PROGRAMMATIC GOALS AND OBJECTIVES

Agriculture – Natural Resources and the Environment

Imperative 1: Consumers, homeowners, agricultural producers, communities, and irrigation districts understand and adopt best management practices to protect water quality and enhance conservation so water supplies will meet future water needs in Texas that are essential for expanding agricultural growth, jobs, and the economy in both rural and urban areas.

Statement of Support: Water quality and quantity have emerged as the preeminent issue across the state, as indicated through local input, legislative efforts, and numerous other indicators. Agriculture is the largest water user in the state, and agriculture is under close scrutiny because of the potential for negative environmental (water quality) impacts.

### Summary of Educational Contacts for Imperative 1

<table>
<thead>
<tr>
<th>Educational Sessions</th>
<th>Group Contacts</th>
<th>Contact Hours</th>
<th>Other Direct Contacts</th>
<th>Total Direct Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,235</td>
<td>273,953</td>
<td>266,558</td>
<td>194,394</td>
<td>468,347</td>
</tr>
</tbody>
</table>

Goal 1: Agricultural producers utilize efficient irrigation methods and conservation tillage to conserve water.

**Benchmark:** In 2006-07, over 50,000 agricultural producers participated in water irrigation programs. Of those surveyed in 2007, over 80% of participants said they have adopted irrigation practices taught by Texas AgriLife Extension Service.

### Strategy Timeline/Measure(s) 

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop educational programs to promote efficiency and effectiveness of irrigation through improved timing and application of irrigation water on crop and forage land.</td>
<td>2009–2013: 55% of producers attending educational programs increase their knowledge of irrigation technologies, management of irrigation technologies, and water use efficiency in their production system (crop production per unit of water). (OUTCOME)</td>
<td>B Lesikar T Miller</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2009–2013: Producers increase their knowledge crop management inputs that impact water use efficiency and irrigation scheduling. (OUTCOME)</td>
<td>T Miller</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

**Results/Narrative**

An irrigation training program was developed to provide educational opportunities and informational resources to support efficient irrigation technologies and practices. A curriculum guide and resource compilation in print and electronic formats were used in six training events throughout the state over a 15 month period in 2008 and 2009. Irrigation conferences were conducted in Lubbock, Mercedes, Chillicothe, Sinton, Hondo and Amarillo. The meetings had over 350 attendees, and target audiences included progressive agricultural producers, technical service providers, agencies, agricultural consultants, irrigation professionals and extension educators. The percentage of respondents to the evaluation instrument reporting knowledge gained, willingness to adopt practices and economic benefit was 84% (86 of 102), 57% (63 of 110) and 75% (51 of 68), respectively. Also, Continuing Education Units were offered for TDA Licensed Pesticide Applicators, Texas Certified Crop Adviser Program licensed Certified Crop Advisers, and Irrigation Association licensed Certified Irrigation Designers and Certified Agricultural Irrigation Specialists.

**Subsurface Drip Irrigation Technology Transfer Program**

Declining water resources and water-limiting agricultural production conditions in the Ogallala Aquifer Region continue to place pressure on irrigators to manage irrigation efficiently. When properly designed, installed, maintained and managed, subsurface drip irrigation (SDI) can be a highly efficient irrigation method. Obstacles to adoption of SDI include need for information on SDI system design, maintenance and management.

A collaboration between faculty of Kansas State University, Texas AgriLife Research, Texas AgriLife Extension Service and USDA-ARS at Bushland is developing educational materials and events as a technology transfer effort designed to remove informational barriers to adoption of SDI; increase awareness of advances in SDI; promote appropriate application and management of SDI; and promote SDI research programs. Educational events include field days and workshops. This year-long technology transfer effort is funded in...
part by the USDA-ARS Ogallala Aquifer Initiative Program, with supplemental funding from irrigation industry. Freddie Lamm (KSU) and Dana Porter (Texas AgriLife Extension Service) are co-PIs on this project, but it is truly a team effort involving KSU faculty Mahbub Alam and Dan Rogers; Texas AgriLife Research and Extension Service Engineer James Bordovsky and Irrigation Program Specialist Nich Kenny; USDA-ARS Engineer Paul Colaizzi; and other research and extension faculty from Kansas and Texas. Field Days were held at Colby, Kansas on August 4, 2009 and Halfway, Texas on August 25, 2009. Both events were well attended, and included field tours on research farms, as well as industry and educational exhibits. A proceedings packet containing research poster printouts and a CD with research reports, fact sheets and other information, was developed and distributed to all participants in these events. Presentations included research-based recommendations for crop-specific SDI management; maintenance issues; advantages and disadvantages of SDI; system design, layout, uniformity and germination issues; and other topics. Audiences included agricultural producers, irrigation professionals, USDA-NRCS personnel, agricultural and engineering consultants, and others.

The Halfway event had approximately 118 participants, and feedback has been positive. According to an evaluation survey, 63% of respondents indicated an increase in level of understanding of at least one topic; all other respondents indicated a high level of understanding both before and after the event. Forty percent of respondents indicated an increase in knowledge about SDI system components, layout and planning and SDI system maintenance and trouble-shooting; 46 % indicated an increase in knowledge about irrigation best management practices to optimize benefits of the technology and improve water use efficiency; 49% indicated an increase in knowledge of advantages and disadvantages of SDI and of applicability of practices and/or technologies to their farm operations. Eighty-nine percent of respondents indicated that they received information that would be helpful in their irrigation decisions. Fifty percent indicated intentions to make changes in their irrigation practices as a result of information they received.

A field day was held in D-1 to highlight a study comparing the production of six warm season grasses under dryland, limited, and full irrigation. Many water planners expect improved forages under limited irrigation may increase as available water supplies decrease on the High Plains.

Crop consultants and ag-chemical representatives have a significant impact on the decisions that are made by row crop producers. Many of these consultants do not have formal training or education in soil and crop sciences. To address this issue, Peter McGuill, Wharton County Extension Agent held an Ag Industry Professional Crop Improvement Conference for row crop consultants and ag-chemical representatives. Thirty-five consultants were in attendance at the January meeting. At the conference, a presentation was given on irrigation timing and water use of field crops (corn, grain sorghum, and cotton). Prior to the presentation, only 29% of the participants considered their level of understanding of this topic to be in either the good to excellent range. Following the presentation, 83% of the participants considered their level of understanding of this topic to be either in the good to excellent range. This represents a 186% change in level of understanding when comparing the before and after results.

<table>
<thead>
<tr>
<th>Demonstrate conservation tillage strategies to manage and conserve soil water.</th>
<th>2009–2013: Producers increase their knowledge of equipment and best management practices for conservation tillage systems by 2% per year. (OUTCOME)</th>
<th>T Miller B Lesikar</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009–2013: Producers increase their knowledge of alternative production systems by 2% per year. (OUTCOME)</td>
<td>T Miller B Lesikar</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

Results/Narrative

Educational programs on fertilizer management in conservation tillage systems increased producer adoption of deep profile soil sampling strategies for nitrogen management by over 20%. In addition, producer understanding of nutrient stratification and specifically of potential economic and environmental benefits of phosphorus placement in reduced tillage production systems increased by more than 25%.

Drilling fluids on Texas croplands and pastures

- The proliferation of drilling associated with high energy prices in 2007 and 2008 has left drilling companies searching for disposal alternatives
- Drillers have offered many landowners what appear to be attractive prices for the opportunity to dispose of these on agricultural land, often with disastrous consequences due to salinity, heavy metals and pH problems.
- Two workshops were held to educate 180 landowners on issues related to land application of aqueous drilling fluids as well as issues relating to fertilizers and non-traditional soil amendments. These workshops will potentially save hundreds of thousands of dollars in land reclamation expenses, soil erosion and lost crops and forages.
**Goal 2:** Homeowners, grounds keepers, and other managers reduce water consumption for irrigating home lawns, landscapes, athletic fields, and recreational areas.

**Benchmark:** Of those surveyed, 50% noted an increase in knowledge on water use associated with landscapes, utilization of native species, and mulch use. Rainwater harvesting through programs with Master Naturalists and Master Gardeners has also been heavily emphasized in this objective.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and deliver education program demonstrating use of alternative water resources for landscape irrigation.</td>
<td>2009-2013: 55% of participants in Rainwater Volunteer training programs increase their knowledge regarding rainwater harvesting methods. (OUTCOME) 2009–2013: 55% of participants in training events increase their knowledge of alternative water sources such as harvested rainwater and reclaimed water (wastewater, graywater, etc.) for landscape irrigation. (OUTCOME)</td>
<td>B Lesikar</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Train existing and new Master Gardeners and other homeowners to implement water conservation and other environmentally responsible (Earth Kind® Landscaping) practices in their home landscapes.</td>
<td>2009–2013: 55% of participants increase their knowledge of landscape water conservation and other environmentally responsible practices; average ratings of intent to adopt practices by participants will exceed “undecided” (3 on a 6 point scale); and 50% of participants will report expectations of a positive economic impact by adopting practices. (OUTCOME)</td>
<td>D Welsh  S George</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Use technology-assisted delivery systems (i.e., Aggie-Horticulture®) to educate users about water conservation and sustainable principles and practices.</td>
<td>2009–2013: Aggie-horticulture® remains the most accessed website in Texas A&amp;M AgriLife with over 5,000,000 unique visitors and 40,000,000 page views annually. (OUTPUT)</td>
<td>D. Welsh  M Anderson</td>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>

**Results/Narrative Earth-Kind® Landscaping**

Within Texas AgriLife Extension Service’s long-range strategic plan (2007–2012), Extension Horticulture has selected *Natural Resource Conservation and Management* as the lead strategic initiative for a unit-wide effort to educate Master Gardeners and the homeowners.

Earth-Kind Landscaping addresses *Natural Resource Conservation and Management* through the use of innovative, environmentally-responsible landscaping principles and practices. The primary goals of Earth-Kind Landscaping are: water conservation, protection of air and water quality by reducing fertilizer and pesticide use, reduction of yard waste entering landfills, and landscaping for energy conservation (website: [http://earthkind.tamu.edu/](http://earthkind.tamu.edu/)).

In addition, the Earth-Kind Landscaping program incorporates Extension’s focus on: accountability, use of information technology, marketing and external communications, volunteerism, and professional development.

The Earth-Kind Landscaping program empowers County Extension Agents with a research-based educational program that is standardized, easy-to-use, and produces valuable Outcomes for AgriLife Extension to showcase to all stakeholders.

Earth-Kind Outcome/Output plans/programs can use either the scanable Earth-Kind Evaluation Form ([http://earthkind.tamu.edu/EKScanableEval.pdf](http://earthkind.tamu.edu/EKScanableEval.pdf)) or the on-line form ([http://horticulture.tamu.edu/ekchallenge/ekusersurvey/index.html](http://horticulture.tamu.edu/ekchallenge/ekusersurvey/index.html)) to collect quantitative data relevant to: increase in knowledge, intent to adopt practices, and economic impact.

For the period of 09/01/2008 – 08/31/2009, a total of 2,699 evaluations were submitted:

- 530 from On-line Master Gardener Training Modules
- 108 from the On-line Earth-Kind Challenge
- 59 from the Earth-Kind Website
- 2002 from On-site Presentations

Please Note: These data are available on-line from the Earth-Kind Evaluation Database ([http://horticulture.tamu.edu/ekchallenge/ekusersurvey/search.html](http://horticulture.tamu.edu/ekchallenge/ekusersurvey/search.html)).
Earth-Kind® Landscaping Annual Data Summary indicates:

Percent of respondents/participants who increased their knowledge and felt what they learned in the program provided them with the ability to analyze land situations and make better landscape management decisions? 94%

Change in Levels of Understanding: topic and percentage:
- Understanding of how your landscape can affect water usage: 33.33%
- Understand how to use mulch more effectively: 27.27%
- Knowledge of appropriate plant selection to better conserve water: 30%
- Knowledge of how to manage your irrigation system: 38.89%
- Knowledge of soil preparation: 36.84%
- Understanding of how to safely use and handle fertilizer: 27.78%
- Understanding of how to safely use and handle pesticides: 29.41%
- Understanding of the benefits of rainwater harvesting and storage: 31.25%

Intent to Adopt Practices: topic and rating
- 1 = Definitely Will Not; 2 = Probably Will Not; 3 = Undecided; 4 = Probably Will; 5 = Definitely Will; 6 = Already Using Practice
- Plan to design or re-design landscape: 3.6
- Plan to use mulches more appropriately: 4
- Plan to select plants based on water conservation: 3.8
- Plan to improve management of home irrigation system: 3.6
- Plan to modify soil for water conservation: 3.6
- Plan to decrease use of fertilizers: 3.5
- Plan to decrease use of pesticides: 3.7
- Plan to increase composting of yard waste: 3.7
- Plan to landscape for energy conservation: 3.4
- Plan to harvest and store rainwater: 2.9

Economic Impact:
- Percentage of respondents who thought the practices adopted would result in economic savings? 92.7%
- Average amount anticipated in savings: $248
- Percentage of respondents who thought the practices adopted would decrease their water use? 67.8%
- Average percentage of anticipated water savings: 31.3%
Aggie-Horticulture® Website

Aggie-Horticulture.tamu.edu remains the most accessed website in Texas A&M AgriLife, serving over 6.5 million unique visitors and 47.5 million pages viewed in FY2009. Aggie Horticulture contains over 100,000 documents providing Internet access to every topic in the art and science of horticulture. Of the 161 web servers reporting to the Texas AgriLife Extension Web Stats database system, Aggie Horticulture served 65% of the total pages viewed and 53% of the total unique visitors of AgriLife Extension websites during the 2009 fiscal year. According to the Alexa Traffic Rankings, for the past 6 months, Aggie Horticulture is the 8th most active website in the tamu.edu domain serving 3.2% of all traffic across websites in the domain. Aggie Horticulture is also the number one website in Alexa Traffic Ranking under the category of horticulture nationwide.

In order to meet the demand of the public for information on rainwater harvesting system installation, a manual titled, “Rainwater Harvesting: System Planning” has been developed and is currently in draft form. The manual focuses on planning of systems with catchment areas less than 50,000 square feet and have a storage capacity of less than 100,000 gallons. The topics covered address the popular and unusual distribution of water for landscapes, pets, wildlife, livestock, and private non-potable and potable in home rainwater systems. While the main focus of the manual is placed on issues of planning, some installation, start-up, and operational topics are covered.

The Master Gardener “Rainwater Harvesting Specialist” training was held June 1-3 in Granbury, TX. A total of 31 participants attended this event. 90% (28 of 31) indicated knowledge gained through participation in the event.

The Master Naturalist “Rainwater Steward” training was held on October 24-26, 2008 in Hunt, Texas with 16 participants. 94% (15 of 16) indicated knowledge gained through participation in the event and 81% (13 of 16) indicated a willingness to implement a rainwater harvesting system.

Landscape Irrigation is a high consumer of municipal water supply, especially during the summer months. By considering water conservation during the design, installation and operation of landscape irrigation systems, the amount of water needed to maintain landscapes can be significantly reduced. Persons who have benefitted most from the short course are licensed irrigators, landscape contractors, and conservation directors of cities and public utilities. An additional course was developed to meet the educational needs of homeowners and other irrigation practitioners. This training program promotes water conservation by the adoption of management practices such as auditing and seasonal irrigation scheduling. In total, the School of Irrigation taught 21 short courses to 308 irrigators on such topics as auditing, drip irrigation, weather stations, irrigation scheduling, computer aided design and ET “Smart” irrigation controller technology. As a result of these short courses, 71% plan to take action and make changes to their daily practices based on information gained from these trainings and 69% of the students anticipate benefiting economically as a direct result of what was learned from the trainings. The School of Irrigation currently holds a 92% overall satisfaction rating from its students. 83% of Professionals who attended the Landscape Irrigation Auditing Course became Certified Auditors; and 65% of Short Course attendees reported an increase in their knowledge of efficient landscape irrigation practices.

Onsite wastewater treatment systems provide the wastewater infrastructure for about 25% of Texas’ population. The owners of these systems are responsible for performing operation and maintenance activities associated with keeping their system working properly. Several educational methods are being implemented to reach these facility owners.

The onsite wastewater treatment systems fact sheet series describes the various technologies and practices for managing wastewater onsite. The Texas regulations regarding onsite wastewater treatment systems were modified effective September 11, 2008. Thirteen fact sheets were revised and/or updated during 2008 to reflect the revisions in the rule package.

The onsite wastewater treatment systems educational series was developed to provide information to the owners of these facilities to assist them in understanding their onsite wastewater treatment system, how to use the system to treat their wastewater and to conduct operation and maintenance activities on the system. Two new training courses cover maintenance of septic systems and maintenance of aerobic treatment units (ATUs) with spray distribution. These ATUs are commonly combined with a spray field for application of the wastewater in the landscape. The first class was taught on December 17, 2008 in New Braunfels, TX. The class was attended by 32 people generating a total of 192 contact hours. 96% (26 of 27) of the participants gained knowledge through the course and 48% (13 of 27) indicated a willingness to adopt management practices discussed during the course. The onsite wastewater treatment system web site had 49,171 page views and 13,613 unique visitors during September 1, 2008 to August 31, 2009.

Homes must have an effective wastewater treatment system to collect, treat and disperse the wastewater generated in a home. An inspection at the point of sale is used to evaluate the operational status of a system. Each component of the system is evaluated to document the current status. The operational evaluation does not determine how long the system will last, because system longevity is directly related to the user.

The lending institutions require an inspection of all onsite wastewater treatment systems at the time of sale. However, Texas does not define a point of sale inspection or provide guidance on how to perform the inspection. Therefore, current inspections range from running water through the system from all the fixtures to a detail evaluation of system components. The Texas Association of Real Estate Inspectors (TAREI) sought training on how system components function and methods to determine operational status. Two courses were taught in Austin (October 3-4, 2008) and College Station (August 21-22, 2009). A total of 15 students attended an eight hour session, and 70 students attended the sixteen hour course generating a total of 1000 contact hours.

Rainwater Harvesting programs are providing timely information to assist Texans with water conservation on their property. Trainings include information on proper design of systems
for capturing rainfall to support landscape irrigation, indoor uses and water for livestock and wildlife. RWH capture structures were constructed during workshops to provide hands-on experience and demonstration.

- From January to August 2009, information was delivered to 132,511 participants at 22 venues. Six new RWH demonstration sites were established. A RWH display at San Antonio Livestock Exposition display was viewed by 130,497 attendees. Of those surveyed (256 of the 636 distributed), 58% planned to implement a system for rainwater harvesting within the next 12 months.
- Results from pre- and post-test evaluations indicated that 92.6% of participants increased their knowledge regarding uses, limitations and proper design of rainwater harvesting systems.
- Awards included the Texas AgriLife Extension Service Team Superior Service Award and Finalist for TCEQ’s 2009 Texas Environmental Excellence Award.
- Working in cooperation with the Texas State Soil and Water Conservation Board, TCEQ, the Rio Grande Basin Initiative, and TWRI, numerous additional rainwater harvesting workshops will be conducted across the state throughout the upcoming year.

Texas Watershed Stewards
The Extension Soil and Crop Sciences Water Quality Team conducted three Texas Watershed Steward Workshops the third quarter to educate citizens about water quality and potential sources of water pollution, and to facilitate local involvement in watershed management and protection efforts. The workshops were held in Granbury, Fort Worth, and Kaufman in June, July and August with a total of 173 participants representing state and federal agencies, small business owners, youth, landowners, teachers, homeowners, and other watershed residents. In total, 15 workshops have been conducted across the state with over 800 citizens becoming official Texas Watershed Stewards.

- Preliminary results from the first round of 6-month delayed post-test evaluations indicate that knowledge regarding pollutant sources/BMPs and watershed function has increased by 58% and 35% respectively.
- Preliminary results from the first round of 6-month delayed post-test evaluations indicate that knowledge regarding pollutant sources/BMPs and watershed function has increased by 58% and 35% respectively.

Goal 3: Irrigation districts utilize methods and management strategies to use water efficiently.

Benchmark: In 2007, 46 participants attended a Water Measurement and Automation Workshop. Also, technical assistance was provided to seven districts.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and deliver education program demonstrating efficient conveyance and delivery of irrigation water.</td>
<td>2009–2013: 55% of the Irrigation district personnel attending annual training events increase their knowledge of water conveyance losses and water quantity-monitoring techniques for conveying irrigation water. Provide technical assistance to five irrigation districts per year.</td>
<td>B Lesikar</td>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>

Results/Narrative
100% of district personnel attending trainings reported an increase in knowledge. Two training programs were conducted: the LRGV Irrigation Conference in which district personnel report a 66% increase in knowledge, and SCADA/Automation trainings in which district personnel reported a 100% increase in knowledge. Technical assistance was provided to 7 districts (of approximately 35 districts in Texas). Other indicators include the Irrigation District Engineering and Assistance (IDEA) web site and the new WaterGIS website which had approximately 180,000 page views and 4600 unique hosts during 2008. Other products included the release of a report on canal lining project evaluations and two Map Releases and GIS projects on urbanization within the irrigation districts to assist in planning for future water needs, and congressional districts to educate district and legislatures on boundaries and responsibilities.
**Goal 4:** Homeowners, landowners, and managers manage land within a watershed to more effectively use rainfall and runoff.

**Benchmark:** In 2007, Six Basic Maintenance Provider short courses were conducted across Texas reaching 271 wastewater professionals conducting operation and maintenance of onsite wastewater treatment systems and generating 4336 contact hours.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
</table>
| Develop and deliver education programs on watershed management. | 2009-2013: Sixty-five percent of urban and agricultural program participants increase their knowledge of watershed management. | B Lesikar T Miller | | YES

**Results/Narrative**
Onsite wastewater treatment systems provide the wastewater infrastructure for approximately 25 % of the residences in Texas or approximately 1.3 million homes. These onsite wastewater treatment systems are commonly referred to as septic systems. The homeowner education is conducted through a web page, fact sheets and educational program. The practitioner educational activities include the web page, fact sheets, training courses and guidance documents. During the reporting period, the educational program focused on updating of educational materials for homeowners, writing technical manuals, development of new training courses and delivery of courses. Four courses were taught to wastewater practitioners in Bandera (November 21, 2008), Granbury (April 15, 2009), Lockhart (May 28, 2009), and Lubbock (July 24, 2009). A total of 129 students attended the courses generating a total of 1032 contact hours. An evaluation summary was distributed and analyzed for the course taught in Lockhart. 62% of respondents indicated knowledge gained through participation in the course.

The Basic Maintenance Provider training program is offered to practitioners and homeowners interested in maintaining onsite wastewater treatment systems. The course is offered in cooperation with the Texas Onsite Wastewater Association. The sixteen hour course was offered five times (Baytown, Mesquite, Seguin, Tyler, and Waco) during September 1, 2008 to August 31, 2009 with a total attendance of 226 students (3616 contact hours). An evaluation summary was distributed and analyzed for the courses taught. 83% of respondents indicated knowledge gained through participation in the course.

We are in the final stages of completing development of the educational components of Lone Star Healthy Streams (Power Point presentation and BMP Manual) with a planned launch date for the program of Fall, 2009. This represents a totally new watershed protection program targeting beef cattle producers that will be offered in all regions of the state beginning in the fall/winter of 2009.

A total 4 workshops were conducted in target watersheds undergoing TMDL or WPP development and/or implementation. More than 240 citizens representing small business owners, landowners, cities, agricultural producers, schools, state environmental agencies, universities, and other watershed residents were trained as Texas Watershed Stewards (1680 contact hours). Results from pre- and post-test evaluations demonstrate that knowledge regarding water quality, pollutant sources, watershed management, and best management practices increased by 31%. More than 99% of program participants reported the program enabled them to be better stewards of their water resources, 80% are more closely monitoring individual actions that could impair water quality, 80% have adopted and/or maintained water quality BMPs on their property and 65% have encouraged others in their community to take similar action and get involved.

**Training teachers in environmental stewardship**
Collaborating with the Texas Mining and Reclamation Association, Soil and Crop Sciences faculty conducted a Teachers’ Workshop for the Walnut Creek Mine in July. This workshop is geared toward 3 to 8 grade science teachers, however, social science teachers often attend and grades 1 to 12 are always represented. The teachers learned about the lignite surface mining industry, geology, hydrology, and soils. There were 14 teachers that participated. TMRA estimates that each teacher will have an impact on approximately 125 students per year. So, with our 14 teachers we were able to reach about 1,750 students this year on topics related to soil science and potential careers in soil science.
Goal 5: Homeowners, landowners, and communities understand and adopt best management practices regarding their water supply.

**Benchmark:** The Extension Soil and Crop Sciences Water Quality Team completed development and implementation of the Texas Watershed Steward Program, an 8-hour training event that educates citizens about water quality and potential sources of water pollution, and facilitates local involvement in watershed management and protection efforts.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and deliver education programs describing water resources and proper management of these resources.</td>
<td>2009-2013: Reach clientele in Texas through various educational mechanisms to increase basic water literacy. Water literacy covers the broad topics of state water planning and water management, water resources, water conservation, water quality, groundwater resources and best management practices to protect water resources. (OUTPUT)</td>
<td>B Lesikar</td>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>

**Results/Narrative**

Texas parks want to be good stewards of land and water. Many people who visit parks look at the landscape and water BMPs practiced at the parks to help make decisions for BMPs at their home and businesses. Extension provided training on Rainwater Harvesting and Rain Garden at the Texas Park and Recreation Society state meeting in San Angelo, Texas. 91.8% of attendees who turned in evaluations rated the Rainwater Harvesting training as Excellent. 94% of attendees who turned in evaluations rated the Rain Garden training as Excellent. TRAPS did not ask the adoption question.

Water conservation, water use efficiency in irrigation systems, and stormwater management are critical issues to be addressed through demonstration and educational programs. Rainwater harvesting and rain garden demonstrations are currently under construction to provide water for a Master Gardener’s demonstration garden and to demonstrate water conservation and stormwater management BMPs.

The Texas AgriLife Extension is utilizing the members of the Master Gardener Associations around the state to educate Texans about using rainwater harvesting as an innovative way to control stormwater in urban and rural settings. As a part of the requirements for being trained as a specialist in rainwater harvesting, each person trained is required to volunteer at least 12 hours of their own time to teach others in their area about rainwater harvesting. Of the 10 participants in the class, over half reported knowledge gained from the program- and many people have requested that this class be taught in more locations throughout Texas. 90% of participant survey respondents reported a gain in knowledge. The rainwater harvesting web site had 168,480 page views and 27,632 unique visitors from September 1, 2009 to August 31, 2009.

**Plum Creek Watershed Partnership Stream Cleanup Projects**

The Extension Soil and Crop Sciences Water Quality Team, Plum Creek Watershed Partnership, and Guadalupe-Blanco River Authority sponsored highly successful stream and park cleanups in cooperation with the cities of Lockhart and Kyle.

- The City of Lockhart cleanups were held at 5 city parks along Town Branch of Plum Creek; the City of Kyle events were at the Steeplechase and Plum Creek Community Parks.
- These events included 3 hours of trash cleanup, followed by Environmental Fairs with educational booths and live music.
- A total of 855 local citizens participated, contributing an estimated total of 2,715 volunteer hours at the events.
- Local schools were involved, with over 660 of the participants being youth under the age of 18.
- An estimated 3,560 lbs of trash were collected, and an additional 1,875 lbs of paper, aluminum cans, plastic and glass bottles were recycled from the events. Additional cleanup activities included painting and graffiti removal.
- Over 6.5 miles of creeks were cleaned up as a result of these events.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and deliver education programs, such as Tex-A-Syst, on protection of local groundwater resources. Emphasize drinking water quality protection and appropriate treatments of contaminated water as necessary.</td>
<td>2009–2013: Homeowners and landowners increase their knowledge of wellhead protection best management practices. (OUTCOME) 2009–2013: 55 % of homeowners and landowners attending educational events gain knowledge regarding the utilization of harvested rainfall. (OUTCOME)</td>
<td>B Lesikar</td>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>

**Results/Narrative**

Groundwater management remains a critical issue. A priority groundwater management area was named in October for the North Texas Trinity Aquifer. Texas AgriLife Extension Service will be delivering educational programs in cooperation with the commissioner’s court. An agent training was conducted in District 4 in Waco on October 20, 2008. Educational resources were provided to the counties to assist in their educational efforts. Additional agent trainings were conducted on February 17 and August 25, 2009 to update agents on current matters regarding PGMAs.
| Develop and deliver education programs on groundwater resources and management for clientele in groundwater conservation districts. | 2009-2013: Homeowners and landowners gain knowledge of groundwater management via groundwater conservation districts in areas designated as Priority Groundwater Management Areas and areas seeking a groundwater conservation district. (OUTCOME) | B Lesikar | YES
| Results/Narrative | | | NO |
Agriculture – Natural Resources and the Environment

Imperative 2: Producers, landowners, and consumers effectively evaluate and adapt research-based technologies to enhance wildlife conservation and management, fostering environmental stewardship while capturing economic benefit from the sales of nature-based experiences to customers.

Statement of Support: Wildlife management as an enterprise on private lands is an important income source and diversification alternative for landowners. Maintaining the balance among competing enterprises over time is a total management approach. The TCFF process identified this goal in the natural resources and environment area.

Summary of Educational Contacts for Imperative 2

<table>
<thead>
<tr>
<th>Educational Sessions</th>
<th>Group Contacts</th>
<th>Contact Hours</th>
<th>Other Direct Contacts</th>
<th>Total Direct Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>487</td>
<td>16,801</td>
<td>67,013</td>
<td>151,599</td>
<td>168,400</td>
</tr>
</tbody>
</table>

Goal 1: Land managers meet their goal of enhancing wildlife and fisheries resources.

Benchmark: In 2006-07, over 40,000 people were reached through wildlife and fishery educational programs. Most participant changes were associated with changing land to be more conducive to wildlife habitat, pond management, and nature tourism.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct educational programming aimed at enhancing wildlife and fisheries resources.</td>
<td>2009–2013: 55% of adult program participants increase knowledge of fisheries and wildlife habitat and appropriate management practices. (OUTCOME)</td>
<td>M Masser J Cathey</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>2009-2013: Provide numbers of unique visitors and pages downloaded from websites that provide wildlife and fisheries information. (OUTPUT)</td>
<td>M Masser J Cathey</td>
<td></td>
<td>NO</td>
</tr>
</tbody>
</table>

Results/Narrative
Feral hog Workshops, Bastrop (1/23/09) and Caldwell (2/24/09) Counties (J. Gallagher & C. Lewis)
Feral hogs problems continue to grow and to meeting this problem the WFSC Extension Unit has increased its' programmatic efforts in this arena. Two recently survey workshops illustrate the demand, the response, and the impact.
- 323 evaluation surveys returned
- 100 and 89% respectively reported some form of negative impact from feral hogs in the last year
- 81 and 66% respectively reported using 1 or 2 control techniques
- Mean reported economic loss the previous year $3,410
- Mean reported anticipated loss after attending workshop $1,896
- 99% reported an increase in knowledge from attending the workshop
- Net promoter scores were 61 and 57% respectively

Using Webinars to Conduct Extension Educational Programs (E.Taylor and B. Higginbotham)
Webinars (web-based seminars) are an emerging educational tool that allows research-based information to be extended to unlimited audiences across the United States. We piloted this educational technique by hosting a feral hog management webinar. The webinar was advertised on various listserves and the announcement was forwarded to all EAs-AG/NR in Texas with a request to forward it to targeted clientele groups.
- A total of 71 clientele participated: landowners-34%, government agency personnel-29%, private consultants-22%, other-11% and environmental organization personnel-4%. Texas residents made up 49% of the audience. Damage incurred by feral hogs was most frequent to pastures (63% of survey respondents), followed by wetlands (53%), specialty crops (50%) and row crops (43%).
- A total of 76% of the participants rated the webinar quality as excellent and 24% rated it as good. First time webinar participants made up 64% of the audience. Participants increased their knowledge by 32%. They also estimated that feral hog damage would decrease by an average of $6,871 each based on adopting practices recommended to them. Planned practice adoption included use of larger traps (98% of respondents), pre-baiting (85%), varying baits with location (68%) and wearing protective eyewear and gloves during field dressing (65%). Participants assigned a Net Promoter Score value of 79% to this webinar (an NPS value of > 50% is considered
Impacts of Educational Programming in Wildlife and Fisheries Management
Ninety seven percent of Texas is held by private landowners, their land management decisions will ultimately determine the fate of natural habitats and therefore our wildlife and fisheries resources.

- Texas AgriLife Extension Service conducts a number of field days, workshops and seminars each year to provide landowners with the tools necessary to successfully manage these wildlife and fisheries resources integrated with other existing agricultural and natural resources enterprises.
- The Unit serviced 2,489 adult clientele participating in 72 Extension educational programs with a combined 4940.25 contact-hours across the state this quarter.
- Based on estimates of program impacts, the information provided through these programs (to better manage their wildlife and fisheries resources for increased farm and ranch income and recreation) are valued at $340,867.00.

### Results/Narrative
Numerous news articles submitted during FY2009.

---

<table>
<thead>
<tr>
<th>Goal 2: County Extension agents and specialist faculty meet professional competency goals in order to provide educational programs related to wildlife and fisheries enterprise development and nature-based tourism.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benchmark:</strong> NA</td>
</tr>
</tbody>
</table>

#### Strategy
Expand professional development and in-service training programs for county Extension agents and specialists related to wildlife and fisheries development.

#### Timeline/Measure(s)
2009–2013: Evaluate usage by county Extension agents and modify as needed. *(OUTCOME)*

#### Oversight
M Masser
J Cathey

#### Comments/Notes

#### Measure Met
YES
NO

---

### Develop timely news releases and magazine articles to enhance stakeholder awareness.

<table>
<thead>
<tr>
<th>2009-2013: News articles adopted by 25 local or area newspapers and electronic outlets. Articles could be submitted Texas Wildlife Association, Texas Fish and Game, Texas Parks and Wildlife, Southwest Cattle Raisers Association, and other wildlife and fisheries related magazines, newspapers, and website outlets. <em>(OUTPUT)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>M Masser</td>
</tr>
</tbody>
</table>

#### Results/Narrative
Numerous news articles submitted during FY2009.

---
Agriculture – Natural Resources and the Environment

Imperative 3: Landowners, professional ecosystem managers, community planners, and other interest groups become more knowledgeable, make informed decisions, and adopt best management practices that insure the proper management of rural and urban natural ecosystem resources through stewardship education in order to support the biological, sociological, and economic sustainability of those resources.

Summary of Educational Contacts for Imperative 3

<table>
<thead>
<tr>
<th>Educational Sessions</th>
<th>Group Contacts</th>
<th>Contact Hours</th>
<th>Other Direct Contacts</th>
<th>Total Direct Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>711</td>
<td>23,628</td>
<td>141,677</td>
<td>522,700</td>
<td>546,328</td>
</tr>
</tbody>
</table>

Goal 1: To increase clientele knowledge about the wise use of Texas’ rural and urban natural ecosystems

Benchmark:

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct educational programs to support maintenance and restoration of natural ecosystems</td>
<td>2009-2013: Sixty-five percent of urban and agricultural program participants increase their knowledge of ecosystem services and emerging markets (OUTCOME)</td>
<td>C Hart</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>2009-2013: Sixty-five percent of program participants increase knowledge of vegetation and pest management practices. (OUTCOME)</td>
<td>C Hart</td>
<td></td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>2009-2013: Sixty-five percent of program participants increase knowledge of rural and urban ecosystem management, health, and monitoring techniques (OUTCOME)</td>
<td>C Hart</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2009-2013: Increase participant knowledge by 10% of ecosystem management practices at the urban wildland interface. (OUTCOME)</td>
<td>C Hart</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2009-2013: Sixty-five percent of program participants increase their knowledge and understanding of the water cycle and how ecosystem management practices influence watershed processes. (OUTCOME)</td>
<td>C Hart</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results/Narrative

A number of education and outreach events were conducted as both live events (6), webinars (15), and recorded presentations (10) to disseminate information about sustainable natural resource management through new markets for ecosystem services. Resulting gain in knowledge is 89%. Overall satisfaction is 85% or higher. When asked what economic value would they assign to the information they received and knowledge they gained by attending individual programs, the average value was between $25 and $100.

A major challenge for Extension programming has always been to provide timely, accurate and complete technical information to clientele. Because of time constraints, traditional county level educational meetings, tours and field days are able to present only a small percentage of the total information available on any one particular subject. Fortunately, the exponential growth of the internet provides Extension a mechanism for enhanced technology transfer to clientele. One of the major constraints to clientele use of the internet to seek Extension information has been their lack of knowledge of the resources available and where to go to find that information. A majority of the queries to Extension Range Specialists are associated with rangeland weed and brush control. In 2008 the Extension Range Specialists developed a curriculum for CEU training that focused on teaching rangeland herbicide users where to access timely and accurate information on rangeland weed and brush control. The training curriculum included 11 teaching points. A total of 30 counties and 1,604 individuals participated in the CEU training described above, representing over 3 million acres of Texas rangeland. Percent gain in knowledge averaged 90% across the 11 teaching
Participant knowledge of the information available on the Texas Natural Resources Web site (118%), Texas AgriLife Bookstore (122%), the publication Weed and Brush Control – Suggestions for Rangeland (104%), the Goldmine website (132%), Brush Sculptors (102%) and the PestMan web site (125%). When participants were asked if the information they received from the training would help them make better decisions selecting and using herbicides on rangeland, 99% responded YES.

Brush Busters is a trademarked program first developed by Extension Range Specialists in 1995. The program was designed to expedite the adoption of effective individual plant treatment technology for control of brush on Texas rangelands. Other program objectives were to educate clientele on safe and effective herbicide use and to define application rates for different brush species. Since 1995 Brush Busters has been recognized for program excellence by the Society for Range Management (2001), Texas Natural Resources Conservation Commission (2000), Progressive Farmer Magazine (2000), Texas AgriLife Extension (1999), and the Texas A&M University Vice Chancellors Office (1997). A major program emphasis for Extension Range Specialists in 2009 is to renew brand recognition of Brush Busters with Texas rangeland owners and managers. Beginning in January 2009 through August 2009, Extension Range Specialists conducted 20 hour-long Brush Busters training sessions throughout Texas. A total of 1101 individuals participated, representing 2.9 million acres of rangeland. Percent gain in knowledge ranged from 38% to 71% for the 11 individual teaching points, averaging 52% across all teaching points. When participants were asked if the information they received from the training would help them make better decisions selecting and using herbicides on rangeland, 99% responded YES.

Managing livestock grazing can impact grazingland health, animal performance and economic stability. Many ranchers lack the basic information on background, implementation and monitors of grazing strategies and tactics. A statewide initiative in managing livestock grazing on Texas grazing lands was developed by Texas AgriLife Extension and Natural Resource Conservation Service - grazingland Conservation Initiative in 2008. This initiative was implemented in 2009. A manual was developed and published by Grazingland Stewardship in March 2009. In late 2008, 5 workshops were conducted across the state. Additionally, in 2009, two more workshops were conducted. Over 500 manuals have been sold. Over 574 persons attended the 7 workshops representing ranches averaging 6000 acres (over 100,000 to 10 acres) with herd size averaging 400 head. Attendees reported an increase of about 45% in their knowledge of grazing and management skills. Feedback indicated a need for additional workshops. The highest gain in knowledge (55%) concerned the concept of grazeable acres. One hundred percent said they would use the materials to make better decisions. Ninety-five percent said they will benefit economically from this program.

One-half day range health workshops for ranchers and regional biologists were conducted in Coleman, Concho, Shackelford, Gillespie and Ector Counties. Over 185 total ranchers attended these trainings.

The number of new landowners managing small acreages continues to grow in Texas. Many of these new land managers are at least one generation removed from those who grew up on the land and as a result, lack the natural resource management experience of their ancestors. These land managers need management skills, ecological understanding and knowledge about the impact of decision making toward the production of clean air and water, healthy wildlife, sustaining a healthy range ecosystem and livestock enterprises. Texas AgriLife Extension Service professionals are well positioned to teach the ecological principles and management skills needed to maintain the health of Texas’ air, waters, and the vitality of range ecosystems, native wildlife, and domestic animal enterprises.

For Travis and Hays Counties, the Range 101, 201, 301 and 401 series training classes have been directed to educate rangeland managers and owners of small to medium size land holdings about goals of landownership, planning, ecology, making correct decisions, monitoring and management practices directed at improving forage production, promoting a healthy rangeland landscape and productive wildlife populations. To advance the training curriculum and achieve these educational goals, Range 401 was introduced for the first time in 2008 with a program conducted on October 18th. The program demonstrated how prescribed burning can be used to enhance rangeland water quality and water quantity. A total of 31 landowners and managers participated in the event. A retrospective post evaluation was administered to participants with a total of 24 evaluation instruments received. Participants had an average gain in perceptual knowledge of 70.18% across 8 topic areas evaluated. The greatest gain in knowledge by participants came under the topic “Understanding the Laws, Rules and Regulations Pertaining to the use of Prescribed Burning” with a perceptual knowledge gain of 131.58%, indicating that many small to mid-size acreage owners are not aware of the laws governing the management of the land with prescribed burning as a tool. Participants owned or operated a total of 7,453 acres.

October 1, educational presentations and field exercises were conducted for Travis County Range 301. Thirty-six landowners participated in this event. A retrospective post-pre evaluation conducted for this event showed an average increase of 67% in understanding for the 4 teaching areas measured with a range of 57 to 76%. One-hundred percent of the field day participants completed the evaluation. One-hundred percent of participants indicated that the information presented during the field day would help them make better management decisions. An estimated 9,300 acres was represented by the landowners participating in this event.

A Range 101 Workshop was conducted on April 16. Twenty landowners participated in this event. A retrospective-post evaluation was conducted for this event. Seventeen of the participants returned the evaluation. Average increase in understanding across the 12 teaching points evaluated was 67% with a range of 43 to 88%. Twelve of the 17 participants returning the evaluation indicated that what they had learned would help them make better land management decisions. A Range 201 Workshop was conducted on May 28. Thirty-four landowners attended this event. A retrospective-post evaluation was conducted for this event. Thirty-one workshop participants returned the evaluation. Average increase in understanding across the seven workshop topics was 57% with a range of 46 to 88%. Twenty-six of the 31 participants returning the evaluation indicated that what they had learned would help them make better land management decisions. Twenty-eight of 29 (97%) participants indicated that they intended to conduct brush management on their property. Eight of 28 (28%) of participants indicated that they intended to convert native grassland to non-native pastures. Thirteen of 28 (46%) of participants indicated that...
they planned to convert non-native pastures to native grassland.

The revision of B-6074, Juniper Biology and Management in Texas was completed in April, 2009. This revision included results of juniper rainfall interception studies conducted across 10 locations in the Edwards Plateau from Uvalde County to Hays County. Study results featured in this revision included estimated average ashe juniper canopy interception which was 40% of annual rainfall and estimates of rainfall loss with various levels of juniper canopy cover which averaged 342,000 gallons (almost 1 acre foot) of water per acre with a 100 percent cover. This juniper interception information was also presented at the 2009 Sutton County Ranchers Roundup.

The Pecos Basin Assessment Project completed the Assessment Phase of the project in FY 2009. Comments pertaining to the “Federal Consistency Review” were received from the EPA, resulting in the need for edits to the Watershed Protection Plan (WPP) for the Pecos River in Texas. Upon approval of the final version of the WPP by the EPA, the document was reformatted and printed for distribution throughout the watershed. This was one of the first completed Watershed Protection Plans in Texas. The Implementation Phase will be initiated in the fall of 2009, beginning with a round of public meetings held in the Pecos Basin to discuss future project activities with landowners. During this phase, TWRI will assume project coordination duties and we will provide subject matter support. Ten counties are supported by this project.

The Pecos Basin Assessment Project completed the Assessment Phase of the project in FY 2009. Comments pertaining to the “Federal Consistency Review” were received from the EPA, resulting in the need for edits to the Watershed Protection Plan (WPP) for the Pecos River in Texas. Upon approval of the final version of the WPP by the EPA, the document was reformatted and printed for distribution throughout the watershed. This was one of the first completed Watershed Protection Plans in Texas. The Implementation Phase will be initiated in the fall of 2009, beginning with a round of public meetings held in the Pecos Basin to discuss future project activities with landowners. During this phase, TWRI will assume project coordination duties and we will provide subject matter support. Ten counties are supported by this project.

The Cowhouse Creek CEAP Project began its first year of activities in FY 2009. Project personnel toured Fort Hood in Coryell County to view rangeland conservation techniques being used on the base and to plan a field tour for landowners. A public meeting/field tour was held in Gatesville to introduce stakeholders from Coryell, Hamilton, and Bell Counties to the project and allow them to view conservation measures being utilized at Fort Hood. The majority of Extension activities will occur in the third year of the project.

County level workshops continue to be conducted around the theme of watershed management. ESSM faculty conducted field exercises with 33 youth from around the state to collect streamflow and channel morphology data at the 55th Annual Youth Range Workshop, Junction Texas. The same techniques were shared with youth participants at the 2009 State Water Camp in Monahans, Texas (21 youth). A detailed discussion of: 1. Historical rainfall characteristics from 5 stations in the region and the relevance to 2. Brush control for water yield was presented at the Val Verde County Rangeland Management Workshop (24 participants).

The Water for Texans Reading the Landscape Outdoor Training was conducted at the ESSM Range Area for 4 volunteer groups with 112 participants of the Texas Master Gardener and Texas Master Naturalist programs and one landowner group in Travis County. Participants represented Fayette, Colorado, Washington, Austin, Travis, Caldwell, Burnet, Milam and Walker Counties (9 counties). The outdoor training provided greater understanding for volunteers on the water cycle, rainfall and vegetative cover, rainfall evaporation, rainfall infiltration, runoff, soils and erosion. A post retrospective evaluation was used to determine the perceptual knowledge gained by volunteers participating in this 3 hour training. Across the 5 programs and 10 subject matter areas, volunteers and landowners had an average perceptual knowledge gain of 59.7%. 100% of volunteers stated that they felt what they had learned in the training provided them with the ability to analyze land situations and make better land management decisions.

At the 2009 Youth Range Workshop, a total of 34 4-H and FFA youth were provided hands-on training on the water cycle. Teaching areas or topics for this 2 hour training covered rainfall interception, influence of plant cover on rainfall infiltration, plant transpiration, rainfall runoff and soil characteristics affecting the fate of rainfall. The youth participants represented 30 Texas counties. Youth participants visited the ESSM Water for Texans Watershed Catchment demonstration located at the Kerr Wildlife Management Area in Kerr County.
Goal 2: Support county Extension agents

**Benchmark:** Over 200 County Extension Agents were trained on ecosystem management in 2007

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
</table>
| Assist county Extension agents with applied research demonstrations, program development, educational events, and professional development to support improved rural and urban ecosystem management. | 2009-2013: Install and evaluate 30 new method and/or result demonstrations each year. (OUTPUT)  
2009-2013: Assist 75 County Extension Agents with County or Multi-County Extension meetings. (OUTPUT)  
2009-2013: Conduct 3 County Extension Agent training programs each year. (OUTPUT) | C. Hart  
D Appel  
C. Hart | | YES |

**Results/Narrative**

Support of County Programs continues to be a priority within the Ecosystem Science and Management Extension Program Unit. Result demonstrations are one way to effectively transfer new technologies to Extension clientele. During FY 2009, the ESSM Unit supported County level programming with 330 result demonstrations established in 124 counties across the state. Demonstrations were established in the areas of watershed management, weed and brush control, rangeland health and monitoring and grazing management.

Ecosystem Science and Management Extension personnel continue to provide quality program support to Counties through traditional Extension programming efforts. Most of these programs were multi-county based program efforts that supported a larger County level program plan. During FY 2009, the ESSM Unit made 147 presentations supporting 334 Counties in Texas. These meetings resulted in an excess of 7,782 direct contacts with clientele through support to the County offices.

County Extension Agents are expected by their constituency to have knowledge, understanding, and experience about renewable natural resource (RNR) issues throughout Texas. The Natural Resources Leadership Course provides agents with practical, hands-on experiential exploration of RNR issues throughout many regions of Texas. On October 14 -16, 2008 the ESSM Extension Unit hosted the first session of the 2008-2010 NRLC in East Texas. Seventeen CEAs were introduced to East Texas Pineywoods ecosystems; to the renewable resource values they provide to the local economy and to sustainability challenges. The overall satisfaction of the event was positive (87.5% rated it “Good” to “Excellent”). Most participants (87.5%) indicated that the class did significantly improve their understanding of the major topics discussed. A second course was held in April, 2009 in the Central Texas region, with participation from Extension Range Specialists. Agent participants of this training indicated an overall rating of the program as good or excellent.

The West Region (Districts 6, 7 & 10) has experienced a significant influx of new County Extension Agents in the past few years. Most of these agents have little training or experience in rangeland management, although they are serving in counties that are dominated by rangeland. Two days of rangeland management training were offered to West Region County Extension Agents. The training was coordinated by Extension Range Specialists in cooperation with Texas AgriLife Research personnel and conducted at the Sonora Experiment Station. The training focused on rangeland watershed management, livestock grazing management, prescribed fire and rangeland weed and brush control with herbicides. Twenty-seven County Extension Agents from the West Region participated. Sixty-three percent of those participating had less than 5 years of experience with Extension. Ninety-five percent of the agents rated the value and effectiveness of the training as “Beneficial” or “Very Beneficial” (30% - Beneficial and 65% - Very Beneficial). When averaged across the 9 teaching points, percent knowledge gained averaged 64%. Percent knowledge gained for specific teaching points ranged from 27% (Rangeland Watershed Management) to 135% (CEA involvement in prescribed burning).

Using a powerpoint presentation and evaluation instrument developed by the ESSM Program Unit, three separate CEA training workshops were held during November of 2008, one in each of the three Extension Districts of the North Region. The training was designed to make attendees aware of and demonstrate how to access various web sites that have information and/or links to information on rangeland resource management. The evaluation was designed to measure changes in level of understanding for each of the various topics covered. A total of 26 agents from 24 counties of the North Region participated in one of the workshops. There were 25 of 26 participants that completed the evaluation instrument for a response rate of 96%. All respondents (100%) indicated that the information received would enable them to make better decisions. In ten of eleven questions (topics) covered in the evaluation instrument, there was an overall increase in understanding of 45 %.
**Goal 3:** Provide alternative training opportunities through online, web-based modules to better meet clientele education needs

**Benchmark:** Data is currently being collected to determine the number of user's on the website.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand the use of information technology to effectively communicate relevant and timely information to County Extension Agents, producers, associated agribusiness professionals, community planners, and the general public.</td>
<td>2010 – 2014: Maintain and update 2 websites with new information that improve our ability to meet clientele needs and increase real web hits by 15%. (OUTPUT)</td>
<td>C. Hart</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>2009 – 2009: Two new online training courses will be established and evaluated annually. (OUTPUT)</td>
<td>C. Hart</td>
<td></td>
<td>NO</td>
</tr>
</tbody>
</table>

**Results/Narrative**

There are two websites, the ESSM Extension homepage (essmextension.tamu.edu) and the TexNat Server (texnat.tamu.edu), hosted by the unit. The ESSM Extension homepage underwent a major re-design during the 2008 fiscal year. During fiscal year 2009 our goal was to increase the number of unique hosts and page visits for this site. During that time, we also changed our statistical software from AWStats to Google Analytics. All pages linked to the site were properly coded and tracking began in earnest. Over the past year, we have increased the number of unique hosts per month by approximately 130% (from 793 to 1837). The number of page visits per month has increased approximately 400% (from 3276 to 17423). The TexNat site is hosted from the Texas AgriLife Research and Extension Center in San Angelo. It has an average of approximately 1000 page views per month. The number of unique hosts has remained steady around 60 per month. During fiscal year 2010 the site will be re-designed and tracked using Google Analytics with the goal of increasing hits.

A third site, CFEgroup (http://cfegroup.org) is also being redesigned to provide continuing education credits to natural resource professionals. Fiscal year 2010 will see the completion and launch of the site.

Rangeland Ecology and Management 101 is an online professional development course for County AgriLife Extension agents. The course provides an overview of various rangelands management topics including weed and brush management, drought management, and grazing animal management. The course was completed and the evaluation process was started. The course is scheduled for a full release to all county agents in late 2009-early 2010.

During fiscal year 2009, we began the process of re-designing our continuing education site, cfegroup.org. Previously developed courses are being transferred to the new site and the site will be debuted in late 2009. We captured the Trees & Utilities National Conference 2009 which was hosted by the National Arbor Day Foundation and the Grazing Management and Brush Busters Workshops from the Beef Cattle Shortcourse. These presentations will be developed into modules and hosted on the new CFEgroup site, posted on our YouTube site and burned to an educational DVD.

A unique partnership was created between AgriLife Extension forestry program, North Carolina Cooperative Extension forestry program and Southern Region Extension Forestry to develop and implement the Forestry and Natural Resources Webinar Series (forestrywebinars.net). The webinar is delivered over the Internet via a synchronized learning management system, where educators can create and hold continuing education activities that are collaborative and interactive, allowing full participation between the audience and the presenter. Webinars area a powerful tool for meeting the demands of continuing education requirements. Results from FY 09 include 20 webinars with 1026 attendees. On a scale of 0 to 4 with 4 being the highest quality, viewers rated the webinars an average of 3.41 and showed an average of 89% in increased knowledge about the subject matter being presented.
Agriculture – Natural Resources and the Environment

**Imperative 4:** Advance the planning and management of natural resource-based recreation opportunities in Texas.

**Statement of Support:** As the population of Texas increases and our parks, forests and open spaces experience more outdoor activity, resource management agencies will need to plan ahead for sustained use for future generations.

### Summary of Educational Contacts for Imperative 4

<table>
<thead>
<tr>
<th>Educational Sessions</th>
<th>Group Contacts</th>
<th>Contact Hours</th>
<th>Other Direct Contacts</th>
<th>Total Direct Contacts</th>
</tr>
</thead>
</table>

**Goal 1:** Assist natural resource managers in their efforts to understand recreation demand.

**Benchmark:** Data is being collected for recreation participation. A total of four fact sheets were developed.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Translate science-based relevant information into educational resources including fact sheets, pod casts, and web resources</td>
<td>2009–2013: Work with collaborators to increase educational contact hours by 5% yearly (OUTPUT/OUTCOME)</td>
<td>JR Walker, L Hodges, G Ellis, S Shafer, D Scott</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>2010: Develop web resources and create baseline use measures (OUTPUT)</td>
<td>JR Walker, S Shafer, D Scott</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2011-2013: Continue to develop web resources and increase educational user sessions by 5% yearly (OUTPUT)</td>
<td>JR Walker, S Shafer, D Scott</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2009-2010: Conduct at least 15 case studies on Green practices utilized by park departments and related entities (OUTPUT)</td>
<td>JR Walker, S Shafer, L Hodges</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2011-2013: Create and conduct a series of podcasts and publications on “the GREEN going GREENER” (parks implementing GREEN initiatives) (OUTPUT)</td>
<td>JR Walker, S Shafer, L Hodges</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Results/Narrative**

In collaboration with TAMU class and TAMU Faculty, 20 case studies on Green practices utilized by park departments and related entities have been conducted. The information will be used to create a series of podcasts and fact sheets.

2009 should provide baseline for future 5% growth in educational contact hours and educational resource distribution. Sessions were presented on Outdoor Recreation Trends, Green Practices in Parks and Park Related Entities, Texas Parks and Wildlife ATV Trail Use; Trail Funding and Planning; Guadalupe Blanco River Authority. Published Fact Sheet on Outdoor Recreation Trends in Texas (95 downloads from Ag Comm Library).

Work with TAES and TAMU experts to translate science-based, relevant Recreation and Park related information

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work with TAES and TAMU faculty and NPS/Amtrak Rails to Trails Program to develop educational materials and content for NPS/Amtrak Rails and Trails interpretive programs</td>
<td>2009–2013: Work with TAMU faculty and NPS/Amtrak Rails to Trails Program to develop educational materials and content for NPS/Amtrak Rails and Trails interpretive programs (OUTPUT)</td>
<td>JR Walker, S Scott</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Results/Narrative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Issue:</strong> Need to develop policy that will enhance safety, help maintain property values and provide enhanced public access lake based recreation. <strong>Outreach:</strong> In collaboration with TAMU Faculty work with the Guadalupe Blanco River Authority was initiated starting in June 2009. Two scoping meetings with the GBRA’s citizen steering committee (representatives of local lakeshore property and homeowner associations) and one meeting with over 130 interested citizens have provided input to this project. <strong>Output:</strong> The project will result in educational resources that will help the GBRA and local citizens understand how to move forward with developing needed polices.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Issue:</strong> Assist Texas Parks and Wildlife in examining the possibility of introducing all terrain vehicle (ATV) recreation in one or more state parks. <strong>Outreach:</strong> This project involved working with managers on-site at four state park units to inventory and analyze the potential for the development of ATV trail systems. <strong>Outcome:</strong> The policy decision that TPWD makes based on this work has implications for economic development in around these state parks through new development that would support the activity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conducted a needs assessment of national and Texas websites that provide socioeconomic, demographic, and recreation data to the public.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presented a program to the Texas Recreation and Park Society Board of Directors meeting on outdoor recreation trends in Texas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Agriculture – Natural Resources and the Environment

Imperative 5: Bioenergy – Texas agricultural producers increase their understanding about issues related to biofuels and how they could produce biofuel feedstocks.

Statement of Support: Increases in demand and cost of gasoline, has generated a great deal of interest in investigating energy alternatives.

Summary of Educational Contacts for Imperative 5

<table>
<thead>
<tr>
<th>Educational Sessions</th>
<th>Group Contacts</th>
<th>Contact Hours</th>
<th>Other Direct Contacts</th>
<th>Total Direct Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>274</td>
<td>961</td>
<td>4,079</td>
<td>4,353</td>
</tr>
</tbody>
</table>

Goal 1: Educate agriculture producers regarding biofuel feedstock opportunities to meet the demand of Texas the bioenergy industry.

Benchmark: No 2007 data was provided for benchmark development. This is a new goal for Agriculture – Natural Resources

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Timeline/Measure(s)</th>
<th>Oversight</th>
<th>Comments/Notes</th>
<th>Measure Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop educational programs to educate producers and the agricultural industry on efficient production of biofuel feedstocks to meet the demand of Texas the bioenergy industry.</td>
<td>2009–2013: Producers increase their knowledge of bioenergy and biofuel crops and cropping systems by 10% annually. <em>(OUTCOME)</em></td>
<td>T. Miller</td>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>

Results/Narrative

There remains a lot of media play and information on oil-seed crops and the economic potential. However, much of this information is not relevant to Texas farms and can be misleading to clientele. Three Oil-seed Workshops that were conducted at Corpus Christi, Plainview, and Wichita Falls to provide producers, crop consultants, and agency employees with the information necessary (risk management, economics, and production information) to make decisions on selecting, growing, and marketing oil-seed crops. The oil-seed workshops were fully funded by a Southern Regional Risk Management Education grant. Average knowledge gain across all topics was a 61% increase. The economic impact of the workshop is difficult to quantify because we were only providing information to the clientele so that they could make an educated decision on producing and marketing oil-seed crops and mitigate risks associated with their farming operation.