

**NATURAL RESOURCES DEPARTMENT
MEMORANDUM**

DATE: December 22, 2011

TO: City Manager Judie Zimomra

FROM: Natural Resources Director Robert K. Loflin Ph.D.

RE: Charity Car Wash Recommendations

After observing a proliferation of charity car wash events on the island in locations that drain into the already water quality impaired Sanibel River basin and in consideration of potential water quality impacts from such events, the Natural Resources Department recommended that charity car washes be restricted to the Sanibel School. This alternative location was thought by staff to be an adequate option for these events which would not contribute run-off water to the Sanibel River basin and where run-off would be better retained and treated in the extensive retention system that exists on school grounds.

At Council's direction, water quality sampling was conducted at a Fort Myers Lacrosse Team's charity car wash at the Bank of the Islands. The attached memo from biologist James Evans evaluates the sample results from this event. The samples do show concerns for a number of pollutants including surfactants from the soap and increased chemical oxygen demand consistent with the existing literature on potential charity car wash impacts. However, the volume of run-off from the approximately 60 cars that day was insufficient to deliver any of these pollutants directly into the Sanibel River basin and they will only enter the basin following future rains where they will be substantially diluted and have the potential for considerable treatment prior to entering any open water body.

Staff still recommends that the Sanibel School is a better location for these events but if Council wishes to authorize charity car wash events within the Sanibel River basin, a combination of best management practices and the potential implementation of a transfer of carwash runoff to the Sanibel sewer system would minimize potential impacts. These recommended requirements for the issuance of a special events permit for a charity carwash in the Sanibel River basin include:

- 1. Applicant will submit a plan for the placement of hay bales and/or filter fabric to contain direct run-off in coordination with the City Engineer. Upon approval, that plan will be implemented prior to the start of the event and removed within 24 hours afterwards.**
- 2. Applicant will use spray nozzles exclusively to limit water volume**
- 3. Applicant will utilize an environmentally appropriate detergent that is biodegradeable and does not contain phosphates.**
- 4. Applicant will locate the actual carwash operation at the host business in a manner that maximizes the use of the existing retention facilities at the site and minimizes direct run-off as determined by the City Engineer.**

Memorandum

To: Rob Loffin, Director of Natural Resources
From: James Evans, Environmental Biologist
Subject: Water Quality Testing Results for the FMHS Lacrosse Team Fundraiser Carwash
Date: 12/27/2011

In an effort to determine if runoff from charity carwashes poses a direct threat to water quality within the Sanibel River, Natural Resources Department staff monitored and collected water samples from the Fort Myers High School Lacrosse Team's fundraiser carwash held on November 5, 2011.

Prior to sampling, Natural Resources Department staff conducted a brief literature review and consulted with the Lee County Environmental Laboratory to determine appropriate parameters for sampling. Chemical oxygen demand (COD), nitrate and nitrite (NO_x), surfactants, and total dissolved solids (TDS) were selected to determine if effluent from the carwash had the potential to impact water quality within the Sanibel River. In addition to collecting samples, fluorescent dye was also used to track effluent water from the carwash through the stormwater system.

The original sampling plan included collection of two control samples and two effluent samples. This design would allow us to subtract the background pollutants within the stormwater system from the effluent water from the carwash and to determine the effectiveness of the Best Management Practices (BMPs) employed.

Prior to the start of the carwash, representatives from the FMHS Lacrosse Team installed hay bales around the catch basin located on the south side of the washing area. Additional hay bales were also installed in the vegetated swale running parallel to Casa Ybel, approximately 75 feet from the terminus of the culvert. The BMPs were inspected to ensure that they complied with the National Pollution Discharge Elimination System (NPDES) installation specifications provided by the City's Public Works Department.

Sampling was conducted November 5, 2011 between 9:00 a.m. and 3:00 p.m. All samples were collected wearing latex gloves and using sterile 60 ml syringes to fill each of the bottles. All sample bottles not requiring preservatives were rinsed 4 times with sample water prior to collection. The first control sample (Control 1) was collected at 9:30 a.m., just prior to the beginning of the carwash. The sample was collected within the catch basin located at the bottom of the slope to the south of the bank teller window. The catch basin grate was removed in order to collect the sample. After the sample was collected the grate was replaced. The second control sample (Control 2) was collected at 9:40 a.m. from the swale at end of the culvert that runs parallel to Casa Ybel Road. At 12:30 p.m., midway through the event, green fluorescent dye was deployed in the storm drains located to the north and south side of the washing area.

The volume of water produced by the carwash was relatively low. During the event, runoff never reached the hay bales placed in front of the storm drain or the unprotected drain located to the north (see attached photos). Due of the lack of runoff, only one effluent sample was collected (Effluent 1). The sample was taken from a small stream of effluent water within a shallow joint between the pavement and bank teller pad, located approximately 10 feet from the washing area (see attached photos). After collection, all samples were placed on ice and were delivered to the Lee County Environmental Lab the following Monday for analysis.

The fluorescent dye that was deployed within the storm drains remained stagnant during the entire event and did not move out of the catch basins. I inspected the site three days after the carwash and the fluorescent dye was still present in the catch basins and had not moved to other areas of stormwater system.

Below are the results of the water quality samples collected on November 5, 2011.

Water Quality Results

Sample	COD (mg/L)	NOx (mg/L)	Surfactants (mg MBAS/L)	TDS (mg/L)
Control 1	24	1.41	0.010	586
Control 2	24	0.038	0.033	584
Effluent 1	94	0.205	7.56	410

Chemical oxygen demand (COD) is a measure of the mass of oxygen consumed per liter of solution and can be used as a measure of organic compounds in water. Sample results suggest that the chemical oxygen demand in the effluent water was approximately three times greater than that of the stormwater system. This suggests that organic compounds in the effluent water

have the potential to decrease dissolved oxygen available to fish and invertebrates if the water were to reach natural waterbodies.

Nitrate and nitrite (NO_x) is a measure of inorganic nitrogen (excluding ammonia and nitrogen gas) and is often used as an indicator of nutrient pollution. NO_x concentrations were more than 6 times greater within the catch basin (Control 1) compared to the carwash effluent and were more than 35 times higher than Control 2. The carwash effluent concentrations were comparable to the 70th percentile distribution for Florida streams (Hand 2008), while concentrations within the catch basin (Control 1) were much higher and exceeded the 90th percentile. It not surprising to see higher NO_x concentrations associated with a catch basin located within a parking lot, as these areas are known to collect and concentrate nitrogen. However, NO_x concentrations at the end of the stormwater system (Control 2) were the lowest of the three samples collected and were comparable to the 30th percentile distribution.

Surfactants are compounds that lower surface tension of a liquid and may act as detergents, wetting agents, emulsifiers, foaming agents, or dispersants. Even biodegradable detergents are surfactants and can have negative environmental impacts. Ecologically they are known to be toxic to plants and animals. In aquatic systems they can be especially toxic to fish by destroying the external mucous layer that protects them from harmful bacteria (Oknich 2002 and references therein). A study conducted on rainbow trout in Washington State found that surfactant concentrations of 1.6 mg/L were sufficient to kill one-half of the population in their study (Brasino and Dengler 2007). Surfactant concentrations in the carwash effluent collected on November 5th were 7.56 mg/L and were more than 225 times higher than either of the control samples. Because the carwash effluent was collected within 10 feet of where the cars were being washed and did not reach the stormwater catch basin, it is hard to determine what the surfactant concentration would be at the end of the system and if it would impact the ecology of the Sanibel River. Therefore, with the available data it is impossible to make direct comparisons between these two studies.

Total dissolved solids (TDS) is a measure of the combined content of all inorganic and organic substances contained in a water sample. TDS data suggest that background levels within the stormwater system were higher than what came from the carwash; however, concentrations were relatively comparable between the control and effluent samples.

References to Environmental Impacts of Carwashes

Oknich, J. 2002. The Perceived Environmental Impact of Car Washing. Ramsey-Washington Metro Watershed District.

<http://sharepoint.snoqualmie.k12.wa.us/ckms/spiesse/Lists/Announcements/Attachments/43/carwash.pdf>

Brasino, J., and J. Dengler. 2007. "Practical" Fish Toxicity Test Report. Car Wash Enterprises Final Report.

<http://www.washwithwatersavers.com/Portals/0/Fish%20Toxicity%20Report.pdf>

Hand, J. 2008. Typical Water Quality Values for Florida's Lakes, Streams, and Estuaries. Florida Department of Environmental Protection.

Smith, D., H. Shilley. 2009. Residential Carwash Water Monitoring Study. City of Federal Way, Public Works Division Final Report.

<http://www.washwithwatersavers.com/Portals/0/2009%20FW%20CarWash%20water%20Monitoring%20Study.pdf>

Cressall, R., Presentation from President of Western Carwash Association.

<http://www.carwash.org/SiteCollectionDocuments/Research/Environmental%20Reports/Want%20to%20Help%20the%20Environment.pdf>

Massachusetts Department of Environmental Protection Nonpoint Source Pollution Education: Car Washing

<http://www.mass.gov/dep/water/resources/carwash.htm>

New England Carwash Association

<http://www.newenglandcarwash.org/feature/2733/answers-to-consumer-questions-about-car-washing.htm>

U.S. Environmental Protection Agency Residential Car Washing

<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=96>

International Carwash Association

<http://www.carwash.org/operatorinformation/research/Pages/EnvironmentalReports.aspx>

Fort Myers Lacrosse Team Fundraiser Carwash WQ Sampling

November 5, 2011
10:00 a.m. – 3:00 p.m.

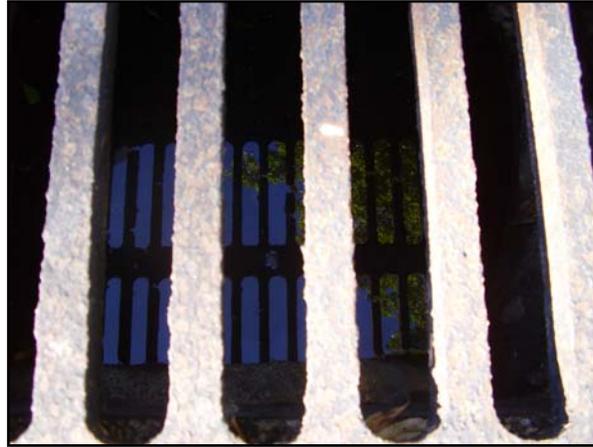
James Evans, Environmental Biologist



NPDES Measures

November 5, 2011 9:56 a.m.

*Control WQ samples collected in stormwater drain and at outfall at 9:30 a.m. and 9:40 a.m.



Storm drain in center of parking lot (west of bank building)

November 5, 2011 10:00 a.m.



November 5, 2011 11:16 a.m. – 12:29 p.m.



Fluorescent dye deployed in north stormwater drain

November 5, 2011 12:35 p.m.



November 5, 2011 12:42 – 12:51 p.m.



Fluorescent dye deployed in southern stormwater drain

November 5, 2011 12:55 p.m.



November 5, 2011 1:14 – 1:36 p.m.



November 5, 2011 1:37 – 1:51 p.m.

*Effluent sample collected from car runoff (photos 3 & 4)