FINAL REPORT

ABSTRACT:

SHORELINE STABLIZATION AND HABITAT ENHANCEMENT IN THE MULLOCK CREEK BASIN

Abstract/Executive summary:
Matching funds of $3000 were requested for a collaborative project to install a demonstration plot of what became approximately 180 linear feet along the primary canal in the East Mullock Drainage District (EMDD) in San Carlos Park, Lee County Florida. Invasive exotic Melaleuca and Brazilian pepper, and buckets full of air potatoes were removed and SHORESOX, a shoreline stabilization product was affixed to this steep (approximately 60 degree incline). The SHORESOX are designed to decompose within 36 months, leaving behind a shoreline which will be held in place by native plants. Florida native plants were installed in an approximately 15 foot wide buffer between the yards and the stormwater canal. The plants will help stabilize the shoreline, collect excess nutrients and runoff from the residences before entering the canal, and provide improved forage and habitat for fish and wildlife at this urban interface. This demonstration is part of several related projects to improve the entire EMDD stormwater drainage system. The demonstration nature will help educate residents and agency officials who are expending significant funds and resources to improving this system. A website that highlights this project (and the related projects) is being maintained by Dr. Nora Demers at FGCU, with links to and from the contributing organizations. The URL is http://itech.fgcu.edu/faculty/ndemers/East%20Mulloch/index.htm

SHORELINE STABLIZATION AND HABITAT ENHANCEMENT IN THE MULLOCK CREEK BASIN

I Project Rational, Geographic Area and Common Problems addressed

East Mullock Drainage District (EMDD) is at the Headwaters of Mullock Creek, an outstanding Florida Waterway that drains directly into the Estero Bay, Florida's first "Aquatic Preserve". The landscape has been significantly altered both by hydrologic modifications and by increased development of adjacent lands. This has destroyed fish and wildlife habitat, degraded water quality, and changed the timing and delivery of freshwater flows to the streams and estuaries. This public outreach application support several other initiatives that are ongoing in the community.

This demonstration project will be used to determine the efficacy of the SHORE SOX product, filled with mulched invasive exotic plants, corn stalks, or landscape hay in achieving improvements to the restoration of this inadequate stormwater system. EMDD is located in San Carlos Park, a middle class residential community located in south Fort Myers. It is bounded by I-75 to the East, US-41 to the West, Alico Road to the North, and Estero Blvd to the South. This canal system historically (15-30 years ago) was inhabited with a variety of fishes and even river otters. Today it is overrun by invasive exotics and full of discarded TV's, refuse, and etc. The project will be done on a portion of the North central publicly owned canal in San Carlos Park (see figure for exact location). Its location will allow us to isolate a portion of the system for dedicated energies to help determine whether the efforts to improve the system are effective in restoring habitat, and improving water quality in comparison to other areas in the community that have not benefitted from such resources and efforts. The location of the demonstration plot is in area that can be expanded to incorporate more of the system as more funding becomes available. We hope use this demonstration plot will encourage neighbors to expand implementation of other 'soft' best management practices including strict adherence to the recently passed fertilizer ordinance and creation of native planting buffers between residential yards and the riparian zones of the canal system.

The ultimate goal of these efforts is to reclaim fish and wildlife habitat, improve water quality that suffers from degradation due to nutrient enrichment and other pollutants, and, perhaps most importantly, promote methods to continue to educate the public and enhance personal responsibility for ecosystems of the Charlotte Harbor Watershed.

II Management Plan and Time Line

Project schedule / timeline:

Task	Nov-Jan '09	Feb '09	April "09	May '09	June '09	July'09	October '09
Planning	XXX	XXX	XXX				
Removal of exotics, mulching and installation of SHORESOX			XXX	XXX	XXX		
Native Planting*					XXX	XXX	XXX
Report and outreach				XXX			XXX

* The plants that were used to help stabilize the shore line and steep (about a 60 degree incline) bank included cypress and red maple near the water. For the midslope, species included Wax Myrtle, Sea Grape, Firebush, necklace pod and dwarf Fakahatchee grass. These are all shrubs/small trees that are evergreen and all will take full sun to part shade and are multiple trunk that enhance their soil stabilization quality. All of these have excellent soil stabilization attributes, should stabilize the bank, provide habitat, and create a fertilizer-free buffer zone between the residential yards and the canals, with very little maintenance.

This complete report was submitted to the CHNEP in October of 2009. The report includes record of the planning process, reasons for any impediments to implementation, records of services rendered and their cost, images of the process of installation, images that document the planting and growth of the Florida native plants, and degradation of the stabilizing (berming) product. The report and project details are documented on a webpage available to the public at http://itech.fgcu.edu/faculty/ndemers/East%20Mulloch/index.htm. In addition, to improve public understanding of these issues, oral presentations of the project was made to the San Carlos Park Civic Association (and other groups upon request) during the Spring of 2009. The project was also described at the Estero Bay Watershed Public Symposium at FGCU on September 28, 2009. In November Nora Demers will present the project and outcomes to the San Carlos Civic Association, The energies that continue to be spent on this community to inform and engage the residents should result in improvements to the CHNEP Estero Bay Watershed.

III Cost/Budget and project Partners

Funds for this demonstration project were for products and services necessary to install approximately 180 linear shoreline stabilization berm, planted with Florida native plants. Nora Demers collaborated with the team partners to implement this project, which included volunteers from the University and community.

Alan Freeman of the East Mullock Drainage District provided a letter of commitment to removed invasive exotic trees.
Paul Cooks of Sanibel Biosolutions provided an estimate and letter of commitment for installation of the SHORESOX shoreline stabilization product.
John Cassani of the Watershed Council of Southwest Florida provided a letter of commitment to the project for a small stipend to pay for the SHORESOX installation.
Proposed REVISED budget for project:
SHORELINE STABLIZATION AND HABITAT ENHANCEMENT IN THE MULLOCK CREEK BASIN

Expenses	**CHNEP request**	**EMDD matching funds**	**Sanibel Biosolutions matching Funds**	**Watershed Council matching Funds**
Removal of invasive plants	$0.00	$8750- EMDD has committed to contract with agent to remove invasives, and has pledged $3000 for that purpose		
Installation of 180 linear feet of Shore Sox Shore Sox Installer stipend			$5,800- Sanibel Biosolutions has committed to the installation, cost is based on charges for services	$300- Watershed Council pledged a small incentive stipend for the installation of the product
Native planting	$814			
Food and drink for Volunteers	$350			
Preparation of shoreline for planting (pump, boat for pump, tools etc)	$1063			
SHORE SOX Supplies	$500			
Total Direct cots	**$2727**	**$8750**	**$5,800**	**$300**
Indirect costs (grant administration)	$273			
Total Costs	**$3000**	**$8750**	**$5800**	**$300**

Total costs $12,100

The total cost of the installation of this demonstration plot project was estimated to be $12,100 for the removal of invasive exotics, installation of stabilization system, and planting of native plants along an approximately 180 linear foot length of this primary canal (see figure). The EMDD pledged $3000, The Watershed Council of SW Florida pledged $300, Sanibel Bio-solutions pledged $5800 in in-kind services for the

installation of the SHORESOX, and we received $3000 from the CHNEP Partners program to cover some of the remaining costs of this project.

ACTUAL REVISED budget for project:
SHORELINE STABLIZATION AND HABITAT ENHANCEMENT IN THE MULLOCK CREEK BASIN

Expenses	**CHNEP request**	**EMDD matching funds**	**Sanibel Biosolutions matching Funds**	**Watershed Council matching Funds**
Removal of invasives	$0.00	$8750- EMDD has committed to contract with agent to remove invasives, and has pledged $3000 for that purpose		
Installation of 270 linear feet of Shore Sox Shore Sox Installer stipend			$8,500- Sanibel Biosolutions has committed to the installation, cost is based on charges for services	$273- Watershed Council had pledged a small incentive stipend for the installation of the product
Native planting	$450 33 Sea grape 40 firebush 30 wax myrtle 20 necklace pod 28 dwarf fakahatchee grass			
Trees	(no charge) Cypress 5 Pop Ash 4 Red Maple 4 Live Oak 2			
Food and drink for Volunteers	$350			
Preparation of shoreline for planting (pump, boat for pump, tools etc)	$1063 (pump $500, boat $100, misc tools approx $463)			
SHORE SOX Supplies	$500			
Total Direct cots	**$2727**	**$8750**	**$5,800**	**$300**
Indirect costs (grant administration)	$273			
Total Costs	**$3000**	**$8750**	**$8500**	**$300**

Total costs $14,800

Itemized (chronological) purchases and costs:

Item	**Cost**	**Date**	**Purpose**
Boat plug	$3.70	3/27/09	For trash removal from canal – to keep boat afloat!
Twine	$5.47	3/27/09	For bundling exotic refuse
Food and drink	$74.90	4/6/09	Hydration and refreshments
Tools	$234.78	4/6/09	Hand tools for exotic removal
Tools	$94.26	4/6/09	Hand tools
Post-hole diggers	$79.96	4/30/09	For digging holes for planting
Rope (300')	$12.69	5/27/09	For SHORESOX installation
Boat (non-motorized John boat 15')	$100	6/3/09	For exotic and trash and removal
Landscape Hay	$90.00	6/9/09	For stuffing SHORESOX
Trash pump	$475.00	6/3/09	For pumping muck
Food and drink (Albertsons)	$16.32	6/4/09	Hydration and refreshments
Food and drink (Costco)	$81.16	6/5/09	Hydration and refreshments
Mesh	$14.30	6/5/09	For pump alterations
Bolt clamps	$25.66	6/5/09	For pump alterations
Hand tools and gloves	$113.45	6/3/09	Gloves and tools for air potato removal
Boots	$26.11	6/6/09	For canal mucking about
Gas (Costco)	$29.82	6/7/09	Plant moving from FGCU
SHORESOX	$500.00	6/15/09	For more SHORESOX product
Daniel Schaaf	$279.50	6/26/09	For more SHORESOX product
Plants (TransGro)	$450.00	10/6/09	For native plants
Food, drink trash bags	$50		
TOTAL	**$2896.00**		**Just over the $2790 I had to spend**
	($273)		Grant administration

The report includes

Record of the planning process and implementation process: Planning was *ad hoc* based on my lack of experience in undertaking such an event. I had students coming to the site on several days starting in March, and continuing through October of 2009 to do Service-learning volunteer work as required by the FGCU University Colloquium course. Each of approximately 61 students contributed about 10 hours each to the project. Planning for these days consisted of a work plan for the day that was shared with students as they arrived.

I have attached a copy of the work plan for the first work day (March 28, 2009) as an example. On October 9 & 10, the final group of 26 University Colloquium student volunteers donated 100 hours. They cleared the site of weeds and grasses and prepared it for planting. After removal of the dense grass that had established in the past two months we were able to finally see the plants that were transplanted from the FGCU complex earlier in the summer. They were established, with the pine trees showing the best survival and growth. I am not sure that the effort in resources was worth it as so few plants were moved, and their survival fate was mixed. The additional plants were purchased wholesale from Trans-Gro (800-801-2475) and were delivered in excellent condition on the morning of Oct 9. I had originally scheduled for the plants to be delivered the day before the planting (Thursday) but fortunately changed that to the day that the students were available to help transport them from the trailer to the work site. We planted 33 (3 gallon) sea grapes, 40 firebush, 30 wax myrtle, 20 necklace pod and 28 (1 gallon) dwarf Fakahatchee grass. Mike Weston from the Division of Forestry donated several trees including cypress, red maple, pop ash and live oak. He also provided some iron for the trees when they need it, and offered his expertise to the students to show them how to plant the plants. The result was a very densely planted hillside. I highly recommend Trans-Gro and partnership with the Division of Forestry for future projects.

Future plantings could probably be cut by 1/3 for the same area and still have plenty of plants for a lush landscape that will show well in a short amount of time (growing). We watered all the newly planted shrubs and trees. Watering will have to continue until the plants are established. Future plantings, should be done earlier during the summer to take advantage of the rainy season if it all possible. Because we had to work at times that volunteers were available, it was not possible to plant earlier in the summer during this project

The project could not have been accomplished for so few dollars had the University Colloquium students not participated. Since they are required to provide 10 service learning/civic engagement hours faculty and students alike were appreciative of the opportunity to work on a project that demonstrated the goals of the class so well (environmental education, sense of place and sustainability). Many students remarked about this, and talked about wanting to come back to follow up on the project and see how it was progressing. Some students did return and made a video highlighting their effort in the project. Unfortunately although I asked for a copy of the video I have not been provided with one. Hopefully future student generated material will be able to be highlighted on the website.

It was helpful that the site was so close to our home, which was used as a base and work station. Students used our bathroom and outside shower during the SHORESOX installation, site preparation and planting. Our outside deck surface was thoroughly thrashed by the foot traffic by dirt and sand being ground into the deck, and needs to be re-sealed as a result of the extreme wear and tear. Lunches were prepared and served by Roy Demers out of our home kitchen. He donated his cooking skills, equipment and passion during this entire project, which made the funds for food and refreshments stretch almost far enough to complete the project. Future projects will be easier as long as this arrangement can continue. The further the project moves from our home base the more difficult these aspects will become and thoughtful arrangement for these aspects will be necessary.

The equipment purchased for the project met various outcomes. We burned through about 10 pair of gloves; 2 post hole diggers were demolished, and a variety of hand tools were broken during the project. This was done by use, not abuse of the equipment. The remaining tools were brought to the Environmental studies storage bin at FGCU and will be used for other similar projects. The boat has been kept at our home and has been used for trash removal from the canal system, which will continue with future student volunteers. The trash pump has been placed for sale on Craig's list, and if it ever sells we'll use the funds for deck resurfacing, restocking of the cooking supplies, water for the plants, and other cost overruns that were absorbed by us.

All in all, I feel that we took full advantage of the $3000 partnership project funds from the CHNEP and created a beautifully restored native landscape and hope that we might be eligible for future funds for similar projects.

Reasons for any impediments to implementation: The biggest impediment to the planning was the delay of two months for removal of the invasive exotic plants by the EMDD. Unfortunately, this was not accomplished until May of 2009 (instead of March), which meant that we were preparing the shoreline with the stabilization product and planting the native plants without the two months we'd hoped to have for SHORESOX installation. On a brighter note, the EMDD decided to expand the exotic removal so the project could be seen from the cross street (New Jersey Rd. and the canal between Phlox and Laurel Valley Road in San Carlos Park). This cost nearly tripled what they committed to, and made it so that we also had to purchase and install more SHORESOX to make the project cover the new land exposed to further erosion.

We wanted to be able to plant the plants during the rainy season. This was partially accomplished on June 20, 2009 when we dug up and relocated dozens of plants from the site of the future Arts Complex expansion at FGCU. A second planting of native plants purchased from TRANS GRO Superior Plant Company in Golden Gates Estates took place on October 9 & 10, 2009 with another group of University Colloquium students. We also received a donation of trees from the Division of Forestry (Mike Weston) that were planted that weekend. Regrettably, we'll have to water the plants using city water for the next several weeks if they are to survive the dry season.

Additionally, Sanibel Biosolutions, although they committed to installing the SHORESOX, was a no-show. This was frustrating and disappointing, but the parent company, SHORESOX provided an installation expert, who, with the help of volunteers installed the product on several different days as outlined in the table below.

Records of Volunteer services rendered and their cost:

Date	Work accomplished	Number of Volunteers X hours of work each	Volunteer hours contributed
March, 2009	Filling SOX with mulch	3 X 7 +2	23
March 28, 2009	Habitat prep, garbage and exotic removal	7 X 6 hours	42
April 22, 2009	SHORE SOX INSTALL (54' of cornstalk-filled)	4 X 3 hours	12
May 10, 2009	Fill and move mulch-filled SHORESOX	2 X 5	10
May 27, 20009	Clean canal, SHORESOX install (30' of mulch-filled)	4 X 4.5	18
May 29, 2009	Air potato removal	4 X 3.5	14
June 1, 2009	Air potato removal	5 X 4	20
June 3, 2009	Air potato removal and trash removal	8 X 4 (approx)	32
June 5, 2009	Air potato removal, trash	7 X 5	35
June 6, 20009	Dig and plant plants from Arts Complex at FGCU	13 X 4 + misc	62.5
June 19, 2009	Pump muck, remove garbage and air potatoes	10 X 5	50
June 20, 2009	Pump and remove air potatoes	6 X 5	30
July 21, 2009	Install SHORESOX 25' landscape hay filled	2 X 3	6
July 22, 2009	Install SHORESOX 50' landscape hay filled, air potatoes removal,	6 X 4	24
July 24, 2009	Prep SHORESOX and air potatoe removal	4 X 4	16
July 25, 2009	Install SHORESOX 50' landscape hay filled, air potatoes removal,	7 X 4	28
October 9, 2009	Remove exotics from site	20 X 4	80.5
October 10, 2009	Plant natives from Nursery	6 X 4	23
TOTAL			**491**

Images of the process of installation: I have attached several representative images to this document, and have far more available on the webpage for the project.

Monthly images that document the planting and growth of the Florida native plants: Some of these are also attached, and can be viewed on the webpage as slide shows and movies:

http://itech.fgcu.edu/faculty/ndemers/East%20Mulloch/index.htm

information that may be of interest to future awardees:

Contact for vendors:

Plants:

Trans-Gro Wholesale Nursery 510 Frangipani Ave, Naples, FL 34117
(800) 801-2475 Neil-

Trees donated by Florida Division of Forestry

Mike Weston, County Forester

10941 Palm Beach Blvd.
Fort Myers, FL 33905
239-690-3500 ext 118
westonm@doacs.state.fl.us

Hay:

Meloy Hay company, INC
3621 Buckingham Road
Ft. Myers, FL 33905
(239) 634-4611

Exotic Tree Removal

John Dickey
(239) 851 2318

Trash pump provider

Howard Blair/Quality Pumps
4915 Rattlesnake Hammock Dr
Naples FL 34113
(239) 674-7528

Summary of lessons learned:

Advice when involving students and other volunteers:

- be flexible and encouraging with all facets of operation.
- Prepare contingency plans for when too many or two few volunteers attend
- Try to have enough buffer of timing to allow for overruns from folks not as committed to the project as you (those who offered services free or at a reduced rate).
- Keep in touch with neighbors that abut property to keep them informed of project and try to enlist their support in helping with maintenance, restoration and watering of plants before the project begins.
- When working on outdoor projects in the hot summer heat provide plenty of water and food for volunteers

- TIMING: When working in our wet/dry season be sure to get started early enough for dry season activity to be completed before July and wet season activity to be completed before mid-September (plants needed water).
- Try to have a facility available for bathroom, cleaning up, food preparation nearby

Advice when purchasing tools:

- Buy the highest quality possible so it withstands the use and abuse of unskilled labor using the equipment.
- Rent instead of buying when you are unsure if the the strategy will work (this depends on the cost to rent).

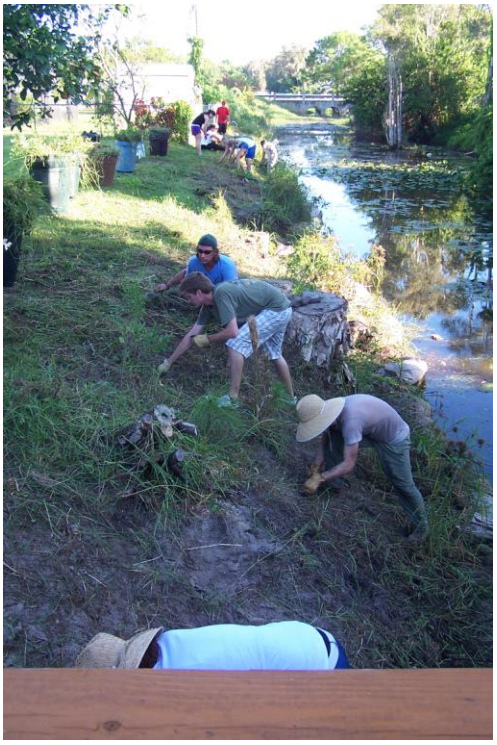
Advice when deciding out much to plant in a given space:

- Consult the experts (I did)
- Mike Weston with the DOF gave great recommendations on how far apart to space the trees. The same would have been helpful for the shrubs and bushes (rather than the educated guess I took), however he did comment that the thick planting I did was probably a good idea since we wanted to be able to see results relatively quickly

April, 22, 2009




October 9, 2009

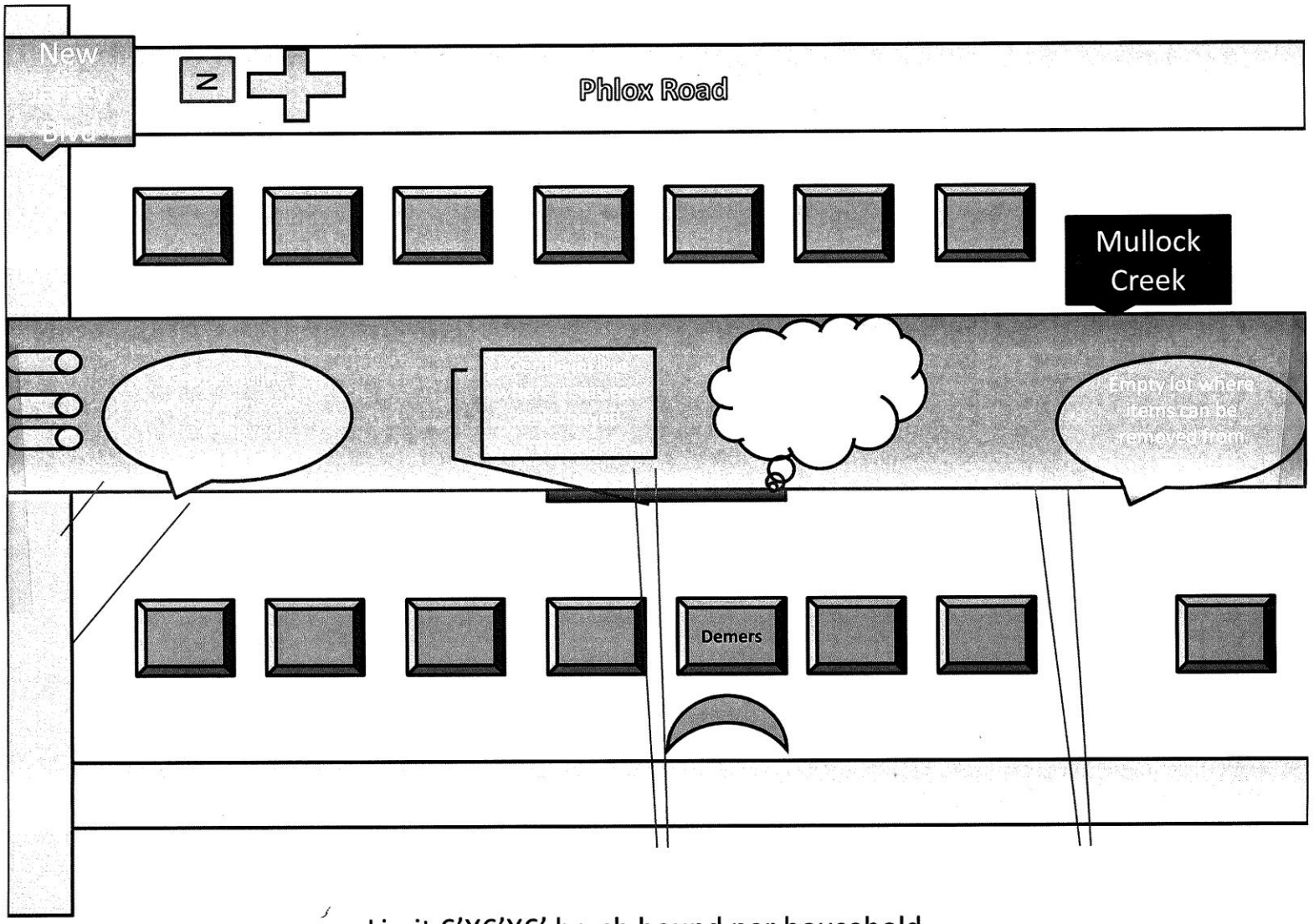





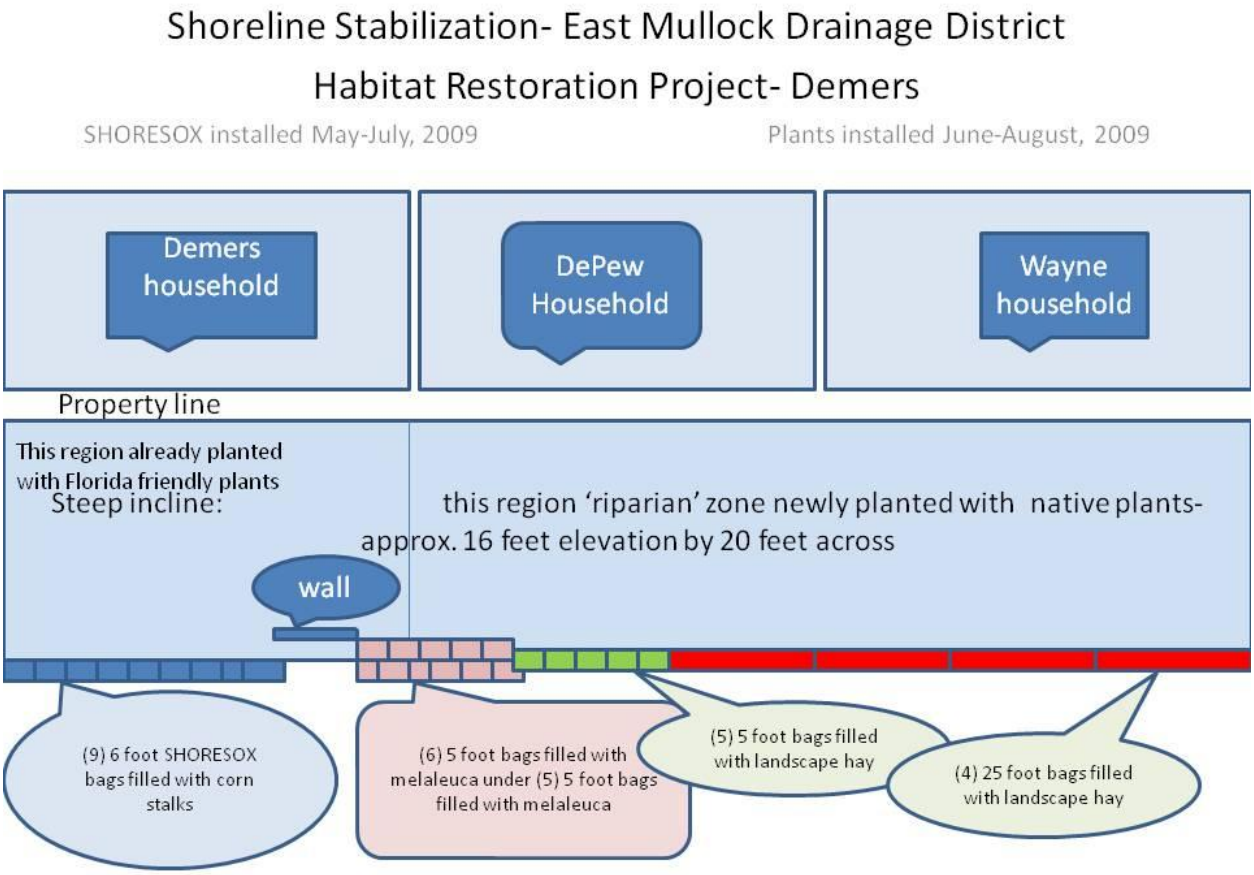



Degradation of the stabilizing (SHORESOX) product: Because this degradation is expected to take up to three years, it will not be possible to provide images to show this in time for submission of this report. We have observed numerous aquatic turtles using the SHORESOX for thermoregulation, and also seen apple snail eggs laid on the product. In addition, some volunteer plants have already established themselves on the product.

I've provided one of the flyers that I produced for soliciting volunteer assistance. Flyers were produced for each of the work days, and future flyers had the CHNEP logo as the first mentioned.



Limit 6'X6'X6' brush bound per household



III History and Personnel

The applicant, Nora Demers, is an Associate Professor of Biology and Interdisciplinary Studies at Florida Gulf Coast University. She is a member of the Estero Bay Agency on Bay Management (ABM), and resident of San Carlos Park who has been hearing at ABM meetings about the problems emanating from her residential community as a result of the residences septic tanks, fertilized lawns and inadequate stormwater system. We hope to build on the prior success of the CHNEP/NOAA initiative to engage residents of the community in helping improve the water quality of Mullock Creek. Last year she assisted with construction of a demonstration garden at the local (Karl Drew) Community House. The implementation of this current shoreline stabilization demonstration plot and native plant buffer is being planned in an attempt to encourage residents in the park to voluntarily tax themselves to make improvements to the system. These improvements should benefit not only the waterways, wildlife and habitat in the area, but also help install a sense of ownership, appreciation of our surroundings, and of necessity, result in an improvement in community culture and property values that will be one of the "carrots" necessary to encourage the community to tax itself for future improvements.

Current funding for the upkeep of publicly owned lands in the park is from two sources, an MSTU for street paving and lighting, and the EMDD taxing authority, which currently raises less than $68,000/year. To that end, several steps have already been undertaken. In 2007 Demers successfully lobbied the Board of County Commissioners into putting a straw poll on the election ballot asking if the community would be willing to pay higher taxes for the purpose of improvements and maintenance to the EMDD. The initiative received over 44% support, even though we had no idea of what costs would be incurred by such an effort!

Since that time, we successfully petitioned Lee County to finance a study ($180,000) of the system and what it will take to bring it to a better functioning system. In addition, the CNNEP/NOAA demonstration garden project was completed at the Karl Drew House in San Carlos Park in 2008. Dozens of residents participated in helping plant the garden, and attended one of several two-day workshops to learn how to plant Florida Native gardens at their homes.

Dr Nora Demers has also been working on research determining the sources of nitrogen in the waters and sediments of the community with funding from the Watershed Council..

Figure 1. Aerial image showing surface drainage and water flow patterns for San Carlos Park, Lee County Florida. Approximate locations of homes with septic tanks are indicated by blue highlighting. The project described here is proposed to be done on the main canal that is on the eastern edge of the Golf Course and just south of Winged Foot Drive (see star on map below). .