

**GALVESTON BAY WATERSHED ACADEMIC PARTNERSHIP
(GBWAP)**

Contract Number 582-6-77775

Final Report

Prepared by

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Prepared for

**Texas Commission on Environmental Quality
Galveston Bay Estuary Program
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I. EXECUTIVE SUMMARY

The Galveston Bay Watershed Academic Partnership aimed to improve the environmental literacy and citizenry of students and teachers in the Lower Galveston Bay Watershed and to create strong and effective partnerships between schools and local organizations. It accomplished its mission by providing materials and opportunities for students and teachers to interact with each other, with local organizations, and with our Galveston Bay resources.

The GBWAP project leaves behind new partnerships between schools and local organizations, experience and pride in students that have learned science concepts in the context of their local environment, and resource materials for teachers to develop bay curricula.

II. INTRODUCTION

The Galveston Bay Watershed Academic Partnership aimed to improve the environmental literacy and citizenry of students and teachers in the Lower Galveston Bay Watershed and to create strong and effective partnerships between schools and local organizations.

TCEQ-GBEP funding of the project was used to support program objectives from April 27, 2006 to August 31, 2007. Over the 16 month grant cycle, GBEP funds were the sole provider of salary funds for the project manager who coordinated the grant components. Other funds were used for materials for events, presentations/exhibits, habitat restoration efforts, and publications.

III. PROJECT COMPONENTS AND SUMMARY OF RESULTS

This section provides descriptions of grant components and summaries of component results. Although many component outcomes overlapped, Table 1 has been provided below to summarize the primary targeted tasks for each component.

Table 1. Summary of primary targets for GBWAP grant components.

Project Component/Event	PRIMARY TARGETS		
	Improve the Environmental Literacy of Students and/or Teachers	Improve the Environmental Citizenry of Students and/or Teachers	Create Strong and Effective Partnerships
2006 GBWAP YOUTH SUMMIT	X	X	X
GBWAP WEBSITE	X	X	X
SCHOOL ADVOCACY/PARTNERSHIPS	X	X	X
EDUCATIONAL PRESENTATIONS	X	X	
PARTNERSHIP: PROJECT DIBS		X	X
STATE OF THE BAY 2007 EDUCATOR'S SUMMIT	X		
BAY DAY 2007/GBWAP YOUTH SUMMIT	X	X	
HABITAT RESTORATION SUPPORT		X	X
EDUCATIONAL MATERIALS	X		
AWARENESS POSTERS	X	X	

2006 GBWAP YOUTH SUMMIT

The 2006 Galveston Bay Watershed Youth Summit was held at the Armand Bayou Nature Center on May 5, 2006 in celebration of National Wetlands Month. During the summit, more than 150 students from 6th grade to seniors in high school had a place to share their GBWAP projects with their peers, parents, and the community and celebrate with great music, food, and fun.

Organizations that were brought together for the event included: Texas Parks and Wildlife, The Galveston Bay Foundation, The Galveston Bay Information Center, The Coast Guard, The Galveston Bay Estuary Program, The Texas Coastal Watershed Program, The Bayou Preservation Association, National Wildlife Federation, Texas Watch, Wildlife Rehab., The Baytown Wetlands Center, The Artist Boat, and The Waterborne Education Center. School districts represented at the summit included The Chinquapin School, Katy ISD, Houston ISD, Clear Creek ISD, Goose Creek CISD, Humble ISD, and Pearland ISD. At the event, students, teachers, and local organizations celebrated together and networked for future collaboration. Grant funds were used to provide materials and coordination/hosting staffing costs.

GBWAP WEBSITE

The GBWAP website provided a medium for students and teachers to learn about local environmental issues, what other students (and adults) are doing, and how to make a difference. The website was hosted by Earth Force and managed by the GBWAP project manager with funds provided by the GBWAP grant.

The website had several helpful pages including news articles, research pages, and resource pages. Several of the website components are described below. Figure 1 provides an example of GBWAP web pages.

News Articles. The GBWAP website posted news articles for students, teachers, and community members. News articles included: Updates from student projects and events, upcoming community habitat restoration events, trash-clean-ups, environmental issues in the news. Articles were authored and posted by the GBWAP manager provided by GBEP grant funding. Example headlines of articles are provided below.

2006 GBWAP Youth Summit a Success! (June 2006)

Science, Art, and Fun on Our Bay! (February 2007)

Students Investigate Mining on the San Jacinto River (March 2007)

Bolivar School Habitat Benefits Students and Wildlife (April 2007)

Get Ready for Trash Bash! (January 2007)

Marsh Mania Coming Soon! (May 2007)

Research Your Environment Articles. In the spirit of creating strong and effective partnerships, professionals from several local organizations contributed articles to the website. The GBWAP manager solicited articles from these individuals, edited content for clarity and educational purposes, and posted them on the website for local (and abroad) students to view and/or download. Examples of guest articles and author/affiliation are provided in Table 2.

Table 2. Example contributed articles from local partnering organizations.

Article Title	Author	Affiliation
<i>Responsible Aquarium Keeping</i>	Brian Plankis	Project DIBS
<i>Exotic Fish in Galv-bay system Waterways</i>	Jan Culbertson	TPWD
<i>Invasive Species Around Galveston Bay</i>	Lisa Gonzalez	HARC

Several other articles were written and posted by the GBWAP manager. Examples include: Aquatic Invertebrates in our Watershed, Conduct Your Own Ecostudy, Fishes in our Bay, Riparian Zones and Healthy Waterways, Amphibians in our Watershed.

Resources for the Classroom.

The website provided a resources page where teachers and students could view/download Galveston-Bay related lesson plans and tools for learning. Example resources provided include: video downloads (A day on the bay), video order forms, and short clips on environmental awareness.

Helpful Links.

The website provided a wealth of updated links to information on local waterways including, governmental agency reports (e.g., USGS, TCEQ) on water quality and habitat, newspaper articles, summaries of past student projects related to that waterway, and aerial photos or maps. Example waterways with links include: Armand Bayou, Dickinson Bayou, Clear Creek, Christmas Bay, Sheldon Lake, San Jacinto River, Trinity River, Houston Ship Channel.

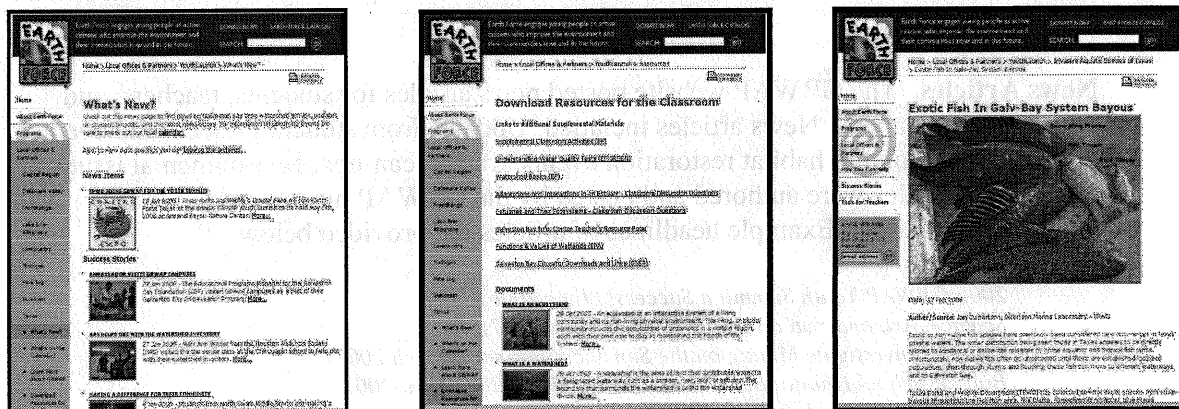


Figure 1. Example pages from the GBWAP website.

SCHOOL ADVOCACY/CREATING PARTNERSHIPS

A primary goal of the grant was to create strong and effect partnerships between schools and local organizations. This goal was incorporated into the majority of the components and given the nature of the goal, is difficult to obtain numbers on the partnerships created and even more

difficult to quantify strength or effectiveness. Nonetheless, creating partnerships is a key for lasting impacts and environmental advocacy longevity in our schools. Two examples of created partnerships are provided below.

GBWAP Teachers-Project DIBS. A partnership was created between GBWAP and Project DIBS (Desirable Invertebrate Breeding Society), a local organization for promoting awareness of responsible aquarium keeping. Support was provided to Project DIBS in two ways: 1. A portable aquarium set-up was provided for classroom demonstrations, and 2. The GBWAP project manager consulted with DIBS outreach volunteers on teaching science using our bay watershed as an integrated context for learning. DIBS reciprocated support for GBWAP by providing written articles on classroom activities and responsible aquarium keeping for the GBWAP website. As a lasting result of the partnership, Project DIBS has incorporated Galveston Bay issues into their outreach mission, and GBWAP affiliated teachers have invited Project DIBS back in future years to speak to new groups of students.

The Chinquapin School – Legacy Land Trust

Thanks to the grant funding, a partnership was created between The Chinquapin School and Legacy Land Trust. GBWAP consulted with Chinquapin students and teachers on conducting research and a project on sand mining on the San Jacinto River. Through the efforts of GBWAP and the students, the Legacy Land Trust, and other organizations and professionals worked with the school on raising awareness of the issue and making a difference. Because of the success of the 2006-2007 school year, Legacy Land Trust and administrators at the Chinquapin School have created a comprehensive plan for working together for the 2007-2008 school year. In a sense, the Legacy Land Trust has taken over GBWAP's role with the school. Success!

More information on the 2006-2007 Chinquapin School Sand Mining Project can be found at www.chinquapin.org/envsci/ourproject.html

EDUCATIONAL PRESENTATIONS

In an effort to increase the environmental literacy and citizenry of students, teachers, and community members, grant funds were used to support several presentations over the grant cycle. Support was provided in the form of salary for presenters and supplies for presentations/workshops. Descriptions of the types of presentations that were supported are provided below.

Chemicals in the Environment Summer Teacher Workshops. In both July 2006 and July 2007, the GBWAP project manager conducted a 2 hour presentation and workshop on using the Galveston Bay Watershed as an Integrating Context for Teaching Science Concepts. Approximately 45 teachers participated in each of the two workshops. Teachers were provided with a background on local environmental issues and methods for getting students involved in learning more about our environment as well and improving their environmental citizenry. Teachers were also provided educational posters, pamphlets, curricular materials, and classroom environmental awareness materials.

Bay Ambassador Presentations. Between April 30th and June 30th, 2007 Eighteen "Bay Ambassador" presentations were given to local students. The 1 hr presentations provided students and teachers with an awareness of Galveston Bay and its inhabitants and promoted environmental citizenry in our watershed via thorough discussions on point and non-point source pollution.

Event Presentations. Presentations and exhibits on behalf of GBWAP were made at two local community events reaching hundreds of students in our watershed. At the Annual Water Festival (May 10th, 2007), 1,200 students from 13 schools participated and learned about our bay and how to be environmental citizens. Also at "Kids Day on Buffalo Bayou" (June 9th, 2007) students and families learned more about our watershed through hands-on environmental learning opportunities.

STATE OF THE BAY 2007 EDUCATOR'S SUMMIT

GBWAP collaborated with the TCEQ State of the Bay Symposium 2007 to create the State of the Bay 2007 Educator Summit: *Teaching Science using our Bay System as an Integrating Context*. The summit provided an opportunity for educators in the Galveston Bay Watershed Region (and beyond) to share ideas, gather resources, and receive training on methods for teaching science concepts using the Galveston Bay system as an integrating context both in and out of the classroom. Educators attending the summit participated in on-site workshops, education-focused symposia and panel discussions, field events, exhibits, field/water workshops, and were provided with environmental education posters, books, pamphlets, and classroom materials. Thanks to the funding provided by GBEP, the GBWAP project manager was lead coordinator of the Educator's Summit and collaborated efforts with Scott Jones (TCEQ-Estuary Program), and several partnering organizations including Texas Parks and Wildlife and the Armand Bayou Nature Center.

BAY DAY 2007/GBWAP STUDENT SUMMIT

In an effort to coordinate events, the 2007 GBWAP Youth Summit was held in conjunction with Bay Day 2007 in May 2007 and in celebration of National Wetlands Month. GBEP grant funds were used for student activities at Bay Day including supplies for educational booths, a scavenger hunt, and Bay Day t-shirts for participating GBWAP-affiliated students. Also, students from Galena Park ISD, The Chinquapin School, and Pearland ISD participated in the event by running an educational booth on local environmental issues. Hundreds of residents from within the Galveston Bay Watershed visited the student booth, talked with students, and received Galveston-bay relevant environmental education materials.

HABITAT RESTORATION SUPPORT

GBWAP supported habitat restoration in our watershed by sponsoring student marsh habitat restoration events at the Anahuac National Wildlife Refuge (April 2007), The Texas City Prairie Reserve (June 2007) and Pierce Marsh (June 2007). GBWAP also supported the community-wide Marsh Mania 2007 by providing equipment (i.e., boots, waders, and trailers), working directly with a group of at-risk student volunteers, and by providing promotion, awareness, and reports of these events on the GBWAP web pages.

EXISTING EDUCATIONAL MATERIALS PROVIDED TO EDUCATORS

In an effort to improve the environmental literacy of teachers in our bay watershed, GBWAP collected, purchased, or put in usable form, environmental education materials and distributed them directly to teachers. Materials provided to teachers included: Estuary Ecotour CDs, educational posters, environmental awareness magnets, and environmental education website promotional materials. Materials were provided to teachers at educational booths and delivered to their classroom. Field/Restoration tools were also provided to teachers (i.e., nets, seines, boots, hand tools).

PUBLICATIONS CREATED AND PROVIDED TO EDUCATORS

New Galveston-Bay related publications were created and also provided to educators. New publications include a book and four awareness posters and are described below.

The Galveston Bay Estuary System: An Educator's Resource for Developing Bay-related Curricula. This 140 page book was created, printed and distributed thanks to the GBEP grant. The book is a teacher's tool for understanding our local environment, the environmental issues we face, and also provides materials, methods, and assessment tools for teaching students about our bay system. The book is drawn from the the Texas Essential Knowledge and Skills (TEKS) for Science Education and is written in a student-friendly and Galv-Bay Ecosystem-relevant manner. The books were bound using spiraling binding and heavy-duty recycled paper for easy photocopying and durability. Two hundred copies of the book were created and have been distributed to teachers and local organizations for future distribution. Electronic copies have been provided to the Galveston Bay Information Center for posting on their educational web pages.

Local Environmental Issue Awareness Posters.

The grant funded the creation, printing, and distribution of four local environmental issue awareness posters (18 inch x 24 inch). The posters provide a brief description of non-point source pollution sources and a message of environmental citizenry. Smaller print copies of posters are attached.

IV. LESSONS LEARNED

Two student summits were held over the grant cycle. The May 2006 event was held on a Friday ("school day") and students were bussed in. The May 2007 event was held on a Saturday in order to combine efforts with Bay Day 2007. A lesson learned from these two approaches is that a school day event yields greater student participation, greater teacher interest (resulting in more teacher and student efforts and preparation), and greater pride and sense of accomplishment by the students as they share stories of their experiences.

V. RECOMMENDATIONS

The following are recommendations based on feedback from GWAP-affiliated teachers.

Continue/update/improve Galveston Bay Website/Newspage.

The GBWAP website was the only on-line resource that provided articles on past and upcoming student events, progress on projects, Galv-bay specific articles, research tools, and curricula. Students and teachers found the

the website to be motivating and helpful.

Although there are some outstanding online resources for teachers and pages with quick links for teachers and/or students, it is recommended that a more comprehensive Galveston Bay Action website be launched that is similar to that created under the GBWAP project. Recommended to be included in the website are: a news page (where brief (1-3 paragraph) articles on restoration projects, monitoring projects, student activities, and upcoming events are highlighted), a research tool page (where the audience can learn about monitoring and restoration strategies, tools, and science concepts, a media page (where videos, streaming clips) can be viewed, and a wildlife gallery where photos and downloadable illustrations of local wildlife are posted with brief write-ups on special adaptations and habitat of each species. Local organizations that host events and/or work with students and communities should be encouraged to submit brief articles and photographs.

It is recommended that hosting, management, and editing of the website be conducted by a neutral organization – i.e., one that will fairly promote events hosted and sponsored by other organizations. The editor should be familiar with the curricular needs of student groups and well trained in bay-related science concepts and environmental issues.

Continue and expand the end-of-the-year student summit and the State of the Bay Educator Summit

Both the end-of-the-year student summits and the State of the Bay Educator Summit were the first of their kind in the Galveston Bay area and were successful. Both events provided opportunities for participants to learn and/or share strategies and projects. From the experience gained by GBWAP it is recommended that both events are continued and expanded. The Texas Parks and Wildlife (TPWD) Coastal Expo is a recommended partner for a student summit.

VI. CLOSING COMMENTS

We want to thank the Galveston Bay Estuary Program for funding educational programs like GBWAP. Thanks to the funding provided by GBEP, hundreds of students and teachers in our watershed have now had training on local environmental issues and how to get involved, have received bay-related environmental education materials, and/or have generated new partnerships with local organizations. Also, the distributed materials and new publications generated because of this grant will also have a lasting impact far beyond the grant termination date.

Sincerely,

Brent Stafford
GBWAP Project Manager

ATTACHMENTS

Images of printed posters

CD ROM with project photos

The Galveston Bay Ecosystem: A Guide to Developing Bay-Related Curricula.

10

**WHEN YOUR CAR IS LEAKING OIL ON THE STREET,
IT'S NOT JUST LEAKING OIL ON THE STREET**



Oil and other fluids that leak from your car, run from the street (or driveway) to your storm drain, then to your neighborhood bayou, & finally into your Galveston Bay. Along the way the fluids cause contamination and oxygen depletions in the waterway which causes ugly, smelly, and slimy, waterways that are unhealthy for sustaining fish & wildlife & are unpleasant for fishing, swimming, & boating!

Please help keep our waterways healthy by fixing oil leaks.

Brought to you by the Galveston Bay Watershed Academic Partnership with funding provided by the Galveston Bay Estuary Program (GBEP).
Contact GBEP for more information on your bay and how you can make a positive change ! (www.gbep.state.tx.us)

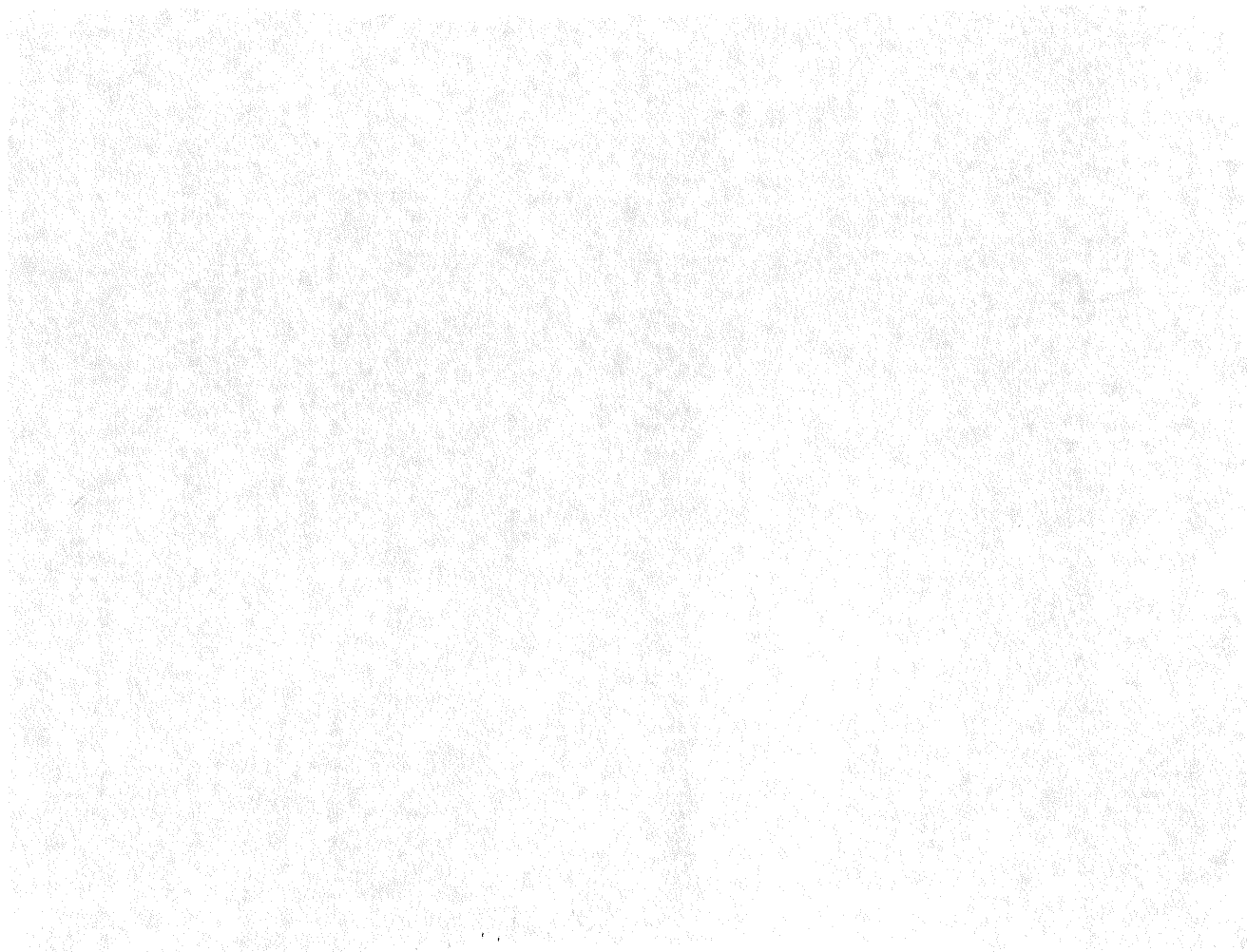
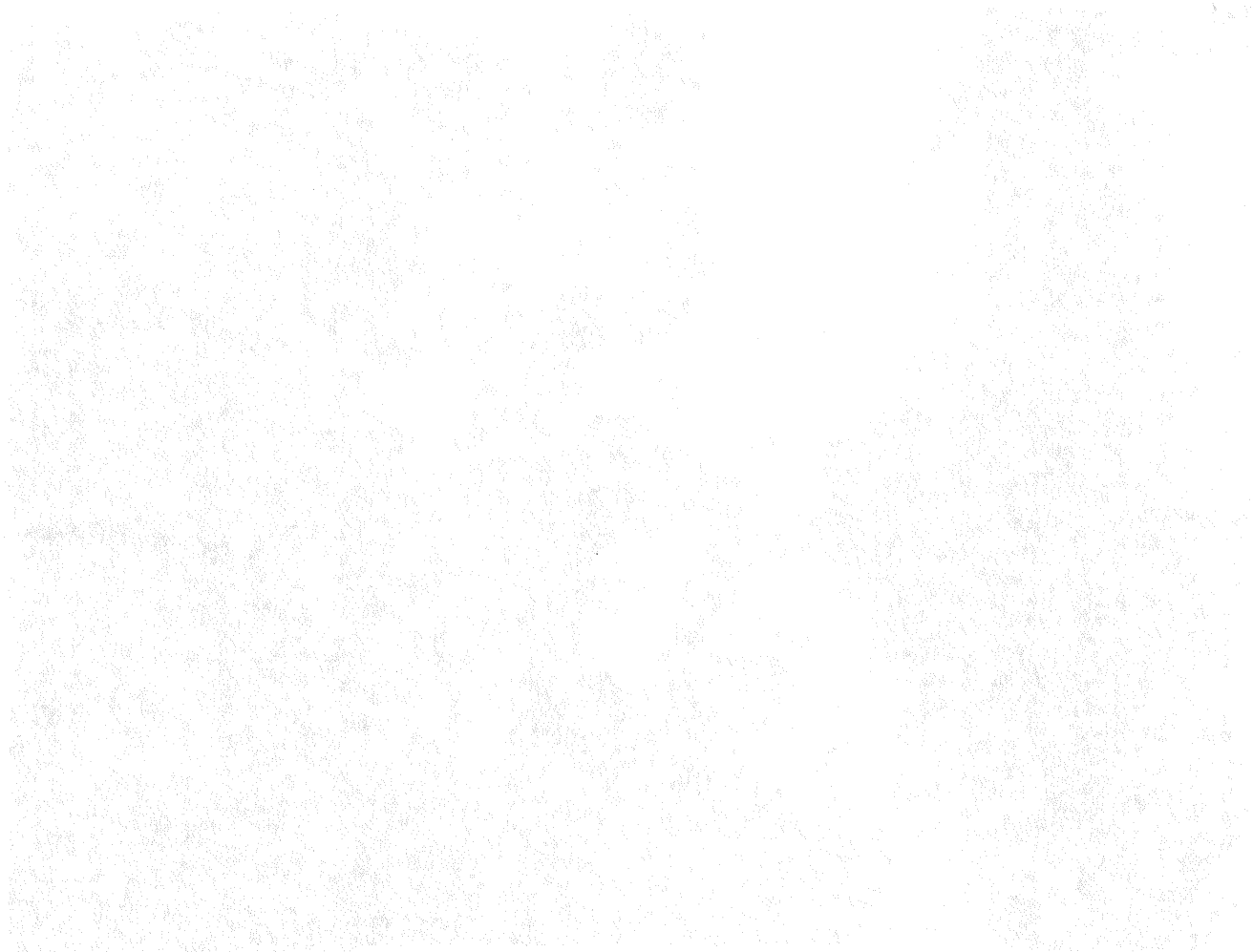
WHEN YOU'RE WASHING YOUR CAR IN YOUR DRIVEWAY,
YOU'RE NOT JUST WASHING YOUR CAR



All the soap, scum, oil, grease, & grit runs to your storm drain, then to your neighborhood bayou, & finally into your Galveston Bay. Along the way this runoff causes ugly, smelly, waterways that are unhealthy for sustaining fish & wildlife & are unpleasant for fishing, swimming, & boating!

Instead, wash your car on the grass or on gravel instead of paved surfaces. Or even better, take it to a car wash where the water gets treated or recycled!

Brought to you by the Galveston Bay Watershed Academic Partnership with funding provided by the Galveston Bay Estuary Program (GBEP).
Contact GBEP for more information on your bay and how you can make a positive change! (www.gbep.state.tx.us)



NOT ALL CLASSROOMS HAVE WALLS



Get involved in monitoring, conserving, and restoring habitat in
our Galveston Bay Estuary System.

Contact the Galveston Bay Estuary Program to get involved!

Galveston Bay Estuary Program,
17041 El Camino Real, Ste. 210, Houston, Texas 77058
281-218-6461 (phone), 281-218-6807 (fax), gbep@tceq.state.tx.us.

Brought to you by the Galveston Bay Watershed Academic Partnership with funding provided by the Galveston Bay Estuary Program (GBEP).
Thanks to the Chinquapin School Students (photo above) & other student groups for their hard work on making a difference for our environment.
Contact Brent Stafford (b_stafford@earthlink.net) for more information

WHEN YOU'RE FERTILIZING THE LAWN, YOU'RE NOT JUST FERTILIZING THE LAWN



Fertilizers are great for making our lawns turn green. Unfortunately, fertilizing your lawn before it rains can also make our waterways turn green (and slimy!)

When rain washes fertilizer off of your lawn, it runs to your storm drain, then to your neighborhood bayou, & finally into your Galveston Bay. Along the way the fertilizer causes algae blooms and oxygen depletions in the waterway which causes ugly, smelly, and slimy, waterways that are unhealthy for sustaining fish & wildlife & are unpleasant for fishing, swimming, & boating!

Please help to keep fertilizer where it belongs by
never fertilizing your lawn just before it rains.

Brought to you by the Galveston Bay Watershed Academic Partnership with funding provided by the Galveston Bay Estuary Program (GBEP).
Contact GBEP for more information on your bay and how you can make a positive change! (www.gbep.state.tx.us)

