Texas Fishing Effort Survey – Final Project Report

Office of Science and Technology

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Texas Fishing Effort Survey Final Project Report 06/29/2019 The MRIP Fishing Effort Survey (FES) is a bi-monthly (wave), cross-sectional mail survey designed to estimate the total number of private boat and shore-based recreational saltwater fishing trips taken by residents of coastal states. The FES was implemented in Texas in 2016 and administered for six reference waves.

Sampling Design

The FES utilizes address-based samples (ABS) and covers all residential addresses within the study states. The FES samples from the United States Postal Service Computerized Delivery Sequence File (CDS). Sampling is stratified by coastal state and geographic proximity to the coast within each state. Specifically, counties with any border that is within 25 miles of the coast are in the coastal stratum, and all other counties are in the non-coastal stratum. Geographic stratification within states provides an opportunity to sample different segments of the population at different rates, thereby increasing the efficiency of data collection. Counties in the coastal stratum for the TX FES include the following: Aransas, Bee, Brazoria, Brooks, Calhoun, Cameron, Chambers, Fort Bend, Galveston, Goliad, Harris, Jackson, Jefferson, Jim Wells, Kenedy, Kleberg, Liberty, Matagorda, Nueces, Orange, Refugio, San Patricio, Victoria, Wharton, Willacy.

Each wave, a representative sample of addresses is selected for each stratum from the CDS, and sampled addresses are matched, by address and telephone number, to databases of anglers who are licensed to participate in saltwater fishing in the respective state. License databases are provided to NMFS by state natural resource agencies approximately one month prior to the beginning of data collection for each wave.

Matching addresses to license databases screens the ABS sample to identify households with (matched) and without (unmatched) licensed anglers, effectively stratifying the sample into matched and unmatched strata (Figure 1). Augmenting the ABS sample in this manner provides an additional opportunity to optimize sampling - previous studies (Andrews et al., 2010, Brick et al., 2012a, Andrews et al., 2014) have demonstrated that residents of households that match to license databases respond to fishing surveys at a higher rate and are more likely to have fished during the reference wave than residents of unmatched households. Optimum sampling allocations among matched/un-matched strata are obtained by sub-sampling the initial ABS. Sample sizes for the TX FES are provided in Table 1.



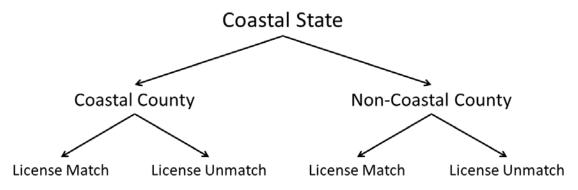


Table 1. Estimated number of households, sample size and completed surveys by wave and stratum for the Texas FES.

Wave	Geographic Stratum	License Stratum	Estimated Households	Sample Size	Completed Surveys
1	Coastal	Unmatched	2,436,936	501	101
1	Coastal	Matched	374,248	198	46
1	Non-coastal	Unmatched	6,813,408	286	70
1	Non-coastal	Matched	561,798	115	31
2	Coastal	Unmatched	2,593,153	518	113
2	Coastal	Matched	224,039	181	68
2	Non-coastal	Unmatched	7,061,297	286	77
2	Non-coastal	Matched	334,415	115	38
3	Coastal	Unmatched	2,555,679	501	111
3	Coastal	Matched	269,346	198	54
3	Non-coastal	Unmatched	7,056,966	286	77
3	Non-coastal	Matched	358,523	115	35
4	Coastal	Unmatched	2,601,390	514	132
4	Coastal	Matched	230,157	185	63
4	Non-coastal	Unmatched	7,062,500	286	74
4	Non-coastal	Matched	375,114	115	47
5	Coastal	Unmatched	2,529,640	501	101
5	Coastal	Matched	310,745	198	60
5	Non-coastal	Unmatched	6,980,654	286	75
5	Non-coastal	Matched	493,976	115	37
6	Coastal	Unmatched	2,670,382	555	119
6	Coastal	Matched	180,363	144	49
6	Non-coastal	Unmatched	7,274,908	314	82
6	Non-coastal	Matched	227,015	87	33

Data Collection Procedures

The FES is a self-administered mail survey. Data collection procedures have been extensively tested through several pilot studies (Andrews et al. 2010, 2014; Brick et al. 2012a). Each year, the survey is administered for six, two-month reference waves. The data collection period for each wave begins one week prior to the end of the wave with an initial survey mailing. The timing of the initial mailing is such that materials are received prior to the end of the reference wave. The initial mailing is delivered by regular first class mail and includes a cover letter stating the purpose of the survey, a survey questionnaire, a post-paid return envelope and a \$2.00 prepaid cash incentive. One week following the initial mailing, a thank you/reminder postcard is sent via regular first class mail to all sample units. Three weeks after the initial survey mailing, a follow-up mailing is delivered to all sample units that have not responded to the survey. The follow-up mailing is delivered via first class mail and includes a nonresponse conversion letter, a second questionnaire and a post-paid return envelope. Survey materials are included as Appendix A. The data collection schedule for the TX FES is provided in Table 2.

Task/Event	Wave 1, 2016	Wave 2, 2016	Wave 3, 2016	Wave 4, 2016	Wave 5, 2016	Wave 6, 2016
Wave begins	1/1/16	3/1/16	5/1/16	7/1/16	9/1/16	11/1/16
Initial survey mailing	2/23/16	4/25/16	6/24/16	8/25/16	10/25/16	12/27/16
Wave ends	2/29/16	4/30/16	6/30/16	8/31/16	10/31/16	12/31/16
Postcard reminder mailing	3/1/16	5/2/16	7/1/16	9/1/16	11/1/16	1/3/17
Follow-up mailing	3/15/16	5/16/16	7/15/16	9/15/16	11/15/16	1/17/17

Table 2. FES Data collection schedule.

Estimation Design

The FES estimates marine recreational fishing effort (angler days of fishing) by residents of sampled states. Final FES weights are calculated in stages. In the first stage, base sample weights within each geographic stratum (state/sub-state region) are calculated as the inverse of the inclusion probabilities ($\omega_i = \pi_i^{-1}$, where π_i is the probability that unit *i* is included in the sample).

In the second stage, base weights are adjusted to account for nonresponse. Specifically, the weights of responding units are increased by the inverse of the weighted response rate within nonresponse adjustment cells

$$\omega_{ci}^* = \begin{cases} \omega_{ci} \widehat{\emptyset}_c^{-1}, & respondents \\ 0, & nonrespondents \end{cases}$$

$$\widehat{\phi}_c = \frac{\sum \omega_{ci} r_{ci}}{\sum \omega_{ci}}$$

$$r_{ci} = \begin{cases} 1, & respondents \\ 0, & nonrespondents \end{cases}$$

 r_{ci} is a categorical variable indicating response and $\sum \omega_{ci}$ is the sum of base weights within nonresponse adjustment cell c.

Currently, nonresponse adjustments are applied within strata. Other potential criteria for defining nonresponse adjustment cells will be examined after each wave of data collection.

In the final weighting stage, non-response adjusted weights are post-stratified to control totals within each state x sub-state stratum. Control totals for the number of households are estimated from the most recent reliable data available from the American Community Survey.

Estimates of fishing effort by residents of coastal states, as well as associated estimates of variance, are calculated in SAS Version 9.4 using the surveymeans procedure. For each state and wave, total resident effort is calculated as a weighted sum over the sample

$$\widehat{Y}_r = \sum_h \sum_j \omega_{hj}^* y_{hj}$$

where ω_{hj}^* and y_{hj} are the final weight and reported number of recreational fishing trips, respectfully, for address *j* in stratum *h*.

Variance of the effort estimate is estimated using the Taylor series linearization

$$\hat{V}(\hat{Y}_{r}) = \sum_{h} \frac{n_{h}}{n_{h} - 1} \left(\sum_{j} w_{hj}^{*} y_{hj} - \frac{1}{n_{h}} \sum_{j} w_{hj}^{*} y_{hj} \right)^{2}$$

Results

Response Rates

Response rates for the TX FES are provided in Table 2. Overall, the TX FES achieved a response rate of 27.27%. Among waves, response rates ranged from 25.26% to 28.43%. FES response rates in other states ranged from 28.9% to 43.1% during this period.

Wave	Response Rate
1	25.26
2	28.28
3	27.20
4	28.43
5	26.82
6	27.02
Overall	27.17

Table 2. TX FES response rates. Response rates were calculated using the formula for AAPOR response rate 2 (RR2), in which both completed and partially completed surveys are included in the numerator, and ineligible addresses are excluded from the denominator.

Estimates

Table 3 provides estimates of fishing prevalence (percent of TX households with anglers who fished during the reference wave) and shore and private boat fishing effort (number of trips) by TX residents.

Table 3. Estimated fishing prevalence and total shore and private boat fishing effort by wave (2016).

Prevalence	PSE	Boat Trips	PSE	Shore Trips	PSE
6.63	29.35	1,685,121	30.47	2,518,555	28.43
4.93	26.04	898,166	30.42	1,422,293	22.44
6.65	21.73	1,865,120	32.57	1,793,679	19.60
9.56	27.35	2,652,864	25.32	5,499,739	24.76
9.09	22.64	1,588,433	27.02	2,095,050	19.82
9.05	24.37	2,482,892	35.08	2,334,920	24.19
7.66	10.60	11,172,597	12.97	15,664,235	11.21
	6.63 4.93 6.65 9.56 9.09 9.05	6.63 29.35 4.93 26.04 6.65 21.73 9.56 27.35 9.09 22.64 9.05 24.37	6.6329.351,685,1214.9326.04898,1666.6521.731,865,1209.5627.352,652,8649.0922.641,588,4339.0524.372,482,892	6.6329.351,685,12130.474.9326.04898,16630.426.6521.731,865,12032.579.5627.352,652,86425.329.0922.641,588,43327.029.0524.372,482,89235.08	6.6329.351,685,12130.472,518,5554.9326.04898,16630.421,422,2936.6521.731,865,12032.571,793,6799.5627.352,652,86425.325,499,7399.0922.641,588,43327.022,095,0509.0524.372,482,89235.082,334,920

References

Andrews, W.R., J.M. Brick, and N.M. Mathiowetz (2014). Development and Testing of Recreational Fishing Effort Surveys: Testing a Mail Survey Design. Retrieved from http://www.st.nmfs.noaa.gov/Assets/recreational/pdf/2012-FES_w_review_and_comments_FINAL.pdf.

Andrews, W.R., J.M. Brick, N.M. Mathiowetz, and L. Stokes (2010). Pilot Test of a Dual Frame Two-Phase Mail Survey of Anglers in North Carolina. Retrieved from <u>http://www.countmyfish.noaa.gov/projects/downloads/Final_Report%20NC%202009%20Dual%</u> <u>20Frame%20Two%20Phase%20Experiment.pdf</u>.

Brick. J.M., W.R. Andrews, and N.M. Mathiowetz (2012a). A Comparison of Recreational Fishing Effort Survey Designs. Retrieved from https://www.st.nmfs.noaa.gov/mdms/doc/08A_Comparison_of_Fishing_Effort_Surveys_Report_FINAL.pdf.

Brick, J.M., W.R. Andrews, P.D. Brick, H. King, and N.M. Mathiowetz (2012b). Methods for Improving Response Rates in Two-Phase Mail Surveys. Survey Practice 5(4).

Dillman, D.A., J.D. Smyth, and L.M. Christian (2009). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. New York: Wiley and Sons.

APPENDIX A

- FIRST MAILING COVER LETTER
- SURVEY
- OUTER ENVELOPE
- BUSINESS REPLY ENVELOPE
- **REMINDER POSTCARD**
- SECOND MAILING COVER LETTER

GALLUP



<<Date>>

<<State>> Resident -- <<Last Name>> Household Add 1 Add 2 City, State, Zip

Dear <<State>> <<Resident -- Angler>>

I am writing to ask for your help in a study that the Gallup Poll is conducting on behalf of the National Oceanic and Atmospheric Administration (NOAA). This survey asks questions about severe weather and outdoor activities. The results will be used to learn more about the environment and help improve the quality of marine and coastal resources.

For this study to be accurate, we need all households who receive this short survey to complete it and send it back. Your address was randomly picked from a list of <<addresses -- licensed anglers>> in <<State>>, and we can't replace you with someone else. Your responses will help all <<residents -- anglers>> of <<State>> have their voices heard.

This survey asks about many outdoor activities. Some people enjoy many of these activities, while others aren't interested in these activities. It is very important that your household complete the survey, even if no one participates in these activities.

This survey should be completed by an adult living at this address. We have included a small gift as a way of saying thank you for your help.

This is a voluntary survey, and your responses are confidential and will only be used in combination with answers from other households. If you have any questions or comments about this study, we will be happy to talk to you. Please call 1-888-297-8999.

Thank you very much for your help with this important study. Please return your finished survey to Gallup using the enclosed postage-paid envelope.

Yours sincerely,

Dave Van Voorhees Chief, Fisheries Statistics Division NOAA Fisheries Office of Science & Technology

Responses are kept confidential as required by section 402(b) of the Magnuson-Stevens Act and NOAA Administrative Order 216-100, Confidentiality of Fisheries Statistics, and will not be released for public use except in aggregate statistical form without identification as to its source.

Commonly Asked Questions

How did you get my address?

Your address was randomly selected from <<all addresses -- a list of all licensed anglers>> in <STATE>. You and your household represent many other <<households -- anglers>> in <STATE>.

Nobody in my household participates in outdoor recreational activities. Should I still complete the survey?

Yes. It is important that everyone who receives this short questionnaire complete it and return it. For the results of the study to be accurate, we need basic information about all households who received the survey – regardless of whether they participate in outdoor recreational activities.

Why can't you interview another household instead of mine?

We can't select another household. For the results to be accurate, we need all households who receive this short questionnaire to complete it and send it back.

How much time will this survey take?

On average, it should take less than five minutes to complete, including reviewing instructions, and answering the questions.

Who is sponsoring the survey?

This study is being sponsored by the National Oceanic and Atmospheric Administration (NOAA). NOAA's mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs.

How will the information I provide be used?

This survey collects information about how outdoor and marine resources in <<STATE>> are used and will help us better manage these resources for the future.

Your answers are completely confidential and will be used only for this study in accordance with the Privacy Act of 1974. Call Gallup, toll-free, at 1-888-297-8999 with questions about this survey.

HOUSEHOLD MEMBER 4 11 What is this person's gender? Male Male Female Female 12 How old is this person? If less than 1 year, mark 0 years Age in years 13 Is this person of Hispanic, Latino, or Spanish origin? Yes, of Hispanic origin No, not of Hispanic origin 14 What is this person's race? Mark one or more boxes. Wute White Black, African-American Asian Asian American Indian or Alaska Native Native Hawaiian or other Pacific Islander Please think only about recreational saltwater fishing in <Merged State>, How many days did you go recreational <u>saltwater</u> fishing from the SHORE in <u><Merged State>?</u> The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based Mace or area. Do not include freshwater fishing Did not recreational saltwaler fish from shore in last 12 months -> Go to question 16 Number of days shore fishing in Jul. and Aug. of 2016 Total number of days shore fishing in last 12 months, including Jul. and Aug. How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in <Merged State>? Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish Did not recreational saltwater fish from private boat in last 12 months. Jul. and Aug. of 2016 Number of days boat fishing in Total number of days boat fishing in last 12 months, including Jul. and Aug. If you have more people in your household, continue to Household Member 5. If you have answered for all people in your household, please return your survey.

HOUSEHOLD MEMBER 5

11 What is this person's gender? 12 How old is this person? If less than 1 year, mark 0 years Age in years 13 Is this person of Hispanic, Latino, or Spanish origin? Yes, of Hispanic origin No, not of Hispanic origin 14 What is this person's race? Mark one or more boxes. Black, African American American Indian or Alaska Native Native Hawaiian or other Pacific Islander Please think only about recreational saltwater fishing in <Merged State>. 15 How many days did you go recreational <u>saltwater</u> fishing from the SHORE in <u><Merged State>?</u> The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing. Did not recreational saltwater fish from shore in last 12 months -> Go to question 16 Number of days shore fishing in Jul. and Aug. of 2016 Total number of days shore fishing in last 12 months, including Jul. and Aug How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in < Merged State>? Do not include freshwater trips or trips where a maid captein or crew helped locate and catch fish.

Did not recreational saltwater fish from private boat in last 12 months.

Number of days boat fishing in Jul, and Aug. of 2016

Total number of days boat fishing in last 12 months, including hit months, including Jul. and Aug.

> Please return your survey to Gallup in the enclosed postage-paid envelope.

<MERGED STATE>

Weather and Outdoor Activity Survey



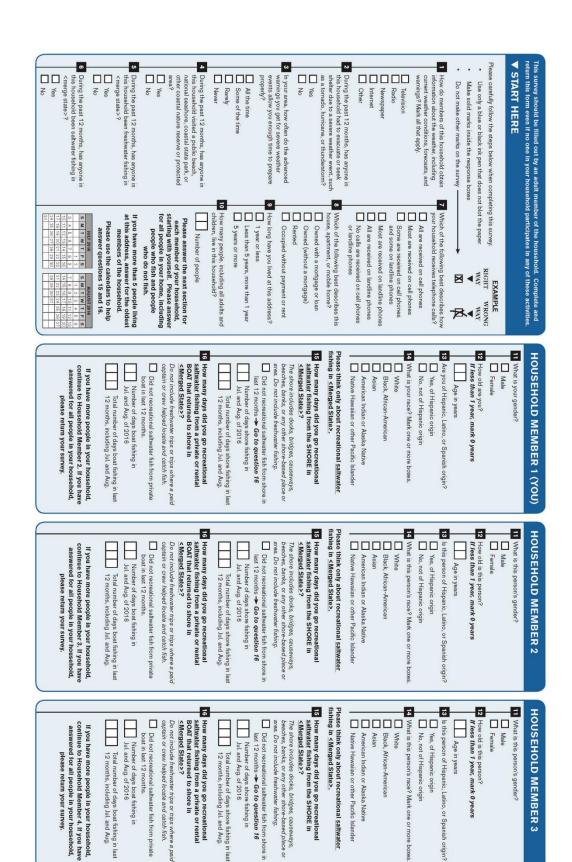
OMB # 0648-0652

Exp. Date 10/31/2016



Public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other suggestions for reducing this burden to Rob Andrews, NOAA Fisheries Service, 1315 East-West Hwy., Silver Spring, MD 20910.

This is a voluntary survey, and responses are kept confidential as required by section 402(b) of the Magnuson-Stevens Act and NOAA Administrative Order 216-100. Confidentiality of Fisheries Statistics, and will not be released for public use except in aggregate statistical form without identification as to its source. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subjected to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number-





National Oceanic and Atmospheric Administration c/o Gallup 1001 Gallup Drive Omaha, NE 68102 First-Class Mail U.S. Postage Paid Gallup





GALLUP C/O NOAA PO BOX 9014 LYNBROOK NY 11563-9820 երիկերիրինիկիրիկերինը,ինուսերենին



<<State>> Weather and Outdoor Activities Survey c/o Gallup 1001 Gallup Drive Omaha, NE 68102

<<State Resident -- Last Name Household>> Add 1 Add 2 City, State, Zip

<<Date>>

Last week we sent your household a <<State>> Weather and Outdoor Activities Survey that the Gallup Poll is conducting on behalf of NOAA (National Oceanic and Atmospheric Administration). If you have already completed and returned the survey, please accept our sincere thanks. If not, I hope you will do so today. It should take no more than 5 to 10 minutes to fill out the survey.

The Gallup Poll and NOAA are conducting this study to learn more about the impact of recreational fishing on natural resources in <<State>>. We need to hear from households that fish and do not fish, and your responses are very important to us. Please know that your answers are completely confidential and will be used only for this study in accordance with the Privacy Act of 1974.

If you did not receive the survey or need another copy, please call Gallup toll-free at 1-888-297-8999.

Land a Van Van

Dave Van Voorhees Chief, Fisheries and Statistics Division NOAA Fisheries Office of Science & Technology



GALLUP



<<Date>>

<<State>> Resident -- <<Last Name>> Household Add 1 Add 2 City, State, Zip

Dear <<State>> <<Resident -- Angler>>

A few weeks ago we sent a survey to your household on severe weather events and outdoor activities. The Gallup Poll is conducting this study on behalf of NOAA (National Oceanic and Atmospheric Administration). If you have already returned the survey, we thank you. If you have not returned it, we ask you to please complete the enclosed survey and return it in the postage-paid envelope as soon as possible.

Your completed survey will help our understanding of the environment and coastal resources in the state of <<State>>.

Your address was randomly selected from a list of all <<addresses -- licensed anglers>> in <<State>>. For this study to be accurate, we need all households who receive this short survey to fill it out and send it back - whether or not you participate in outdoor activities. The survey should be completed by an adult member of the household.

We are very grateful for your help. If you have any questions or comments, we will be happy to talk with you. Please call 1-888-297-8999.

Yours sincerely,

Dave Van Voorhees Chief, Fisheries Statistics Division NOAA Fisheries Office of Science & Technology

This is a voluntary survey. Responses are kept confidential as required by section 402(b) of the Magnuson-Stevens Act and NOAA Administrative Order 216-100, Confidentiality of Fisheries Statistics, and will not be released for public use except in aggregate statistical form without identification as to its source.

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Yes. It is important that everyone who receives this short questionnaire complete it and return it. For the results of the study to be accurate, we need basic information about all households who received the survey – regardless of whether they participate in outdoor recreational activities.

Why can't you interview another household instead of mine?

We can't select another household. For the results to be accurate, we need all households who receive this short questionnaire to complete it and send it back.

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On average, it should take less than five minutes to complete, including reviewing instructions, and answering the questions.

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How will the information I provide be used?

This survey collects information about how outdoor and marine resources in <<STATE>> are used and will help us better manage these resources for the future.

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