Texas A&M AgriLife Extension

Prairie View A&M University
College of Agriculture and Human Sciences
Cooperative Extension Program

Sea Grant Texas

Extension Education in Cameron County

Making a Difference

2016

TEXAS A&M AGRILIFE EXTENSION

Making a Difference

Cameron County 2016

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Making a Difference

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Agriculture and Natural Resources

EXTENDING KNOWLEDGE *Providing Solutions*

The Texas A&M AgriLife Extension Service and its partners have long been dedicated to educating Texans. Extension education evolved nationwide under the 1914 federal Smith-Lever Act, which sought to extend university knowledge and agricultural research findings directly to the people. Ever since, Extension programs have addressed the emerging issues of the day, reaching diverse rural and urban populations.

In Texas, all 254 counties are served by a well-organized network of professional Extension educators and some 100,000 trained volunteers. Extension expertise and educational outreach pertain to the food and fiber industry, natural resources, family and consumer sciences, nutrition and health, and community economic development. Among those served are hundreds of thousands of young people who benefit annually from Extension's 4-H and youth development programs.

Texans turn to Extension education for solutions. Extension agents and specialists respond not only with answers, but also with resources and services that result in significant returns on the public's investment. Extension programs are custom-designed for each region of the state, with residents providing input and help with program delivery. Here are just a few highlights of Extension impacts on this county and its people.

Cameron County – Summary of 2016 Educational Contacts

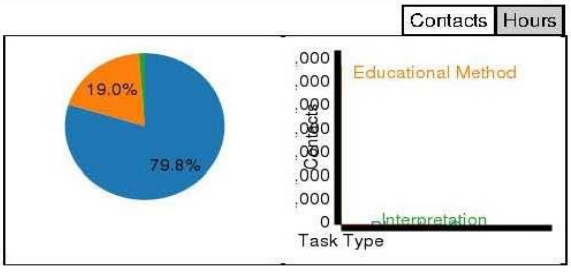
Texas Reporting Retrieval - Summary - Cameron

Total Contacts	**125,302**
Educational Events	67,535
Other Contacts	57,767

Educational Events

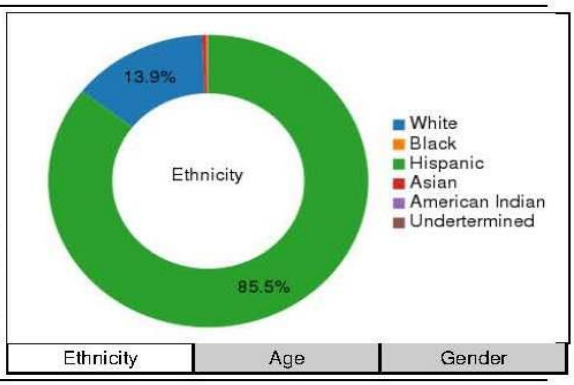
	Contacts	Hours
All Session Contacts	67,535	115,587

Plan Level	**Contacts**	**Hours**
In-Depth	53,880	78,318
Outreach	12,850	31,271
Organizational Support	805	5,998
Task Type	**Contacts**	**Hours**
Planning Group	1,785	4,645
Educational Method	62,224	98,413
Interpretation	3,426	9,329
Plan Support	100	3,200
Delivery Method	**Contacts**	**Hours**
Face-to-Face	66,820	113,237
Technology Assisted	715	2,350



Demgraphics

Ethnicity	**Contacts**	**Hours**
White	9,353	30,433
Black	109	518
Hispanic	57,743	83,841
Asian	276	718
American Indian	27	35
Undetermined	0	0
Age	**Contacts**	**Hours**
Adult	23,135	55,664
Youth	44,400	59,923
Gender	**Contacts**	**Hours**
Male	31,586	57,532
Female	35,949	58,055



Friend to Friend In-Depth Summary – Cameron County Report, 2016

Developed by Lilian Mezquida, County Extension Agent-Family & Consumer Sciences

The *Friend to Friend* program's purpose is to encourage women to get regular mammograms and Pap tests for the early detection of breast and cervical cancer, when the disease is most curable.

Relevance

- In Cameron County the incidence of Breast cancer is 175 cases.
- Regular screening significantly increases the likelihood of finding cancer early, when treatment is more often successful.
- Women living in rural areas of Texas are less likely than their urban counterparts to have had a mammogram or Pap test within the past two years.
- Mortality is higher for rural women because of later diagnosis.

Response

- This project's goal is to decrease breast and cervical cancer morbidity and mortality for women living in rural Texas counties by improving screening rates and early detection of cancer.
- Through a grant from the Cancer Prevention and Research Institute of Texas (CPRIT), funding was provided for screenings and transportation for uninsured and underserved women in need of services.
- The county Extension agent, regional cancer prevention specialist, and patient navigators plan and implement a *Friend to Friend* event. Women attending are given the opportunity to sign a commitment card to obtain a mammogram and/or Pap test within the next year and the option to complete a help request form for assistance in obtaining screening services.

Partnership:

Important collaborators included Commissioner Alex Dominguez, Dra. Esperanza Zendejas, Brownsville ISD, Gracias Texas, Superior Healthplan, Community Outreach Diabetes Management, Ribbons of Hope, Rodeo Dental, Tu Salud Si Cuenta, Jafra and Wesley Nurses.

Impact of the Program

- 36 counties held *Friend to Friend* events throughout Texas in 2016.
- 140 women attended the *Friend to Friend* events on April 29, 2016 at the BISD Wellness Center in the city of Brownsville, Texas.
- 25 total volunteers assisted at party event.
- A Health Profession and a Breast Cancer Survivor urged women to obtain a mammogram/Pap screening at the events.
- At the end of the event **85.9%** of women, aged 40 or over, correctly identified the need for a mammogram screening every year.
- **117** women requested help to navigate screening and diagnostic services.
- **28** Clinical sites contracted statewide for screenings, diagnostics, radiologists and lab services.
- **186** Mammogram screenings and 13 diagnostics were paid for through CPRIT funds.
- **141** Pap screenings and 7 diagnostics were paid for through CPRIT funds.
- Women were referred to other available sources for Breast and Cervical screenings and diagnostics.

Success Stories

- Thanks to this program I will be able to get my mammogram

The information was very helpful and I did learn how important is to get my mammogram and Pap screening.

Parenting Connections In-Depth Summary – Cameron County Report, 2016

Developed by Lilian Mezquida, County Extension Agent-Family & Consumer Sciences

Relevance

Although children are influenced by many different elements in their environment, parents are the primary influence in the lives of their children. Parents' contributions to their children's development are unparalleled, especially during their early childhood years.

Research suggests that quality educational programs can assist parents in developing the skills they need to effectively raise their children. The qualities/skills that are common to effective parents (e.g., unwavering love, sensitivity to a child's needs and feelings, clear and consistent limits geared toward a child's stage of development, firm but not harsh discipline, encouragement of child's emerging independence, parental involvement in child's education, being a positive role model) can be taught through a series of parenting education classes that allow parents the opportunity to discuss and practice the desired skills.

In Cameron County there were **1,371** confirmed victims of child abuse and **399** children in foster care. Hispanic children represent the greatest number of children who died from abuse or neglect.

Response

In 2016, the Texas A&M AgriLife Extension Service conducted multiple parent education workshop series' in Cameron County utilizing the *Parenting Connections* curriculum. Topics covered included guidance/discipline, parent-child communication, promoting a healthy self-esteem in children, and child development. One hundred and twenty (**120**) single session parenting evaluations were completed by participants. Forty (**40**) parents and/or other relatives completed the 4-week program (see Table 1 for outcomes).

Results

Participant Characteristics

The average age of participants was 29 years. Parents who attended the classes had an average of 2.9 children. Fifty-give percent of attendees who completed the demographic portion of the survey were female and 30% were male. Approximately 43% possessed a high school diploma and 13% some college.

Thirty-three percent did not possess a high school diploma. Eighty-three percent of the participants identified themselves as Hispanic/Latino, and 8% Caucasian. Sixty-eight percent reported household incomes under $20K, 10% between $20-29K, and 15% over $30K. Twenty-eight percent of participants were married (1st time), 18% divorced/separated, 5% remarried, and 43% single. Eighty-five percent identified themselves as the child's custodial parent, and 5% as the non-custodial parent.

Parent/Child Behaviors

Participants were evaluated after completing the parent education series using a retrospective evaluation tool. Results indicate that the program had a very positive effect on specific parenting practices. **Significant behavioral changes from pre to post occurred in the following areas: parent-child communication, parental self-confidence, and parental use of positive disciplinary practices. In addition, parents reported a significant improvement in their children's behavior after participating in the program**. The following tables demonstrate the positive changes that occurred:

Table 1. Percent reporting "frequently" or "almost always" from pre to post (N = 40)

Parenting Behavior	Pre	Post
Compliment child	52.5%	85.0%
Encourage child	52.5%	85.0%
Listen carefully to child	65.0%	95.0%
Communicate clearly & directly	42.5%	75.0%
Confident in parenting skills	55.0%	80.0%
Set limits (rules) for child	42.5%	62.5%
Consistently enforce limits	45.0%	67.5%

Table 2. Child's behavior pre vs. post (N = 27)

Child's Behavior	Pre	Post
Excellent or Very Good	33.3%	51.8%
Adequate, Fair, or Poor	66.6%	48.1%

Partnership:

Important collaborators included Texas Department of Family and Protective Services, Adult Probation, WIC, Religious Organizations, School Districts, and Community Services.

Better Living for Texans – A Fresh Start to a Healthier You!

Cameron County Report, 2016

Developed by Lilian Mezquida, County Extension Agent-Family & Consumer Sciences

Relevance:

In Texas more than 3.7 million individuals receive SNAP, in Cameron County an estimated **123,911** individuals receive benefits from the Supplemental Nutrition Assistance Program (SNAP), historically known as food stamps. Studies have shown individuals who live in poverty (including SNAP recipients) have dietary intakes that are not in agreement with current recommendations (i.e. Dietary Guidelines or MyPlate). This audience, like many, may not recognize their risk for foodborne illness. Having enough food to eat is also a challenge; an estimated 1 in 6 households in Texas experience food insecurity.

Response – Better Living for Texans (BLT)

The BLT Program is a cooperative endeavor among Texas A&M AgriLife Extension Service, Texas Health and Human Services Commission (HHSC), and the Food and Nutrition Services (FNS) of USDA. A component of the Supplemental Nutrition Assistance Program (SNAP), BLT offers food and nutrition education to SNAP recipients, applicants, and other low-income audiences to help improve their ability to plan and prepare nutritious meals, stretch food dollars, and prepare and store food safely. BLT also incorporates gardening and the *Walk Across Texas* program to promote physical activity and improve access to vegetables and fruits.

During 2016, **364** Cameron County adults completed the BLT *A Fresh Start to a Healthier You!* series. This program focuses on improving vegetable and fruit intake, meal planning, increasing physical activity, and adopting selected behaviors that can reduce the risk of foodborne illness. Of those **323** participants, completed the 30-day follow-up survey which allows us to assess the extent that targeted behaviors were adopted.

Results:

Participant characteristics

Average household size was **4.23%**; the average age of the participants was **45** years. Participation in the selected assistance programs was as follows: SNAP **62.2%,** food pantries or other emergency food assistance free/reduced school meals **22.3%,** Head Start TANF 3.7%, and WIC **11.1%.**

Evaluation results:

Changes in targeted behaviors were examined by evaluating the pre, post and (where available) follow-up surveys of those individuals who completed the program series.

Vegetable and Fruit Consumption

Behavior	Pre		Post		Follow-Up	
	N	%	N	%	N	%
Fruit Consumption						
None or rarely	37	10.6%	4	1.2%	0	0.0%
1-2 times a week	93	26.6%	75	22.1%	54	16.2%
3-4 times a week	86	24.6%	87	25.6%	88	26.4%
1 time a day	57	16.3%	66	19.4%	74	22.2%
2 times a day	55	15.7%	77	22.6%	85	25.5%
3 or more times a day	22	6.3%	31	9.1%	32	9.6%
Vegetable Consumption						
None or rarely	42	12.0%	3	0.9%	0	0.0%
1-2 times a week	97	27.7%	66	19.5%	43	12.8%
3-4 times a week	97	27.7%	101	29.8%	101	30.1%
1 time a day	50	14.3%	63	18.6%	70	20.8%
2 times a day	45	12.9%	71	20.9%	86	25.6%

Meal Planning and Food Management Practices

	Pre		Post		Follow-Up	
	N	%	N	%	N	%
Plan meals in advance						
Always	52	15.0%	84	25.1%	104	32.3%
Sometimes	113	32.7%	92	27.5%	67	20.8%
Never	32	9.2%	5	1.5%	3	0.9%
Not Sure	2	0.6%	0	0.0%	1	0.3%
Shop for food with a list						
Always	77	22.4%	109	32.1%	123	36.6%
Sometimes	86	25.0%	69	20.3%	69	20.5%
Never	49	14.2%	7	2.1%	1	0.3%
Compare prices when shopping						
Always	112	32.1%	161	47.9%	190	56.7%
Sometimes	90	25.8%	50	14.9%	41	12.2%
Never	32	9.2%	4	1.2%	1	0.3%

Food Safety

	Pre		Post		Follow-Up	
	N	%	N	%	N	%
Wash hands before preparing meals						
All of the time	224	63.8%	292	85.6%	291	86.6%
Most of the time	91	25.9%	42	12.3%	40	11.9%
Some of the time	28	8.0%	7	2.1%	4	1.2%
Hardly ever	6	1.7%	0	0.0%	0	0.0%
Wash fruits or vegetables before eating or preparing						
All of the time	234	66.7%	291	85.3%	336	100.0%
Most of the time	82	23.4%	43	12.6%	285	84.6%
Some of the time	25	7.1%	6	1.8%	49	14.5%
Hardly ever	7	2.0%	1	0.3%	3	0.9%

Change in Physical Activity Behaviors

	Pre		Post		Follow-Up	
	N	%	N	%	N	%
How often are you physically active for at least 30 minutes, five days a week?						
All of the time	84	23.9%	118	34.6%	128	38.2%
Most of the time	88	25.1%	92	27.0%	102	30.4%
Some of the time	100	28.5%	106	31.1%	87	26.0%
Hardly ever	64	18.2%	20	5.9%	17	5.1%
Not sure	2	0.6%	0	0.0%	1	0.3%

Other findings:

62% of the participants identified BLT as their first exposure to AgriLife Extension. This suggests that the program is reaching new audiences who otherwise might not have the opportunity to benefit from Extension programs.
59% of the participants rated the BLT program as "excellent" while **38.3%** rated the program as "very good."
In addition, **80.5%** of the participants reported they were "very likely" to recommend BLT to another person; said they were "likely" to recommend the program. In addition, the **73.2%** of participants reported they were "very likely" or "likely" to attend another BLT program.

Partnership:

Important collaborators included Cameron County School Districts, Community Centers, Religious Organizations, Housing Authorities, Salvation Army, Food Bank and Health Department.

TEXAS A&M AGRILIFE EXTENSION

Cameron County

HEALTHY SOUTH TEXAS IN CAMERON COUNTY

Using the proven agriculture-based Extension model, Healthy South Texas is creating a new crop of health educators to engage Texans where they live and work to take control of their own health and wellness. Our comprehensive, multi-disciplinary team engages families, enhances education, promotes behavior change, and improves quality of medical care and health outcomes.

HEALTHY SOUTH TEXAS COALTION MEMBERS

Our county recruited, trained, and mobilized a community Healthy South Texas coalition, identifying the most critical health needs in our community and helping assess the best way to address those needs.

25 COALITION MEMBERS REPRESENTING:	
Ag Producer/Industry (1)	Health Department (1)
Agrilife Extension (3)	Medical Professional (2)
City/County/State Government (4)	Other (6)
Education (3)	Public Health Professional (2)
Faith-Based Organization (1)	Social Services (2)

WALK ACROSS TEXAS!

OVER THE COURSE OF THE 8 WEEK PROGRAM, 3,843 PARTICIPANTS WALKED A TOTAL OF 156,472 MILES.

764 adult participants walked **77,726 miles** and **3,079** student participants walked **78,746 miles.**

It is estimated that **71** of the adults who completed the WAT! program could avoid or delay the onset of diabetes through increased physical activity.

In Healthy South Texas Year 1, including the cost of lost wages, the total potential economic impact for Cameron County WAT! participants is approximately **$4,884,748.**

Community members and students in Los Fresnos support wellness by getting active.

HEALTHY SOUTH TEXAS

Texas A&M AgriLife Extension—Cameron County
1390 W. Expressway 83
San Benito, Texas 78586
956-399-4015
cameron-tx@tamu.edu

EMPOWERING YOUTH

Youth Ambassadors were trained on the Learn, Grow, Eat & Go!

Healthy South Texas Youth Ambassadors are local, high-school age youth recruited by agents and trained to serve as a community health and wellness advocate. These ambassadors also assist county Extension agents in providing leadership to the youth components of Healthy South Texas.

- Seven Cameron County youth have been selected through the application process and trained. Recently they assisted with Landrum Elementary's Walk Across Tex- as kickoff by hosting nutrition trivia and helping with a recipe demonstration.

DINNER TONIGHT/NUTRITION EDUCATION

Healthy eating begins at home and with Texas A&M AgriLife Extension Services Dinner Tonight! program, we make it easier for people to plan and cook healthy meals. Recognizing the challenges of busy families, this program uses face-to-face cooking schools and an all-access website to teach cooking tips and techniques, provide reliable nutrition information, address food safety concerns, and give guidance on food preparation.

- Cameron and Willacy Counties partnered together to host a Dinner Tonight Healthy Cooking School with **165** participants on October 25, 2016.
- **Partners:** City of Rio Hondo, Cameron County DHHS, Shrimp Outlet
- **Other Sponsors:** Texas Citrus Mutual, Crop Guard and Cameron County Agriculture Program, HEB

Audiences members at Dinner Tonight enjoyed dieticians from the Cameron County DHHS and a Shrimp Outlet vendor showcasing easy and nutritious meal ideas.

HEALTH EDUCATION

- "Si Yo Puedo Controlar Mi Diabetes" - **52** individuals enrolled in Si Yo Puedo classes and **32** participants successfully completed pre- and post-test questionnaire. Average HbA1C scores decreased from baseline **7.6 M** to 3 months post-intervention **5.9** M (N=9). **A 0.5% reduction** in A1C scores significantly decreases diabetes complications.
- **39** individuals enrolled in Food Handler Certification Class and **39** participants successfully completed pre-post-test questionnaire.

Diabetes education participants recognized for completing class.

2016 Master Gardener Volunteer Training Program in Cameron County

Developed by Jennifer Herrera, County Extension Agent-Horticulture, Cameron County

Relevance:

Cameron County ranks 7th in the state of Texas for products sold in crops including nursery and greenhouse.

Nursery production in Cameron County is a million dollar industry next to agriculture production. During the 2015 Texas Community Futures Forum, two critical issues were identified, "Environmental Stewardship" and "Water Conservation". The major programmatic goal of the Master Gardener Volunteer Training program is to increase knowledge and skills of homeowners, landscapers, home gardeners, city and county parks and recreation employees. In order to reach more of our target audience the Master Gardener program was established. The volunteers support and assist Texas A&M AgriLife Extension Service by providing the community with researched based information and guidance on good gardening practices.

Response:

Through the Texas Master Gardener Volunteer Program participants are trained through a series of educational activities supported through demonstrations, evaluation of research, workshops, hands-on activities, tours and presentations on environmental stewardship. As a result from the 2014-2015 Master Gardener Training Evaluations the training was held in the fall for the first time to take advantage of cooler temperatures and accommodate more tours and outdoor hands-on activities.

Cameron County Master Gardener and Hidalgo County Education Committees met three times to develop the following educational events to address relevant issues: Composting, Citrus Greening, Herbs, Rainwater Harvesting, Superstar Plants presented by Master Gardener Specialists, Plant Growth and Development, Plant Propagation Workshop, Drip Irrigation, Soils and Soil Fertility, Tree Care and Management in the Landscape presented by Local Experts, Vegetable Gardening, Understanding and Identifying Insect and Plant Diseases by Texas A&M Specialists and Researcher, Tropical and Subtropical Fruit Trees, Earth-Kind Roses, Cut Flowers presented by Nursery Owners.

The Master Gardener course consisted of 75 hours of instructional education and a minimum of 50 volunteer service hours in Cameron County. Four of the eight sessions were held in partnership with the Hidalgo County Master Gardeners to showcase geographical features unique to each county.

This year 21 Master Gardener Interns graduated and became certified Texas Master Gardeners. In Cameron County, the Master Gardener interns and Master Gardener's volunteers contributed **2611 service hours** equating to **$ 61,515.16 savings** to the county in volunteer service in horticulture education.
Master Gardeners provide education through a variety of teaching methods; personal contact, newspaper articles, workshops, training, clinics, seminars and tours.

Evaluation Strategy:
A retrospective post evaluation was administered to 21 Master Gardener Interns at the end of the Master Gardener Volunteer Training Program and 18 evaluations were completed.

Results:
The results of the retrospective post survey clearly indicated that respondents' level of knowledge and understanding on horticulture practices and topics increased upon completion of the Master Gardener Training Program.

- 100% of respondents were mostly or completely satisfied with the overall Master Gardener Program
- 82% of respondents indicated that they definitely will or have already adopted Earth-Kind Horticulture practices learned from the Master Gardener Training Program.

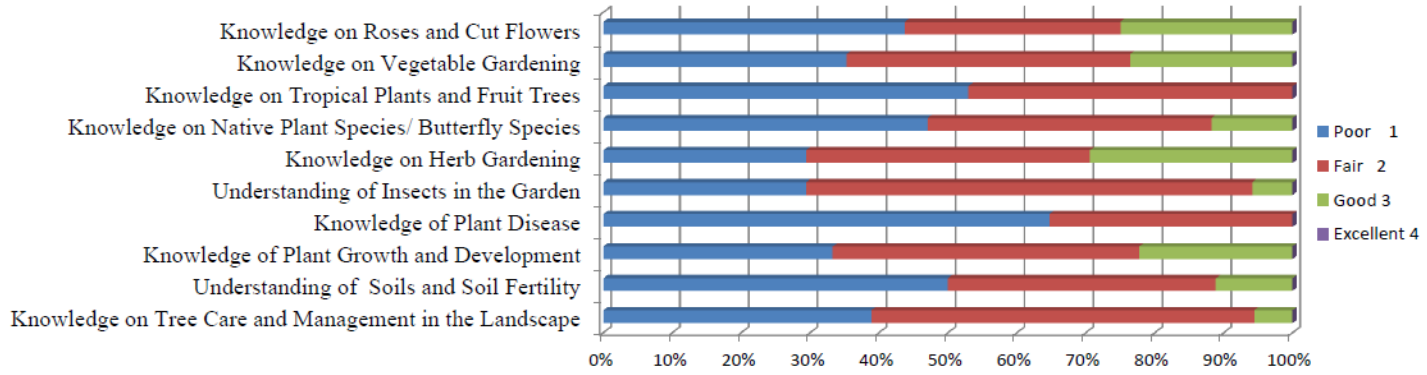


Figure 1: Illustrates the results of respondent's level of knowledge and understanding of varies horticulture topics **before** the Master Gardener Training Program

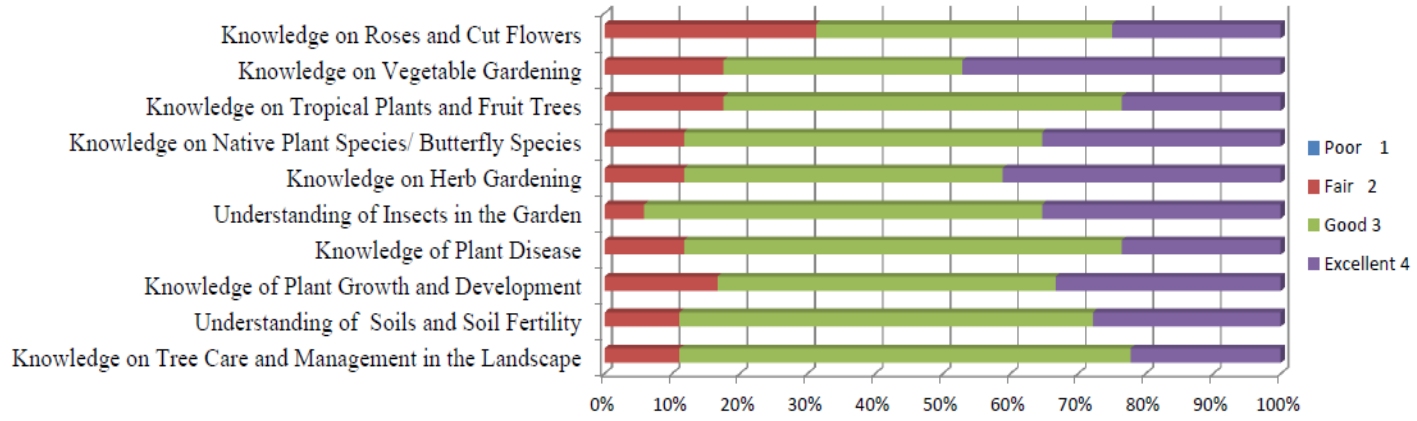


Figure 2: Illustrates the results of respondent's level of knowledge and understanding of varies horticulture topics **after** the Master Gardener Training Program

Future Plans: In 2017, the Cameron County Master Gardener Education Committee will plan the Master Gardener Intern class by utilizing the 2016 results. The 2017 Master Gardener Intern Class will also be evaluated. The Master Gardener will continue to find projects throughout Cameron County and continue to share horticultural Earth-Kind practices.

2016 Cameron County Growing and Nourishing Healthy Communities

Developed by Dr. Jenna Anding Professor and Extension Specialist and Jennifer Herrera, County Extension Agent-Horticulture, Cameron County

Relevance

In Cameron County, an estimated **123,911 individuals** receive benefits from the Supplemental Nutrition Assistance Program (SNAP), historically known as food stamps. Studies have shown individuals who live in poverty (including SNAP recipients) have dietary intakes that are not in agreement with current recommendations especially when it comes to consuming vegetables and fruits. In addition, low-income families often live in neighborhoods with limited access to healthy foods (i.e. food deserts), compounding the challenge of eating a healthy diet. During the 2015 Texas Community Futures Forum, two critical issues were identified, "Adult Obesity" and "Child Obesity".

Response – Growing and Nourishing Healthy Communities

The Growing and Nourishing Healthy Communities (GNHC) program is a cooperative endeavor among Texas A&M AgriLife Extension Service, Texas Health and Human Services Commission (HHSC), and the Food and Nutrition Services (FNS) of USDA. A component of the Supplemental Nutrition Assistance Program (SNAP), GNHC works with local partners to establish community gardens in communities identified as a food desert. Targeted towards SNAP recipients (and those eligible for benefits), the program's goal is to improve availability and accessibility of vegetables and fruit in the home by teaching participants (1) how to build gardens and (2) the skills needed to successfully grow and harvest fresh produce. The community gardens also serve as an outdoor classroom for participants who want to apply their knowledge at home (i.e. backyard garden). The program also includes nutrition education from Extension Better Living for Texans (BLT) educators to help participants learn how to incorporate their fresh produce in healthy and budget-friendly recipes. The program is evaluated by assessing the amount of produce harvested and participant feedback via a pre and post survey.

During 2016, 115 Cameron County adults completed the GNHC program; 85 participants completed the retrospective post surveys.

Results

Participant Characteristics

Participants were primarily female (74%) and Hispanic (98%). More than 22% of the participants (n=15) had not completed high school; 28% (n=24) had completed high school and 42% (n=36) had completed some college or a college degree.

Thirty of the 85 participants (35%) received SNAP benefits while 19 (22%) reported having children living in the household who received free or reduced price meals at school. Forty percent (n=34) reported they had grown vegetables or fruits before and more than 62% of the participants (n=53) identified the GNHC program as the first Extension program they had attended.

Gardens

A total of 9 community gardens have been established in Cameron County through the GNHC program yielding more than 2,100 pounds in 2016. Watermelons, tomatoes, and squash were grown most often.

Impact of the Gardens on Availability and Accessibility of Vegetables and Fruits in the Home

Compared to when the program ended, there was statistical increase in the frequency of serving fruit as a dessert and having vegetables as a snack in the home (Table 1). There was also a statistical trend in having more vegetables served as meals and having them cut-up and available in the refrigerator, suggesting that availability and accessibility of vegetables and fruits in the home were improved.

Table 1. Availability and Accessibility of Vegetables and Fruits in the Home

Question	Average Response* Pre	Average Response Post	Significance
We have fruits and vegetables in my home.	3.01	3.49	.001
In my home vegetables are served at meals.	2.90	3.27	.001
In my home, fruit is served for dessert.	2.51	3.01	.001
In my home, there are vegetables available to have as a snack.	2.56	3.08	.001
In my home, there is fruit available to have as a snack.	2.94	3.35	.001
In my home, there are cut-up vegetables in the fridge for me and my family to eat.	2.39	2.94	.001
In my home, there is fresh fruit on the counter, table or somewhere else where I and my family can easily get them.	3.00	3.38	.001

*Based on a 4-part Likert scale: 1=hardly ever; 2=sometimes; 3=often; 4=almost always. **NS means no change from a statistical standpoint although an upward trend is always encouraging.

Summary

These results suggest that the GNHC program is playing an important role in improving the availability and accessibility of fresh produce (particularly vegetables) in the home of the GNHC participants. Although not shown, participants who before reported a significant increase in self-perceived knowledge/skills related to gardening. Overall, More than 86% of the participants (n=74) rating their gardening knowledge and skills as either “good” or “excellent” at the end of the program.

2016 Cameron and Hidalgo Small Acreage Production

Developed by Samuel Zapata, Assistant Professor and Extension Specialist - Agricultural Economics, Ashley Gregory, CEA-Horticulture, Hidalgo County and Jennifer Herrera, CEA-Horticulture, Cameron County

Relevance:

The Lower Rio Grande Valley (LRGV) leads the nation in terms of the percentage of population living in poverty and number of persons without educational degrees at all levels. As a result, most small producers have limited formal education on sustainable and profitable production practices. In order to build a sustainable agricultural future and maximize the LRGV's diverse agricultural production, it is essential to train its socially disadvantaged farmers and ranchers on better farming techniques. USDA Census of Agriculture reports that 22% of Cameron County and 25% of Hidalgo County farms are less than 9 acres.

Agricultural profitability, economic development, food security and sustainable food systems were all identified as critical issues during the 2015 Cameron and Hidalgo Counties Futures Forums. In the last three years there has been a rapid development of farmers markets throughout the LRGV. There are 6 established markets and 5 markets that are in the developing stages.

Response:

Advisory boards from both Cameron and Hidalgo Counties met to develop the Small Acreage Production Workshop series. Workshops were conducted by a multidisciplinary team of Texas A&M AgriLife Extension specialists, County Extension Agents, and local experts and growers. The major programmatic goal was to train socially disadvantaged, beginning, young, veteran, small farmers and ranchers in marketing and business planning, crop production, irrigation and water management.

- Backyard Hens, 3/24/16, 77 participants
- Grape Growing 101/Home Wine Making, 6/24/16, 25 participants
- Marketing Resources and Tools for Local Growers, 6/30/16, 21 participants
- Production Resources and Tools for Local Growers, 7/22/16, 10 participants
- Vegetable Production for Local Growers, 8/25/16, 42 participants
- MarketReady Training: Selling to Local Restaurants, 9/23/16, 26 participants
- Organic Production for Local Growers, 10/26/16, 29 participants
- Aquaponics for Local Growers, 10/27/16, 45 participant

Evaluation Strategy:

A retrospective post survey was administered to all participants at the end of the each small acreage production training.

Results:
Over 250 farmers attended the workshop series. On average, evaluation results indicated that there was a 50% increase in knowledge gained as a direct result of the workshops. Additionally 70% of respondents anticipated a positive economic benefit averaging $331 per participant.

Table 1. Percent of participants reporting "Good" or "Excellent" knowledge level before and after the workshops

Workshop Topics	Before	After
Home Egg Production (n=57)	27	92
Vegetable Production (n=33)	42.5	66.7
Selling to Restaurants (n=14)	21	92
Organic Production (n=17)	35	77
Aquaponics Production (n=31)	6.5	77

Table 2. Percent of participants that anticipate an economic benefit from the workshops

Workshop Topics	Yes
Home Egg Production (n=57)	44
Vegetable Production (n=26)	88
Selling to Restaurants (n=10)	80
Organic Production (n=17)	59
Aquaponics Production (n=26)	50

Table 3. Percent of participants that plan to either mostly or completely adopt practices from workshops

Workshop Topics	Yes	Not Sure
Home Egg Production (n=57)	23*	30
Vegetable Production (n=34)	50	38
Selling to Restaurants (n=14)	50	36
Organic Production (n=17)	35	47
Aquaponics Production (n=31)	36	36

*28% had already adopted

Future Plans:
Based on suggestions from the evaluations the 2017 Small Acreage Production series will include workshops on Good Handling Practices, Tropical/Subtropical fruit trees, IPM, and soil. Cooperative Extension Program (CEP) Agents from Hidalgo and Willacy Counties will be joining the planning group to add expertise in the areas of community development and small farm outreach and technical assistance. Advisory boards have already scheduled the first planning meeting for January 2017.

2016 Earth-Kind Horticulture Education Outreach in Cameron County

Developed by Jennifer Herrera, County Extension Agent-Horticulture, Cameron County

Relevance: During our 2015 Cameron County Critical Issues Forum two critical issues that were identified were "Environmental Stewardship" and "Water Conservation." Nursery production in Cameron County is a million dollar industry next to agriculture production. Several homeowners, landscapers, and home gardeners lack the knowledge and skills to effectively make horticulture management decisions while maintaining environmental friendly practices. "Earth-Kind Landscaping is a research-proven technique to provide maximum garden and landscape enjoyment while preserving and protecting the environment. The objective of Earth-Kind Landscaping is to combine the best of organic and traditional gardening and landscaping principles to create a horticultural management system based on real world effectiveness and environmental responsibility"(aggie-horticulture.tamu.edu).

Response: The Green Advisory Board and Cameron County Master Gardeners implemented a series of educational programs following Earth-Kind practices. The Target audience included local homeowners, home gardeners, owners and employees within the landscaping and nursery industry. The Earth-Kind educational programs provide leadership and guidance to offer programs to assist in making sound, environmental decisions.

- 4-H/FFA Horticulture Project Workshop
- Master Gardener Course, 75 hours of training and education (October through November 2016, 21 Interns)
- Junior Master Gardener School Gardens (21 total)
- Community Gardens (12 Total)
- Master Gardener Horticulture Weekly News Articles, (Approximately 150,400 residents 18+ read the Valley Morning Star each Sunday)
- Horticulture Education Snippet KMBH Radio (weekly)
- Self-Guided Garden Tours (monthly)
- Civic and Garden Club Programs (monthly)
- Arboretum Demonstration Garden (monthly)
- Compost Demonstration Garden (monthly)

Emerging Issues:

- Citrus Greening (4 programs)
- Zika Presentation (1 program)

Results of Efforts:

A retrospective survey was administered for one of the Rainwater Harevetsing and one of Citrus Greening educational programs. 100% of the participants that completed an evaluation had an increase in knowledge for both Rainwater Harvesting and Citrus Greening. 90% of the participantsplant to adpot the practices that were discussed in the programs. The goal of the outreach program was focused on increasing he knowledge and skills on bascis Earth-Kind practices for both adults and youth in Cameron County.

Future Plans:
The Green Adisory board and the Cameron County Master Gardeners will continue to proide educational programs to Cameron County residents that follow Earth- Kind practices.

Synthetic Drug Use and Prevention Outcome Summary, Cameron County - 2016

Developed by Marco Ponce, County Extension Agent – 4-H & Youth Development

Relevance:

Cameron County has a new type of development that is threatening the stability and prosperity of life in the county. The use of drugs and other synthetic substitutes has been steadily increasing from year to year by adolescents. Cameron County, along with other coastal counties, continues to be one of the most prolific drug smuggling channels in the country. Marijuana and other drugs are being readily marketed to area youth for both consumption and distribution. Studies have shown that students who live along the border had twice the cocaine usage rates of student just 50 miles inland. Some of the highest rates of admission to treatment for drug abuse are in counties near large ports of entry such as Brownsville. According to a student survey take in 2012, the average Cameron County student age when they first tried marijuana and other drugs was 13.9. The average age when they first tried inhalants was 12.5. Studies have shown that preventative educational programs are much more effective than incarcerating youth on a continual basis. Youth who have been jailed for drug offences tend to be continually incarcerated several times over.

Response:

Educational lessons were conducted at the Dr. Cano 9th Grade Academy in Harlingen. Presentation materials were developed utilizing educational resources from iCEV drug and alcohol awareness lessons, our local health department, and from the University of Texas Health Science Center – School of Public Health. Lessons were delivered using power point technology as well as handouts that were given to the students in order to take notes and follow along. Some individual instruction was also conducted with students who needed special attention in order to fully understand the topic. Educational lessons included Synthetic Drug Use and Prevention, Drug Abuse by Adolescents, and Designer Drugs. Students were informed about the dangers associated with both synthetic drug use and traditional drug use. They were also informed about the many ways that drugs are continually marketed towards youth and young adults in order to make them more appealing. Students were informed of the highly addictive nature of drugs and the many ways that drug use affects the body.

Results:

Students gained a greater understanding of the many dangers associated with drug and synthetic drug use. Students specifically gained a greater knowledge in the different types of synthetic drugs and how they are developed. In Class 1, Students missed an average of -6 or 50% of the questions on the pre - program questionnaire. On the post – program questionnaire, students missed an average of -2.3 or 19% of the questions. In Class 2, Students missed an average of -7.4 or 62% of the questions in the pre – program questionnaire. On the post – program questionnaire, students missed an average of -1.8 or 15% of the questions. A total of seven students from both classes answered every one of the questions correctly in the post program questionnaire, as opposed to only two in the pre- program questionnaire from both classes. Both classed seemed to gain a considerable amount of knowledge and did improve significantly on the post-test. Overall, the students showed a gain in knowledge of close to 50% after programming was complete.

Future Plans:

The future plans for this program in to interpret the results to our key stakeholders and county leaders. We also have plans to continue this program at the Dr. Cano 9th Grade Academy and other schools throughout the county.

4-H Livestock Judging Outcome Summary - Cameron County, 2016

Developed by: Marco Ponce, County Extension Agent – 4-H & Youth Development

Relevance:

4-H youth are lacking the necessary skills to visually evaluate livestock in an effective manner. The many skills acquired while training will be a lifelong benefit to these 4-H members. Some of the skills that will be acquired while training include: public speaking, decision making, visual evaluation, note taking, persuasion, and reasoning. The skills learned will also benefit
4-H members as they become livestock producers themselves and they will possess the knowledge needed to logically select livestock for their own private herds.

Response:

Agent planned and implemented a series of livestock judging trainings for 4-H youth in Cameron County. Topics of discussion were visual livestock evaluation, judging market and breeding livestock, note taking, and oral reasons. 4-H volunteers were also utilized in conducting hands on trainings at the local livestock shows in order to practice visual evaluation on live animals. 4-H members were encouraged and thus participated in several livestock judging contests in order to gain further experience and knowledge.

Results:

Students learned about the importance of being able to visually evaluate livestock in an effective manner. Students were administered a retrospective post program questionnaire in order to measure there level of understanding. These levels were measured as a comparison based on their knowledge before training occurred and then after training ceased. Student responses were evaluated on a scale from 1 to 4 with 1 being poor and 4 being excellent. Student level of understanding related to market and breeding livestock evaluation averaged 1.6 before programming. There levels increased to 3.0 after programming was complete. Student responses related to the level of influence livestock judging has on life skills were 3.2 which is the equivalent of being above moderately influential. In the survey, students were also asked about if what they have learned has provided them the ability to make better leadership decisions. All but two of the students surveyed agreed that what they have learned has given them the ability to make better leadership decisions.

Future Plans:

The future plans for this program in to interpret the results to our key stakeholders and county leaders. We have plans to continue this program in future years and to recruit new 4-H members to this project that has many benefits for its participants.

PRAIRIE VIEW A&M UNIVERSITY
COLLEGE OF AGRICULTURE AND HUMAN SCIENCES
Cooperative Extension Program

TEXAS A&M AGRILIFE EXTENSION

4-H YOUTH DEVELOPMENT

Making a Difference in Cameron County 2016

Annual 4-H Program Summary

Total Youth Reached
11,829

County 4-H Youth Involvement

20 Chartered Community Clubs
333 Members Enrolled in 4-H Clubs
5,041 Youth Reached through Community-based Programs
6,455 Youth Reached through School-Based Enrichment Curriculum

County 4-H Leadership, Advisory, and Support Organizations

10 Youth Board Members attended **2** Meetings
105 County 4-H Council Members attended **10** Meetings
75 Adult Leaders & Parents Organization Members attended **10** Mtgs

# of Youth Attending

Participation in County 4-H Events		County Participation in District Events		County Participation in State/National Events	
Cameron 4-H Awards Banquet	120	D12 Livestock Judging Contest	31	San Antonio Stock Show & Rodeo	46
County 4-H Roundup	40	D12 4-H Shooting Sports Postal	27	Texas 4-H Roundup	26
County 4-H Record Book Judging	43	D12 4-H Record Books	30	Texas 4-H Record Book Judging	6
Synthetic Drug and Alcohol Lessons	48	D12 4-H Food Show / Challenge	28	Houston Livestock Show & Rodeo	15
Thanksgiving and Christmas Service	58	D12 4-H Leadership Lab	18	State Rifle & Archery Postal League	9

Most Popular Club Projects in the County		Most Popular Curriculum in the County	
Swine	65	Food and Nutrition	5,562
Photography	62	Healthy Lifestyles	2,484
Food and Nutrition	56	4-H After School	1,050
Beef Cattle	46	Junior Master Gardener	630
Poultry	45	Science of Agriculture	551

County 4-H Volunteer Support

163 Registered & Screened Volunteers Supporting Clubs
88 Club Managers, Co-Managers, and Project Leaders
13,845 Hours Contributed by Volunteers in Support of Clubs

Value of Volunteer Time Supporting 4-H
$319,404

Livestock Show Premium Sale Proceeds*
$284,944
Includes all projects (4-H and FFA)

1390 W. Expressway 83 San Benito, TX 78586 – Ph: 956-361-8236 – Fx: 956-361-8289 – Cameron.agrilife.org

County 4-H Leadership & Personal Development Programs

25 Attended State-level Leadership & Personal Development educational or competitive events
113 Attended District-level Leadership & Personal Development educational or competitive events
18 Attended District Leadership Lab
15 Received 4-H Scholarships valued at a total of **$21,500**

Local Training Opportunities for Youth and Adults

46 County 4-H Record Book Training
21 4-H Club Management Training
18 4-H Archery Project Training
27 4-H Horticulture Project Training

Significant Leadership & Personal Development accomplishments from county Events & Activities

Cameron County 4-H members received numerous scholarships from the Rio Grande Valley Livestock Show. Scholarships were awarded to 4-H members based on academics and also for their top placing animals. Several other 4-H members received scholarship awards from various stock shows and other organizations based on their 4-H achievements.

County 4-H Agriculture & Natural Resource Programs

322 Livestock Projects (all species)
279 Participated in County Livestock Shows
47 Attended State-level Livestock Shows
42 Attended District-level Agriculture & Natural Resources educational or competitive events
48 Youth Trained through "Quality Counts" Program

Local Training Opportunities for Youth and Adults

71 4-H Livestock Judging Trainings
23 4-H Rabbit Project Training
46 4-H Record Book Training
14 4-H Meat Goat Training

Significant Agriculture & Natural Resource accomplishments from county Events & Activities

Several Cameron County 4-H members earned Grand Champion, Reserve Champion, and Breed Champion honors at the Cameron County Fair, Rio Grande Valley Livestock Show, and San Antonio Stock Show. Cameron County 4-H also had several top placing individuals at the District 12 4-H Livestock Judging Contest in Fredericksburg.

County 4-H Family & Consumer Science Programs

7 Attended State-level educational or competitive events
31 Attended District-level educational or competitive events
38 Attended County-level educational or competitive events

Local Training Opportunities for Youth and Adults

17 County 4-H Food Show and Nutrition Training
21 County 4-H Food Challenge Training
13 CEP 4-H Healthy Ambassador Training

Significant Family & Consumer Science accomplishments from county Events & Activities

Cameron County 4-H Food Show and Food Challenge participants had a great year. We had four Food Challenge teams and many 4-H members competing in the Food Show at the District 12 4-H contest. Our senior Food Challenge team placed 2nd and advanced to the State 4-H Food Challenge contest. We also had five Top Chef award winners at the Food Show.

Cameron County 4-H Members participating in the District 12 4-H Archery Contest

Riverside 4-H members from Rio Hondo that participated in the District 12 4-H Archery Contest

Cameron County 4-H members who placed at the District 12 4-H Livestock Judging contest

Cameron County 4-H members preparing their entries for the County 4-H Food Challenge

Cameron County 4-H members participating in the Thanksgiving holiday help community service project

The newly elected Cameron County 4-H council officer team

2016 Heroes 4-Health Program

Developed by Guadalupe Castro-Cooperative Extension 4-H Agent

Relevance:

In Cameron County an estimated 123,803 individuals receive benefits form the Supplemental Nutrition Assistance Program (SNAP), historically known as the food stamp program. Studies have shown individuals who live in poverty (including Snap recipients) have dietary intakes that are not congruent with current recommendations (i.e. Dietary Guidelines or My Plate). The Prairie View (PVAMU) 4-H Cooperation Extension Program implemented the Heroes 4-Health in Cameron County targeting undeserved youth and their families. County identified need.

Response:

The goals of the Youth Voice: Youth Choice 4-H Healthy Living grant provided by Wal-Mart are to mobilize underserved youth to take action around nutritional deficiencies, healthy food choices, and physical activity.

After meeting with local school administration and community youth organizations it was determined that the areas in the county to pilot the program this year would be Harlingen and Brownsville.

The goals for the county were to reach underserved youth and families in rural, suburban, and urban communities through direct program participation in the Heroes 4-Health program. This program had two levels of youth participation. Youth ages 14-18 could be trained as Heroes 4-Health Ambassadors and would help implement the program in their assigned areas in the county. Once the Ambassadors were trained they used the curriculum Choose Health: Food, Fun, and Fitness to teach youth ages 8-18 in their communities about healthy food choices and benefits to physical activities through six comprehensive nutrition and fitness hands-on lessons. Throughout the year the Heroes 4-Health Ambassadors attended Health Fairs and other city events to promote healthy living. They also coordinate and conducted 3 youth camps in the county where they were able to teach the six lesson series from the Choose Health: Food, Fun, and Fitness curriculum.

Results:

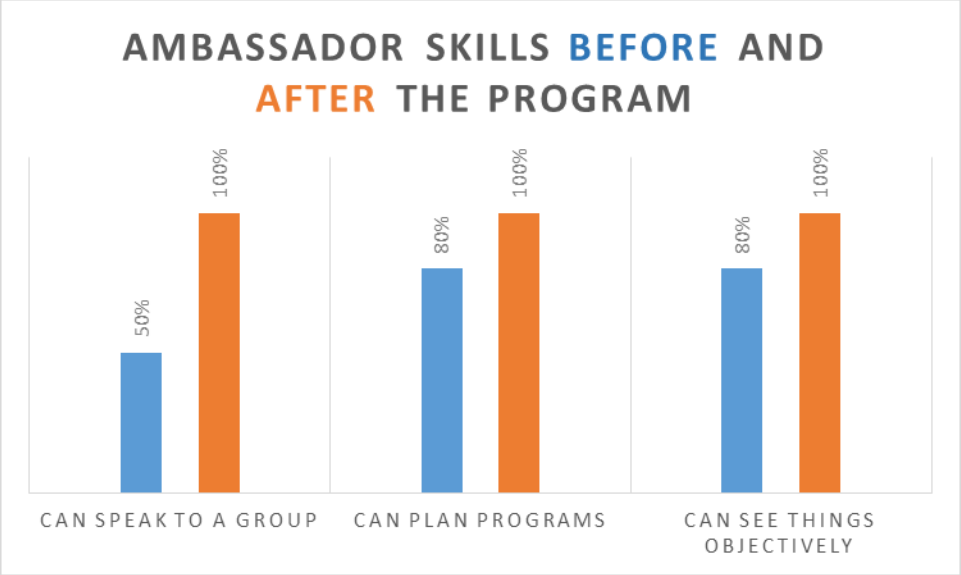
The program was evaluated using the Common Measure survey which was a retrospective post survey. There were 143 Heroes 4-Health Participants surveyed on increased knowledge learned in healthy living and adopted behavioral change that lead to a healthy lifestyle.

According to the program participant survey results:

- 95.7% of participants reported on increased knowledge learned in healthy living by learning why it is important to eat a healthy diet.
- 95.7% of participants reported on increased knowledge learned in healthy living by learning how to make healthy food choices.
- 96.6% of participants reported adopting a behavioral change that lead to a healthy lifestyle by eating more fruits and vegetables
- 97.8% of participants reported adopting a behavioral change that lead to a healthy lifestyle by drinking more water

The Common Measure survey was also given to the Heroes 4-Health Ambassadors at the end of the program year. There were 11 Ambassadors that were surveyed on increased knowledge learned in healthy living, adopting behavioral change that lead to a healthy lifestyle, and youth exercising leadership.
According to the Heroes 4-Health Ambassador survey results:

- 100% of Ambassadors reported on increased knowledge learned in healthy living by learning how to make healthy food choices.
- 100% of Ambassadors reported on increased knowledge learned in healthy living by learning why it is important to eat a healthy diet
- 100% of Ambassadors reported adopting a behavioral change that lead to a healthy lifestyle by eating more fruits and vegetables.
- 100% of Ambassadors reported adopting a behavioral change that lead to a healthy lifestyle by drinking more water.
- 100% of Ambassadors reported exercising leadership skills by gaining skills though serving their community that will help them in the future.
- 100% of Ambassadors reported exercising leadership skills by teaching others, acting as a mentor, and confidently helping others.



Future Plans: The Youth Voice Youth Choice Wal-Mart grant has been refunded to the county, so the program will continue to train more Teen Ambassadors and teach more youth about health and wellness. In 2016 the program reached 11 teen ambassadors and 145 youth. The goal for 2017 is to reach at least 15 to 20 Teen Ambassadors and 250 to 300 youth.

2016 Summer Food Fun and Fitness Camp: Jacob Fraga leading a Physical Activity game

2016 Spring Break Camp: Brownsville Border Youth 4-H Ambassadors preparing healthy snacks with camp participants.

2016 Harlingen Market Days: Teen Ambassador Michael Garza teaching youth about the dangers of sugary drinks

Expanded Food & Nutrition Program
Cameron County Outcome Summary Report

SUPPORTING TEXAS FAMILIES WITH GREATEST NEED SINCE 1969

The Expanded Food and Nutrition Education Program (EFNEP) helps young families and youth with limited resources – those most at risk to suffer from hunger, food insecurity and the inability to connect with available support systems. EFNEP offers practical lessons in basic nutrition, food preparation, food budget management and food safety in settings convenient for the participants. EFNEP also includes a walking program for adult participants. Program graduates reflect significant, lasting improvement in eating behaviors and healthy food habits. Texas has a need for EFNEP – 2014 data show that 20% of Texas families with children under the age of 18 were living below poverty level, compared to 18% of U.S. families.

EFNEP REACHES DIVERSE AUDIENCES IN CAMERON COUNTY

In Cameron County, ethnically diverse EFNEP nutrition assistants reach youth and adult groups whose principal language may be English or Spanish.

In 2016,

- 1,816 families enrolled in EFNEP.
- 5,353 youth contacts were made through the EFNEP youth program.
- 80% EFNEP participants have children under the age of 19.
- 55% of families were at or below 100% of federal poverty level.
- 80% of families enrolled in one or more food assistance programs at entry.
- 91% of EFNEP adult participants were Hispanic/Latino.

VOLUNTEER STRENGTHEN EFNEP

In 2016, 83 adult volunteers donated 1,623 hours of work to EFNEP in Cameron County. At the Texas rate of $25.11/hour, this volunteerism has a minimum dollar value of $40,739. Volunteers make a difference in their own communities, and contribute to EFNEP's continued success.

EFNEP MAKES A REAL DIFFERENCE

Adult Program:
Using "hands-on" experiences, EFNEP adult participants complete at least a six-lesson series on stretching food dollars, improving eating habits, and practicing food safety principles. As a result of participation in EFNEP the following food and nutrition behaviors were achieved:

- 95% with positive change in any food group at exit.
- 80% improved in one or more food resource management practices such as using a list for grocery shopping.
- 88% improved in one or more nutrition practices such as using the "Nutrition Facts" on food labels to make food choices.
- 62% improved in one or more food safety practices such as thawing foods safely.
- 21% of program participants reported a positive change in physical activity.

Youth Program:

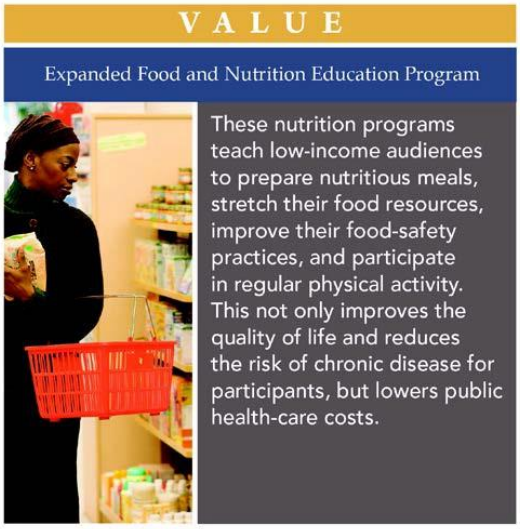
The EFNEP – Youth program is directed toward low-income school-age youth. These students participate in a series of fun and educational lessons on good nutrition and food safety as part of summer programs, classroom and after-school activities.

The following results show how youth participants' food behaviors improved after attending EFNEP classes.

- 86% improved ability to choose foods according to the Dietary Guidelines.
- 47% improved their safe food handling practices more often.
- 42% improved physical activity practice

COST –BENEFITS OF EFNEP

Studies have shown that for every $1 spent of EFNEP, $10 were estimated to be saved in health care costs and $2 saved in food costs by participants. For Cameron County, this is $3 million in estimated health care cost savings and almost $616,986 in food costs.



2016 Cameron Crop Production/Profitability Program

Developed by Dr. Enrique Perez, County Extension Agent- Agriculture, Cameron County

Relevance: Approximately 400,000 acres of grain sorghum are grown in the Rio Grande Valley. In Cameron County 83,000 acres were planted in 2016. The Sugarcane Aphid, a potentially damaging insect was identified for the first time in 2013. The Cameron County Agriculture Production Committee determined that educational efforts and partnering with neighboring counties and agriculture industries should be initiated to address this damaging insect.

Nutrient management was another issue of importance on economic and environmental. Agriculture Production committee identified the importance of water quality, soil quality and crop productivity. All these areas are of importance for a sound competitive and profitable outcome. This year the Arroyo Colorado Watershed Partnership and The Texas Water Resources Institute determined a continued need to stress soil testing as a best management practice.

It is important that agriculture producers continue to increase their knowledge on locally produced crop varieties and evaluate their performance. County Agriculture Production Committee, agriculture industries, agriculture governmental agencies all partner to continue supporting the needed for crops result demonstrations.

VALUE

Crop and Forage Production Education

Extension programs in crop production promote best practices that lead to reduced irrigation, safer pest management, and improved profitability of agricultural enterprises. This benefits Texas as a whole by contributing to the quality and quantity of water resources and enhancing both agricultural competitiveness and rural economies.

Response: The Cameron County Agriculture Production committee met three times this year to address the need of environmental stewardship and profitability in agriculture production. The Cameron County Production committee addressed the need at the May Extension Advisory Board meeting. The committee also met with neighboring county committees initiated a diverse agenda of educational programs to address competitiveness, profitability and environmental issues in the county. This year a series of 12 educational group teaching methods resulted in a total of 2908 contact hours of education. Agriculture producers had the opportunity to participate in a variety of educational programs on the sugarcane aphid, fertility management, variety performance data and a host of other timely topics. Educational events included the Annual Cotton & Grain Conference, Grain Sorghum and Cotton producer meetings, row crop production field days, invasive insect meetings and agriculture crop market outlook meetings. Other educational tools introduced and utilized by agriculture producers included Extension publications, informational media, information posted to the County Extension Office web site, electronic systems and social media. Also information was shared through communication with Agriculture Production Committee members, input from members the committee members, board of directors of the Cotton & Grain Producers Association of the Lower Rio Grande Valley served as important tool to address and plan for Extension programs. Texas A&M AgriLife Extension Specialist along with Agriculture Production Committee members played an important role in the planning, implementation and evaluation process.

Again this year a Tri- County Soil Testing program was conducted for the 16th consecutive year. This year, a total of 217 soil samples representing 7725 acres of agriculture production fields were submitted to the soil testing laboratory in College Station for analysis. Fertilizer recommendations were provided to the growers for the specific crop to be grown. Over the past 16 years, 6681 samples have been submitted by local producers from a total of 227,129 acres.

Research demonstrations conducted on producer farms were used to produce an unbiased source of performance data that are used by growers to help determine the most profitable varieties to select for this area. Ongoing efforts to increase producer profits also included rating grain sorghum variety trials for differences among varieties in their tolerance to the sugarcane aphid and it's damage.

Results: The Cameron County Agriculture Production committee initiated all efforts for Educational programs by Texas A&M AgriLife Extension to battle the sugarcane aphid credited with a net savings to grain sorghum producers of $66 million in 2014. Although the aphid did not cause widespread damage in 2016, producers were participating in educational programs by Texas A&M AgriLife Extension. These programs targeted on sugarcane aphid were important to keep agriculture producers in tune with current and new technologies (applied research) resulting in good best management practices (BMP).

The economic impact of the RGV Nutrient Management Education Program was measured in terms of potential fertilizer savings that have resulted from increased adoption of soil testing. Reduction in fertilizer application rates translates into an average cost savings of $25 per acre, depending on crop and management history. This is a potential savings of $193,125 in 2016. The total potential economic benefits to producers since the program began in 2001 are estimated at $5.7 million. This analysis does not include the value of environmental benefits. Local water bodies, including the Arroyo Colorado benefit from producer efforts to match the application of fertilizers to crop fertility requirements through scientific soil testing. A survey conducted by the Cameron County Extension office documented that 97 percent of participants plan to follow the recommended fertilizer rates and 80 percent of participants felt that the test results are accurate. At present there is pressure from local agriculture industries in providing soil sampling to local growers.

This year's performance data from four result demonstrations conducted to evaluate grain sorghum, cotton and sunflower hybrid variety performance under local commercial conditions were shared with producers to assist them in making more economical choices for their next crop season. Of special significance this season was the county sunflower hybrid trial and the Soil & Crop Sciences Department small plot hybrid trial. Both trials provided important documentation concerning issues with seed set in this year's sunflower crop and are being studied closely by many involved in the production of sunflowers including growers, seed companies, Extension specialists, marketing companies and buyers.

This year also as a request form agriculture producers the Agriculture Production Committee and local county agriculture committees initiated a two-day marketing workshop included a pre and post-test evaluation. This evaluation included pre and post expectations of grain and cotton prices, as well as pre and post acreage intentions. This data will be used to eventually estimate dollar impacts from the program's influence on acreage allocation following the conclusion of the 2017 crop season. In the meantime, over a range of nine pre/post questions testing knowledge of hedging concepts, a 15% gain in knowledge was measured, as reflected by the percent of previously incorrect responses that shifted to the correct response.

The Cameron County Agriculture Production committee is currently working in establishing a local Master Marketer program for beginners. In 2003 an existing group graduated in Cameron County under the umbrella of the Texas Master Marketer Program.

Important collaborators included: Dr. Gaylon Morgan, Dr. Calvin Trostle, Dr. Tom Isakeit, Dr. John Robinson, Dr. Mark Welch, Dr. Luis Ribera, Dr. James Grichar, Danielle Sekula, Victor Gutierrez, Dr. Samuel Zapata, Dr. Femi Alabi, Rio Farms, Inc., Lower Rio Grande Valley Cotton and Grain Producers Association, Texas Farm Bureau, Farm Service Agency, Natural Resources Conservation Service, Texas Grain Sorghum Association, National Cotton Council, Texas Water Resources Institute, Texas Department of Agriculture, the Texas Boll Weevil Eradication Foundation and numerous local agriculture industry company representatives and local media.

Future Plans: The Agriculture Production Committee will continue to meet and provide Extension education to meet agriculture producers up-to-date with current and new technology/ information on the sugarcane aphid and its management. Continue the soil testing campaign contingent upon funding. Continue important hybrid trails for the major crops in cooperation with local producers, seed companies and Extension Specialists. The Agriculture Production Committee will determine the need to repeat the marketing workshop and the possibility of implementing a Master Marketer Program in the county this year (2017). The Agriculture Production committee members will continue monitoring the local agriculture scene for emerging issues Extension is qualified to address. This county Extension agent will provide results of program during all interpretation and marketing events to stakeholders and commissioners court.

2016 Rio Grande Valley Beef Development Program

Developed by Dr. Enrique Perez, County Extension Agent- Agriculture, Cameron County

Relevance: Beef production producers can improve their herd or the herds of their customers through more rigid sire selection. Replacement heifers will perform to higher levels when in optimum body condition. Beef producers want to increase the value of bulls by collecting feedlot performance data and carcass characteristics. The Rio Grande Valley Beef Improvement Association identified the need to conduct a bull gain test and heifer development program in 1998 to support the beef cattle industry and it has been conducted each year since.

Response: In response to beef cattle producers in the Rio Grande Valley the Cameron County Texas A&M AgriLife Extension along with Hidalgo, Starr and Willacy conducted an official 112 day bull gain test and a 126 day heifer development program. A series of multiple data is collected on all animals including: initial and final weights, average daily gain, body condition score, scrotal circumference, sheath score, reproductive tract score, pelvic area measurements, hip height and ultra-sound measurement of back fat thickness and ribeye area. All data is provided to consignors and to the public.

Results: This year a total of 8 group teaching methods were planned and conducted to meet the needs of beef cattle producers in the Rio Grande Valley. A bull gain test and heifer development program has been a very successful tool for area beef cattle producers. The program has been conducted each year from 1998 through 2016. Participants indicate a positive economic benefit to their beef cattle operations as a result of their participation.

In nineteen years a total of 1348 bulls, 1029 heifers and 142 steers have been entered the Rio Grande Bull Gain and Heifer Development program. In current year 2016-17 RGBIHD program a total of 25 consignors have entered 101 bulls and 33 heifers. Cattlemen from 10 different counties from throughout south and central Texas are participating is the current program.

Participants receive recognition every year during the Rio Grande Valley Livestock Show in order to recognize the award winners in front of their beef cattle producer peers and the public.

The Santa Gertrudis, Simbrah, Beefmaster, Simmental, and Brahman awards were each presented during the open show for their particular breed. A feeder pen of steers is also offered and adds a different dimension to the program. The Bull Gain Test and Heifer Development Program participants were surveyed to measure program effectiveness. Final survey results are pending but a preliminary look at responses provided the following: What respondents liked best about the program included updated information, small breeder needs bull data, used data to compare sire and dam groups, gives more emphasis to other traits rather than just rate of gain, economical, good data, like the way the animals look at the end, like to be kept posted, economical to participate in, use the data in selection decisions.

A total 50% of the respondents said that as a result of their participation in the program they financially benefitted in the range of $1000-5000 annually, 16% reported more and 33% reported less.

Important collaborators were: Dr. Joe Paschal, Extension Livestock Specialist, Dr. Samuel Zapata, Extension Economist, Rio Beef Feed Yard management and personnel, Rio Grande Valley Livestock Show officials & volunteers and the members of the Rio Grande Valley Beef Improvement Association. New energy was provided during the planning process this year by the Rio Grande Valley Beef masters Association. They see the value that performance tested bulls can bring to their bull sale. A number of their members consigned bulls to the program this year for the first time. County agricultural agents from 5 counties are implementing the program with assistance and support from the above collaborators.

Future Plans: In cooperation with the Rio Grande Valley Beef Improvement Association who works closely with Extension agents meet twice per year and plans are to continue the program and perhaps consider marketing alternatives for participants. Another future possibility will be to offer an artificial insemination program for heifers.

The year Rio Grande Valley Beef 706 program is being planned for 2017. It is a three-part series of hands-on sessions focusing on beef quality management. This beef check-off funded program is designed to help producers maximize profits and have a better understanding of the production process after their cattle enter the feed yard.

2016 Cameron County Pesticide Safety Program

Developed by Dr. Enrique Perez, County Extension Agent- Agriculture, Cameron County

Relevance: Agriculture producers have a statutory requirement to obtain and maintain a pesticide license issued by Texas Department of Agriculture in order to use State restricted crop protection chemicals in agriculture production. These are important tools (chemicals) for agricultural producers and Extension is relied upon to provide the education needed in this process. In addition, many school district, city, county, state and federal employees need to have a pesticide license for their work. Local training's are provided for those needing to obtain a pesticide license and also continuing education is provided to local license holders in order for them to be knowledgeable in the safe and efficient use of crop protection chemicals and to be able to meet the requirements to renew their license. The Cameron County Agriculture Production Committee continues to affirm that these efforts are important as requests are met from agriculture producers in the county.

Response: In response the Cameron County Agriculture Production Committee initiated a series of educational training events in 2016 which were planned and conducted to meet State statutory requirements for producers to be able to obtain a license. Continuing education units were also provided to all participants at educational events conducted which contained applicable subject matter. A listing of continuing education opportunities served as an effective tool for the Extension Office web page as a for local producers to learn of these meetings. Also, an extensive email list of local license holders is maintained to use as a primary communication tool to inform license holders of continuing education opportunities. In addition, this agent generated and maintains an extensive list of cell phone numbers of license holders which is used to send text messages to remind license holders of upcoming meetings.

Results: This year 656 persons attended 24 teaching methods which resulted in a total of 1845 hours of continuing education contact hours. The economic value of the Continuing Education Units earned is estimated to be over $48,000. Also a series of four Pesticide Safety Training meetings were conducted in 2016. A total of 58 persons attended the five hour course which is required in order to obtain a private pesticide license issued by Texas Department of Agriculture. This resulted in a total of 290 contact hours of classroom instruction.

Aerial applicators have specific requirements for continuing education and those needs were met by conducting an educational training meeting specifically for them. This allowed them to obtain their required training without traveling outside of the local area. The aerial applicators are very appreciative of being able to obtain the training from Extension.

The Cameron County Agriculture Production Committee conducted 24 group teaching methods each reported to TDA by submitting the required documents to the state regulators.

Important collaborators were: members of the Cameron County Agriculture Production Committee, board members of the Cotton & Grain Producers Association of the Lower Rio Grande Valley, Dr. Don Renchie and Dr. Mark Matocha, Agricultural & Environmental Safety Specialists and state & local personnel with Texas Department of Agriculture.

Future Plans: This effort will continue next year to meet the needs of local agricultural producers and other individuals in the private sector needing a State pesticide license issued by Texas Department of Agriculture.

Annual Agricultural Increment Report

Cameron County Agricultural Cash Receipts for Agriculture Commodity

	Commodity	Estimated 2013	Estimated 2014	Estimated 2015	Estimated 2016	Projected 2017
	Crops:					
	Feed Corn	7,928.0	8,400.0	6,739.0	24,135.0	26,250.0
	Hay	630.0	1,824.0	2,304.0	3,150.0	3,150.0
	Sorghum	27,709.0	35,913.0	27,950.0	19,567.0	8,550.0
	Cotton Lint	38,322.0	35,309.0	6,890.0	83,027.0	105,000.0
	Cottonseed	7,200.0	7,800.0	1,400.0	3,000.0	3,600.0
	Melons	328.0	420.0	780.0		
	Vegetables	3,645.0	5,262.0	1,856.0	6,135.0	4,230.0
	Watermelon	1,500.0	420.0	720.0	770.0	350.0
	Grapefruit	10,608.0	11,424.0	10,098.0	13,600.0	10,404.0
	Oranges	1,080.0	1,296.0	720.0	1,760.0	720.0
	Nursery	20,000.0	18,000.0	15,000.0	18,000.0	20,000.0
	Sugar Cane	14,565.0	8,451.0	4,122.0	6,226.0	9,450.0
	Livestock:					
c	**Other Beef**	3,085.0	1,994.0	3,100.0	1,670.0	1,000.0
	Ag-Related:					
	Aquaculture	2,490.0	3,294.0	1,800.0	1,657.0	1,400.0
	Fishing	70,050.0	74,756.0	53,256.0	53,387.0	55,200.0
	Other Commodities:					
*	**Recreational Fishing**				45,000.0	45,000.0
*						
*						
	Total	**209,140.0**	**214,563.0**	**136,735.0**	**281,084.0**	**294,304.0**

* Cash value in the thousands

* This page with receipts over one thousand dollars

Introduction

Our Cameron County Marine Extension Program is guided by our Coastal Issues Committee, two Texas Master Naturalist Boards of Directors, the Brownsville - Port Isabel Shrimp Producers Association Board, the Texas A&M AgriLife Extension Service and Texas Sea Grant Program, all contributing to our annual plan of work of which a few of the many successes are highlighted below. We are grateful for their guidance in 2016 an look forward to another productive year, 2017.

Cameron County Texas Master Naturalists: Rio Grande Valley Chapter & South Texas Border Chapter

Tony Reisinger, County Extension Agent – Coastal & Marine Resources

Relevance: Coastal Texas is experiencing major growth and urbanization. Rapid development, greater demands on fisheries resources, and other human activities are leading to water quality degradation, increased demands on water supplies, wetlands loss, a proliferation of invasive species and a multitude of other environmental impacts. These are the preeminent issues facing the Texas coast.

Response: Extension has responded to this growth by establishing two Texas Master Naturalist chapters in the Rio Grande Valley, the Rio Grande Valley Chapter Texas Master Naturalists (RGVCTMN) founded in 2002 and the South Texas Border Chapter (STBCTMN), chartered in 2015. These chapters provide a volunteer program that has become an integral part of Texas A&M AgriLife Extension and Texas Sea Grant's efforts as a base program with Texas Parks &Wildlife. A Master Naturalist is a formally trained volunteer who must complete an initial minimum of 48 hours of instruction, and 40 hours of volunteer service annually, designed to provide naturalists with the knowledge, "how to" skills and tools needed to provide service dedicated to the beneficial management of natural resources and natural areas within their communities. They are also required to attend 8 hours of advanced training every year.

Each chapter maintains a Facebook page and website: Rio Grande Valley Chapter < http://rgvctmn.org/ > and South Texas Border Chapter < http://southtexasborder.wix.com/txmn >. The Rio Grande Valley Chapter site hosts information pertinent to classes and volunteer opportunities and a quarterly chapter newsletter "The Chachalaca" which we have published for 12 years and serves as an excellent outreach tool for marketing.

The South Texas Border Chapter hosts a website providing information on volunteer activities available to naturalists and classes, events and field trips. Both chapters share Cameron and Hidalgo Counties. The South Texas Border Chapter extends west to Starr County and the Rio Grande Valley Chapter north into Willacy County.

The chapters together trained 59 Texas Master Naturalist interns comprising two classes, one with 22 interns in Hidalgo County and one with 37 in Cameron County. The Master Naturalist curriculum for both classes included 32 presentations on different natural history subjects and 24 field trips to various ecosystems of the Rio Grande Valley.

Results: Our South Texas Border Chapter and Rio Grande Valley Chapter Texas Master Naturalists are currently comprised of 250 members, 103 and 147 members respectively. The two chapters conduct at least one board and one general meeting monthly and an educational presentation is given during general meetings. Our planning groups are boards of directors composed of 25 members and 13 members.

In addition to our monthly educational meetings, our chapter members conducted outreach and education events reaching 858 adults and 213 youth in 2016. Chapter land restoration projects impacted 78 acres of wetlands, uplands, city parks, sand dunes, and rookery islands in the Laguna Madre. In 2016 chapter members contributed 23,951 volunteer hours to our community valued at $564,285.

Texas Master Naturalist evaluations were conducted for 15 educational presentations (either 1.5 or 3 hours) and 13 field trips. Each activity was evaluated by the interns on a scale of 1 to 5 and 39 responses were assessed.

Master Naturalist Results: 13 Field Trips Average Score 4.5 out of possible 5 for relevance
15 Classes Average Score 4.5 out of possible 5

All evaluations were conducted by chapter educational committee members, with classes and field trips conducted by volunteers from local universities or experts in their fields of knowledge. Class results from pre-tests and post-tests indicated a 42% increase in knowledge for the interns. The post-test results indicated: a 92% attitude change, 100% increase in skills, and 96% change in behavior.

Recap: Ten weeks of 24 classes and 20 field trips taught by expert volunteers in two separate locations, Mission and San Benito, trained 59 Master Naturalist interns in 2016. **In 2016, chapter members conducted outreach and education events reaching 1071 people. Chapter land restoration projects impacted 78 acres. Members of the two chapters contributed 23,951 volunteer hours to our community valued at $564,285 in 2016. Class results from pre-tests and post-tests indicated an 42% increase in knowledge for the interns. The post-test results indicated: a 92% attitude change, 100% increase in skills, and 96% change in behavior.**

Unmanned Aerial Vehicle from TAMUCC Monitors the 2016 Texas Red Tide

Texas Coastal Naturalist Program

Tony Reisinger, County Extension Agent – Coastal & Marine Resources

Relevance: The Texas Coastal Naturalist is a Texas Sea Grant Extension / Texas AgriLife Extension sponsored program consisting of a cadre of 262 trained first responders for: sea turtle cold stun events, harmful algal blooms, marine mammal strandings, and oiled bird events. Coastal Naturalists fill an essential role reacting quickly, assisting state and federal agencies overwhelmed in such emergencies by lack personnel for timely and efficient responses to these events. The Texas Coastal Naturalist program sponsors the harmful algal bloom volunteer workgroup Red Tide Rangers. Coastal Naturalists provide essential support to the Sea Turtle Inc. Sea Turtle Patrol, protecting sea turtle nests to help increase the population of endangered sea turtle species.

Response: Six educational programs and two group trainings on the Texas Coastal Naturalist program were conducted in 2016. Red Tide returned this year and five new Red Tide Rangers were trained in red tide sampling and monitoring.

Making a Difference

Texas Coastal Naturalists mobilized as Red Tide Rangers in September and October 2016, due to red tide bloom detected in the area causing extensive fish kills and irritating aerosols along beaches and bay shores. We provided critical info on how to reduce respiratory impacts by wearing dust masks to filter the aerosol. An Unmanned Aerial Vehicle (UAV) was brought back this year to further assess red tide monitoring capabilities.

Seventeen Coastal Naturalists volunteered at Sea Turtle Inc. on South Padre Island for sea Turtle patrols during the nesting season and taking care of injured sea turtles at the facility. Four Coastal Naturalists volunteered at the University of Texas Rio Grande Valley Coastal Studies Laboratory on South Padre, assisting with youth summer camps. Facebook pages were maintained to inform the public on the status of red tide and other coastal emergencies or events.

Results: We trained: one City of South Padre Island, three Cameron County and three State of Texas emergency managers, and five Red Tide Rangers to collect, identify and count red tide cells, and determine strength of the aerosol. Through their monitoring activities, Red Tide Rangers shared knowledge and resources with local, state and federal agencies who monitor and respond to the 2016 red tide event. The group provided ground-truth to National Oceanic and Atmospheric Administration Harmful algal Bloom Workgroup satellite forecasts and reached out to communities and businesses in the affected area to make them aware of the presence of red tide and steps they could take to reduce the impact on human health, pets and businesses. Texas A&M Corpus Christi arranged red tide bloom Unmanned Aerial Vehicle over-flights off South Padre Island to determine the feasibility of monitoring bloom location and concentration, a new technology with potential to track and predict red tide movement via UAVs. Seven of the Red Tide Rangers were recognized at our County Volunteer Recognition Event in December. We informed the public on the status of red tide through our Texas Coastal Naturalist, Red Tide Ranger Facebook pages and press interviews.

Coastal Naturalists provided valuable sea turtle nest monitoring during the nesting season on South Padre Island helping increase the population of endangered sea turtles.

Five educational programs and two group trainings had 164 attendees including 65 youth. A survey of attendees indicated a need for more Coastal Naturalist trainings.

Recap: A cadre of specially trained Texas Sea Grant volunteers, the Texas Coastal Naturalists, attended natural resource training for coastal events. They in turn provided informed first response to a red tide bloom in South Texas, informing the public how to avoid the impact of the noxious aerosol produced by red tide.

Program Partners: Rio Grande Valley Chapter Texas Master Naturalist, Texas A&M University AgriLife Extension Service and Texas Sea Grant, Texas Marine Mammal Stranding Network, University of Texas Rio Grande Valley Coastal Studies Laboratory, Texas A&M University AgriLife Research, Texas A&M University Department of Oceanography, Texas A&M University Corpus Christi Center for Coastal Excellence and Lone Star UAS Center of Excellence & Innovation, University of Texas Rio Grande Valley School of Multidisciplinary Sciences, Texas Parks & Wildlife Department, , Cameron County Department of Health, National Oceanic and Atmospheric Administration Harmful Algal Bloom Operational Forecast System, City of Port Isabel, and City of South Padre Island.

Brownsville Based Shrimp Vessel Miss Opal Flies Her Colors
During the 2016 Blessing of the Fleet

Port of Brownsville during Christmas Break 2016

2016 Cameron County Shrimp Industry Best Management Practices Outreach

Tony Reisinger, County Extension Agent – Coastal & Marine Resources &
Andrew Ropicki Ph.D., Marine Economics Specialist and Assistant Professor

Relevance: Cameron County has a 178 vessel shrimp fleet which produces an average $50 million worth of shrimp annually and provides over 1000 jobs. Diesel fuel costs averaged $1.50 /gallon in 2016, down from the 2015 average cost of $1.70 / gallon. Shrimp nets deployed by the fleet are now almost 100% constructed from super-fibers or advanced webbing (initially introduced by Texas Sea Grant Extension) with 85% of the fleet (151 boats) using Sapphire webbing, a high-density polyethylene fiber. Another 20 vessels in Brownsville use knotted Spectra and 6 use knotless Dyneema (both ultra-high molecular weight polyethylene). Each vessel in our fleet (baseline – no fuel saving technology) uses an average 66,101 gallons of fuel per year. Super-fiber webbing decreases fuel usage 5%. Texas Sea grant research has determined fuel savings from fishing super-fiber nets combined with cambered doors, results in a 25% savings in diesel consumption. Twenty percent (20%) of the 25% fuel savings from the combined system (cambered doors and super-fibers) was due to the use of super-fiber netting, which presents less twine area (drag) and is a lighter hydrophobic material. The median fuel savings from the combined system is 25% (24% × .2 = 5%), with a 29% use of cambered doors (51 boats) in the Brownsville / Port Isabel fleet. This information was determined in a survey by Reisinger in December 2016, of vessels at the Port of Brownsville and Port Isabel.

Vessels employing cambered doors and advanced webbing (~100% of the fleet now uses advanced webbing) showed Cambered door usage cuts fuel (after accounting for super-fibers) an additional 20.2%, yielding a 25% reduction for the combined system.

The shrimp fleet is required to deploy bycatch reduction devices (BRDs) and TEDs (turtle excluder devices) on all their shrimp nets and the annual change of crews requires education to new crews on the requirements. Any severe violation of the Endangered Species Act, which requires TEDs, can result in shrimp fishing area closures in the Gulf of Mexico.

A recent exotic species introduction, Asian tiger shrimp are being captured more frequently off Texas and becoming more of a concern by our fishermen. Juvenile tiger shrimp have also been reported caught in the upper bays of the Texas coast. In previous years, the tigers were concentrated more offshore of Louisiana. Recent reports by fishermen in the Port of Tampico, Mexico say tigers are appearing more frequently in their nets off northern Tamaulipas. Our fichermen report the same off Texas.

With increased protection from fishing regulations, the coastal shark population has increased and shark attacks on shrimp nets are still resulting in lost catch. Fishermen are experimenting with magnets and heavy or metal chafing gear.

Shrimp aquaculture in Cameron County is in decline due to import competition and pond owners have unique challenges for which we can provide assistance.

Response: One hundred and twelve Cameron County vessel owners, captains and crew were trained this year on turtle excluder device, TED compliance and bycatch reduction. These trainings helped reduce sea turtle fishing mortality, which is estimated at 3%. Over 400 bycatch reduction devices, BRDs, were checked and crew trainings conducted on proper installation and positioning. Outreach activities in 2016 with fisheries specialist Gary Graham included 507 fishermen who received training throughout the Gulf Coast and 1122 TED publications were distributed. At the docks, 189 vessels were boarded and received TED inspections, resulting in 303 fishermen being able to articulate how adopted practices increased shrimp capture and 115 fishermen adopted best practices that resulted in compliant fishing gear. There were 21 people that received follow-up visits who adopted practices that resulted in compliant fishing gear.

Results:

-For the year 2016, most of Cameron County's 178 shrimp vessels used advanced webbing, saving an annual average of 3,173 gallons of fuel per vessel, valued at $4,760 in savings (Total Annual Savings of 564,794 gallons worth $847,191 for the Cameron County fleet).

-In 2016 Cameron County, 51 of 178 shrimp vessels used cambered doors saving an annual average of 12,691 gallons of fuel per vessel valued at $19,037 per vessel for a total annual savings of 647,241 gallons worth $970,862 to the fleet employing the doors.

Use of cambered doors has dropped precipitously due to a lack of supply and there is no longer a distributor in the area. The steel cambered doors require frequent maintenance and the lack of replacements led many fishermen to go back to smaller traditional wooden doors.

Although use of the cambered doors has fallen, our work appears to have inspired many of the fishermen to evaluate and test other fuel saving technologies on their own. While Sapphire webbing is used extensively, some boats have adopted even more advanced webbing and almost the entire fleet uses some form of advanced webbing, other Fuel Saving Efforts.

Eight vessels from the Zimco fleet out of Brownsville are now using smaller more advanced engines (Volvo Penta's D13), which have decreased fuel usage by 5+ gallons per hour or 20%! Volvo claims to reduce NOx and particulate emissions, which will meet the meet the upcoming US EPA Tier 3 emission regulations for shrimp vessel engines. Four D13 engines repowered four vessels in 2016, bringing the total to eight vessels using the Volvos. Fuel prices have dropped, reducing fuel saving gear incentives. This phenomenon has exacerbated the move away from cambered door to the old style wooden doors, which now average 7' in length vs. the 9' doors used before the cambered conversion began. This regression to the smaller doors is indicative the fishermen realized if the cambered doors had less area, a smaller wooden door may work, which seems to be the case.

Bycatch was reduced by 30% for fish and 97% for sea turtles, through the use of BRDs and TEDs respectively. One hundred fifty one individuals were educated on TED compliance at the ports of Brownsville and Port Isabel through our TED outreach.

Bycatch information for Asian tiger shrimp caught offshore of Texas by our Cameron County fleet was provided to Texas Parks and Wildlife for study of the impact of this invasive species.

We also have been advising shrimp fishermen on ways to reduce shark bites on net resulting in reduced catches. Magnets, red chaffing gear, and super-fiber cod ends were demonstrated and super-fiber cod ends seemed to be the best deterrent.

In 2016, our 178 vessel Cameron County shrimp fleet produced an estimated 12 million pounds valued at $53 million. These are very preliminary figures graciously provided by NOAA fisheries biologist James Patterson and are subject to change.

Shrimp is the only aquaculture crop in Cameron County. In 2016, five shrimp farms in Cameron County produced 591,888 lb. of cultured shrimp, *Litopenaeus vannamei* in 236 acres of saltwater ponds, according to Ya Sheng Juan Ph.D. with Texas Parks and Wildlife. The crop value was $ 1,657,286 million farm-gate. All farmers produced two crops and most experienced unexplained high mortality in the second crop, according to Dr. Juan. One major farm KAAPA did not produce this year and will not reopen. Plans for next year include a similar effort as 2016.

Recap: In 2016 our effort to improve shrimp fishing energy efficiency resulted in fuel/cost savings for our fleet, due to the use of advanced webbing and cambered doors: 1.2 million gallons worth $1.8 million. Bycatch was reduced by 30% for fish and 97% for sea turtles, through the use of BRDs and TEDs.

On a final note, the Brownsville – Port Isabel Shrimp Producers Association, founded in 1949, closed its doors in December and turned over their assets to the Texas Shrimp Association. We have been conducting monthly educational seminars for them since 1982. They will be missed.

Program Partners: Brownsville – Port Isabel Shrimp Producers Association, National Fish and Wildlife Foundation, Texas Sea Grant, Texas Shrimp Association, National marine Fisheries Service, Texas Parks& Wildlife

Early Weigh-in at the Texas International Fishing Tournament 2016

Recreational Fishing

Relevance: Recreation is a major economic engine in the Rio Grande Valley providing an economic output of over $.3 billion annually. Recreational fishing in the Lower Laguna Madre contributes a $45 million annual output and almost 500 jobs according to our new publication below.

Response: Training and assistance to weighmasters at the Port Mansfield and Texas International Fishing Tournaments is an annual event to assure a smooth running contest with proper species identification, law and tournament rule compliance. We have provided this training for 34 years.

Results: Nine weighmasters were trained in fish identification, and rules and regulation compliance at two major fishing tournaments in the Lower Laguna Madre and over 1500 anglers benefitted from their training.

The Economic Impacts of Recreational Fishing in the Lower Laguna Madre

Prepared by
Andrew Ropicki[1]
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November 9, 2016

Executive Summary

The objective of this report was to estimate the economic impacts of marine recreational fishing in the Lower Laguna Madre Bay. The estimates presented include only impacts associated with fishing trips and not spending on durable goods (fishing gear, rods, boats, etc.,) related to fishing. The data used to estimate the economic impacts came from fishing effort estimates provided by the Texas Parks and Wildlife Department and a National Marine Fisheries Service study entitled: "The Economic Contribution of Marine Angler Expenditures in the United States, 2011". Major findings include:

[1] Assistant Professor and Extension Economist, Texas A&M AgriLife Extension Service/Texas Sea Grant
[2] Extension Associate, Texas A&M AgriLife Extension Service
[3] Assistant Professor and Extension Economist, Texas A&M AgriLife Extension Service
[4] Cameron County Coastal and Marine Resources Agent

- Total annual economic impacts of marine recreational fishing in the Lower Laguna Madre were estimated to be:
    - 479 jobs
    - $16.6 million in labor income
    - $26.0 million in value-added (contribution to Texas GDP)
    - $45.3 million in output (sales value of goods and services).
- Shore-based fishing trips accounted for about 62% of all angler-trips and the majority of economic impacts (~60%).
- While mean trip expenditures of for-hire trips were more than twice as large as private vessel and shore based expenditures, for-hire trips accounted for the smallest share of total economic impacts due to fewer trips (~12% of all trips).
- Resident anglers accounted for 95% of all angler-trips and almost all economic impacts (~93%).

Introduction

The Laguna Madre is a coastal bay that stretches approximately 130 miles from Corpus Christi to the Rio Grande. The lagoon is the only hyper-saline coastal lagoon (higher salinity than seawater) in North America and one of only five in the world (Blankinship and Spiller). The lagoon is actually two bodies of water separated by approximately 25 miles of mud and sand flats. The Lower Laguna Madre is approximately 60 miles long and stretches through portions of Kennedy, Willacy, and Cameron counties. The bay is home to expansive seagrass beds that provide habitat for numerous fish species and make the lagoon popular with recreational anglers. Species commonly targeted by anglers include spotted seatrout, flounder, and red and black drum. In addition to these more common species, recreational fishers in the Lower Laguna Madre have opportunities to target species not often found in other Texas bay systems such as snook, gray snapper, Florida pompano, and barracuda (Blankinship and Spiller).

The abundant fishing opportunities available in the Lower Laguna Madre make recreational fishing a favored pastime of both locals and visitors to the area. The Texas economy benefits from these fishing trips through angler spending on goods and services such as lodging, food, ice, bait, and fuel. In this paper, we estimate the annual economic impacts of Lower Laguna Madre recreational fishing on the Texas economy. Our analysis combines data from the Texas Parks and Wildlife Department (TPWD) on recreational fishing in the

Lower Laguna Madre with Texas marine recreational angler spending estimates from a National Marine Fisheries Service (NMFS) report (Lovell, Steinback, and Hilger 2013) to calculate estimated economic impacts. The analysis presented covers three types of bay fishing: 1) fishing from shore, 2) fishing from a private vessel, and 3) for-hire fishing trips utilizing a guide or charter service.

Recreational Angler Effort Data

Data on fishing effort by bay system in the state of Texas is collected annually by the TPWD through their creel surveys. TPWD conducts creel surveys throughout the year at specified boat-access sites along the Texas coast from Port Arthur to Port Isabel. More than 1,000 surveys are scheduled annually on randomly selected weekdays and weekend days, with site survey frequency proportional to site fishing pressure – meaning more active sites are surveyed more frequently (Green). While the major objective of the surveys is to determine how many fish are being caught, TPWD also uses the data gathered to estimate fishing effort (number of trips) in each bay system, including the Lower Laguna Madre. Table 1, shown below, provides TPWD estimates of recreational angler effort in the Lower Laguna Madre for anglers employing for-hire vessels (charter trips), fishing from private vessels, and shore anglers. The estimates are provided in "angler trips" which accounts for multiple anglers on a trip; for instance, if four anglers went fishing together it would represent four angler trips not a single group fishing trip. In addition, the percentage of anglers from Texas is presented as well. The estimates for private vessel and for-hire effort is from the 2014-2015 fishing year, while the estimate for shore fishing effort is from the 2013-2014 fishing year[5].

Table 1. Lower Laguna Madre Recreational Fishing Effort by Angler Type

Angler Type	Angler Trips	% Texan
For-Hire	8,629	84.9%
Private Vessel	89,198	97.7%
Shore	160,875	93.8%

[5] TPWD creel survey data is annualized for a fishing year spanning from May 15th to May 14th. TPWD collects shore angler effort data less frequently, the 2013-2014 creel year represents the most recent estimate of shore angler effort.

Recreational Angler Spending Data

Data on recreational angler spending was gathered from a NMFS report titled "The Economic Contribution of Marine Angler Expenditures in the United States, 2011". This report uses survey results to estimate marine recreational fishing expenditures for each coastal state. The report defines marine recreational fishing as: "… fishing for finfish in the open ocean or any body of water that is marine or brackish for sport or pleasure." The surveys implemented collect data on angler trip expenditures related to their most recent marine recreational fishing trip. The data gathered is used to calculate the economic impacts of marine recreational fishing at the state and national level (Lovell, Steinback, and Hilger 2013). The analysis presented in this paper adjusts the trip expenditure estimates to account for changing prices (fuel) and general inflation and calculates current estimates of the economic impacts associated with marine recreational fishing in Texas.

Texas survey data was collected through a mail survey of fishers with valid Texas fishing licenses that allowed marine recreational fishing in 2011[6]. Surveys were conducted monthly throughout the year to capture seasonality in trip expenditures. The response rate to the survey was 17.6%; 1,025 of the 5,820 mail surveys sent out were at least partially completed[7] (Lovell, Steinback, and Hilger 2013).

The survey asked respondents questions about their expenditures related to their most recent marine fishing trip and spending on marine fishing related durable goods (tackle, clothing, boats, license fees, etc.,) during the previous year[8]. Respondents were asked to report what they personally spent on themselves and others and to not include any money that was spent on them by others, the question was asked in this manner in attempt to calculate per angler expenditures and not per angling party expenditures. For multi-day trips that included other activities (sightseeing, beach-going, etc.,), fishers were asked to estimate expenses related to the entire trip and not just the days spent fishing. Although all spending on multi-day trips was included in survey responses, reported mean trip expenditures were for an angler-trip which was defined as single day of fishing for a single angler (Lovell, Steinback, and Hilger 2013). Mean angler-trip expenditures from the report are presented in Table 2 by angler effort type (for-hire, private vessel, and shore) and residency status. The next section outlines the calculation of angler-trip economic impact estimates.

[6] Some Texas fishing licenses are restricted to freshwater fishing only; these were excluded from the sample frame. The license holders that were included in the sample frame were: resident fishing and hunting combination, resident all-water, resident marine, non-resident all-water, and non-resident marine.
[7] Some responses did not have all questions answered.
[8] The analysis presented in this paper focuses on fishing trip expenditures and their impacts; durable goods expenditures are not included in the analysis.

Angler-Trip Economic Impact Estimates

The first step in calculating the angler-trip economic impact estimates was to update the 2011 spending estimates to account for inflation and price changes. Spending estimates were updated to 2015 values. Fuel costs were adjusted to account for the decrease in fuel costs that occurred between 2011 and 2015[9]. All other expense categories were adjusted for inflation using the United States Bureau of Labor Statistics CPI figures[10]. After accounting for inflation and lower fuel costs, mean angler-trip costs fell an average of 5% across the different angling types (for-hire, private boat, and shore) and angler types (resident and non-resident).

The second step in estimating the angler-trip economic impacts was to use IMPLAN, an input-output analysis software package, to determine how spending on recreational fishing impacted the Texas state economy (IMPLAN Group LLC. 2015). Each type of trip expenditure (fuel, lodging, food, etc.,) is included in an IMPLAN sector that matches the type of business activity it represents and the economic impacts associated with spending in each sector are calculated. Once the appropriate IMPLAN sectors were identified the IMPLAN model was run to estimate the associated impacts. Four different economic impact measures were calculated: employment, labor-income, value-added, and output.

Employment measures the number of jobs created by the marine recreational fishing expenditures. Labor-income measures the wages paid to those employed due to marine recreational fishing in the Lower Laguna Madre. Value-added measures the increase in Texas GDP due to the spending of recreational fishers, and output measures the total value of goods and services purchased because of Lower Laguna Madre recreational fishing. Labor income is a component of value-added, which is a share of output; thus, these figures cannot be summed. The economic impacts estimated in this report are state level impacts. Respondents to the NMFS survey were asked to report their trip expenditures incurred in the State of Texas; as such, we are unable to determine what percentage of spending occurred in the Lower Laguna Madre area. Because we are unable to determine where in Texas expenditures were incurred, estimating city or county level impacts was not feasible. The IMPLAN sectors associated with each expense category are presented in Table 3[11].

[9] The United States Energy Information Administration website was used to estimates changes in fuel costs. Per the website the average fuel cost was $3.37/gallon in 2011 and $2.17/gallon in 2015. Mean angler-trip fuel expenditures were divided by the 2011 value and then multiplied by the 2015 value.

[10] Estimated inflation was 5.5% between 2011 and 2015.

[11] An examination of Table 3 will highlight differences between the IMPLAN sectors we used in our calculations of economic impacts and those used in the NMFS study. For a few of the expense categories we felt different IMPLAN sectors better fit the expense than the sectors selected by the NMFS researchers.

For each impact measure three different effect types were estimated: direct, indirect, and induced. Direct effects are directly attributable to marine recreational fishing and include spending on goods and services by recreational anglers. Indirect effects are due to changes in inter-industry purchases as those businesses used by recreational fishers purchase more goods and services from other businesses; an example of an indirect effect would be increased recreational fishing leading bait shops to buy more bait from commercial bait fishers. Induced effects include increased purchases of goods and services by those employed due to marine recreational fishing (bait fish retailers, charter guides, etc.).

Table 2. Mean Angler-Trip Expenditures by Fishing Type (from Lovell, Steinback, and Hilger 2013)

	For-Hire		Private Boat		Shore	
	Resident	Non-Resident	Resident	Non-Resident	Resident	Non-Resident
Auto Fuel	$54.94	$85.63	$46.04	$36.93	$44.52	$47.26
Auto Rental	$0.00	$22.57	$0.00	$14.27	$0.04	$3.16
Bait	$4.26	$2.55	$13.60	$10.20	$12.33	$10.35
Boat Fuel	$0.00	$0.00	$32.99	$16.11	$0.00	$0.00
Boat Rental	$6.72	$5.89	$1.98	$0.66	$0.00	$0.00
Charter Fees	$205.77	$152.20	$0.00	$0.00	$0.00	$0.00
Crew Tips	$13.86	$19.65	$0.00	$0.00	$0.00	$0.00
Fish Processing	$0.00	$0.00	$0.00	$0.00	$0.00	$0.09
Food from Grocery Stores	$34.16	$27.89	$32.74	$15.64	$33.16	$32.21
Food from Restaurants	$37.31	$30.41	$23.84	$28.68	$24.39	$24.82
Gifts/Souvenirs	$8.13	$24.83	$1.70	$8.94	$3.04	$10.24
Ice	$5.45	$2.42	$4.19	$3.17	$2.87	$3.50
Lodging	$38.56	$67.44	$22.35	$21.35	$33.84	$48.66
Parking & Site Access	$0.58	$4.64	$1.68	$1.59	$2.33	$2.60
Public Transportation	$0.00	$13.55	$0.00	$21.37	$0.02	$3.56
Tournament Fees	$0.00	$0.11	$1.74	$2.71	$0.00	$0.00
Total	**$409.74**	**$459.78**	**$182.85**	**$181.62**	**$156.54**	**$186.45**

Table 3. IMPLAN Sectors

Expense Category:	IMPLAN Sectors	IMPLAN Sector Descriptions
Auto Fuel	402	Retail - Gasoline Stores
Auto Rental	442	Automotive Equipment Rental & Leasing
Bait	404	Retail - Sporting Goods
Boat Fuel	402	Retail - Gasoline Stores
Boat Rental	443	General and Consumer Goods Rental
Charter Fees	414	Scenic and sightseeing transportation
Crew Tips	414	Scenic and sightseeing transportation
Fish Processing	93	Seafood Product Preparation & Packaging
Food from Grocery Stores	400	Retail - Food & Beverage Stores
Food from Restaurants	501	Full Service Restaurants
Gifts & Souvenirs	406	Retail - Miscellaneous
Ice	402	Retail - Gasoline Stores
Lodging - Hotels and Motels	499	Hotels and Motels
Lodging - Other Accommodations	500	Other Accommodation
Parking & Site Access	512	Other Personal Services - Parking
Public Transportation	408	Air Transportation

Calculation and Presentation of Economic Impacts

Angler-trip economic impacts were calculated for all three angling types (for-hire, private vessel, and shore) for both resident and non-resident anglers. Total economic impacts from recreational fishing in the Lower Laguna Madre were calculated as the product of TPWD estimates of angler-trips, and the estimated economic impacts per angler trip. The economic impacts from for-hire, private vessel, and shore anglers are presented in Tables 4, 5, and 6; respectively. Economic impacts associated with shore-based fishing were approximately double the size of those associated with private vessel fishing and roughly four times the size of impacts associated with for-hire fishing. The higher impacts from shore fishing were due to the large number of shore-based recreational fishing trips taken (62% of all trips). Total impacts across all three angler types (for-hire, private vessel, and shore) are presented in Table 7. The impacts associated with resident anglers were significantly higher than those associated with non-resident trips. While non-resident fisher trips generally led to greater angler-trip expenditures and economic impacts, the larger volume of residential trips (95% of all trips) outweighed the per-trip effects.

Table 4. Economic Impacts of Lower Laguna Madre For-Hire Recreational Fishing

For-Hire Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	24.70	$961,433	$1,207,178	$2,489,528
Indirect Effect	8.62	$476,787	$748,493	$1,316,642
Induced Effect	8.99	$417,943	$728,254	$1,278,096
Total Effect	**42.30**	**$1,856,163**	**$2,683,925**	**$5,084,266**
For-Hire Non-Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	4.65	$175,645	$243,253	$470,166
Indirect Effect	1.50	$82,717	$132,657	$235,134
Induced Effect	1.62	$75,110	$130,879	$229,693
Total Effect	**7.76**	**$333,472**	**$506,789**	**$934,994**
For-Hire Total				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	29.34	$1,137,078	$1,450,431	$2,959,694
Indirect Effect	10.12	$559,504	$881,150	$1,551,776
Induced Effect	10.61	$493,053	$859,133	$1,507,789
Total Effect	**50.07**	**$2,189,635**	**$3,190,714**	**$6,019,259**

Table 5. Economic Impacts of Lower Laguna Madre Private Vessel Recreational Fishing

Private Vessel Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	98.91	$2,730,353	$3,923,644	$6,537,068
Indirect Effect	16.90	$874,572	$1,547,816	$2,780,371
Induced Effect	22.65	$1,053,615	$1,836,221	$3,222,478
Total Effect	**138.47**	**$4,658,541**	**$7,307,682**	**$12,539,916**
Private Vessel Non-Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	2.62	$80,527	$127,395	$222,173
Indirect Effect	0.52	$29,199	$52,394	$96,933
Induced Effect	0.69	$32,055	$55,864	$98,038
Total Effect	**3.83**	**$141,781**	**$235,652**	**$417,144**
Private Vessel Total				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	101.52	$2,810,880	$4,051,039	$6,759,241
Indirect Effect	17.43	$903,772	$1,600,210	$2,877,303
Induced Effect	23.34	$1,085,670	$1,892,085	$3,320,516
Total Effect	**142.30**	**$4,800,322**	**$7,543,334**	**$12,957,060**

Table 6. Economic Impacts of Lower Laguna Madre Shore-Based Recreational Fishing

Shore Angler Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	188.52	$5,112,623	$7,541,873	$12,670,475
Indirect Effect	33.32	$1,723,258	$3,009,281	$5,436,940
Induced Effect	42.99	$1,999,432	$3,484,653	$6,115,366
Total Effect	**264.83**	**$8,835,313**	**$14,035,806**	**$24,222,781**
Shore Angler Non-Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	15.42	$431,783	$658,367	$1,104,266
Indirect Effect	2.87	$150,061	$261,111	$473,465
Induced Effect	3.66	$170,099	$296,447	$520,249
Total Effect	**21.95**	**$751,942**	**$1,215,925**	**$2,097,979**
Shore Angler Total				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	203.94	$5,544,406	$8,200,240	$13,774,741
Indirect Effect	36.19	$1,873,319	$3,270,392	$5,910,405
Induced Effect	46.65	$2,169,530	$3,781,099	$6,635,614
Total Effect	**286.77**	**$9,587,255**	**$15,251,731**	**$26,320,760**

Table. 7 Economic Impacts of Lower Laguna Madre Recreational Fishing (All)

Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	312.13	$8,804,409	$12,672,695	$21,697,071
Indirect Effect	58.84	$3,074,618	$5,305,591	$9,533,953
Induced Effect	74.63	$3,470,990	$6,049,128	$10,615,940
Total Effect	**445.60**	**$15,350,017**	**$24,027,414**	**$41,846,963**
Non-Resident				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	22.68	$687,955	$1,029,015	$1,796,605
Indirect Effect	4.90	$261,977	$446,162	$805,532
Induced Effect	5.96	$277,263	$483,189	$847,980
Total Effect	**33.54**	**$1,227,195**	**$1,958,366**	**$3,450,117**
Total				
Impact Type	**Employment**	**Labor Income**	**Value Added**	**Output**
Direct Effect	334.81	$9,492,364	$13,701,710	$23,493,676
Indirect Effect	63.73	$3,336,595	$5,751,753	$10,339,484
Induced Effect	80.59	$3,748,253	$6,532,317	$11,463,920
Total Effect	**479.14**	**$16,577,212**	**$25,985,779**	**$45,297,080**

Concluding Remarks

Marine recreational fishing in the State of Texas is not only a popular recreational activity but also a valuable part of the Texas economy. Our analysis indicates that Lower Laguna Madre recreational fishing trips generates approximately 480 jobs and $17 million in labor income in Texas annually. Trip spending by Lower Laguna Madre recreational fishers is also responsible for $45 million of economic activity and contributes $26 million to the Texas economy yearly. Although per trip spending by anglers employing for-hire vessels was much higher than trip level spending by shore and private-vessel anglers, total economic impacts were influenced more by shore and private-vessel anglers due to greater effort levels (more trips). Similarly, although non-resident anglers spent more money per trip on average; economic impacts from resident fishing trips were much larger than non-resident impacts due to the total number of trips (95% of trips were by residents).

The results presented in this analysis are presented with some caveats regarding the data from the NMFS survey. The first issue is that the data was not specific to the Lower Laguna Madre and gathered data on Texas marine recreational fishing regardless of where the fishing occurred. It is possible that gulf anglers spend more on fishing trips, on average, than bay anglers which would lead to overstated economic impacts. Such a problem would be exacerbated if gulf anglers were more willing to respond to the survey. Similar problems could arise if spending on fishing trips varied significantly by coastal region or bay system. The second issue concerns the possibility of response bias. Anglers were asked to report only what they personally spent on themselves or others and not to include expenses paid on their behalf by others (Lovell, Steinback, and Hilger 2013). If anglers that funded trips were more likely to respond to the survey than those being funded, the spending estimates at the angler-trip level would be skewed upwards which would lead to overstated impacts. The NMFS survey did not look specifically at this form of response bias, the authors evaluated other possible forms of response bias and found no issues. While the issues noted could impact the findings of this analysis we have no evidence that any of these issues exist (regional spending differences, bay vs. gulf differences, non-response bias among non-paying anglers) and believe the results presented provide an appropriate estimate of the annual economic impacts of recreational fishing in the Lower Laguna Madre.

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Shane Wilson, Founder of Fishing's Future, Fly Casting in a Resaca –

Texas Sea Grant photo by Seth Patterson

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