

**Texas A&M AgriLife
Texas Water Resources Institute**

**Arroyo Colorado Watershed Protection Plan Implementation
FY 07 CWA 319(h)
TCEQ Agreement No. 582-7-77045**

Quarter no. 5 From 3/01/08 Through 05/31/08

I. Abstract

The Arroyo Colorado Watershed Partnership is continually learning about the growing pains and processes of becoming a sustainable and successful watershed partnership. However, with each lesson, the partnership moves forward. Wetland development, a top priority in the WPP, will be included in proposals submitted during the next quarter. Also, additional water quality monitoring stations, another priority outlined in the WPP, were identified and adopted by various agencies this past quarter. Two accomplishments of the WPP! Another great success is the four-county soil testing program conducted since 2002 in Cameron, Hidalgo, Starr and Willacy Counties. Projected fertilizer savings based on soil test were an estimated 3.3 million lbs of nitrogen and 3.8 million lbs of phosphorus; the reduced nutrient loading represents a reduced threat for potential impacts to surface and ground water resources. Results also indicate that producers could potentially save from \$7.50 to \$27.20/acre by utilizing soil test results. The physical watershed model continues to be demonstrated at several events with a combined total attendance of over 2,070 – what great exposure!

II. Overall Progress and Results by Task

TASK 1: Project Administration

Subtask 1.1: Project Oversight – TWRI will provide technical and fiscal oversight to ensure Tasks and Deliverables are acceptable and completed as scheduled and within budget.

The following actions have been completed during this reporting period:

- a. TWRI has provided guidance and assistance to Watershed Coordinator in developing meeting agendas, summaries, an agency resolution, and facilitation of various meetings.
- b. TWRI provided TCEQ with a schedule of deliverables to track project activities and contract status. The schedule is included in Appendix A.

55% Complete

Subtask 1.2: Quarterly Progress Reports (QPRs) – TWRI, with the assistance of the Arroyo Colorado Watershed Coordinator (ACWC) and Arroyo Colorado Grant Writer/Water Quality Analyst (ACGC), will submit QPRs to TCEQ by the 15th of the month following each state fiscal quarter for incorporation into the Grant Reporting and Tracking System (GRTS). The Reports will include:

- *status of deliverables for each Objective and Task*

- *narrative description of activities for each task outlined in this Scope of Work in Progress Report format*

The following actions have been completed during this reporting period:

- a. Submitted Year 2, Quarter 1 Report on June 16, 2008.

55% Complete

Subtask 1.3: Quarterly TTVN or Teleconference – To facilitate good communication between project participants, a quarterly TTVN (Trans-Texas Videoconference Network) or teleconference will be scheduled and hosted by TWRI.

The following actions have been completed during this reporting period:

- a. TWRI and Watershed Coordinator and Grant Writer(s) maintain regular communication on a weekly basis.
- b. TWRI conducted a site visit in March to the watershed.
- c. TWRI conducted a site visit in April and while in the area, attended an IBWC clean rivers program, the habitat workgroup and the Steering committee meetings.

55% Complete

Subtask 1.4: Arroyo Colorado Website – TWRI will maintain and improve the Arroyo Colorado website.

The following actions have been completed during this reporting period:

- a. The Web site continues to receive updates. Total unique hits for this quarter include the following: March (316); April (429); and May (398). More indicative of site value is the percentage of viewers who add the site as a bookmark (favorite). Currently 45 of the 253 or 17.7% of the viewers added the project site as a favorite.
- b. TWRI added news items to the Website including the fish advisory (last quarter) and the press release on the physical watershed model being demonstrated at the International Museum of Arts and Science.
- c. TWRI is still working on creating a database link on the Web site per task 5 of this project. More information on the development of the database is listed under task 5.

55% Complete

Subtask 1.5: Reimbursement Forms – Texas Cooperative Extension will submit reimbursement forms by the last day of the month following each state fiscal quarter

The following actions have been completed during this reporting period:

- a. An invoice was submitted to TCEQ for \$31,130.31 covering all expenses from December 1, 2007 through February 29, 2008.
- b. Total invoiced expenditures to date: \$85,793.27 or 28% of total project budget.

28% Complete

Subtask 1.6: Final Report – TWRI, with assistance of the ACGC and ACWC, will provide TCEQ and EPA with a comprehensive report on the activities and success of the WPP conducted during

the course of this project. An assessment of data collection and analysis efforts conducted under Task 5 of this scope of work will also be included in the final report.

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% Complete

TASK 2: Steering Committee and Work Group Facilitation

Subtask 2.1: Facilitate and Coordinate Meetings – The ACWC will facilitate the Arroyo Colorado Watershed Steering Committee and Work Group meetings by working with the chairman and work group leaders. Specifically, the ACWC will be responsible for:

- *Developing agendas, arranging meeting facilities and sending E-mail notices for Quarterly Steering Committee meetings*
- *Assisting all individual work groups with facility arrangements, developing and distributing agendas, and developing meeting summaries as requested by the Work Group Leaders; Work Group meetings will be held as needed, but, at least, semi-annually*
- *Providing information requested by work group leaders prior to and following work group meetings*
- *Attending all individual work group meetings*
- *Compiling and submitting all individual work group meeting agendas and meeting summaries to the TWRI project manager (these will be attached to QPRs and submitted to the TCEQ contract manager and posted on the webpage)*
- *Coordinating efforts of the individual work groups and the Watershed Steering Committee to facilitate the integration of the different components of the Watershed Protection Plan implemented by each workgroup*
- *Updating all Steering Committee meeting participants on the progress of individual workgroups (and/or arranging for individual workgroup leaders to provide these updates) and of the overall implementation of the Watershed Protection Plan*
- *Facilitating a forum for open discussion among Steering Committee meeting participants and interested parties attending the meetings*
- *Arranging presentations by guest speakers offering useful information to Steering Committee participants*
- *Preparing and disseminating summaries of Watershed Steering Committee meetings to all participants*

The following actions have been completed during this reporting period:

- a. Developed agenda, arranged meeting facilities and sent E-mail notices for a quarterly SC meeting held on April 24, 2008.
- b. Updated Partnership on overall implementation of the ACWPP at SC meeting.
- c. Arranged for 1 guest speaker to present information about bacteria water quality issues (Roger Miranda).
- d. Assisted in arranging and facilitating three work group meetings:
 - Water Quality Monitoring held on April 9, 2008.
 - O&E meetings held April 15, 2008.

- Habitat meeting held April 24, 2008
- e. Participated in special meeting of the Agriculture Issues Workgroup Leaders and select workgroup members to discuss the status of the cost-share program, its future and the BMPs eligible for the cost-share program.
- f. All meeting summaries for SC and workgroup meetings are included in Appendix B. All summaries were posted to the Project website.
- g. Attended all workgroup meetings, provided information requested by work group leaders and conducted follow-up activities as noted in the meeting summaries.
- h. Met with SC members Ken Jones and Jim Tabak continuing discussions on long-term sustainability of the ACW Partnership.

55% Complete

Subtask 2.2: Provide Bi-Monthly Updates – The ACWC will provide e-mail updates to TWRI, TCEQ and the Arroyo Colorado Watershed Partnership on progress made in implementation of the ACWPP at least twice monthly.

The following actions have been completed during this reporting period:

- a. Bi-monthly updates were distributed to the Arroyo Colorado Watershed Partnership members via the Arroyo Colorado listserv on March 12 and 31, 2008; April 17, 2008; and May 1, 20 and 31, 2008. Copies of updates are provided in Appendix C.

55% Complete

Subtask 2.3: Provide Membership Lists – The ACWC will provide TWRI updated lists of the Steering Committee and their contact information for posting on the project website.

The following actions have been completed during this reporting period:

- a. The latest membership list has over 715 individuals with several new members just added with the latest release of the AC newsletter.
- b. The Steering Committee Membership list posted on the Web site was updated to reflect the new member, Jim Tabak, from the Valley Land Fund.
- c. The work group member has been updated to better reflect participation and interest. The new lists will be distributed to the work groups for finalization. Lists currently listed on Project Web site will be corrected.

90% Complete

Subtask 2.4: Engage Stakeholders – The ACWC will encourage participation and involvement of key stakeholders in the implementation of the WPP.

The ACWC conducted the following actions during this reporting period:

- a. March 5, 2008, met with Hidalgo County Judge, J. D. Salinas to discuss implementation of the ACWPP.
- b. March 17, 2008, met with Roxanne De La Garza, Hidalgo County as follow-up with Judge Salinas. Conducted site visit to Arroyo Colorado trail project in “Mission Inlet”.
- c. April 3, 2008, met with Eddie Lucio, III to brief on implementation of the ACWPP. .

- d. April 16, 2008, attended the Region M Planning meeting.
- e. April 16, 2008, participated in the RGV Water Committee meeting and the USIBWC Citizen Forum meeting. Met with influential stakeholders including Godfrey Garza, Roel Rodriguez, Wayne Halbert, Met and brief Patrick J. Daize, the new IBWC manager of the Mercedes Field Office replacing Rick Reyes.
- f. April 22, 2008, met with SC member, Alan Johnson. Discussed permitting of aeration/weir structures and 100 ac potential wetland site.
- g. April 22, 2008, met with Chris Maley to discuss the radio airing of AC PSAs on community radio station KMBH. .
- h. April 30, 2008, introduced Miguel Flores and Paula Flores to representatives of local NGOs in relation to potential Border 2012 projects. .
- i. May 9, 2008, participated in the Riparian Network meeting with the Nueces River Authority.
- j. May 16, 2008, Participated in the LRGV TPDES Storm Water.

55% Complete

TASK 3: Facilitate Watershed Protection Plan Implementation

Subtask 3.1: Facilitate and Coordinate Implementation of Education and Outreach Measures as Outlined in ACWPP

The ACWC conducted the following actions during this reporting period:

- a. Arranged and facilitated one O&E work group meetings on April 15, 2008.
- b. Finalized and posted on the project website the demonstration script for the physical watershed model.
- c. March 31, 2008, trained four IMAS educators on the demonstration of the watershed model.
- d. The physical watershed model was demonstrated at the following events:
 - Rio Grande Valley Livestock Show in Mercedes March 8-10, 2008 (approximately 850 individuals viewed the model).
 - The Edinburg Coastal Expo on April 13-14, 2008
 - Vela Middle School 5th and 6th grade classes of Ms. Vela (approximately 130 students participated).
 - The McAllen IMAS Earth Day event on April 20, 2008 (approximately 299 people attended).
 - The Gorgas Science Club Earth Day event on April 24, 2008 (approximately 109 individuals attended the full day event).
 - McAllen Goes Green event on April 25, 2008 (approximately 450 people attended).
 - Port Isabel Sea Life Center the month of May 9, 16, 20 and 23, 2008 (approximately 235 local area students).
- e. TWRI developed a press release regarding the demonstration of the physical watershed model at IMAS. The release was published in the McAllen Monitor on April 20, 2008.
- f. April 11, 2008, participated in Reynosa Water Day. Presented the implementation of the ACWPP.

- g. Presented the implementation of the ACWPP at a soil scientist meeting coordinated by Texas Agrilife Research.
- h. Met with Nancy Millar, Director of the McAllen Chamber of Commerce to discuss planning of an ecotourism luncheon.
- i. Worked extensively to arrange an outlined plan and obtain quotes to conduct a stormdrain marking campaign in the watershed. Presented the information to the Stormwater Taskforce on May 30. Received feedback on the campaign and additional information was requested. The Partnership will followup with the Outreach and education subcommittee of the stormwater taskforce to further plan the stormdrain marking campaign.
- j. Worked extensively on development of road signage to be displayed at watershed boundaries. Preliminary designs were developed and will be distributed to the Partnership during the next quarter for recommendations.

55% Complete

Subtask 3.2: Facilitate and Coordinate Implementation of Agricultural Pollution Control Measures as Outlined in ACWPP

The following actions have been completed during this reporting period:

- a. Participated in a Sustainable Ag meeting on March 11, 2008.
- b. A special task group of the ag issues workgroup met on May 29, 2008 to discuss limitations on the cost-share program and best management practices currently being funded by NRCS and SWCDs. Recommended practices to be included as priority BMPs was included in the WPP and discussed at this meeting. As a result TSSWCB will develop a list of all practices currently being cost-shared or included in WQMPs for the partnership and County Extension Agents to use in education efforts.
- c. Agricultural education events occur on a regular basis in the watershed as part of the TSSWCB funded project, Education of Agricultural BMPs. As of the last quarter reported (January through March 2008), 232 agricultural producers and more than 800 youths from Cameron, Hidalgo, Willacy and Starr Counties were educated. The total number of participants who have benefited from the Arroyo Colorado Education Program is now 4,780.
- d. The four-county soil testing program, conducted since 2002 in Cameron, Hidalgo, Starr and Willacy Counties, has generated a total of 2,974 samples representing 119,400 acres. Projected fertilizer savings based on soil test were an estimated 3.3 million lbs of nitrogen and 3.8 million lbs of phosphorus compared to rates planned before testing. These reductions in nutrient loading represent a reduced threat for potential impacts to surface and ground water resources. In addition, results indicate that producers could potentially save from \$7.50 to \$27.20/acre by utilizing soil test results, depending on their crop and management history. The total economic impact from the project was estimated at \$1.9 million based on average per pound costs for nitrogen and phosphorus.
- e. In the TSSWCB funded project Arroyo Colorado Agricultural Assessment, the Land Use/Land Cover map was finalized and submitted to the TSSWCB for approval. Impacts of BMPs are also being measured in this project through edge of field

monitoring and drainage ditch sampling that began in March 2008 and continued through this quarter.

55% Complete

Subtask 3.3: Facilitate and Coordinate Implementation of Recommended Measures Described in the Habitat Component of the ACWPP

The following actions have been completed during this reporting period:

- a. Held a Habitat Work Group meeting on April 24, 2008.
- b. Scouted a potential 100 ac regional wetland site on the AC in west Harlingen.
- c. On May 7, 2008, met with Army Corp of Engineers (Lloyd Mullins) to discuss wetland permitting
- d. Attended a wetland conference in Beaumont on May 14-15, 2008. Networked with potential partners.
- e. Arranged a tour to the InVista Wetland in Victoria, TX, for ACWP members (special invitation to all habitat workgroup members) to learn from their experience in the development and management of the 55 acre wetland in the area.

55% Complete

Subtask 3.4: Facilitate and Coordinate Implementation of Wastewater Infrastructure Pollution Control Measures as outlined in the ACWPP.

The following actions have been completed during this reporting period:

- a. Met with Anita Keese, TCEQ Region 15 office, to discuss records of LRGV permitted wastewater treatment facilities.
- b. Met with Darrell Gunn, Director of Harlingen Waterworks, to discuss Harlingen's commitment in the ACWPP.
- c. Conducted a site visit to the Alamo treatment lagoons on April 2, 2008. Discussed potential for a treatment wetland with consultants.
- d. Met with the engineers and consultants on the San Benito wetland project.
- e. Met with LaFeria city representatives and consultants on the LaFeria wetland project.

55% Complete

Subtask 3.5: Semi-annual Newsletter Publication.

The following actions have been completed during this reporting period:

- a. TWRI developed and distributed the spring issue of the Arroyo Colorado Newsletter. More than 700 individuals received the letter.

50% Complete

TASK 4: Resource Identification and Grant Writing

Subtask 4.1: *Track Grants and Assist Partners in Grant Applications – In coordination with TWRI, the Arroyo Colorado Grant Coordinator/Water Quality Analyst (ACGC), with assistance from the ACWC, will: 1) actively seek and pursue funding opportunities for watershed protection*

and restoration projects, 2) track appropriate grants that fund activities outlined in the WPP and assist Arroyo Partners in the grant application process and 3) link appropriate partners and projects.

The following actions have been completed during this reporting period:

- a. Worked with County Extension Agents in Cameron, Hidalgo and Willacy Counties on re-submitting a proposal to the General Land Office for an education program for agricultural producers focusing on proper pesticide application, storage and disposal.
- b. Worked with The Lower Rio Grande Development Council-Council of Governments (LRGVDC-COG) in the development of a proposal for a wetland of approximately 900-acres to reduce pollution flowing into the Lower Laguna Madre from Cameron and Willacy Counties to be submitted to GLO for CIAP funding. Proposal will be reviewed and submitted if possible upon release of the CIAP RFP.
- c. Worked with UT Pan-American on developing a proposal to submit to the NOAA Bay Watershed Education and Training (B-WET) Program. Program proposed to develop and deliver bay-watershed curriculum through workshops for elementary teachers.
- d. Attended a CMP grant workshop on May 21, 2008 in preparation for two wetland grant submittals.
- e. Organized information for 2 pre-proposals to submit to GLO for CMP funding:
 - Construction of a ~15 acre wetland at the Port of Harlingen
 - Construction of a ~5 acre wetland and a dock in Rio Hondo
- f. Maintained and updated information on potential funding opportunities for distribution to work group and steering committee members. Status of current funding opportunities included in Appendix D.

55% Complete

Subtask 4.2: Lead proposal development to request/acquire funding for Implementation of Measures as Outlined in ACWPP. A minimum of 10 grant proposals will be developed during the project period by the ACGC, in cooperation with the ACWC, TWRI, and project partners. Upon completion, the grant proposals will be submitted by either project partners or TWRI/TCE, whichever is most appropriate. Potential proposals may include, but not limited to funding requests to:

- *Implement recommendations of the Outreach and Education Work Group.*
- *Produce an educational video.*
- *Increase wastewater and surface water infrastructure development within cities and public utility systems for colonias.*
- *Design and construct individual and/or regional enhanced biological treatment projects.*
- *Conduct feasibility studies and final engineering designs for development of individual and regional constructed wetland demonstration projects throughout the watershed.*
- *Establish individual and regional constructed wetland projects.*
- *Conduct feasibility studies for modifying the drainage channels to maintain moist soils to sustain wetland plants for treatment of nonpoint source pollution.*

The following actions have been completed during this reporting period:

- a. Re-submitted project proposal at the request of the General Land Office::
 - *Pesticide Education in the Coastal Zone of the Arroyo Colorado Watershed*, \$84,032. A collaborative effort between TWRI, ACW Partnership and Texas AgriLife Extension.
- b. Submitted project proposal to NOAA for B-WET funding:
 - *Arroyo Colorado BWET: Watershed Teacher Education and Training Program*. \$392,370. A collaborative effort between UT Pan-American Coastal Studies Laboratory (lead), NOAA Sea Grant Floating Classroom, Arroyo Colorado Partnership, Region One Educational Service Center, and Harlingen CISD.
- a. Proposal workplans for these 2 submitted proposals are included in Appendix E.

55% Complete

TASK 5: Data Gathering and Analysis to Assess Effects of Water Quality Protection Plan

The ACGC will assemble and maintain a data clearinghouse for all data collected in the Arroyo and from that data, evaluate changes in BOD, TSS, fecal bacteria, and nutrient loading to Segments 2201 and 2202 of the Arroyo Colorado. Data collection will include:

- *Pollutant removal effectiveness of enhanced treatment projects through effectiveness monitoring conducted by participating cities.*
- *Wastewater permit holders self reporting data to better characterize loading of nutrients from WWTPs to the Arroyo Colorado*
- *Data collected through the Arroyo Colorado Agricultural Nonpoint Source Assessment Project'*
- *Texas Clean Rivers Program.*

The following actions have been completed during this reporting period:

- a. April 24, 2008, attended the Clean Rivers Program at IBWC to discuss adding monitoring of additional sites on the Arroyo Colorado. Five new sites will now be monitored **completing all 12 recommended sites outlined in the WPP.**
- b. Continued developing static graphs of data created from TCEQ database. The graphs will include the following key parameters with their respective screening levels:
 - a. Biological Oxygen Demand
 - b. Dissolved Oxygen
 - c. Nitrate + nitrite
 - d. Total P
 - e. Bacteria
 - f. Chlorophyll a
 - g. Total suspended solids
 - h. Total kjeldahl nitrogen
 - i. Nitrogen
 - j. Ammonia-nitrogen
- c. Graphs created using data from eight additional major sites on the Arroyo Colorado
 - a. Station ID: 13079
 - b. Station ID: 13080
 - c. Station ID: 13082
 - d. Station ID: 13084

- e. Station ID: 13086
- f. Station ID: 13559
- g. Station ID: 13782
- h. Station ID: 16445
- d. TWRI web technician created a draft webpage with a map of all the sites. Only one site was linked to its static graphs for trial purposes.
- e. The static graphs, when finalized, will be linked to their respective sites listed on the map displayed on the project website. TWRI will maintain the database site.

30% Complete

III. Related Issues/Current Problems and Favorable or Unusual Developments

- None to report at this time.

IV. Projected Work for Next Quarter

Task 1

- Continue improving Web site including development of database per task 5.
- Assist watershed coordinator with steering committee and workgroup meetings as well as communication and outreach activities.
- Assist grant writers in development of proposals, budgets and coordinating efforts.
- Maintain regular weekly communication with project personnel. Also travel to valley for workgroup and steering committee meetings.
- Submit quarter 6 report on September 15, 2008.

Task 2

- Ten newsletters were returned per the "Change Service Requested" information and the mailing list will be during the next quarter.
- Schedule and facilitate a Steering Committee meeting and three work group meetings (Habitat, Agricultural Issues and Outreach and Education). Draft and distribute agendas and meeting summaries.
- Attend all work group meetings.
- Coordinate work group efforts.
- Arrange for guest speakers at Steering Committee meeting.
- Production and distribution of bi-monthly updates.
- Continue to engage key stakeholders.

Task 3

- Conduct at least 3 presentations on the implementation of the ACWPP.
- Demonstrate the physical Arroyo watershed model.
- Produce at least two press releases.
- Finalize the development of an O&E evaluation instrument.
- Develop an evaluation instrument for distribution to the Arroyo Colorado SC.
- Participate in the LRGV TPDES Storm Water Task Force Meetings.
- Continue participation in the USIBWC Citizen Forum, Region M planning, Rio Grande Regional Water Authority, and the Lower Rio Grande Water Committee meetings.

- Continue work with the MPOs and USFWS in the development of an open areas map that includes sensitive environmental features for natural resource protection in transportation planning.
- Follow-up with at least three (3) cities in regards to commitments in the Pollution Reduction Plan.
- Continue facilitation of work for the development of a regional wetland system.
- Followup with the outreach and education subcommittee of the stormwater taskforce to further plan the stormdrain marking campaign. TWRI prefers a campaign in late summer or early fall.
- Following partnership recommendations, finalize watershed boundary road signage design and locations for placement.
- Conduct tour of InVista Wetland in Victoria, TX, for ACWP members (special invitation to all habitat workgroup members) to learn from their experience in the development and management of the 55 acre wetland in the area.

Task 4

- Complete and prepare for submission the CIAP Proposal.
- Complete and prepare for submission the 2 CMP Pre-proposals.
- Identify additional funding opportunities to pursue.

Task 5

- Finalize data site of static graphs.
- Begin adding other databases including, but not limited to Texas Stream Team data and possibly, TPWD data.

Appendix A**Schedule of Deliverables**

Deliverable	Due Date	Date Submitted	Comments
TASK 1			
Quarterly Progress Reports	7/15/2007	7/16/2007	Submitted via email & posted on Site
	9/15/2007	9/14/2007	Submitted via email & posted on Site
	12/15/2007	12/13/2007	Submitted via email & posted on Site
	3/15/2008	3/13/2008	Submitted via email & posted on Site
	6/15/2008	6/17/2008	Submitted via email & posted on Site
	9/15/2008		
	12/15/2008		
	3/15/2009		
Special release (supplement) to WPP - status of Implementation			Not in contract
Draft Final Report	2/28/2009		
Final Report	3/31/2009		
Quarterly Meetings	Jul-07	7/9/2007	in CS
	Oct-07	9/25/2007	in CS
	Jan-08	1/24/2008	in AC
	Apr-08	3/4/2008 & 4/24/2008	in AC
	Jul-08		
	Oct-08		
	Jan-09		
	Mar-09		
Reimbursement Forms	7/30/2007	6/30/2007	(4/1/07 thru 6/30/07) \$7,734.28
	9/30/2007	8/31/2007	(7/1/07 thru 8/31/07) \$16,426.77
	12/30/2007	11/30/2007	(9/1/07 thru 11/30/07) \$30,501.91
	3/31/2008	2/29/2008	(12/1/07 thru 2/29/08) \$31,130.31
	6/30/2008		
	9/30/2008		
	12/30/2008		

	3/31/2009		
Website Updates	7/15/2007	--	Files were transferred from Sea Grant to TWRI
	9/15/2007	9/1/2007	Web site went online at http://www.arroyocolorado.org
	12/15/2007	12/15/2007	Added projects in the watershed and related information
	3/15/2008	3/15/2008	Added 'About the Watershed' section
	6/15/2008	6/15/2008	Added presentations news items as provided to TWRI
	9/15/2008		
	12/15/2008		
	3/31/2009		
TASK 2			
Quarterly Steering Committee Meetings	7/24/2007	7/24/2007	Minutes submitted in QPR/posted on Web site
	10/25/2007	10/25/2007	Minutes submitted in QPR/posted on Web site
	1/24/2008	1/24/2008	Minutes submitted in QPR/posted on Web site
	4/24/2008	4/24/2008	Minutes submitted in QPR/posted on Web site
	7/24/2008		
	10/23/2008		
	1/22/2009		
Habitat Restoration Workgroup Meeting	7/24/2007	7/24/2007	Minutes submitted in QPR/posted on Web site
	1/24/2008	1/24/2008	Minutes submitted in QPR/posted on Web site
	7/24/2008		
	1/22/2009		
Ag Workgroup Meeting	7/24/2007	7/24/2007	Minutes submitted in QPR/posted on Web site
	1/24/2008	1/24/2008	Minutes submitted in QPR/posted on Web site
	7/24/2008		
	1/22/2009		
Wastewater Infrastructure Workgroup Meeting	9/20/2007	9/20/2007	Minutes submitted in QPR/posted on Web site
	12/17/2007	12/17/2007	Minutes submitted in QPR/posted on Web site
	7/24/2008		
	1/22/2009		
Outreach & Education Workgroup Meeting	7/16/2007	7/16/2007	Minutes submitted in QPR/posted on Web site
	9/11/2007	9/11/2007	Minutes submitted in QPR/posted on Web site; 2 nd meeting 10-16-07
	1/15/2008	1/15/2008	Minutes submitted in QPR/posted on Web site
	4/15/2008	4/15/2008	Minutes submitted in QPR/posted on Web site
	7/15/2008		

	10/14/2008		
	1/13/2009		
Agendas & Summaries submitted with QPRs			Also posted on Web site
Update workgroup & steering committee membership list	Aug-07	9/15/2007	Provided SC opportunities to review information for posting
	Aug-08		
Post workgroup & steering committee membership list on Website	Oct-07	10/8/2007	SC list has email contact info; workgroup lists - no contact info
Bi-monthly email updates			Posted on the Website
TASK 3			
Conduct at least one presentation per month to different targeted audiences	QPRs		
Meet face-to-face with at least 4 community leaders per month to deliver basic facts on the Arroyo Colorado and discuss progress in implementing the ACWPP.	QPRs		
Contingent upon approval by TXDOT, install roadway signage by the end of the two year contract	QPRs		
Have storm drains stenciled in at least six cities and communities within the Arroyo Colorado watershed.	QPRs		
Implementation status of education and outreach measures, agricultural pollution control measures, habitat restoration measures, and wastewater infrastructure pollution control measures.	QPRs		
Media press releases	7/15/2007		
	9/15/2007		
	12/15/2007		
	3/15/2008		
	6/15/2008	4/20/2008	<i>Children celebrate Earth Day at IMAS – McAllen Monitor</i>
	9/15/2008		
	12/15/2008		
	3/15/2009		
Evaluation instrument (survey) for targeted audiences at select events	9/15/2007		
Evaluation instrument (survey) for SC and Partnership	12/15/2007		
Summary of evaluation instrument (survey) results	QPRs		
Semi-Annual Newsletter	Oct-07	10/20/2007	Distributed to over 600 ind (596 direct + 54 hand distribution)

	Apr-08		
	Oct-08		
	Mar-09		
TASK 4			
10 Grant Proposals	QPRs		
Summary table of grant application status	7/15/2007	--	
	9/15/2007	9/15/2007	Submitted with QPR & distributed at SC meeting
	12/15/2007	12/15/2007	Submitted with QPR & distributed at SC meeting
	3/15/2008	3/15/2008	Submitted with QPR & distributed at SC meeting
	6/15/2008	6/15/2008	Submitted with QPR & distributed at SC meeting
	9/15/2008		
	12/15/2008		
	3/15/2009		
TASK 5			
Data summary report	11/30/2007		
	11/30/2008		
Data clearinghouse including monitoring update	7/15/2007		
	9/15/2007		
	12/15/2007		
	3/15/2008		
	6/15/2008		
	9/15/2008		
	12/15/2008		
	3/15/2009		

Appendix B

**Steering Committee and Workgroup (O&E and Habitat)
Meeting Summaries**

Arroyo Colorado Steering Committee/Partnership Meeting

Texas A&M Kingsville, Citrus Center
Rio Red Classroom
312 N. International Blvd, Weslaco, Texas 78596

January 24, 2008

4:30 p.m. - 7:00 p.m.

ATTENDANCE:

- | | |
|------------------------------------|--|
| Enrique Perez – TCE | Ernesto Reyes – USFWS Ecological Service |
| Brad Cowan – TCE | Rocky Freund – NRA |
| Andy Garza – TSSWCB | Brad Lamb – EPA |
| John D. Wallace – USFWS/LANWR | Fred Moore – EPA |
| Jude A. Benavides – UTB/TSC | Neil Haman – HWWS/POH |
| Richard Ister – TDA | Kevin Wagner – TWRI |
| Rick Reyes – IBWC | Cecilia Wagner – TWRI |
| Heather Harris – CH2M Hill | Laura De La Garza – TWRI |
| Tony Reisinger – TX Sea Grant Ext. | Cory Horan – TCEQ |
| Elizabeth Heise – UTB | Kim Jones – TAMUK |
| Abel P. Garza – TAMUK | Martha McClain – City of San Benito |
| Ruben Saldana – TCE | Darla Jones – City of La Feria |
| Jason Pinchback – TSU/RSI | Richard LeFever – City of Mercedes |

MEETING

5:00 Welcome and Introductions Dr. Jude Benavides, Chairman

- Thanks to Harlingen Waterworks System for providing the snacks and refreshments
- Shifting from planning to action
- Special Guests from the EPA Region – Dallas Texas, Brad Lamb – Regional NPS Coordinator and Fred Moore – Extension Service Liaison
- Cory Horan – Project Manager Water Quality Planning also present
- Self introductions made

Steering Committee Member Change Dr. Jude Benavides, Chairman

- Steve Bearden request that Bobby Aguilar replace him on the Steering Committee (to represent sugar cane growers), there were no objects. Bobby now a SC member
- Neil Haman no longer with TWDB but serves locally on two other boards (ask Neil)
- New Direction for Partnership – Plan Implementation rather than planning – new focus on grant writing for funding strategies.

ACWPP Implementation Facilitation/Meeting Schedule.....Kevin Wagner, TWRI

- Lapse between contracts
- Position open for Program Assistant – Megan Meier assisting in mean time.

Quarterly SC meetings to be held on the 4th Thursday of month – Next meeting October 25

Presentation/Wetland StudiesLaura De La Garza introduced City Representatives

- Going through permitting process

- Discussed education and ecotourism possibilities
- Cost of land issues and engineering fees; discussed whether a liner will be needed
- Requested more guidance from TCEQ

Four City Wetland Project..... Martha McClain, City of San Benito
 Darla Jones, City of La Feria
 Richard LeFever, City of Mercedes
 Laura De La Garza for the City of San Juan

Work Group Updates:

Agricultural Issues Andy Garza, TSSWCB
 Kevin Wagner, TWRI

- Development of water quality management plans for thousands of acres
- BMP education and evaluation
- SWAT model simulation
- NPS assessment project

Habitat Issues Dr. Kim Jones, TAMUK
 Tony Reisinger, Texas Sea Grant

- Overview of CMP grants
- Site suitability analysis...need LIDAR data
 - Possible sites include Port of Harlingen oxbow, San Benido wastewater plant, Llano Grande near TPWD property, La Feria sand pit, Goat Island Resaca, shrimp farms

Education and Outreach Laura De La Garza, TWRI

- Physical Model – Acknowledgement of Nueces RA and the Clean Rivers Program for providing \$12,000. Sky Lewey for being project coordinator, and Jude and Anthony Reisinger for providing the engineering. Should be completed by September 15th and housed at UTB.
- On going compost project. Acknowledge Christie Jo Lugo-Waldron and the City of Weslaco for project management. Will highlight project at one of the future meetings.
- CMP Grants and Don Hockaday taking lead on NSF grant
- Texas Watch’s work in the Valley – Jason Pinchback and Eric Mendelman
 - September 22, 2007 event

Other Work Groups Laura De La Garza, TWRI

- Will be scheduling a WWI Work Group meeting for end of August
- Need a new WG leader – Roger on other projects – Asking for nominations
- Four Cities wetland project – read and distribute write-up from Arthur Talley
- Acknowledge TCEQ and EPA for work and funding
- Rocky Freund, Nueces RA said that in regards to instream monitoring of the Arroyo Colorado, she has been working with the TCEQ Region 15 to establish five additional sites. Jude said that UTB could help in the sampling.
- TMDL work continues?
- Jason Pinchback presented Texas Watch Activities

6:40 Discuss/Prioritize Future Funding Needs and Sources Cecilia Wagner, TWRI

- Regional Wetland development a priority need – CIAP maybe a source, need at least \$12M
- Review some of the grants available
- Work groups to focus on developing Scopes of Work – SC approval for drafting letters of support (LOS). Additional individual LOS may be asked of SC members
- Expressed need to maybe look for private funding sources

6:50 Direction of Partnership/Other Business Dr. Jude Benavides, Chairman

- Long-term sustainability. Laura tasked with looking at local NOG umbrella, other possibilities like the Coastal Bend Bays and Estuary Program.

- IBWC meeting
- Cameron County resolution supporting ACWPP
- Ask SC of input.

7:00 Adjourn..... Dr. Jude Benavides, Chairman

**Arroyo Colorado Outreach and Education Workgroup
January 15, 2008
Meeting Summary**

Attendees

Amy Rangel, TWRI
 Laura de la Garza, TWRI
 Briana Carlson, TPWD
 Elizabeth Heise, UTB
 Sky Lewey, NRA

Cecilia Wagner, TWRI
 Jennifer Buratti, TCEQ
 Megan Meier, TWRI
 Don Hockaday, UTPA

Welcome and Introductions..... Laura De La Garza, TWRI

Arroyo Colorado Outreach Activities:

Past Events and Lessons Learned..... Laura De La Garza, TWRI
 Amy Rangel, TWRI

- Demonstrated model at several events
 - Winter wildlife expo, Harlingen Ocelot Festival, Rio Grand Valley Livestock Show, Edinburg Coastal expo, local schools, etc.
- Demonstrations have revealed a pervasive lack of knowledge of where water comes from and where it goes; suggestion to have full time O&E person
- Laura has trained Amy, people at IMAS, teachers, etc. on using the model
- Amy expressed the need to cater the script or modify it to work with little kids (had problems with running around, spraying each other). Need something to grab attention.
 - Sky Lewey suggested for little kids to have them feel the model and how it feels lumpy; ground/surface of the earth/watershed is not flat
- Model script is posted on the website now
- WPP includes reviewing science textbooks and providing inserts/supplements that are watershed/regional specific

Upcoming Events Laura De La Garza, TWRI

- Model at IMAS for Earth Day April 20
- Rio Fest April 17
- Earth Fest, Brownsville April 19
- Hummingbird Days, McAllen April 19
- McAllen Goes Green April 26
- Teacher training event with UTB July 2

O&E Project Updates:

Texas Stream Team Jason Pinchback, Texas River Institute

- 41 contacts/people have been trained
- Received funding from EPA for volunteer monitoring, education and coordinating in the Arroyo and requesting \$30k from another grant
- Working with UTPA teacher workshops
- 3 watershed education presentations
- 4 established monitoring sites and goal is to have 10
- Laura will work with volunteer monitors more; ask Master Naturalists for more volunteers

O & E Evaluation Form..... Cecilia Wagner, TWRI

- Met with Evaluation office at TAMU to further develop O&E draft from January

- Will vary depending on what the presentation is on
- Committed to doing at least one presentation a month; at meetings such as IBWC, Master Naturalist, Rotary Clubs, etc. and at Valley Nature Center
- Cecilia will make the form more specific and then re-send to group for comments
- Questions like “where does your water come from”, “where does it flow to”
- Laura’s presentations focus more on awareness than specifics
- Sky Lewey came across an evaluation tool created by the Meadows Foundation

Curriculum Development Laura De La Garza, TWRI

- Birdie (McAllen Recycling Center) introduced Laura to UTPA folks about curriculum testing using the computers at IMAS for testing the water quality monitoring part of the curriculum. Many computer not working well but have funding to purchase new equipment

NOAA B-WET Grant Development Don Hockaday, UTPA
Amy Rangel, TWRI

- Related to curriculum development
- Program for elementary teachers (2-5 grades) to teach teachers about wetlands and the watershed with field trips in the watershed and workshops (South Padre Island new World Birding Center and other Valley nature centers)
- Using SeaGrant’s floating classroom and Arroyo Colorado curriculums in workshops
- \$100,000 match from South Padre Island Economic Development Corporation
- Most of funding used for content development

Project Discussion:

Storm Drain Marking Megan Meier, TWRI

- Someone knows of another area where the vinyl markers faded in 3 yrs even though they had a 10 year warranty; make sure the marker and installation costs are guaranteed for 10 years
- Laura suggested marking drains in the downtown areas or the art districts ore parade routes
- Jennifer at TCEQ suggested to not use the stencil and how nice the metal ones are
- Suggestions for putting markers in areas of high pedestrian traffic, schools, parks

Road Signage – Watershed Boundary Megan Meier, TWRI

- Maybe have contest for designing road signs
- Discussed adding 1 to 2 extra colors, but this will come with a cost
- Discussed adding Spanish to the sign
 - Rectangle with English on one side, Spanish on the other side with logo in the middle
- Cecilia will work on updating design

Upcoming Grants and Potential Projects Cecilia Wagner, TWRI

- NOAA B-WET
- GLO CMP
- South Padre Island (Possibly use SPI funds for printing WPP, fliers, etc.)
- Endangered Species
- Gulf of Mexico Community-based Restoration
- Received funding from EPA-SAI for agricultural education and potential funding for similar project from GLO-CMP

Other Business Laura De La Garza, TWRI

- Habitat workgroup meeting and Steering Committee Meeting on April 24
- Task group/community event for Rio Hondo education center project

Next Meeting Date/Adjourn Laura De La Garza, TWRI

- July 15th
-

Arroyo Colorado Habitat Work Group

January 24, 2008

MEETING SUMMARY

ATTENDEES

Kim Jones, TAMUK
Laura de la Garza, TWRI
Amy Rangel, TWRI
Megan Meier, TWRI
Cecilia Wagner, TWRI
Roger Miranda, TCEQ
Dr. Jose Martin, Universidad Automoma de Tamulipas, Mexico
Dr. Efran, Universidad Automoma de Tamulipas, Mexico
Wayne Bartholomew, Frontier Audobon

Jim Tabak, Valley Land Fund
Hudson Deyoe, UTPA
Paul Duke, UTPA
Jack Wilson, Valley Land Fund
Chris Hatcock, TPWD
Amy Spaulding, Valley Land Fund
Audrey Martin, Valley Land Fund
John Martin, Valley Land Fund
Kendall Keyes, TPWD
Elizabeth Heise, UTB

Welcome and Introductions..... Dr. Kim Jones, TAMUK

Arroyo Colorado Watershed Protection Plan

AC WPP Implementation HighlightsLaura De La Garza and Cecilia Wagner, TWRI

- Ag Assessment sampling has begun
- Received EPA Integrated Farm Education Grant
- Water Quality Monitoring, meeting with Cleans River Program, 7 to 12 sites
- Making progress on making water quality data readily available in form of graphs
- Volunteer monitors collecting data
- Working on storm drain marking and roadway signage
- 4 cities wetland projects progressing
- To develop PSAs to be aired on KMBH 88 FM radio; community spotlight, scripts needed 2-3 weeks in advance

Lower Laguna Madre Sea Grass PresentationDr. Hudson DeYoe, UTPA

- Looking at health of sea grass. Production and biomass dynamics of the sea grass, *Thalassia testudinum*, in the LLM.
- LLM is changing; 4 tropical species of algae now found in the LLM; water temperature is changing; wastewater treatment plant discharge is increasing with the increased urban development on SPI.
- 3 main species of sea grass in LLM
- Quarterly sampling - not looking at distribution but at condition/health at specific sites
- LLM responses to climate change, developmental pressures and passage closure
- Collected baseline information on sea grass (spatial differences and sediment quality)
- Texas Sea Grass Monitoring Plan (need distributional data and performance data)
- AC nutrients can influence water quality (influence variable based on time of year)
- Multi-year water quality data show AC tidal segment is higher than the other locations sampled in average concentration of Chl A, phosphorus and ammonium
- Clear water site (ABC) had the highest shoot density and total biomass, with Green Island (at mouth of AC) having the lowest density and biomass
- Root-shoot ratio highest at clear water ABC site
- Longer leaf lengths mean less light is available; thus clear water site has smaller leaves
- Green Island has light as a limiting factor; less light probably due to high phytoplankton abundance fueled by AC nutrients
- There is a lot of TSS data but there is a need to characterize turbidity

UTPA Graduate Student Paul Duke

- Expressed interest in characterizing Arroyo Colorado water quality
- It was suggested that he do a flow/nutrient water budget on a specific segment of the AC. The stretch between Donna and La Feria was recommended.

- Sampling should be done on a monthly basis to determine baseline steady-state loading; source assessment pilot study

Reynosa’s Canal Rodhe..... Dr. Efrain Jaime Ang, Universidad Automoma de Tamulipas

- Project similar to AC - Many institutions are working on water quality issues in Reynosa
- Reynosa is a dynamic portion of the state of Tamaulipas in Mexico; over ½ million people (based on census but probably closer to 800,000) in city and lots of development is happening in this area; shares border with US in LRGV
- Growth from industry and commercial enterprises; population growth; lack of space and security/crime are threatening quality of life and environment
- Rapid growth with lack of planning has resulted in lack of public infrastructure; need wastewater treatment and water supply; resulting also in health issues
- Recreational and thematic park envisioned along Canal Rodhe; goes through the middle of city. Within 1 km, it affects 60 colonias
- Canal is being looked upon currently as a structural problem rather than a pollution / resource problem. Project trying to generate awareness of function of canal and the opportunity / resources of the waterbody
- In addition to potential ecological benefits, there are potential social benefits
- If attitude towards the waterbody could be changed, then city problems could be resolved
- Envision recreational/family outings resources, educational areas (museums, library,), police/medical kiosks, post office, tourism information; natural areas; and shops/restaurants; would help weave together all the social levels in Mexico and solve city’s infrastructure issues
- Opportunities for scientific investigation: studies of sustainable development, water quality and conservation/quantity, land use impacts on water, water re-use, effects of water regulations, public health initiative (water-borne diseases), local studies can take pressure off of national regulatory agencies, socio-economic studies (social equity)

Project Updates:

Regional Wetland Study..... Dr. Kim Jones, TAMUK

- Rio Hondo Oxbow
- Port of Harlingen Dredge Spoil Site and Upstream Site
- San Benito Wetland Expansion
- 100 acre site off Dilworth Road*New potential site
- Goviata Sandpit in La Feria
- Martin, TAMUK grad student is looking at building a model for wetland systems working with Dr. Benavides, UTB, using LIDAR data.

319 Regional Detention Facility Study Proposal..... Dr. Kim Jones, TAMUK

- Proposes to study and model two existing regional storm water detention facilities in McAllen with the goal of demonstrating their effectiveness; possibly improve their effectiveness; and to share and translate these systems in the AC watershed.
- TAMUK resubmitted proposal to TCEQ. It is currently under review.

Project Discussion:

Natural Area Inventory.....Laura De La Garza, TWRI; Jim Tabak, Valley Land Fund

- Working with VLF and USFWS
- VLF currently working on mapping lands under conservation easements/fee simple
- Jim Tabak stressed importance of providing economic incentives of putting land under conservation easements and the need to educate landowners about these incentives
 - Need to get NRCS information on conservation incentives out to a greater audience
 - Need for list of landowners in the AC watershed (Cecilia said that they were working on it however a change in personal has slowed the process)
 - Laura stressed a need for that information to share with the VLF for targeted outreach

Proposed Rio Hondo Nature Center Laura De La Garza, TWRI

- Did not receive CMP grant, will re-submit, but plan to proceed with conceptual design
- Partner with Valley Proud, City of Rio Hondo, Rio Hondo ISD, TPWD (Sam Patten), USFWS, Cameron County, Native Plant Society, landscape designers Sue Griffin, Billy Snyder, and Mike Heep
- James Matz suggested a 2 hour meeting on a Saturday at a school in Rio Hondo; present a few designs and solicit feedback; June target date

Available Grants/Potential Studies Cecilia Wagner, TWRI

- 2 from USFWS; need to submit to TPWD in May

Other Business Tony Reisinger, Texas Sea Grant

- VLF's interest in taking the lead in appropriate action items listed in of the habitat component of the ACWPP
 - Action items 1 and 2 are most appropriate; potentially Action 10-large scale wetlands
 - Taking the lead in wetland mitigation banking (in-line with Action 10) - construct large off-channel treatment wetlands that treat flows from multiple sources including wastewater treatment facilities and NPS runoff from urban and agricultural areas

Next Meeting Date/Adjourn..... Dr. Kim Jones, TAMUK

- July 24, 2008
- Laura is working on rescheduling the Victoria wetland field trip for mid-June

Appendix C

Bi-Monthly Updates March through May 2008

March 12 and 31; April 17; May 1, 20 and 31

March 12, 2008

Arroyo Partners,

Spring is approaching and things are happening in the Valley. Fields are being planted and irrigated, and with this, researchers and staff from TAMU and TAMUK are gearing up for the Ag Assessment program's first water quality, edge-of-field and drainage ditch sampling event. Again, this is part of the "Arroyo Colorado Agricultural Nonpoint Source Assessment" project.

You can go to our website-projects for the project scope of work.

March began with a visit and field tour from TWRI's upper management. Thanks go out to Dr. Allan Jones and Dr. Bill Harris for providing concentrated time and expertise to this project. They toured the watershed including ongoing agricultural and irrigations projects sites, and a few potential regional wetland sites. Their visit provided an opportunity to brain-storm on potential funding opportunities and to strengthen the partnership through contact with important stakeholders. We have much to follow-up on as a result of their productive visit.

Dr. Jones and Dr. Harris were also here to solicit feedback on the Rio Grande Basin Initiative (RGBI) project as part of an effort to ensure the RGBI is targeting priority issues with appropriately focused programs. To get more information on this ongoing project visit: <http://riogrande.tamu.edu>.

If you did not already know, the Mercedes Livestock Show began last Friday and will continue through Sunday, March 16th. What a great event! We were there with the physical Arroyo Colorado watershed model (model), and once again, it was well received and confirmed that many people here in the LRGV do not know where their water comes from or where it goes. The watershed model is proving a great way to raise awareness of local water quality issues. Thanks to the volunteers who assisted in demonstrating the model!

On a final note, the model is pretty booked for all of April and May, so if you would like to demonstrate it at your place or event, think about booking it early.

More later,

Laura

March 31, 2008

Dear Arroyo Partners!

We just completed the fifth Arroyo Colorado Newsletter. It is at the printers and will be mailed-out next week. If you do not receive our newsletters in the mail and would like to, please send your mailing address to Amy at asrangel@ag.tamu.edu. In the meantime, go to www.arroyocolorado.org to view our latest newsletter that includes workgroup and grant updates, upcoming meetings and events, and reports on select watershed projects.

One upcoming meeting is a Water Quality Monitoring Workgroup meeting scheduled for April 9. We will review all water quality monitoring activities in the watershed and present some of the latest data. The efforts of our Texas Stream Team (formerly Texas Watch) Volunteer Monitors, the Texas Clean Rivers Program, and monitoring associated with agricultural assessment project managed by Texas Water Resource Institute will be highlighted. All interested Partners are invited to attend this meeting and become a member of this workgroup, if you so desire. Attached is the agenda for this meeting.

Mark your calendars for the upcoming April 29 Steering Committee and Partnership meeting, same time and place; 5 pm to 7pm at the Citrus Center. I will send additional information on this meeting in the next update.

In regards to wetlands, a field trip to the Invista (formally DuPont) constructed wetland in Victoria is planned for April 29. It will be an all day event with limited seating available in vans. Please let me know if you are interested in seeing this site. Priority will be given to Wastewater Infrastructure and Habitat Workgroup members. Also see the attached flyer for the conference titled "Constructed Wetlands Today: Advanced Design and Operations" that will be held in Beaumont, Texas on May 14 -15.

Finally, a short course you may be interested in attending is the Texas Watershed Planning Short Course being offered in Bandera, TX on June 2 - 6, 2008. This week-long course will familiarize participants with EPA's nine key elements of a watershed protection plan and the general principles of and tools for: Building Partnerships, Assessing Watersheds, Identifying Solutions, and Designing an Implementation Program. Go to <http://watershedplanning.tamu.edu/> for more information. If you have any questions about the course, please contact Kevin Wagner at (979) 845-2649 or klwagner@ag.tamu.edu. For further information on registration or payment, please contact Ellen Weichert at e-weichert@tamu.edu or (979) 845-8572.

Cheers,

Laura

April 17, 2008

Dear Arroyo Partners,

First of all, next week is the 18th Arroyo Colorado Steering Committee and Partnership meeting! It will be held on April 24 from 5:00 p.m. to 7:00 p.m. in the Rio Red Classroom of the TAMUK Citrus Center, 312 N. International Blvd., Weslaco, Texas. Come early for the 4:30 p.m. social with food and beverages sponsored by the Valley Land Fund. Note that the Habitat Workgroup will meet from 2:00 to 4:00 that afternoon, also in the Rio Red Classroom. Remember these meetings are open to all Partners and the general public.

Attached are the meeting agendas. We have come a long way and continue to make progress in the implementation of the ACW Protection Plan. Recently, we had two very productive work group meetings and have new information to present. Aside from providing workgroup updates, there will be an in-depth review of the bacteria issues associated with the Arroyo Colorado, and a presentation on a new technology for water quality improvements. Most importantly we will be discussing long-term sustainability of our Partnership. A budget will be presented along with options for funding the Partnership and associated projects. Again, the Lower Rio Grande Development Council has been identified as the best local organization to administer our Partnership, as they do for the Rio Grande Regional Water Authority and the Region M Water Planning. We will discuss the option of being our own 501(c) administered by the LRGVDC or the option to operate under a new department within LRGVDC. We look to our Steering Committee for directions on this issue.

In regards to the wetland field trip to Victory, it is rescheduled for the second week in June due to an unexpected schedule conflict of one of the trip leaders. A firm date will be announced the next update. Thank you for your patience regarding this scheduling.

April 22 is Earth Day and there are many events happening throughout the LRGV this weekend and next in celebration of our planet and its natural resources including:

- Earth Fest – April 19, 2008 – Linear Park, Brownsville – Noon – 6 PM
- IMAS Earth Day Celebration – April 20, 2008 – McAllen – 1-5 PM
- Gorgas Science Club Earth Day Celebration – April 24, 2008 – UTB

- *McAllen Goes Green – April 26, 2008 – McAllen Recycling Center*

*Hope to see you at next week's meetings,
Laura*

May 1, 2008

Hola Arroyo Partners!

We had a good turnout of people at the April 24 Steering Committee meeting with special guest from Reynosa and Austin. Thanks to all who attend and the Valley Land Fund for providing the meeting refreshments.

The million dollar question was asked at the meeting; is the quality of water in the Arroyo Colorado improving or getting worse? The Nueces River Authority reported no significant trends (ie. no significant improvement in water quality). Phosphorus, nitrogen compounds, and chlorophyll-A remain elevated; however there appears to be less fecal bacteria in the Arroyo Colorado. Some good news from the meeting: a potential Arroyo Colorado bacteria TMDL has been averted temporarily while the Nueces River Authority conducts a study to better characterize bacteria in the Arroyo Colorado (TCEQ will provide funding for the study).

Another meeting highlight is the success of the Texas AgriLife Extension Soil Testing Campaign. Since 2002, the addition of nitrogen and phosphorus to Valley (Cameron, Hidalgo, Willacy and Starr counties) agricultural fields has been reduced by over 3 million pounds each! This has provided a positive economic impact (between \$7 and \$27 per acre) to producers and translates into nutrient load reductions in the Arroyo Colorado. Another area where load reductions are being realized is from our cities. At least two Valley cities have realized greater load reductions (than committed to in the plan) from wastewater treatment facilities by the nature of reuse. Many Valley cities are using their treated wastewater for irrigation. This is positive in one sense however raises the question of adequate "freshwater" flows to the Lower Laguna Madre. This issue will be discussed in future meetings.

Note, a couple of wetland restoration grants are out for proposals; National Coastal Wetlands Conservation Grant (NCWC) and North American Wetlands Conservation Act (NAWCA) Grant. These grants require restoring sites where wetlands "previously existed". We have a couple of sites in-mind and if you know of any and/or would like to participate as a Partner in this grant opportunity, please let me know. Attached is an updated grants table. Again, we have a grant writing team to assist any community or organization in the drafting of proposals for improving water quality and habitat within the Arroyo Colorado Watershed.

Two final notes; the wetland field trip to Victoria, Texas is rescheduled for Thursday, June 12, 2008 and May 10, 2008 is the 9th Annual Dragonfly Days Event. See the attached press release for more information the Dragonfly Days and be on the lookout for additional information on the wetland fieldtrip.

*Happy May,
Laura*

May 19, 2008

First of all, attached are the meeting summary notes from the April 15 Outreach and Education Workgroup Meeting and the April 24 Steering Committee and Habitat Workgroup meetings. These notes are also posted on the website at <http://www.arroyocolorado.org/Partnership.php>.

And remember, the field trip to the Invista (formally Dupont) constructed wetland site in Victoria, Texas is scheduled for Thursday, June 12, 2008. Please let me know if you are interested in attending this all day event. Priority will be given to Habitat and Wastewater Infrastructure Workgroup members. See the attached pictures for a preview of the water treatment wetland and the on-site outdoor classroom. Additional information will be sent to interested individuals and workgroup members.

Last week I attended the “Constructed Wetlands Today” conference and came back with some insight in regards to creating and maintaining wetlands. The first thing driven home was the multiple layers of value inherent in the development of wetlands. Many already know the value of wetlands for wastewater treatment, habitat, education, and passive recreation, but other values include carbon sequestration, increased property values, and public relations/community marketing. The bottom line is the cumulative community benefits from the overlay of wetland uses and functions.

Constructed wetlands are dynamic robust systems and attention must be paid to every aspect of planning, design, operation and maintenance. There is a lot to wetlands systems and the following are just a few excerpts from my conference notes in regards to lessons learned.

- It takes a team to plan and design a treatment wetland. Important to involve an engineer, biologist and the operator. Most success when operators were involved from the start.
- Operating a wetland is like farming; the operator must be a good observer and sensitive to seasonal changes.
- In the design phase, one must consider hydraulic retention time, minimum area needed to meet treatment objectives, and design equations should be tested against site constraints.
- Sedimentation zones, multiple cells and treatment trains are important to allow for maintenance and/or upsets in a system. Equally important is to be able to control water levels and maintain even flow through the wetlands. Open water zones help in balancing the system and for controlling invasive plants and maintaining diversity.
- The life of a constructed wetland (treatment effectiveness) is 25 to 50 years before rejuvenation is needed. At some point, it will be necessary to remove some vegetation, re-grade and replant.

In regards to wetlands for the Arroyo Colorado watershed, our grant writing team is gearing up for another round of grant submittals to the Coastal Management Program - Cycle 14. Go to <http://www.glo.state.tx.us/coastal/grants/cycle14.html> for more information and please do not hesitate to contact me if you and/or your organization are interested in partnering on a submittal.

On a final note, our local grant writer Amy Rangel, has been accepted into UTPA Physician’s Assistant Program and will be leaving her position as Program Assistant for the Arroyo Colorado effective June 30. Amy has done a fine job for us and she will be missed. The position has been posted and we are looking for applicants and would appreciate your help. If you are interested or you know of someone interested, please pass the word along. To view the posting, go to <http://greatjobs.tamu.edu/>, Notice of Vacancy Number: 03430, Position Title: Program Assistant for the hiring unit: Texas Water Resource Institute.

Laura

May 30, 2008

Hola Arroyo Colorado Partners,

First of all, I want to acknowledge the ongoing work of the LRGV TPDES Stormwater Task Force (Task Force), an important partner in the protection of water quality. As you may know, the Task Force is a voluntary association of 14 Valley cities affected by federal stormwater runoff regulations. With the assistance of TAMU-Kingsville, the Task Force is helping local governments comply with the Phase II stormwater regulations, including the development of individual stormwater management programs (SWMPs). The notices of intent for the SWMPs were submitted this past February and the Task Force is now working on the implementation of the plans. Currently, our Outreach and Education (O&E) workgroup is working with the Task Force on a storm drain marking campaign. We have tentatively decided on metal markers and plan on placing them on a number of storm drain markers this fall. The beauty of working together on this project is the pooling of resources and getting the most for our Partners’ time and money.

Check out the attached document highlighting the 2008 Texas Environmental Excellence Award Winners. Of the 11 awards given, three of them are for work in the Lower Rio Grande Valley! Congratulations to the City of McAllen Recycling center, Texas Water Resource Institute, and the Bahia Grande Restoration Partnership. I also want to acknowledge the Nueces River Authority for their award in the realm of environmental education. Their watershed model is the centerpiece of their O&E program and we are fortunate to be working and learning from them.

There are several important upcoming events:

- *June 25, 2008, TxDOT Workshop on Context Sensitive Solutions (transportation and regional planning). See the attached flyer.*
- *June 27, 2008, The Texas Chapter American Planning Association in cooperation with the Texas Association of Regional Councils is sponsoring a planning workshop. Session topics include: the importance of planning, roles and responsibilities of a Planning Commissioner, a comprehensive plan that works, planning in communities with limited staff, and tools to implement planning. Contact Xavier Cervantes, City of McAllen, at (956) 681-1263, xcervantes@mcallen.net for more information.*
- *July 14-17, 2008, 10th Annual EPA Region 6 MS4 Operators Conference to be held in Waco, Texas. For more information contact branch.terry@epa.gov, (214) 665-6667.*

And finally, another reminder for the upcoming wetland field trip to see the Invista treatment wetland on June 12, 2008. Please let me know if you would like to join us on the all day trip.

Laura

Appendix D

Status of Funding Opportunities for the Arroyo Colorado

Grant Title	Due Date	Purpose	Funding Agency	Amount	Partnership Status	Grant Status
State Wildlife Grant Program	3/1/08	Must be tied to Texas Wildlife Action Plan	TPWD	Unspecified	Not applicable	
Five Star Restoration Grant	3/1/08	Habitat restoration	NFWF	\$5,000-20,000; \$13,000 average	Will apply Feb 2009 after funding received to perform regional wetland site suitability analysis	
Gulf of Mexico Alliance Regional Partnership	3/15/08	To improve health of Gulf of Mexico by addressing: improved water quality and public health, priority coastal habitat protection/recovery, more effective coastal envt. education, strategic nutrient reductions	EPA	\$13,000-\$330,000		
Pesticide Environmental Stewardship Program (PESP)	3/17/08	Proposed projects should address implementation of IPM approaches that reduce the risks associated with pesticide use in an agricultural or non-agricultural setting and demonstrate the importance and relevancy of the project to the goals of PESP	EPA	\$50,500 per project (2 per EPA region)		
Pollution Prevention Information Network (PPIN)	3/17/08	1) Make specific technical assistance available to businesses seeking information about source reduction opportunities;(2) Target assistance to businesses for whom lack of information is an impediment to source reduction. (3) Provide training in source reduction techniques.	EPA	up to \$300,000 per year		
Migratory Bird Joint Ventures - Gulf Coast Joint Venture	4/13/08	Conservation of bird habitats through biological planning, implementation of habitat conservation actions, focused monitoring and evaluation of planning/implementation processes , and communication/outreach	USFWS	Unknown		
NOAA Bay Watershed Education and Training (B-WET) Program	4/18/08	promotes locally relevant, experiential learning in the K-12 environment. Provide meaningful watershed educational experiences for students, related professional development for teachers, and supporta regional education/enviro priorities	NOAA	not to exceed \$300K for a 3 year project (up to \$100k/yr)	UT-Pan American (Hockaday) submitted proposal in cooperation with ACWP	
General Land Office Special Request for Pesticide Education Proposal	4/22/08	Additional funds were allocated to coastal NPS and GLO contacted TWRI to re-submit the Pesticide Education Program proposal submitted to the CMP program in Oct 2007.	GLO	\$42,000	Submitted edited proposal to conduct pesticide education/outreach for agriculture community	
Assessment and Watershed Protection Program Grants	4/22/08	Build the capacity of watershed stakeholders to develop and implement effective, comprehensive programs for watershed protection, restoration, and management.	EPA	\$30K to \$180K	Does not fit goal of the WPP	

(AWPPGs)						
Region 6 Wetland Program Development Grants	4/28/08	Restore, protect and increase wetlands	EPA	\$250,000 max; \$25,000 min	Attempted to draft proposals for Port of Harlingen site - no interest from science community	
Integrated Research, Education, & Extension Competitive Grants - Natl Integrated Water Qual Prog	4/29/08	Environmental restoration; nutrient and pesticide management; pollution assessment and prevention; watershed management; MUST address water quality issues in agricultural, rural, and urbanizing watersheds	USDA-CSREES	\$60k to \$220k	Worked with John De Graca (TAMUK) – proposal fell through	
Kodak American Greenways Awards Program	6/15/08	to stimulate the planning and design of greenways in communities throughout America for activities such as mapping, ecological assessments, surveying, conferences, and design activities; and other creative projects		\$2500 max	Working with Eric Ellman (Los Caminos Del Rio) on bike trails or other enhancement	
Coastal Management Program	6/25/08 (pre-proposal)	Habitat restoration, protection, and enhancement; land acquisition; water quality improvement; research; education	Texas GLO	\$200,000 for small scale; \$800,000 for large scale; \$60,000 average	Working on 2 pre-proposals for wetland development at Port of Harlingen and Rio Hondo	
National Coastal Wetlands Conservation Grant Program	6/27/08	Acquire, restore, and enhance wetlands in coastal states	USFWS	\$1,000,000 max	Will apply June 2009 after funding received to perform regional wetland site suitability analysis	
Water Environment Research Foundation	7/2008	Advance science and technology addressing water quality issues: wastewater treatment, watershed management, and water quality	WERF	Unknown	Not applicable at this time	
NAWCA US Standard Grants	7/2008	Acquisition, establishment, enhancement and restoration of wetlands and wetland-associated uplands	USFWS	\$1,000,000 max; \$75,000 min	Will apply July 2009 after funding received to perform regional wetland site suitability analysis	
Fish America Foundation's Funding Conservation	7/2008	Habitat Improvement; stream atabilization; aeration systems; fishing reeves; silt removal; litter pick-ups; heavy equipment usage; vegetation planting	Fish America	\$7,500 average		
Coastal Impact Assistance Program - County	7/11/08	Habitat restoration; planning and administrative costs; conservation management plans	GLO	Unspecified	Adolph Thomae Park improvements; Regional wetland Suitability study; Additonal Rio Hondo activities to support CMP application	
Coastal Impact Assistance Program - State	7/31/08	Adolph Thomae Park improvements; Regional wetland Suitability study; Additonal Rio Hondo activities to support CMP application	GLO	Unspecified	Adolph Thomae Park improvements; Regional wetland Suitability study;	

					Additional Rio Hondo activities to support CMP application	
Outdoor Recreation Grants	7/31/08	Acquire and develop parkland or to renovate existing public recreation areas.	TPWD	\$500,000 max		
Indoor Recreation Facility Grants	7/31/08	to construct recreation centers, community centers, nature centers, and other facilities (buildings)	TPWD	\$750,000		
National Wetland Program Development Grants	8/2008	Support and/or build any aspect of a comprehensive wetlands program; Address 1 or more of the 4 National Priority Areas: regulation; monitoring and assessment; restoration; and water quality standards	EPA	\$120,000 max; \$25,000 min	Not applicable because required submission by a non-profit organization	
Estuary Habitat Restoration Program	8/2008	Restoration and creation of estuary habitat; includes creation of riparian buffer zone in estuary	USACE	\$1,000,000 max; \$100,000 min		
Endangered Species Grant Program	8/2008	Species and habitat conservation on non-federal land; includes habitat restoration, public education and outreach, land acquisition, and research/surveys	USFWS	Varies; typically between \$1,000 and \$24,000,000		
Gulf of Mexico Community-Based Restoration Partnership	8/2008	Coastal habitat restoration, creation or enhancement with community involvement; public education	GCRP	\$20,000-\$50,000		

Appendix E

Project Proposal (scope of work) Submitted

Pesticide Education in the Coastal Zone of the Arroyo Colorado Watershed

Arroyo Colorado BWET: Watershed Teacher Education and Training Program

Pesticide Education in the Coastal Zone of the Arroyo Colorado Watershed

Funds Requested	\$ <u>42,000</u>
Local Match Contributed	\$ <u>42,032</u>
Total Project Cost	\$ <u>84,032</u>

Background and Problem Statement

The Arroyo Colorado is an ancient channel of the Rio Grande River that extends eastward for about 90 miles from near the City of Mission through southern Hidalgo County to the City of Harlingen in Cameron County, eventually discharging into the Laguna Madre near the Cameron-Willacy County line. The tidal segment of the Arroyo Colorado, as classified by the Texas Commission on Environmental Quality, is between the confluence with Laguna Madre in Cameron/Willacy County to a point 100 meters (110 yards) downstream of Cemetery Road south of Port Harlingen in Cameron County. This part of the river is also defined as a coastal natural resource area (CNRA) and a coastal wetland in the Coastal Coordination Act.

Water quality monitoring over the past decade has confirmed low oxygen levels, as well as escalated ammonia and nitrate concentrations, that have contributed to multiple fish kills in the tidal segment. These sub-optimal aquatic conditions resulted in this portion of the Arroyo Colorado being placed on the 303(d) list for high aquatic life use impairment in 2002. Numerous urban sources, such as point source wastewater discharges, have contributed to this impairment; however, according to the Arroyo Colorado Watershed Protection Plan, nonpoint source agricultural runoff accounts for much of the water quality issues in the tidal segment.

These coastal issues and other water quality issues in the watershed have been addressed by the more than 500-member Arroyo Colorado Watershed Partnership in the Arroyo Colorado Water Protection Plan (ACWPP). That plan identifies needs specific to water quality protection and improvement for the agricultural community. Therefore, Texas Water Resources Institute (TWRI) proposes to work through the Texas AgriLife Extension Service (Extension) to implement an integrated pest management program focused on pesticide education for Cameron County to address these water quality issues related to agricultural production in the tidal segment of the Arroyo Colorado.

This education plan will help fulfill two of the goals of the Texas Coastal Management Program. First, agricultural producers in Cameron County will be educated on water quality issues and how the proper application of pesticides meets current laws and regulations and can improve the water quality and fish community in the Arroyo CNRA. Second, utilization of proper pesticide application practices by producers will reduce the potential for nonpoint source pollution, which will improve the water quality in the Arroyo CNRA and enhance the ability of this area to continue to support valuable aquatic life and meet water quality goals outlined in the ACWPP.

Project Objective and Tasks

The overall objective of this project is to implement components of an integrated pest management program to educate agricultural producers about laws and regulations and on how to better manage their land through safe use of crop protection chemicals and in doing so, reduce the potential for nonpoint source pollution. Extension will utilize its already developed resources

and delivery system to enhance their programs and educate producers on pesticide laws, use regulations, and management and application techniques. The Pesticide Applicator Safety Training and Continuing Education program will address the following topics: principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, and calibration.

TWRI and Extension will host educational meetings and produce educational materials for producers on the importance of proper pesticide application and use of integrated pest management practices to protect water quality in Cameron County as they implement the Arroyo Colorado Watershed Protection Plan. Funds to support the development and delivery of the educational programs will be provided by the EPA Strategic Agricultural Initiative Program. In addition, the EPA program will cover the delivery of an IPM and Best Management Practice (BMP) Newsletter and a fact sheet directed at implementing BMPs for proper natural resources management. TWRI and Extension will document project participation at all events and meetings. Programs will have pre and post assessment surveys where knowledge gained can be gauged. Follow-up surveys will be used to quantify implementation of BMPs. Overall success will be measured by the number of individual producers the project reaches and estimates of BMP implementation.

Under this program, TWRI and Extension will supplement the educational trainings and field days with outreach materials that address specific practices to reduce the potential for nonpoint source pollution from pesticides, nutrients, irrigation and sediment. These materials will encourage the adoption and implementation of proper integrated pest management practices. For example, signs will be distributed to growers to use on-farm to designate areas of pesticide mixing, clean-out and the proper disposal of used pesticide containers. Additionally, growers can participate in soil-testing campaigns to encourage proper nutrient applications. Finally, fact sheets will be produced that can be used outside of the Arroyo Colorado Watershed to address water quality issues in other coastal areas impacted by agricultural nonpoint source pollution.

Arroyo Colorado BWET: Watershed Teacher Education and Training Program

Project summary

* Organization title: The University of Texas-Pan American Coastal Studies Laboratory

* Summary of work to be performed: We propose to develop a sustainable, interdisciplinary elementary school teacher professional development workshop series on the Arroyo Colorado watershed – Lower Laguna Madre system. We will also develop an associated guide for educational field-trips at a bay-wetland nature center. The program combines resources of a university, two school districts and a regional education center, a NOAA Sea Grant marine education program, a watershed program, and ecotourism interests. It will serve a predominately Hispanic community, and is designed to continue after program end.

* Primary objectives:

- Year 1: Program development. Conduct three workshops (72 teachers). Participate in 70 field trips (70 teachers; 1,500 students)
- Years 2 & 3: Improve programs. Conduct three workshops each year (144 teachers). Participate in 150 field-trips (140 teachers; 3,000 students). Classroom observations and teacher support at schools.

* Budget Information:

- Total Federal funding requested this fiscal year: \$100,000
- Cost-sharing--non-Federal: \$100,000 cash (over 3 years). FY 08-09 = \$31,290
- Total project cost this fiscal year: \$131,290
- Cost per student and/or teacher FY 08-09: Program teachers -- \$1,823/ea. (direct teacher support = \$435/ea.); other teachers and students on field trips cost are negligible additions.

Project Narrative

The four southernmost counties in Texas comprise the **Lower Rio Grande Valley** (Valley). The Valley borders the Rio Grande and Mexico on its south and west; the Lower Laguna Madre, Padre Island, and the Gulf of Mexico on its east; and sparsely populated rangeland on its north. The Valley has an irrigated agriculture (cotton, sorghum, vegetables, citrus, and sugar cane) based economy. The tourism and retirement industries are rapidly growing in importance. The climate is semi-tropical and semi-arid with a negative annual water balance. Precipitation (26"/yr.) is sporadic. The population, municipalities, and irrigated crops are 100% dependent on the Rio Grande for water. Competing water allocations upstream have reduced available flow.

The Lower Laguna Madre (LLM) is a shallow, hypersaline, barrier island lagoon exchanging with the Gulf of Mexico at the southern tip of South Padre Island and bisected by the Gulf Intracoastal Waterway (GICWW). It has the best developed seagrass community and the highest finfish production in Texas. It is an important nursery for many Gulf species, including commercially important species. Its only perennial fresh water inflow is the **Arroyo Colorado** (Arroyo). The Arroyo is a ninety-mile long abandoned distributary of the river, draining 706 sq. mi. of watershed. Eighteen major wastewater plants discharge into the Arroyo. The Arroyo is also supplied with storm water runoff and irrigation return flow, including fugitive fertilizer. The Arroyo is channelized for barge navigation between the GICWW and the Port of Harlingen,

contributing to development of a saltwater wedge. Organic and inorganic pollutants, bacteria, and the saltwater wedge contribute to the tidal portion of the Arroyo's 303(d) listing for dissolved oxygen and bacteria, and threaten the rich seagrass ecosystem of the LLM.

The program developed by this project targets professional development for teachers of **school districts** in Cameron and Hidalgo counties. The Arroyo passes through both counties, and most school field trips to South Padre Island are sponsored by their schools. The student population of these counties is 292,835 students, 96.4% of whom are Hispanic and 85.8% of whom are economically disadvantaged. This project is developed for teachers of 2nd through 5th grades. There are 81,366 students and about 3,800 teachers in this grade range in the two counties. For program development, we chose two school districts as participants. Harlingen CISD (a program partner) is a large district bisected by the Arroyo. Port Isabel (Point Isabel ISD, a program partner) has a smaller student population and extensive bay and Gulf shorelines on the mainland and Padre Island. Both schools have student socioeconomic profiles representative of the Valley at large. Program partners' interest in the program and their contributions to it are more fully developed in their attached letters.

The Arroyo Colorado Partnership (a program partner) seeks to reduce eutrophying pollutant load and restore natural habitat to meet state-designated uses. Education and outreach are essential to the objectives of the goals. A teaching guide, "Arroyo Colorado Curriculum," is under review for publication. It is a collection of water-related modules from other curricula used with permission and keyed to state standards. It has been field tested in area schools, but has not been evaluated. The **NOAA Texas Sea Grant** "Floating Classroom" program (a program partner) includes a collection of internally-developed, water-related classroom modules keyed to state standards and a student field experience aboard the R/V Karma. Its program supports teacher training, but lacks formal teacher workshops. Evaluation revealed significant increases in 5th grade state science scores at participating schools of the Texas coastal bend. It has not been used in the Valley. The program partnership will select modules from these and from among several other curricula with watershed-related lessons (e.g. *Project Wet Discover a Watershed*, *WOW – Wonders of Wetlands*, *Project Wild – Aquatic*, and *Save San Francisco Bay*). Selection will be for the development of an integrated, interdisciplinary series of activities supporting state standards of knowledge and skills, not simply a group of modules all keyed to state standards. We will consider specific items of the state essential knowledge and skills sets determined to require extra attention in our educational region.

The **South Padre Island Nature Center** is one of nine components of the World Birding Center, and is the only coastal component. This \$6 million, 30-acre birding and nature center includes a 10,000 sq. ft. visitor center with auditorium, exhibit hall, and gift shop; bird and butterfly brushy habitat; and 5,000 linear feet of elevated boardwalks over cattail marsh and bay shore. A conservative projection is 75,000 to 150,000 annual visitors and an economic contribution to the Town of South Padre Island between \$13.7 and \$27.5 million annually. It opens in November 2008. Boardwalks and walkways surround a municipal sewer treatment plant that feeds treated effluent through the marsh before draining to the lagoon. Thus, it is a perfect outdoor classroom for interpreting human and natural influences on wetlands and estuarine environments, plus it has supporting infrastructure for training and outreach. Timing also is perfect. The Center has yet to begin outlining its education and interpretation program, its docent-training program, or its K-12 field trip program.

The goals of this program are summarized as:

- Develop an effective, cost-efficient, sustainable teacher professional development workshop series in ecology, geography, and social sciences of bay watersheds focusing on the Arroyo Colorado – Lower Laguna Madre System.
- Design the workshop products for elementary teachers. Products will be transferable or extractable for GR 6-16 teachers and classes and for informal education opportunities.
- Teach and evaluate ten elementary teacher workshops for program development and to directly serve 200 to 230 teachers and ten to twelve school administrators.
- Develop and improve through evaluation one or more field trip guides for school field trips.
- Coordinate with the South Padre Island Nature Center and the Arroyo Colorado Partnership for bay-watershed-related informal education program development.

Ms. Gayle Robinson (**Educator**) is charged with most day-to-day operations. Program costs for salary, benefits, and indirect costs for the PI (Nevarez), other CSL staff time, and staff time for partner organizations are waved or disallowed, as are their in-kind matching values. The South Padre Island Economic Development Corporation contributes \$100,000 cash match to the project to help assure ecological accuracy, authenticity and relevance in the Center's education and outreach programs and for helping develop a teacher workshop program at the Center. Our program supports NOAA and Gulf of Mexico Alliance (Alliance) educational goals and interprets inland population influences on watersheds and estuaries. We propose an elementary-teacher bay-watershed workshop series. Texas elementary teachers all have college degrees, but few have science degrees. We will design most program presentation materials with segments at a comprehension level suitable for use in grade 9-16 classes, for docent training, for ecotourism provider workshops, and for the public.

With professional scientific and design assistance, staff will carefully design, evaluate and modify the teacher workshop program to achieve long-term sustainability past program end. A goal is to reduce the time necessary for direct professional participation in future teacher workshop programs. The Educator will train Center staff, docents, and volunteers to conduct most of the workshop sessions and field trip activities. At program end, the workshop series should be cost-effective by lessened reliance on professional participants. Further, the Nature Center can package work-pleasure vacations for out of area teachers, expanding the program's impact state wide.

The program will include field experiences: 1) a bus trip to informative sites in the Arroyo above-tidal watershed, 2) a boat trip in the Arroyo tidal portion and the bay, and 3) Nature Center-based on-site activities including wastewater treatment plant tour. It will include hands-on activities transferable by teachers to their classrooms. Periods are devoted to inquiry-based learning and challenges, expansion of presented materials, and discussions of applicability to classroom realities and state standard knowledge and skills. The program will produce ten to twelve carefully crafted, 15 to 20-minute presentations and evaluate them in thin slices for clarity, learning efficiency, and timing. Front-end research will help develop specific content to be created by contracted faculty members at area universities. Content will be adapted through formative evaluation and audience questions and comments. Presentations will teach facts and concepts appropriate for elementary teachers with non-science degrees. Staff will develop presentations to be transferable in whole or part to 9-16 classes and for general consumption. They will interpret the Arroyo watershed and important national and global watersheds. Content will include geography, descriptive ecology, historical and cultural relevance, economic and

political importance, local and global weather and climate, and items related to the arts and literature when applicable. We will attempt to include at least some non-science content in each presentation to maintain relevance, especially for those with a low interest in science. On the last day of the series, based on knowledge gained and experiences of earlier days, the presentations will incorporate some higher-level concepts and systems ecology. These might include interactions of energy flow and nutrient cycling, homeostatic balances and resilience, development of the Gulf of Mexico dead zone, global climate and climate-change concepts. These slightly more advanced presentations will function to build appreciation, awareness, attitude, and enthusiasm among participants for teaching about bay-watersheds and for teaching science. Teacher attitude and enthusiasm for subjects has been shown to strongly influence student learning. Presentation construction will allow cut-and-paste transfer for topic-specific presentations in grades 2-16 courses, including social science courses.

Each workshop series will be a 4-1/2 consecutive-day (24 contact hour) summer program. Teachers will receive stipends and, at program end, all the necessary classroom materials for transfer of hand-on activities to their classes, to help assure the program will ultimately benefit the students. The first day, Monday, will be in the familiar environment of a school classroom. Presentations will include watershed and Arroyo watershed overviews; Arroyo Partnership structure and activities; and important global watersheds and their places in history, culture, and modern global politics and economy. Hands-on activities will include an introduction to the Texas Stream Team (previously, Texas Watch) volunteer water chemistry and bacteria monitoring program. About 40% of its monitoring groups are teachers and their students. The program will use Stream Team chemistry and microbiology analysis kits each program day. Tuesday will be a field experience with experiential learning activities on a school bus to interpret Arroyo watershed infrastructure, landscape, and realities. Stops will follow water movement through a part of the watershed beginning at a pumping and meter calibration station. Stops will interpret the water transport system, irrigation system, a storage reservoir, a water treatment plant, drainage system, a wastewater treatment plant, and a treated effluent discharge into the Arroyo from a drain in a city park. The trip will include storm-water management and on-farm best-management-practice sites. Bus time will take opportunity advantage for experiential learning challenge questions, pre- and post-stop interpretation and discussions, and focus activities. Wednesday will be at the Nature Center. It will begin with a brief introduction to the center followed by allowing teachers self-guided exploration. Daily activities will alternate presentations and hands-on activities including Floating Classroom modules and box lunch in bird blinds. On Thursday, the group will split for half-day boat tours of the Arroyo tidal segment, Port of Harlingen, and nearby Laguna Madre. Activities will include water sampling and bird identification. Other on-board activities will reflect those of the bus trip. Friday will again use the Nature Center for additional presentations, other hands-on activities suitable for transfer to the classroom, and box lunch at a nearby beach pavilion. Early afternoon's activities at the Center will follow water a second time from Nature Center restroom through wastewater treatment and marsh to the bay with new perspectives based on facts and concepts learned and for reinforcement. The program will close with 'lessons learned' discussion, post-test, graduation, and distribution of classroom materials.

During the first program year, the Educator will outline a tentative elementary school educational field trip guide. Teachers and students on Nature Center field trips provide evaluation opportunity, and program participants will discuss results during workshops. No direct program funding is requested to support the field trips. The program will improve the field

trip guide by evaluation and workshop discussions. It will be available on the Center web site and announced by Region One education resource center.

We will conduct three workshops in each of three program summers plus one Saturday workshop series in Year-Three. Workshops will serve 24 participants each. We expect 215 completions. Workshops will be open to 2nd – 5th grade teachers to assure vertical alignment and to encourage cross-content instruction for all disciplines. Selection will be weighted toward 5th grade teachers for evaluation purposes. Elementary student state science tests are given only at the 5th and 8th grade levels. Staff will recruit some elementary school administrator participants related to the state Professional Development and Appraisal System (PDAS). Staff will also recruit some middle school science teachers for upstream vertical alignment. For evaluation purposes, the Educator will select teachers from campuses with different Texas Education Agency accountability ratings. The program will be accredited by the State Board of Education and Certification (SBEC). Teachers will receive 24 SBEC certification hours upon completion of the program.

Organization: The University of Texas-Pan American (UTPA) is a comprehensive regional university with an enrollment of 17,435. It has 55 undergraduate, 53 master's, and two doctorate programs. The enrollment is 86.3% Hispanic (95% total minority). The college of education offers six undergraduate, six Master's, and one doctoral program. The UTPA Coastal Studies Laboratory (CSL) is a marine field station on South Padre Island, 72 miles from the main campus in Edinburg. It supports university education, coastal research, and public education. Research programs focus on aircraft remote sensing, seagrass and dune systems ecology, and estuarine sediments. Research programs directly related to Arroyo eutrophying influences on the LLM have been continuous for the last seven years with participation of UTPA biology, chemistry, microbiology, and remote sensing faculty and students. The CSL has hosted public school students on field trips through its display area for the 34 years since establishment. For the last two years it has lead the marine unit of the UTPA Gear-Up public school program. Dr. Nevarez holds a doctorate degree in science education. He managed annual budgets up to \$380 million and a workforce of 1,400 faculty and staff members during 23 years as UTPA president before stepping down to lead the CSL as Director. Ms. Robinson (Educator) is a certified and experienced elementary school teacher with university teaching experience. She conducted the marine unit of a recent UTPA Gear-Up program. Our program capitalizes on the experience, expertise and resources of partner organizations: NOAA Sea Grant Floating Classroom, Arroyo Colorado Partnership, Region One Educational Service Center, and Harlingen CISD. Dr. James Telese (Evaluator) is experienced in K-12 STEM program evaluation. The **start date** is assumed to be any time in the Fall of 2008, but additional flexibility is built into program planning.

Outreach to other teachers will include presentations at the Rio Grande Valley Science [teachers] Association conferences. The Association has sponsored annual conferences for twenty years and attracts several hundred K-12 teachers annually. The program will have a booth and posters each year during Hispanic Science Engineering and Technology (HESTEC) week and will present results at program end. HESTEC is organized by UTPA in conjunction with the office of Congressman Rubén Hinojosa's office. In 2007, 85,000 students, teachers and parents attended and four US congress people participated in roundtable discussions. We will encourage participants to provide in-service presentations at their schools for both outreach and evaluation functions. After each workshop, the Educator will send participants digital images and short mp3 videos taken during their workshop week, and allow them to select slides, images, and video clips from presentations. Follow-up examination of their products will reveal characteristics of

the program judged important to the participants, and the participants' perceptions of items important to other teachers.

No **other government financial assistance** or other sources of funding has been sought for this program. The program is based at the SPI Nature Center, which will not open until the fall of 2008.

Expected benefits and results of this program include direct impact on 230 school teachers and ten elementary school administrators, although not every one is expected to complete the entire series. Teachers will receive hand-on classroom materials and audiovisual products to assure the program ultimately benefits the students. For this objective and for evaluation, we will conduct classroom visits and consultations with each participant at least twice subsequent to the workshops.

The program will impact non-program teachers and their students each year through our Nature Center field trip guide. Sea Turtle, Inc. is a non-profit organization with an educational facility bordering the Nature Center. It drew seventy-five school groups (ca. 1,650 students) in 2007, mostly during a two-month period. We expect a larger number of groups served annually through our field trip guide with docent participation at the Nature Center; the Center can accommodate more groups at a time than can Sea Turtle, Inc.

This program is an elementary teacher workshop program. However, we expect to impact thousands of visitors, including teachers and children, each year through informal education related to NOAA and Alliance goals. Center staff will train at least 200 docents over the project period, and training will include this workshop series or modifications of it. For program development purposes, the program will fund docent travel (only) during the first year. Thereafter, docents training will receive no program funding. Center staff and docents will utilize modified extractions of program deliverables in patron programs. The Center planning document states "birders are the defining market" of the Nature Center, so it is assumable the outreach and education programs would develop around birds and birding with only marginal value to NOAA and Alliance missions. Our program will expand Center programs to more effectively include bay-watershed facts and concepts in the displays, signage, and patron programs. Likewise, program products will improve interpretation of bay-watershed concepts by the Arroyo Partnership's outreach programs, including its active program of reaching schools, civic groups and political leaders. These benefits will endure past program end.

The program **evaluation** will be formative in nature. The Evaluator (Telese) will conduct final summative evaluation as well. The formative evaluation will consist of the collection of quantitative and qualitative data regarding the workshops and presentations. Quantitative data will include responses to surveys gauging the effectiveness of the workshops and presentations, measuring attitudes toward science of the participants, including teachers and students. Regarding students, the program has the potential to positively influence students' view of science, and its relation to the natural world. It is important to measure attitudinal changes as a gauge of the impact the program may have on participants. Students with positive attitudes toward science may have a tendency to take more science courses, and possibly pursue science related careers.

Other quantitative data will consist of scores obtained from observations, using a rating scale, of participating teachers to determine whether teachers transfer the knowledge and skills obtained in the workshops to their classroom teaching. In addition, as a measure conceptual knowledge obtained during the workshops, we will administer pre-tests and post-tests to the teachers and other participants. In addition, the Evaluator will collect student achievement data

in the form of the state mandated accountability exam for students of the teachers whose classes participate in the program. The Evaluator will compare scores to a random sample of students from teachers who did not attend the program. Finally, he will evaluate any curriculum materials that are developed in terms of their clarity, ease of implementation, and content knowledge aligned to the state and national science standards.

Qualitative data will consist of semi-structured interviews of participants who attended the workshops; this would include teachers and non-school participants. The purpose of the interviews is to gain an understanding of their experience from their participation in the program. The Evaluator will attempt to gauge their understanding of concepts, how the experience translates into their practice in the classroom, as well as positive and negative aspects of the program. The classroom observations will also collect qualitative data in the form of field notes taken during the observation. Other field notes will be collected while the workshops are being conducted to document events during the workshops and presentations. Content analysis of data will be conducted on both the data and any curriculum materials that develop during the program.

This program fulfills all but one (research) of BWET's "best practices" guidelines for "meaningful" watershed educational experiences. The program aligns with NOAA's Education program by emphasizing the interaction of atmosphere, oceans, and coasts as natural laboratories to demonstrate fundamental processes across disciplines, including social sciences; addresses goals identified by national science organizations; prepares teachers to understand and present NOAA sciences; is coordinated with partners including NOAA Sea Grant, non-governmental organizations (Nature Center and Arroyo Partnership) and the education community (Harlingen CISD and Region-One Educational Support Center); and supports informal education to increase environmental literacy of adults as well as students through the South Padre Island Nature Center. The program supports the Gulf of Mexico Alliance goals to improve and protect water quality of the Lower Laguna Madre; reduce pollution and nutrient loading of the Arroyo Colorado; and expand environmental awareness to improve stewardship of the Arroyo, lagoon, and associated wetlands. This program extends NOAA mission and goals to a predominately Hispanic and economically disadvantaged population. It leverages support of the area's ecotourism industry for mutually beneficial goals in the higher education, K-12 education, marine education, and watershed communities.