & Indian River Lagoon National Estuary Program); Grace Johns, Ph.D. (Project Manager, 2007 Indian River Lagoon Economic Valuation Report, Hazen & Sawyer); Kathleen O'Keife (Research Administer, Florida Fish & Wildlife Research Institute); Mitchell Roffer, Ph.D. (President, Roffer's Ocean Fishing Forecasting Service, Inc.); Vembu Subramanian (Manager, Regional Coastal Ocean Observing System, SECOORA); and Gary Zarillo, Ph.D. (Professor, Florida Institute of Technology). Lastly, we sincerely thank all IRL community members who took time out of their busy schedules to participate in this research. We hope the following report is useful to them.

Summary of Survey Findings

- Water quality, physical oceanography and meteorological data are the most-collected data categories.

- The most common data collection intervals are weekly and monthly.

- The most readily available data categories are GIS, water quality, seagrass, biological and meteorological.

- Although the temporal structure of IRL data collection ranged from real-time to archival/multi-year, the most frequently used data or needed by end users was monthly or archival/multi-year.

- The most frequently provided data by collectors to users are water quality; the least frequently shared are biological and physical oceanography.

- About 70% of organizations collecting data in the IRL do not have a designated data steward to serve as the single point of contact for obtaining data from that organization.

- The professions that most use or access data are: environmental managers, university educators, environmental consultants, military, oceanographers, engineers, recreational boaters, recreational fishermen and informal educators.

- Types of end users of IRL data varied greatly and this diversity exemplifies the increased need for more effective data flow via new portals and innovative sharing techniques.

The Survey*: Connecting IRL Users with Data*

The responses gained from this short survey (approximate time: 15 minutes) will give decision-makers insight into what Indian River Lagoon (IRL) scientific data are readily available, what data may be pending and unavailable, and what data are archived. The survey results will reveal how we currently collect, translate and share IRL data and what new approaches we could explore to improve our sharing of data that can be used to restore the Indian River Lagoon's health. We appreciate you taking time to provide your answers.

1. Please provide your:
   Name
   Phone number
   Email address

2. Select your organization type.
   a. Non-profit
   b. Academic
   c. Federal agency
   d. State Agency
   e. Local government
   f. Private sector- tourism industry
   g. Private sector- environmental consultant
   h. Private sector- other

3. Please state your organization's name.

4. Which best describes your job function within your organization?
   a. Science/Research
   b. Information Technology/ Data Management
   c. Regulatory/ Permitting
   d. Planning (e.g. coastal planning, marine planning)
   e. Educator
   f. Policy and Rulemaking
   g. Monitoring/ Observing
   h. Weather Forecaster
   i. Resource Management (e.g. fisheries, ecosystem management)
   j. Program Manager
   k. Other (write in)

5. Does your organization have a data steward?
   a. Yes (include steward's name, phone number and email address)
   b. No

6. In what parts of the IRL region is your work/activity focused? For each focus area CLICK on the work/activity area that apply (Mosquito Lagoon, Banana River, North IRL, Central IRL, South IRL, St. Lucie Estuary).

a. Estuary
b. Rivers
c. Beachfront
d. Freshwater Wetlands
e. Coastal Watershed
f. Water Control Structures

7. Does your organization collect data?
   a. Yes (If YES, continue to Question 8)
   b. No (if NO, continue to Question 14)

8. If yes, what kind of data do you collect? For each answer CLICK on the intervals that apply (REAL-TIME, ARCHIVAL, MONTHLY, WEEKLY).
   a. Biological (e.g. plankton, catch data by species, sea turtle nesting)
   b. Habitat (e.g. submerged aquatic vegetation, hard bottom)
   c. Physical Oceanographic (e.g. water temperature, currents)
   d. Meteorological (e.g. winds, rainfall, atmospheric pressure.)
   e. Water Quality and Chemistry (e.g., dissolved oxygen, bacteria, pH, pCO2)
   f. Human Use (e.g. fishing, scuba diving, military use)
   g. Extreme Event Data (e.g. harmful algal blooms, hurricanes, spills)
   h. Geological (e.g. bathymetry, sediment type)

9. Do you share IRL data collected real-time, daily, weekly, monthly or archival
   a. Yes (CLICK applicable intervals: REAL-TIME, ARCHIVAL, MONTHLY, WEEKLY)
   b. No

10. Is your IRL data available for sharing for each type you listed above?
    a. Yes (include types of data and data link addresses)
    b. No

11. Do you have IRL metadata to share? If yes, can you provide data link addresses?
    a. Yes (include types of data and data link addresses)
    b. No

12. Do you follow any data sharing protocols (NOAA, NSF, FWC, classified data, etc.)?
    a. Yes
    b. No

13. Are you willing to share classified IRL data once published?
    a. Yes
    b. No

14. Does your organization use IRL data? If yes, CLICK on the intervals that apply for each question (REAL-TIME, ARCHIVAL, MONTHLY, WEEKLY).
    a. Biological (e.g. plankton, catch data by species, sea turtle nesting)
    b. Habitat (e.g. submerged aquatic vegetation, hard bottom)

c. Physical Oceanographic (e.g. water temperature, currents, salinity)
d. Meteorological (e.g. winds, rainfall, atmospheric pressure)
e. Water Quality and Chemistry (e.g., dissolved oxygen, bacteria, pH, pCO2)
f. Human Use (e.g. fishing, scuba diving, military use)
g. Extreme Event Data (e.g. harmful algal blooms, hurricanes, spills)
h. Geological (e.g. bathymetry, sediment type)

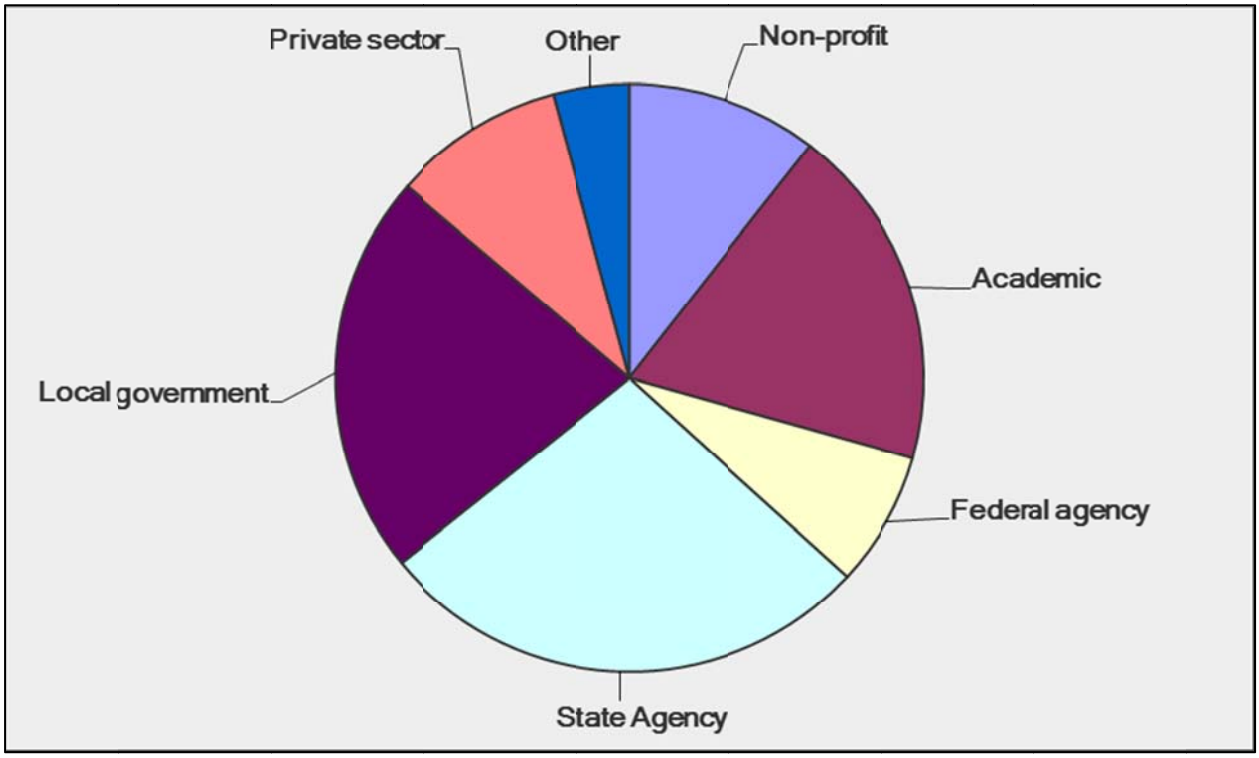
15. In what capacity do you use data observing information? CLICK on the user categories that apply.
    a. Recreational boater (motor, sail, kayak, paddle, or row)
    b. Commercial fisher or other harvester
    c. Recreational fisher or other harvester
    d. Environmental/ Coastal manager
    e. Coastal permitting
    f. Fisheries manager
    g. Emergency manager
    h. Hazard manager
    i. Informal educator
    j. Educator (K-12)
    k. University professor and/or research scientist
    l. Agency research scientist
    m. Student
    n. Coastal resident
    o. Live on a boat
    p. Tourism (participant)
    q. Tourism owner/operator (whale watch boat, tour boat, etc.)
    r. Environmental consultant
    s. Scuba (diver/instructor)
    t. Engineer, contractor, surveyor, or similar
    u. Military, Coast Guard or Law enforcement (marine patrol)
    v. Communications/ media
    w. Harbormaster, marina operator
    x. Energy industry permitting
    y. Meteorologist/Forecaster
    z. Other:

16. When do you access/use IRL data and products? Check all that apply.
    a. Hourly
    b. Daily
    c. Monthly
    d. Mostly weekends
    e. Seasonal
    f. Event Driven (e.g. tropical storm, algal bloom, oil spill)

17. Please identify gaps in data or data availability for your IRL work.

Responses to Survey Questions

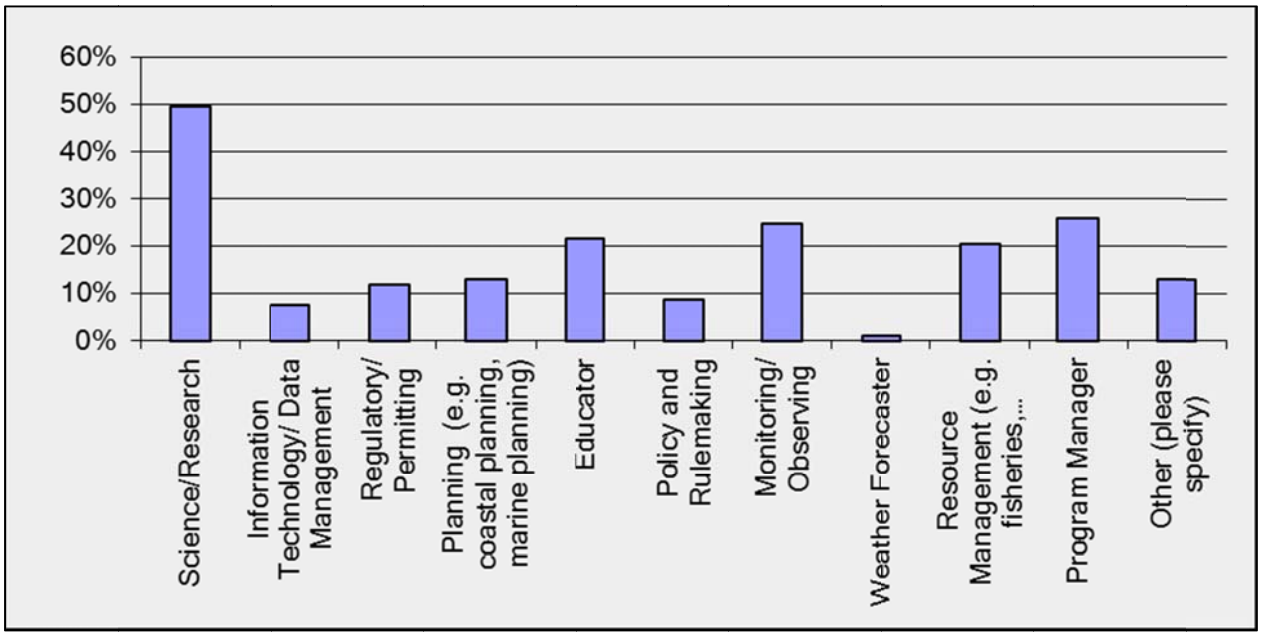
Q2: Select your organization type.



Answer Options	Response Percent	Response Count
Non-profit	10.5%	10
Academic	18.9%	18
Federal agency	7.4%	7
State Agency	27.4%	26
Local government	22.1%	21
Private sector	9.5%	9
Other (please specify)	4.2%	4
		95

Note: Answers under “Other” included news media and resident.

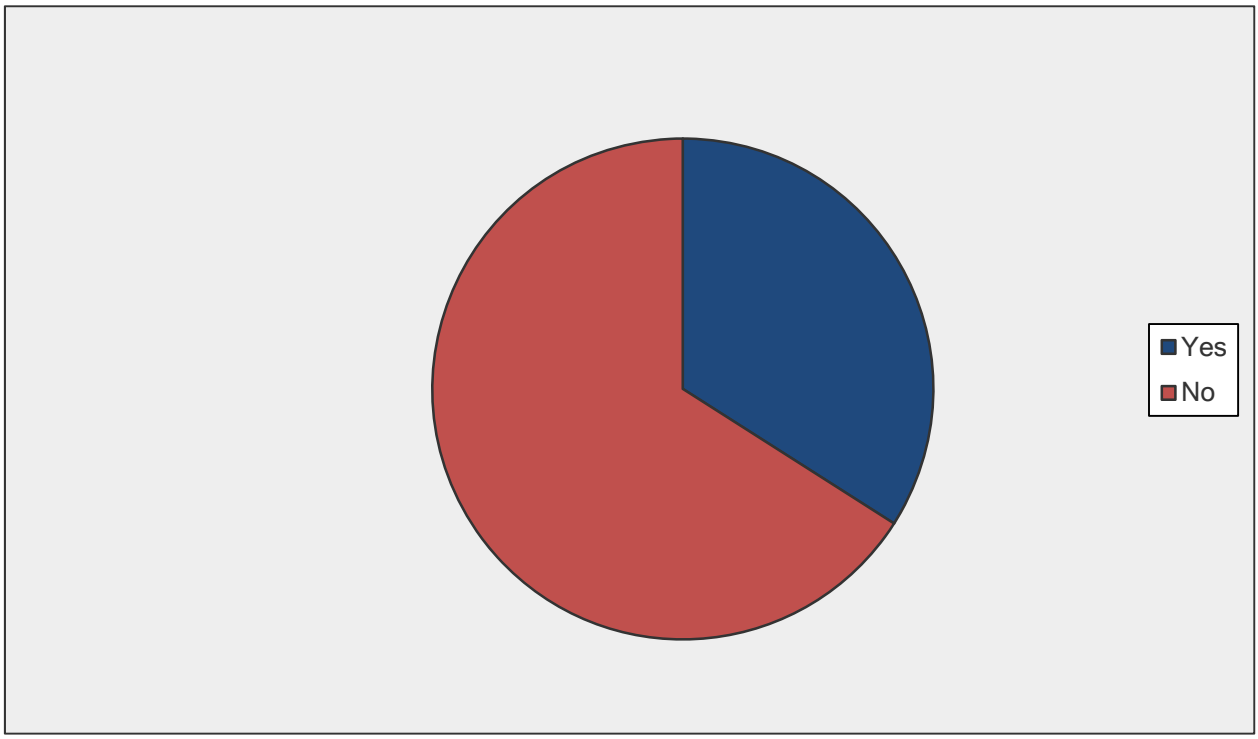
Q4: Which best describes your job function within your organization? Please check all that apply.



Answer Options	Response Percent	Response Count
Science/Research	49.5%	46
Information Technology/ Data Management	7.5%	7
Regulatory/ Permitting	11.8%	11
Planning (e.g., coastal planning, marine planning)	12.9%	12
Educator	21.5%	20
Policy and Rulemaking	8.6%	8
Monitoring/ Observing	24.7%	23
Weather Forecaster	1.1%	1
Resource Management (e.g., fisheries, ecosystem management)	20.4%	19
Program Manager	25.8%	24
Other (please specify)	12.9%	12
		93

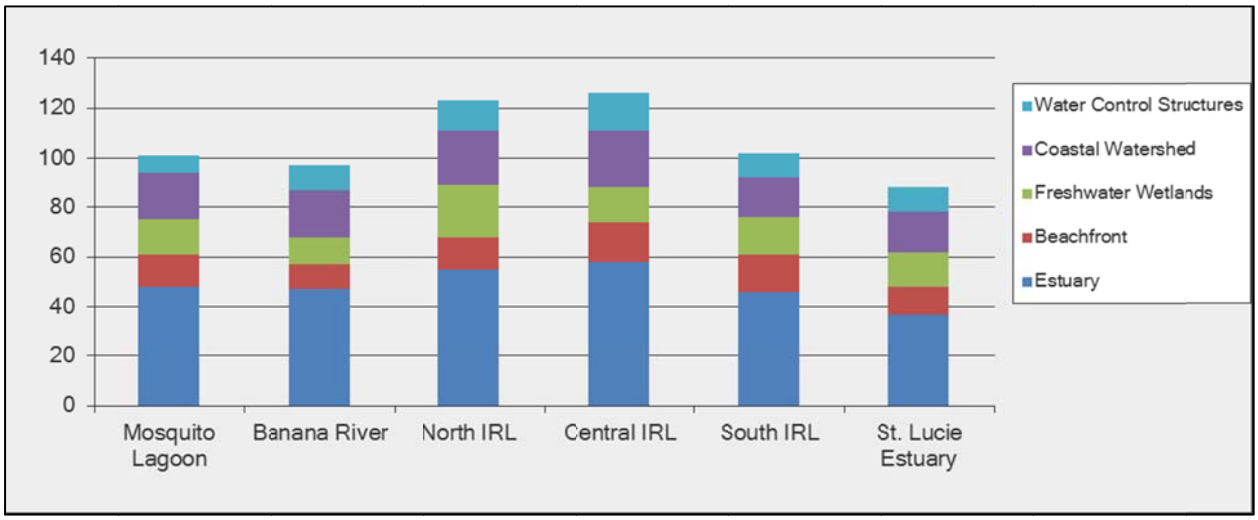
Note: Answers under “Other” included journalist, environmental writer, elected official, legal, special projects, ecotour owner/operator, and volunteer.

Q5: Does your organization have a data steward?



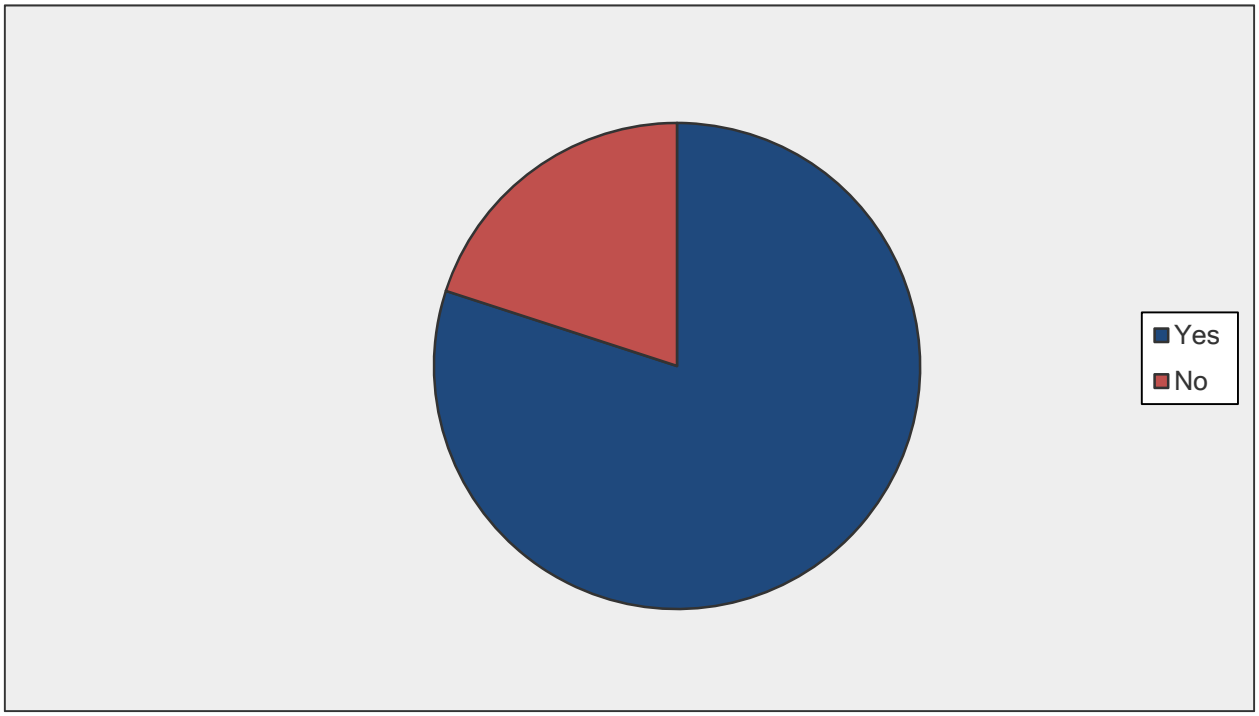
Answer Options	Response Percent	Response Count
Yes	34.4%	32
No	66.7%	61
		93

Q6: In what parts of the IRL region is your work/activity focused? Check the regions and work/activities that apply.



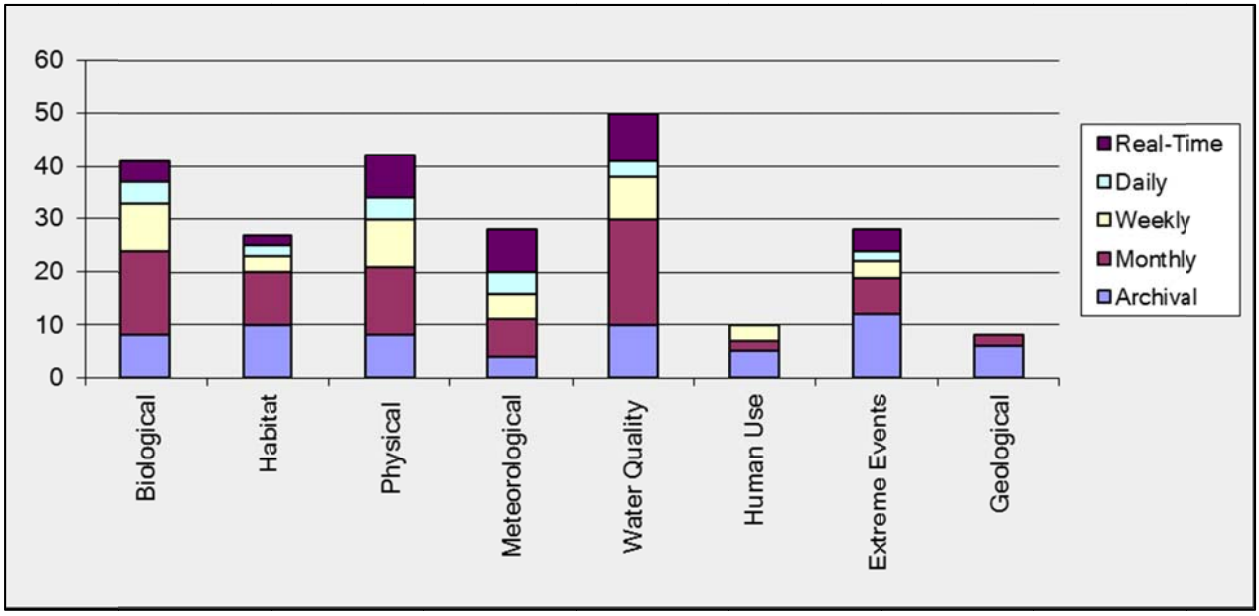
Answer Options	Mosquito Lagoon	Banana River	North IRL	Central IRL	South IRL	St. Lucie Estuary	Response Count
Estuary	48	47	55	58	46	37	89
Beachfront	13	10	13	16	15	11	32
Freshwater Wetlands	14	11	21	14	15	14	38
Coastal Watershed	19	19	22	23	16	16	42
Water Control Structures	7	10	12	15	10	10	29
						answered question	**95**

Q7: Does your organization collect IRL data?



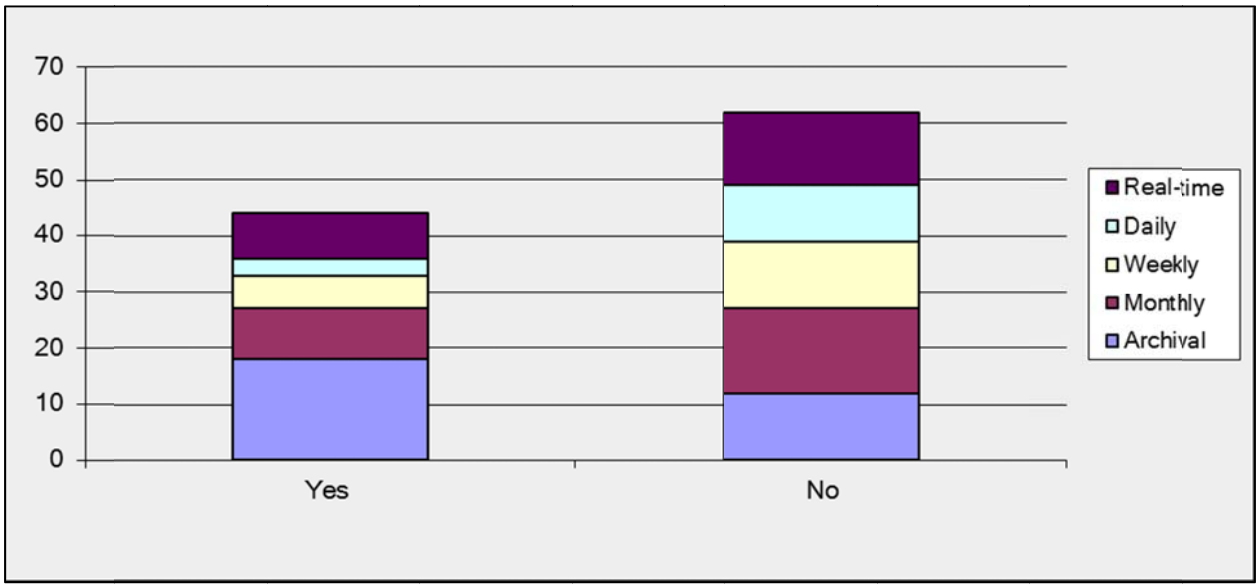
Answer Options	Response Percent	Response Count
Yes	80.0%	76
No	20.0%	19
		95

Q8: If yes, what kind of IRL data do you collect? Check all that apply.



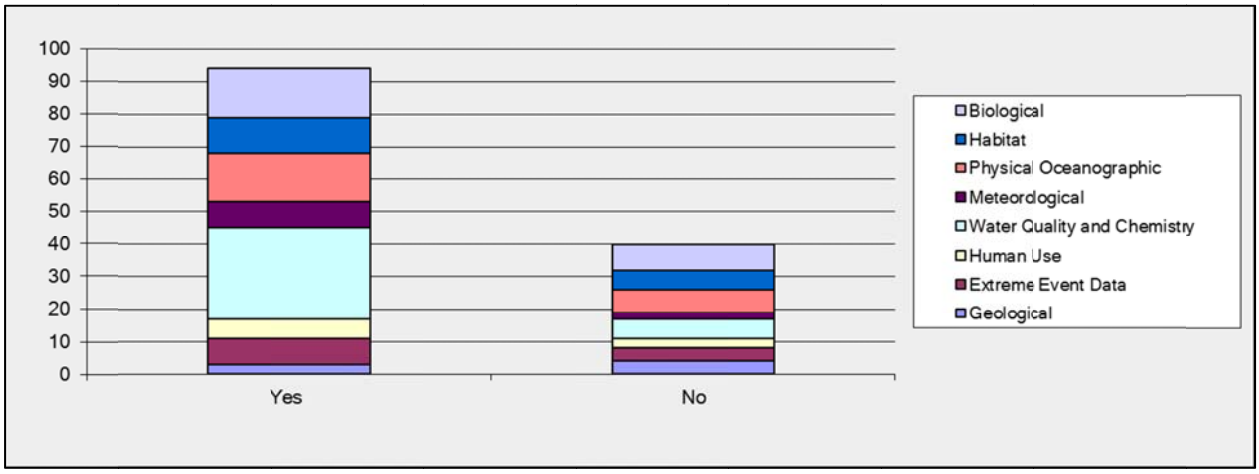
Answer Options	Real-Time	Daily	Weekly	Monthly	Archival	Response Count
Biological (e.g. plankton, catch data by species, sea turtle nesting)	4	4	9	16	8	28
Habitat (e.g. submerged aquatic vegetation, hard bottom)	2	2	3	10	10	22
Physical Oceanographic (e.g. water temperature, currents)	8	4	9	13	8	27
Meteorological (e.g. winds, rainfall, atmospheric pressure)	8	4	5	7	4	15
Water Quality and Chemistry (e.g., dissolved oxygen, bacteria, pH, pCO2)	9	3	8	20	10	34
Human Use (e.g. fishing, scuba diving, military use)	0	0	3	2	5	9
Extreme Events (e.g. harmful algal blooms, hurricanes, spills)	4	2	3	7	12	20
Geological (e.g. bathymetry, sediment type)	0	0	0	2	6	8
Other (please specify)						22
					answered question	51

Q9: Do you share IRL data collected real-time, daily, weekly, monthly or archival? If yes, can you provide data link addresses?



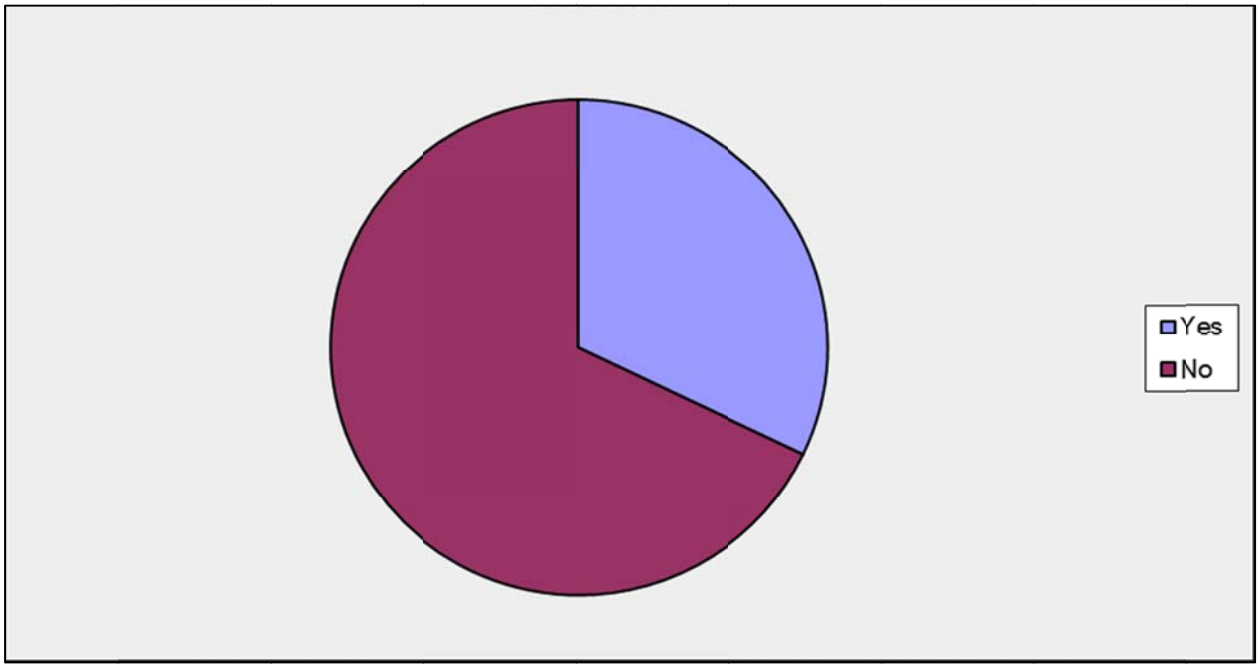
Answer Options	Real-time	Daily	Weekly	Monthly	Archival	Response Count
Yes	8	3	6	9	18	27
No	13	10	12	15	12	22
						49

Q10: Is your IRL data available for sharing for each type you listed above?



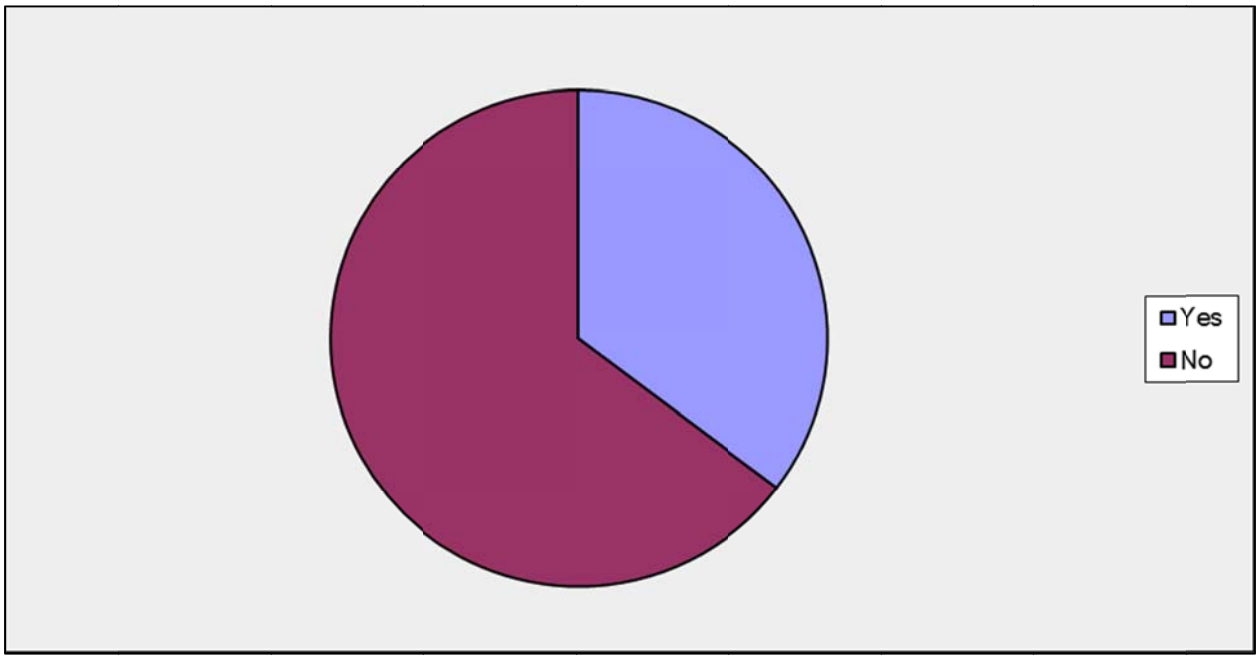
Answer Options	Biological	Habitat	Physical	Meteorological	Water Quality/Chemical	Human Use	Extreme Events	Geological	Response Count
Yes	15	11	15	8	28	6	8	3	38
No	8	6	7	2	6	3	4	4	13
									47

Q11: Do you have IRL metadata to share?



Answer Options	Response Percent	Response Count
Yes	32.1%	18
No	67.9%	38
		56

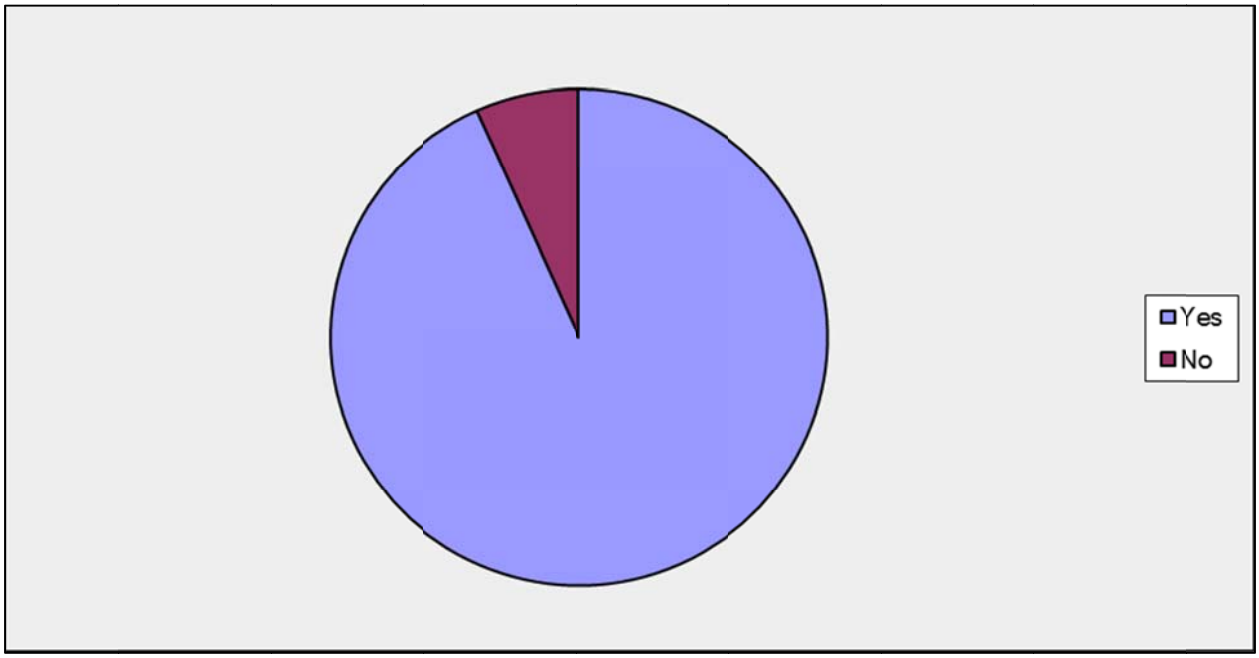
Q12: Do you follow any data sharing protocols (NOAA, NSF, FWC, classified data, etc.)?



Answer Options	Response Percent	Response Count
Yes	35.3%	18
No	64.7%	33
		51

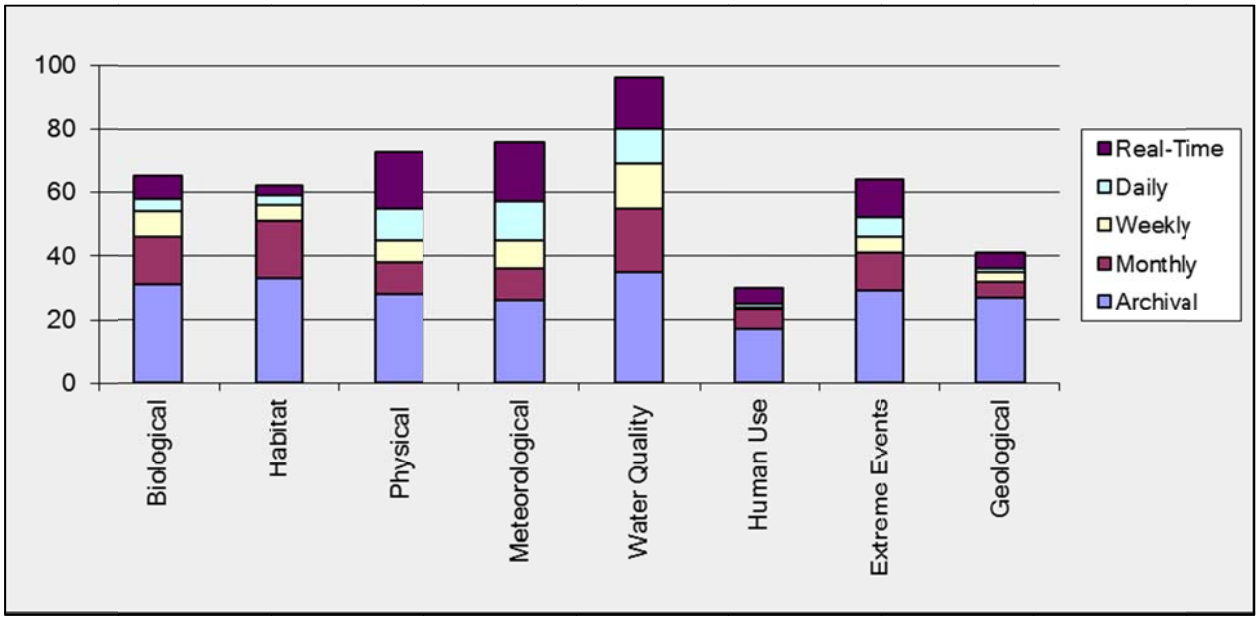
Note: The most frequently mentioned data protocols were FWC and Storet.

Q13: Are you willing to share classified IRL data once published?



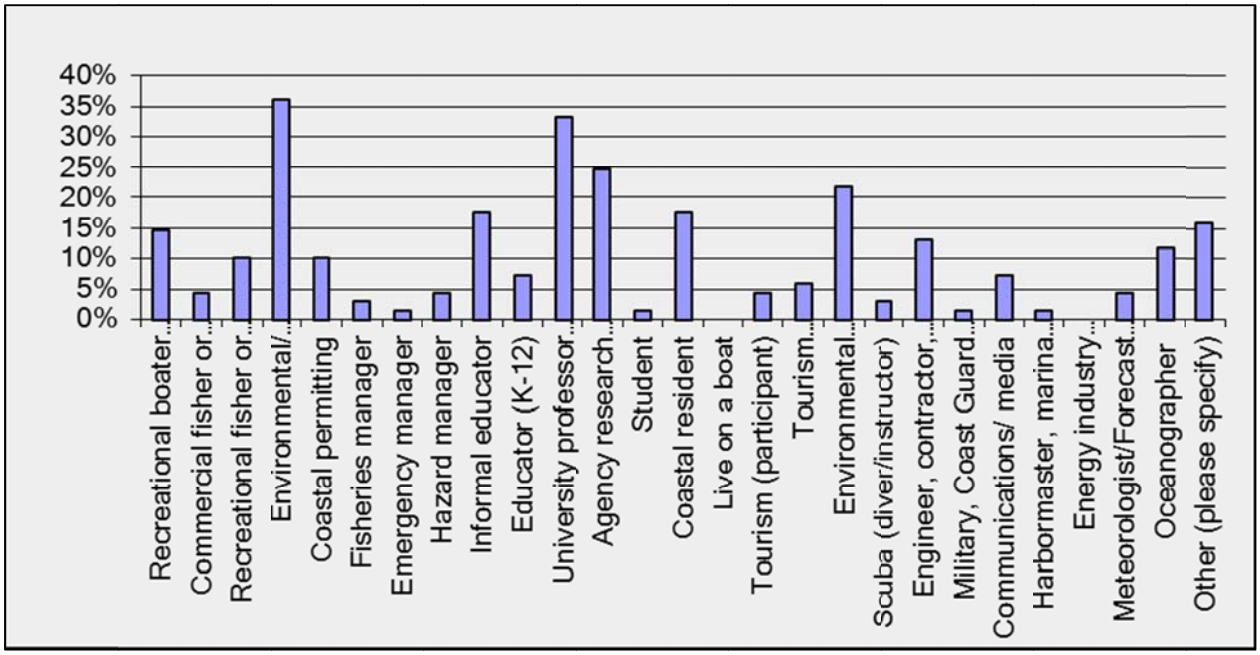
Answer Options	Response Percent	Response Count
Yes	93.3%	42
No	6.7%	3
		45

Q14: Does your organization use IRL data? Check all that apply.



Answer Options	Real-Time	Daily	Weekly	Monthly	Archival	Response Count
Biological (e.g. plankton, catch data by species, sea turtle nesting)	7	4	8	15	31	42
Habitat (e.g. submerged aquatic vegetation, hard bottom)	3	3	5	18	33	45
Physical Oceanographic (e.g. water temperature, currents)	18	10	7	10	28	41
Meteorological (e.g. winds, rainfall, atmospheric pressure)	19	12	9	10	26	41
Water Quality and Chemistry (e.g., dissolved oxygen, bacteria, pH, pCO2)	16	11	14	20	35	54
Human Use (e.g. fishing, scuba diving, military use)	5	1	1	6	17	23
Extreme Events (e.g. harmful algal blooms, hurricanes, spills)	12	6	5	12	29	42
Geological (e.g. bathymetry, sediment type)	5	1	3	5	27	31
Other (please specify)						12
					answered question	69

Q15: In what capacity do you use IRL data observing information? Check the user categories that apply.



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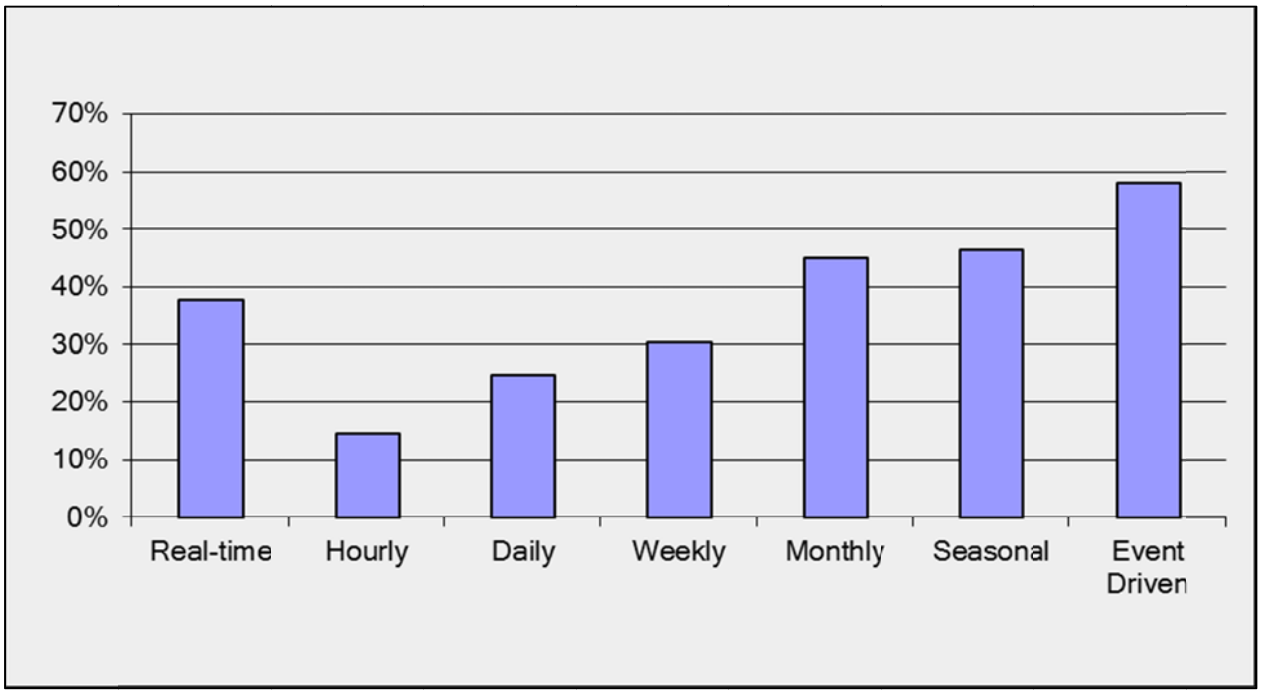
Q15: In what capacity do you use IRL data observing information? Check the user categories that apply.

Answer Options	Response Percent	Response Count
Recreational boater (motor, sail, kayak, paddle, or row)	14.5%	10
Commercial fisher or other harvester	4.3%	3
Recreational fisher or other harvester	10.1%	7
Environmental/ Coastal manager	36.2%	25
Coastal permitting	10.1%	7
Fisheries manager	2.9%	2
Emergency manager	1.4%	1
Hazard manager	4.3%	3
Informal educator	17.4%	12
Educator (K-12)	7.2%	5
University professor and/or research scientist	33.3%	23
Agency research scientist	24.6%	17
Student	1.4%	1
Coastal resident	17.4%	12
Live on a boat	0.0%	0
Tourism (participant)	4.3%	3
Tourism owner/operator (whale watch boat, tour boat,	5.8%	4
Environmental consultant	21.7%	15
Scuba (diver/instructor)	2.9%	2
Engineer, contractor, surveyor, or similar	13.0%	9
Military, Coast Guard or Law enforcement (marine	1.4%	1
Communications/ media	7.2%	5
Harbormaster, marina operator	1.4%	1
Energy industry permitting	0.0%	0
Meteorologist/Forecaster	4.3%	3
Oceanographer	11.6%	8
Other (please specify)	15.9%	11
answered question		69

Q16: When do you access/use IRL data and products? Check all that apply.



Answer Options	Response Percent	Response Count
Real-time	37.7%	26
Hourly	14.5%	10
Daily	24.6%	17
Weekly	30.4%	21
Monthly	44.9%	31
Seasonal	46.4%	32
Event Driven	58.0%	40
answered question		69

Q17: Please identify gaps in data or data availability for your IRL work.

Note: Responses were grouped by the editors.

All, or Unspecified, Data

- Need compilation of who is doing what work and where
- A website that lists and describes available IRL data (biological, water quality, etc.) and their links or appropriate contacts would be very helpful
- A centralized portal for all IRL data is needed
- An IRL data clearing house is not available as to parties involved in data collection
- Gaps exist where not all agencies/organizations share their work in one overall database.
- Lots of archival data not available on-line
- Too many gaps to list. Severely needed: water temperature, turbidity, oxygen, salinity, grass cover, red tide, sources of nitrogen, phosphorous, chemicals.
- Gaps are starting to fill in, still sparse elevation and almost non-existent current data in the IRL
- Data availability remains a huge burden on the researcher; QA/QC and sending individual data requests can be time consuming and sometimes it takes a while to figure out the details of what you are getting.

Biological Data

- Most biological data is not readily available. Most historical data from the 1970's and 1980's is not readily available
- Archival seagrass maps, not done by WMDs, are not available. These are maps done by Harbor Branch (M.J. Thompson) and Brevard County (C. White).
- Up-to-date seagrass information
- Current, detailed seagrass data
- Need more complete and updated sea grass inventory
- Natural oyster reef locations (maps) of the IRL shellfish aquaculture lease locations (mapped) of the IRL
- Recent maps of IRL oyster reefs are unavailable (except for Mosquito Lagoon); some FIM data are available as reports but not as on-line tools showing long-term and recent trends
- There are data gaps in the juvenile fish recruitment and community data in the southern portion of the lagoon. There are data gaps in ichthyoplankton data in the lagoon. There are data gaps in recent years on fish and invertebrate community data from impoundments.

Economic Data

- Current funding of an economic valuation of the IRL by the ECFRPC will provide economic data pertaining to the IRL.

Maps

- Difficulty in preparing an up-to-date map of existing sewered areas versus those areas on septic systems – linkage to the existing canal/drainage networks for contiguous city and county areas. Using this data to plan for much-needed sanitary sewer infrastructure improvements and land use planning and redevelopment planning aspects are needed to reduce nitrate and other nutrient inputs to the IRL system.

Meteorological Data

- In-situ wind and precipitation gauges

Water Quality Data

- There are some data gaps in the archival water quality data in the central portion of the lagoon.
- Continuous water quality monitoring data across the IRL; microbiological data
- Water quality and chemistry data near every municipal outfall are needed. This would be helpful for focusing in on which outfall is most polluting and, further, to investigate what upland factors are responsible for the observed conditions.
- Groundwater – chemistry and dynamics all – horticultural chemicals (pesticides, herbicides)
- Accurate muck deposit depths and extents, water levels and salinity within the estuary and at inlets