I. PROJECT INFORMATION

Project Title*	Cedar Key ShOREs (Shoreline Options for Resilience and Equity)
Project Director*	Savanna Barry
Project Location*	Cedar Key
Project Summary*	We leveraged previous community engagement on living shorelines to build capacity for and consensus around a nature-based solution targeted at key public infrastructure. Recent collaborations on living shorelines between Cedar Key stakeholders and UF generated interest in further application of nature-based solutions for vulnerable public infrastructure systems threatened by sea level rise, frequent storms, and chronic erosion. Cedar Key is particularly vulnerable to storm surge and rising sea levels, and recent hurricanes have caused extensive damage to shorelines. Of particular local concern is the highly exposed corner of G and 1st Streets. The area is a critical route for emergency/fire services and a popular shore-fishing spot, but also includes private homes, a hotel, and failing stormwater infrastructure. Cedar Key staff lack the capacity to address climate hazards at this location due to the complexity of the situation, let alone to integrate nature-based features. At the same time, multiple groups interact with the shoreline area of interest, and must be engaged from the beginning to ensure an equitable solution is achieved. We built on past collaborations to integrate feedback from shoreline users of all types using multiple methods. In Phase I (Planning), we deployed stakeholder-driven workshop and survey processes, conducted site visits to inform design possibilities, and integrated technical expertise with local preferences, equity considerations, and infrastructure function needs defined by this process to prepare a full proposal detailing the design activities we plan to conduct in Phase II (Design).

II. PROGRESS REPORT QUESTIONS

1. Please revisit your proposal and review your goals and the outcomes you were seeking to achieve through this grant. How successful were you in meeting your goals? Please assess your success against the criteria you set in your proposal and use any combination of anecdotes, stories, graphs, charts, visuals as well as data to explain your success. Upload supporting files if you choose.*

Our team set out to use two approaches to gather input from a broad range of shoreline users: (a) place-based intercept surveys and (b) a series of focused visioning workshops. We also aimed to orient our team of experts to the issues facing Cedar Key (CK) and integrate stakeholder feedback with expert opinion to write and submit a full proposal to the design phase of this funding opportunity. Overall, we were successful in meeting our goals as proposed. Below, we briefly outline tasks, proposed and actual outcomes, and overall status of each task. For more details, see the supplemental files.

Task 1: Stakeholder Surveys
Task 1 Proposed Outcome: A compilation of stakeholder preferences and thoughts related to shoreline use, shoreline erosion, and climate hazards, especially from disadvantaged groups.

Task 1 Actual Outcome: Opinions of CK's at-risk groups are typically not considered when management decisions are made but they are key users of the focus area. Our first approach to collect feedback from these groups was an intercept survey to explore how residents of CK, Levy County, and visitors perceived the town, the hazards related to SLR and stormwater runoff, and their perception of nature-based solutions (NBS). After obtaining IRB approval, we conducted a multi-mode (intercept, flyer to online, email) opinion survey from December 2022 to March 2023. Our team of interns and post-doctoral researchers collected 180 survey responses, 157 of which were complete responses. The intercept mode yielded 108 responses, the flyer mode yielded 46 responses, and the email mode yielded 26 responses. In total, 57% of the complete responses were from local Cedar Key or Levy County residents while the remaining 43% were from visitors (29% Florida residents, 14% visiting from outside Florida). "Residents of Cedar Key" was the most common stakeholder group our respondents identified with. Therefore, we are confident that the views and opinions primarily of local residents were captured on the survey. Female respondents (54%) were slightly overrepresented in our sample. Self-reported demographic data indicate respondents were 85% white, 4% black, 4% Native American/Alaska Native, 1% Asian, and 6% unreported. Further, 5% identified as Hispanic or Latino. According to data accessed through Headwaters Economics for the zip code that contains Cedar Key (32625), 8.8% of residents are people of color or identify as Hispanic/Latino. Thus, our survey data shows that we achieved a representative sample of racial and ethnic groups, with 9% of responses coming from people of color and 5% of responses coming from Hispanics. We did not collect data on socioeconomic status, but our team surveyed at community gathering places such as shore fishing spots, the food bank, the hardware store, and aquaculture facilities to ensure adequate access to the survey by financially disadvantaged individuals. Overall, respondents demonstrated environmentally aligned attitudes and a clear recognition that erosion and stormwater flooding are top issues. Participants supported science-based solutions

and wanted to learn more about NBS. We incorporated these insights into a facilitated series of three co-design workshops. A more detailed summary of survey responses is provided in the supplemental materials.
Task 1 Status: Met

Task 2: Stakeholder Workshops
Task 2 Proposed Outcome: Insights into shoreline user preferences and potential barriers to green infrastructure/nature-based solutions. A final community-vetted conceptual design.

Task 2 Actual Outcome: As planned, our team conducted three workshops in Phase I. The first workshop (held in February 2023) focused on the issues and options surrounding the watershed and green stormwater options to address these issues. Workshop attendees were asked to provide their thoughts and comments in multiple ways. The second workshop (held in March 2023) focused on the issues and options regarding the shoreline component of the focus area and also created ample opportunity for stakeholders to provide feedback and modify the proposed ideas. At the third and final workshop (held in April 2023), we integrated feedback and preferences gathered at the first two workshops and presented updated conceptual designs where community-preferred solutions were matched with feasible locations. Throughout the process, we engaged the participants in diverse ways, like envisioning the problems and options on a conceptual map, anonymous virtual polls, ample time for Q&A/dialogue, and collecting oral histories about living and experiencing flooding in CK. A workshop participant commented, “I think community buy-in is important because even if it is grant money and funded from other sources, if the community's not for it, then it's not respected.” Another added, “I love it. I think more of this has to happen. Instead of somebody making the rules, start at the local.” This series of three workshops resulted in community-vetted conceptual designs for an integrated project that addresses both watershed (green stormwater) and shoreline (hybrid living shoreline) risks, as planned. More details about each workshop are provided in the supplemental information in the form of workshop summary reports.
Task 2 Status: Met

Task 3: Site Visits
Task 3 Proposed Outcome: Expert opinions about the wave climate, stormwater features, and project types suitable for the area.

Task 3 Actual Outcome: Our entire team completed the first site visit on December 9, 2022. At this site visit, all project personnel received a tour of the focus area and special attention was paid to problem spots such as failing stormwater outfalls and exposed shoreline areas. We also met with two local City of Cedar Key officials to hear their perspectives. Several follow-up site visits by members of the shoreline team (2/25, 3/3, and 4/2/2023) and stormwater team (1/19, 2/1, 3/24 and 4/7/2023) were conducted to collect data on currents, shoreline elevations, and verify stormwater system infrastructure connections. Findings and photographs were used in the workshops to

inform feasibility of project types and full proposal development.
Task 3 Status: Met

Task 4: Proposal Development
Task 4 Proposed Outcome: An action plan for turning the community-vetted conceptual design into a fully specified and engineered nature-based solution.

Task 4 Actual Outcome: Our team prepared a full proposal for the Phase II funding opportunity that was submitted on May 31, 2023. This proposal is our proposed action plan and details next steps, funding needs, potential roadblocks, further stakeholder engagement processes, case study outcomes, and important collaborators for the design phase.
Task 4 Status: Met

Optional File Upload

CK ShOREs Final Report Supplementary Materials.pdf

Filename: CK ShOREs Final Report Supplementary Materials.pdf **Size:** 3.4 MB

2. How has your work benefited your organization, professional field, community, or other stakeholders?*

Academic contributions: Our team is preparing a manuscript based on survey data gathered in Phase I. This manuscript will be submitted to the journal Nature-Based Solutions this summer. Furthermore, we submitted an abstract to present at the November 2023 CERF conference about Cedar Key ShOREs Phase I in the session titled “Community Engagement Initiatives for Increased Coastal Resilience”. Finally, a student supported by the project (Swathi Dhulappanavar) completed her MS thesis based on the Cedar Key ShOREs shoreline design with the title “Cedar Key Shoreline Restoration Project”.

Community benefits: Based on the first workshop of Phase I, CK installed in-line check valves (in May 2023) for two of their most vulnerable stormwater outfalls. On June 8-9, 2023, a significant precipitation event caused flash flooding in several areas around Cedar Key and inland Levy County. However, the two locations where the City installed the new check valves did not flood as they have in the past. In addition, street areas that used to flood with saltwater at very high tides have not been inundated by saltwater since check valve installation despite several tides that were high enough to have caused saltwater backflow prior to the check-valve upgrade. Even before these positive benefits were evident (at the final Phase I workshop in April 2023), community members expressed sincere hopes for continued funding to build the NBS interventions they helped conceptualize. For green stormwater interventions, the community was in such support that they requested our team expand the focus area to include more neighborhoods. Overall, Phase I has already resulted in tangible actions and has heightened momentum for additional nature-based solutions in the city.

3. Are there any other successes related more broadly to this project that you would like to share with us?*

Additional investments in green stormwater by the city are already being discussed. At a recent meeting, a city official began referencing the Cedar Key ShOREs stormwater solutions workshop and mentioned a solution our team presented (tree box filters) as an approach they would like to try in another stormwater problem area. In this area, rain often ponds on the road and will not drain. The City still has some residual funds from infrastructure money that came to them during as part of a covid relief package. They are considering spending some of these funds on installing a pilot tree box filter in this area, further demonstrating investment in the models presented through Cedar Key ShOREs.

At the Florida Nature Coast Conservancy (FNCC) annual membership meeting held on March 4, 2023, the president presented one of the Cedar Key ShOREs shoreline options to 40+ members as a possible future project. FNCC is a key landowner in the focal area of Cedar Key ShOREs and this level of support and buy-in is encouraging. The membership was receptive to the presentation.

As part of a state-funded comprehensive flooding vulnerability assessment project titled “Planning and Assessment for a Resilient Cedar Key”, there is a need to identify green infrastructure projects that can be highlighted in a forthcoming resilience plan. Project Director Barry is also the Principal Investigator on the flooding vulnerability project and is ensuring that the Cedar Key ShOREs conceptual designs are also incorporated into the resilience plan for the City of Cedar Key. This will make it more likely that future implementation funding will be available for the Cedar Key ShOREs designs because the City plans to use the resilience plan as a roadmap for prioritizing projects and seeking implementation funds.

4. What did you learn (positive or negative) as a result of this grant? What lessons would you share with other organizations or the field at large?*

Our team gained numerous positive insights during this project, as we always do when we collaborate with communities. We will detail some of our most transferable findings here in three sections 1. Insights from the survey, 2. Insights from the workshops, and 3. General insights for coastal resilience engagement.

Survey insights: We had several interesting and somewhat surprising findings from the survey. One major result of the survey was that respondents overall had a highly environmentally focused mindset and seemingly trust science-based solutions. Firstly, shoreline erosion and loss of habitat were identified as the top two most important coastal issues in Cedar Key. The fact that these two issues ranked higher than items such as drinking water quality, hurricane protection, and nutrient pollution highlights how vital shoreline functions are valued by respondents. Second, respondents indicated that their top considerations for choosing coastal infrastructure are: 1. Impact on the ecosystem, 2. Best scientific solution, and 3. Functionality. These items were ranked higher than items such as cost, aesthetics, and even public support, indicating a strong preference for functional, nature-based solutions informed by science. A second overall take home from the survey was strong support for environmentally sound actions that benefit locals, especially the clam aquaculture industry. The most important shoreline functions to safeguard, according to respondents, are 1. Shellfish production, 2. Pollutant capture and buffering, and 3. Residential living. Further, when asked which groups should be prioritized in coastal infrastructure decisions, respondents selected 1. Cedar Key residents, 2. The environment, and 3. Clam aquaculture workforce. These two results together highlight those actions supporting locals, especially those in the aquaculture industry, and protecting the environment/capturing pollutants are high priorities. Overall, the high tendency for acceptance of/preference for nature-based and scientifically sound solutions brings further weight to the Cedar Key ShOREs project goals. The insights into the priorities of Cedar Key residents are extremely helpful for future actions related to community driven coastal adaptation. They also show a broad base of public support for actions such as the nature-based shoreline and watershed project co-produced in CK ShOREs Phase I. Finally, we believe that these results may indicate that years of outreach and extension efforts around living shorelines, water quality's influence on shellfish, and other environmental topics have made residents more attuned to these topics. Importantly, the survey also revealed that residents believe that funding is the largest need for coastal infrastructure, closely followed by community buy-in and political will. Our findings overall from Phase I show that community support and political will are high, indicating that if further funding is obtained that nature-based solutions will likely continue to move ahead in the city.

Workshop insights: When given clear and actionable solutions, the community's desire and willingness to act is exceptional. During the first workshop of Phase I, focused on stormwater infrastructure, we presented in-line check valves as an option to prevent saltwater backflow through stormwater outfalls. During the coffee break, City staff were already talking about installing the valves. Immediately after, the option was investigated by City staff to

determine feasibility and cost. Within one month, local funds were approved and within two months, both check valves were installed. This will immediately increase the capacity of the stormwater system during king tide events. During other workshops, participants asked what they could do on their property to better manage stormwater runoff and be part of the solution. The takeaway from this is that despite limited funds and expertise, the community is eager for solutions and willing to act on guidance that incorporates their values and viewpoints.

In contrast to the immediate action taken with in-line check valves, during the second workshop, participants were offered several NBS shoreline intervention options to consider as a means to mitigate shoreline erosion. As an add-on to the NBS shoreline intervention options, “Tide CAPS” (Tidal-flooding Coastal Adaptation and Protection Structure) were suggested to reduce the frequency of future nuisance flooding events. The Tide CAPS add-on was presented as a low 2-foot seating wall set back away from the shoreline edge and adjacent to the sidewalk and road. The wall would act as a seawall and hydrologic barrier when water levels rose above the street elevation. This add-on was the only effective way to address near-term sea level rise nuisance flooding issues without raising the road and other infrastructure. However, the Tide CAPS add-on was almost universally dismissed by stakeholders, some stating concerns about the negative effects of seawalls. It was not entirely clear why the Tide CAPS approach was not considered but it was interesting to see which practices were embraced by community members and which were less desirable.

The Shore Stories portion of workshop 3 also revealed how meaningful the workshops were for residents and how meaningful it would be if flooding and other coastal vulnerabilities are addressed. We have included some key excerpts below.

- Speaking on workshops and vulnerability: “It was amazing. Cedar Key is in for a ride here. I keep going back to 2050. The thing I got most out of is that the [sea level] rise is going to be dramatic and it's not that far off. If the city is able to get help I think this process here has been enlightening and I think it's been good for this city… I would think that even the residents would wake up and say, we can do this in our yard. We can do all things that we've covered here because it's going to happen.” – John
- Speaking on workshops: “So you're bringing it to the people. Yeah. And letting the people decide. And then they're interacting makes them a part of it where they're not going to automatically naysay it. You know, it's like, oh, well, yeah. The, you know, hearing, you know, the pros and con and you don't have like one person that has his idea that it makes it more open.” – Debbie
- Speaking on infrastructure: “I think it's even maybe more important for you, just regular thunderstorms, lesser than hurricane events, you know, because you know, we get, you know, some surge, even short hurricane. I think the kind of stuff that is being proposed here. Would much better handle that situation than is now.” – Chuck
- Speaking on adaptation: “And that means the city can't pay for, you know, we're gonna have to have people go grants to do this. That I think that's one reason, but they're necessary. And if we don't start now 15 years, It's gonna be too late. We need the water system change. We need the sewage system changed and we need the shorelines and the storm water taken care of, shorelines are eroding.” – Tony
- Speaking on adaptation: “It's not an option, it’s a necessary thing. It's a luxury to be able to be having options to

pick from, but we better pick soon. Or the damage is gonna be done." – Patrick
- Speaking on infrastructure: "Well, for me I am high. I'm 21 feet above sea level. My land is, but one of my concerns is that if we don't do this [project], then I don't have a town. I have a house, but no town. Yeah. And so, I feel like we have to take care of all of that for, you know, so we have a store. I have a community as well as a house. Yeah. Definitely. … and I saw that where they came, they planted the [marsh] grass on G Street when I walked one morning where they planted the grass on G Street, when the tide came up, the tide came up a lot less, where they planted the grass than where they didn't plant the grass. So, I can see how little changes really help with the problems. … I love the idea of tree boxes. I've never heard of that." – Patty

General insights: First, the Cedar Key ShOREs Phase I work reinforced our existing knowledge of the power of co-production and co-design processes in creating real change in communities. Cedar Key residents and officials have repeatedly demonstrated their ability to adopt and enact projects that result from an organized and genuinely collaborative process that presents actionable steps to address a local issue. As detailed above, Cedar Key ShOREs was no exception. Next, our team learned that acceptance of climate change and sea level rise is broad but not universal in Cedar Key. In recent years, general acceptance of climate risks has risen noticeably, even in this conservative corner of Florida. Signs such as the day-to-day changes in water levels, the increased rainstorm/hurricane intensity, and the changes in the bird and plant species are becoming obvious to more people. However, a few community members who attended the Cedar Key ShOREs workshops expressed skepticism or denial of climate change as a driver of these changes or that these changes were occurring at all. This opened up a chance to discuss the issue in more depth but also served as a reminder that acceptance of climate change is not universal and that this fact must be acknowledged when planning and implementing community engagement activities. Finally, our team learned that getting under-represented groups to participate in the survey was easier than for the workshops. However, we did have more engagement in our workshops by at-risk groups such as inland residents and aquaculture workers than for past living shorelines workshops. We attribute this to the targeted outreach at gathering points, invitations we sent to survey participants, and the stipends made available through GRP support. These strategies and additional ones (such as short "pop-up workshops" at community spaces if need be) will be applied in Phase II.

5. How do you characterize your relationship with GRP and what suggestions do you have for improvement?*

The relationship with the GRP staff was professional and productive. Our team had a few changes in staffing needs and personnel effort that resulted in two requests for budget modifications. Each of these was quickly handled by GRP staff and they made the process very efficient and easy. This made it easy for the project team to adapt and be nimble, which is critical when timelines are short. They also communicated very clearly about expectations related to reporting (the kick-off call was very helpful) and were quick to address questions that arose during the full proposal preparation phase.

I do not have any suggestions for improvement, we have really enjoyed working with the GRP and hope to work together again in the future.

6. Please provide any other feedback or comments you have for the GRP.*

As project director, one aspect of the kick-off call I would like to highlight as beneficial was hearing about other projects that were funded. I think the “funding cohort” aspect of the GRP funding opportunities could be enhanced in some way, perhaps through a closeout call or some other mechanism for us to see what directions other projects went and learn from others who were funded by the same RFP. The peer learning aspect would be valuable, at least it would be for me.

7. If applicable, please identify and describe the ways you or your organization leveraged GRP's grant (e.g., other funders, volunteers who worked on the program, in-kind donations etc.) Please specify the value and/or number/hours of volunteers if possible.

In kind/volunteer hours – Total: $52,083

- The City of Cedar Key invested $36,000 of local money to purchase and install two in-line check valves ($18,000 each) at the most vulnerable stormwater outfalls.
- The City of Cedar Key waived $900 (3 workshops at $300 each) in fees for community center rental.
- $5,350 of university funds were used to purchase a Nortek ECO2 Acoustic Doppler Current Profiler. This instrument was and is being deployed to measure currents in Daughtry Bayou and to calibrate a hydrodynamic model of the area.
- Student interns in Jason von Meding's lab assisted with surveys and workshops. These interns were either volunteers or were paid from other sources. At least 200 hours were contributed from the von Meding lab, valued at approximately $3,000 (based on $15/hour).
- A graduate assistant in Jason von Meding's lab contributed approximately 6.5 weeks of time towards a literature review and analysis of survey data for the manuscript in preparation. This amount of effort is valued at approximately $2,000 (including stipend and tuition costs).
- Ferguson Waterworks, LLC partnered on this project by providing a Green Stormwater Infrastructure Specialist (Jessica Bruso) to participate in workshops, team meetings, and site visits. In total, Ferguson covered $3,630 in salary and $1,203 in travel expenses for Jessica's participation.

Leveraged projects – Total: $5,987 directly leveraged, $566,502 indirectly leveraged

Directly leveraged:

- Staff paid from other sources contributed to data collection events. In total, 47 hours of OPS personal time was contributed from a UF Florida Sea Grant Project at a value of $1,269 in salary + $90 fringe and 16 hours of UF Biological Scientist II staff time at a value of $510 in salary + $209 fringe.
- We leveraged a postdoctoral associate supervised by Dr. Xiao Yu funded by a project titled "Enhancing Engineering with Nature® Design and implementation in Coastal Systems through multi-sector and interdisciplinary collaboration" (US Army Corps of Engineers) to complete some of the preliminary hydrodynamic modelling. This post-doc contributed 3 weeks of time to the Cedar Key ShOREs analysis and workshop attendance, valued at $3,462 salary + $447 in fringe.

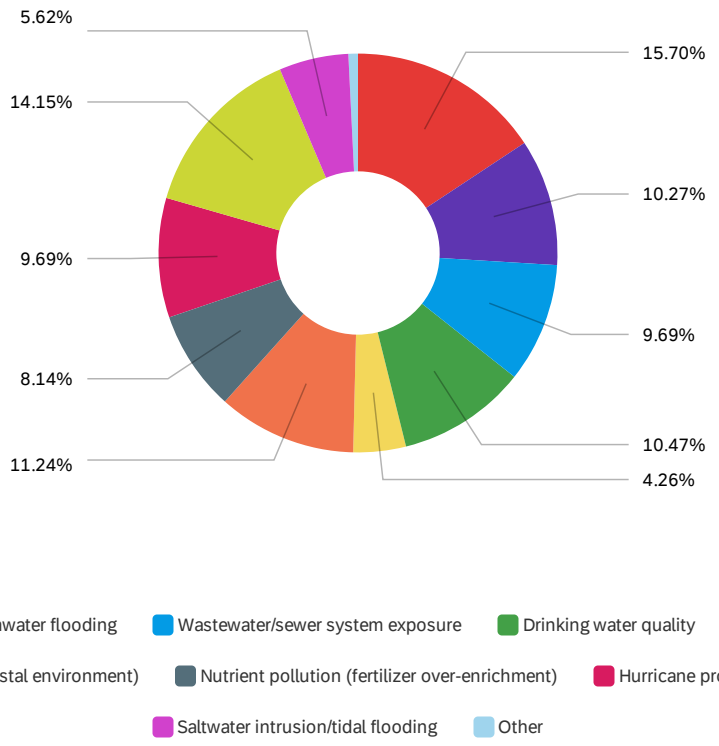
Indirectly leveraged:

Two other grants related to resilience and green infrastructure are closely related to and highly complementary with the Cedar Key ShOREs project.

First, the project titled “Planning and Assessment for a Resilient Cedar Key” (funded by the Florida Department of Environmental Protection, $185,000). In this project, a team of UF faculty, post-docs, and students are completing a flooding vulnerability assessment for the City. This project also includes a stakeholder engagement portion and the content presented in the Cedar Key ShOREs workshops was complemented and reinforced by the content presented in the Resilient Cedar Key workshops. The Resilient Cedar Key project helped residents see and understand their flooding risks while the Cedar Key ShOREs project offered actionable pathways to address risk. The openness and acceptance of nature-based features we experienced in Phase I may be in part due to the strong focus on flooding risk in the Resilient Cedar Key project. Finally, as mentioned above, the designs produced during Cedar Key ShOREs are going to be included in the adaptation plan that will be produced in the coming year of the Resilient Cedar Key project.

Second, a USEPA-funded project titled “Enhancing Shoreline Habitat to Increase Resilience and Raise Awareness about Sustainable Erosion Control Options in Florida’s Central Gulf Coast” ($381,502) recently funded the construction of two living shorelines in highly public and visible shorelines. This project lasted from May 2019 to April 2023. During that time, significant support and momentum for nature-based projects has built within the residents of Cedar Key. We believe that the community engagement and co-design our team previously carried out for these living shorelines prepared us to construct an effective and meaningful series of workshops for Cedar Key ShOREs Phase I. In addition, our previous experience with planning, permitting, and funding nature-based features in the City has prepared us very well for Cedar Key ShOREs Phase II.

S1Q1 - What do you think are the 3 most important coastal issues in Cedar Key?



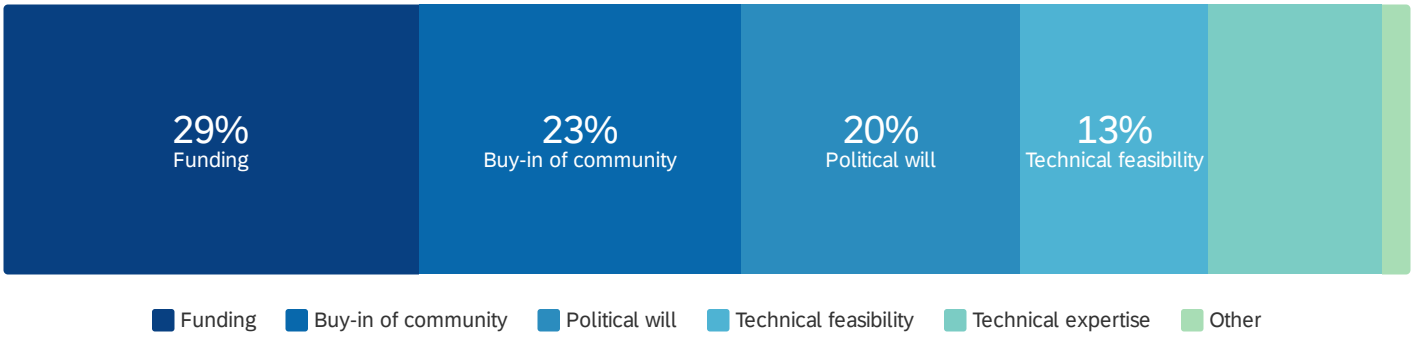
#	Field	Choice Count	
15	Erosion of shore	15.70%	81
16	Stormwater flooding	10.27%	53
17	Wastewater/sewer system exposure	9.69%	50
18	Drinking water quality	10.47%	54
19	Drinking water availability	4.26%	22
20	Marine debris (trash in the coastal environment)	11.24%	58
21	Nutrient pollution (fertilizer over-enrichment)	8.14%	42
22	Hurricane protection	9.69%	50
23	Loss of habitat	14.15%	73
24	Saltwater intrusion/tidal flooding	5.62%	29
25	Other	0.78%	4
			516

Showing rows 1 - 12 of 12

S1Q1_25_TEXT - Other

Other
Sea level rise (causes all issues)
Bacteria levels
Public Access
Loss of beaches and barrier islands

S1Q2 - In your opinion, what are the top 3 key needs for addressing Cedar Key's coastal issues more effectively?



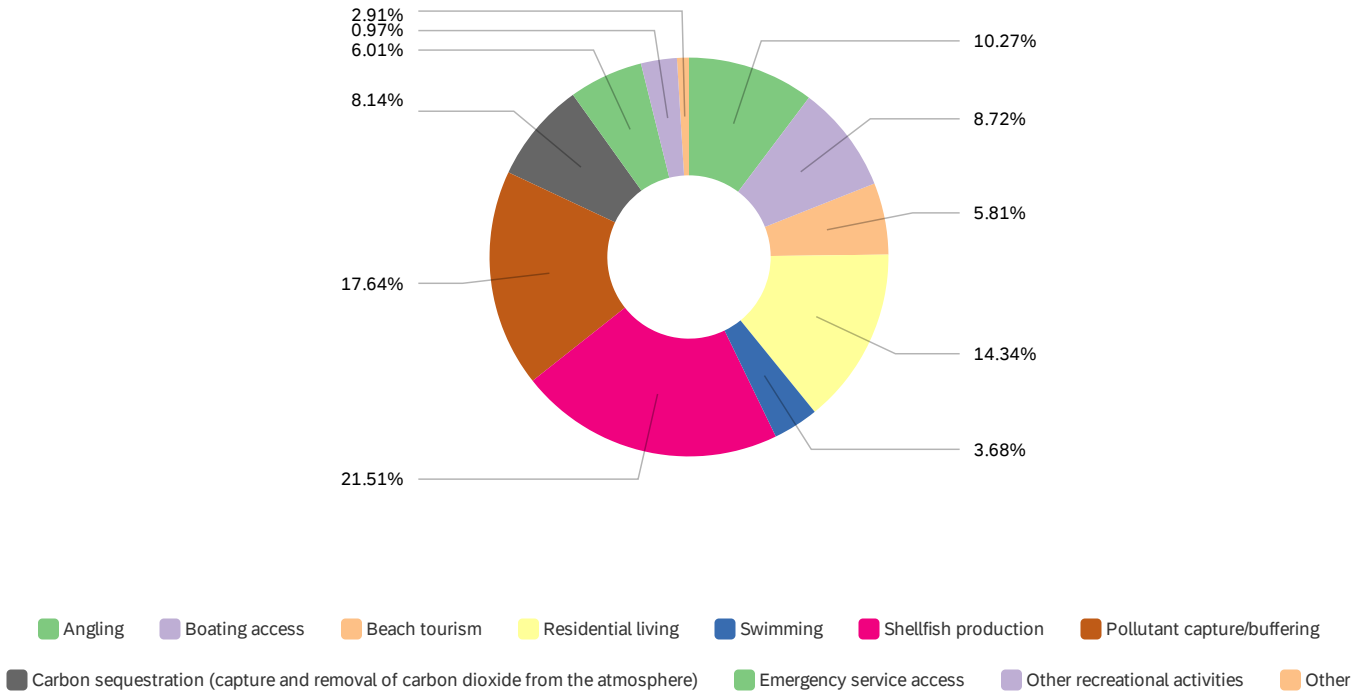
#	Field	Choice Count	
1	Funding	29.46%	152
2	Political will	19.77%	102
3	Buy-in of community	22.87%	118
4	Technical expertise	12.40%	64
5	Technical feasibility	13.37%	69
6	Other	2.13%	11
			516

Showing rows 1 - 7 of 7

S1Q2_6_TEXT - Other

Other
education of citizens
Devisive interests
Locals use habitat correctly
Community organization
Volunteers
Fines for littering and stringent motor certifications (number rone pollution creator is small motors)

S1Q3 - What are the 3 most important shoreline functions that should be safeguarded?



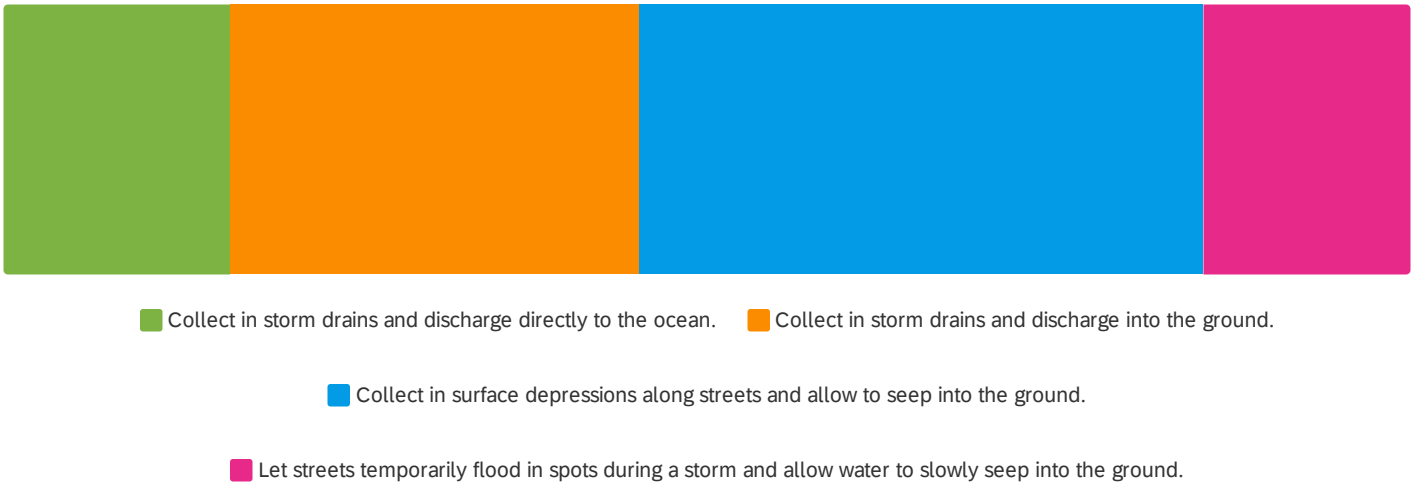
#	Field	Choice Count	
1	Angling	10.27%	53
2	Boating access	8.72%	45
3	Beach tourism	5.81%	30
4	Residential living	14.34%	74
5	Swimming	3.68%	19
6	Shellfish production	21.51%	111
7	Pollutant capture/buffering	17.64%	91
8	Carbon sequestration (capture and removal of carbon dioxide from the atmosphere)	8.14%	42
9	Emergency service access	6.01%	31
10	Other recreational activities	2.91%	15
11	Other	0.97%	5
			516

Showing rows 1 - 12 of 12

S1Q3_11_TEXT - Other

Other
Marine/Coastal life habitats
Natural action of tides along our shorelines
Preservation of natural breeding habitats and barrier islands

S2Q3 - Of the following, which approach do you believe is the best way to manage stormwater runoff (excess rainwater).



#	Field	Choice Count	
1	Collect in storm drains and discharge directly to the ocean.	16.05%	26
2	Collect in storm drains and discharge into the ground.	29.01%	47
3	Collect in surface depressions along streets and allow to seep into the ground.	40.12%	65
4	Let streets temporarily flood in spots during a storm and allow water to slowly seep into the ground.	14.81%	24
			162

Showing rows 1 - 5 of 5

S2Q4 - What approach would you prefer to manage stormwater (excess rainwater) in Cedar Key?

Restrict use of potential pollutants and allow water to be discharged directly to the ocean. (27%)

Allow use of potential pollutants and treat stormwater before discharge to the ocean. (6%)

Allow use of potential pollutants and discharge stormwater to the ocean. (1%)

Allow use of potential pollutants and discharge stormwater into the ground. (5%)

Allow use of potential pollutants, treat then discharge into the ground. (10%)

Restrict use of potential pollutants and discharge stormwater into the ground. (51%)

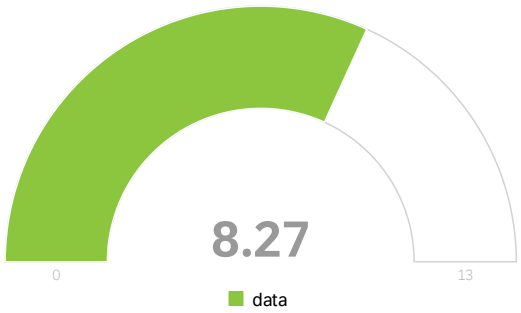
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What approach would you prefer to manage stormwater (excess rainwater) in Cedar Key?	1.00	6.00	4.18	2.18	4.77	161

#	Field		Choice Count
1	Restrict use of potential pollutants and allow water to be discharged directly to the ocean.	26.71%	43
2	Allow use of potential pollutants and treat stormwater before discharge to the ocean.	6.21%	10
3	Allow use of potential pollutants and discharge stormwater to the ocean.	1.24%	2
4	Allow use of potential pollutants and discharge stormwater into the ground.	4.97%	8
5	Allow use of potential pollutants, treat then discharge into the ground.	9.94%	16
6	Restrict use of potential pollutants and discharge stormwater into the ground.	50.93%	82
			161

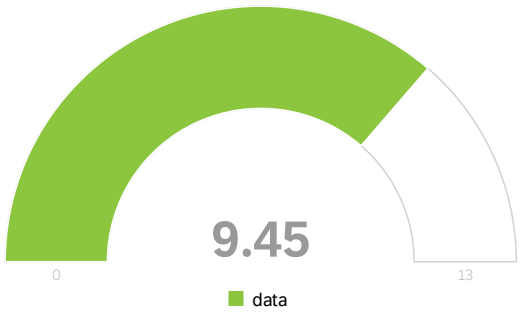
Showing rows 1 - 7 of 7

S2Q5 - We are interested in personal perspectives regarding what might be considered a nuisance flood vs. a critically disruptive flood for various activities and services. Please, rank the activities and services below ordering them by the most important (number 1) to be protected from flood to the least important (number 13) to be protected from flood. Respond in relation to your individual/family values.

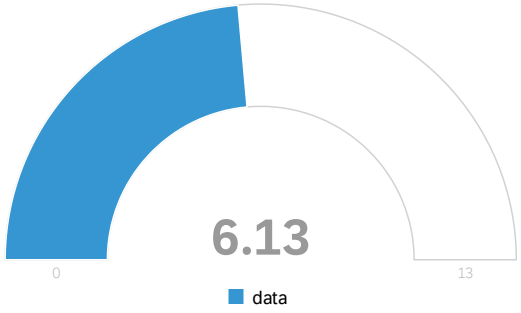
S2Q5_1 - Beach



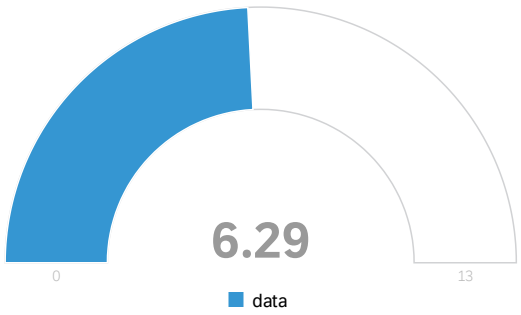
S2Q5_2 - Favorite fishing spot



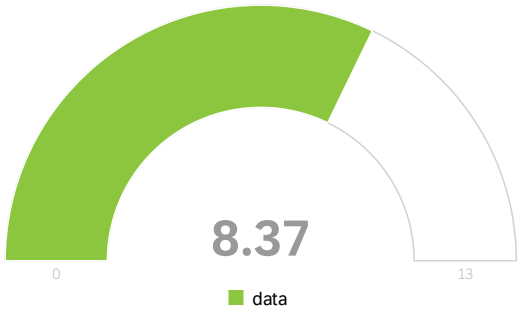
S2Q5_3 - Grocery store



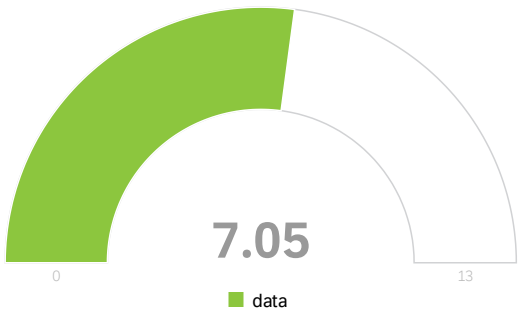
S2Q5_4 - Gas station



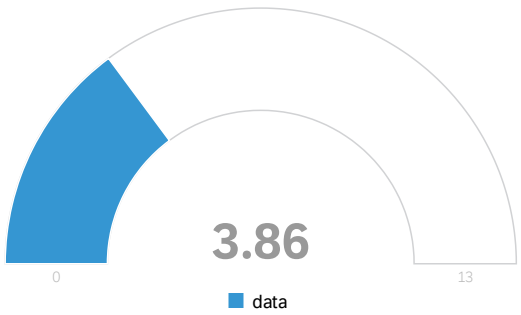
S2Q5_5 - Boat ramp



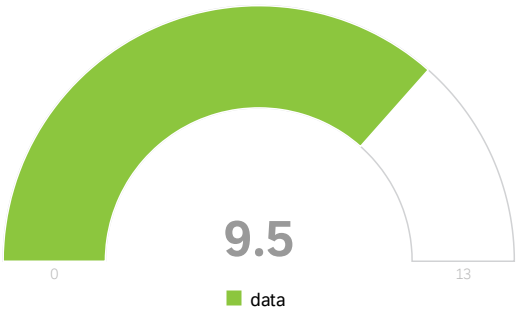
S2Q5_6 - Workplace



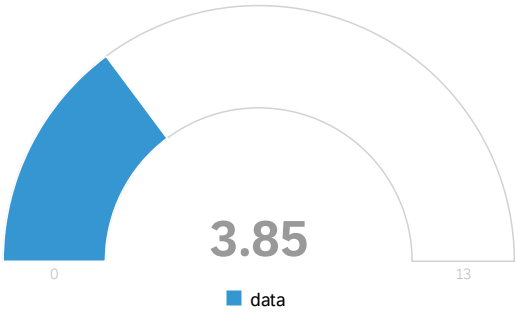
S2Q5_7 - Residence



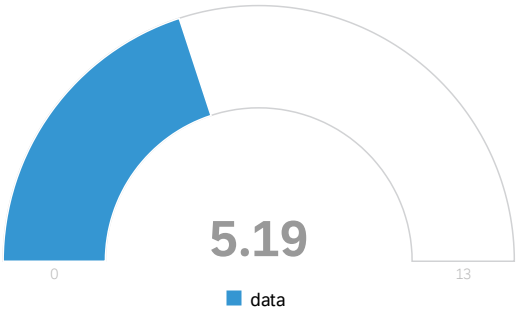
S2Q5_8 - Favorite bar/restaurant



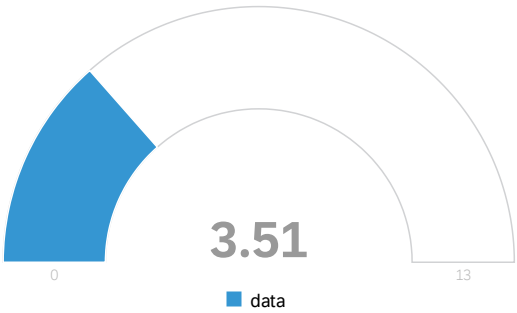
S2Q5_9 - Hospital



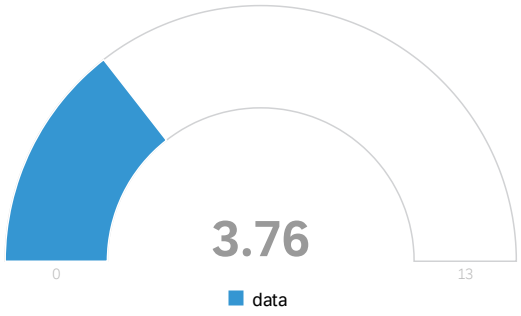
S2Q5_10 - Health care clinic



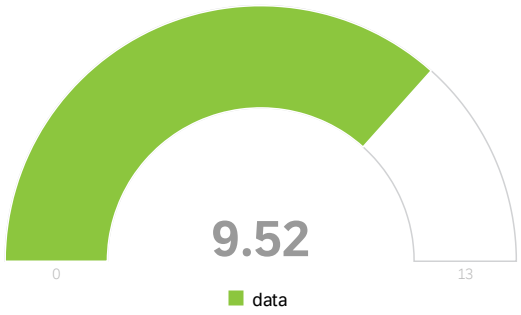
S2Q5_11 - Ambulance



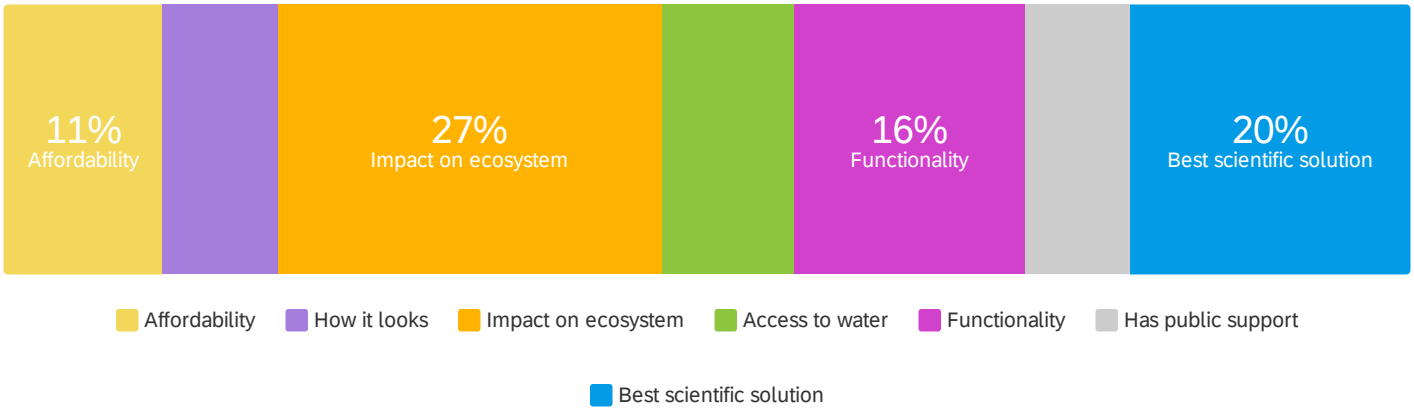
S2Q5_12 - Fire station



S2Q5_13 - Church



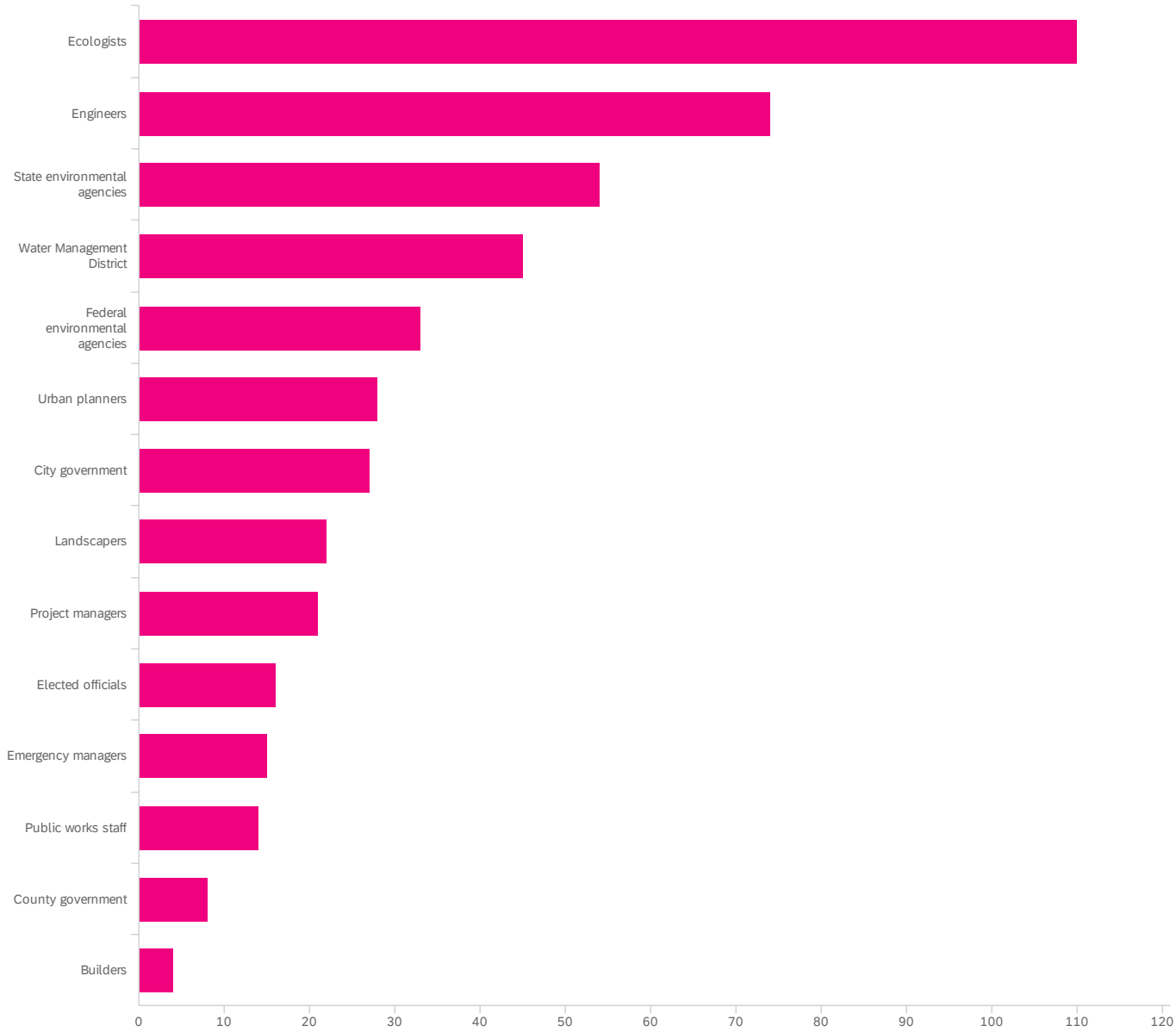
S2Q6 - What are your main priorities in choosing coastal infrastructure options for Cedar Key? (Select top 3)



#	Field	Choice Count	
3	Impact on ecosystem	27.29%	131
2	How it looks	8.13%	39
6	Has public support	7.50%	36
5	Functionality	16.46%	79
7	Best scientific solution	20.00%	96
1	Affordability	11.25%	54
4	Access to water	9.38%	45
			480

Showing rows 1 - 8 of 8

S3Q1 - What professionals are most important to green infrastructure projects? (select top 3)

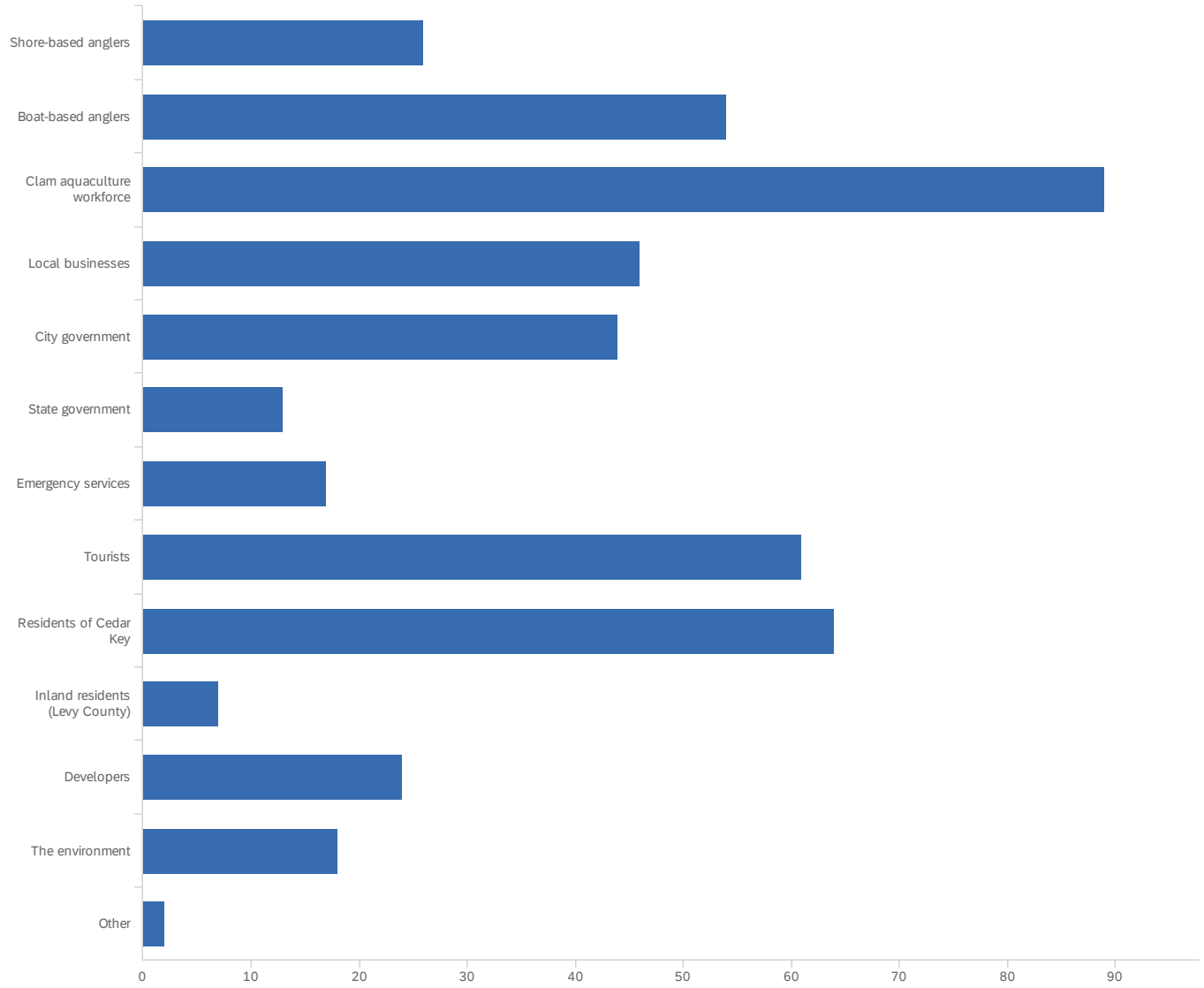


#	Field	Choice Count	
1	Engineers	15.71%	74
2	Urban planners	5.94%	28
3	Landscapers	4.67%	22
4	Ecologists	23.35%	110
5	Builders	0.85%	4

#	Field		Choice Count
6	Project managers	4.46%	21
7	Emergency managers	3.18%	15
8	Public works staff	2.97%	14
9	City government	5.73%	27
10	County government	1.70%	8
11	Federal environmental agencies	7.01%	33
12	Elected officials	3.40%	16
13	Water Management District	9.55%	45
14	State environmental agencies	11.46%	54
			471

Showing rows 1 - 15 of 15

S3Q2 - Which group’s/whose needs ARE CURRENTLY prioritized in Cedar Key’s coastal infrastructure? (select top 3)

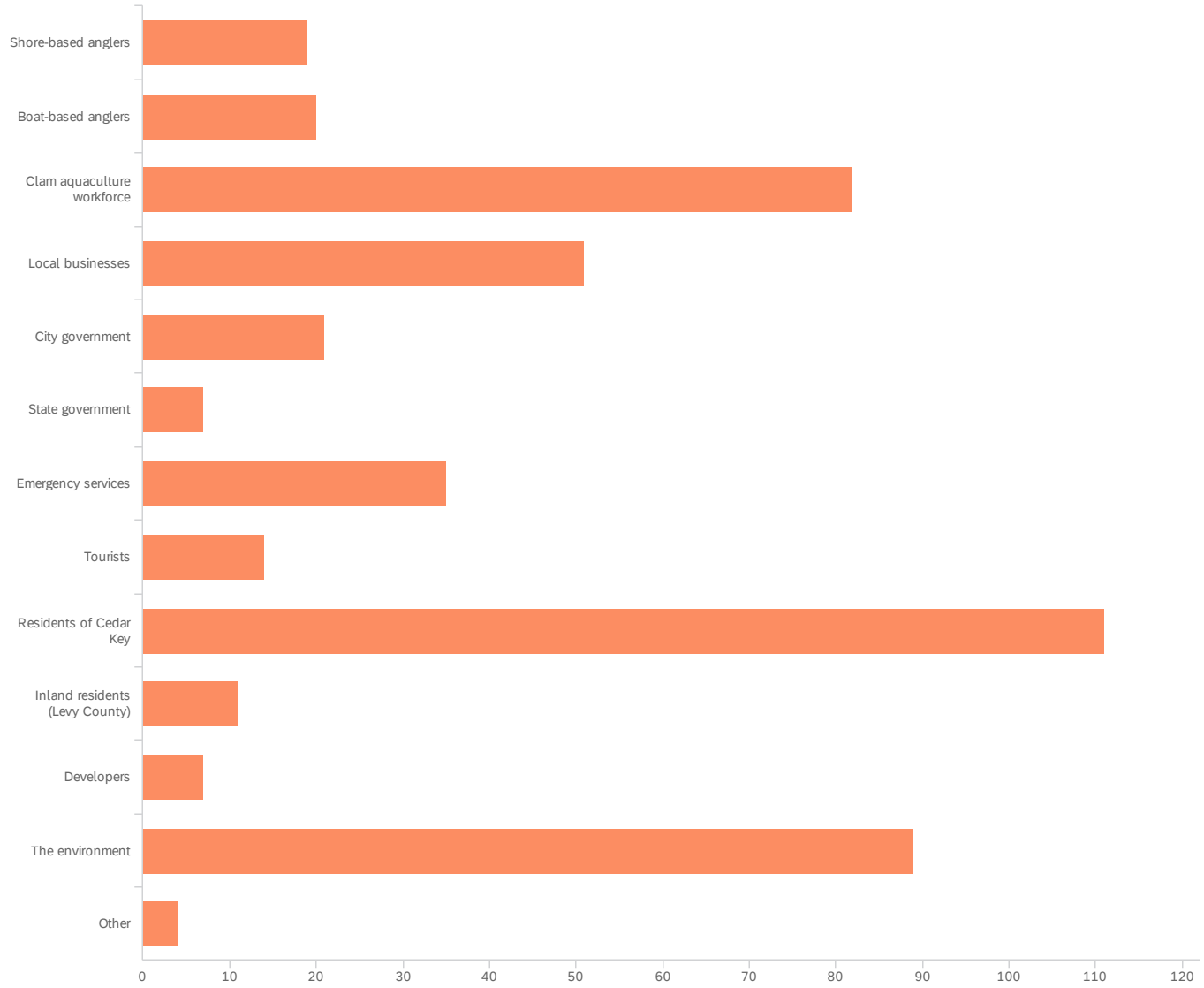


#	Field	Choice Count
1	Shore-based anglers	5.59% 26
2	Boat-based anglers	11.61% 54
3	Clam aquaculture workforce	19.14% 89
4	Local businesses	9.89% 46
5	City government	9.46% 44
6	State government	2.80% 13

#	Field		Choice Count
7	Emergency services	3.66%	17
8	Tourists	13.12%	61
9	Residents of Cedar Key	13.76%	64
10	Inland residents (Levy County)	1.51%	7
11	Developers	5.16%	24
12	The environment	3.87%	18
13	Other	0.43%	2
			465

Showing rows 1 - 14 of 14

S3Q3 - Which group’s/whose needs SHOULD BE prioritized in Cedar Key’s coastal infrastructure? (select top 3)



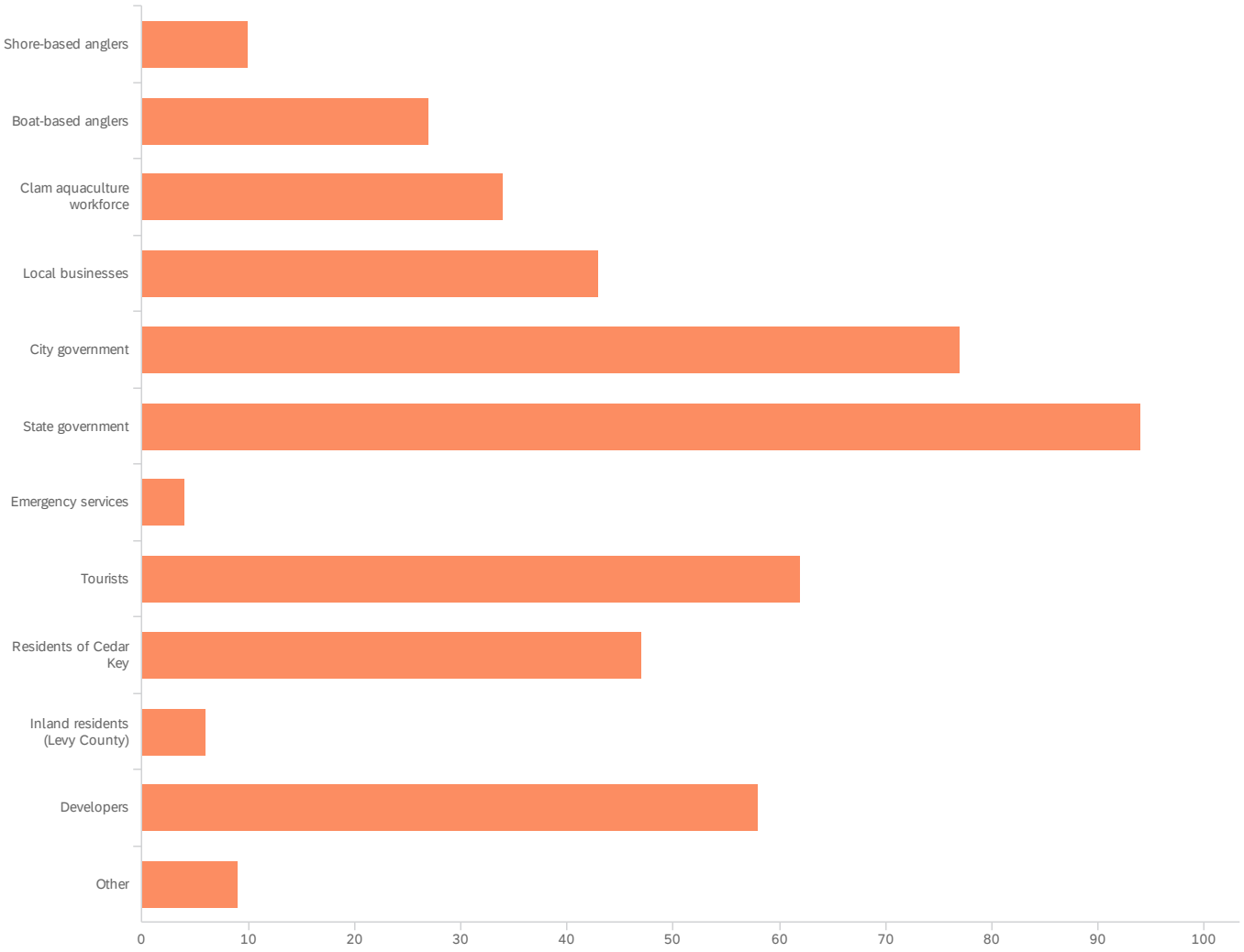
#	Field	Choice Count	
1	Shore-based anglers	4.03%	19
2	Boat-based anglers	4.25%	20
3	Clam aquaculture workforce	17.41%	82
4	Local businesses	10.83%	51
5	City government	4.46%	21
6	State government	1.49%	7

#	Field		Choice Count
7	Emergency services	7.43%	35
8	Tourists	2.97%	14
9	Residents of Cedar Key	23.57%	111
10	Inland residents (Levy County)	2.34%	11
11	Developers	1.49%	7
12	The environment	18.90%	89
13	Other	0.85%	4
			471

Showing rows 1 - 14 of 14

S3Q4 - Who should CONTRIBUTE FUNDING to Cedar Key’s coastal infrastructure?

(select top 3)

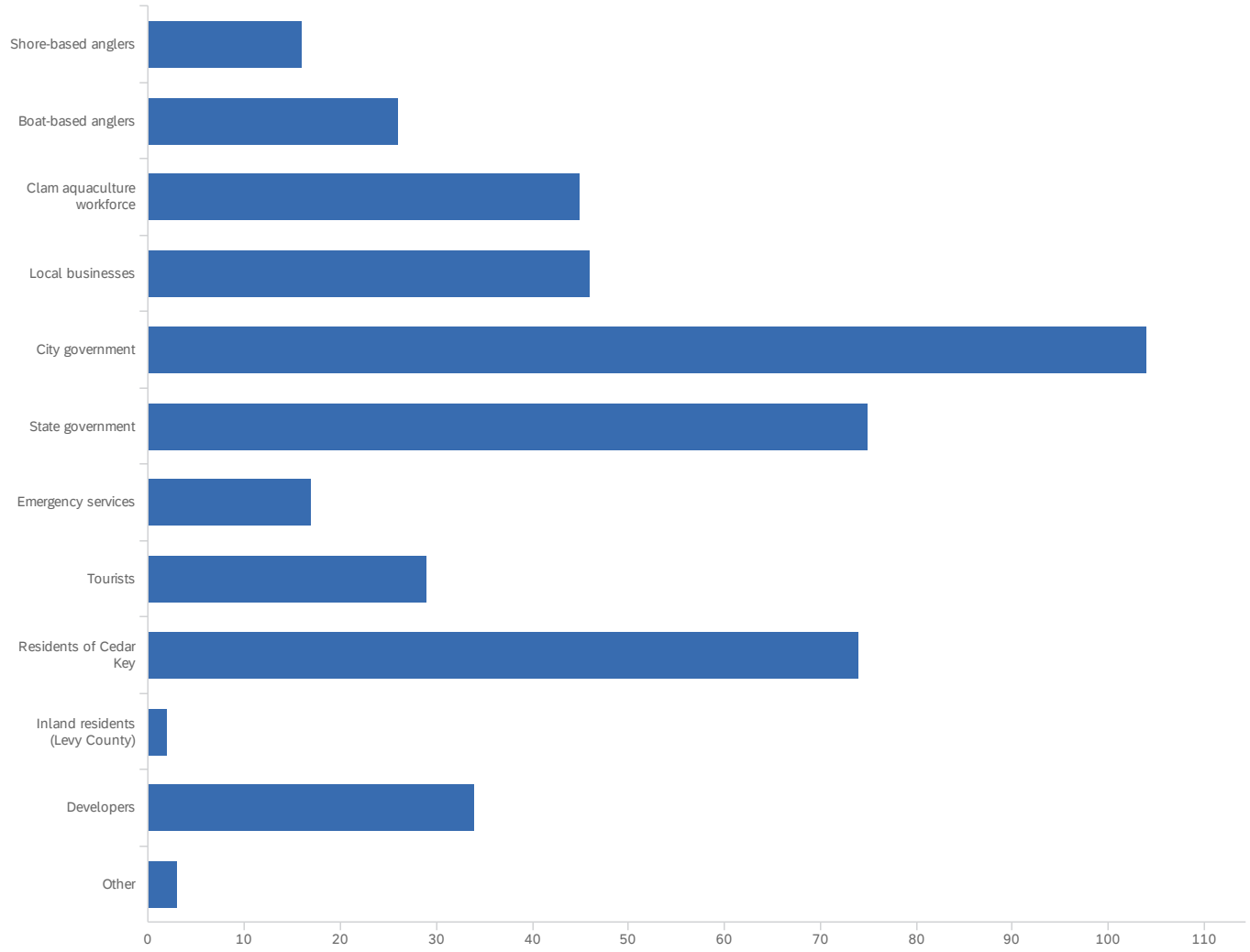


#	Field	Choice Count	
1	Shore-based anglers	2.12%	10
2	Boat-based anglers	5.73%	27
3	Clam aquaculture workforce	7.22%	34
4	Local businesses	9.13%	43
5	City government	16.35%	77
6	State government	19.96%	94
7	Emergency services	0.85%	4
8	Tourists	13.16%	62

#	Field		Choice Count
9	Residents of Cedar Key	9.98%	47
10	Inland residents (Levy County)	1.27%	6
11	Developers	12.31%	58
13	Other	1.91%	9
			471

Showing rows 1 - 13 of 13

S3Q5 - Who should contribute to the MANAGEMENT AND MAINTENANCE of Cedar Key's coastal infrastructure? (select top 3)



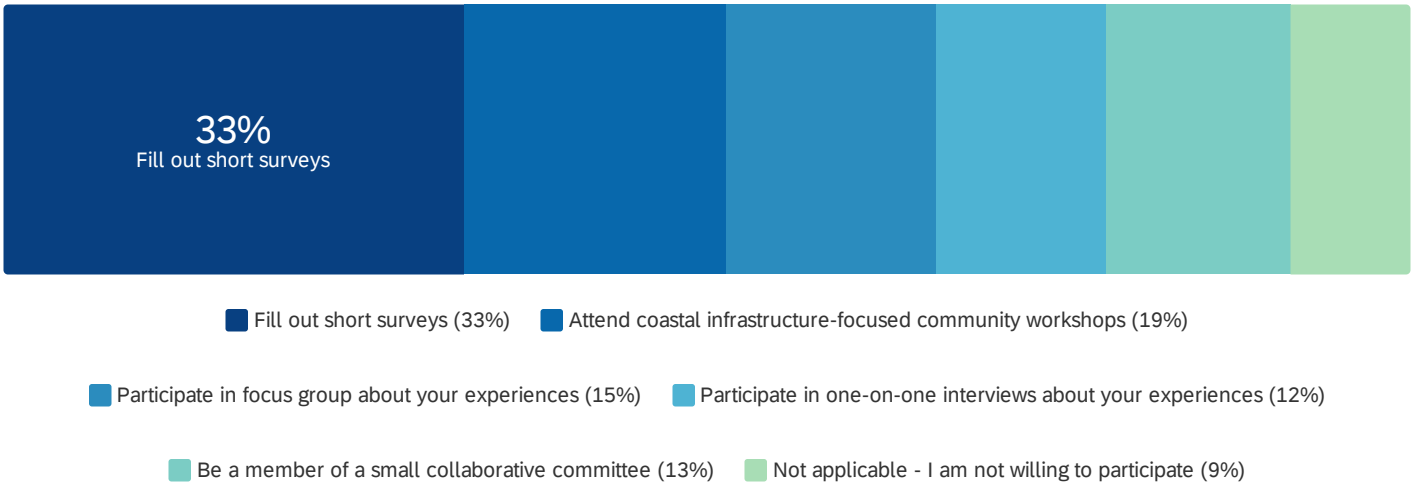
#	Field	Choice Count	
1	Shore-based anglers	3.40%	16
2	Boat-based anglers	5.52%	26
3	Clam aquaculture workforce	9.55%	45
4	Local businesses	9.77%	46
5	City government	22.08%	104
6	State government	15.92%	75
7	Emergency services	3.61%	17
8	Tourists	6.16%	29

#	Field		Choice Count
9	Residents of Cedar Key	15.71%	74
10	Inland residents (Levy County)	0.42%	2
11	Developers	7.22%	34
13	Other	0.64%	3
			471

Showing rows 1 - 13 of 13

S3Q6 - How would you be willing to participate in coastal infrastructure co-design?

(select all that apply)

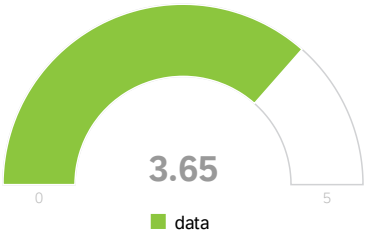


#	Field	Choice Count	
1	Fill out short surveys	32.66%	114
2	Participate in one-on-one interviews about your experiences	12.03%	42
3	Participate in focus group about your experiences	14.90%	52
4	Attend coastal infrastructure-focused community workshops	18.62%	65
5	Be a member of a small collaborative committee	13.18%	46
6	Not applicable - I am not willing to participate	8.60%	30
			349

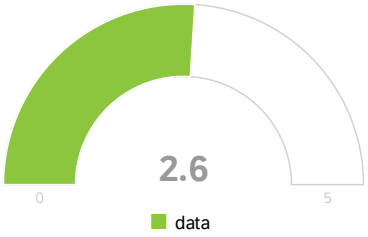
Showing rows 1 - 7 of 7

S4Q1 - Please indicate whether you agree or disagree with the following statement:

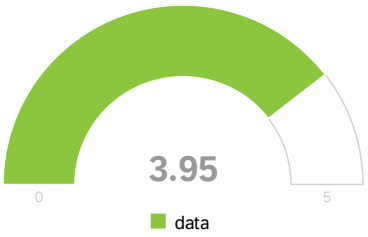
We are approaching the limit of the number of people the Earth can support.



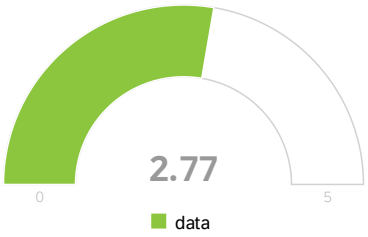
Humans have the right to modify the natural environment to suit their needs.



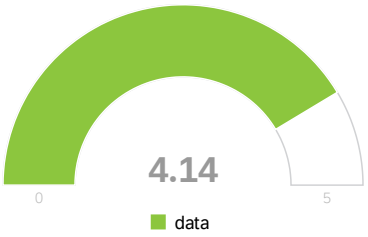
When humans interfere with nature it often produces disastrous consequences.



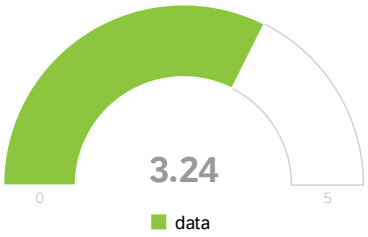
Human ingenuity will ensure that we do not make the Earth unlivable.



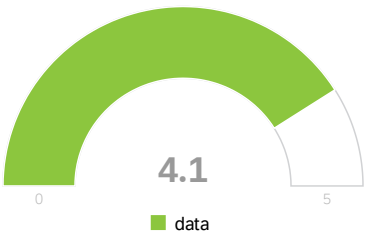
Humans are seriously abusing the environment.



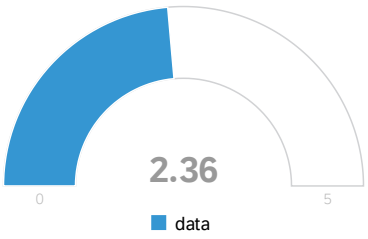
The Earth has plenty of natural resources if we just learn how to develop them.



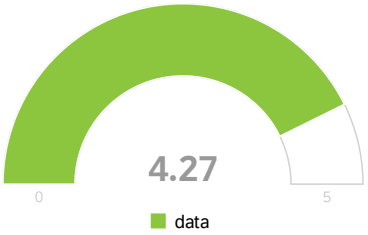
Plants and animals have as much right as humans to exist.



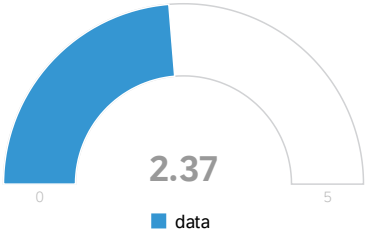
The balance of nature is strong enough to cope with the impacts of modern industrial nations.



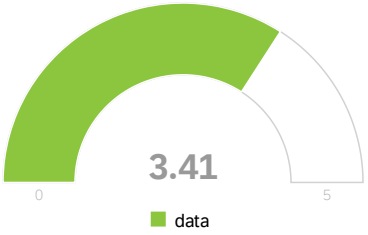
Despite our special abilities, humans are still subject to the laws of nature.



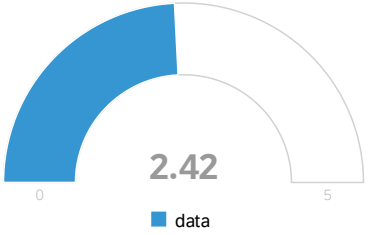
The so-called “ecological crisis” facing humankind has been greatly exaggerated.



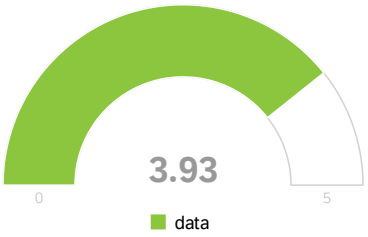
The Earth is like a spaceship with very limited room and resources.



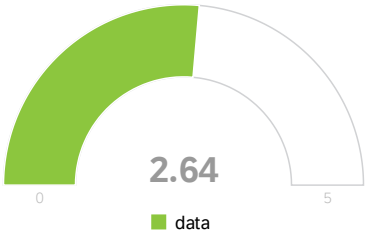
Humans were meant to rule over the rest of nature.



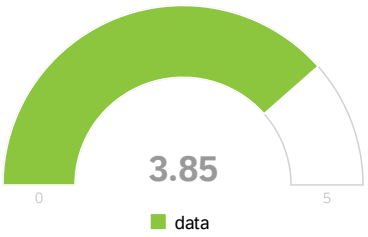
The balance of nature is very delicate and easily upset.



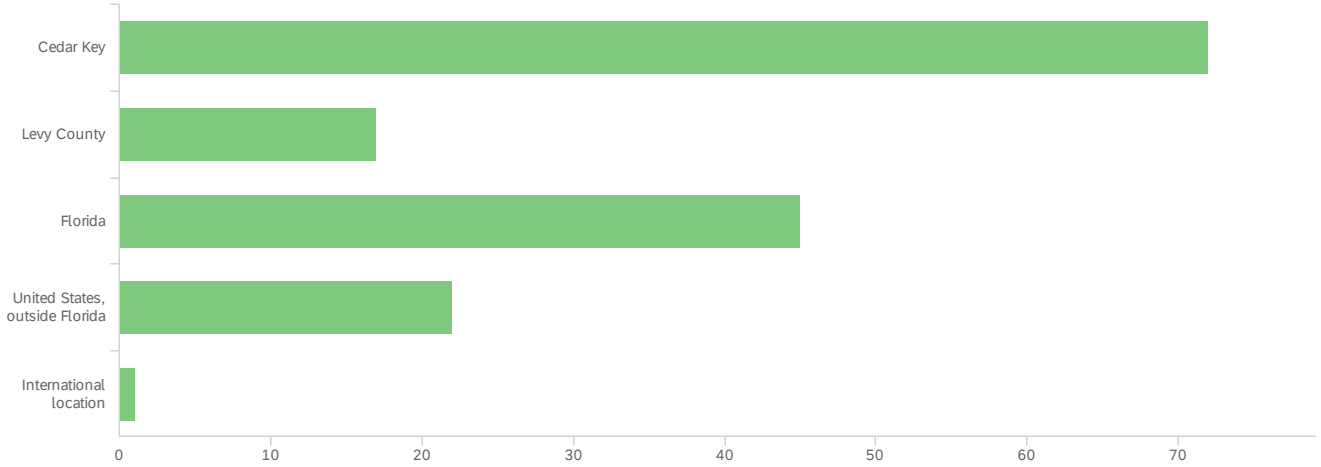
Humans will eventually learn enough about how nature works to be able to control it.



If things continue on their present course, we will soon experience a major ecological catastrophe.



S5Q2 - You reside in ……. (select the most applicable choice)

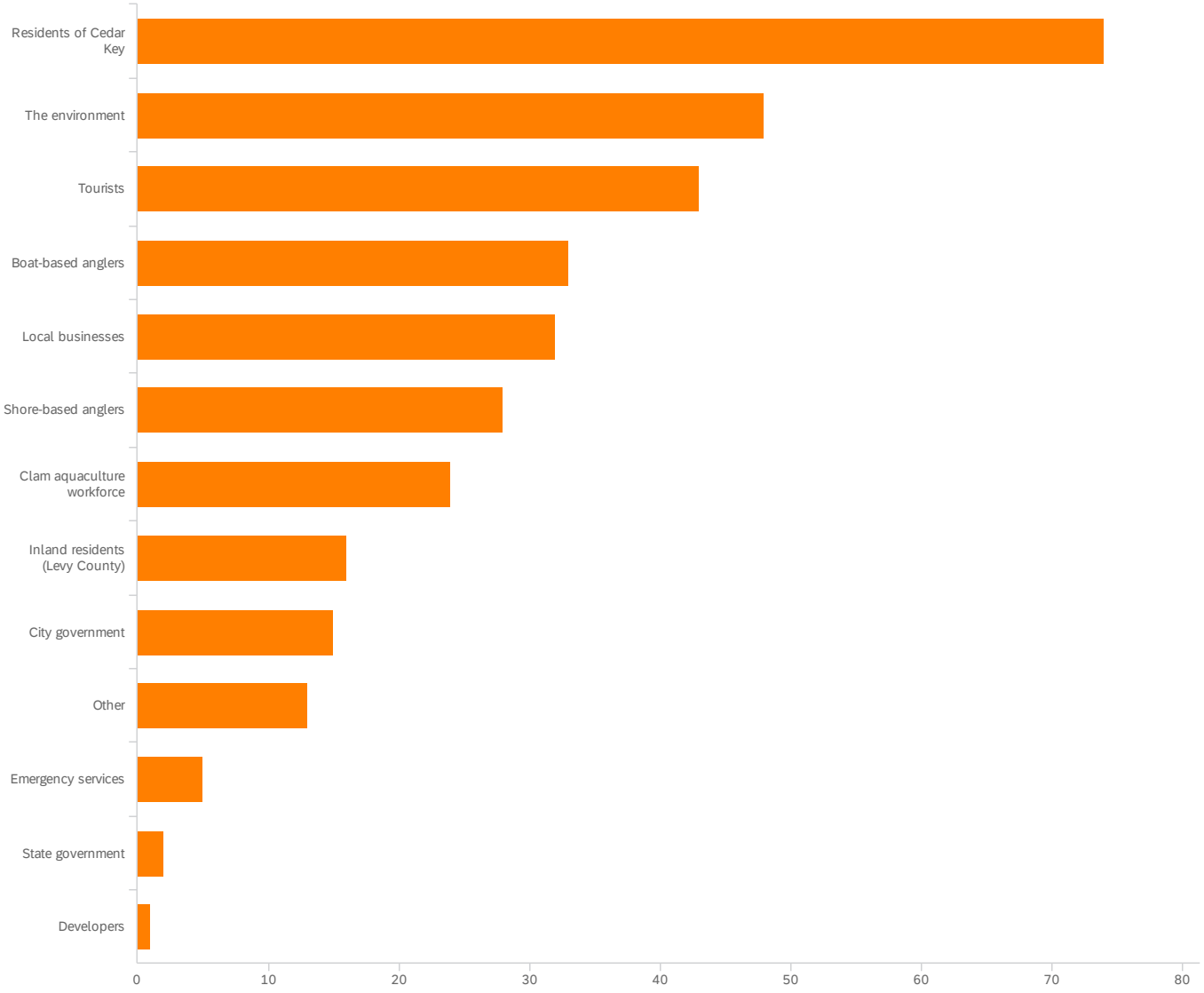


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	You reside in ……. (select the most applicable choice)	1.00	5.00	2.13	1.16	1.35	157

#	Field	Choice Count	
1	Cedar Key	45.86%	72
2	Levy County	10.83%	17
3	Florida	28.66%	45
4	United States, outside Florida	14.01%	22
5	International location	0.64%	1
			157

Showing rows 1 - 6 of 6

S5Q4 - What stakeholder group(s) do you most identify with? Select all that apply.

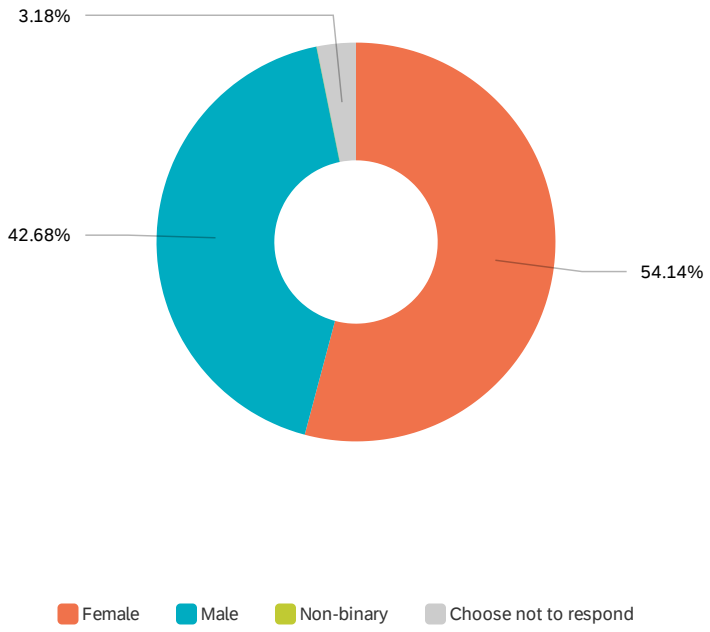


#	Field	Choice Count	
1	Shore-based anglers	8.38%	28
2	Boat-based anglers	9.88%	33
3	Clam aquaculture workforce	7.19%	24
4	Local businesses	9.58%	32
5	City government	4.49%	15
6	State government	0.60%	2
7	Emergency services	1.50%	5
8	Tourists	12.87%	43

#	Field	Choice Count	
9	Residents of Cedar Key	22.16%	74
10	Inland residents (Levy County)	4.79%	16
11	Developers	0.30%	1
12	The environment	14.37%	48
13	Other	3.89%	13
			334

Showing rows 1 - 14 of 14

S5Q4 - What is your gender identity?

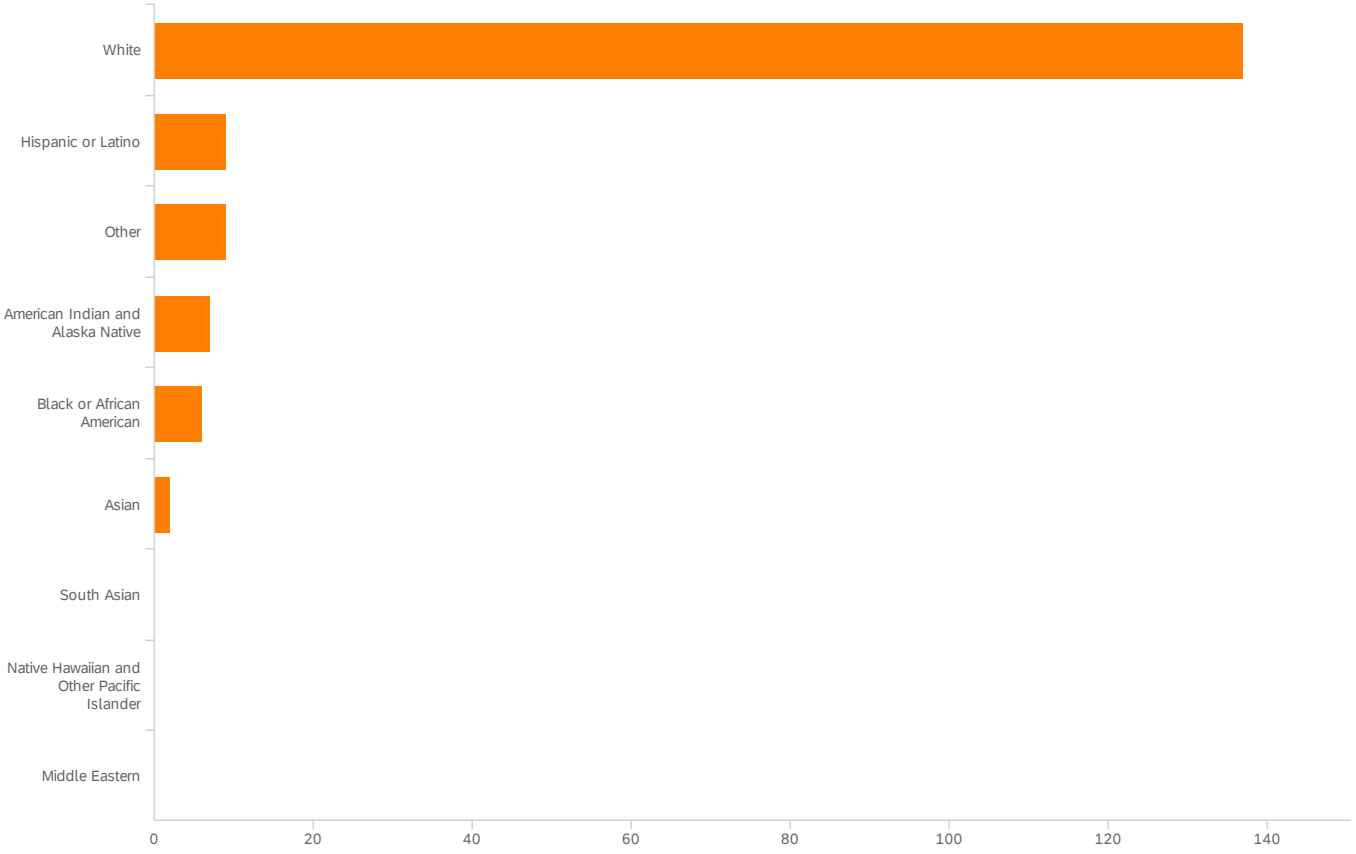


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your gender identity?	1.00	4.00	1.52	0.66	0.44	157

#	Field		Choice Count
1	Female	54.14%	85
2	Male	42.68%	67
3	Non-binary	0.00%	0
4	Choose not to respond	3.18%	5
			157

Showing rows 1 - 5 of 5

S5Q5 - What is your race/ethnicity? (Select all that apply)



#	Field	Choice Count	
1	Hispanic or Latino	5.29%	9
2	White	80.59%	137
3	Black or African American	3.53%	6
4	American Indian and Alaska Native	4.12%	7
5	Asian	1.18%	2
6	South Asian	0.00%	0
7	Native Hawaiian and Other Pacific Islander	0.00%	0
8	Middle Eastern	0.00%	0
9	Other	5.29%	9
			170

Showing rows 1 - 10 of 10

Cedar Key ShOREs Workshop #1: Stormwater Concepts
Feb 18, 2023
10 AM to 12:30 PM
Cedar Key Community Center

- 10:00 Welcome & Icebreaker
    - Pick 3 items and add to the town
        - Initial discussions place emphasis on clean drinking water
            - Water & wastewater management
        - Lots of vegetation added along shoreline
        - Shellfish, habitat, recreation were popular themes

    - Savanna gave intro
    - Asked a few folks to come up and explain their additions
        - Issue with squirrels & raccoons infiltrating house
            - Thoughts about relocating animals
        - Better recycling
            - Cedar Key has but Levy County doesn't
            - No glass recycling
        - Fertilizer reduction
            - Runoff issues
        - Habitat restoration for horseshoe crabs
        - Want sewage out of town
            - No drain pipes (emphasis on wanting sewage and drain pipes OUT, bringing clean water IN)
        - Clean water
        - Clean oysters & clams

        - Keep fishermen & products in the city
    - Native plants & coastal vegetation
        - "Appealing landscapes"
    - Many trees near waterfront, reduce the cutting or trees
    - Approve of pervious pavement
        - Don't like the practice of de-vegetating lawns and replacing with gravel
    - Better wildlife education/signage for residents and also weekend tourists
        - Fix issue with cut fishing lines
        - Animal and bird rescues
    - Approve of infiltration trench
    - Mangrove restoration and trenches to help with filtration
    - Better pet waste pick up
        - For clean waterways, feral cats a major issue?
        - Cedar Key added more bag stations, issue is getting people to use them
- <u>10:20 Project Overview & Team Intros</u>
    - Make sure they know the goal
        - National Academies Gulf Research Program nature-based features planning grant
        - Get a conceptual design community accepts, next phase will be design work for the community-approved projects(s)
        - Question: Focus on G street or in general?
            - Answer: Focus is along G & 1st Street neighborhoods
        - Question: Are we trying to capture and filter stormwater?
            - Answer: Upland options to reduce flow into the gulf.
    - Team members intro (name, affiliation, role on project)
- <u>10:30 Context/Issue</u> -
    - Presentation of stormwater context and issues identified
        - G St & D St outfall catchments
        - Rising sea level impact on stormwater management infrastructure
        - Questions
            - Noticed stormwater floods by beachfront only; not familiar with it on higher ground.
                - Answer: flooding is occurring in the low ground
            - When removing water after storms, higher ground should produce filtration/treatment, not just remove water
            - Does most of the flooding occur during king tide?
            - If sea level rises past a certain level, is there anything we can do?
            - Is it possible to pump water further inland or somewhere else?

- If you treat this water can it become reclaimed water?
    - People can do this on their own property
- Wildlife rescue gotten calls about manatees stuck in drainage pipe by G St
    - But it is actually the whale tail on the end of the drain pipe (not wildlife)
- Possible to raise the level in low lying areas?
- Town has never held water after storm, excess water generally leaves quickly
    - Nuisance flooding
- Consider the maintenance costs of each solution
- Is there an engineering design that would be an improvement for whale tail drains
- Are options sorted by cost?
    - They are sorted from top of watershed to coast
- How to fix G St issue of water running down the hill?
- Do catch basins fill with sedimentation? Can the pipe be extended?
    - City measures sediment & hires maintenance (5-15 thousand dollars per year in maintenance costs)
    - Street sweeping helps alleviate
- Are we taking lessons from Miami dealing with the same issue?
    - Opportunities to move things up and away from flooded areas?
- Have we done any loading estimates on storm events with nitrogen, phosphorus, etc?

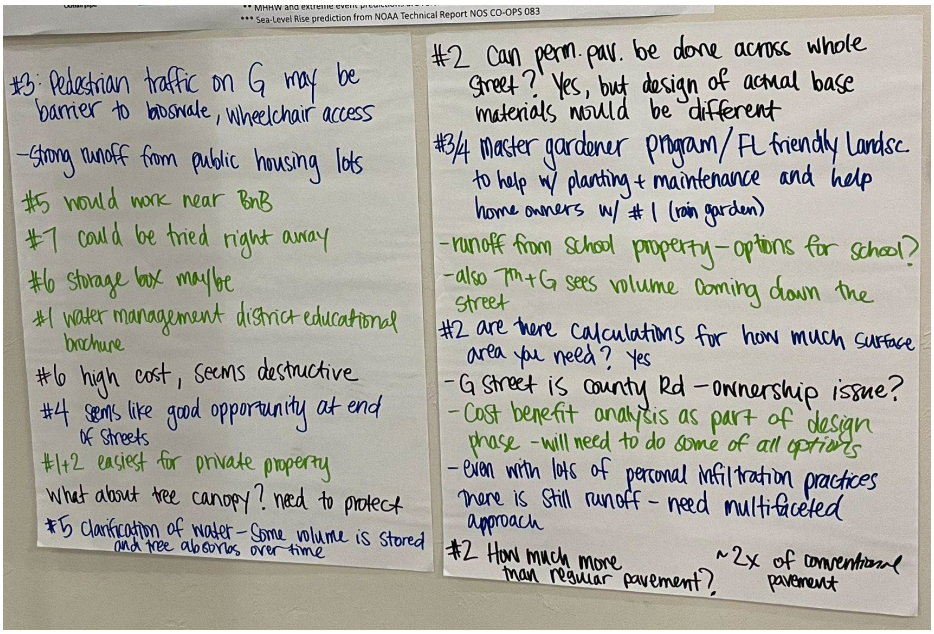
- 11:00 Coffee break
- 11:10 Project options
    - Presentation of stormwater project options
        - Option 1: Personal Runoff Reduction
            - Initial survey
                - 100% acceptable
        - Option 2: Permeable Pavement
            - Cedar Key already has permeable pavements on 3rd St
            - Initial survey
                - 80% acceptable
        - Option 3: Bioswales
            - Existing example in Cedar Key can be seen on Hodges, doesn't have a pipe but is a bioswale
            - Is there funding available?
            - Where on G Street would it be?

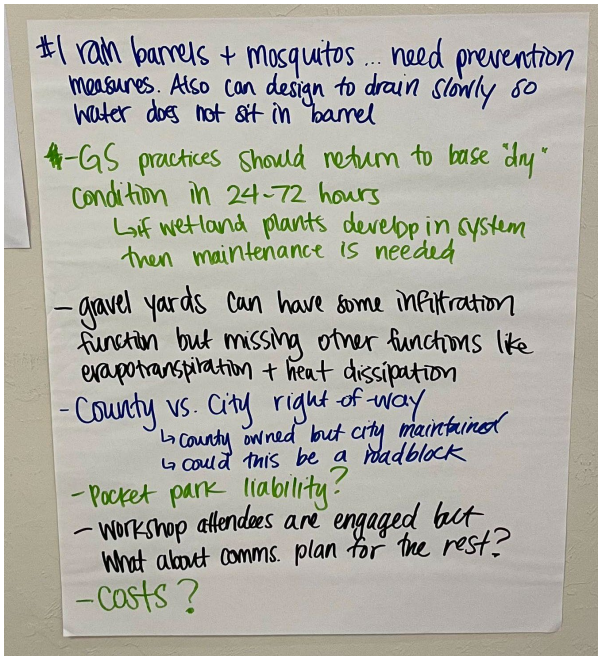
        - Initial survey
            - 92% acceptable
        - How are bioswales and bioretention different?
    - Option 4: Bioretention/Landscape-based Infiltration
        - Initial survey
            - 90% acceptable
    - Option 5: Tree Box Filter
        - How does water accumulate?
        - Are there prices?
        - Initial survey
            - 90% acceptable
    - Option 6: Underground storage
        - Initial survey
            - 67% acceptable
    - Option 7: Inline Check Valve
        - Initial survey
            - 91% acceptable
- <u>11:45 Feedback session</u>
    - G St pedestrian traffic
        - Everyone walks on street
        - Wheelchair access needs to be maintained
        - Concern there is no space for bioswale
        - Strong runoff from public housing lots
    - All options are good, but depend on area of town
        - Bioswale might not good option for G St - space concerns
        - #5 would work near BnB, but would want to know cost
        - #7 could be tried right away, very much in favor
        - #6 storage box, open to it if we fix check valve and there is still problem
        - #1: Could get water management board to help
            - Educational brochure
        - Pleased with presentation & options
    - #6 underground storage concerns
        - High cost
        - Destructive
        - Where would it be put?
    - Anchor hole drainage ditch pipe goes into NCBS property
        - Would be good place to fix the issue & study this option
        - Is there salt water/freshwater testing?
    - #4 good opportunity at end of streets
    - #1 & #2 best for private property owners

        - Other options they are unlikely to have space for
        - How to give incentive to property owners?
    - Absence of tree canopy protection
    - #5: Does the tree box drain better than a standalone tree?
        - Some volume is stored and tree absorbs over time
    - #2 permeable pavement
        - City should practice using permeable materials in new projects
        - Can this be done across an entire street?
            - Yes, but design of actual base materials would be different
    - #3 & #4: Could these be worked on with homeowners through the master gardener program?
        - Use native plants & help with #1 rain garden
    - Major runoff after rain events near the school
        - Options to stop flow?
    - Also runoff down 7th and G St
        - Grassy lot absorbs water
    - #2: Are there calculations for how much surface area we need?
    - G St belongs to county, potential issue
    - Useful to look at cost benefit analysis of each
        - Likely will end up doing some of all options
    - Participant has multiple of these options on property, still has runoff issues during larger events
        - Have to use multiple methods
    - Cost difference between permeable and regular pavement?
        - About 2x conventional pavement
    - Mosquito concerns with rain barrels
        - Increased pesticide use to prevent mosquitos?
        - Can design to drain slowly so water does not sit in barrel
    - GS practices should return to base dry condition in 24-72 hours
        - If wetland plants develop then maintenance needed
    - Benefits of native vegetation vs gravel?
        - Gravel has some infiltration function but missing evapotranspiration & heat dissipation functions - overall less functional than vegetation
    - County vs. city limitations?
        - County owned but city maintained
        - Legal obstacles?
        - Pocket park liability
    - Limited group of participants, is there a communications plan for the rest of CK?
        - Get everyone else involved
        - Expand education programs

- Call county commissioner & put pressure to get involved
- Don't rely on grant, get everything ready for when opportunities arise
- Claim undeveloped land now to not create animosity with homeowners
- Written feedback sheet (John Goad):
    - Option 1: Personal Runoff Reduction
        - What do you think about this option?
            - Every bit helps
        - What concerns do you have about this option?
            - Participation: Cost of pavement reconstruction
    - Option 2
        - What do you think about this option?
            - Helps
        - What concerns do you have about this option?
            - Cost
    - Option 3
        - What do you think about this option?
            - Helps
        - What concerns do you have about this option?
            - Cost
    - Option 4
        - What do you think about this option?
            - Citizen Participation
        - What concerns do you have about this option?
            - Maintenance
        - Do you have any additional thoughts on this option?
            - Helps
    - Option 5
        - What do you think about this option?
            - Helps
        - What concerns do you have about this option?
            - Who pays for this?
        - Do you have any additional thoughts on this option?
            - How much water can a tree absorb in any period of time?
    - Option 6
        - What do you think about this option?
            - Great! Helps
        - What concerns do you have about this option?
            - Cost
        - Do you have any additional thoughts on this option?
            - Pump it out to add volume reduction

- Option 7
    - What do you think about this option?
        - Works. Helps
        - Strong recommendation
    - What concerns do you have about this option?
        - Cost-maintenance
    - Do you have any additional thoughts on this option?
        - Priority. Should work well





- 12:15 Wrap-up, Next Steps
    - Volunteers for photo voice project
        - Identify local scenes to get buy-in from residents
    - Positive feedback for how everything was arranged & laid out :)
    - Can we change survey responses?
- 12:30 - Discussions continued over lunch

Cedar Key ShOREs Workshop 2: Shoreline Concepts

March 4, 2023

10 AM - 12:30 PM

Cedar Key Community Center

- 10:00: Welcome & Icebreaker
    - Pick 3 items to add to town

        - Lots of vegetation & wildlife along shoreline
        - Revetment exists already but participant is not a fan
        - Groins can be essential to shoreline restoration to address wave energy
            - Storms have been uprooting vegetation before it gets a foothold
        - The bladder (large sand bag) along Tyree canal near Joe Rains has been effective
    - Shoreline concerns
        - Are there options besides vegetation to filter stormwater?
        - Horseshoe crabs can't lay eggs in concrete
- 10:15: Project overview & Team intros
- 10:25: Context/Issue
    - Presentation comments
        - History of G & 1st St Shorelines
            - Does G St 2003 picture depict a catch basin? Asked what the structure was and if it was a historic drainage structure.
        - Survey results
            - Are these open ended questions?

- Summary
    - Are we trying to address the fact that the original sand supply has been cut off?
- Olsen Associates past efforts
    - Were there cost estimates associated with implementing groins?
    - Where does the sand from this project and UF projects come from? Is it dredged?
- Existing G Street vegetation from previous project
    - How long will what we've (UF) already done last?

- Q&A
    - For Joe Rains, what were your expectations compared to what has actually happened?
    - Has the lack of community support that prevented finishing the G Street project changed since past efforts?
    - City has an inner marina project-dredging event, is there any way to utilize that material to feed the shoreline? How can we pair the two projects?
        - Natural sediments seem better than bringing something in from mine
            - Legal issues & silt/fine particles

        - Could this material be used to fill bladders like at Joe Rains Beach?
            - Bladders would clog with fine silt
        - Resident specifically had issue with sand having to be brought in from a mine rather than using an emphasis on **local** sediment (other resident pointed out that the very high silt content would make it incompatible)
- How sure are you about the projection for 2050 about water rise?
    - If that happens, wouldn't these options just serve as band aids?
- Is there thinking of locating structural areas where we could move buildings and reinhabit those areas with vegetation? Concerns about real estate
    - We have to consider infrastructure like sewage treatment & wastewater, it is a complex situation with multiple stakeholders
    - Resident (Sue Colson) put forward that this is a very complex problem with relocation of people as well as water/wastewater systems; this is not the only solution proposed, but rather an investment and not one-size-fits-all
- Participant has multiple issues with logic of project
    - There are not more clams in the canal due to someone moving sand onto G St; "you guys actually shut down two businesses"
    - Claimed multiple conflicting sources about sea level rise, had issues with NOAA 12 inches vs. projected 18 inches in presentations
    - As a clammer, has not observed the water coming up
        - Worst negative tides this year since 05
    - Claimed 2007 picture of G St inaccurate, was at low tide
    - At high tide, you can barely move water or boats through the canals due to people moving sand onto G St
    - General issue with Dock Street culvert; will you guys just do the same thing elsewhere?

                - Lack of crabs in canal because of G St project; crabs died off in canal due to mudflats
                - Violation of 1899 Safe Harbors Act by obstructing safe waterway
                - The canal on Widdon Street used to be 8 feet deep
                - Seagrass is not a lasting fix, serious storms will move everything; North Carolina Outer Bank Islands as example
                - Canal has been filled with sediment
            - Other participant (Sue Colson): As someone whose family has been in clamming for decades, pointed out those views were not the consensus of others in the room or other clammers not present
- 11:00: Coffee break
- 11:10: Project options
    - Option 1: Living Breakwaters
        - Would they still be above water during storm events?
        - What are these made of?
    - Option 2: Single Sea Groin
        - Wouldn't you be building up sand outside of it and starving sand behind it?
    - Option 3: Multiple Sea Groins
        - How far out are these? How far are reef balls out on Airport Rd for reference?
    - Option 4: Mixed Design
        - What would be the height of those?
        - People would definitely climb on the rocks, they do already
    - Add-on Option: Tide CAPS
        - There are already 2 cases on the island where they put up a similar structure in the past, would be useful to examine that for more data
        - Are we assuming that a big storm would go over the top?
- 11:50: Feedback block
    - Option 1
        - Survey
            - Mixed results

        - Not a solution on its own without groins, only addresses wave energy
        - Would this prevent boats from launching on that beach?
    - Option 2
        - Survey
            - Many people like public access
            - Parking concerns
            - Would like to understand sand issues
        - From recreation standpoint, it would be good to get people in deeper water
        - Do we know about land ownership on 1st St?
        - Can you plant mangroves there without pushback?
        - Concerns about property ownership/jurisdiction
        - Doesn't look like that much additional maintenance
        - There is an example of a similar structure in Mexico that was damaged by a storm
    - Option 3
        - Survey
            - Uncertainty with property ownership
            - Would like to understand hydrology
        - Groins seem dependent on sediment filling them naturally
        - Would it have more assured success if we added material from flushing the marina?
        - What are the implications of this for sediment transport?
        - Are there options to make these smaller sea groins accessible?
        - Multiple groins could be an opportunity to provide additional recreation for shore fishing, which would help public acceptance
        - Will the model be ready before the next workshop?
        - How far into the future are you thinking? Is this something you could build on afterwards?
            - Does the property owner benefit from this? Do they have a say in what happens in the future?
        - Are we considering beach buildup in between these groins?
            - Would that provide recreational opportunities?

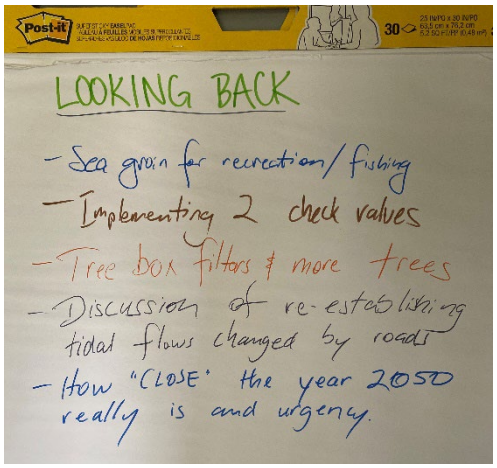
- Option 4
    - Survey
        - General acceptance, better than #3
        - Visual concerns
        - Why is it necessary on an already hardened riprap shoreline?
    - Suggestion of option 5: have a groin coming out to a living breakwater
    - Concerns with visibility & navigation for boats; should there be any concerns with navigability for boats with the structures that are 100 ft out?
    - Like the option because no issues with homeowners, public access, or law enforcement
        - Opportunity for horseshoe crab nesting if area along groin stayed sandy
        - Concerned about rocks on groins
- Tide CAPS
    - Survey
        - Mixed results
        - Concerns with wildlife & horseshoe crab nesting areas
        - Concern that seawall and energy refraction; concentrating erosion forces on shoreline investment preceding it
            - General concern with people trying to get away from sea walls and science being manipulated and presented so that sea walls are installed under a different name. Concerned about county ownership as well, especially with rocks being "dumped"
    - There are other owners besides private property to consider
    - Rocks were dumped along G St shoreline without thought/planning
- Want to hear community's thoughts on a do nothing option

- 12:15: Wrap up, next steps
    - April 8th next workshop
- 12:30: Lunch discussion

Cedar Key ShOREs Workshop 3: Final Conceptual Designs
April 8, 2023
10 AM - 12:00 PM
Cedar Key Community Center

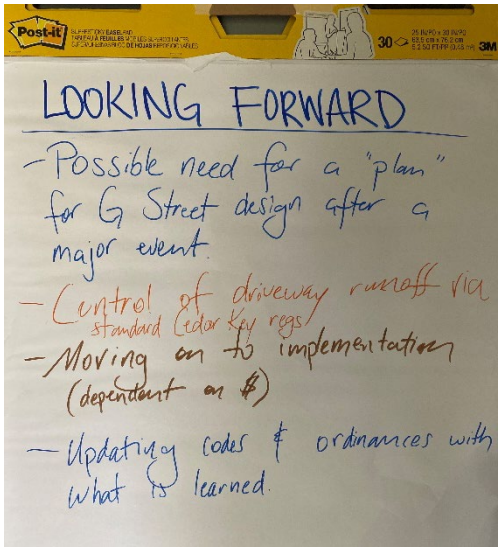
10:00: Welcome & Review Exercise: Looking back, Looking forward

Looking back – *participants were asked to reflect on what we have covered and what they have learned in the past two workshops*



- Sea groin in front of beach front hotel helping with recreation & fishing
- Hopeful to finish the first project on G Street now that participants/residents seem to be more willing; would like to see enhancements as well
- City has already implemented 2 inline check valves
- Tree box filter sounded good, want more trees
- Only one participant had heard of tree box filters before workshops; tree boxes have been considered elsewhere in Cedar Key as well
- Re-establish tidal flows changed by roads, discussion from workshop 2
- Concerned about how close 2050 is with sea level rise; 2050 issues are a lot closer than we think they are.

Looking forward – *participants were asked "what are your hopes for the future of G and 1st Streets?"*



- Sue: Concern about hurricanes/disasters altering plans & causing need for new G St design. If we had a major hurricane, should we redo G street the same or try something new? Should we have a "plan in the box on the shelf?"
- Joe: Controlling driveway runoff (with city involvement/make it an ordinance?)
- Chuck: Hope this gets funding & leads to implementation stage.
- May take a 'local champion' to really go after future grants.
- Need to consider city ordinances & building codes, some interventions may be disturbances so look at what is least disruptive to get most buy-in, G street is historic; options may need to work within certain constraints.

10:20: Station Gallery: *Participants rotated through multiple stations on 10-minute cycles. Notes from each station are below.*

Stormwater Interventions (5 stations):

Station 1, Lead: Mark Clark

Questions and suggestions at this station included:

- Should turn parking areas into pervious pavement
- Concern that Bed & Breakfast area pools water
- What exactly is a pervious driveway? How do you change it to that?
    - Participant stated "We just built our driveway, don't want to change it"
- Would the driveway not plug up quickly with sediments?
    - Yes, pervious pavement requires maintenance such as a vacuum to suck out particulates
- Some of the area in pervious pavement picture is city property, concern about disruption
- Couldn't you put a gutter in the street instead?
- Why not just have one solution that runs the full length of F Street rather than multiple?
- What would work for the most homeowners?
    - It would be easier to fix a storm gutter than implement new driveways
- How far down do these solutions go?
    - Would they hit the aquifer?
    - Would we run into limerock?
- Like the idea of bioswale but don't know how it would fit in this area
- Load bearing capacity for previous gutters and new parking spaces?
- Are there any previous pervious pavements in the area?

    - Sue:
        - 3rd street, the whole length down by the corner lot station
        - The school parking lot next to the gym
        - Bioswales which are located past the cemetery, going up the hill. One side is a parking lot and the other is a bioswale.
            - CK can NOT lose parking; avoid bioswales near places where parking is located.
- It would be easier to get everyone on board with pervious concrete than bioswale
- Public opinion is generally pro parking
- Not enough parking on G St
- Currently trying to reclaim cactus field, as it is being used for garbage

Station 2, lead: Eban Bean

Questions and suggestions at this station included:

- Are rain barrels above ground?
- Would we help property owners implement these?
- How do you control mosquitoes in barrels and ponds?
- What is under the bioretention cells?
- Want to clarify bioswales vs. bioretention; are we trying to hold water or move it?
- Could the ground get too saturated?
- Would each one have to be built specifically depending on how deep soil/sand goes?
- What happens if some people (private property owners) don't want to be part of this?
- Does this interfere with city ordinances?
- Have other cities in Florida done this already? Can we get a list?

- Will porous concrete support heavy traffic?
- Parking is a big concern in Cedar Key; anything that would cause parking loss will be met with opposition
    - Bioswales are incompatible with existing parking on 5th St
- Pocket park on the corner of G & 5th might be a good spot for a rain garden
    - Can you put a drain there?
- Concern about additional burden on maintenance
- Has there been talk of pumping water further inland?
- Sessions haven't fully addressed people who fertilize their yards for aesthetics; could you encourage them to do something to lessen the nitrogen & phosphorus load?

Station 3, lead: Jessica Bruso

Questions and suggestions at this station included:

- Concern with space by the school
- Tree boxes: What types of trees?
    - First responses included crepe myrtles and sea grapes. It was later emphasized that native species should be prioritized and that in the past, residents have greatly favored cedars for these projects. "Crepe myrtles were liked but not native, people want cedars." Oaks have been opposed due to their size.
    - "Needs to be eclectically spaced according to what people are willing to have, not what we think they will have." Specific emphasis on the intersection of 7th St and G St being rejected due to resident. It was also noted that there is a plot on 7th St that is currently being developed where the owners would need to be informed.

    - Concerns about freezes as well as salt water flooding downtown, 25 year lifespan trees with saltwater tolerance suggested for downtown.
    - What will we do about existing trees? Transplant them?
    - Overall positive reaction to boxes
- Overall yes to bioretention garden off 6th St. Concerns over getting rid of the bench at the end of 6th St and where the wall would be in relation to it. Cinder blocks have apparently been dumped in the area. Concerns were also raised about maintenance of the garden.
- Concerns over factoring in private property, public-private agreement
- Pervious pavement and gutters
    - Overall supported and liked. Concerns raised over whether wire brooms would be an issue for the pervious pavement and whether special gutter brooms would be needed
    - Asked for percentages on how it would work
- R Tank concerns over plastic, recycled plastic. "Tried and true from how long ago? 15-20 years"
- Concerns about cost, whether grant will supply insurance and whether taxes will rise if something goes wrong. Asked for alternatives with Miami as example.
- Residents wanted native plants for bioswales and liked the idea of planted/planters reducing mowing
- Can we capture water coming down 7th St? The goal of all of this is to create a public amenity
- People overall very intrigued by Ferguson infrastructure "do as much as you possibly can"
- Think it's very important to take record of goals and what to do when new things are happening

Station 4, lead: Thomas Ruppert

Questions and suggestions at this station included:

- Emphasis on keeping gutters clean and clear with help from the city
    - A lot of sand in drainage system
- Efforts to protect public from any mosquito issues that may arise
- Major right of way issues. Large concern over what residents think is theirs; owners may be concerned about any changes that happen near their property.
    - Who is responsible for any apparent issues (maintenance) that may arise especially if new projects are implemented and the nearby homeowners have always upkept the immediate area

- Property lines and issues, community interactions
    - Some of the legislative changes may get in the way of new projects. (The government controlling wetland areas was an example).
    - Aesthetic issues from rain barrels
    - “Adverse Possession” can't work against the state or federal system.
        - If a person has land that they think is theirs, even if they have been there for a long time, if it is government owned, it must be released.
    - Emphasis on informing neighbors who may or may not know laws, land rights. (ex. Talking with neighbors about the actual right of way in their immediate area.
- Is public education in our grant?
    - We try to get involved on the front end
    - We also want to get this education going after the fact. (during implementation)

Station 5, lead: Carla Brisotto

- One resident “not convinced,” feared that area around F St and 8th St would not work due to too many buildings around G St. Thought trees already in place are nice but all along the street would not work.
- Another resident mentioned that NCBS has not modified their area where the street drains into the bayou
- Asked if foundations would need to built in for different solutions
- More concerns about the right of way; driveway policies (maybe implemented by the city)
- Rehoming cedar trees and placing in city/public gardens.
- Pervious gutters
    - General consensus favored the pervious gutter running the whole street rather than being broken up

    - Some residents brought up that it may be complicated by some streets not having previously existing gutters

- Bioswales
    - Overall overwhelming response that it would take valuable parking away from residents, several pointed out specific locations on the map where people typically park boats and cars. Tourists were also emphasized as a potential problem even if residents could manage
        - "We barely have parking already, taking it away would make people very mad"
- Rain gardens
    - Concerns over how they would be maintained, need low maintenance plants like wildflowers
- Tree boxes
    - Generally liked. Questioned whether they'd be willing to uproot an existing tree for the sake of tree boxes. "Crepe myrtle goodbye, but leave the indigenous trees and shrubs–if it's deeply uprooted leave as much as you can."
    - Trees and gutters work together, how dense could the trees get?
- Pervious gutters
    - What is the purpose, and how much would it cost to clean? Residents would be willing to pay a small fee to clean the driveway, likened it to paying for snow to be cleared

Shoreline Station, lead: Xiao Yu

Questions and suggestions at this station included:

- Is the large sea groin accessible to fishermen?
- What are the breakwaters made out of?
- If mangroves grow in between sea groin & breakwaters, would they remain there? Would hope so
- We have mangroves and are happy with their protection
    - The view is not obstructed, just keep them trimmed
- Are people planning on launching boats from breakwaters?
- Are we abandoning the oyster ball concept and going with these breakwater designs instead?
- Would like oyster balls in this area as well

- How deep into the water and how high are breakwaters?
- Is height based on high or low tide?
- What is the longest standing "boomerang" (sea groin peninsula) we know of? Where else do they have these?
- Concern about parking issue with the fishing traffic these would attract
- Love it!
- Building multiple walkways under/connecting the mixed design concept for recreation purposes.
- Will parking along G and 1sty now become an issue?
- Will the new check valve obstruct construction of future mixed design projects?
- Traffic may build up on the mixed design walkway; should the walkway be only for locals?

- What safety concerns may arise as people may want to venture out onto certain parts of the structure?

Shore Stories Station, lead: Jason von Meding

- *Participants shared stories in response to prompts. These stories were recorded and transcripts will be used as background for future work with the community.*

11:45: Wrap-up, Summaries from facilitators

- G St, 5th to 8th St
  - Porous gutter lines sound like a good solution, but start with the natural solutions first
  - Native species preferred
- G St, 7th, 6th, & 5th St
  - Bioswales may create parking issue
  - People like tree boxes but have questions about how they work
  - Everyone seems happy about pervious parking/driveways
  - Suggestions about pervious driveways
    - Are policy changes possible?
    - Willing to pay city fee to clean them
  - Location has public housing, maybe involve them to help install rain gardens & bioswales
- G St, between 4th & 5th St
  - Positive attitude towards pervious pavement
  - Concerns about capacity for maintenance for rain gardens/bioswales as well as having workshops to teach people how to maintain
- F to G St, 1st to 3rd St
  - Excitement about pervious parking
  - Is there a way to do a pilot study to see if there is a bioswale that can maintain occasional parking (such as weekend parking)?
  - Tree boxes are a favorite
  - People identified private properties, could we partner with them to make their parking pervious?
- E to G St, 3rd to 4th St
  - Pervious gutters but other things preferred, maybe want shallower swale to maintain parking
    - Vegetative swales are not necessarily incompatible with parking
  - F St is the most swept street in city, would also need vacuuming to maintain pervious surfaces
- Shoreline Solution
  - Positive feedback for mixed design
  - Could increase fishing accessibility & help wave attenuation

        - Questions of maintenance
        - Concerns of sediment accumulation and parking
        - Possibilities for kayak access
    - Shore Stories
        - Thank you everyone who contributed a story and shared your thoughts

12:00: Lunch discussions