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# Evaluating Physical, Chemical, and Biological Impacts from the Savannah Harbor Expansion Project

Cooperative Agreement Number W912HZ-13-2-0013

## Second Quarterly Report - 2017

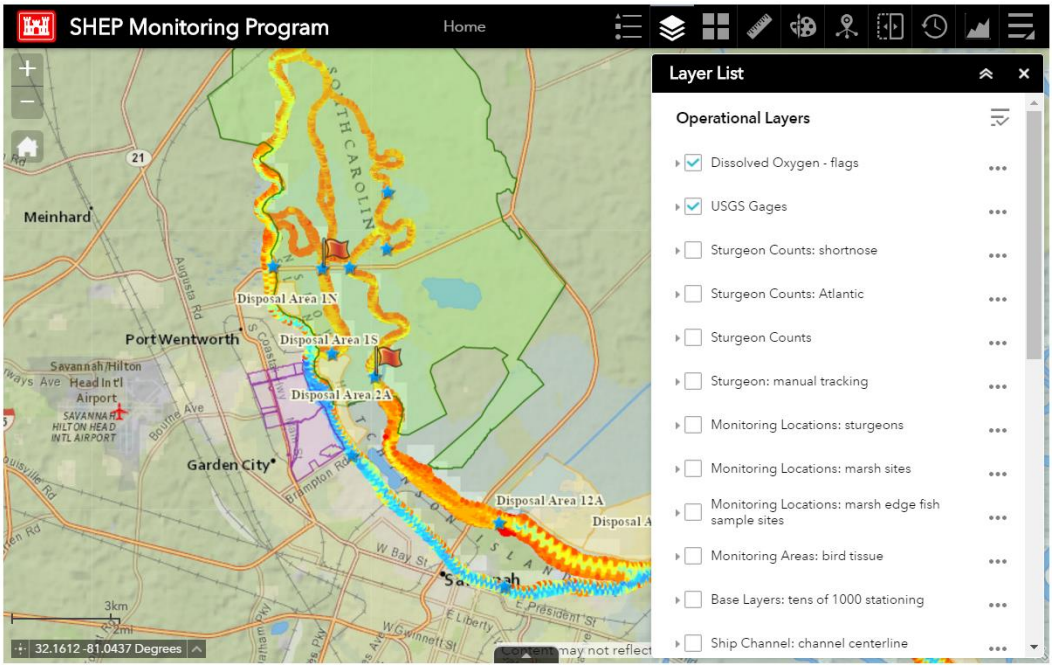
Submitted by Sergio Bernardes and Marguerite Madden
Center for Geospatial Research (CGR)
Department of Geography - University of Georgia
Athens, Georgia 30602

Dear Ms Richards –
The following paragraphs summarize the progress on the project for the period January 1, 2017 through March 31, 2017, according to the five objectives outlined in the Statement of Work and summarized below.

**Progress by Objective**

1. **Research and develop data analysis tools and standardized maps; Analyze and integrate multiple, complex datasets to provide detailed map**
    a. **Bathymetric Data –** We did not receive any additional bathymetry data during this quarter.
    b. **Sturgeon Data –** On February 14 2017 the Center for Geospatial Research met with the South Carolina Department of Natural Resources and discussed strategies for sturgeon data processing, analysis and representation using the SHEP Monitoring Program web portal. South Carolina DNR is compiling an updated sturgeon movement dataset including all receivers and dates, to be sent to the Center for Geospatial Research. We did not receive any additional data for the sturgeon monitoring study in the Savannah River during this quarter. We received reports on sturgeon distribution for December 2016, January 2017 and February 2017. Reports have been posted to the SHEP monitoring website.
    c. **Water Quality –** A new water quality data flagging system was implemented and incorporated into the map portal during this quarter. The system flags real time USGS gage data based on threshold values. A server at the Center for Geospatial Research periodically retrieves the most recent instantaneous value for any selected variable from USGS gage stations. Scripts using the Python language

were written and tested to be used with REST services from USGS (http://waterservices.usgs.gov/rest/IV-Test-Tool.html) for data retrieval. Frequency of retrieval is pre-configured (currently every 15 minutes). The system has been implemented to retrieve dissolved oxygen and water conductance. Retrieving other variables is also possible. The map portal has been programmed to continuously load the retrieved instantaneous data using a pre-configured refresh interval. So, if new data become available after a user opens a map and there are flags to display, the map refreshes itself and displays the flags. No need for the user to refresh the browser to see changes. Refresh rates has been set to 5 minutes. Variables are symbolized using threshold values. For instance, for dissolved oxygen, values below 4 mg/l show as a flag positioned where the gage is located. Dissolved oxygen values above this threshold are not displayed. Currently, the legend for the map has been programmed not to display flag layers. Conversely, the Layer List (second icon from left on the menu of tools) allows for visibility of the flag layer to be turned on and off. The figure below uses mock data to exemplify the use of the flag layer. Flags are displayed for gages 02198950 and 021989793.




d. **Vegetation/Marsh Monitoring Data** – We have received monthly reports for December 2016, January 2017 and February 2017. In addition, we received the Vegetation First Quarterly Report for 2017 and the Vegetation Annual Report for FY 2016. Received reports have all been posted to the SHEP monitoring website.

Data are being retrieved from Vegetation/Marsh monitoring reports for the multitemporal analysis and representation of monitoring variables, including salinity and tree growth.

e. **Avian Tissue Monitoring** – We have not received any data for the avian tissue monitoring study during this quarter. We have received the first quarter Avian Tissue Monitoring reports for 2017. The report has been posted to the SHEP monitoring website.

f. **Marsh Edge Fishes –** Pre-construction monitoring was completed in May 2014. Additional monitoring is scheduled to occur during years 1, 3, 5, and 9 of the post-construction monitoring period but not during the construction timeframe.

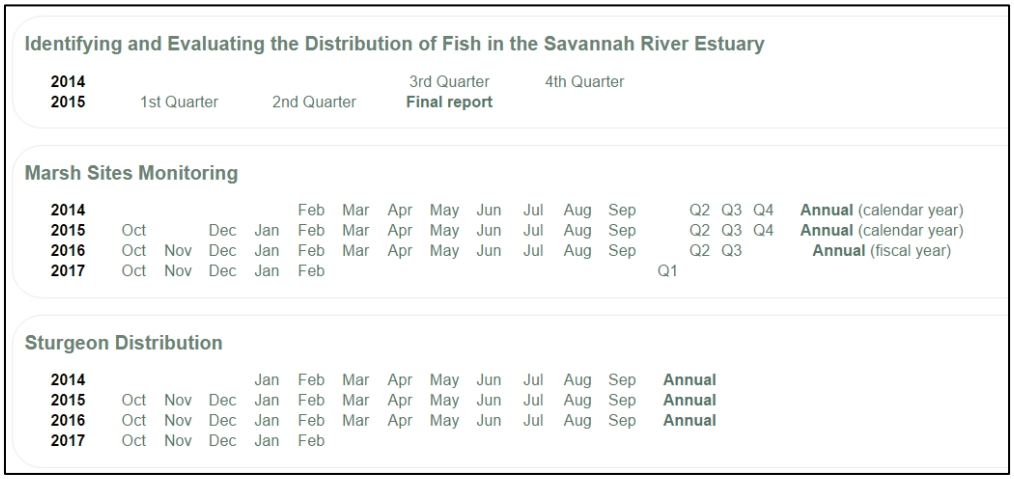
g. **Intensive Water Quality/Hydrologic Monitoring Events –** Sampling for this monitoring element was completed for the pre-construction phase. Sampling efforts are not planned for the construction phase of the project however two additional intensive sampling events are scheduled to occur during the first and fifth years of the post-construction period.

2. **Research, identify, and catalogue existing study documents for the major resource areas**
   a. All existing study documents that we are aware of have been gathered and catalogued.

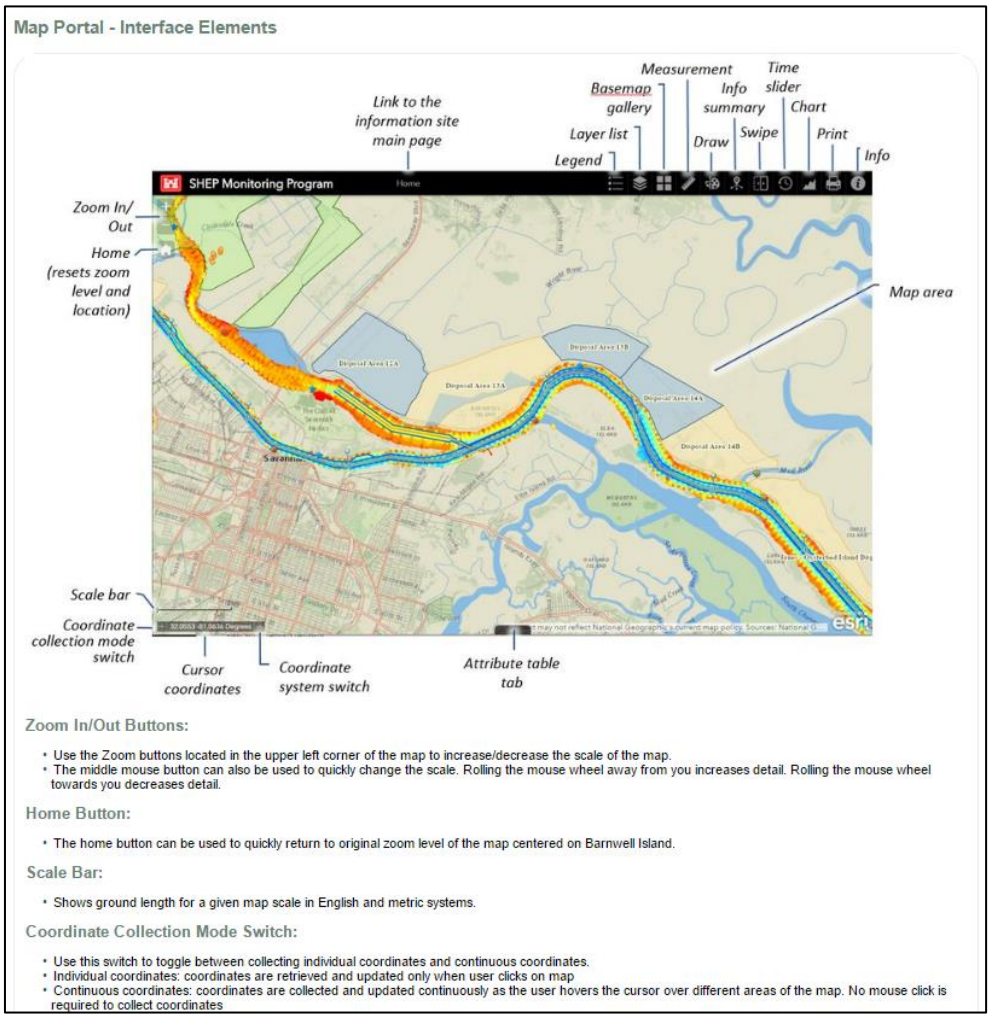
3. **GIS Data and Web Portal**
   a. **Determine appropriate attributes for the GIS**
      i. This is an on-going effort and depends on the data we receive from other researchers as described above in Objective 1. All mapping coordinates are being standardized on the Georgia State Plane Coordinate System, East Zone, NAD83. Vertical coordinates are referenced to NAVD88, except for raw bathymetric data, which are referenced to local MLLW. Data sets with coordinates in other systems are converted to State Plane for compatibility. The original coordinates are preserved in the data sets as attributes. Considering the incorporation of data from sources other than USACE (e.g., water quality data from USGS), a similar effort is being conducted for attribute determination and the definition of the database schema in support of data ingestion by the GIS.

b. **Develop a web portal to facilitate public access to the pertinent data**

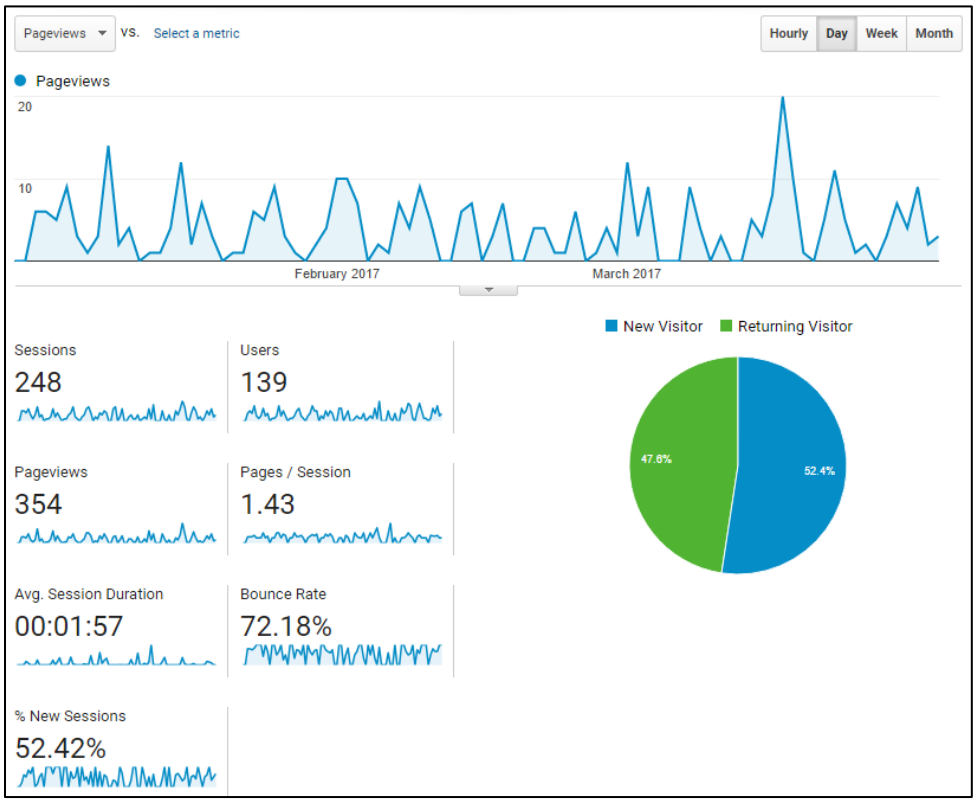
i. During this quarter we restructured the map portal's reports page (http://www.shep.uga.edu/reports.html). The more organized table-based layout uses a Year – Time Unit (e.g., quarter, month, annual) organization scheme and will help users find specific reports. The figure below shows a section of the new reports page and illustrates the organizations of reports by quarter, month and year.




ii. The augmented version of the SHEP Monitoring Program map portal presented to the Army Corps in October 2016 brings multiple enhancements and increased data analysis capabilities. Because those extra capabilities increased map portal complexity, we implemented instructions on how to use the site. A new help page containing descriptions of interface elements was added to the site (see figure below). The page can be accessed by clicking the About button on the menu bar of the map portal, and then clicking on the "map portal help" link. A direct link to the map portal help page is http://www.shep.uga.edu/mapportal_help.html. Descriptions of tools and functionalities are being incorporated into the page.




iii. In order to further understand how the website is accessed by the public, Google analytics were implemented on the SHEP website. These analytics currently can track the number of page views and information regarding the users accessing the site (figure below). The analytics information provided tells us if the user is a new or returning visitor, the operating system used by the visitor, and the country of origin of the user.




During the second quarter of 2017 there were 248 sessions (groups of interactions that may include one or more web page), through which a total of 139 users actively engaged with the website. Statistics include new and returning users. In total, there were 354 page views during the period, including repeated views of a single page.

c. **Develop Standard Operating Procedures (SOP)**

i. Standard Operating Procedures (SOP) for data reporting and handling have been established for the sturgeon, water quality, and bathymetry data. We have developed visualization and display methods for the sturgeon monitoring data, water quality, and the bathymetric surveys. We continue to develop methods for data reporting and handling and are currently working with sturgeon, water quality and marsh sites monitoring datasets.

ii. We are currently reviewing layer content and standardizing attribute table fields for the layers displayed by the map portal. Standardization aims to (1) ensure that relevant fields are being displayed to map portal users, (2) guarantee that field names are descriptive and provide

The University of Georgia

information regarding field contents, and (3) to create a table describing layer and field contents in support of data analysis.

4. **Update and maintain the GIS**
    a. These efforts are on-going. We continue to monitor the availability of GIS data for Chatham and Effingham counties (Georgia) and Jasper County (South Carolina), including LiDAR, base GIS data layers (roads, hydrology, boundaries, etc.), multi-date aerial photography and satellite images in order to build a comprehensive geodatabase for the region. Sources of data include the Georgia GIS Data Clearinghouse, the USGS National Map, NOAA Coastal Services Center, and Savannah SAGIS.
    b. Additional data will be incorporated into the base GIS as they become available.

5. **Prepare quarterly progress reports and annual reports**
    a. This document represents the Second Quarter Report of the 2017 fiscal year for this project.
    b. A budget summary is being provided as a separate document.

Please feel free to contact either Sergio Bernardes or Marguerite Madden if you have questions or concerns regarding this report.

Respectfully submitted,

Sergio Bernardes, Ph.D.
Associate Director, CGR
sbernard@uga.edu

Marguerite Madden, Ph.D.
Director, CGR
mmadden@uga.edu

CGR
Center for Geospatial Research
The University of Georgia