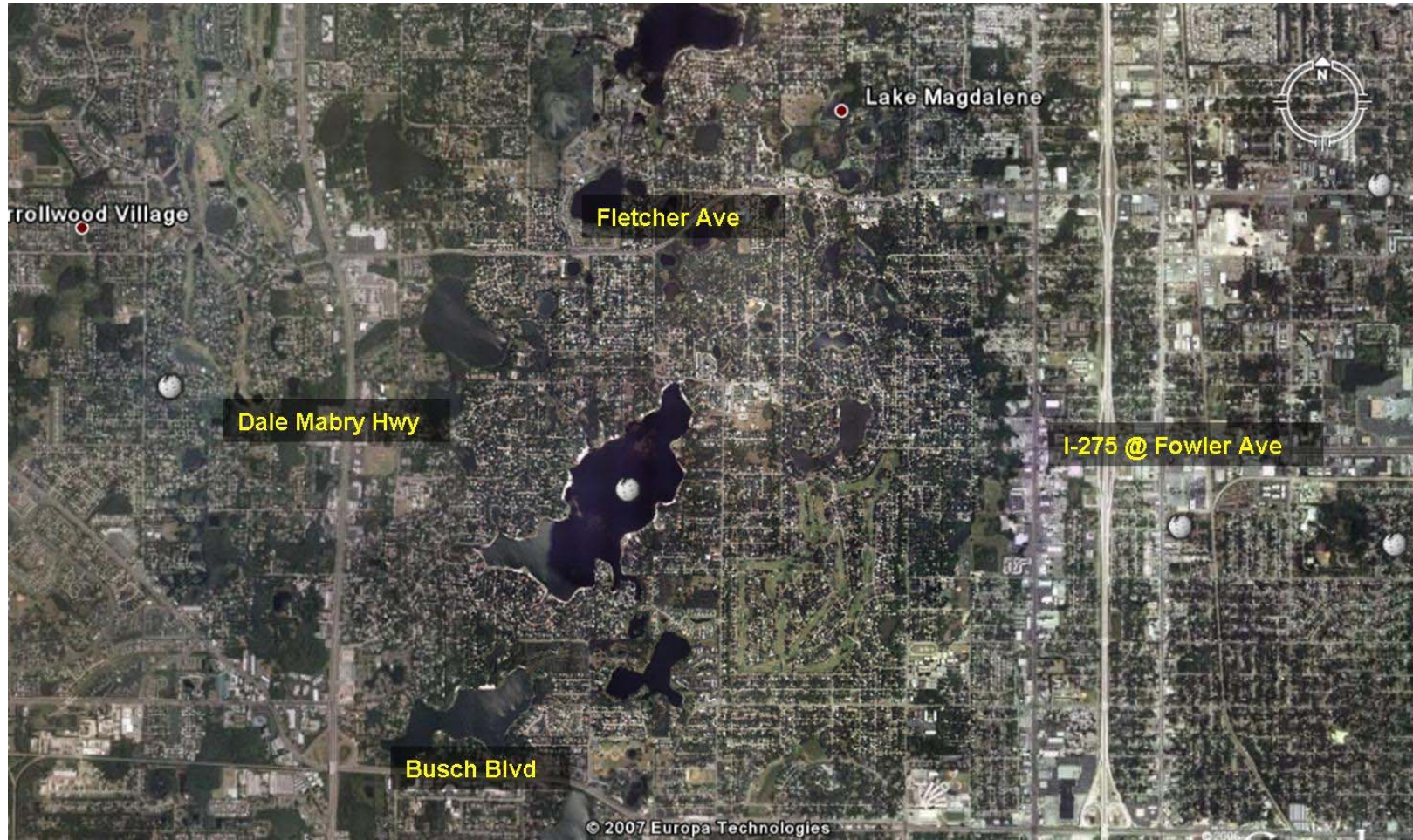
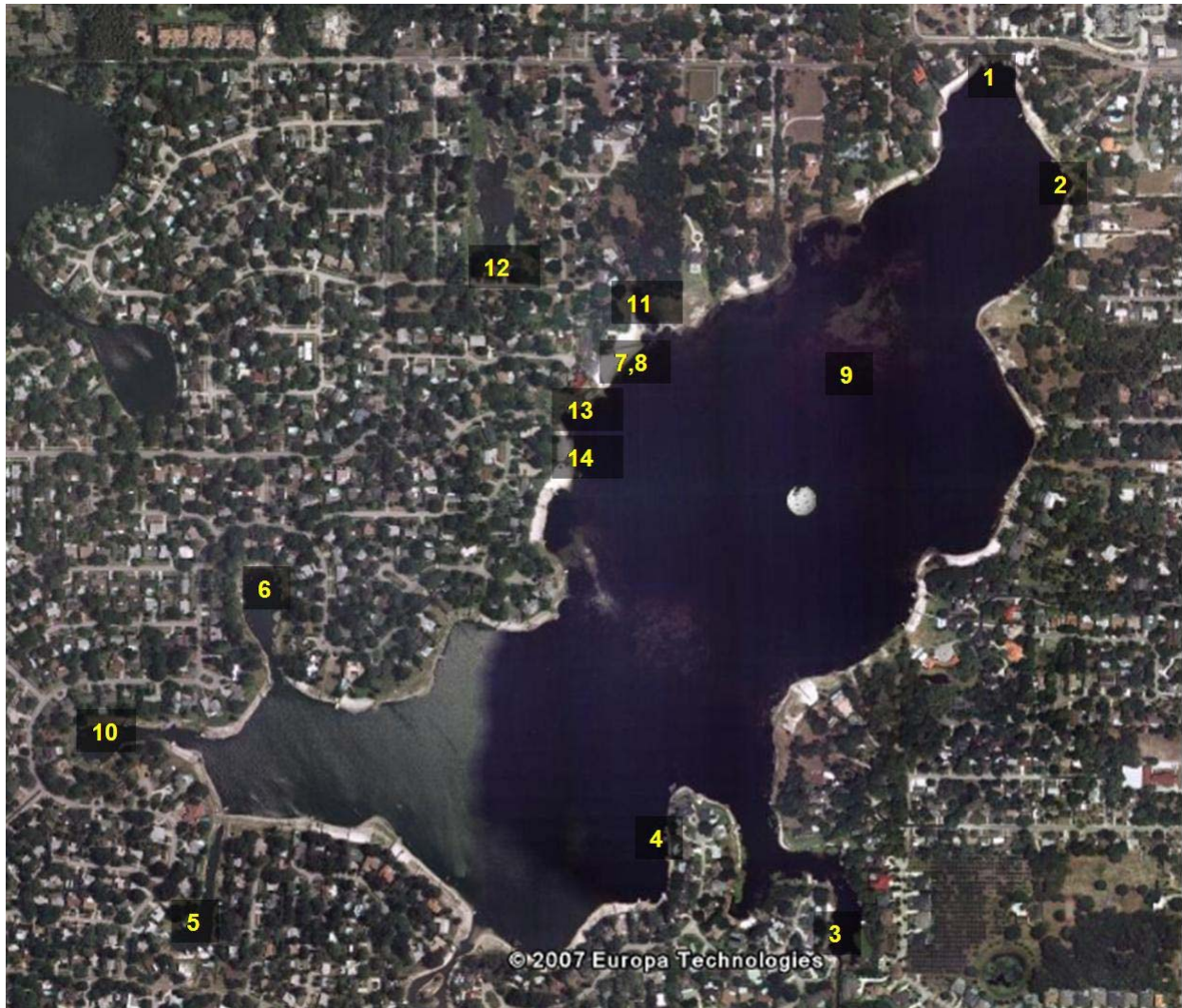


Attachment 1

Site map showing location of Lake Carroll (center) in Tampa, Florida. See next page for sampling stations in pilot study.



Site map showing sampling sites for pilot study at Lake Carroll in Carrollwood (Tampa), Florida.



Attachment 2: Curriculum Vitae and Contact Information

Valerie J. Harwood, Ph.D.

Valerie J. Harwood, Ph.D. Dr. Harwood has carried out numerous water quality studies in areas ranging from Jacksonville, FL to Albuquerque, NM and Orange County, CA. She is recognized as an expert on microbial source tracking, the science of identifying the sources of fecal pollution in environmental waters, and has received funding from federal, state and local agencies including the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, and the Florida Department of Environmental Protection. Dr. Harwood will oversee the project, participate in weekly meetings and planning sessions, and will write the Final Report. A PhD-level graduate student will conduct sampling and data analysis with the help of an undergraduate student.

Contact

vharwood@cas.usf.edu Telephone: (813) 974-1524
Department of Biology, SCA 110
University of South Florida
4202 E. Fowler Ave.
Tampa, FL 33620

Education

BA French 1980 Iowa State University, Ames, IA
BA Biology 1982 State University of New York at Plattsburgh, NY
PhD Biomedical Sciences 1992 Old Dominion University and E. Virginia Medical School

Employment History

Postdoctoral Fellow: University of Maryland Center of Marine Biotechnology 1992 - 1995
Assistant Professor: University of North Florida, Department of Natural Sciences 1995 - 1998
Assistant Professor: University of South Florida Department of Biology Aug 1998 – July 2004
Associate Professor: University of South Florida Department of Biology Aug 2004 – present

Ten Publications Relevant to the Research (Postdocs and graduate/undergrad student authors are bolded.)

2006. **Shannon M. McQuaig**, Troy M. Scott, Valerie J. Harwood, Samuel R. Farrah and Jerzy O. Lukasik. Novel method for the detection of human derived fecal pollution in environmental waters using a PCR based human polyomavirus assay. *App. Environ. Microbiol.* 72: 7567-74.
2006. **M. A. Anderson**, J.E. Whitlock and V.J. Harwood. Diversity and Distribution of *Escherichia coli* Genotypes and Antibiotic-Resistant Phenotypes in Feces of Humans, Cattle and Horses *Appl. Environ. Microbiol.* 72:6914-6922.

2006. V.J. Harwood. Assumptions and limitations associated with microbial source tracking methods. *In: Santo Domingo, J.W. and Sadowsky, M.J. (Eds) Microbial Source Tracking.* ASM Press, Washington, DC.
2006. M. Chatzidaki-Livanis, M. A. Hubbard, **K.V. Gordon**, V. J. Harwood, and A.C. Wright. Population genetics discriminates clinical vs. environmental strains of *Vibrio vulnificus*. *Appl. Environ. Microbiol.* 72:6136-6141.
2005. **K.L. (Hood) Anderson**, J.E. Whitlock and V.J. Harwood. Persistence and differential survival of fecal indicator bacteria in subtropical waters and sediments. *Appl. Environ. Microbiol.* 71: 3041-3048
2005. V. J. Harwood, A. D. Levine, T. M. Scott, **V. Chivukula**, J. Lukasik, S.R. Farrah and J.B. Rose. Validity of the indicator organism paradigm: pathogen reduction and public health protection in reclaimed water. *Appl. Environ. Microbiol.* 71: In press.
2005. D. F. Moore, V. J. Harwood, D. M. Ferguson, J. Lukasik, P. Hannah, M. Getrich and **M. Brownell**. Evaluation of antibiotic resistance analysis and ribotyping for identification of fecal pollution sources in an urban watershed. *J. Appl. Microbiol.* 99: 618-628.
2004. **S.D. Shehane**, V.J. Harwood, J.E. Whitlock and J.B. Rose. The influence of rainfall on the incidence of microbial fecal indicators and the dominant sources of fecal pollution in a Florida river. *J. Appl. Microbiol.* 98:1127-1136.
2004. V. J. Harwood, **J.P. Gandhi** and A.C. Wright. Methods for isolation and confirmation of *Vibrio vulnificus* from oysters and environmental sources: a review. *J. Microbiol. Meth.* 59:301-316.
2004. V.J. Harwood, **N.E. Delahoya**, M.F. Kramer, J.E. Whitlock, **R. Ulrich**, J.R. Garey and D.V. Lim. Molecular confirmation of *Enterococcus faecalis* and *E. faecium* from clinical, fecal and environmental sources. *Lett. Appl. Microbiol.* 38:476-482.

Invited Seminars and Symposia (since 2001) - ~ 25

Published Proceedings - 7

Grants Previously Funded

Approximately \$2.5 million since 2000 from the following agencies: U.S. Environmental Protection Agency, U.S. Department of Agriculture, CICEET (NOAA), Water Environment Research Foundation, Orange County, CA Health Care Agency; FL Dept. Environmental Protection, Hillsborough Environmental Protection Commission.

Current Funding:

- 2007-2010. Validation and Field Testing of Microbial Source Tracking Methodologies in the Gulf of Mexico US Environmental Protection Agency (Gulf of Mexico Program). **\$444,000 to Harwood; \$875,907 total** with Co-PIs at UWF & USM
- 2007-2008. Rapid concentration and quantification of bacteria and viruses from marine waters. NOAA-CICEET **\$68,974 to Harwood; \$145,893 total** with Co-PI D.V. Lim at USF
2007. Further Investigation of the Sources of Fecal Indicator Bacteria in Wakulla County, Florida. Florida Department of Health. **\$77,931**

2006-2007. Analysis of Sources of Fecal Indicator Bacteria Causing Beach Closures in Hillsborough County, Florida. Environmental Protection Commission of Hillsborough County. **\$125,000.**

ATTACHMENT 3

PROJECT NARRATIVE

Specific Study Objectives

This one-year research project is designed to determine the dominant sources of fecal indicator bacteria (fecal coliforms, *Escherichia coli* and enterococci) to Lake Carroll in Tampa, Florida, and their relationship to inputs from stormwater and impacts from human sewage.

- Fecal indicator bacteria will be measured at sites around the lake, including White Sands Beach, and in the stormwater system. Water column, sediment, and aquatic plants will be sampled.
- DNA markers that are specific to microorganisms shed in **human feces** will be used to detect human sewage contamination (microbial source tracking).
- **Pathogenic microorganisms** associated with fecal contamination such as *Salmonella*, *Cryptosporidium* and enteric viruses will also be measured to shed light on the link between indicator bacteria and health risks to beachgoers.
- The impact of the stormwater system that empty into Lake Carroll will be investigated by conducting microbial measurements (indicator bacteria, human-source markers and pathogens) and determining stormwater flow rates under various hydrological conditions (e.g. recent rainfall vs. dry). Measurements at the outfalls that drain Lake Carroll will also be taken. Estimates can then be made of bacterial loading to Lake Carroll and compared to bacterial measurements from water, sediments, and plant material.
- In collaboration with the Department of Health, identify homes on septic systems that are near the water and specifically test those areas for high microbial numbers.
- The relationship of rainfall, stormwater flow, temperature, nutrients, aquatic plant density, proximity to septic systems and **bacterial concentrations** at White Sands Beach will be modeled to determine whether a **predictive relationship** exists between bacterial contaminants and the other parameters.

Results and Expected Benefits

The expected outcomes of this study include the following.

- A better understanding of the contribution of stormwater, septic systems, sediment reservoirs, and the growth of fecal indicator bacteria on aquatic plants to microbial pollution of the lake.
- Correlation of indicator bacteria and microbial source tracking indicators of human fecal pollution with a group of representative human pathogens. This will improve our understanding of the relative usefulness of various indicator bacteria (fecal coliforms, *E. coli*, enterococci) in freshwater bodies in Florida for public health protection, as well as help to identify the dominant locations and sources of contamination to the lake.
- Development of methodology to identify pollution sources in a stormwater-impacted lake, which can then be used to improve infrastructure, whether the pollution is stormwater-related, tied to sewage disposal, or from mixed sources.
- Development of a predictive model that links environmental parameters to microbial concentrations at the beach.
- In collaboration with Hillsborough County Public Works Department Stormwater section, we expect to develop recommendations for best management practices that will, when implemented, restore the water quality of Lake Carroll to allow full usage of this important natural resource.
- Ultimately, the improved understanding of the relationship between environmental parameters (i.e. stormwater flow), human health risk (human-associated markers and pathogens) and the various indicator bacteria will allow the State of Florida to make informed decisions about the best use of fecal indicator bacteria for assessing water quality and protecting human health. The methodologies employed and lessons learned here will be applicable to other water bodies across the State of Florida, providing great benefits to **public health** and to **protection of environmental water quality**.

General Project Information

Lake Carroll is a 216 acre Lake located in the Carrollwood section of Tampa, FL. Lake Carroll was chosen as the study site for several reasons: (a) stormwater has been implicated as a possible major contributor to the degradation of water quality in Lake Carroll (see below), (b) the lake houses a beach permitted by the Florida Department of Health (DOH), (c) several groups, including DOH, Hillsborough County Stormwater, and the University of South Florida (USF) have planned or have ongoing studies there, and (d) the system is relatively simple, in that there are no agricultural and few wild animal inputs, therefore stormwater or sewage are the most probable sources of contamination to the lake.

A one-year study funded by the Carrollwood Civic Association has just been completed by the applicant (laboratory of Dr. Valerie J. Harwood). White Sands Beach is located on Lake Carroll, and has been permitted as a public swimming beach for decades. The Florida Department of Health (DOH) monitors water quality at permitted beaches by testing for the fecal indicator bacteria known as fecal coliforms, enterococci, or both. In the past two years, high levels of enterococci that exceed State water quality standards have resulted in several advisory warnings issued by DOH for White Sands Beach; however, fecal coliform levels less frequently exceeded the standard. The beach water quality advisories prompted the Carrollwood Civic association to fund the pilot study to assess microbial water quality in Lake Carroll, which was conducted by our (Harwood) laboratory.

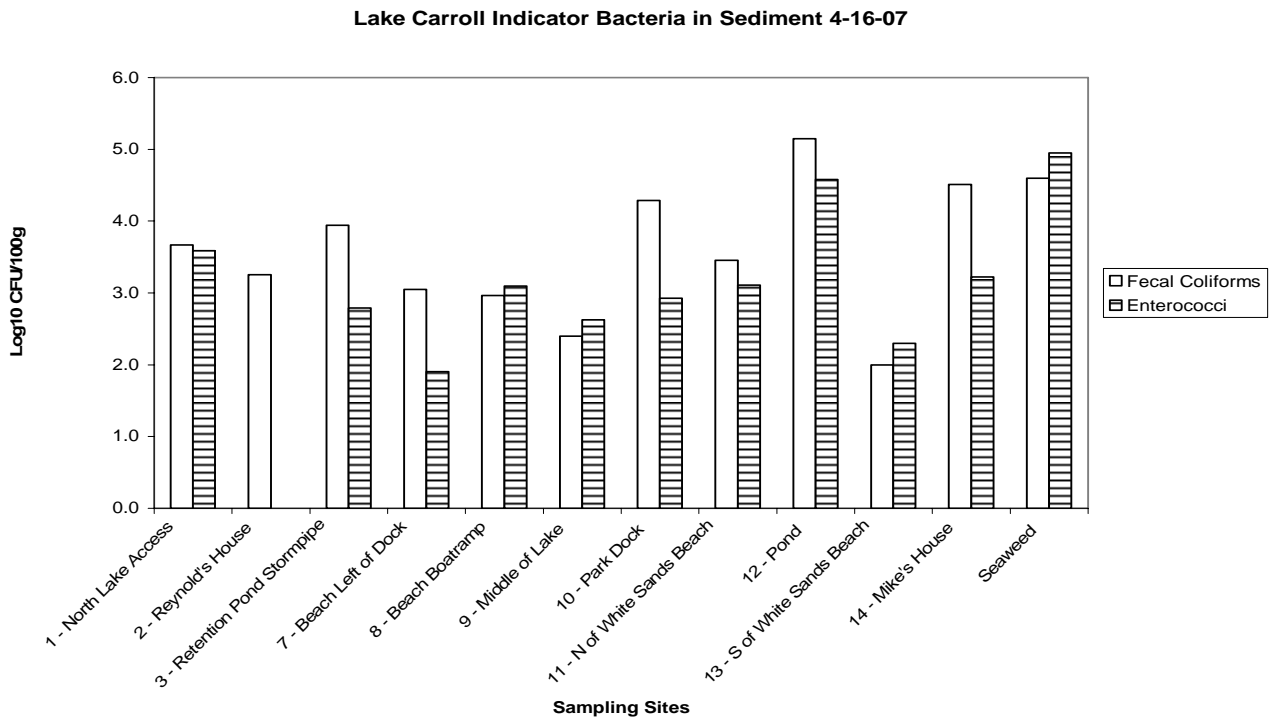
The results of this study can be outlined as follows:

- Enterococci levels at the White Sands Beach site and/or the immediately adjacent boat ramp site exceeded State standards on 9 of 11 sample dates (81.8%). Fecal coliform standards were only exceeded on 3 of 11 sample dates (27.3%).
- The northern sites that receive stormwater from smaller lakes north of Lake Carroll had higher levels of fecal coliforms and enterococci than the southern sites, which would be less immediately impacted by the stormwater.
- The concentration of fecal coliforms, but NOT enterococci, at all Lake Carroll sites was correlated with rainfall.

- The concentration of enterococci, but NOT fecal coliforms rose in Lake Carroll waters over the winter months, which is an atypical pattern for Florida waters.
- Extremely high concentrations of enterococci were attached to (growing on) aquatic vegetation in the lake (see last column of Figure 1).
- The DNA marker (*esp*) for human-associated *Enterococcus faecium* was observed at White Sands Beach through December 2006, but not from January through April 2007. These observations coincided with renovations to the beachfront restrooms, which was completed in December 2006. These results suggest that human fecal contamination may have been coming from the restrooms, but was terminated after repairs were completed.

Taken together, these observations suggest that different factors are driving enterococci levels and fecal coliform levels in the water, although as fecal indicators, both SHOULD be correlated.

Figure 1. Fecal indicator bacteria (fecal coliforms, white bar; enterococci, striped bar) in sediment samples from Lake Carroll. Note extremely high concentrations of enterococci attached to sea grasses (far right column).



ATTACHMENT 4

Scope of Work

Site Selection and Sampling. Sample sites will be selected in collaboration with Hillsborough County Stormwater, and will include many of our existing sites. They will include the two White Sands Beach sites currently monitored, the point of entry for flow from the upstream lakes, and several stormwater effluent sites. Whenever possible, stormwater samples will be taken (a) within the pipe, (b) at the point of effluent delivery to the lake, and (c) from sediments entrapped in the system (baffle boxes, etc). Five sediment samples, seven water samples and three samples of aquatic plants will be collected at each sample event. Some flexibility will be maintained in the sampling plan so that “targets of opportunity” can be sampled. Samples will be collected monthly for a ten-month period (ten sample events) in order to capture seasonal variability. Sampling for indicator bacteria will be coordinated with Hillsborough County Stormwater’s project so that bacterial loading to Lake Carroll from stormwater inputs can be calculated and correlated with nutrient (nitrogen and phosphorus) loading.

At the White Sands Beach site, an experiment will be carried out to determine whether elevated bacterial levels in the water column can be caused by sediment or aquatic plant disturbance. Bacterial levels in water, in sediments and on aquatic plants will be tested separately, and sediments will be purposely agitated at the water depth of one foot to mimic a bather in the water. The water column will be sampled immediately after agitation to capture bacteria that are resuspended from sediments and plants. This experiment will be repeated on at least 3 separate dates.

Indicator Bacteria. At most sites, both water column and sediments will be sampled. Indicator bacteria will be enumerated by membrane filtration methods approved by the State of Florida and the USEPA, and will include fecal coliforms (APHA 1995), enterococci (USEPA 2002) and *Escherichia coli* (*E. coli*) (USEPA 2003).

Microbial Source Tracking. Tests for bacteria from human sources will include PCR for the *esp* gene of *Enterococcus faecium* (Scott et al 2005), PCR for human polyomaviruses (a nonpathogenic virus found in ~50% of individuals) (McQuaig et al 2006), and PCR for human-specific *Bacteroides* (Bernhard and Field 2000).

Pathogens. Water samples from stormwater pipes and White Sands Beach will be tested for representative pathogens during the study. Bacterial pathogens will include *Salmonella* spp., the protozoan will be *Cryptosporidium*, and enteric viruses (*Enterovirus*, *Reovirus*) will be measured by integrated cell culture-PCR (ICC-PCR; USEPA/600/R-95/178). Pathogens will be measured at one stormwater outfall and at White Sands Beach (two sites per sample event).

Other Measurements. Physical-chemical measurements such as pH, dissolved oxygen and temperature will be recorded. Accumulated rainfall at various time intervals preceding sampling will be calculated and correlated with bacterial measurements. Aquatic plant material will be quantified by randomly sampling using the rake toss methodology (<http://www.dec.state.ny.us/website/dow/bwam/aquatic06.pdf>) and recording the dry weight of the biomass collected.

Data Analysis. The correlation of fecal indicator bacteria, pathogens, and markers for human-associated fecal microorganisms will be determined. Bacterial loading into Lake Carroll from stormwater under various hydrologic conditions will be calculated and compared to values in sediments and water column. The relationships of various parameters, including stormwater flow, temperature, and aquatic vegetation to that of microbial parameters will be modeled to determine which parameters are predictive of elevated indicator bacteria concentrations and/or pathogen or human fecal source loading.

Deliverables

- Interim report 6 months
- Draft final report 11 months
- Final report 12 months

References

- American Public Health Association.** 1995. Standard Methods for the Examination of Water and Wastewater, 19th ed. American Public Health Association, Inc., Washington DC.
- Bernhard, A. E., and K. G. Field.** 2000. A PCR assay to discriminate human and ruminant feces on the basis of host differences in *Bacteroides-Prevotella* genes encoding 16S rRNA. Appl. Environ. Microbiol. 66:4571-4574.
- McQuaig, S.M., T.M. Scott, S. R. Farrah, J. O. Lukasik and V. J. Harwood.** 2006. Novel method for the detection of human derived fecal pollution in environmental waters using a PCR based human polyomavirus assay. App. Environ. Microbiol. 72: 7567-7574.

- Scott, T. M., T. M. Jenkins, J. Lukasik, and J. B. Rose.** 2005. Potential use of a host associated molecular marker in *Enterococcus faecium* as an index of human fecal pollution. *Environ Sci Technol* 39:283-287.
- U.S. Environmental Protection Agency.** 2002. Method 1600: Enterococci in water by membrane filter using membrane-enterococcus indoxyl- β -glucoside agar (mEI). EPA/821-R02-022. U. S. Environmental Protection Agency, Office of Water. Washington, D.C.
- U.S. Environmental Protection Agency.** 2003. Bacterial water quality standards for recreational waters (freshwater and marine waters). EPA/823.R-03/008. U. S. Environmental Protection Agency. Washington, D.C.



Hillsborough County
Florida

Office of the County Administrator
Patricia G. Bean

BOARD OF COUNTY COMMISSIONERS

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April 30, 2007

Valerie J. Harwood, Ph.D.
Department of Biology
University of South Florida
4202 E. Fowler Ave.
Tampa, FL 33620

Subject: Lake Carroll Study

Dear Dr. Harwood,

This letter expresses strong support for your research proposal entitled "Assessing Sources of Indicator Bacteria and their Relationship with Human Pathogens in Lake Carroll" which will be submitted to the Hillsborough County Environmental Protection Commission Pollution Recovery Fund.

The research direction outlined in this proposal is highly compatible with the goals of Hillsborough County Public Works Department's Stormwater Management Section. We have scheduled a study of Lake Carroll that will include a stormwater pollutant loading component, as well as development of best management practices based on the results of the study. Data on bacteriological and microbial water quality will allow a much more complete assessment of stormwater pollutant loading.

We anticipate working closely with you and your group on this study, and will provide you with technical assistance and help with data interpretation whenever possible.

Sincerely,

David Glicksberg, P.G.
Environmental Manager
Stormwater Management Section

cc: Chin-Feng Ho, Ph.D., P.E., Acting Manager, Stormwater Section, Public Works
Jason Mickel, Chief Environmental Scientist, Stormwater Section, Public Works



APPLICATION FOR POLLUTION RECOVERY FUND ASSISTANCE

DATE OF APPLICATION: _____

A. BASIC ASSISTANCE

1. Applicant: The legal name of the applicant/organization, the organizational unit and the complete mailing address of the applicant.

Name: Valerie J. Harwood, Pd.D.
Organization: Department of Biology, University of South Florida
Address: 4202 E. Fowler Ave, SCA 110
Tampa, FL 33620

2. Project Manager Information: Give name and title of the representative of the applicant who will be the Environmental Protection Commission's principle contact concerning this application

Name: Valerie J. Harwood, Ph.D.
Title: Associate Professor
Address: 4202 E. Fowler Ave, SCA 110
Tampa, FL 33620
Phone Number: (813) 974-1524
Email: vharwood@cas.usf.edu

Project Title Assessing Sources of Indicator Bacteria and Pathogen Presence at Lake Carroll, a Freshwater Beach

Project Time Start: April 30, 2008 End: March 31, 2009

Total Cost of Project \$ **101961.70**

Total EPC share requested \$ **101961.70**

3. Assistance Type: **New or Renewal** (check one)

New - Award of funds for initial request within the project period.

Renewal - Award of additional funds for a project beyond the current project period.

4. Project Location: The specific location(s) of the project. **(Attach Site Map)**

Lake Carroll, Carrollwood area of Tampa, FL

5. Is the Project for:

Restoration of a polluted area

Mitigation of the effects of pollution

Pollution Control Activity to prevent or minimize pollution

Education (Environmental Stewardship and/or Pollution Prevention)

6. Is the Project directed toward restoring an identified "polluted area" (a geographic area destroyed or altered by dredging or filling or contaminated by an emission or discharge), or toward terminating an identified pollution source? Identify and explain:

This project is aimed at **identifying** the source of bacterial pollution (fecal indicator bacteria) in a freshwater lake, which must first occur before the pollution input can be **reduced or terminated**. White Sands Beach is located on Lake Carroll in the Carrollwood neighborhood of Tampa, FL, and has been permitted as a public swimming beach for decades. The Florida Department of Health (DOH) monitors water quality at permitted beaches by testing for the fecal indicator bacteria known as fecal coliforms, enterococci, or both. In the past two years, high levels of enterococci that exceed State water quality standards have resulted in several instances of advisory warnings issued by DOH for White Sands Beach; however, fecal coliform levels less frequently exceed the standard. The beach water quality advisories prompted the Carrollwood Civic Association to fund a one-year pilot study to assess microbial water quality in Lake Carroll, which was conducted by our (Harwood) laboratory. The results of this study (see study plan) suggested that the many stormwater outfalls that enter the lake are major contributors of indicator bacteria; however other sources, including enterococci growing on aquatic plants, may also be influencing water quality. The goal of the proposed study is to (a) determine the loading of indicator bacteria to Lake Carroll from stormwater runoff, which can potentially be controlled (terminated), (b) to assess the extent to which bacterial growth on plant matter affects the water quality, which could be decreased by controlling the plant biomass that grows in Lake Carroll, and (c) test the stormwater and beach water for human pathogens to gather direct evidence for

human health risk, or lack thereof. This study has implications for the assessment of water quality in all urban water bodies of Florida. If the indicator bacteria are shown to be primarily derived from stormwater impact and from growth on plants, their high levels have little relevance to human health risk. A contrasting situation would be that in which human sewage contamination was suspected, which constitutes a great risk to the health of recreational water users.

7. Is the harm or potential harm to health, safety or welfare of the public or wildlife actual or potential? Does the project seek to alleviate actual or potential harm and what is the severity of the harm and the causal relationship between the “pollution” and the harm?

Identify and explain:

This study seeks to clarify the relationship between the **pollutant** and the **possible harm** to human health. Elevated levels of fecal indicator bacteria are linked to increased health risk for swimmers and bathers when the contamination source is HUMAN SEWAGE. Human health impacts from such exposure range from life-threatening diseases such as hepatitis to less severe illnesses such as gastroenteritis, which is generally self-resolving in healthy adults. However, microbial infections that are relatively mild in healthy adults can have much more severe impacts on the immunocompromised, elderly, and infants. Because fecal indicator bacteria can be contributed to water from many different sources, including stormwater, domestic animal feces and bird feces, elevated levels of these bacteria do not always indicate sewage contamination. The many possible source(s) of indicator bacteria complicates interpretation of test results when the bacterial source is unknown (as is frequently the case). The Lake Carroll pilot study conducted by our laboratory found that the regulatory standard for enterococci, but not fecal coliforms, was regularly exceeded at White Sands Beach in Lake Carroll. Such results are difficult to interpret for regulatory officials and citizens alike: which standard should be believed?

In the pilot study an additional test for human sewage was used: a polymerase chain reaction (PCR)-based, test for human-specific *Enterococcus faecium* that detects the *esp* gene. This marker was detected on 3 occasions at White Sands Beach from July to December 2006. These results strongly suggested that human fecal pollution (sewage) was contributing to the indicator bacteria load at the beach, which would indicate elevated human health risk to beachgoers. The restrooms at the beach underwent renovation from October 2006 to December 2006. The human-associated *esp* gene was not detected in the next four months, from January to April, suggesting that the renovations may have eliminated the sewage contamination. Further testing for microbial pathogens is necessary to confirm this hypothesis and also to ascertain the sources of indicator bacteria if they are not from sewage.

8. How long has the pollution existed or how long before any harm will be evident?

The deterioration of water quality in Lake Carroll may have occurred over decades, but in 2000, the stormwater system was altered due to local flooding, and stormwater from three smaller lakes to the north was directed to Lake Carroll. Currently, ten stormwater outfalls empty into Lake Carroll. The water quality at White Sands Beach was assessed by fecal coliform counts for many years, and was generally in compliance with State standards with the exception of a few samples per year. *Enterococcus* levels exceeding Florida standards were noticed in May 2005 when this fecal indicator bacteria group was measured rather than fecal coliforms. Retesting revealed continued elevated levels of enterococci, which were sporadically accompanied by elevated fecal coliform levels. The results of the pilot study to identify the source(s) of this contamination by the University of South Florida have indicated that enterococci concentrations through 2007 are still frequently high; enterococci levels at White Sands Beach and throughout the northern portions of the lake exceeded DOH regulatory limits on a majority of sampling dates.

9. Identify and describe how the project proposes to alleviate the pollution (addressing technical, practical, and cost effectiveness issues):

This study will **identify point sources of bacterial contamination** in Lake Carroll, which we hypothesize are the stormwater system inputs. Furthermore, this study will be coordinated with a study by the Hillsborough County Public Works Department Stormwater Management section that will be measuring nutrient inputs from the stormwater system. With the aid of the Department of Health, this study will also map the locations of the homes that utilize onsite wastewater treatment and disposal (septic) systems. Intensive sampling of lake water and sediments will be conducted at those homes that are near the water in order to determine whether they are contributing to contamination. These results will determine whether **changes in stormwater infrastructure** will be necessary to alleviate contaminant loading to Lake Carroll. Ultimately, this cooperative, multi-agency study will lead to recommendations for best management practices to reduce loading and potential fecal pollution. The occurrence of human-specific markers for pathogens and their validation with pathogen presence will also lead to cost-effective methods to assess impaired recreational waters that may impair human health. These human-markers will also allow the determination of sources of fecal pollution and whether elevated indicator bacterial concentrations represent a danger to public health.

10. Is the polluted area one which has previously been subject to commission enforcement and, if so, when and what was the result?

No

11. If no actual pollution exists and no prior commission enforcement action has occurred, does the project otherwise enhance pollution control activities within the

County?

The state of Florida allows the use of fecal coliforms or enterococci as the basis for bacteriological water quality at freshwater beaches. The US Environmental Protection Agency has encouraged states to use *E. coli* or enterococci as the basis for recreational water quality assessment, and requires each State to demonstrate that alternative criteria (such as the fecal coliform standard) are at least as protective for public health as the EPA-recommended standard. The enterococci standard is generally more frequently exceeded than the fecal coliform standard when they are simultaneously conducted; however, the risk to human health posed by elevated enterococci levels that are contributed from stormwater and other natural sources (e.g. growth on plants) is not known. Prior to altering the indicator bacteria criteria in Florida, it is necessary to assess the usage of these indicators in predicting the presence of human pathogens as well as correlating the survival of indicator organisms with the fate of pathogens. The work proposed here will assess the correlation of indicator organisms and pathogens, and determine alternative sources of these organisms. Furthermore, an improved understanding of the impact of stormwater, septic systems, and the "natural" proliferation of enterococci in Lake Carroll on plants, will be applicable to other Florida recreational water bodies.

12. Can this Project be divided into separate and independent parts, and if so,

a) What are they? No

b) How would the costs be allocated between them? _____

c) Would the applicant be willing to accept only partial funding? _____

13. Are other funding sources committed to the project?

If so, how much and for what? No

14. Why do you believe that this Project is of sufficient importance to justify the expenditure of Pollution Recovery Funds?

This study will serve several important purposes with far-reaching implications for the assessment of water quality at Florida freshwater beaches: (1) It will determine the extent to which stormwater and other sources impact water quality; (2) it will provide information on the ability of enterococci to grow on aquatic plants and in the water and sediments; and (3) It will help determine whether the enterococci standard (recommended by the USEPA) is an appropriate standard in urban lakes by correlating enterococci numbers with specific markers for human sewage. **If enterococci, which should be definitively linked to fecal pollution, can become “naturalized” and grow in these waters, they have lost their connection to human health risk and are therefore not an appropriate indicator organism for urban lakes in Florida.** The consequences of such a disconnect are fiscal and emotional; loss of revenue for businesses, decrease in property values, and decrease in quality of life from loss of use of the resource. The assessment of fecal indicator bacteria concentrations in water and sediment associated with the stormwater system will also allow **recommendations for the reduction and/or elimination of pollution into Lake Carroll, and the methodologies employed will be applicable to reduction of pollution in other recreational water bodies.** Data generated from monitoring of human-specific markers, pathogens, and the fate of pathogens will also be useful in better protecting human health by identifying sources of fecal pollution. Correlation of these data with indicator concentrations will also lead to a better understanding and interpretation of bacterial concentrations and their actual relevance to pathogen presence.

15. Will the project enhance the value of private property, and if so, whose?

Lake Carroll is an urbanized watershed dominated by residual land use. Retention of a beach swimming permit should support existing property values, but should not increase them.

B. ATTACHMENTS

All applicants must submit responses to the following as attachments corresponding to the indicated numbers:

1. Please provide a detailed map of the project site, if applicable.
2. Principal Investigator and Key Personnel - Present a biographical sketch of the principal Investigator(s) incorporating the following information: Name, Address, Phone Number, Email Address, Education, Background and other qualifying experience for the project.
3. Project Narrative - Please provide a narrative statement describing the project that includes the following:
 - a) Objectives of this Project - Describe the principal and subordinate environmental objectives of the project. Pinpoint any relevant physical, economic, social, financial, institutional or other problems requiring solution.
 - b) Results and/or Benefits Expected - Identify specific environmental results

- and/or benefits to be derived from the project. Include all primary and secondary benefits accruing to the grantee, to the pollution served, and in general, to the public and environment.
- c) General Project Information - Discuss the criteria that will be used to evaluate the results and successes of the project as well its relationship to other work planned, anticipated or underway.
4. Scope of Work – Provide a detailed scope of work for the proposed project. List in chronological order a schedule of accomplishments, progress, or milestones that are anticipated over the length of the project.

5. Budget Information – Please itemize expenditures necessary to perform project using the format below. **Please note that it is the policy of the Executive Director to maximize the environmental restoration and pollution prevention potential of each project seeking funding. Therefore, projects requesting indirect costs (e.g. – overhead) in excess of five percent (5%) of the total direct costs of the project will not be considered for funding.**

BUDGET CATEGORIES

	PRF Funds	Federal	Applicant	State	Other
a. Personnel	39563.59				
1.					
2.					
b. Administrative					
c. Materials	23750.00				
d. Contractual	29000.00				
e. Construction					
f. Other (grad student tuition)	4680.00				
g. Total Direct Charges (Sum of a. to f.)	\$97106.39				
h. Indirect Charges	4855.32				
TOTAL	101961.70				

C. SUBMITTAL OF APPLICATION

Please submit a total of five (5) applications [Four (4) paper + one (1) in electronic format on a CD] to:

Environmental Protection Commission of Hillsborough County
Environmental Resources Management Division
Attn: Tom Ash / Pollution Recovery Fund
3629 Queen Palm Dr., Tampa, Florida 33619

***Completed applications must be received at the above address by
5:00 p.m. (EDT), May 1, 2007.***

Late applications and email applications will not be considered.

www.epchc.org

E-Mail: epcinfo@epchc.org

AN AFFIRMATIVE ACTION – EQUAL OPPORTUNITY EMPLOYER

POLLUTION RECOVERY FUND APPLICATION PROCESS
Terms and Conditions

The following terms and conditions govern the use of the Pollution Recovery Fund and will be considered during the application review process and applied to any subsequent award of grant funding:

1. This application is for funds granted through the Environmental Protection Commission's Pollution Recovery Fund as regulated by the EPC Act and Chapter 1-9, Rules of the Environmental Protection Commission. Reimbursement for work performed is contingent upon submittal of valid, original invoices to the EPC Project Manager within the timeframe specified in a fully executed grant agreement by and between the applicant and the Environmental Protection Commission of Hillsborough County. No work associated with the approved project is authorized until such time as the applicant has received a copy of a fully executed grant agreement.
2. Funding for indirect costs (e.g. – overhead) in excess of five percent (5%) of the total direct costs of the project will not be considered.
3. Funding requests for capital equipment will only be considered if such equipment relates directly to the project proposed and is a vital part of the project's success. Any such requests will be considered on a case-by-case basis and any equipment purchased using Pollution Recovery Funds may be subject to ownership by the Environmental Protection Commission under the terms of the executed grant agreement.
4. Travel is not reimbursable by the Pollution Recovery Fund unless explicitly allowed under the terms of the executed grant agreement.
5. Repairs and/or routine maintenance of equipment, not purchased by Pollution Recovery Funds and, therefore, not subject to EPC ownership are not reimbursable by the fund.
6. EPC Board approval and subsequent execution of grant agreements may take up to one year from the date of application. Applicants should plan accordingly to allow for this timeframe in their project planning. Every effort will be made to expedite seasonal or otherwise time-sensitive projects however, at no time will the process take less than six (6) months from the application deadline.



I have read and accept the terms and conditions presented here and choose to submit my application for Pollution Recovery Funds in accordance with these terms and conditions.

Applicant's Signature:

05/01/07
Date:

POLLUTION RECOVERY FUND APPLICATION PROCESS

Instructions

The Hillsborough County Environmental Protection Act (Chapter 84-446, Laws of Florida) and Chapter 1-9, Rules of the EPC establish a pollution recovery fund which is to be supervised and used by the Commission to restore polluted areas of the county, as defined by the Commission, to the condition they were in before pollution occurred, to mitigate the effects of pollution, or to otherwise enhance pollution control activities within Hillsborough County. The application and review process is generally as follows:

Application Forms must be submitted on or before the May 1, 2007, 5:00 p.m. deadline. *Late applications and email applications will not be considered.*

- There will be a newspaper advertisement, and possibly press releases, specifying the deadline for submitting applications.
- Application forms and instructions can be obtained from Tom Ash, phone 813-627-2600 Ext. 1011 or from our website at: www.epchc.org
- Except under special circumstances, applications submitted earlier than the deadline will be held until the next processing period, and then processed with the others.

Following the deadline, applications will be distributed to the EPC General Counsel's office, EPC Staff, and Citizen's Environmental Advisory Committee (CEAC).

- Both the applicant and/or reviewer may request a meeting to discuss details of the project at any time during the review process.
- Applicants will be invited to attend a regularly scheduled CEAC public meeting to make a brief (15 minute) presentation in support of their project and answer any questions that may arise. EPC technical staff will be in attendance.
- EPC staff will meet with the Executive Director to discuss all applications in the group and to prioritize and determine recommendations for CEAC and the EPC's Commissioners to consider.

A summary of the EPC Staff recommendations will be presented to CEAC.

- Staff will present recommendations to CEAC, then CEAC will discuss the applications and its recommendations to the EPC Board.

Staff and CEAC recommendations will be presented to the EPC Board for final decision.

- The EPC Board meeting will likely be the first or second EPC Board meeting following the CEAC meeting so that the information can be properly placed on the agenda (typically the EPC Board meeting will be one of those in the September – November time frame) .
- Applicants may choose to attend the EPC Board meeting and may request to speak.

If the project is approved, the applicant must sign an agreement before monies will be available.

- EPC Legal will draft the agreement with standard terms and conditions. The EPC's Project Manager will then provide it to the applicant for review and execution.
- EPC Legal will arrange for execution of the agreement by the EPC Chair after it is executed by the applicant, and will then forward final copies to the Applicant's Project Manager and the EPC Project Manager.
- The EPC Project Manager will be responsible for ensuring the applicant's compliance with the agreement.



Hillsborough County
Florida

Office of the County Administrator
Patricia G. Bean

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April 30, 2007

Valerie J. Harwood, Ph.D.
Department of Biology
University of South Florida
4202 E. Fowler Ave.
Tampa, FL 33620

Subject: Lake Carroll Study

Dear Dr. Harwood,

This letter expresses strong support for your research proposal entitled "Assessing Sources of Indicator Bacteria and their Relationship with Human Pathogens in Lake Carroll" which will be submitted to the Hillsborough County Environmental Protection Commission Pollution Recovery Fund.

The research direction outlined in this proposal is highly compatible with the goals of Hillsborough County Public Works Department's Stormwater Management Section. We have scheduled a study of Lake Carroll that will include a stormwater pollutant loading component, as well as development of best management practices based on the results of the study. Data on bacteriological and microbial water quality will allow a much more complete assessment of stormwater pollutant loading.

We anticipate working closely with you and your group on this study, and will provide you with technical assistance and help with data interpretation whenever possible.

Sincerely,

David Glicksberg, P.G.
Environmental Manager
Stormwater Management Section

cc: Chin-Feng Ho, Ph.D., P.E., Acting Manager, Stormwater Section, Public Works
Jason Mickel, Chief Environmental Scientist, Stormwater Section, Public Works