

The Economic Impacts of Sport Divers Using the Flower Garden Banks National Marine Sanctuary

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ABSTRACT

To establish whether a potential marine protected area (MPA) is an area of special national significance requires knowledge of the area's resource, ecological, historical, cultural, and archeological qualities. Socio-economic understandings include the public benefits to be derived from recreational use and tourism activity. Managers at the Flower Garden Banks National Marine Sanctuary (FGBNMS) are required to facilitate all public and private uses of sanctuary resources (not otherwise prohibited) "to the extent compatible with the primary objective of resource protection". This paper provides estimates of the total economic impacts of FGBNMS sport divers on the Texas coastal community where they boarded their dive charter boats (Freeport, Texas). FGBNMS managers wanted a baseline understanding of the extent of new money entering the local and state economy as a result of the marine sanctuary. We sent an 11-page mail questionnaire to a sample of 1,059 sport divers using dive charter boats along the Texas coast; 528 were returned for a response rate of 56%. FGBNMS divers spent an average of \$259 in the local community and \$94 "elsewhere in Texas" on their last diving trip. Most

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and \$407,344. Non-residents of Texas spent an additional \$204,068 to \$407,346 in the local community. Using a multiplier of 1.8169 (number of times money is spent and re-spent before leaving the local economy), diver direct expenditures resulted in \$1,030,450 to \$1,155,800 of total economic output in the local area. This level of economic output also generated 21 to 24 jobs. The total value-added (or income and taxes that remain in the local community) was estimated at between \$653,921 and \$733,467. Various uses of economic impact data will be discussed.

KEY WORDS: Economic Impact, human dimensions, SCUBA diving

Impacto Económico del Buceo Deportivo en el Santuario Marítimo Nacional Flower Garden Banks

Para determinar si un área marítima protegida (MPA) es de especial importancia nacional, se requiere del conocimiento de sus recursos ecológicos, históricos, culturales y arqueológicos. El entendimiento socio-económico incluye los beneficios públicos derivados del uso recreativo y de la actividad turística. Los

responsables del manejo del Flower Garden Banks National Marine Sanctuary (FGBNMS) deben permitir el acceso a los recursos del santuario para su uso público o privado (usos no prohibidos) "hasta donde este uso sea compatible con el objetivo prioritario de proteger los recursos". Este artículo reporta estimaciones del impacto económico del buceo deportivo en el FGBNMS en la comunidad costera de Texas, donde los buzos abordan las embarcaciones que arrendan (Freeport, Texas). Los responsables del manejo del FGBNMS deseaban conocer la cantidad de dinero que ingresa a la economía local y estatal por efecto de estas actividades en el santuario. Enviamos por correo un cuestionario de 11 páginas a buzos deportivos que rentan embarcaciones en la costa de Texas; se recibieron 528 cuestionarios contestados por lo que la respuesta fue del 56%. En su último viaje, los buzos que visitaron el FGNMS gastaron en promedio \$259 USD en la localidad y \$94 USD "en cualquier otra parte de Texas". El 74% de los gastos realizados en la localidad fueron dedicados al pago de la renta de las embarcaciones. Estimamos que la derrama económica en el área de Freeport por parte de visitantes del estado de Texas estuvo en el rango de \$363,079 a \$407,344 USD. Adicionalmente, los visitantes de otros estados gastaron en la localidad entre \$204,068 y \$407,346 USD. Utilizando un multiplicador de 1.8169 (número de veces que el dinero es gastado antes de salir de la economía local), los gastos directos de los buzos deportivos produjeron en la localidad una salida económica total de \$1,030,450 a \$1,155,800 USD. Este nivel de respuesta económica además generó entre 21 y 24 empleos. El valor agregado total (o ingresos e impuestos que se quedan en la localidad) se estimó entre \$653,921 y \$733,467 USD. Se discuten varios usos de la información sobre impacto económico.

INTRODUCTION

The Flower Garden Banks National Marine Sanctuary (FGBNMS) is one of 13 National Marine Sanctuaries in the U.S. It is managed under the National Marine Sanctuaries Act (16 U.S.C. 1431- 1445b), where the U.S. Congress found that "special areas of the marine environment will contribute positively to marine resources conservation, research, and management." The goal of the U.S. Marine Sanctuaries Program is to "enhance public awareness, understanding, appreciation, and wise use of the marine environment". Much like national park legislation in the U.S., the National Marine Sanctuaries Act seeks to facilitate "to the extent compatible with the primary objective of resource protection", all public and private uses of the resources of these marine areas (not otherwise prohibited). The FGBNMS was designated as a Sanctuary in 1992 because of its biodiversity of Caribbean reef fishes and invertebrates, its reputation as a sport diving area of national significance, and to provide a means for protecting the coral reefs from damage due to anchoring.

There are many considerations involved in National Marine Sanctuary designation in the U.S. First, the area needs to be of special national significance due to its resource or human-use values. Second, existing state and Federal management

authorities must be found to be inadequate for ensuring coordinated and comprehensive management of the marine area. In addition to having knowledge of an area's resource, ecological, historical, cultural, and archaeological qualities and significance, present and potential uses of the area that depend on these qualities should be well understood (16 U.S.C. 1431, 1433). To establish whether the marine environment in question is an area of special national significance, socio-economic understandings are required as well. These include an understanding of the public benefits to be derived from Sanctuary status with an emphasis on protecting those resources that generate tourism activity and the overall socio-economic effects of Sanctuary designation.

Economic benefits generally fall into two categories: economic impact and economic value. Economic impacts at the local, regional and state level result from participation in an outdoor recreation activity like sport diving at the FGBNMS. These impacts are measured in jobs, sales, income, and tax revenues and are derived from the expenditures made by sport divers (i.e., the cost of going diving) prior to and following their diving activity. Economic value, on the other hand, addresses how much resource users value the opportunity to use a particular resource like the FGBNMS. The extent to which sport divers value the resource is partially expressed by their expenditures for sport diving as well as an additional value they would pay in a market situation before foregoing the opportunity to go sport diving at the FGBNMS. This paper will focus solely on economic impact concerns. Since economic impact assessments do not measure willingness to pay (they do not measure the economic benefit to individuals), they are not suitable for benefit-cost analyses (Propst and Gavrilis 1987, Edwards 1991). They nevertheless provide answers to many of the questions posed by local, state, and federal officials.

The objective of this paper was to provide estimates of the total economic impacts of FGBNMS divers on the Texas coastal community where they boarded their dive charter boats (Freeport, Texas) as well as at the statewide level. This involves making estimates of sport diving-related expenditure by divers who reside in the coastal community, elsewhere in Texas, and out-of-state with the multiplier effects on the economy. In particular, FGBNMS managers were interested in demonstrating the extent sport diving and related tourism activity impacts the local economy of Freeport, Texas as well as the state of Texas. At the local community level, it is important to know the extent and distribution of new money entering the local economy as a result of sport diving activity at the FGBNMS. Likewise, FGBNMS managers wanted some baseline understanding of the extent to which out-of-state sport divers bringing new money into the state's economy used FGBNMS.

METHODS

This study employed a stepwise approach to learn about sport divers in Texas marine waters and diving activity at the FGBNMS, in particular. First, an inventory of dive charter boat operators was completed in 1997 (Ditton et al. 1995). Twenty-three operators were identified and asked to provide data on the number of dive

charter trips taken offshore in the previous 12 months as well as the number of divers carried overall on these trips; only 10 responded. In a follow-up effort in 1997, the one charter dive boat operator making dive trips to the Flower Garden Banks National Marine Sanctuary reported 77 boat trips in the previous 12 months to the Sanctuary; these trips accounted for 2,350 diver trips. This information was derived directly from logs and databases maintained by the operator. Additionally, this dive boat operator along with others on the Texas coast were asked to provide us with access to their customer lists so we could send a mail questionnaire to their customers.

This research was facilitated by a study initially funded by the Texas Parks and Wildlife Department to learn about the sport diver population that used agency-managed artificial reefs as well as other artificial and natural reefs in Texas offshore waters (Ditton and Baker 1999, Ditton et al. (a) in press, Ditton et al. (b) 2002). The diver sample was derived from the population of charter dive boat operators who provided names and addresses of their customers. The goal of the diver survey was to sample 1,200 sport divers overall: 600 divers from boats known to take divers to the FGBNMS and 600 divers from boats using mostly manmade dive resources along the Texas coast. Actual sizes of the FGBNMS and artificial reef diver samples were 614 and 445, respectively.

An 11-page self-administered mail questionnaire was used to solicit information from divers regarding their diving activity and experience, their overall level of involvement in sport diving, their diving participation in Texas offshore waters as well as other dive destinations, and information about their last diving trip to the Texas coast. Additionally, the survey included several economic questions, including those designed to gain information about personal expenditures made in the coastal community on their "last trip to the coast to go sport diving in offshore Texas waters" as well as elsewhere in Texas. Direct expenditure results taken with estimates of the number of sport diver days at the FGBNMS are essential ingredients for calculating the total economic impact of sport diving at the National Marine Sanctuary. Finally, a demographic profile of sport divers was sought with questions regarding age, gender, race, ethnicity, education, income, and residence location. Survey questions were based on those proven effective in previous outdoor recreation studies completed in our Human Dimensions Lab at Texas A&M University and modified, as necessary, as a result of a pre-test of members of a local diving club. We employed the survey methodology advocated by Salant and Dillman (1994), which entailed four, personalized, first-class mailings over a five-week period with an expected response rate of 60%.

Of the 528 divers who responded to the survey, 461 had been diving in the previous twelve months. Using two survey questions, we identified those divers whose total number of trips in Texas offshore waters in the previous twelve months were made solely to the FGBNMS and those who made trips to the FGBNMS as well as other places off the Texas coast. Of the 461 divers who had been diving in the previous twelve months, 333 (10 were deleted because they were minors) reported they went diving at the Flower Garden Banks in the previous twelve

months; 186 of these went diving only at the FGBNMS (henceforth called FGBNMS only divers) and the remainder went diving at the Flower Garden Banks as well as other dive sites along the Texas coast (henceforth called FGBNMS plus divers). This paper will focus on the economic impact information derived from each group of divers.

Responses to all questions were tested for statistically significant differences between FGBNMS only divers ($n = 186$) and FGBNMS plus divers ($n = 147$). Differences between groups for interval-scaled variables were tested using t-tests. For variables with ordinal measures (scale items), the Kruskal-Wallis test was used. For nominal variables, chi-square tests for independence were used. All tests were conducted using SAS Version 8 and level of statistical significance was set at $\alpha = 0.05$. Results will be presented in aggregate form, since there were no significant group differences between the two groups (FGBNMS only and FGBNMS plus divers) regarding their expenditures made in the local community where they boarded their dive charter for the FGBNMS (Freeport, Texas) or elsewhere in Texas.

Utilizing the data provided by survey respondents for their expenditures in the local community and elsewhere in the state of Texas, we estimated direct economic impacts at each of these respective levels. Direct expenditures, however, are only one portion of the total economic impact of sport diving. Direct impacts, combined with other indirect and induced impacts represent the full economic impact of sport diving at FGBNMS to both local and state economies. Indirect impacts include the economic activity that is created among businesses and organizations that supply goods and services to the businesses that directly sell products to visiting sport divers. Induced impacts refer to the effects of generated economic activity resulting from increased incomes as a result of divers' overall expenditures. It is the combination of the direct, indirect, and induced effects that results in total economic output. Through the use of an input-output model, we can determine the changes in total output, income, value-added, and employment that reflect the economic importance of an industry and the habitats and resources that generate tourism activity (i.e. sport diving at the FGBNMS) to the coastal community and state economies.

Economic impacts of sport diving at the coastal community and state levels were estimated using economic impact multipliers for the Texas coast and statewide, derived by Tanyeri-Abur et al. (1998). Through their understanding of the total impacts of recreation activities on the Texas coast, they concluded that each dollar of expenditure resulted in an average of \$1.81 total output in the coastal community, \$0.75 in personal income, and \$1.15 in value-added to the Texas coastal economy. Based on their calculations, they reported that 37 jobs were generated per \$1 million of expenditures. At the state level, Tanyeri-Abur et al. derived an economic multiplier of \$1.91 of total economic output, \$0.78 in personal income, and \$1.20 in value-added to the state economy with 38 jobs created per \$1 million of expenditures.

RESULTS

Of the 333 individuals who went diving at the FGBNMS, 248 (75%) were male. Most divers classified themselves as Anglo (92%), with remaining divers classifying themselves as "other" 6%, African-American 1%, and Asian 1%. When asked about their ethnic origin, 4% indicated they were of Spanish/ Hispanic origin. Divers ranged from 18 to 68 years of age with a mean age of 39 years. The median annual household income of the FGBNMS divers was between \$120,000 and \$149,000 with a corresponding average 16 years of school completed.

FGBNMS divers traveled an average of 201.6 one-way miles to reach Freeport, Texas for their last sport diving trip in offshore Texas waters. Most (73.57%) of the sport divers visiting the FGBNMS resided in Texas, particularly larger metropolitan areas: 44.5% Houston, 13.9% Austin, 8.2% San Antonio, 4.9% Ft. Worth, 4.1% Beaumont, and 4.1% Dallas.

The FGBNMS divers spent an average of 3.9 days diving in freshwater and 12.9 days diving in saltwater in the previous 12 months. They also made between one and four trips, specifically, to the Flower Gardens Banks National Marine Sanctuary in the previous twelve months with an average of 1.3 trips.

FGBNMS divers spent an average of \$259 in the local coastal community (Freeport, Texas) and \$94 "elsewhere in Texas" on their last diving trip, resulting in a total trip expenditure of \$354 (Table 1). Seventy-four (74%) percent of local expenditures were made for charter dive boat fees, 7% were for tips, 5% were for auto transportation, and 5% were for restaurant meals. Most (74%) expenditures made "elsewhere in Texas" were for dive boat fees and automobile transportation. Overall, including the local community and "elsewhere in Texas", seventy (70%) percent of the total diver expenditures were for dive charter fees; 6% for tips; 7% for transportation; 5% for restaurant meals; and 2% for lodging. Dive charter fees included the costs of transporting them to and from the FGBNMS, as well as overnight accommodations onboard at the sanctuary.

In order to understand the total economic impacts that sport diving at the FGBNMS has on the local and state economies, it was necessary to separate the divers into three groups: local residents, non-local Texas residents, and non-residents (out-of-state). This was done because impact depends upon having "new" money coming into the area of particular concern, not including money that would have been spent by residents regardless of whether they went diving at the FGBNMS or not. If they could not go diving for some reason, they would have made expenditures for other items in the local economy, for example. Therefore, only non-locals and their expenditures were counted when calculating local economic impact. Similarly, only non-residents of Texas and their expenditures were counted when calculating the state level economic impact of sport diving at the FGBNMS. Since there were no "local" divers in the study from the Freeport area, no one was deleted for purposes of calculating the local economic impact of sport diving at the FGBNMS. Two hundred forty-five FGBNMS divers (74%) were non-local Texas residents and eighty-eight (26%) were non-residents from out-of-state.

Table 1. Number and Percent of FGBNMS Divers Making Dive Trip Related Expenditures on Their Last Dive Trip to the Texas Coast; Average Expenditures for Those Making Each Expenditure and Overall

Expenditure Category	n	Percent of Divers with Expenditure on Item	Average Expenditure per Diver Who Purchased Item	Average Expenditure for Item for All Divers n=270
<i>Amount in the Coastal Community:</i>				
Automobile transportation to the Texas coast (fuel, rental car, taxi, etc.) *	190	57.1	22.09	12.72
Other transportation to the Texas coast (airplane, etc.)	7	2.1	353.29	1.46
Dive boat fees *	197	59.2	293.75	192.14
Tips *	223	67.0	27.69	19.18
Lodging *	39	11.7	77.08	6.00
Restaurant meals *	172	51.7	25.09	12.23
Groceries, drinks, ice *	135	40.5	13.88	4.43
Rental of diving gear	34	10.2	38.53	3.81
Anything else for this diving trip *	28	8.4	42.46	7.51
Total			\$893.86	\$259.48
<i>Amount Elsewhere in Texas:</i>				
Automobile transportation to the Texas coast (fuel, rental car, taxi, etc.) *	165	49.5	26.16	13.04
Other transportation to the Texas coast (airplane, etc.)	12	3.6	197.58	2.57
Dive boat fees *	50	15.0	306.30	56.81
Tips *	44	13.2	27.84	3.37
Lodging *	17	5.1	72.24	0.57
Restaurant meals *	95	28.5	32.54	3.99
Groceries, drinks, ice *	61	18.3	16.67	2.43
Rental of diving gear *	34	10.2	45.03	6.84
Anything else for this diving trip	24	7.2	55.25	4.73
Total			\$779.61	\$94.35

* Indicates extreme outliers have been eliminated from data

Non-local FGBNMS divers who were Texas residents spent an average of \$235 in the local coastal community on their "last trip to the coast to go sport diving in offshore Texas waters". These divers spent an average of 2.39 days diving on their overall trip of 2.79 days, resulting in an expenditure of \$99 per diving trip day. They also spent an average of \$98 "elsewhere in Texas," resulting in an additional expenditure of \$41 per diving trip day. Non-resident FGBNMS divers spent an average of \$369 in the coastal community on their last trip to the Texas coast (5.14

days) during their 3.13 days of sport diving. This resulted in an average expenditure of \$118 per sport diving trip day in the coastal community. These same divers also spent \$104 "elsewhere in Texas," yielding an additional \$33 per sport diving trip day. Whereas out-of-state divers spent nearly \$134 more in the coastal community than Texas residents, the former only spent about \$20 more per dive trip day.

From a review of the diveboat operators' log books, there were 77 diver boat trips made by two vessels to the FGBNMS, and 2,350 divers taken offshore to FGBNMS or approximately 30.5 persons per vessel per trip. This number is slightly greater than the average number of divers (excluding captain and mate) on board the dive boats (27.2) as reported by FGBNMS divers in their questionnaire responses. This would have resulted in a total of 2,094 diver trips to the FGBNMS.

The range of diver trips was multiplied by the average trip expenditures for non-local Texas residents to estimate a range of total expenditures (direct economic impact) made in the Freeport area (\$363,079 and \$407,346) (Tables 2 and 3). Non-residents of Texas spent an additional \$204,068 to \$228,792 in the local community. These divers also made expenditures ranging between \$57,236 and \$64,170 elsewhere in the state on their way to and from Freeport.

Table 2. Total Expenditures (Direct Economic Impact) Made by FGBNMS Divers by Residence Location Using Data Provided by FGBNMS Survey Respondents (n = 2,095)

Residency	Dollars spent in coastal community	Dollars spent elsewhere in Texas	Total
Coastal community residents	0.00	0.00	0.00
Texas residents (not coastal community)	363,079.32	151,486.08	514,565.40
Non-residents	204,068.06	57,235.50	261,303.56
Total	567,147.38	208,721.58	775,868.96

Table 3. Total Expenditures (Direct Economic Impact) Made by FGBNMS Divers by Residence Location Using Data Provided by Dive Boat Charter Operators (n = 2,350)

Residency	Dollars spent in coastal community	Dollars spent elsewhere in Texas	Total
Coastal community residents	0.00	0.00	0.00
Texas residents (not coastal community)	407,345.80	169,955.20	577,301.00
Non-residents	228,792.40	64,170.00	292,962.40
Total	636,138.20	234,125.20	870,263.40

Calculated based on data provided by one dive charter boat operator for number of trips taken offshore for sport diving and number of divers carried offshore in 1996.

Estimated total expenditures made by non-local residents and non-residents in the Freeport area as a result of their trips to FGBNMS ranged from \$567,147 to \$636,138. Using the 1.8169 multiplier (number of times money is spent and re-spent before leaving the local economy) calculated by Tanyeri-Abur et al. (1998), these direct expenditures resulted in \$1,030,450 to \$1,155,800 of total economic output, respectively, in the local area. This level of economic output also generated 21 to 24 jobs. The total value-added associated with this level of output was estimated between \$653,921 and \$733,467. Value-added represents only the amount of income and taxes that remain in the local community, and therefore, is smaller than the level of total output. Personal income is a component of the total value-added impact of sport diving activity on the local community.

Since only 26.4% of FGBNMS divers were non-residents of Texas, the state level economic impacts resulting from sport diving activity at the FGBNMS were, as expected, less than the economic impacts on the local community. Using a multiplier of 1.9099, the total economic output contributed by this group of FGBNMS divers to the state of Texas ranged between \$498,933 and \$599,382 with 10 to 11 jobs. Total statewide impacts from indirect and induced spending are likely to spread well beyond sport diving jobs and include a wide range of sectors including manufacturing, retail, and services sectors. The total value-added dollars generated by the increased level of output was estimated to be between \$313,617 and \$351,613.

Using the number of dive trips and number of divers per trip as provided by dive charter boat operators, the total economic output (direct, indirect, and induced economic impacts) of FGBNMS divers for the Freeport area (\$1,151,410) was nearly double that of divers using artificial reefs in offshore Texas waters in all coastal communities in Texas (\$581,994) (Ditton et al. 2002). In terms of new money being brought to the state by divers, the total economic output of non-resident sport divers using the FGBNMS (\$559,558) greatly exceeds that of divers coming to Texas to dive artificial reefs (\$166,349) (Ditton et al. 2002). When the number of divers per trip as reported by respondents is used, the picture is not quite as clear. Accordingly, total economic output of artificial reef divers on coastal communities (\$1,745,559) is nearly twice that of the FGBNMS divers on one community (\$1,026,537) with total economic output at the state level being roughly the same for both diver groups (Table 4).

DISCUSSION

Economic impact data can be used to inform current businesses as well as local and state officials about the economic contributions of sport diving. From the results provided here, the community of Freeport, Texas should have a better understanding of the importance of this activity vis-à-vis others in the local economy, and as a result may want to develop strategies to increase the extent of local FGBNMS-related economic impacts. Taking a different perspective, if the two current boats operating charter trips to the FGBNMS were to cease operations for

some reason, the loss of \$600,000 in diver expenditures in the local area would have an estimated total impact of \$1,086,000 on the Freeport economy. The data presented should allow the FGBNMS to calculate the economic impact effects of additional charter dive boats using the marine sanctuary.

Table 4. Coastal Community and Statewide Impacts of FGBNMS Divers by Economic Impact Variable

Economic Impact Variable	Total Impacts			
	Local		State	
	Low	High	Low	High
Direct Impact	\$567,147.38	\$636,138.20	\$281,303.56	\$292,962.40
Output	\$1,026,536.76	\$1,151,410.14	\$499,089.80	\$559,558.18
Personal Income	\$425,360.54	\$477,103.65	\$203,816.78	\$228,510.67
Value-Added	\$852,219.49	\$731,558.93	\$313,564.27	\$351,554.88
Employment	21	24	10	11

The total economic output (direct, indirect, and induced impacts) of sport diving using a dive charter boat in offshore Texas waters (diving at the FGBNMS and artificial reefs) at the state level (new money to Texas) is estimated at \$725,907 if we rely on party size data provided by boat operators; it is even higher if we rely on data provided by respondents (\$998,003). Several points should help put these results in perspective. First, the two estimators for boat party size at the FGBNMS were much more congruent; as a result, the difference in high-low estimates of economic impacts is much less than it is for artificial reefs (Ditton et al. (b) in press). Second, the total economic output of non-residents using dive charter boats to access one dive site (FGBNMS) (Table 4) is almost as high as that of the entire statewide charter fishing fleet in Texas (\$667,836) (Sutton et al. 1999). This is best explained by the finding that only 3% of the charter fishing trips in Texas are taken by non-residents of the state compared to some other Gulf states (e.g., 62% in Mississippi, 57% in Alabama) (Sutton et al. 1999). Due apparently to the high costs of accessing the Texas coast from out-of-state in comparison to fishing in their home states, Texas does not attract charter-fishing parties from out of state. Perhaps due to its National Marine Sanctuary status and national significance as a dive site, a higher percent (26%) of FGBNMS divers were attracted from out of state and made expenditures in Texas. Only 19% of artificial reef divers in Texas were from out-of-state, suggesting less draw power for artificial reefs than for one of the thirteen National Marine Sanctuaries. As divers around the U.S. and elsewhere in the world learn about the FGBNMS and the nature of the diving experience there, the percent of out-of-state divers should increase and with it, additional economic impacts at the state level and community level.

Future research needs to focus in a number of areas. First, we chose not to include private-boat sport divers in the study because there was no reliable way to

identify a list of private boats in Texas used one or more times in the previous 12 months for offshore diving purposes. Even if we had been able to do so, it is unclear to what extent their use would have contributed to state level economic impacts (new money to the state of Texas). Unless private boats were being operated inappropriately as dive charter boats, we would have expected them to carry mainly state residents. Second, we need to better understand the use and non-use benefits associated with the FGBNMS. This involves knowing how much sport divers value the opportunity to use the FGBNMS above dive trip costs and how much the public values the existence of the FGBNMS and the option to use it one day for diving purposes. These economic valuation methodologies are well-established (Edwards 1990; Loomis and Swanson 1996; Loomis and Walsh 1997) and need to be applied at the FGBNMS so the value of the sanctuary is well understood among other marine resources and uses.

This paper presents a social science approach and methodology that is readily transferable elsewhere. However, there are particular challenges that need to be overcome first, such as developing a sampling frame or list of divers using a particular resource, achieving the confidence and full cooperation of dive charter boat operators, and building support among the diver community to respond to the survey. Results should be useful to dive site managers in that they will have a better understanding of local and regional stakeholders and how their interests may be affected by policy-making efforts. Likewise, they should also be useful to local communities and their leaders for better understanding how their economy is tied to a marine protected area. As communities evolve from consumptive and utilitarian activities to appreciative and non-consumptive activities, economic impact results can help communities to see which are sustainable and in their best long term interests.

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