# **Methods for building social network**

Surveys that were < 75% complete were removed from the data set.

Social ties between survey respondents

Some survey respondents provided the names of specific individuals as alters. If these alters were also survey respondents, I cross-referenced the organizations that individual is affiliated with. Organization information from survey respondents was then used to expand on the alter organizations listed. For example, DB was cited as an alter in affiliation with one organization, but in responding to the survey themselves, DB identified three organizations that they were working on behalf of. Anyone who listed DB as an alter is now linked to those three organizations. Of the 220 unique alters provided by survey respondents (n=717 with duplicates across survey respondents), 99 included the names of specific individuals (n=267 with duplicates across survey respondents). Of these, 32 were also survey respondents. Of the 32 alters who were also survey respondents, 13 affiliated themselves with multiple organizations.

Four named alters had affiliated themselves with a different organization when they responded to the survey; this self-identified affiliation was added as an additional alter organization. One individual failed to provide an organization name in their own survey response, and so their self-identified organization was updated from “Individual” to “University of California Santa Cruz.”

Social network data for survey respondents who did not indicate any organizations with which they collaborate, coordinate, or communicate, are coded as *no tie* (0) in the social network graph’s adjacency matrix. Social network data for alters who were not captured as survey respondents are coded as *missing data* (NA) instead of *no tie* (0)in the social network graph’s adjacency matrix.

Categorizing organizations

1. SES Level: “Systematic direct observers,” “Other kelp connected”
   1. Systematic direct observers: 61% respondents (n=105)
   2. Direct observers: 14% respondents (n=24)
   3. Other kelp connected: 25% (n=43)
2. Scale: Individual, Local (within a single county), Regional (across counties), State (California), West Coast, National, Global
3. Type: Government, NGO, Research, Commercial, Tribal & Local Community, Individual

# **Methods for processing survey data**

Question 2: Are you involved on behalf of one or more organizations?

Issue 1: Volunteer / recreational and commercial divers used a range of phrases to indicate their roles. I simplified these to the following:

|  |  |
| --- | --- |
| **Survey response** | **Recoded as…** |
| Urchin removal diver  Volunteer Diving groups | Individual: Recreational Diver |
| Independent filmmaking | Individual: Photographer |
| I am a commercial Nearshore Rockfish Fisherman, I was an Abalone Diver | Individual: Commercial Fishing |

Issue 2: People who said they were working as individuals may have interpreted the distinction between ‘work on behalf of’ and ‘work with’ differently than the majority of other participants. If respondents said that they **did not** work on behalf of any organization, but then exclusively listed volunteer-led or citizen science organizations, I **added** the first listed alter organization as **an ego** and then removed it as an alter.

|  |  |  |  |
| --- | --- | --- | --- |
| Reef Check or G2KR as first alter? | Number of alters provided | Number of respondents (out of 9) | Edited? |
| No | 1 | 6 | N |
| No | 2+ | 1 | N |
| Yes | 2+ | 2 | Y |

Issue 3: Some individuals listed affiliations with organizations that they later named as collaborators.

If respondents worked on behalf of **one** organization that they also listed as a collaborator, I **removed the alter** if it was an exact match to the ego *and* that individual identified 2+ plus alters (so that they aren’t excluded from the social network data by removal of the alter).

Otherwise, I didn’t change anything.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ego-alter match type | Reef Check or G2KR? | Number of alters | Number of respondents (out of 127) | Edited? |
| exact | No | 15 | 1 | Y |
| exact | Yes | 1 | 15 | N |
| exact | Yes | 2-5 | 12 | Y |

If respondents, worked on behalf of **two or more** organizations that they also listed as alters, I used the following steps to filter ego / alter organizations

* I **removed the alter** if: the **first** organization the respondent works on behalf of was also listed as an alter, without specifying a different individual or unique group / project team at that organization

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ego-alter match type | Reef Check or G2KR? | Number of egos | Number of alters | Number of respondents (out of 63) | Edited? |
| Exact – remove the alter only | No | 2 | 3 | 1 | Y |
| Yes | 3,2 | 1 | 2 | N |
| Yes | 2 | 2 | 1 | Y |

* I r**emoved the ego** on a case-by-case basis, if the **second, third, fourth, etc.** organization the respondent works on behalf of was also listed as an alter, as long as that ego wasn’t a citizen science or volunteer organization. I did some extra investigating (check staff pages on websites, for non cit-sci / volunteer orgs?) to verify whether someone might just be funded by or collaborating with an organization. See table at end of doc for extensive accounting of what was changed by response ID.
* I also **removed the ego** on a case-by-case basis for any individuals who said that they worked on behalf of three or more organizations

\*\*For building the social network, I would like to use all edited responses, including those where I’ve removed an ego organization, to avoid duplicates in the network, and to avoid incorrectly linking survey respondents to organizations based on named alters. 🡪 For example, one survey respondent whose first listed affiliation was UC Santa Cruz said that they also work on behalf of MBNMS, California Ocean Protection Council, and CDFW. However, these are all funders / collaborators. This survey respondent was named as an alter by a number of other survey respondents. They are all now connected to those three organizations in the unadjusted data set.

Question 11: In the past year, which organizations and individual operators have you

worked directly with on kelp forest-related projects or programs?

How I treated non-specific answers, or collaborative projects. This is all within the function `clean\_org\_names(collab=TRUE)`

|  |  |
| --- | --- |
| **Response** | **Output** |
| "none",  "Other credible kelp scientists",  "kelp farmers",  variations of “many others” | NA |
| [[Name]] (urchin diver)  [[Name]] (commercial fisher) | Commercial Diver:[[Name]] |
| Grant Downie *fisher / diver / sea urchin commission* | California Sea Urchin Commission:Grant Downie |
| commercial fishermen in San Diego | Commercial Divers |
| Recreational Divers | Recreational Divers |
| Many Kelp Restoration Divers,  Urchin removal,  Urchin removal diver | Commercial Divers  Recreational Divers |
| CCCoP | CCCoP |
| PISCO | Partnership for Interdisciplinary Studies of Coastal Oceans Oregon State University Stanford University - Hopkins Marine Station University of California Santa Barbara University of California Santa Cruz |
| Kelp RISES | University of California Davis - Kelp Restoration as an Integrated Socio-Ecological System University of California Davis: Marissa Baskett University of California Davis: Tyler Scott University of California Davis: Mike Springborn University of California Davis: John Largier University of California Santa Cruz: Carrie Pomeroy University of California Santa Cruz: Mark Carr California State Polytechnic University Humboldt: Sean Craig California State Polytechnic University Humboldt: Laurie Richmond |

Question 4: How are you involved in kelp forest-related issues?

One of the output files for processing this section includes all “Other” text results, used in SEN data processing.

|  |  |  |  |
| --- | --- | --- | --- |
| **Summary** | **N** | **Responses** | **Edits** |
|  |  | RC volunteer Diver  Volunteer  purple urchin removal, all sizes, Caspar, Calif.  Urchin Culling  ex situ preservation of kelp gametophytes (biobanking)  Volunteering in kelp restoration  kelp forest surveys, culling urchins, outreach docent | Environmental management (Gabby) |
|  |  | Experimental Restoration  Restoration and stewardship | Environmental management (Mary) |
| If “other” text response includes urchin culling or urchin removal, add or extend 'harvesting or fishing or growing' answer | 4 | purple urchin removal, all sizes, Caspar, Calif.  Urchin Culling  Urchin culling  culling urchins | Harvesting or fishing or growing (Mary) |
| If “other” text response involves citizen science, volunteer diving associated with ReefCheck (but does NOT mention urchin removal), add ‘Research’ | 6 | citizen science  Data Collection  Citizen science  Surveys as citizen scientist  kelp forest surveys  NA\*\* | Research (Gabby) |
| 2 | RC volunteer Diver  kelp forest surveys, culling urchins, outreach docent | Research (Mary) |
| Individual adjustments to research | 5 | Involvement as related to sea otter research  Otter research  Mitigation monitoring  Data collection  Experimental Restoration | Research (Mary) |
| If “other” text response involves teaching, education, etc. add or extend “Advocacy or outreach” answer | 3 | Education  Teaching | Advocacy or outreach (Gabby) |
| 2 | Film, photography, media  Media film  kelp forest surveys, culling urchins, outreach docent | Advocacy or outreach (Mary) |
|  | 2 | Film, photography, media  Media film | Recreation or tourism (Gabby) |
| If “other” text related to policy, governance, add or extend “Environmental management” | 1 | Science-to-policy; policy development | Environmental management (Gabby) |
| 1 | Government | Environmental management (Mary) |
|  |  | Informing management and policy  Science-to-policy; policy development | People management (Gabby) |
| Individual response adjustments | 6 | Supporting restoration diving operations | People management (Mary) |

\*\*R\_7upUSPV19KS9FVh is a ReefCheck volunteer who is routinely involved in kelp forest-related issues. They selected Environmental Management / Other (Donations), but in their answer to question 9 they put that they directly observe conditions and collect or analyze data. I added ‘Research:CitSci Kelp Forest Surveys’ to their response.

\*\*R\_61dpMIWMs89lZLY is a Giant Giant Kelp volunteer who is routinely involved in kelp forest-related issues. They selected only Other (supporter), but in their answer to question 9 they put that they directly observe conditions and collect or analyze data. I added ‘Research:CitSci Kelp Forest Surveys’ to their response.

Explanations for where I kept “other” text as a unique response:

* Volunteer: Reef Check volunteer, did not report collecting data or observing conditions
* Restoration volunteer: collaborates with Giant Giant Kelp and is occasionally involved in kelp-related issues. In their answer to question 9 they put that they directly observe conditions, but did not report collecting or analyzing data. I suspect that they conduct urchin removal, but cannot confirm from the survey.
* Restoration / Restoration and Stewardship: this may encompass some or all of the activities listed, helpful for SEN to know that they participate in restoration activities

Extended accounting of ego changes:

|  |  |  |  |
| --- | --- | --- | --- |
| **Response ID** | **Egos [removed]** | **Alters [removed]** | **Direct observer?** |
| R\_1AGjFLTVbTA4HTj | UCSC, [TNC, CDFW] | TNC, CDFW, [UCSC] | 0 |
| R\_1kGTi1GqQ0cAh7l | Giant Giant Kelp Restoration Project,  [MLML Sunflower Star Lab] | [Giant Giant Kelp Restoration Project],  MLML Sunflower Star Lab | 0 |
| R\_1MEiTDdy7UTusoz | University of California Santa Barbara – MPA,  [TNC] | TNC, […] | 1 |
| R\_1QxOFb6rcRAJfNj | San Diego State University, University of California Davis - Bodega Marine Laboratory, [MLML] | [University of California Davis - Bodega Marine Laboratory], UC Santa Cruz, CDFW, MLML, TNC, Catalina Island Marine Institute, SSU, SDSU: Matthew Edwards | 1 |
| R\_3QfvHYy3RtQ0Y3p | Kashia Band of Pomo Indians, [Greater Farallones Assoc and NMS] | Greater Farallones Assoc and NMS, Noyo Center, UC Davis | 1 |
| R\_3qIDU2i8sWSWYdH | Above/Below, North Coast Kelp Fest, [TNC] | TNC, Reef Check, MLML, UC Davis – BML, California Sea Urchin Commission, Noyo Center | 0 |
| R\_7L1g8rvgxtmyocF | WHOI, [UC Santa Barbara] | UC Santa Barbara, CDFW, OPC, TNC, … | 0 |
| R\_5rju7W12HtPajKX | Cal Poly Humboldt, The Sea Ranch Assoc Coastal Stewardship Task Force, [CDFW] | [Cal Poly Humboldt], [The Sea Ranch Assoc Coastal Stewardship Task Force], UC Santa Cruz, SSU, … ++CDFW | 1 |
| R\_7GVc2EVkNJq5OuE | UC Berkeley, [UC Davis], [CDFW] | [UC Berkeley], UC Davis, Florida State University, Kashia Band of Pomo Indians, CDFW | 1 |
| R\_5R8mhuPcpBgJCfg | G2KR, [TNC] | [G2KR], TNC | 1 |
| **Response ID** | **Egos [removed]** | **All removed egos in alter?** | **Direct observer?** |
| R\_3rlB6ugHMc8cqTQ | SSU,  [Moss Landing Marine Laboratories','Greater Farallones Assoc and NMS','The Nature Conservancy','University of California Davis - Bodega Marine Laboratory] | Yes | 1 |
| R\_73yGa8USaSXYR0T | UC Santa Cruz, PISCO, [CDFW, UC Davis, MBNMS, California OPC] | All but OPC - added | 1 |
| R\_50v3Pt1UGJw51HP | MLML, MLML-Sunflower Star Lab, Monterey Abalone Co, [TNC, CA Sea Grant] | No - added | 1 |
| R\_6u3YTDhcZ4dOrtv | CA Sea Grant, [CA OPC, CDFW] | Yes | 0 |
| R\_56D6mBrAXbvzaBX | SSU, [TNC, CA Sea Grant, ] Individual:Photographer | Added CA Sea Grant | 1 |
| R\_5dGJi242F31TvPK | UCSD – Scripps, UCSD – Birch Aquarium, [Seatrees','California Sea Grant] | No – added | 1 |