# *FINAL AUDIT REPORT*

## *Nova Southeastern University*

**Field Performance Audit, February 12, 2018**

**Division of Environmental Assessment and Restoration**
**Florida Department of Environmental Protection**
**May 30, 2018**

## Introduction

This field performance audit of the Nova Southeastern University Guy Harvey Oceanographic Center (NSU) was conducted by the Florida Department of Environmental Protection (DEP or department) Southeast Regional Operation Center (SEROC), partnering with the Aquatic Ecology and Quality Assurance Section (AEQAS), in accordance with Rule 62-160.650, Florida Administrative Code (F.A.C). NSU staff have been tasked with the environmental sample collection for the Southeast Florida Coral Reef Initiative's (SEFCRI) Water Quality Monitoring Program, a joint effort between DEP, NOAA, NSU and multiple counties. The Monitoring Program is the first region-wide effort to understand the water quality of the reefs of the SEFCRI region. This large-scale effort measures water quality over the 106-mile length of the coral reef ecosystem that spans from Martin County to Miami-Dade County. This audit was conducted to inform the department and NSU staff of the extent of NSU's conformance of field procedures with the requirements of Chapter 62-160, F.A.C., including implementation of the DEP Standard Operating Procedures for Field Activities, DEP-SOP-001/01, March 1, 2014 (DEP SOPs), which cover sample collection, field testing, and required field documentation. The results of the audit have been evaluated to provide the required corrective actions and recommendations in this report that should be implemented by NSU for full conformance with the DEP SOPs.

## Description of Sampling Event and Audit

Department auditors Kalina Warren and Jordan Skaggs (SEROC) conducted a field performance audit of NSU samplers Kirk Kilfoyle, Emma Wightman, Zachary Vetack, and Don Fahy on February 12, 2018. Auditors met the field personnel at the boat ramp at 8:00 AM to start the sampling day of Jupiter Inlet, one of nine inlets sampled for the project. This sampling event covered ten open water sites: the center of the inlet, south of the inlet, east of the inlet, north of the inlet, and six sites about a mile off shore, parallel to the shore. Sites were sampled in the following order: JUP120, JUP122, JUP123, JUP121, JUP124, JUP125, JUP126, JUP127, JUP128, and JUP129.

At each site, auditors observed samplers collect water samples from 0.5 m below the surface and 1 m from the bottom for total suspended solids, turbidity, ortho-phosphate, nitrate-nitrite, total Kjeldahl nitrogen, total phosphorus, and total nitrogen. Sample containers for nitrate-nitrite, total Kjeldahl nitrogen, total phosphorus, and total nitrogen were pre-preserved with sulfuric acid by NSU prior to the sampling event. Both surface and bottom samples were collected using intermediate devices. Surface samples were collected with a container attached to a pole, and bottom samples were collected with a

Niskin water samplers. For both surface and bottom samples, multiple grab samples were composited in a bucket with a spigot, from which the samples were collected into the bottles. Auditors observed the filtering (0.45 µm) of nutrient and ortho-phosphate samples via syringe for preservation. The buckets, syringe, and Niskin were rinsed 3 times with deionized water at the fourth site; field/equipment blanks were collected at the fifth site. The salinity was measured and recorded with a refractometer; this is not an acceptable testing method by the department and the procedure was not audited.

Kristen Sapp of the AEQAS compiled the audit findings into this report.

## Preliminary Audit Report and Implementation of Corrective Actions

A preliminary audit report was sent to Kirk Kilfoyle of NSU on 04/02/2018. The report included a findings table with spaces for the audited party to respond with further information and/or corrective actions. NSU replied with proposed corrective actions on 04/16/2018 (Table 1). The auditors have reviewed the corrective actions, including form and SOP revisions, and deem them acceptable. Corrective actions were implemented according to the statements in Table 1 and approved by the Department on 04/24/2018.

## Audit conclusions

The audited field procedures and field documentation utilized by NSU conform with the DEP SOPs for surface water collection, and the data quality objectives for the specific project are met. The AEQAS auditors reviewed and accepted corrective actions in the department's final response, and the corrective actions have been implemented as of the dates indicated in Table 1.

***Table 1. Findings of deficiency and corrective actions for field sampling and field testing performance of NSU conducted on 02/12/18.***

| Finding Number | DEP SOP Reference | DEP SOP Requirements | Audit Finding/Auditors' Notes | Recommended or Required Corrective Action (CA) | NSU Response | AEQAS Final Response |
|---|---|---|---|---|---|---|
| **1** | FD 5000 section 2.5 and section 3. | A specific description of all sampling locations must be recorded. | Station IDs are recorded, but the latitude and longitude of those station IDs cannot be traced to the SOP or Scope of Work (SoW). The lat/longs were programmed in the GPS, but not documented anywhere. | **Required CA**: Link the location (latitude and longitude) with the station ID either in the SOP or the SoW. | **CA Date**: 04/13/2018<br>**CA**: The latitude and longitude of each sampling location has been added to the SoW. | Acceptable |
| **2** | FD 5000 section 3 | Total number of samples transmitted to the laboratory must be documented on forms submitted to the laboratory. | Chain of custody (COC) did not include total number of samples transmitted to the laboratory. | **Required CA:** Modify the COC to include a line to document the total number sample bottles submitted to the lab. | **CA Date**: 04/13/2018<br>**CA**: The total number of sample bottles delivered to the lab is now included on the COC. | Acceptable |

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| **3** | FD 2000 section 1.1 | Cleaning steps in all procedures used for decontamination must be documented either by description or reference to an SOP (DEP SOP or internal SOP). | Sampling equipment (buckets and Niskin) were washed with soap and water at the end of each sampling day, but this procedure is not documented in the SOP. | **Required CA:** Update SOP to include each step of the cleaning procedure. | **CA Date**: 04/13/2018<br>**CA**: The SOP has been updated to include each step of the cleaning procedure for sampling equipment. | Acceptable |
| **4** | FD 2000 section 1.2.1 | For equipment decontaminated on-site in the field, the date and time of the cleaning procedure associated with the affected equipment must be recorded in the field records. | Sampling equipment (buckets and Niskin) were washed with soap and water at the end of each sampling day, but this step was not documented. | **Required CA:** Create a log for cleaning and maintenance should be made for each piece of sampling equipment to document date and time of decontamination. | **CA Date**: 04/13/2018<br>**CA**: Logs have been created to document cleaning and maintenance/repairs for each piece of sampling equipment, including date and time. | Acceptable |
| **5** | FD 5100, section 1 | Filtration of the sample must be recorded, if applicable, including the design and type of filter, pore size, and date and time of filtration. | The filter size and filter time were not documented on the COC or the field sheet. | **Required CA:** Include information regarding filter size and time on the COC or field sheet. | **CA Date**: 04/13/2018<br>**CA**: Filter size and pore size are now included on the COC. Filtration times are already listed on the field data sheet for every sample; it is the same as the sample collection time. | Acceptable |

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| **6** | FD 5100, section 3.1 | The lot numbers and inclusive dates of use must be recorded for all reagents, detergents, solvents and other chemicals used for decontamination and preservation of samples. | Lot numbers for detergents were not documented. For the acid preservative, the expiration date was not documented on the field sheet or the COC. | **Required CA:** Document the lot number and expiration date of all reagents and ensure that they are linked to the associated samples. | **CA Date**: 04/13/2018<br>**CA**: Lot number and expiration date of all reagents are documented on the COC and field data sheet. Single entry applies to all samples collected each day unless otherwise noted. | Acceptable |

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| **7** | FS 1002, section 1.1.2 & 1.1.2.1 | When possible, samples must be collected from the least contaminated sampling location to the most contaminated sampling location. Ambient or background samples are collected first. | Samples were collected on the outgoing tide, and followed the current, so samples with higher concentrations may be collected first. | **Recommended CA:** Describe in your internal SOP the rationale for the sampling order. | **CA Date**: 04/13/2018 **CA**: Sampling takes place during the outgoing/ebb tidal cycle, ideally 2-3 hours past peak high tide to allow time for outgoing water to reach reef sites offshore. Inlets may become hazardous to navigation for small boats (27', in our case) in certain conditions, particularly during the outgoing tide. To increase the safety margin, inlet sites are typically sampled prior to offshore/reef sites before the flow reaches maximum velocity, especially on rough days with swell/heavy chop coming out of the east. Outfall sites are generally targeted last to further reduce the chance of contamination. However, given the location of the outfalls at some inlets, it is not possible to sample them last without creating additional logistical difficulties (i.e., backtracking) which can be greatly exacerbated by rough conditions offshore. This information (and more) has been added to the SOP. | Acceptable |

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| **8** | FS 1005, section 1 | All fuel-powered equipment and vehicles must be parked downwind of or well away from sampling locations where fuel contamination of samples, purging equipment or sampling equipment may have interfered with representative sample collection. | Given the power of the outgoing tide, ocean current, and wind, it was not always possible to sample upwind of any contamination sources. However, petroleum products were not collected for this project. | **Recommended CA:** Make every effort to collect samples downwind and away from any possible fuel contamination source. | **CA Date**: 04/13/2018<br>**CA**: Out of necessity, the engines on the boat are running at all times during sampling, but the bow is generally pointed into the seas (and therefore usually into the wind) during sampling. | Acceptable |
| **9** | FS 1007 sections 1 | Manufacturers' suggested maintenance activities and any repairs must be performed and documented for all applicable equipment and instruments. | There is no log for documenting repairs or maintenance of sampling equipment. | **Required CA:** Create a log for each piece of equipment to document cleaning and repairs. | **CA Date**: 04/13/2018<br>**CA**: See response to finding #4. | Acceptable |