SUPPORTING STATEMENT
U.S. Department of Commerce
National Oceanic & Atmospheric Administration
Social Network Analysis In-Person Survey
OMB Control No. 0648-xxxx

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method used. Provide data on the number of entities (e.g., establishments, State and local governmental units, households, or persons) in the universe and the corresponding sample in tabular form. The tabulation must also include expected response rates for the collection as a whole. If the collection has been conducted before, provide the actual response rate achieved.

The 2018 Fisheries of the United States (NMFS, 2019) indicates the potential respondent universe for the SNAIS includes an estimated 7,028,000 licensed, in-state saltwater recreational anglers (Table 1). The SNAIS will be conducted in three coastal communities that are representative as revealed by the MRIP Social Network Analysis Mail Survey (SNAMS, OMB # 0648-0781). One urban, one suburban, and one rural community as determined by the 2010 Census results will be selected for the SNAIS[1]. The communities, which have yet to be determined, will be representative of similar sized (rural, suburban, or urban) counties with respect to the proportion of the population that is made up of licensed anglers.

Table 1: Estimates of the number of in-state anglers from the 2018 Fisheries of the United States (in thousands of anglers).

State	In-State Anglers	
	From Coastal Counties (1,2)	From Non-Coastal Counties
Connecticut	292	-
Maine	57	2
Massachusetts	335	45
New Hampshire	39	8
Rhode Island	109	-
Delaware	64	-
Maryland	406	30
New Jersey	411	17
New York	605	14
Virginia	324	45

[1] Urban, suburban and rural communities will be defined based on 2010 United States Census statistics regarding the percentage of residents within the county living in urban areas. Rural counties are those with less than 20% urban population, suburban counties have 20 to 80% urban populations, and urban counties are those with >80% urban populations.

Florida	2,419	-
Georgia	91	81
North Carolina	460	268
South Carolina	176	116
Alabama	211	156
Mississippi	169	78
TOTAL	*6,168*	*860*
	Total In-State Anglers	*7,028*

NOTE: (1) All counties in Rhode Island, Connecticut, Delaware and Florida are considered coastal.

Study personnel (two interviewers) will spend 10-14 days per community conducting approximately three interviews per day (per interviewer) and 60 interviews will be conducted per community. The sampling approach involves chain-referral sampling (Kirchherr and Charles, , 2018) to allow for a more accurate depiction of local information sharing networks. In each fishing community to be evaluated, between ten and fifteen initial respondents shall be interviewed for the survey. Recreational anglers will be asked to participate in the survey during visits to businesses and entities (marinas, bait and tackle shops, fishing clubs, state natural resource agencies, etc.,) within the community either selected at random or identified by local and state agency personnel familiar with the recreational fishing community such as Sea Grant agents and state agency resource officers. Respondents will be asked to provide survey contact information to additional contacts from their network that could provide meaningful information for the study. These additional contacts will then be interviewed in the same manner as the initial respondents.

All efforts made to identify, select, contact, and interview recreational saltwater anglers will be documented as part of the study process so that participation rates can be determined. Our goal is to achieve an unweighted response rate of 70%. That is, we expect that 257 anglers will be determined to be eligible for the survey and will be asked to participate in the SNAIS in the three communities, resulting in 180 completed surveys or sufficient partial interviews.

Table 2 summarizes the key statistics about the proposed sampling strategy.

Population	Target Sample	Expected Response Rate	Anticipated Sample
7,028,000	257	0.70	180

2. Describe the procedures for the collection, including: the statistical methodology for stratification and sample selection; the estimation procedure; the degree of accuracy needed for the purpose described in the justification; any unusual problems requiring specialized sampling procedures; and any use of periodic (less frequent than annual) data collection cycles to reduce burden.

One time, voluntary surveys will be used to elicit fishing habit, information sharing, and attitudinal information from recreational saltwater anglers. Recreational anglers will be asked to participate in the survey during visits to relevant businesses and entities (marinas, bait and tackle shops, fishing clubs, state natural resource agencies, etc.,) within the community. The initial respondents will be asked to provide survey contact information to additional contacts from their network that could provide meaningful information for the study. These additional contacts will then be interviewed in the same manner as the initial respondents. At the interview level, the

information will be used to model a respondent's ego network. Ego networks consist of a single individual (ego) together with other individuals they are directly connected to (alters) and all links between those alters (Everett and Borgatti, 2005). The benefit of ego network analysis is the ease of data collection relative to collecting data on the entire social network, an approach that is infeasible for this project due to the size and complexity of recreational angler social networks. All data in an ego network is collected directly from ego and ego networks can be used to make inferences about entire populations (Everett and Borgatti, 2005). Ego networks will be analyzed regarding the density of ties within each network, the role of ego in each network as measured by ego betweenness, and network homophily (the tendency to form connections with similar individuals) based on level of engagement in the fisheries management and data collection processes (McPherson, Smith-Lovin, and Cook, 2001).

Density is the amount of ties present in an ego network relative to the total number of ties possible (if all alters in the network were connected). Average ego network densities and variations across groups of anglers will provide insights into the connectedness of information sharing networks. Ego betweenness measures the extent to which ego serves as the only source of connections among their alters (Freeman 1979). Two betweenness measures will be calculated: 1) a raw score that simply measures the number of geodesics (shortest paths) between alters that ego is a part of, and 2) the percentage of all alter pair geodesics that ego is a part of. The first measure allows us to account for differences in ego network sizes. Average ego betweenness scores and variations across angler groups will provide information on how reliant information sharing is on individuals acting as network hubs. Homophily will be measured regarding the engagement in the fisheries management and data collection process. We will examine whether highly engaged egos are more likely to form connections with other highly engaged anglers or less-engaged anglers and vice versa. Homophily will be measured as the percentage of alters sharing similar fisheries management and data collection engagement strategies (either engaging in the process or not).

A visualization of an ego network is shown in Figure 1. Interviewing additional contacts represented in their ego network may allow the connection of other angler ego networks and create a community level information sharing network model. For instance, if one of the initial targets provides an ego network similar to Figure 1 it is likely they will name additional contacts represented in their ego network (possibly "a", "c", and "f") and interviewing these individuals will allow us to connect ego networks and create a localized information sharing network. Creation of localized information sharing networks could provide insights into homophily based on other angler traits (e.g., beliefs regarding fisheries management, types of non-personal fishing information sources used, fishing club memberships). If respondents were selected completely at random it is much less likely that ego networks would be connected and identification of community-level information sharing networks would be unlikely.

Figure 1: Visualization of an ego network (Chase and Borgatti, 2019).
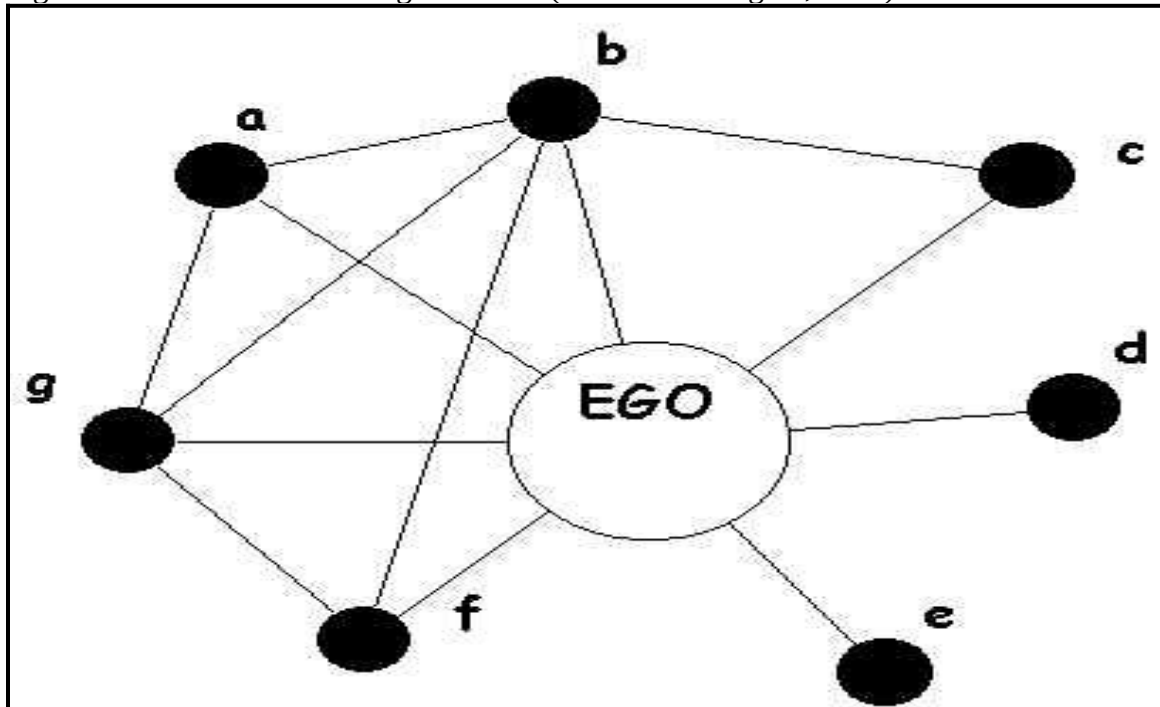
3.   Describe the methods used to maximize response rates and to deal with nonresponse. The accuracy and reliability of the information collected must be shown to be adequate for the intended uses. For collections based on sampling, a special justification must be provided if they will not yield "reliable" data that can be generalized to the universe studied.

During contacts with potential respondents, interviewers will stress the importance of the data to be collected, and the opportunity the interview provides to saltwater recreational anglers to provide input to improvements to the MRIP. Interviewers will also make clear the voluntary nature of participation and confidential treatment of the data. Since in-person interviews require a time commitment on the part of participants information elicitation using interviews can sometimes lead to responses by only the most engaged and invested stakeholders on the topic being examined. In this case, such an outcome would involve only those recreational anglers that are already invested in the fisheries management and data collection process (e.g., those that already attend fisheries management meetings or provide input on fishery data collection processes). Chain referral sampling as outlined in Griffiths *et al. (2010)* will be employed to complete interviews with a variety of marine recreational anglers in each community. Respondents will be asked about both their level of engagement in fishery management and data collection issues and the involvement of their alters (members of their ego networks). Alters ranging from "more-involved" to "less-involved" will be interviewed to obtain a broad cross-section of angler ego networks.

While the SNAMS was designed to provide appropriately weighted estimates of the target population of anglers covered by the license frame, the SNAIS is intended to be an observational study of the different angler network types encountered during sampling. The validity of the analysis that will be conducted using the SNAIS data, is dependent on having different types of

anglers or networks included in the sample but is not dependent on having them included in a distribution that accurately approximates the full population.

4. Describe any tests of procedures or methods to be undertaken. Tests are encouraged as effective means to refine collections, but if ten or more test respondents are involved OMB must give prior approval.

In addition to sharing the survey instrument with NMFS Office of Science and Technology, Division of Fisheries Statistics staff who are members of the MRIP Research and Evaluation Team and Communications and Education Team, NMFS line offices staff members who are also RET and CET members, and experts in academia, the attached survey was pre-tested with seven saltwater anglers. Members of NMFS, academia, and recreational saltwater anglers provided suggestions to improve the content and clarity of the final survey. No additional tests of procedures or methods will be undertaken.

The use of ego network surveys to gather information on variations and commonalities in how different individuals interact with others is quite common (Hanneman and Riddle, 2005). Ego network surveys have been used to examine issues including: professional networks and productivity in academia (Hara, Chen, and Ynalvez, 2017), assimilation and transnationalism among immigrants (Vacca et al., 2018) and online social networks (Arnaboldi et al., 2012). The implementation of an ego network survey involves surveying respondents (egos) regarding who they interact with (question 9 in the SNAIS) and whether those individuals (alters) interact amongst themselves (question 16 in the SNAIS) (Chase and Borgatti, 2019).

5. Provide the name and telephone number of individuals consulted on the statistical aspects of the design, and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

Statistical support was provided by the following:
Dr. Andrew Ropicki, University of Florida, 352-294-7667
Dr. Stuart Carlton, Purdue University, 765-494-3726

Adam Rettig, Survey Statistician, NOAA Fisheries Service, Office of Science and Technology, 301-427-8216 is the point-of-contact for the Agency.

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