Appendix 2. Codebook.
Within interests, seven action and 11 object codes were iteratively identified and defined. The object code COASST was broken down into three exclusive child codes. Within sense of self, 17 codes were identified. Two additional codes were identified: self-esteem and importance (see Miscellaneous below). Codes are sorted into four categories: interest-action, interest-object, sense-of-self, and miscellaneous. Within each category, codes are sorted in rough order of frequency across the two respondent populations (see Figures 2, 4). Bulleted lists describe contrary states (i.e., what the code is not).

Actions: Defined by the verb form or other indication of action or doing; almost always in association with one or more objects of interest, i.e., how the participant wishes to or describes interacting with an object of interest as a functional motivation to join or remain active in COASST.

1. Being Outdoors: Participants say they like/love/appreciate being outdoors, outside and/or in nature. This code includes aesthetics - the beautiful place. This code should also be applied whenever participants talk about walking the beach.
   • The difference between this code and “sense of place” is that this code does not have to be linked to a specific location or express an emotional attachment.
   • The difference between this code and physical/mental health is that this code does not have to name a specific benefit (like health) of being outside.

2. Help/Volunteer/Contribute: Participants explicitly mention that they contribute to, volunteer for, and/or help with something. They might mention their previous volunteer experience which becomes a reason for them to join COASST.
   • If they only talk about doing something (e.g. "I want to make even a small difference in our understanding of the changes taking place in our coastal ecology."), that is not enough.
   • Pay attention to what is being "helped/contributed/supported" - if the helping equates to conserving or protecting (e.g., "help bird-life" or "help environment") then code as Conserve/Protect not Help/Volunteer/Contribute.
   • If they write about helping an organization that engages in conservation, and also write about conserving/protecting actions they want to engage in, then code as both Conserve/Protect and Help/Volunteer/Contribute.
   • Be aware that contribute can have multiple meanings.
      • I want to contribute to science. - code as Help
      • I want to contribute to the greater good (e.g., to help the earth (P4177)) - code as Greater Good

3. Learn/Understand/Experience/Awareness: Participants want to increase, improve on or gain understanding, knowledge, skills or experience (or have already gained through participation). They express curiosity about something (but not including the program in general); want to learn about something; want to deepen, sharpen or increase their awareness of or realization about something; or encounter challenges and puzzles, all through participating in COASST. There
must be a stated sense of gain. Participants might explicitly mention the specific kind of knowledge or skills they want to get/improve on. This is about the participant learning, not about facilitating the learning of others.

- If participants only use a single word “curiosity” without saying what they are curious about, use this code.
- If the reference refers to honing skills or keeping up skills or otherwise not eroding their skill base, use Skill/Task.
- Discovering or finding something new or different, without any other information about learning, doesn't count.

4. Conserve/Protect/Manage: Participants say they want to protect/preserve something (by assumption, from harm or destruction). Participant desires to contribute to work that helps protect and preserve natural resources; or manage resources.

- Assessing the environment, or environmental health - do not code for conserve.
- Contributing to or maintaining the health of the environment - do code for conserve.

5. Monitor/Observe: Participants say they want to monitor and observe beaches and/or wildlife and/or processes. Participants mention change over time. This includes mention of creating or maintaining a baseline.

- This code should only be used when the participant refers to COASST data locally. That is, trends on their beach not "global COASST" trends.
- This is not the same as data collection, unless the reference also includes specifics of monitoring, observation, and/or baseline. If a participant refers to himself/herself as a “monitor” this code may not be appropriate. Decide from context whether the more appropriate code is "steward."

6. Enjoyment: Participants find participating in COASST fun or enjoyable.

7. Maintaining Personal Health: Participants want to stay in good physical or mental health by engaging in COASST surveys, including physical benefits of walking on beach, or hiking; and mental benefits of "brain exercise" associated with COASST and citizen science participation more broadly.

**Objects:** The noun form of an interest, function or reason for joining or staying active in COASST; may connect to one or more actions of interest.

1. Birds: Participants say they are interested in birds/birding or learning more about birds, want to help (conserve/protect/study) birds, or believe the importance of collecting bird data.

- When using the code “birder” this code must also be used; however, when using this code, the code “birder” is not necessarily invoked unless the participant explicitly mentions that they are a birder/bird watcher.
2. **Beach**: Participants refer directly to the/their beach, or to the coastal or marine environment.

- If there is mention of "environment" and no mention of marine or coastal or coast or beach, code as "environment."
- This code has one child code:
  - **Sense of place**: Participants describe their connection to a specific place (e.g., a named beach, use of words like "local"); and/or use possessives regarding place (e.g., "my" beach). The attachment can be emotional. There will be a nearly complete overlap between Sense of Place and Beach, although the latter code will be larger.

3. **Environment/Nature**: Participants talk about the environment or about nature as a place (e.g., out in nature).

- This is not the same as environmentalism, or environmentalist (see Steward).
- If the quote refers to watching or observing nature, then code as "Wildlife." (e.g., I love watching nature.)

4. **COASST**: Participants make explicit mention of the COASST program.

- Do not use this code if the reference refers to COASST only as a reflection of the question, e.g. Q: "Why do you continue to participate in COASST?" A: “I want to be part of COASST because....”
- Participants should explicitly provide their evaluation of the program or practice (e.g., the program/practice is interesting, I like/enjoy/love the program/practice).
- This code has three child codes:
  - **COASST Program**: Participants talk about why they are motivated by/attracted to the COASST program. References can refer to COASST as a whole (e.g., an easy commitment (P3107), successful project), or a part of COASST (e.g., materials, staff).
    - Notes on grammar and completeness of answers:
      - "The COASST program is interesting." Code as COASST Program.
      - "It's interesting" "Sounds interesting." Code as COASST Program.
      - "Interest." Too vague, do not code as COASST Program.
  - **Practice of COASST**: Participants refer to their particular experience of doing COASST - the process or practice of COASST surveys.
    - The difference between this code and Skill/Task is that Practice refers to the totality of their activity or work for COASST, and/or when they speak about the process or procedure of COASST; Skill/Task refers to a particular action: measuring the wing, handling the birds.
      - I like identifying birds. Code as Skill/Task.
      - The process of bird identification is interesting. Code as Practice.
      - Field work. Code as Practice.
  - **COASST Program Data/Results**: Participants explicitly refer to the value or use of COASST data or results.
• This code should be used when the participant refers to COASST data globally, that is, not only trends on their beach but "global COASST" trends or "COASST data stories."
• If the reference also refers to the participant collecting data, also code as "Data Collector"
• If the reference only refers to the participant collecting data, only code as "Data Collector"
• If the reference only refers to the data/results without mentioning collection, only code as "Data/Results"

5. Science: Specific references to science. Participants may espouse: (1) Interest in and/or desire to be involved in science, or in a scientific study. (e.g., "Being outdoors + Science"); (2) A specific science subject or discipline (e.g., ecology, marine biology); (3) Contributing to or increasing knowledge, furthering knowledge, knowledge as the general subject.
• Do not use this code for increasing participants’ personal knowledge, which should be coded Learn.
• References to citizen science are not included in this code.
• References to particular skills or tasks that are (or could be) part of science (e.g., data collection, baseline data or monitoring) are not included in this code.

6. Citizen Science: Participants mention citizen science in general, and/or explicit mention of projects/programs other than COASST. This code does NOT include direct reference to self, as in "I am a citizen scientist." "I volunteer for..."

7. Wildlife: Similar to “Birds,” but referring to all other organisms besides birds, or larger taxonomic or ecological categories (e.g., "wildlife"). If wildlife is not explicitly mentioned, and some more general description (e.g., cool stuff on the beach) is provided, use this code. But if the general description is too vague (e.g., am concerned about the condition of the beach and what washes ashore), don’t use this code.
• If reference refers to interest in nature as an overall thing (towards environment or ecosystem) code as "Environment/Nature."
• If reference refers to some action associated with nature, like watching or observing or monitoring, code as "Wildlife."

8. Skill/Task: Participants mention or describe a particular skill or task they want to learn, (would) like to perform, or feel that performing is important or worthwhile.
• General phrasing (e.g., contribute to science, gather data, help monitor, survey the beach) is not included in this code. (See "Science" "Monitor/Observe").

9. Greater Good: Participants refer to a larger positive outcome of their participation and/or the work or the program beyond a personal benefit.
• Making a contribution, or making a positive contribution, without some larger subject (e.g., world, earth, society, environment or science) - do not include.
10. **Worldview**: Participants talk about their beliefs and value system - their socio-ethical norms used to guide behavior and decisions. If participants mention sharing/supporting COASST mission/aims/goals, use this code.

- This code does not include the word believe (the verb form; e.g., I believe citizen science is worthwhile), but only the noun form (belief; e.g., It reflects our beliefs).
- This code does not include the word value as a verb (e.g., I value it), only as a noun (e.g., I hold this as a value).
- This code can be combined with greater good.

11. **Marine Debris**: All references to picking up debris or trash (e.g., plastic).

**Sense of Self**: Participants say who they were/are. There is a sense of permanence, of time and of intent. Simple mentions of an action or interest without a long-term sense of time is not enough. A participant can have many senses of self (i.e., roles) which are themselves wrapped up into larger identities, of which there can also be multiple.

- **Explicit statements** - the participant is overt about an identity, using words like "I am" "I was" "As a [...] I...
- **Implicit statements** - the participant describes activity that is commonly associated with a particular set of tasks or roles. The activity can be a long-term, even lifetime long.
- **COASST-relevant statements** - the participant is referring to activities/roles that are associated with and/or have come about because of participating in COASST.

1. **Data Collector (explicit; could be COASST)**: All statements referring to data collecting. Participants must refer directly to the data they are collecting or gathering, or the surveys they are doing.

2. **Science Team Member (implicit)**: All statements referring to helping, assisting, or contributing to science or research, without any specific reference to what the participant is/will be doing (e.g., "Data collector").
- Do not use this code if participants refer to their work for COASST or they are involved in/part of COASST (See "Survey Team Member" or "Collective").

3. **Survey Team Member (COASST)**: Any mention of membership in the COASST survey team. Must refer to other COASST participants that the respondent surveys with, and/or COASSSTers in the immediate vicinity that the respondent regularly associates with relative to their COASST work.
- This code does not include statements about all COASSSTers, the power of many data collectors, or other statements that do not refer to specific individuals (See "Collective").
- If the participant only mentions helping family members/friends but does not provide the team as a context, do not include.
But if participants mention “working with partner” (especially the partner is not their family members, but other COASSTers), it shows participants have a mindset about the larger group the survey team and they partner with others to work in the same team, use this code.

4. Collective (COASST): Participants refer to their part of a larger (collective) effort composed of many like individuals in the sense of everyone doing the same thing (collecting the same data, or collecting data the same way) and in the sense of the resultant information/data being important/useful because of its scale. In the collective, participants are aware of the entire group, but don't actually know many/any of the other participants personally. Thus, this is not membership in a socially-structured group. There must be an explicit sense that there is a larger effort beyond the individual. There can be a sense that the collective effort is more than the sum of the parts.

- This code is different from "Greater Good" in that it is focused on membership in a greater/larger group of people all doing the same thing as well as on what comes out of the collective work.

5. Citizen Scientist (explicit): Participants refer to themselves directly as a "citizen scientist;" participants refer to their volunteerism in named citizen science programs other than COASST, including in science-based or natural resource-management-based organizations (e.g., national parks, NOAA, national marine sanctuaries, state wildlife agencies, etc.).

6. Family: Any mention of a familial connection (including marriage). Pets don't count! If the entire quote contains "We" or "Us" with no "I" then a couple is implied. Code as Family.

7. Friend, Colleague: Any mention of specific people other than familial connections; includes friends, colleagues, neighbors and others.

- This code does not include:
  - "the collective" - code as Collective
  - any reference to a specific survey team - code as "Survey Team Member"
  - mention of a group of unspecified people (e.g., beachgoers, folks on the beach) - code as "Community"

8. Community: Any mention of a general social relationship with a specified or unspecified group (e.g., beachgoers, folks on the beach, my church, my community).

- This code does not include the "scientific community" or other communities of practice or interest that are not geographic and/or social.

9. Learner (explicit): Participants refer to themselves as engaged in long-term, or even life-long learning; or that they are actively, constantly or consistently engaged in learning; or that they have a strong interest/like/love of or passion for learning about many different types of things. There must be a sense beyond the immediate; one-time learning does not count. The references could also: (1) Refer to self in the role of student relative to others as teacher; (2) Convey the
sense of another object of learning, a new object of learning, beyond what they already have learned about/know. This is the sense of additive, or implicit life-long learning.

10. **Educator (explicit):** Any mention of being/having been a professor, teacher, education specialist; includes both formal and informal settings.

11. **Birder (explicit):** Participants call themselves birders or birdwatchers.

12. **Naturalist (explicit, implicit):** Similar to “Birder” but with explicit reference to watching or observing nature beyond birds and/or directly to being a naturalist.
   - If the word naturalist is not used, participants must use the noun form of observe (e.g., “observation,” “make observations” "observer") combined with a sense of multiple or continuing - observations conducted over time.
   - This code does not include the verb form of observe (e.g., “observing nature”) unless the quote also contains more explicit information about observing over time and building a baseline of personal knowledge (multiple observations, mental model).

13. **Steward (explicit):** Participant states they are protectors, stewards or conservers of something. This code includes activism or action in service of the environment (e.g., environmentalist).

14. **Other working world Identity:** Any mention of non-science, non-education working world or career identities not otherwise captured in the coding scheme.

15. **Retiree:** When participants explicitly mention they are retired or are retirees.

16. **Credentials – (STEM) Degree:** Participants refer to their educational background, or any degrees or certifications.

17. **Credentials - STEM Job:** Participants mention their work, job titles/positions. When job titles/positions are not explicitly mentioned, participants must describe their work experience with sufficient detail as to allow inference of a present/past scientific job.

**Miscellaneous Codes:**

1. **Importance:** Participants mention what they think, feel, believe and/or what the program is, does or produces is important. At least one of the following keywords must be present: important, worth, valuable, meaningful.

2. **Self-esteem:** Participating in COASST makes participants feel that they are useful and needed, they feel better about themselves, feel good or are rewarded for/by their efforts, and/or are proud of their efforts. It could be a way to prove the value of self.
   - Mention of only a good/better way of using time is not enough.