

MIAMI BEACH

Emergency Purchase Authorization Request

No.: _____

Contact Information

Date: June 23, 2022	Requestor: Lindsey Precht, Assistant Director
Location of Emergency: Park View Island Canal	Requesting Department: Environment & Sustainability
Required Goods/Services: Water Quality Expert to Identify Cause of High Bacterial Levels in Park View Island Canal and Recommend Permanent Solutions	Contact No.: 305-673-7000 ext 26008

Nature of Emergency

Describe Type (threat to public's life, health, welfare or significant loss of property) and Details of Emergency (Attach additional detail, if necessary, and all available documentation justifying emergency declaration.):

Park View Canal is experiencing elevated fecal bacteria levels and a "no contact with the water" advisory is in place for the waterway adjacent to the kayak launch at 73 Street is exceeds limits for recreational swim standards. The persistent high bacteria levels require expertise in intertidal zone contamination. The City has exhausted all available investigations and analysis, and a more in-depth study of non-point source pollution, including an expanded coverage area, more parameters, increased frequency, and recommended solutions is required.

On March 4, 2020 Jaffer Wells Drilling, a sub-contractor for Hy-Power, struck a 42-inch sanitary sewer main near the intersection of 17 Street and Lincoln Road. This event caused increased pressure throughout the sanitary system and on March 5, 2020 caused a sewer force main break at the parking lot at 72 Street and Collins Avenue. Following the break, sewage recovery and cleaning efforts began immediately and continued for approximately one week after the spill. Water quality testing began on March 6, 2020 to identify impacts to the surrounding surface waters.

Typically, following a sanitary sewer break, surrounding surface waters will continue to have high bacteria counts for a couple of days following the incident. However, high bacteria counts continued many days following the sewage break repair and further analysis of historical data indicate that this waterway has chronically elevated bacteria levels beyond those caused by the sewer break.

Signage was posted at the kayak launch, notices were issued via the City's Neighborhood Affairs Division team, and information was posted on the City's website. The Public Works Operations Division, along with the Environment and Sustainability Department identified possible sources of cross-contamination in the area along with site specific conditions that potentially could negatively impact the area. The following were identified as potential sources of bacteria: siphon (underwater sewer pipe) between Parkview Island and 72 Street, abandoned force main from North Bay Village at 72 street, abandoned overflow from Sewer Pump Station No. 23 located at 72 Street and Abbot Avenue, human waste from homeless community or otherwise, animal waste, slow movement of water along the canal, possibly limiting "flushing" effect.

Efforts to isolate potential sewer leaks have included multiple dye tests to isolate potential sewer leaks, deep cleaning of the stormwater lines, water quality testing throughout the stormwater system, sediment sampling in the canal, CCTV inspections and smoke testing to determine potential illegal cross connections between private properties sewer lines and the City's stormwater system. The investigations performed to date have not identified any significant deficiencies within the City's public infrastructure.

In October and November 2020, the City hired Source Molecular to complete source tracking analysis to identify fecal gene biomarker for humans and/or canines at four locations within the canal. The results indicated that fecal coliform from humans was not detected or detected, but in quantities below the limit of quantification. Fecal coliform for canines had high concentrations which led the City to launch a multi-tiered outreach campaign began to educate the public and encourage people to pick-up after their animals. This campaign includes advertisement on bus shelters, water bills, digital ads, and direct mailing. Educational signs have been installed in the local dog parks, parks, and along the right-of-way and reusable doggie bag dispensers and flyers were distributed to residents walking their dogs in the area as well as to local veterinarians and dog groomers.

In November 2020, the City retained ESciences, a third-party consultant specializing in environmental and ecological investigations, to conduct a thorough analysis of the data and investigations to date and provide a road map forward in the illicit discharge detection and elimination. Concurrently, smoke testing and CCTV inspections have also been performed to determine potential illegal cross connections between private property sewer lines and the City's stormwater system. Between June and August 2021, additional DNA source sampling was conducted to identify fecal gene biomarker for humans and/or canines at four locations within the canal, but added a new fecal gene biomarker for birds. The results indicated that fecal coliform from humans was not detected or detected, but in quantities below the limit of quantification. Fecal coliform for canines continued to be detected at high concentrations, and the new biomarker for birds was also detected at high concentrations.

Staff has met with the Florida Department of Health (FDOH) and Miami-Dade County Division of Environmental Resources Management (DERM) to review the data. The recommendation from the meeting was to increase education and outreach related to residents cleaning-up after their dogs. To date, the Code Compliance Department has conducted targeted inspections in this area, focusing specifically on dog issues. In addition, another communication effort was made to inform residents in the area of the importance of picking-up after their pets. The City also had conversations with municipalities in Monroe and Broward Counties to explore other potential solutions for reducing the high bacteria which may be further replicating in the low flow, high nutrient environment of the canal. Potential options include aeration and bubblers to increase dissolved oxygen and potential help increase water movement. These options will require environmental permits and conversation with the regulatory entities are on-going. To date the City has spent over \$70,000 on investigations such as smoke testing, water quality sampling, contracting a third party to perform an unbiased investigation, and in performing additional

cleaning and maintenance in the stormwater system. This long-lasting issue is a threat to the public's life, health, and welfare. It is crucial that the source of the pollution be identified, eliminated, and then solutions developed in perpetuity.

Before these next steps are taken, it is essential to conduct more specialized and in depth analysis. The lasting high bacteria levels in the canal are concerning and an expert in the field of contamination in intertidal zones is necessary to develop permanent solutions.

Vendor(s) Information

Proposed Vendor (attach detail if multiple vendors): University of Miami, c/o Dr. Helena Solo-Gabriele

Estimated Cost (if known):

\$122,000.00

Describe How & Why Recommended Vendor(s) Selected:

An internal staff team, made up of Amy Knowles, Lindsey Precht, Joe Gomez, Cristina Ortega, and Mariana Evora, meet biweekly to examine the next steps to take, and additional analysis/ expertise is needed. An expert in the field of contamination in intertidal zones is necessary to develop permanent solutions. In the area of infectious disease transmission, Dr. Solo-Gabriele is known nationally and internationally for her work evaluating microbes in water and sediments, in particular, beach sands.

Her area of focus is the interface between water and sediments in both rivers and in marine environments. In marine environments, her team has documented new microbial sources and mechanisms of microbe accumulation in the intertidal (or swash) zone. The traditional viewpoint of beach shore microbe contamination has been through the discharge of sewage from urban communities through ocean outfalls. Typically, ocean outfalls are designed to discharge treated sewage offshore and to optimize mixing to minimize impacts to beach waters. The studies by the U.S. Environmental Protection Agency used to develop regulations for beach water quality are conducted in areas impacted by ocean outfall discharges. However, Dr. Solo-Gabriele's team has documented that there are other significant sources of microbes to beaches known as non-point sources. These sources include humans and animals that frequent the beach shore. Her team has documented the contributions of microbes from human bathing and from animal feces in nearshore environments. These local sources are either directly deposited on the shore or washed on-shore (e.g., from human bathers) and accumulate in the intertidal sediments. Her studies have documented elevated concentrations of fecal indicator bacteria (indicate the presence of pathogens) in the nearshore sediments with hot-spots in the supratidal zone, the zone at a higher elevation than the intertidal zone. In addition to work focused on fecal indicator bacteria, her team (as part of the Oceans and Human Health Center at the University of Miami) has conducted pioneering work to evaluate pathogens directly, through traditional culture and innovative molecular techniques, in beach water and sand, followed by risk assessments to suggest acceptable levels for microbes in beach sands.

Her research in this area has included an epidemiologic study (led by Dr. Lora Fleming of UMIAMI) that showed that microbial contamination from local sources results in human health impacts. The epidemiologic study (randomized trial) showed that exposure to beach water contaminated with microbes from local sources was associated with skin and gastro-intestinal ailments. In addition, her team has documented children's behaviors in beach environments as a means of improving the understanding of exposure to contaminants in this area. This information has since been used to update risk assessments from children's exposures to beach sands.

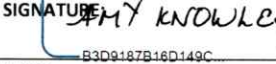



As a result of the environmental studies focused on microbes in the intertidal zone, the paradigm of water quality has changed. It has changed from the traditional viewpoint of offshore sewage discharge sources towards onshore non-point sources. As a result of these studies, the World Health Organization has since added a chapter to their Recreational Beach Water Quality Guidebook which focuses on sand quality. Dr. Solo-Gabriele was a key contributor to that chapter and wrote the section that provides provisional guidelines for acceptable levels of fecal indicator bacteria in beach sands based upon non-point sources. This is the first time that regulations have been proposed globally for beach sands.

Dr. Solo-Gabriele was selected due to her extensive background in non-point source pollution and developing recommendations for permanent solutions. The attached proposal contains additional information on the scope or work.

City Code Sec. 2-396. - Emergency Purchases:

(a) **City Manager.** In case of an apparent emergency requiring immediate purchase of supplies or contractual service, the city manager shall be empowered to authorize the procurement director to secure by open market procedure at the lowest obtainable price, any supplies or contractual services not exceeding \$25,000.00. The city manager has the authority to act in the case of an emergency that might affect the health, safety and welfare of the city. Such action shall be reported at the next regular meeting of the city commission when supplies or services exceed \$25,000.00.

(b) **Head of Department.** In case of actual emergency, and with the prior consent of the procurement director, and the prior approval of the city manager, the head of any using agency may purchase directly any supplies whose immediate procurement is essential to prevent delays in the work of the using agency that may vitally affect the life, health or convenience of citizens. The head of such using agency shall send to the procurement director a requisition and a copy of the delivery record, together with a full written report of the circumstances of the emergency.

Department Head	Procurement Director	Assistant City Manager	City Manager
SIGNATURE: 	SIGNATURE: 	SIGNATURE: 	SIGNATURE: 
DATE: 6/23/2022 3:12 PM EDT	DATE: 6/24/2022 11:49 PM EDT	DATE: 6/24/2022 12:41 PM EDT	DATE: 6/24/2022 12:41 PM EDT

UNIVERSITY OF MIAMI
COLLEGE of ENGINEERING



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RE: **Proposal titled, "Sources of Enterococci to an the Kayak Launch Area in Miami Beach"**

Date: June 1, 2022

To: Lindsey Precht, c/o City of Miami Beach Team Cristina Ortega, Amy Knowles, Joe Gomez, Mariana Evora, Giancarlo Pena

From: Helena Solo-Gabriele, Professor, University of Miami, College of Engineering

Re: Project titled: Sources of Enterococci to an the Kayak Launch Area in Miami Beach

Thank you for meeting with me on March 17, 2022 and for sharing the data files that document the fecal indicator bacteria (enterococci and fecal coliform) in the waters near the Kayak Launch in Miami Beach. Also thank you for meeting with me again on April 29 to provide feedback on the proposal that was submitted. From the data files, it is apparent that a lot of work has been done which provides considerable insight into the potential sources. Below is an overall assessment and recommendation for further evaluation. I have also included an appendix where I describe my thoughts on the information contained in the various folders that were shared with me. There are additional recommendations listed in the appendix.

Overall Assessment

The canal water at the Kayak Launch (GPS: 25° 51' 31.20" N. 80° 07' 33.00" W) located in Miami Beach near 73 Street and Dickens Avenue (Figure 1) is chronically elevated with fecal indicator bacteria. This is observed for both enterococci and fecal coliform, although enterococci are more elevated. In sanitary sewage, the opposite holds true, where fecal coliform is typically at levels of 10^6 MPN per 100 mL whereas enterococci is typically at levels of 10^5 per 100 mL (Roca et al. 2019). So, the fact that enterococci is higher than fecal coliform leads me to believe that there may be differential die-off or regrowth of enterococci in the environment. Regrowth has been documented to occur in shallow sediment side slopes of water bodies in areas characterized by high organic matter and shade (Solo-Gabriele et al. 2000, Desmarais et al. 2002). On the eastern bank of the Kayak Launch area are mangroves which are known to retain soils with high organic content and which also provide shade. I recommend investigating the sediments that are tidally influenced (in the intertidal zone) for levels of enterococci.

I therefore recommend a phased approach. Below is a breakdown of the first phase.

Phase 1a, Further evaluation of bacteria data already collected against environmental data.

Although a considerable amount of data was collected through the City of Miami Beach, a thorough environmental analysis to evaluate correlations with tidal height and weather events was not found in the

documents provided. This work should be conducted with the bacteria data that has already been collected to determine whether associations exist between environmental factors and enterococci and fecal coliform levels.

Phase 1b, Evaluation of sediments as possible sources.

The data collected through the City of Miami Beach to date are consistent with a potential sediment source of fecal indicator bacteria. The sediments should be evaluated for enterococci levels including sediments along the canal banks (under the mangrove area) and sediments within the storm sewer system. Samples should be collected at low tide from the intertidal zone. Sediments should be analyzed for moisture content and percent volatiles, as these factors may influence the ability of bacteria to persist and possibly regrow in the sediments.

Phase 1c, Intense spatial sampling.

To further isolate the location of the hot spot in the Kayak Launch area, a spatially intense sample collection program is recommended. The program is to include a series of transects that cut across the canal at locations of interest to the north and south of the Kayak Launch area. The spatially intense sampling should be conducted at extreme high tide and at extreme low tide, with all samples collected as quickly as possible to get a snapshot of the enterococci distribution. A possible design of the spatially intense sampling program is illustrated in Figure 2. Samples would be analyzed for basic physical chemical parameters (including dissolved oxygen) plus enterococci by Enterolert.

Phase 1d, Intense temporal sampling.

Some prior efforts have been completed to collect bacteria data on a daily basis and also several times per day. The results show that the enterococci levels are highly variable between days and between fractions of a day. The lack of trends indicates that the temporal time scale of sampling is too coarse. There is a need to collect samples from one location over shorter time scales. I recommend the installation of an autosampler at the Kayak station (in an enclosure to avoid vandalism) which collects samples every hour over the course of several days. Samples should be collected 2 times per day (once every twelve hours) in individual pre-sterilized containers. Depending upon the results from Phase 1c, an additional site may be set up at an identified hotspot location (e.g., OT-1) which showed extremely high levels of enterococci in prior studies.

Future beyond Phase 1

Future potential work beyond Phase 1 can include, for example, evaluating unregulated outfalls for possible sources of fecal indicator bacteria.

Estimated Budget

This work is to be initiated on July 1, 2022 and end on October 31, 2022. In order to fast track this study, Phases 1a, 1b, and 1c will be initiated immediately. We will also initiate the process of coordinating the building of the enclosure and nozzle system for Phase 1d. The results from 1c (Intense spatial sampling) will guide the placement of the autosampler system for 1d (intense temporal sampling). The rough budget for a project is as follows.

Description	Amount
Time for Helena Solo-Gabriele, direct and fringe	\$24,290
PhD Student Time (3 months full-time), salary	\$9,000
Research Associate Time (3 months full-time), salary & fringe	\$19,035
Undergraduate Researchers (2 students)	\$11,440
Supplies (includes 300 samples for enterococci)	\$15,298
Administrative Costs	\$42,937
Total	\$122,000

Assumes that City of Miami Beach will provide boat access and construct enclosure and nozzle system for autosampler. University of Miami team will provide examples and design guidance for the enclosure/nozzle system.

Deliverables

The team will host a kick-off meeting to get input and feedback from the City of Miami Beach concerning the planned approach. This meeting will be via Zoom and/or in person.

Reports will be provided monthly. These reporting schedule is as follows.

- Progress Report 1: Due date, July 31, 2022
- Progress Report 2: Due date, August 31, 2022
- Progress Report 3: Due date, September 310, 2022
- Final Report: Due date, October 31, 2022. The final report will include the results of the sampling efforts and work to identify the source of the non-point source pollution. The report will also identify recommended solutions and high-level cost estimates to implement said recommendations.

The University of Miami team will be prepared to meet with the City of Miami Beach every other week to provide updates on the study, to explain the contents of the reports, and to obtain feedback and recommendations from the City.

Timeline

Task Descriptions	July				August				September				October			
Week number	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Kick off meeting and field visit		X														
Phase 1a, Environmental Data Assess	X	X	X	X	X	X	X									
Phase 1b, Sediments			X	X	X	X	X	X								
Phase 1c, Spatial Sampling			X	X	X	X	X	X	X	X	X	X	X	X		
Phase 1d, Temporal Sampling						X	X	X	X	X	X	X	X	X	X	
Bi-weekly Meetings		X		X		X		X		X		X		X		X
Progress and Final Reports				X				X				X				X

References

- Roca, M. A., Brown, R., Solo-Gabriele, H. M. 2019. Fecal indicator bacteria levels at beaches in the Florida Keys after Hurricane Irma. *Marine Pollution Bulletin*, 138, 266-273. <http://doi.org/10.1016/j.marpolbul.2018.09.036>
- Desmarais, T.R., Solo-Gabriele, H.M., and Palmer, C.J., 2002. Influence of Soil on Fecal Indicator Organisms in a Tidally Influenced Subtropical Environment. *Applied and Environmental Microbiology*, 68(3): 1165-1172. <http://dx.doi.org/10.1128/AEM.68.3.1165-1172.2002>
- Solo-Gabriele, H., Wolfert, M., Desmarais, T., and Palmer, C., 2000. Sources of E.coli to a Sub-Tropical Coastal Environment. *Applied and Environmental Microbiology*, 66(1): 230-237. <http://dx.doi.org/10.1128/AEM.66.1.230-237.2000>

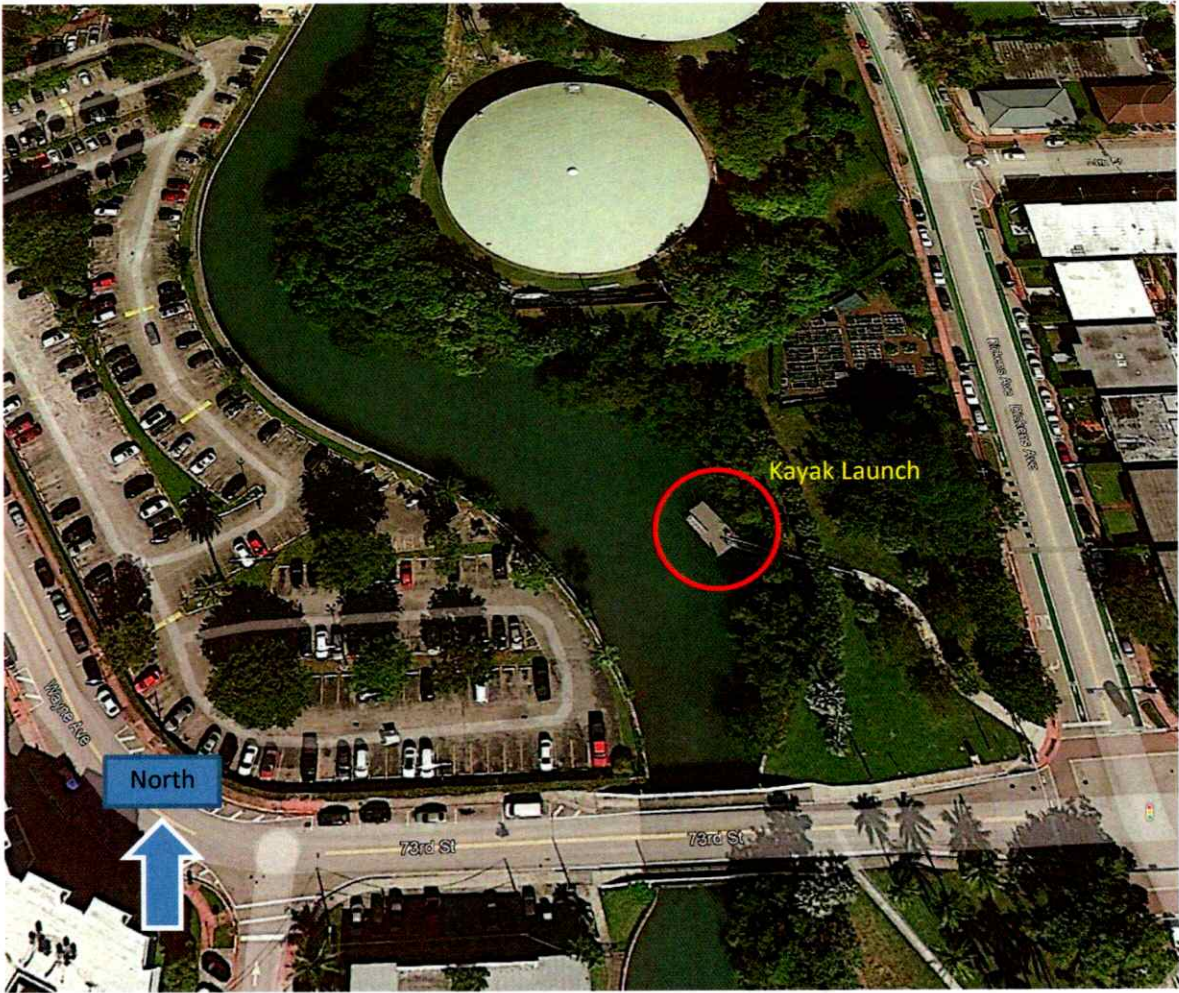


Figure 1: Location of Kayak Launch (25° 51' 31.20" N. 80° 07' 33.00" W), near 73 Street and Dickens Avenue Miami Beach, FL. Basemap from Google Earth.

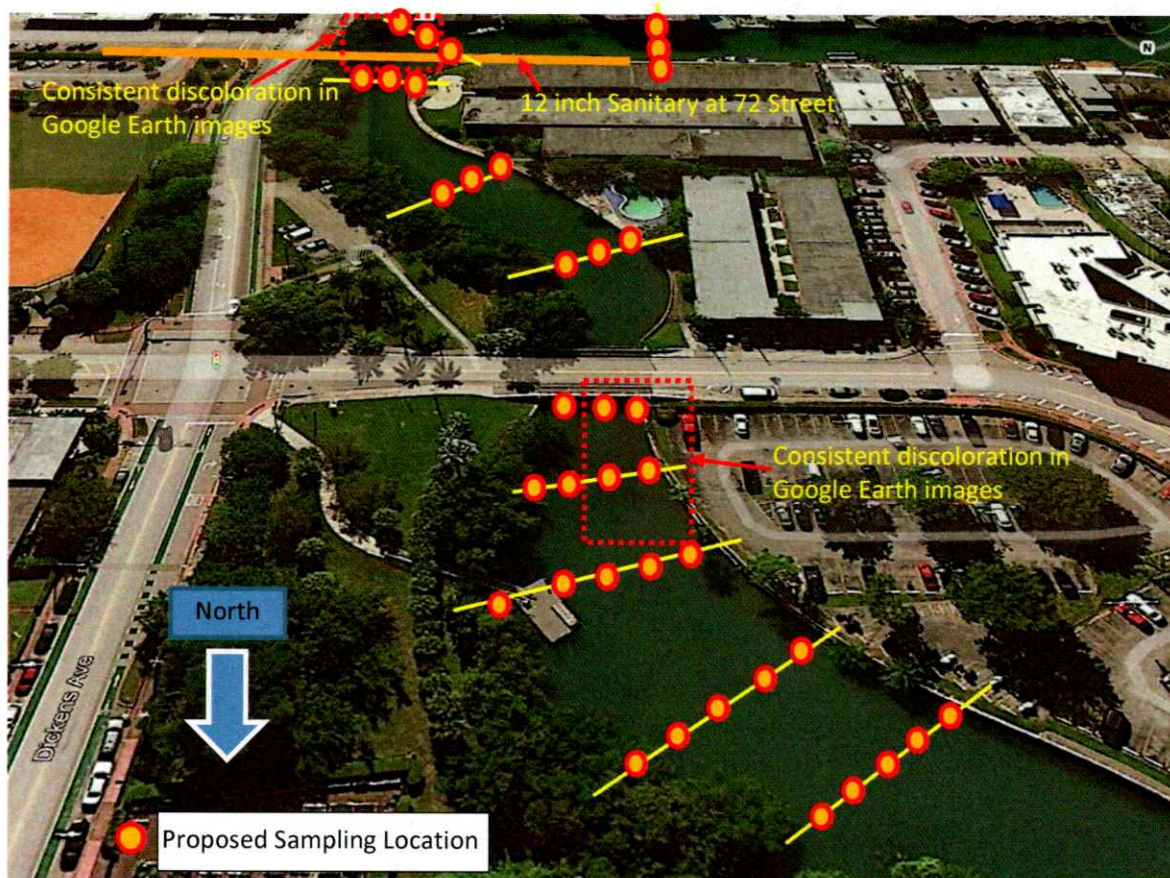


Figure 2: Potential Sample Collection Program for Phase 1c, to evaluate the spatial distribution of enterococci. Conduct sampling at low tide and high tide. Run either 1:10 to 1:100 dilutions using Enterolert.