New England Sustainability Consortium (NEST)

2015 Frenchman Bay Partners Coastal Water Quality Survey Technical Report

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Technical Report

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ACKNOWLEDGEMENTS: *The New England Sustainability Consortium (NEST) Safe Beaches and Shellfish Project is funded by National Science Foundation Award 11A-1330691 to Maine EPSCoR at the University of Maine. Many thanks to NSF EPSCoR, and Maine EPSCoR for their support of this research. Further, the research team would like to acknowledge the key role stakeholders, collaborators, and colleagues played in the design and pre-testing of the 2015 Maine and New Hampshire Coastal Resident Survey Pilot. Thank you to the New England Sustainability Consortium (NEST) Safe Beaches and Shellfish Project social science team, who allowed the modification and use of the 2015 Coastal Resident survey for this research. Thank you to the Frenchman Bay Partners Executive Committee for their support of this research, and to each of the Partners who participated in the survey. Your help is much appreciated!*

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EXECUTIVE SUMMARY

This report provides a summary of results from the 2015 Frenchman Bay Partners Coastal Water Quality Survey. The Frenchman Bay Partners ("FBP" or "Partner(s)" used interchangeably here after) survey was modeled after the New England Sustainability Consortium (NEST) 2015 Maine and New Hampshire Coastal Resident survey, which investigated benefits associated with coastal water quality and focused on capturing social values for this natural resource. [1] While the resident survey captured information from residents along the entire Maine and New Hampshire coast, the information was not particular to Frenchman Bay. In response to region-specific needs, we designed and administered a Partners-specific survey for comparison and contrast. The purpose of the survey was to capture Frenchman Bay Partners knowledge, perceptions and attitudes about water quality including benefits of clean coastal water, factors negatively impacting coastal water quality, and willingness to pay for water quality improvement. In this report, we compare Frenchman Bay Partner responses with those of coastwide Maine residents.

Key findings include:

- 77.8% of Partner respondents were willing to contribute to a *hypothetical* Coastal Water Quality Improvement Program. In comparison, 67.5% of coastwide Maine respondents agreed to contribute to the same hypothetical program.
- Partner respondents ranked polluted runoff, as well as fertilizer, chemical, and pesticide issues as highest in terms of negative impact on water quality. Similarly, coastwide Maine resident respondents ranked polluted runoff issues and fertilizer, chemical, and pesticide issues highest in terms of negative impact on water quality.
- Partner respondents and coastwide Maine resident respondents allocated the largest average percentage of the hypothetical coastal water quality budget toward improving wastewater, storm water, and sewer infrastructure.
- Though most coastwide Maine respondents believe that residents are responsible for helping to solve coastal problems (88.6%), fewer believed it was their *personal* responsibility to help solve coastal problems (67.6%). Frenchman Bay Partner respondents appear to equate the two: 94.7% agreed that coastal residents are responsible and the same percentage agreed that they as residents are *personally* responsible for helping to solve coastal problems.

[1] Technical and response reports for the coastwise pilot survey, response report for the Frenchman Bay Partners survey, and additional related research is publicly available at http://ddc-coastal-residents.sr.unh.edu/

INTRODUCTION

As increasing tourism and recreational opportunities bring more visitors to the Acadia region, coastal water quality becomes an increasingly serious public health and environmental issue. The 2015 Frenchman Bay Partners survey is a part of a larger research effort through the New England Sustainability Consortium (NEST) Beaches and Shellfish Project[2] to address data gaps and provide scientific information to inform policy assessment and design. The 2015 Frenchman Bay Partners Survey was administered as a means of comparison to the results of the NEST coast-wide survey effort. The objective of the Partners survey was to provide data that are directly meaningful and relevant to Partner efforts. The survey focused on valuation of, perceptions of and attitudes of Frenchman Bay Partners regarding water quality along the Gulf of Maine coast.[3]

The goals of this survey were to:

- Identify Partner priorities for coastal management, perceptions of factors influencing water quality, and understanding of the consequences of impaired waters
- Characterize Partner attitudes about water quality
- Assess Partner valuation of coastal water quality
- Understand how individual characteristics may influence knowledge about and affect behaviors impacting coastal public health
- Improve understanding of Partner perspectives for improved stakeholder engagement, community outreach, and community education efforts in Frenchman Bay

[2] The New England Sustainability Consortium (NEST) Safe Beaches and Shellfish Project is a cross-institutional collaboration between The University of Maine, University of New Hampshire, University of Southern Maine, University of New England, Plymouth State, and College of the Atlantic, funded by NSF-EPSCoR. You can learn more about NEST here: http://www.newenglandsustainabilityconsortium.org/safe-beaches-shellfish.

[3] The survey instrument asked a variety of questions about resident attitudes about water quality and perceptions about stressors and negative impacts associated with poor quality. The instrument also included questions about perceptions of climate change and the responsibilities of local and state government, which give insight into the effectiveness of different kinds of policy.

SURVEY ADMINISTRATION AND METHODS

The Frenchman Bay Partners survey was administered online during the summer of 2015 through Qualtrics survey software (Dillman, Smyth, and Christian 2014). Each Frenchman Bay Partner on the Partner email list or registered on the website (www.frenchmanbaypartners.org) received an email inviting them to participate, with a link to the survey. A total of 98 participants were invited with a return of 41 surveys. Of the 41 surveys, one exited the survey after question 1 and two left the survey after question 8. The former respondent was dropped while the latter two were kept, giving us a response rate of 40.8% (N=41, but N=38 for the majority of the results). The pilot NEST coastwide Maine residents survey was also administered in the summer of 2015, but rather than receiving an email invitation, participation was solicited through the U.S. mail. From a sample size of approximately 2,000 Maine residents, we received 404 surveys.

What information is captured here?

There were five major sections to the surveys:

General resident knowledge about water quality and resident priorities for coastal managers

- Ranking benefits of clean coastal water
- Identification of detractors to coastal water quality
- Understanding of consequences from poor water quality

Shellfish consumption/Beach visitation[4]

- Frequency of seafood consumption/beach visitation
- Perceptions about the safety and cleanliness of seafood/beach visitation
- Closure/advisory information-seeking behavior

Coastal water quality valuation

- Prioritization of strategies for water quality improvement
- Assessment of willingness to contribute to a water quality improvement program
- Preferences for the disbursement of program funds and program management

Risk Behavior, climate change, trust in scientists

- Evaluating common risky behaviors
- Assessing beliefs about climate change
- Trust in science and scientists
- Perception of personal responsibility for water quality

[4] *Not included in this report*

Demographics

- Standard demographics: age, gender, education, employment
- Participation in coastal recreational activities

How did we analyze the data?

We analyzed the survey response data with SAS 9.4 (**SAS** Institute Inc, 2013). Our inferential statistics include chi-square tests of distribution differences, t-tests and analysis of variance. The age and gender comparison statistics were calculated using 2010 U.S. Census data.[5] Unfortunately, we lack real statistical power for additional analysis with such a small sample (N=38 for most questions), which is why we provide the comparison from the 2015 NEST coast-wide survey. We implemented the Frenchman Bay Partners survey with the knowledge that it would only capture a small subset of the Frenchman Bay resident population, and an even smaller subset of the coastal Maine population. However, with such a high response rate (40.8%), it means that the inferences are powerful in terms of group trends.

Who participated?

To give a more detailed description of the participants, the demographic or socioeconomic characteristics of those who responded to the survey are detailed below. Note that our sample groups (Partners and coastwide Maine residents) are different in several key areas including percentage of respondents by gender and affiliation with environmental organizations.

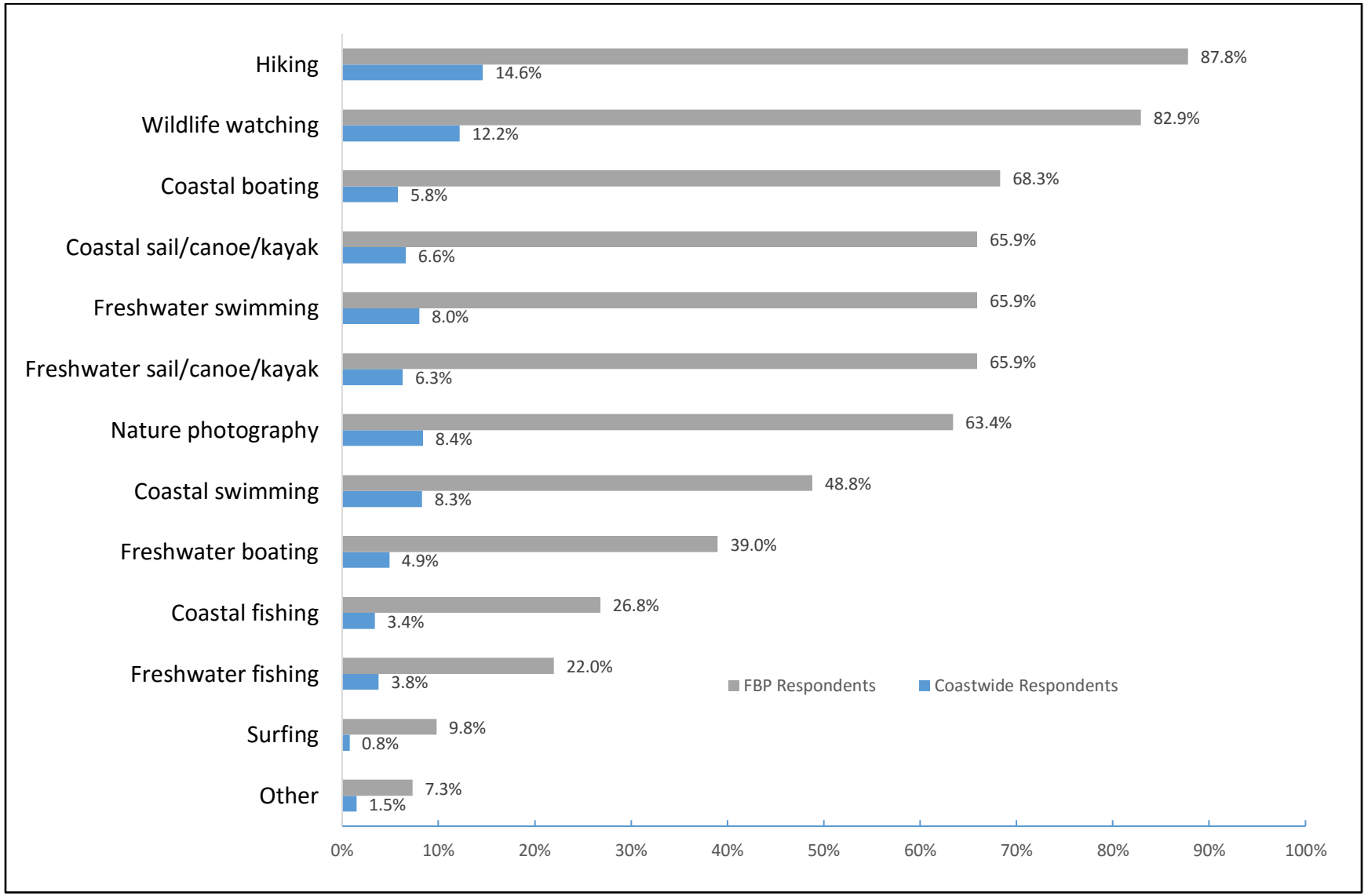
The average age of Frenchman Bay Partners respondents was 57 years, which was the same as the coastwide pilot survey result. In the Partners survey, a majority of the respondents were female (52.8% female, 47.2% male), which is opposite of the respondent gender breakdown for the NEST coastwide pilot (45.5% female, 54.5% male). 50% of Partners who responded are employed full-time, while 28.95% are retired. Similarly, 29.2% of coastwide Maine resident respondents are retired, while 49.6% are employed full time.

As may be expected, a majority of Partner respondents (86.8%) said they were a member of an environmental community organization. This result is strikingly different from the 2015 NEST coastwide respondents, the majority of whom did not claim membership in an environmental organization (approximately 75% said no).

Frenchman Bay Partners members are active outdoors: every survey respondent checked off *at least one* outdoor recreational activity which they participated in within the past year with hiking and wildlife watching being the most popular outdoor activities for Partners (Figure 1). Of the coastal water-contact activities, coastal boating, and sailing/canoeing/kayaking were most popular (Figure 1).

[5] Overview of the Maine 2010 Census: http://www.census.gov/prod/cen2010/cph-2-21.pdf. New Hampshire 2010 Census overview: https://www.census.gov/prod/cen2010/cph-2-31.pdf.

Figure 1. Partners participation in coastal recreation activities, compared to coastwide residents; respondents were allowed to select more than one activity.



STUDY FINDINGS

Why is water quality important?

Partner respondents ranked (1) clean ocean, estuary, and river waters as the (1) most important thing to them as residents of a coastal area, followed by (2) public access to coastal resources, and (3) beautiful scenery. Coastwide respondents also place great importance on public access, clean waters, and aesthetics. Coastwide respondents ranked (1) clean ocean, estuary, and river waters as the most important thing to them as residents of a coastal area, followed by (2) beautiful scenery, and (3) public access. Partners felt that coastal managers should assign top priority to water quality (100%) and reducing pollution entering coastal and ocean environments (95.8%). Likewise, a majority of coastwide respondents assigned top priority to the same actions (72.5% and 80.4% respectively).

How do Partners rate Maine's coastal water quality?

Coastwide respondents were somewhat more critical of Maine's water quality than Partners were. Around 5.3% of coastwide respondents rated Maine's water quality as fair or poor, while 0% of Partners rated water quality as fair or poor. 76.3% of Partner respondents rated Maine's coastal water quality as very good or excellent, while (65.5%) of coastwide respondents rated Maine's coastal water quality similarly (Figure 2).

What knowledge do Partners have about contributors to poor coastal water quality?

Partner respondents' perceptions about contributors to poor water quality differ from those of coastwide respondents, although the general emphasis on pollution is comparable. Coastwide respondents perceive that the top three negative factors impacting water quality are (in order of greatest negative impact): (1) fertilizers, pesticides, and chemicals, (2) polluted river/stream runoff, and (3) aging or failing wastewater treatment facilities. Partner respondents perceive that the top three negative factors impacting coastal water quality are (in order of greatest negative impact): (1) Polluted river/stream runoff, (2) Fertilizers, pesticides, and chemicals, and (3) Failing septic systems (Figure 3).

Figure 2. Coastwide and Partner respondent ratings of Maine's coastal water quality.

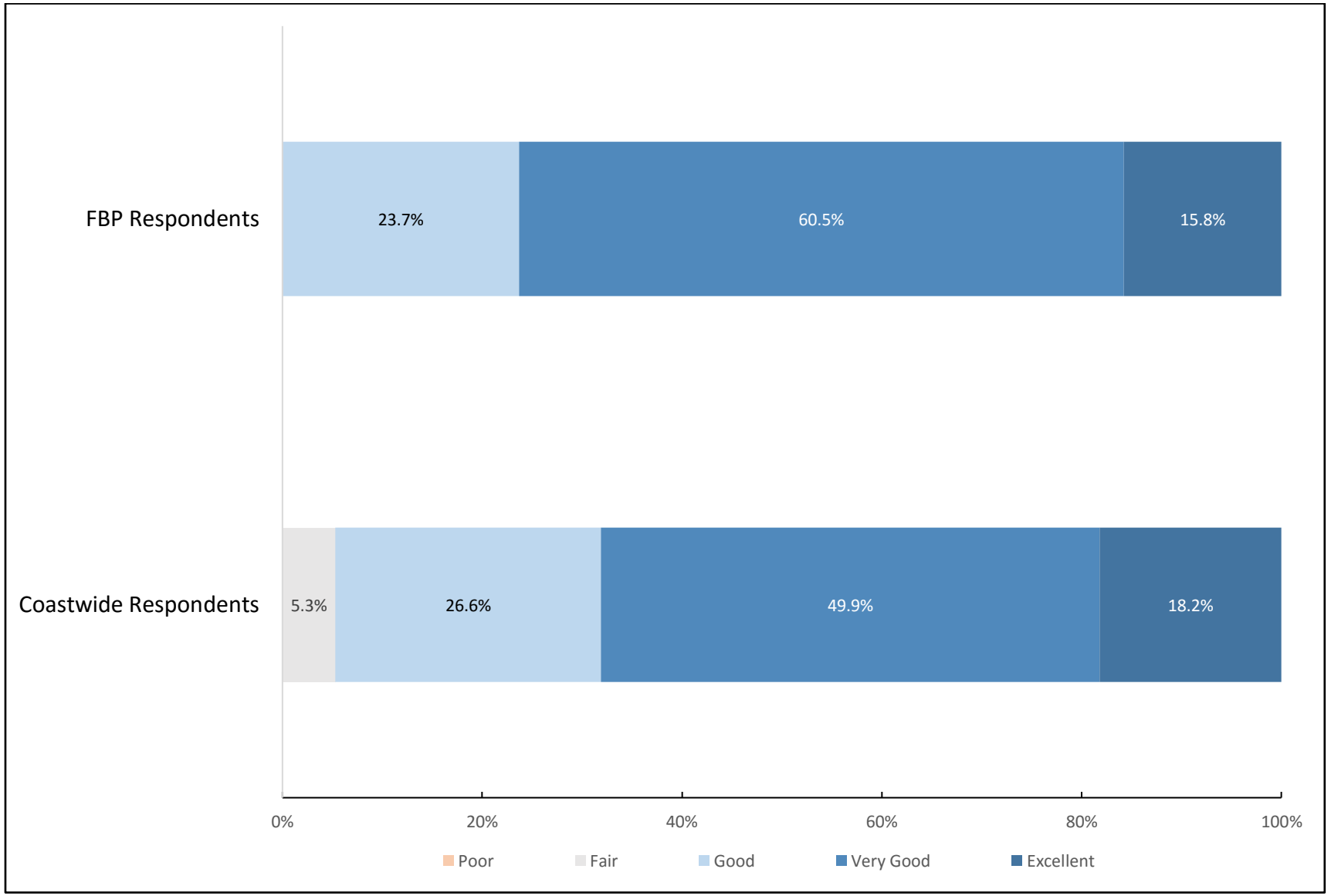
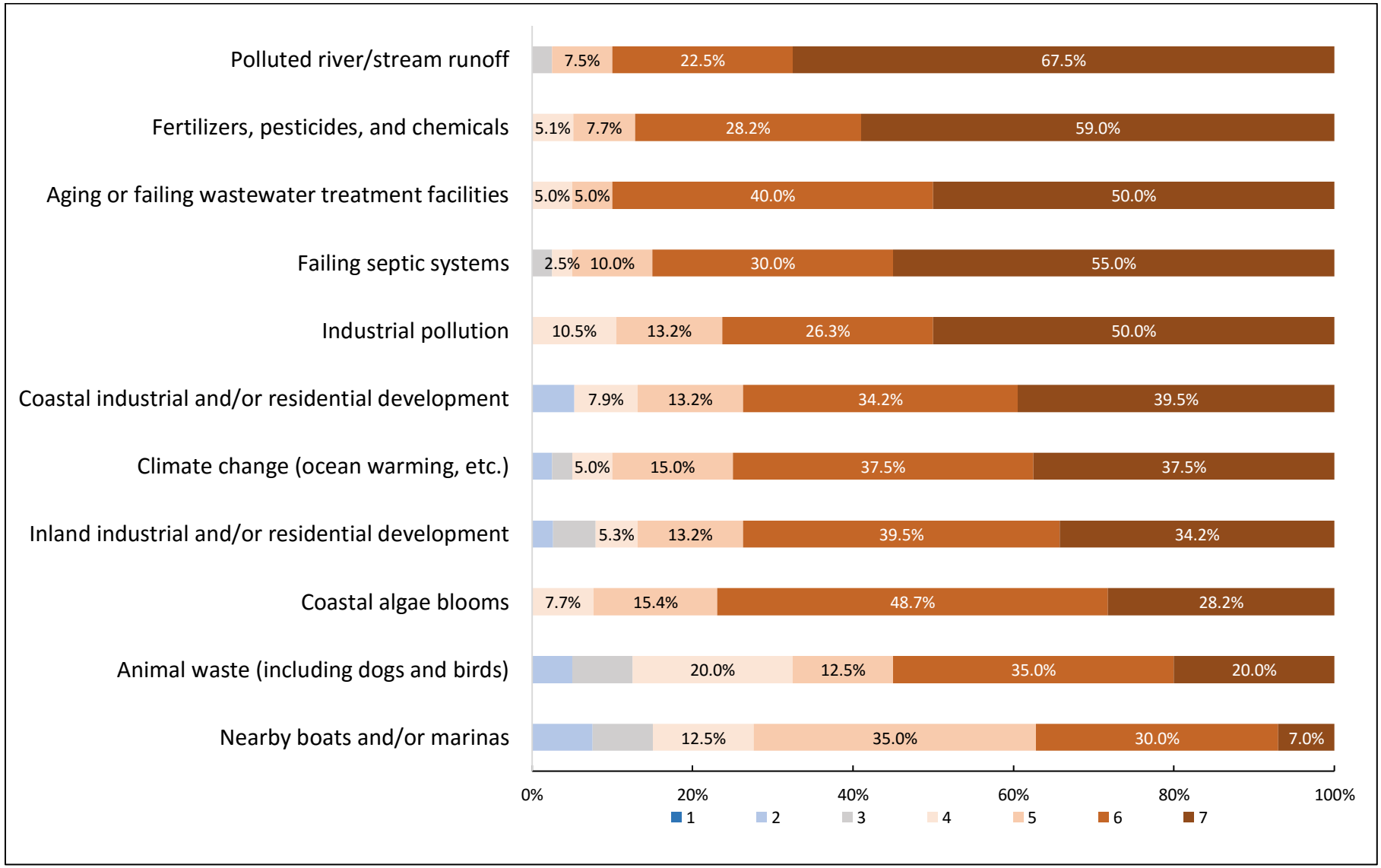


Figure 3. FBP respondents perceptions about the factors negatively impacting water quality (1=No negative impact, 4=Somewhat negative, 7=Very negative); respondents were allowed to choose "very negative" for more than one factor.



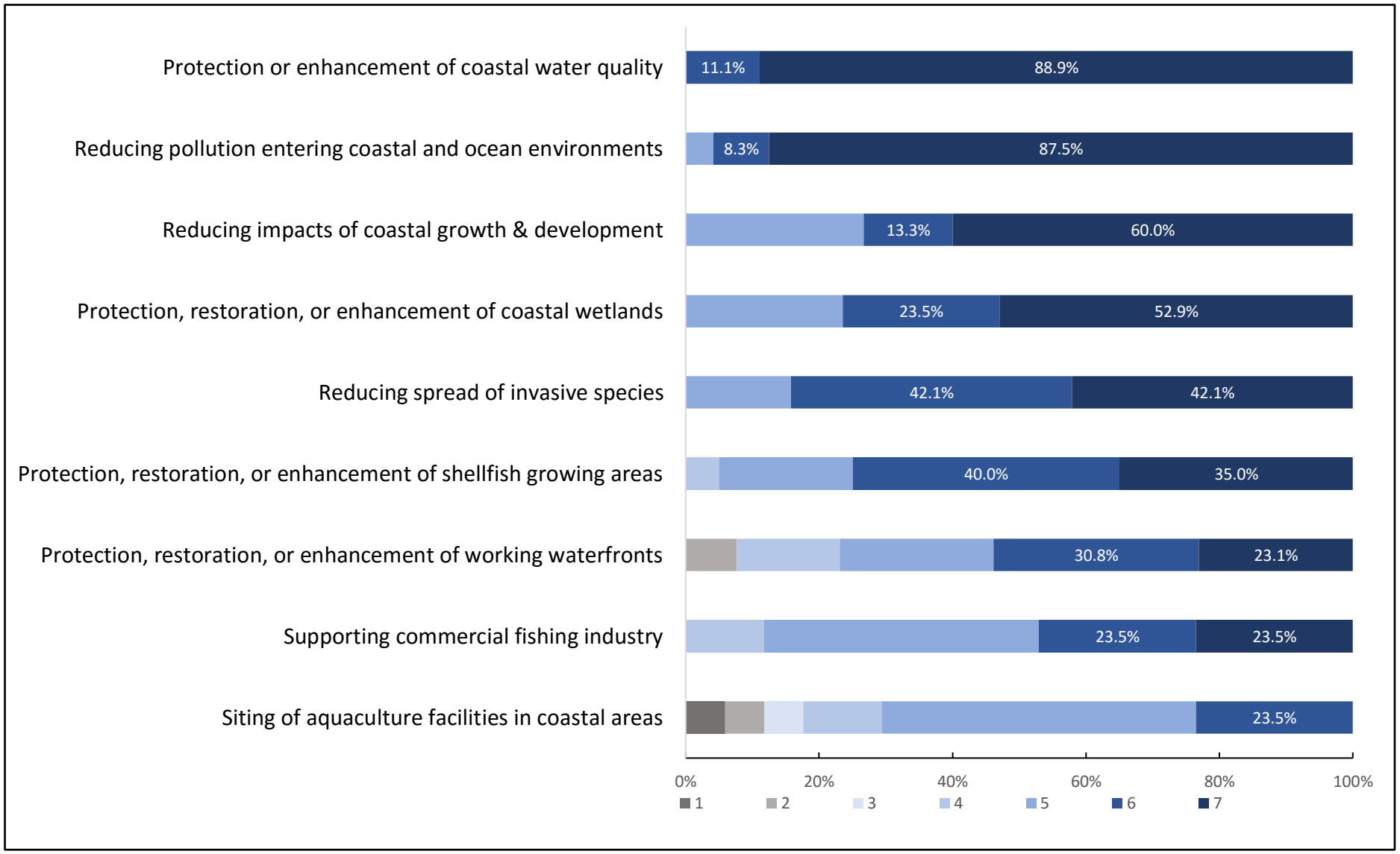
What do Partners think about coastal manager priorities?

Approximately 80.4% of Maine resident respondents perceive the reduction of coastal pollution is the topmost priority for coastal managers, followed by the protection or enhancement of coastal water quality (72.5%), and the protection, restoration, or enhancement of shellfish growing areas (69.5%). Comparatively, 100% of Partner respondents perceive the protection or enhancement of coastal water quality, followed by the reduction of coastal pollution entering coastal and ocean environments (95.8%), and the reduction of the impacts caused by coastal growth & development (73.3%) (Figure 4).

Who is responsible for protecting or enhancing coastal water quality?

A majority of the Partners surveyed ascribed responsibility to State of Maine residents for helping to solve "coastal environmental and public health problems" (94.7%). Partners felt personally responsible in helping to tackle coastal issues (94.7%). This consistent ascription of responsibility to residents and self is somewhat of a departure from our coastwide Maine resident responses, which indicate that although a larger percentage (88.6%) of respondents felt that Maine's state residents were responsible for solving coastal environmental and public health problems, fewer believed that it was their personal responsibility for helping to solve those same issues (67.6%).

Figure 4. Partner respondent priorities for coastal managers (1=Not at all a priority, 7=top priority); respondents were allowed to select more than one action as "top priority."



Economic Valuation

The economic valuation of program support results represent the real 'meat' of the survey—the referendum-style questions in the economic valuation section were formulated to capture Partner willingness to pay for coastal water quality improvement. The phrasing was intentionally kept similar to the valuation question included on the 2015 NEST coastwide resident survey, for consistency and comparison.

77.8% of Partners who responded to the survey were willing to pay an increase in monthly sewer/water/septic fees to support a Coastal Water Quality Program. Comparatively, 67.5% of coastwide residents were willing to support a Coastal Water Quality Program through an increase in monthly fees. This result is expected: we expect more support for water quality improvement programs from an engaged stakeholder group, especially one whose mission statement mentions explicitly an economically, ecologically, and socially sustainable future for the coast. The Frenchman Bay Partners are an engaged stakeholder group—folks get involved with the Partners because they share the vision of a sustainable future for Frenchman Bay. The Partners have even defined the scope of their interest as the entire Frenchman Bay watershed, recognizing that inland activities have an impact on water quality further downstream.

When asked about budget allocation, Partner and coastwide Maine resident respondents each allocated approximately an average of 20% of the Coastal Water Quality Improvement Program budget to improving wastewater treatment, sewer, and storm water infrastructure (Figure 5). Coastwide respodents prefer a healthy marine environment as an outcome of a coastal water quality program (65.2% ranked it as a top outcome). Likewise, Partners prioritized the most important outcome of a healthy environment for marine animals, fish, birds, and other species (78.6% ranked it as a top outcome) (Figure 6). Increases in clam flats open to harvest rose to the top as the second best outcome of a water quality program for both Partners (28.6%) and coastwide Maine resident respondents (32.5%).

The similarities between groups in terms of program budget allocation and outcome priorities is encouraging. The similar priorities may mean that Maine's residents are generally keyed into coastal water quality issues and engaged stakeholders are simply those oriented toward action, or that the state's many engaged stakeholder groups have already made an impact within coastal communities regarding water quality issues.

Figure 5. Partner and coastwide respondent mean percentage budget share allocation for coastal water quality program.

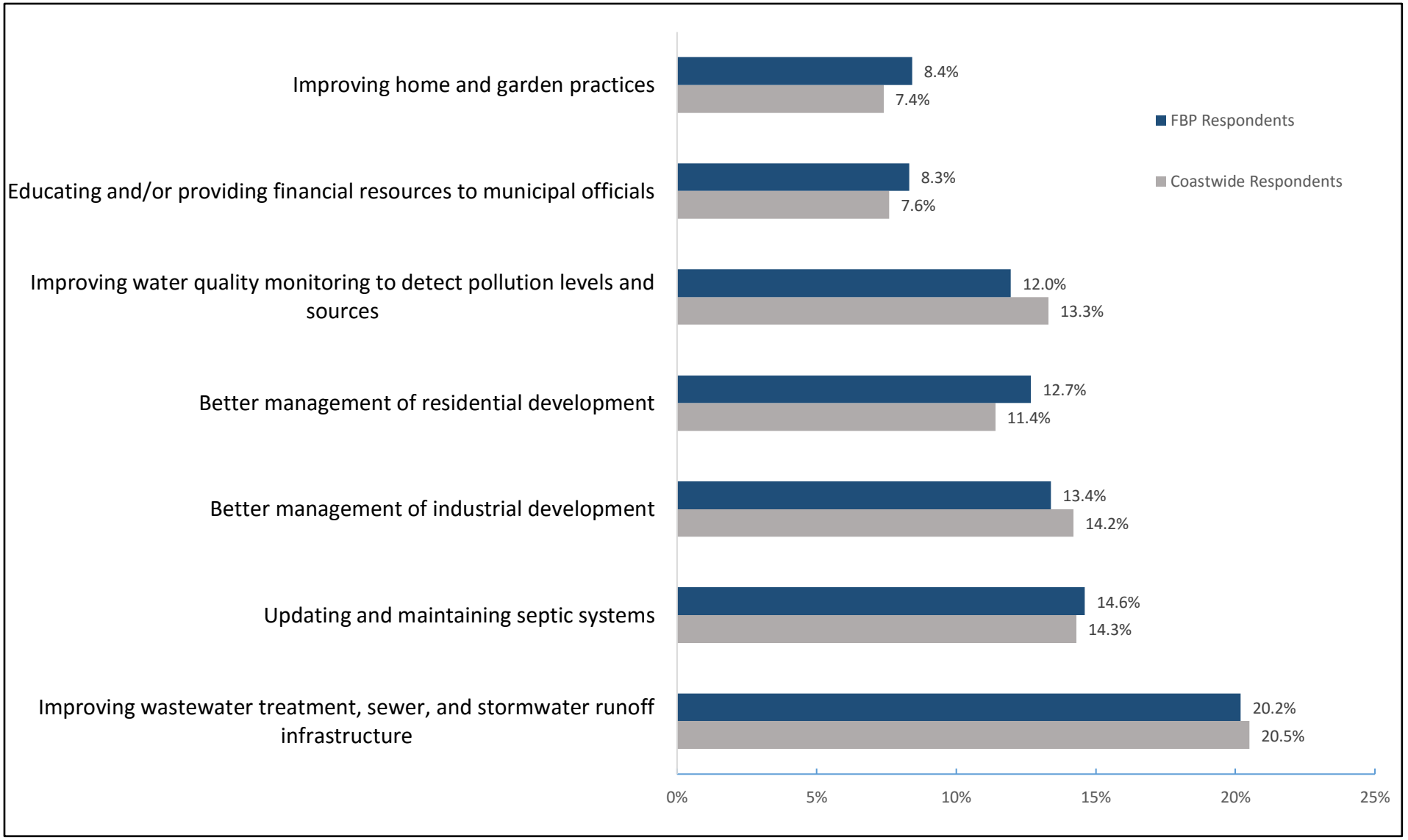
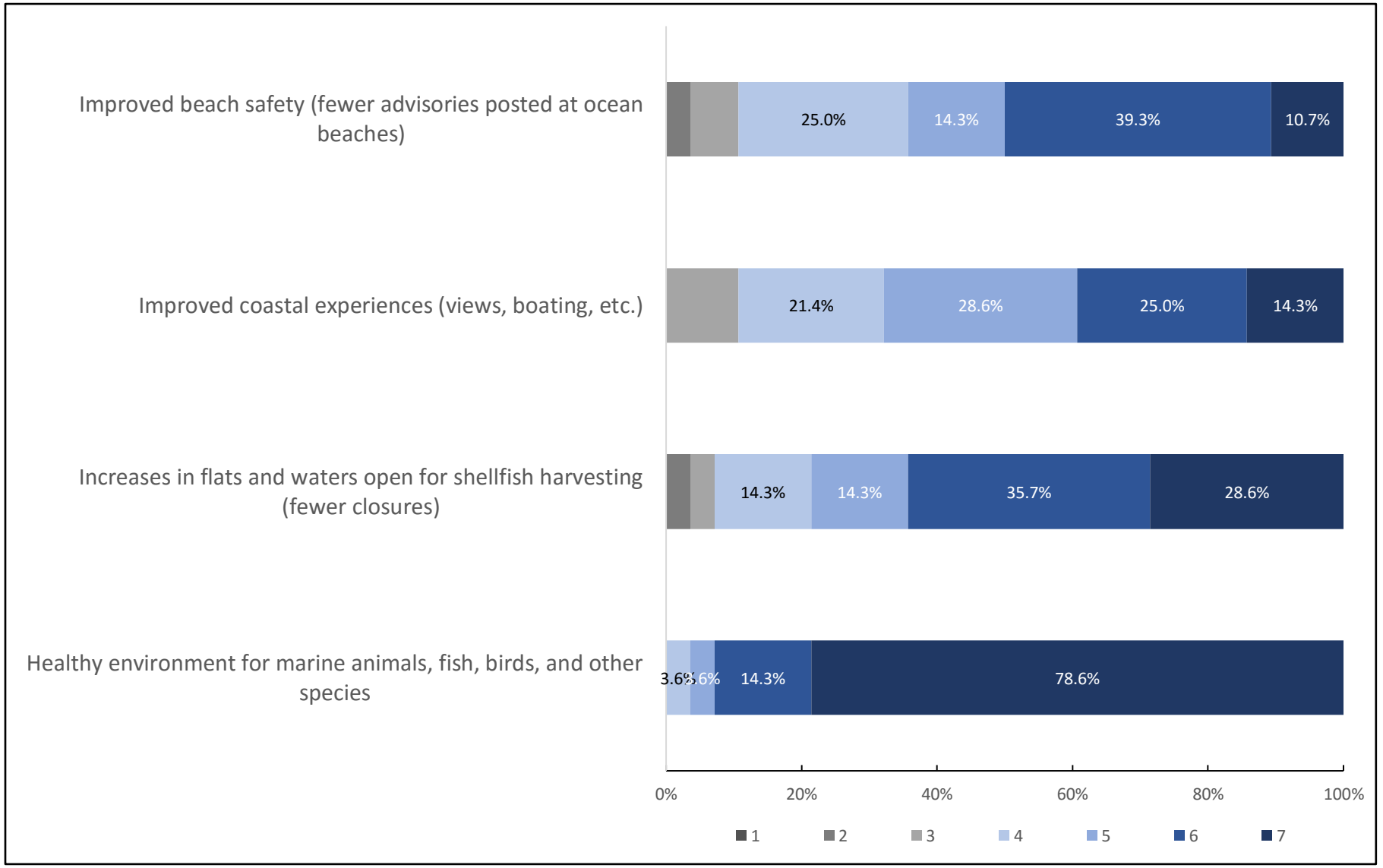


Figure 6. Partner respondent ratings of hypothetical coastal water quality program outcomes (1=not at all important, 4= somewhat important, 7=very important); respondents were allowed to pick more than one outcome as "very important."



DISCUSSION

There are many similarities between Partner and coastwide resident responses. For example, both groups prioritize for coastal managers 1) the reduction of pollution entering the coastal environent and 2) the enhancement or protection of water quality along the coast. Both groups identify pollution and polluted runoff from various sources as the biggest driver of poor water quality. Both groups, on average, allocate a majority of hypothetical coastal water program funds toward the improvement of wastewater treatment, sewer & stormwater runoff infrastructure. What do these similarities tell us? Mainers, coastal residents and engaged stakeholders alike, seem to have a well-defined idea about what impacts coastal water quality: pollution from runoff and wastewater. Mainers also seem have a well-defined idea about how to protect or enhance water quality along the coast: improve infrastructure.

There are also four primary differences between these groups. In particular, budget allocation by Partners and coastwide Maine resident respondents differs in a few key catgories. First, coastwide Maine residents allocate a larger percentage of the budget toward water quality monitoring (13.3%, compared to 12% for Partners). In Frenchman Bay, the Partners work closely with the Department of Marine Resources and the Department of Environmental Protection to identify sources of pollution and strategize about how to remediate those sources through the 610 Project. The 610 Project is a collaborative effort between Partners from the Regional Shellfish Committee, College of the Atlantic, University of Maine, and MDI Biological Laboratory; various state agencies; and municipal representatives aimed at re-opening up to harvest all 610 acres of mudflats classified as restricted closure areas (http://www.frenchmanbaypartners.org/projects/mudflats/). The Partners have managed to leverage some of the resources they already have, as well as the partnerships they have established, as a means by which to improve capacity for water quality monitoring within existing budget constraints.

Second, Partners allocated a larger average percentage of the hypothetical water quality program budget toward updating and maintaining septic systems, and residential development. These action-oriented allocation decisions are may also be reflective of the kind of engaged work the Frenchman Bay Partners do in the Bay. As mentioned previously, the Partners work closely with state agency and municipal partners on water quality issues, because water quality is tied to each Partner project in one form or another. Early on in their history, the Frenchman Bay Partners identified water quality as a key ecological indicator of the health of various conservation targets: eelgrass habitat, benthic habitat, diadromous fishes, and mudflats (http://www.frenchmanbaypartners.org/about/).

Third, Partner respondents participate in more coastal activities than coastwide Maine residents (Figure 1). This participation in coastal activities may indicate that Partners have a more direct or more intimate familiarity with the health of Maine's coastal waters than coastwide Maine resident survey respondents.

Fourth and finally, Partners rate Maine's water quality somewhat more favorably than coastwide Maine residents. We can only speculate as to whether this is a result of experience (since Partners participate in more coastal activities and are closely engaged with water quality issues) or simply a result of appreciation for Frenchman Bay and its resources. This favorable perception of water quality is worth mentioning because, at the end of the day, Maine's coastal water quality issues are highly localized; water quality may differ dramatically from port to port and bay to bay, even from day to day or tide to tide in a single location, depending on the source and concentration of a pollutant. Frenchman Bay may simply experience different issues from the rest of Maine's coast.

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