**EM-8 Pollutant Identification and Assessment**

**December 12, 2016**

**Objectives**

1. To facilitate access to accurate and timely water quality data for the BTES by the public, researchers, and governmental agencies.
2. To facilitate access to GIS data and mapping for hydrology, land use, permitted facilities discharging to BTES water bodies, and other related topological parameters which will promote better identification of current or potential water quality impacts.

**Background**

Based on the draft *2016 Water Quality Integrated Report* (IR) there are currently 94 separate basin subsegments (water quality assessment units) in the BTES that are monitored and assessed by the Louisiana Department of Environmental Quality (LDEQ). Assessments occur every even numbered year as required by the Clean Water Act. Most assessments are based on a percentage of ambient data results that meet water quality standards. The typical period of record for each IR is the four years prior to report development; however, due to the four-year rotating monitoring cycle, most subsegments only have one year of data (October – September) available for each IR assessment. Suspected causes of impairment for each subsegment are reported in the IR. A limited number of suspected causes of impairment are based not on ambient data but rather are based on other available information, such as fish consumption advisories and non-native aquatic plants. Table 1 summarizes the different suspected causes of impairment found in the two basins.

| **Table 1. Number of subsegments impaired by the following suspected causes of impairment in the Barataria and Terrebonne Basins. Based on the Draft 2016 Water Quality Integrated Report.**  |
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| **Suspected Causes of Impairment** | **Number of Impaired Subsegments** |
| Non-Native Aquatic Plants | 27 |
| Fecal Coliform | 25 |
| Oxygen, Dissolved | 20 |
| Nitrate/Nitrite (Nitrite + Nitrate as N) | 11 |
| Phosphorus (Total) | 11 |
| Turbidity | 8 |
| Total Dissolved Solids | 7 |
| Residual Surface and Sub-surface Oil/Tar Balls/Tar Mats | 6 |
| Sulfates | 6 |
| Chloride | 4 |
| Enterococcus | 2 |
| Mercury in Fish Tissue | 2 |
| pH, High | 2 |

In order to address the reported impairments it is important to have accurate and up-to-date water quality data and topological information to target actions that are most likely to result in water quality improvements and protection. A number of local, state, federal, and academic institutions are currently engaged in a variety of water quality and GIS data acquisition. By identifying these sources, BTNEP and its partner agencies can promote better coordination between researchers and water quality protection agencies to avoid costly resampling or reanalysis of data that has already been collected.

While not identified as such in Table 1, eutrophication is a known priority problem within the bayous, lakes, and estuaries of the BTES, and in the Gulf of Mexico. Through the development of a comprehensive GIS, linking land uses to nutrient concentrations, identification of point source and any other source loadings within the basins, and estimating movement of water from interbasin discharge (e.g., the Mississippi River) could be accomplished. Similarly, knowledge of the density of fecal coliform bacteria and concentrations of toxic contaminants will assist managers in addressing and evaluating identified problems related to public health and aquatic toxicity. Without such a system, managers will be faced with the task of redeveloping such estimates for each individually proposed project or any management changes within the two basins. Additionally, speculation concerning the eutrophication and contaminant impacts by project opponents may be difficult or impossible to successfully dispute if a systematic quantitative approach for loading projection is not put in place prior to specific project evaluations. Long delays in project implementation may result in the absence of such an approach.

In addition to the potential contaminants described above, a significant legacy of contamination is likely to exist from the past practice of discharging produced water directly into BTES water bodies. Effective in 1995, State regulation banned the practice of discharging produced water into coastal waterbodies (LAC 33:IX.708.C.2.b). However, prior to this time the practice was widespread and resulted in heavily contaminated sediments in the vicinity of the discharges. Boesch and Rabalais (1989) looked at outer continental shelf discharges and concluded that the total volume of produced water entering estuarine and coastal waters in the Gulf of Mexico was estimated to be approximately 435,000 barrels per day and mainly located in the BTES region. St. Pẻ (1990) reported that an estimated 530,000 barrels per day were released into the BTES based on 1987 estimates. This volume was generated from over 300 individual discharges from oil and gas production facilities. Figure 1 illustrates the estimated extent and volume of produced water discharges at the time of the report. Limited information is available at this time to identify all of these former discharge points, therefore, it may not be possible or feasible to locate and remediate these areas.

Identification and assessment of potential pollutants in the BTES is critical to understanding where water quality concerns may exist. This understanding will permit a more targeted effort to maintain and restore water quality in the BTES. In particular, excess nutrients from regional agriculture poses a potential risk to area water bodies. As such, efforts should be made to coordinate with the Louisiana Nutrient Management Strategy to identify and mitigate excess nutrient sources. Other targeted parameters include oxygen demanding substances, fecal coliforms, and toxic pollutants such as organic compounds and metals. Existing sources of data and information include but are not limited to those found in Table 2.

**Description**

Whenever possible, direct links to the various data sources are provided in Table 2. If direct data links are not available, then links to agency or university or NGO websites are provided to facilitate contacting these entities to determine the scope and availability of their data.

**Location where the action will take place**

All identified data sources are based on monitoring and/or research in the BTES.

**Lead agency or entity responsible for implementing action**

Lead agencies or entities are those listed in Table 2. Links to these entities are also provided where available.

Figure 1. Location of produced water discharges in the Terrebonne and Barataria estuarine systems; hatched circles represent OCS-generated produced water. Originally reproduced from Boesch and Rabalais (1999) and then from Rabalais and St. Pẻ (19XX).



**Timelines and/or milestones**

All timelines and/or milestones for this management plan are based on the requirements of the agencies or entities identified above. Timelines and/or milestones for filling in of data gaps will be based on requirements of the agencies or entities with a potential for gathering additional data under existing or yet-to-be developed monitoring programs.

**Possible Range of Costs and Sources of Funding**

Agencies and entities identified above have existing limited sources of funding for their programs. Any additional monitoring to fill in data gaps will have to be funded from yet to be identified grants or other program resources.

**Performance measures (Qualitative where possible)**

Performance measures are established by requirements placed on each agency or entity for its data collection efforts. In order to ensure the integrity and accuracy of the data made available through this management plan, all data, assessments, and information should be collected or developed with the best possible quality assurance/quality control (QA/QC) measures. QA/QC requirements are frequently a requirement of the funding source for most sampling programs.

1. Website links on BTNEP website to agency data websites
2. Website links to GIS apps
3. Refer to Table 2

| **Table 2. Website links to agencies and entities either collecting or with the potential for collection of water quality and other data or information in the Barataria/Terrebonne Estuary system.**  |
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| **State Agencies** | **Data Type** | **Description of Available Website Information** | **Website Link** |
| **Louisiana Department of Environmental Quality (LDEQ)**  | Ambient water quality monitoring program | Water sample and meter readings from statewide ambient monitoring sites typically sampled monthly for 12 months.  | <http://www.deq.louisiana.gov/portal/tabid/2739/Default.aspx>  |
| Water quality Integrated Reports | Water quality assessment reports mandated by the Clean Water Act produced in April of even numbered years. | <http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityAssessment/WaterQualityInventorySection305b.aspx>  |
| Nonpoint Source (NPS) Watershed Implementation Plans (WIPs) and NPS Management Plans | Special project water quality data collected in support of Nonpoint Source WIPs or other pollution reduction efforts. | <http://nonpoint.deq.louisiana.gov/>  |
| Aquifer Evaluation and Protection | Groundwater data collected to assess and protect drinking water aquifers. | <http://www.deq.louisiana.gov/portal/tabid/108/Default.aspx>  |
| Source Water Assessment Program | Surface or groundwater data collected as part of drinking water source protection efforts.  | <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=1744>  |
| Mercury in fish, vegetation, sediment, water | Mercury and related data from fish tissue and other matrices used to assess the need for fish consumption advisories related to mercury. | <http://www.deq.louisiana.gov/portal/tabid/2733/Default.aspx> (fish)<http://www.deq.louisiana.gov/portal/tabid/2734/Default.aspx> (vegetation)<http://www.deq.louisiana.gov/portal/tabid/2735/Default.aspx> (sediment)<http://www.deq.louisiana.gov/portal/tabid/2732/Default.aspx> (water) |
| Enforcement actions  | Effort by the LDEQ Inspections and Enforcement Divisions to identify and correct illicit discharges to water or other media.  | <http://www.deq.louisiana.gov/portal/DIVISIONS/Enforcement.aspx>  |
| Permitted facilities and other data or information in GIS | Primarily locational information for facilities permitted by LDEQ for water discharges. | <http://map.ldeq.org/Default.aspx>  |
| Nutrient Management Strategy | Contains information and reports on multi-agency coordination of nutrient management strategies. | [http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/ WaterQualityStandardsAssessment/NutrientManagementStrategy.aspx](http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/%20WaterQualityStandardsAssessment/NutrientManagementStrategy.aspx)  |
| Fish kill investigations or other incidents may be available through LDEQ’s Electronic Document Management System (EDMS) | Reports by LDEQ’s Inspections Division on fish kill or other incident investigations that may or may not be water related.  | <http://www.deq.louisiana.gov/portal/ONLINESERVICES/ElectronicDocumentManagementSystem.aspx>  |
| **Coastal Protection and Restoration Authority (CPRA)** | System Wide Assessment and Monitoring Program (SWAMP) | Coast wide and basin wide monitoring plans for Louisiana’s SWAMP, Version III | <http://coastal.la.gov/><http://cims.coastal.la.gov/RecordDetail.aspx?Root=0&sid=11464> |
| Coastwide Reference Monitoring System (CRMS) (CPRA and USGS) | Monitoring of the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting the coastal landscape. | <https://lacoast.gov/crms2/Home.aspx> |
| **Louisiana Department of Health (LDH)** | Beaches Environmental Assessment and Coastal Health (BEACH) monitoring program for Enterococcus  | Tests water at 24 beach sites along the Louisiana coast to determine whether the water quality meets Environmental Protection Agency (EPA) criteria. Water samples are collected weekly during Louisiana's beach season between the months of May and October. | <http://www.ldh.louisiana.gov/index.cfm/page/288> (Data available upon request)<https://watersgeo.epa.gov/beacon2/> (EPA data repository for BEACH monitoring information) |
| Molluscan shellfish program | The Molluscan Shellfish Program is the regulatory agency for the oyster harvesting waters along Louisiana Gulf Coast. The harvesting areas are set forth by the Louisiana Sanitary Code and the National Shellfish Sanitation Program. | <http://www.ldh.louisiana.gov/index.cfm/page/629> (Data available upon request) |
| Harmful algal bloom monthly monitoring for *Karenia brevis* as part of molluscan shellfish program  | Part of Molluscan shellfish program.  | <http://www.ldh.louisiana.gov/index.cfm/page/629> (Data available upon request) |
| **Louisiana Department of Natural Resources (LDNR)** | LDNR Home Page | State natural resource agency. | <http://dnr.louisiana.gov/>  |
| Office of Coastal Management | The Office of Coastal Management is responsible for the maintenance and protection of the state's coastal wetlands. The main function of the Office of Coastal Management is the regulation of uses in the Louisiana coastal zone, especially those which have a direct and significant impact on coastal waters. | <http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=85&ngid=5>  |
| Office of Conservation | The Office of Conservation is charged with conserving and regulating oil, gas, and lignite resources of the state. | <http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=46&ngid=4>  |
| Strategic Online Natural Resources Information System (SONRIS) | Multifaceted data repository for natural resource data and information. | <http://sonris.com/>  |
| **Louisiana Oil Spill Coordinators Office (LOSCO)** | Identification of oil spill sites | LOSCO’s primary function is to ensure effective coordination and representation of the state’s interests in all matters related to spill response and prevention.  | <http://www.losco.state.la.us/>  |
| **Louisiana Department of Wildlife and Fisheries (LDWF)** | LDWF home page | State wildlife and fisheries resource agency.  | <http://www.wlf.louisiana.gov/> |
| Marine Fisheries Management Plans | PDF reports for a variety of marine fisheries management plans.  | <http://www.wlf.louisiana.gov/fishing/fishery-management-plans-marine>  |
| Inland Fisheries Management Plans | PDF reports for a variety of inland fisheries management plans.  | <http://www.wlf.louisiana.gov/fishing/waterbody-management-plans-inland>  |
| Creel Surveys | LA Creel gives managers more confidence in their data and a better foundation for management of our fisheries. | <http://www.wlf.louisiana.gov/about-la-creel>  |
| Fish kill investigations |  |  |
| Aquatic Vegetation Control Plans | PDF reports for a variety of aquatic invasive species control plans.  | <http://www.wlf.louisiana.gov/fishing/aquatic-vegetation-control-plans>  |
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| **Louisiana Department of Agriculture and Forestry (LDAF)** | LDAF home page | State agriculture and forestry resource agency. | <http://www.ldaf.state.la.us/>  |
| Soil and Water Conservation Districts | The Office of Soil & Water Conservation provides financial assistance, administrative support, centralized direction and coordination to Louisiana’s 44 Soil & Water Conservation Districts (SWCDs) which provide conservation planning services to landowners within their individual districts. | <http://www.ldaf.state.la.us/conservation/soil-water-conservation-districts/>  |
| Conservation Programs | Provides links to a variety of state conservation programs.  | <http://www.ldaf.state.la.us/conservation/conservation-programs/> |
| Information and Education | Provides links to a variety of state water, soil, wetland, farming, and forestry education programs.  | <http://www.ldaf.state.la.us/conservation/conservation-information-education/> |
| Pesticide and Environmental Programs | LDAF is the state’s lead agency in regulation of pesticide use and application. LDAF’s Pesticide and Environmental Programs Division is responsible for all aspects of pesticide use to minimize unnecessary impacts by pests to agriculture and society in general while protecting human health, the environment, and endangered and threatened species as mandated by the federal law. | <http://www.ldaf.state.la.us/ldaf-programs/pesticide-environmental-programs/>  |
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| **Barataria Terrebonne National Estuary Program (BTNEP)** | BTNEP home page | A partnership of government, business, scientists, conservation organizations, agricultural interests, and individuals for the preservation, protection, and restoration of the Barataria-Terrebonne National Estuary in southeast Louisiana. | <http://www.btnep.org/BTNEP/home.aspx> |
| Invasive species studies  | Promotes awareness of invasive species in the BTES in order to promote reductions in the spread of these species.  | <http://invasive.btnep.org/InvasiveHome.aspx>  |
| BTNEP Projects | BTNEP develops projects that help better understand the ecological, social, and geologic processes that all play a role in the restoration of the Barataria-Terrebonne National Estuary. | <http://www.btnep.org/BTNEP/projects/ProjectList.aspx>  |
| **Federal Agencies** | **Data Type** |  | **Website Links** |
| **U.S. Environmental Protection Agency (USEPA)** | STORET and WQX | EPA’s primary water quality data storage and retrieval tool. Compiles data from multiple agencies and private research groups.  | <https://www.epa.gov/waterdata/storage-and-retrieval-and-water-quality-exchange>  |
| Watershed Assessment, Tracking and Environmental Results System (WATERS) | **WATERS** unites water quality information previously available only from several independent and unconnected databases. | <https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system>  |
| Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS) | ATTAINS is an online system for accessing information about the conditions in the Nation’s surface waters. | <https://www.epa.gov/waterdata/assessment-and-total-maximum-daily-load-tracking-and-implementation-system-attains>  |
| National Estuary Program | The NEP is a collaborative, effective, efficient, and adaptable coastal ecosystem-based network. | <https://www.epa.gov/nep>  |
| **National Oceanographic and Atmospheric Administration (NOAA)** | Home Page | **NOAA enriches life through science. Our reach goes from the surface of the sun to the depths of the ocean floor as we work to keep citizens informed of the changing environment around them.** | <http://www.noaa.gov/>  |
| Oceans and Coasts | NOAA’s National Ocean Service is positioning America’s coastal communities for the future | <http://www.noaa.gov/oceans-coasts>  |
| Fisheries | NOAA Fisheries provides science-based conservation and management for sustainable fisheries and aquaculture, marine mammals, endangered species, and their habitats. | <http://www.noaa.gov/fisheries>  |
| HAB monitoring | HAB monitoring and research information | <http://oceanservice.noaa.gov/hazards/hab/>  |
| NOAA Environmental Response Management Application | An online mapping tool that integrates key information to support environmental and severe-weather responses in the Gulf of Mexico. | <http://response.restoration.noaa.gov/maps-and-spatial-data/environmental-response-management-application-erma/gulf-mexico-erma.html>  |
| **U.S. Department of Agriculture (USDA)** | Natural Resources Conservation Service (NRCS) | Provides farmers and ranchers with financial and technical assistance to voluntarily put conservation on the ground.  | [https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/ technical/nra/dma/](https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/%20technical/nra/dma/)  |
| Research and Science | Fosters continued economic growth, adapting to the effects of climate change and addressing food security in the United States. | <http://www.usda.gov/wps/portal/usda/usdahome?navid=research-science>  |
| Conservation | USDA recognizes that conservation by farmers, ranchers and forest owners today means thriving and sustainable agriculture for our future. | [http://www.usda.gov/wps/portal/usda/ usdahome?navid=conservation](http://www.usda.gov/wps/portal/usda/%20usdahome?navid=conservation)  |
| Natural Resources Assessment | The USDA Natural Resources Conservation Service (NRCS) documents the effects of conservation practices and systems at various geographic levels so that better decisions can be made up front and risk is managed more effectively. NRCS cooperates with other Federal agencies, State agencies, and partners to collect and analyze natural resource data. | <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/>  |
| Agricultural Research Service (ARS) | USDA Agricultural Research Service is one of the world's premier scientific organizations. Our nationally-coordinated research solves problems that affect Americans daily. | <https://www.ars.usda.gov/>  |
| **U.S. Geological Survey (USGS)** | Streamflow data | Historical instantaneous stream flow data portal.  | <http://waterdata.usgs.gov/la/nwis/uv/?referred_module=qw>  |
| National Water Information System (NWIS): Mapper | Streamflow and water chemistry data portal. | <http://maps.waterdata.usgs.gov/mapper/index.html>  |
| International Charter “Space and Major Disasters” | The International Charter "Space and Major Disasters" (Charter) serves as an important source of satellite imagery for response to major natural and man-made disasters worldwide. | <http://hdds.usgs.gov/international-charter>  |
| Earth Resources Observation and Science (EROS) | Satellite imagery portal. | <http://eros.usgs.gov/>  |
| **Other** | **Data Type** |  | Website Links |
| **Louisiana Universities Marine Consortium (LUMCON)** | Bayouside Classroom | Student and teacher educational opportunities. | <http://www.lumcon.edu/education/K-12/StudentDatabase/>  |
| Teacher Education and Resources | Student and teacher educational opportunities. | <http://www.lumcon.edu/education/Teacher.asp>  |
| **Lake Pontchartrain Basin Foundation (LPBF)** | HydroCoast | Maps of Pontchartrain and Barataria Basins showing salinity, habitat, weather, water quality, and biological information. | <http://saveourlake.org/coastal-hydromap.php>  |
| **The Nature Conservancy (TNC)** | Grand Isle, Louisiana | Information on TNC’s Grand Isle conservation areas.  | <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/louisiana/placesweprotect/grand-isle.xml>  |

**Possible Data Gathered**

Data that may be gathered by the organizations identified in Table 2 includes but is not limited to those found in Table 3. To the extent permitted by the data gathering agency or entity, all data will be made available to the public, researchers, and governmental agencies through websites or direct contact with the data gathering organization.

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| **Table 3. Possible data parameters collected by organizations monitoring in the Barataria/Terrebonne Estuary System. Other organizations may collect additional parameters.** |
| Dissolved Oxygen | pH | Chlorides |
| Sulfate | Total Dissolved Solids | Nitrate/Nitrite Nitrogen |
| Total Phosphorus | Conductivity | Water Temperature |
| Metals | Total Kjehldahl Nitrogen | Ammonia |
| Total Organic Carbon | Salinity | Hardness |
| Alkalinity | Stream Discharge (Cubic Feet per Second) | Fecal Coliform |
| Enterococcus | Total Suspended Solids | Total Dissolved Solids |
| Turbidity |  |  |

**Monitoring**

Monitoring programs are based on data gathering requirements of the agencies and entities listed in Tables 2.

**Parties responsible**

Responsible parties are those listed in Tables 2.

**Timetable for gathering data**

Timelines for gathering data are based on data gathering requirements of the agencies and entities listed in Tables 2.

**How data is shared**

Data is to be shared either by accessing websites for the agencies or entities in Table 2 or by contacting those organizations directly to determine data availability and means of access.

**Possible data gaps**

Sediment contaminant data is likely to be unavailable or dated due to lack of routine sediment monitoring. It may be possible to identify sediment data associated with the Louisiana Oil Spill Coordinators Office/Natural Resource Damage Assessment programs (LOSCO/NRDA). Historical, > 20 years old, data may be available from LDEQ’s produced water data study conducted in early 1990s. However, this data may be of limited value due to its age and is most likely only available as hardcopy.

Harmful algal blooms continue to be a potential risk in the BTES and across Louisiana. LDH’s molluscan shellfish program samples for *Karenia brevis* on a monthly basis in order to help ensure oyster harvesting areas are safe for harvest. Additional sampling or the creation of a quick response team from among interested agencies would be helpful in protecting the public from the risks of HABs. Several groups, including the Gulf of Mexico Program (GOMP), Gulf of Mexico Alliance (GOMA) and the Gulf of Mexico Research Initiative (GOMRI) may be potential sources for additional HABs monitoring.

It is difficult to calculate loads from much of the field data being collected because flow measurements are not being collected as part of routine LDEQ ambient monitoring or other sampling programs.

**If additional funding is needed**

Additional funding is always helpful to agencies and entities engaged in environmental data collection efforts; however, these organizations are responsible for obtaining their own funding sources largely through existing federal, state, or private grants.

Literature Cited

St. Pe, K.M., ed. 1990. An Assessment of Produced Water Imparcts to Low-Energy, Brackish Water Systems in Southeast Louisiana. Louisiana Department of Environmental Quality Water Pollution control Division, Baton Rouge, Louisiana, 204 pp.

Bcesch, D. F. and N. N. Rabalais, eds. 1989. Produced Waters in Sensitive Coastal Habitats : An Analysis of Impacts, Central Coastal Gulf of Mexico. OCS Report/MMS 89-0031, U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Regional Office, New Orleans, Louisiana, 157 pp.