REPORT FOR THE LOUISIANA SAND RESOURCES DATABASE (LASARD): 2023/2024

June 12, 2024

Prepared for:
Coastal Protection and Restoration Authority of Louisiana
150 Terrace Avenue
Baton Rouge, LA 70802

Prepared by:
Aptim Environmental & Infrastructure, LLC
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487

Acknowledgements

This project was supervised by Coastal Protection and Restoration Authority's (CPRA) Task Manager Syed Khalil, The Water Institute's (TWI) Program Manager, Dr. Mike Miner and Project Manager, Diana Di Leonardo, and Aptim Environmental & Infrastructure, LLC's (APTIM) Project Manager Beth Forrest. Rocky Wager (CPRA) and Matthew Vincent's (CPRA) assistance was critical and greatly appreciated. Blaire Hutchison (USGS) is an integral part of the CPRA's Sediment Management Team. They have helped develop and continue to update LASARD with their suggestions and insights. APTIM also wishes to acknowledge Heather Vollmer, APTIM's Geographic Information System Professional (GISP) responsible for quality assurance and quality control throughout the project. Rob Hollis (TWI) and Joseph Hankerson (TWI) played a critical role in locating and formatting additional core borings to add to LASARD.

Recommended Citation

APTIM, 2024. *Report for the LouisianA SAnd Resources Database (LASARD): 2023/2024.* Boca Raton, Florida: Aptim Environmental & Infrastructure, LLC, 255p. (Prepared for Coastal Protection and Restoration Authority of Louisiana).

Executive Summary

In order to archive the historical/legacy geoscientific data and to keep pace with the management of the large volumes of geoscientific data being collected and delivered to the Coastal Protection and Restoration Authority (CPRA) of Louisiana from the implementation of various coastal projects (e.g., marsh creation, ridge restoration, barrier island restoration, sediment diversions, etc.), the current LouisianA SAnd Resources Database (LASARD) needed to be updated to incorporate any previously identified, but unformatted data. During this current phase of LASARD, which was initiated in June of 2023 as a Task Order Amendment under The Water Institute's (TWI) Louisiana Sediment Management Plan (LASMP) contract with CPRA (CPRA-2022-T72-SB03-MM), TWI and Aptim Environmental & Infrastructure, LLC (APTIM) provided CPRA with continued support in updating and advancing LASARD. The goal of this Task Order amendment was to continue processing and formatting data sets that were previously identified that do not conform to LASARD data standards. Under this task, approximately 154 datasets were cataloged, formatted, and submitted for inclusion in LASARD. Over 3,400 datasets now reside in LASARD.

Specific tasks conducted over the course of this 12-month Task Order amendment included:

- Review of existing subbottom seismic data housed in LASARD to determine which datasets have enough information to be reformatted into a web project format that would allow the user to view an image of the data, referenced to the map location.
- Finalization and submittal of the Ship Shoal Gap Assessment report that was submitted in draft format during the previous phase of LASARD.
- Coordination with CPRA to update the Electronic Data Delivery (EDD) requirements and revise the attribute tables of existing sediment sample and survey trackline datasets.
- Review of and recommendations for incorporating the Society for Mining, Metallurgy and Exploration (SME) Mineral Resource terminology into the SSD Mapping.
- Population of newly added fields for grab sample datasets located outside of the Surficial Sediment Distribution (SSD) Map boundaries.
- Coordination with TWI to develop a draft attribute table for suspended sediment sample data.
- Review (and revision wherever needed) of all previously submitted sediment sample datasets.
- Development and submittal of a gap assessment methodology memorandum for survey tracklines to be applied during the next gap assessment update.
- Louisiana Sediment Availability and Allocation Program (LASAAP) support, including assistance with CPRA's internal LASAAP webtool demonstration.
- Completion and submittal of statewide LASAAP implementation report.
- Provided support to CPRA with language and graphics for their LASARD project page within CIMS.
- Review of all datasets cataloged as "poor" to re-assess its category to "moderate" or "good" by finding their respective locations and assess if these could be formatted.
- Review and subsequent revisions to APTIM and TWI Quality Control (QC) procedures.
- Weekly check in meetings with CPRA's task manager.
- Monthly progress meetings with the LASARD team, including APTIM, TWI, CPRA and USGS personnel.
- Participation in meetings with National Oceanic and Atmospheric Administration (NOAA) and National Centers for Environmental Information (NCEI) regarding geophysical trackline data formatting.

- Provided support with abstracts, presentation development and conference proceedings for various conferences.

All items within our scope of services were completed during this phase of LASARD.

Table of Contents

List of Figures

List of Tables

List of Attachments

List of Acronyms

APTIM	Aptim Environmental & Infrastructure, LLC
BICM	Barrier Island Comprehensive Monitoring
BOEM	Bureau of Ocean Energy Management
CIMS	Coastal Information Management System
CMAP	Council Monitoring and Assessment Program
CMP	Coastal Master Plan
CPRA	Coastal Protection and Restoration Authority
EDD	Electronic Data Delivery
Esri	Environmental Systems Research Institute, Inc.
GISP	GIS Professional
GOMA	Gulf of Mexico Alliance
LASAAP	Louisiana Sediment Availability and Allocation Program
LASARD	Louisiana Sand Resources Database
LASMP	Louisiana Sediment Management Plan
NCEI	National Centers for Environmental Information
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RSM	Regional Sediment Management
SME	Society for Mining, Metallurgy and Exploration
SSD	Surficial Sediment Distribution
SSRA(s)	Significant Sediment Resource Area(s)
SWAMP	System Wide Assessment and Monitoring Program
TWI	The Water Institute
USGS	U.S. Geological Survey

Introduction

The Louisiana Sediment Management Plan (LASMP) was developed on the principles of Regional Sediment Management (RSM) as a holistic approach for an efficient and cost-effective coastal restoration (Khalil et al., 2023). The LousianA SAnd Resources Database (LASARD) program was initially developed as a decision support tool of LASMP (Forrest et al., 2023) to manage geological, geophysical, geotechnical, and other data pertaining to offshore sand searches. It was designed to archive historical and current geoscientific data that could be queried by state, federal, and private entities for planning and executing restoration projects (Khalil et al., 2010). LASARD includes geoscientific data pertaining to the exploration of any sediment resources in offshore coastal Louisiana and the Lower Mississippi River. The current objective of the LASARD program is to centralize relevant data from various sources for better project coordination and to facilitate future planning for delineating and using sediment resources for restoration in coastal Louisiana (Forrest et al., 2023).

CPRA is using the LASARD program to archive relevant data collected through the enhanced restoration activities as well as state's rapidly expanding monitoring, assessment, and adaptive management programs. These programs include the System-Wide Assessment and Monitoring Program (SWAMP) and Barrier Island Comprehensive Monitoring (BICM) Program (Forrest et al., 2023). To date, LASARD includes over 3,400 historic and current datasets that were collected over decades by private industry, universities, and federal and state agencies. The data consist primarily of geophysical data (e.g., seismic, sidescan sonar, magnetometer, bathymetric) and sediment data obtained using vibracore, jet probe, and grab samplers. LASARD also includes oil and gas infrastructure data since it affects the delineation of borrow areas and subsequent dredging. Data in LASARD are available through the CPRA Coastal Information Management System (CIMS) website at https://cims.coastal.louisiana.gov/default.aspx. Geoscientific information is easily accessible to all stakeholders, saving money, time, and avoiding duplication of data collection efforts.

Aptim Environmental & Infrastructure, LLC (APTIM) worked with the Coastal Protection and Restoration Authority (CPRA) to update the format required for the standardization and online dissemination of data during a pilot study (LASARD Phase I). During subsequent phases, data formatting standards were refined, guidance documents developed, and geoscientific data were compiled, cataloged, and formatted. An Esri storymap was also developed to provide an overview of the LASARD program. It was designed to provide information on the LASARD program. The storymap provides users with information on geoscientific data acquisition, data formatting and data archiving. Links to the LASARD Standard Operating Procedures, attribute specifications, data delivery guidelines, file naming convention guidelines and shapefile/metadata templates are provided through the storymap. This storymap is currently available through CIMS at https://cims.coastal.louisiana.gov/outreach/lasard.html (Figure 1). However, the Environmental Systems Research Institute, Inc. (Esri) is no longer supporting this version of the storymap. Any changes that need to be made to keep it updated will require the storymap to be recreated using a new template. CPRA has decided that instead of maintaining the storymap, they will work on updating the LASARD project page within CIMS (https://coastal.la.gov/project/louisiana-sand-resource-database-lasard/). Once complete this page will provide the same information as the storymap did.

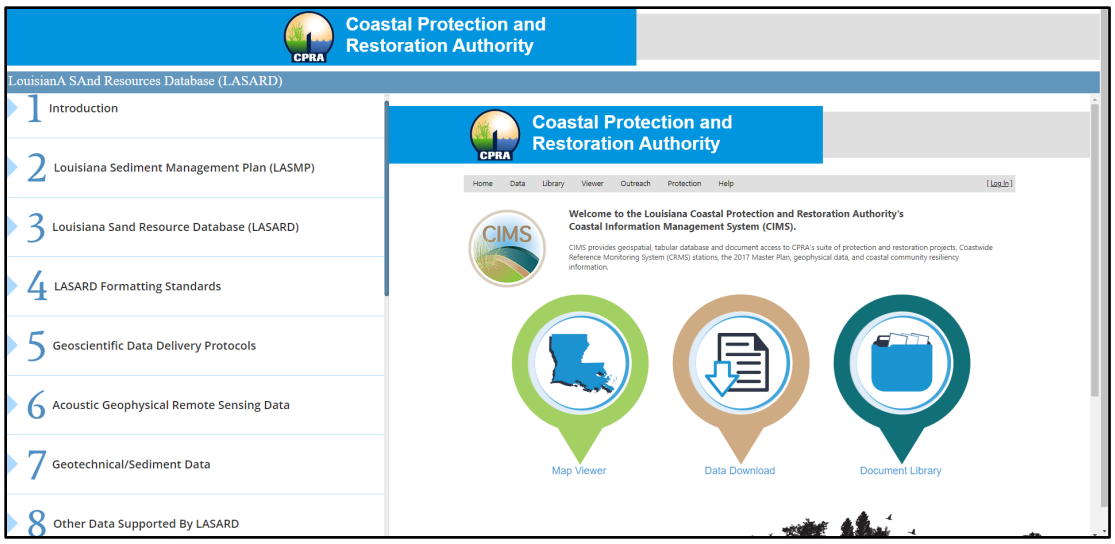


Figure 1. LASARD storymap interface.

Work on the current phase of LASARD was done through The Water Institute's (TWI) contract with CPRA (CPRA-2022-T22-SB03-MM). During the current phase of LASARD, 154 datasets were cataloged and formatted for incorporation into LASARD. Specific tasks included:

- Review of existing subbottom seismic data housed in LASARD to determine which datasets have enough information to be reformatted into a web project format that would allow the user to view an image of the data, referenced to the map location.
- Finalization and submittal of the Ship Shoal Gap Assessment report that was previously submitted in draft format during the previous phase of LASARD.
- Coordination with CPRA to update the Electronic Data Delivery (EDD) requirements and revise the attribute tables of existing sediment sample and survey trackline datasets.
- Review of, and recommendations for incorporating the Society for Mining, Metallurgy and Exploration (SME) Mineral Resource terminology into the SSD Mapping.
- Population of newly added fields for grab sample datasets located outside of the Surficial Sediment Distribution (SSD) Map boundaries.
- Coordination with TWI to develop a draft attribute table for suspended sediment sample data.
- Review and revision (if needed) of all previously submitted sediment sample datasets.
- Development and submittal of a gap assessment methodology memorandum for survey tracklines to be applied during the next gap assessment update.
- Louisiana Sediment Availability and Allocation Program (LASAAP) support, including assistance with CPRA's internal LASAAP webtool demonstration.
- Completion and submittal of statewide LASAAP implementation report.
- Review of all datasets cataloged as "poor" to re-assess their category to "moderate" or "good" by finding their respective locations and assess if these could be formatted.
- Review and subsequent revisions to APTIM and TWI Quality Control (QC) procedures
- Review of and revisions to APTIM and TWI Quality Control (QC) process.
- Weekly check in meetings with CPRA's task manager.
- Monthly progress meetings with the LASARD team, including APTIM, TWI, CPRA and U.S. Geological Survey (USGS) personnel.

- Participation in meetings with National Oceanic and Atmospheric Administration (NOAA) and National Centers for Environmental Information (NCEI) regarding geophysical trackline data formatting and storage.
- Provided support with abstracts, presentation development and conference proceedings for various conferences.

Table 1 provides a summary of the activities completed over the course of LASARD. It should be noted that during the initial phases of LASARD, the focus was on identifying and formatting historic datasets. As LASARD evolved and the historic datasets were formatted, the focus shifted to additional tasks like revising attributes, creating SSD Maps and tools (LASAAP).

Table 1. Summary of previous phases of LASARD.

LASARD Phase	Description
Phase I	Pilot study.
Phases II and III	Initiated to refine the standardized format and to conduct a search for the amount, types, quality, format and spatial distribution of existing data in the Chandeleur Islands, Mississippi River, Barataria Basin, Terrebonne Basin, Atchafalaya Basin and Chenier Plain areas. Initial attribute specifications were developed and based on these specifications, 600+ datasets were identified, obtained, and reviewed. 200+ datasets were formatted following CPRA guidelines for incorporation into LASARD.
Phase IV	450+ datasets were identified, obtained, and reviewed. This phase focused on identifying and evaluating in-house CPRA data while earlier phases targeted legacy data from other sources. Attribute specifications were updated and the data submitted during previous phases of LASARD were revised to meet the new specifications. No new data were formatted during this phase. APTIM also compiled a list of datasets that had been identified and reviewed during Phases I, II, and III, but not processed.
Phase V	412 datasets were formatted, leaving 294 datasets remaining to be processed during the next phase. During Phase V, a standard operating procedures document was developed that outlines typical data collection protocols, as well as LASARD data submittal requirements (Khalil et al., 2022).
Phase VI	1,306 new datasets were cataloged, and 919 datasets were formatted. APTIM also developed a gap analysis, performed updates to the existing SSD Maps, performed a review of existing Bureau of Ocean Energy Management (BOEM) designated Surficial Sediment Resource Areas (SSRAs), developed a continuous bathymetric surface for coastal Louisiana and an Esri storymap to provide an overview of LASARD.
2022-2023	Cataloged and formatted legacy data. Updated current gap assessment report. Updated overburden portions of the SSD map. Reviewed subbottom data to identify which seismic tracklines have actual profiles/data associated with them. Reprocessed subbottom data to identify potential sand under overburden. Reviewed all geophysical trackline and sediment samples datasets cataloged as "poor". Where possible, these datasets were added to the formatting queue. Coordinated to obtain legacy sediment sample data for inclusion in LASARD. Coordinated with BOEM to attempt to obtain historic geophysical and geotechnical data collected by oil and gas companies. Mined MMIS for legacy sediment sample and seismic data that were not incorporated into LASARD.
2023-2024	Cataloged and processed legacy data. Reviewed existing subbottom data housed in LASARD to determine which datasets have enough information to be reformatted into a web project format that would allow the user to view an image of the data, referenced to the map location. Coordinated with CPRA to update the existing sediment sample and survey trackline EDD requirements and revise the attribute tables for these data types. Worked with TWI to develop a draft attribute table for suspended sediment samples. Reviewed all previously submitted sediment sample datasets. Developed a gap assessment methodology memorandum for survey tracklines to be applied during the next gap assessment update. Provided LASAAP support including support for the LASAAP webtool demonstration. Provided support to CPRA with language and graphics for their LASARD project page within CIMS. Reviewed datasets cataloged as "poor" to assess if data can now be located so that the quality of these datasets can be changed to "moderate" or "good" and they can be formatted. Review of and revisions to APTIM and TWI Quality Control (QC) process. Weekly check in meetings with CPRA's task manager. Monthly progress meetings with the LASARD team. Meetings with NOAA and NCEI regarding geophysical trackline data formatting. Completion of statewide LASAAP implementation report. Population of newly added fields for grab samples located outside of the SSD Map boundaries. Provided support with abstracts, presentation development and conference proceedings for various conferences.

Activities

Geoscientific data are constantly being collected and delivered to CPRA from the implementation of various coastal protection and restoration projects and accelerated regional monitoring activities. To keep LASARD current, the database needs to be updated on a regular basis. Keeping LASARD current provides the benefit of real cost savings to upcoming projects by not only providing valuable data for planning, but also by reducing the potential for costly, redundant data collection efforts.

During this phase of LASARD, undertaken as an amendment to the original subcontract which was initiated in July of 2022 as Task Order 72 under TWI's contract with CPRA (2503-12-58), TWI and APTIM provided CPRA with continued support. The goal of this work was to provide continued maintenance and technical support, revise to the attribute specifications for existing data entries, and format remaining data that were previously identified but not in compliance with LASARD format standards (as well as any newly identified data). This Task Order amendment was initiated July 21, 2023, with a completion date of June 14, 2024. This task order included the eight (8) activities described in Table 2.

Table 2. Tasks included in this Task Order Amendment.

Task	Task Description
Activity 1.1: Cataloging of Datasets	Any additional geoscientific data provided by CPRA will be added to the existing data catalog.
Activity 1.2: Formatting of Datasets	Data that are not in compliance with current LASARD formatting standards will be formatted according to the prioritization and evaluation steps conducted during previous phases of LASARD within the available budget.
Activity 1.3: Surficial Sediment Distribution Map and Gap Assessment Methodology Update	The gap assessment methodology will be updated to include the trackline data in CMAP methodology. The gap assessment itself will not be updated. An annual update to the existing Surficial Sediment Distribution (SSD) maps for offshore Louisiana and the Lower Mississippi River will be provided based on newly formatted data.
Activity 1.4: LASAAP Development and Support	The LASAAP tool was initially developed, and a pilot study was funded and conducted under contract with the Gulf of Mexico Alliance (GOMA) in 2020. During this current task, APTIM will provide continued support providing tool training and updates as needed.
Activity 1.5: QA/QC	QA/QC procedures will be developed and applied to ensure that data and metadata are formatted correctly and accurately.
Activity 1.6: Meetings	APTIM will attend weekly meetings with CPRA's Task Manager and monthly meetings via web conference with the CPRA team to review the status of this task order and to review the status of each item listed above. APTIM will develop and provide meeting agendas and meeting minutes for the monthly meetings.
Activity 1.7: Reporting	APTIM will prepare a final summary report of activities at the end of the Task Order. This report will include descriptions of the datasets that were processed.
Project Controls	APTIM will provide continuous monitoring of all activities covered by this task order to meet all milestones according to the allocated budget. A monthly report summarizing the status of the task order activities through the previous month will be provided.

Summary of Work Performed by Task

Activity 1.1: Cataloging of Datasets

During this phase of the project, hundreds of datasets were reviewed and 154 new datasets were cataloged (Table 3). This includes datasets that were provided by CPRA after review of their servers as well as datasets submitted directly to CPRA by contractors. The LASARD data catalog is provided in Attachment 1.

Table 3. Breakdown of cataloged data.

Data Type	No. Datasets
Bathymetric/Topographic/Isopach	10
Deposits/Borrow Areas	1
Geophysical Trackline	9
Magnetic Anomaly	23
Sediment Samples/Grain Size	108
Sidescan Sonar Contacts	3
Water Quality/CTD	3
Unknown	1
Total:	**154**

Note: During the formatting phase, datasets that are cataloged are evaluated prior to formatting to determine if they are duplicates of data already in LASARD. If they are found to be duplicates, they are not formatted.

Activity 1.2: Formatting of Datasets

During this phase of LASARD, 154 datasets were formatted (Table 4). A total of 3,401 datasets have been formatted and submitted for inclusion in LASARD to date.

Table 4. Data formatting summary.

	PREVIOUS PHASES				CURRENT LASARD PHASE (2024-2025)						Total Submitted over LASARD Lifetime
					Formatting	Review				Submittals	
Dataset Type	MRHDMS (Hydrodynamic & Delta Management) No. Datasets Formatted, QC'ed and Submitted	LASARD Phase I-VI No. Datasets Formatted, QC'ed and Submitted	Submitted Directly to CPRA by Contractors	2019-2023 No. Datasets Formatted, QC'ed and Submitted	Total No. Unformatted Datasets	Total No. Datasets Needing First Review	Total No. Datasets Needing Second Review	Total No. Datasets Sent to TWI for Final Review	Total No. Datasets Finalized and Ready to Submit	No. Datasets Submitted	Total No. Datasets
ADCP (moving)	271	112	0	17	0	0	0	0	4*	0	400
ADCP (Stationary)	32	4	0	39	0	0	0	0	0	0	75
Bathy/Topo/Isopach	628	549	78	345	0	0	0	0	0	10	1610
Cultural Resources	0	5	0	1	0	0	0	0	0	0	6
Deposits/Borrow Areas	0	84	5	4	0	0	0	0	0	0	93
Geophysical Tracklines	0	105	11	32	0	0	0	0	0	9	157
Magnetic Anomaly	0	98	16	56	0	0	0	0	0	23	193
Oil/Gas Infrastructure	0	28	0	0	0	0	0	0	0	0	28
Sediment Porewater	1	0	0	0	0	0	0	0	0	0	1
Sediment Samples/Grain Size	26	231	23	298	0	0	0	0	0	108	686
Sediment Concentration	0	0	0	17	0	0	0	0	0	0	17
Shoreline	0	9	0	0	0	0	0	0	0	0	9
Sidescan Sonar Contacts	0	58	3	5	0	0	0	0	0	3	69
Soil Nutrients	1	0	0	0	0	0	0	0	0	0	1
Soil Strength	0	0	0	0	0	0	0	0	0	0	0
Submerged Aquatic Vegetation	9	0	0	0	0	0	0	0	0	0	9
Water Quality	36	8	0	3	0	0	0	0	0	0	47
Total	1004	1291	136	817	0	0	0	0	0	153	3401

Activity 1.3: Surficial Sediment Distribution Map and Gap Assessment Methodology Update

Ship Shoal Gap Assessment

Sediment is critical to the sustainability of coastal Louisiana, and being compatible sediment-limited, proper management of sediment resources is important. Louisiana developed LASMP to help manage sediment resources. It identifies and inventories sediment resources. An important component of this plan is having an understanding of existing sediment resources and a knowledge of where existing data are located and where new data could be collected to help identify new sediment resources or refine existing ones. One of the most well-known sediment deposits on the Outer Continental Shelf (OCS) off Louisiana is Ship Shoal. Due to the estimated volume of available sand and its proximity to target restoration areas, Ship Shoal has been used for several restoration projects and is being considered for further use as a sand source to nourish adjacent barrier islands and headlands. At CPRA's directive and guidance, APTIM conducted an extensive review to identify studies/investigations conducted to evaluate sediment resources of Ship Shoal complex. The inventory and details of data collected during earlier studies may be used as desktop to design and plan future investigations in the area. Future survey plans may be developed, making the most efficient use of existing data while avoiding collecting duplicate data. Data identified during the data compilation effort include single-beam and multibeam bathymetry, magnetometer, sidescan sonar and sediment samples (grab samples and core borings). A draft of this report was submitted to CPRA for review on June 16, 2023 (APTIM, 2023a). Due to funding constraints, this was not completed during the last phase of LASARD (2022-2023). Under this current phase, this report was completed and submitted to CPRA in October 2023. It is available at https://cims.coastal.louisiana.gov/RecordDetail.aspx?Root=0&sid=25976.

Gap Assessment Methodology Memorandum

A gap assessment, originally initiated to aid in the development of the LASAAP planning tool, was conducted under the guidance of CPRA. Its goal was to evaluate the availability of geoscientific data in coastal Louisiana to identify and delineate data density, data quality and data gaps and use this information to prioritize future data collection efforts. It encompassed offshore Louisiana within the limits of the existing SSD Maps (APTIM, 2022a). During the gap assessment, existing data were reviewed to identify information gaps that exist in the compiled datasets and any spatial gaps where additional data would be necessary to describe and quantify potential sediment resources. Certain geoscientific data (e.g., elevation, sidescan sonar, magnetometer, sediment sample) have a shorter "shelf-life" than other data (e.g., subbottom). For this reason, the data were also reviewed temporally to assess the age of the data based on the date of acquisition. This gap assessment was used to identify areas that should be surveyed or undergo additional sampling efforts. Datasets within LASARD and other data sources were reviewed to determine how these data are attributed and where any inconsistencies exist. Datasets were reviewed to determine whether the data attribution would support future sediment resource identification and delineation. Based on this gap assessment, recommendations for regional level (reconnaissance) hydrographic, geophysical, and geotechnical data collection efforts were made in the areas that lack data or contain data that were acquired a long time ago. It was recommended that priority should be placed on collecting data around major sand shoals, buried paleo-channels, within potential paleo-valleys, sand and sandy silt deposits identified by the Bureau of Ocean Energy Management (BOEM) as well as areas that have been delineated as potential or inferred sediment resources (sand and/or mixed sediment) in Louisiana's SSD Maps. The gap assessment is a living document and is updated periodically as new data are added to LASARD.

In 2023, the gap assessment was revised (APTIM, 2023b). This revision was based on the recommendations of the Council Monitoring and Assessment Program (CMAP) (NOAA and USGS, 2020). To present results in a more user-friendly format, specific CMAP methods were adopted for sediment (core boring and grab sample) data only. This was done as a pilot study to determine if these methods could be applied successfully to all other data types. All other data types were assessed using the same methods as used in the past gap assessment updates.

Under this current amendment, a document was developed to evaluate applying these same methods to the survey trackline data type. The gap assessment itself was not updated. The methodology writeup for the survey trackline data type was provided to CPRA in 2024 (APTIM, 2024a) and is available at https://cims.coastal.louisiana.gov/RecordDetail.aspx?Root=0&sid=26120. The methodology outlined in this document will be applied to the next gap assessment update.

Surficial Sediment Distribution (SSD) Map Update

Typically, the SSD Map is updated on an annual basis. However, during this amendment, CPRA directed APTIM to review 229 sediment sample datasets that were previously submitted and fall outside of the SSD Map Boundary. This was done to ensure the information that is being used in the SSD Map is as accurate as possible, especially with the numerous attribute and formatting changes that have taken place since the beginning of LASARD. The next SSD Map update will be conducted in the late summer/early fall of 2024.

Activity 1.4: LASAAP Development and Support

The State of Louisiana undertook a major initiative to address concerns related to the future of Louisiana's coast through the development of the Coastal Master Plan (CMP). CPRA developed its first CMP in 2007 and provides an updated CMP every 5-6 years, to mitigate land loss and degradation of the ecosystem and reduce flood risk. Many of the projects involve soft engineering strategies that utilize sediment. Louisiana sediment resources compatible for restoration are limited. The success of the CMP restoration efforts depends on locating, managing, and utilizing sediment in a cost-effective manner. CPRA needed a planning tool to identify compatible sediment resources for the restoration and protection projects identified in the CMP. APTIM was initially contracted by CPRA and GOMA to design a tool to guide project managers through the initial planning and reconnaissance phases of their projects. The objective was to develop a tool, which can help identify the most suitable and cost-effective sediment resources during the initial planning stages of a project. This tool will not replace the high-resolution design-level surveys and investigations, which will still be required for final borrow area delineation and permitting. A conceptual model and beta version of the tool was developed in 2020. The tool's effectiveness and functionality were tested in a pilot study conducted in Barataria Basin (APTIM, 2020). Based on discussions focused on how CPRA personnel were using the tool, especially non-GIS users, the tool was refined and applied on a coastwide basis in 2022 (APTIM, 2022b).

Under this current amendment, the coastwide implementation report was updated based on the 2023 CMP projects and the 2023 SSD Map update and was provided to CPRA in 2024 (APTIM, 2024b). This report is available at https://cims.coastal.louisiana.gov/RecordDetail.aspx?Root=0&sid=24775.

Activity 1.5: Quality Assurance/Quality Control (QA/QC)

TWI and APTIM developed Quality Assurance/Quality Control (QA/QC) procedures and applied these procedures to the review of all formatted data prior to submittal to CPRA. The process was a three-tier process with APTIM's project manager completing the first review. Upon completion of the first review,

APTIM personnel responsible for formatting the data made the necessary revisions. APTIM's licensed GIS Professional (GISP) then performed a second review on the datasets. If necessary, the datasets were then returned to the formatting personnel for additional revisions. Following the first and second reviews, the datasets were submitted to the TWI project manager for a third and final review. APTIM made any necessary revisions and finalized the datasets before submittal to CPRA. Figure 2 is a schematic illustrating the overall review process. Figure 3 shows the form developed for APTIM's first and second QA/QC of the formatted datasets. Figure 4 shows the form used by TWI for the final QA/QC of the datasets.

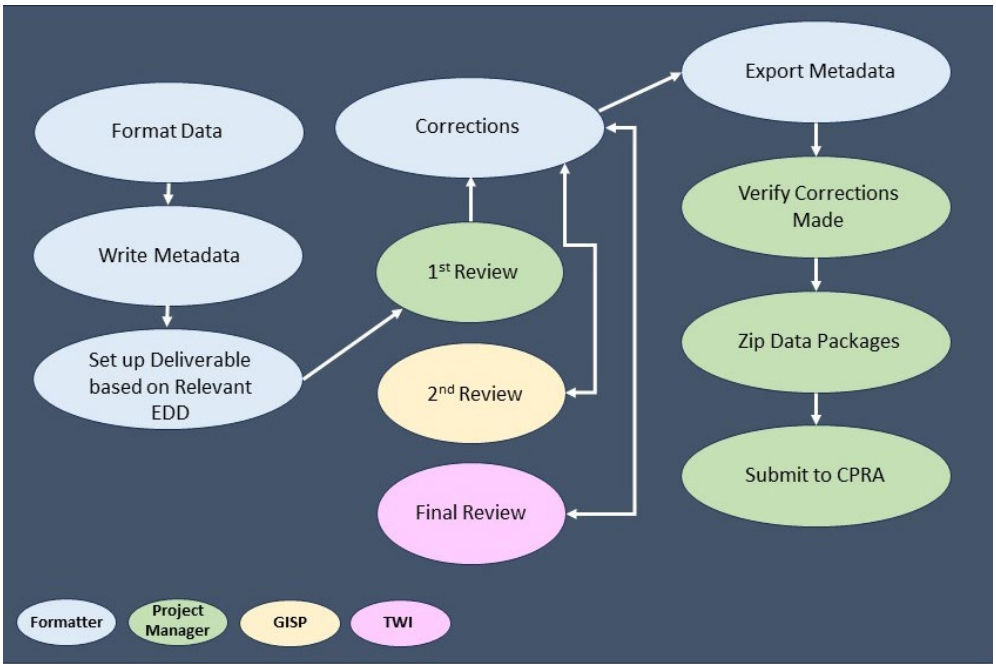
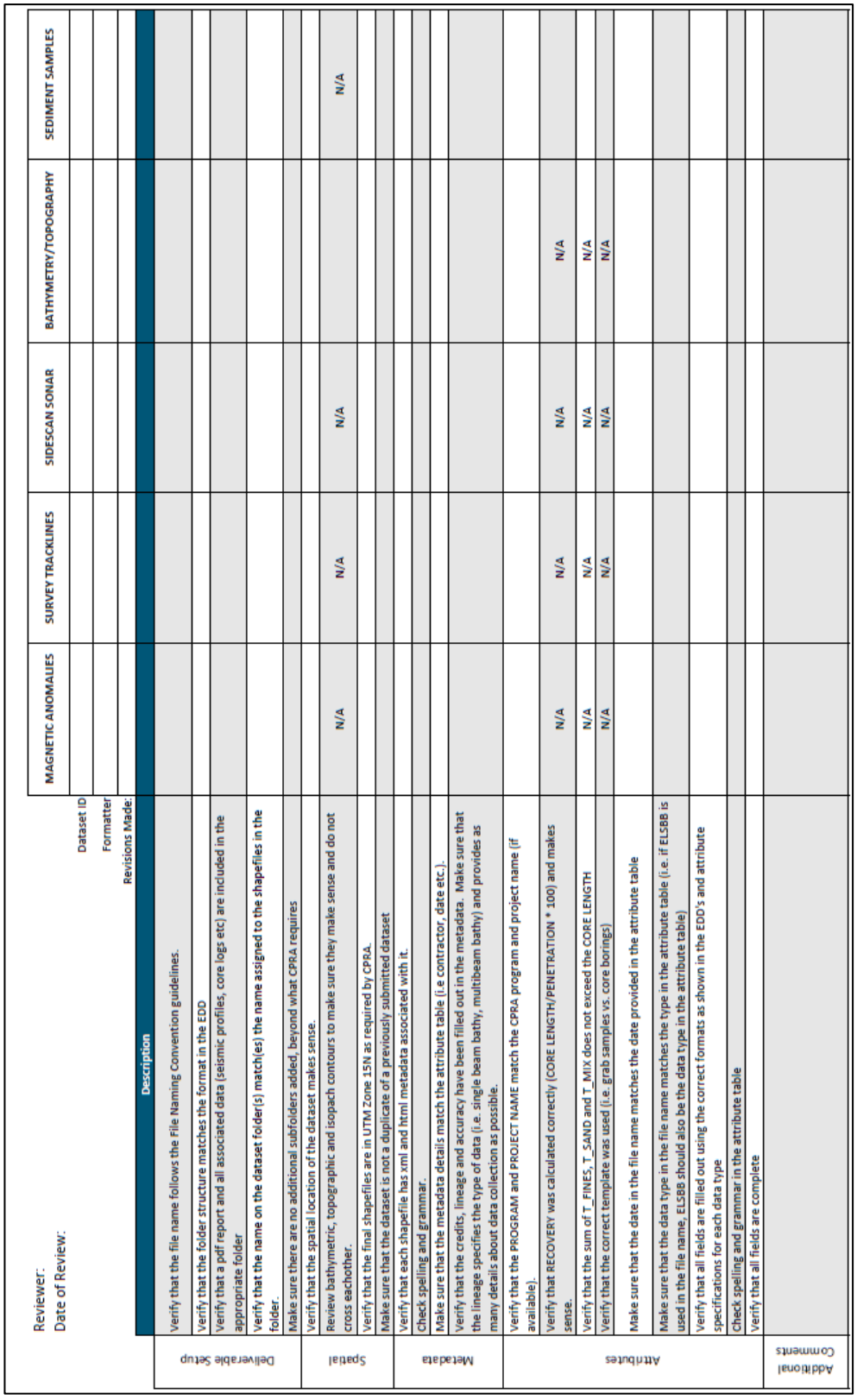


Figure 2. QA/QC process.



Reviewer:
Date of Review:

Dataset ID
Formatter
Revisions Made:

	Description	MAGNETIC ANOMALIES	SURVEY TRACKLINES	SIDESCAN SONAR	BATHYMETRY/TOPOGRAPHY	SEDIMENT SAMPLES
Deliverable Setup	Verify that the file name follows the File Naming Convention guidelines.					
	Verify that the folder structure matches the format in the EDD					
	Verify that a pdf report and all associated data (seismic profiles, core logs etc) are included in the appropriate folder					
	Verify that the name on the dataset folder(s) match(es) the name assigned to the shapefiles in the folder.					
	Make sure there are no additional subfolders added, beyond what CPRA requires					
Spatial	Verify that the spatial location of the dataset makes sense.					
	Review bathymetric, topographic and isopach contours to make sure they make sense and do not cross eachother.	N/A	N/A	N/A		N/A
	Verify that the final shapefiles are in UTM Zone 15N as required by CPRA.					
	Make sure that the dataset is not a duplicate of a previously submitted dataset					
Metadata	Verify that each shapefile has xml and html metadata associated with it.					
	Check spelling and grammar.					
	Make sure that the metadata details match the attribute table (i.e contractor, date etc.).					
	Verify that the credits, lineage and accuracy have been filled out in the metadata. Make sure that the lineage specifies the type of data (i.e. single beam bathy, multibeam bathy) and provides as many details about data collection as possible.					
Attributes	Verify that the PROGRAM and PROJECT NAME match the CPRA program and project name (if available).					
	Verify that RECOVERY was calculated correctly (CORE LENGTH/PENETRATION * 100) and makes sense.	N/A	N/A	N/A	N/A	
	Verify that the sum of T_FINES, T_SAND and T_MIX does not exceed the CORE LENGTH	N/A	N/A	N/A	N/A	
	Verify that the correct template was used (i.e. grab samples vs. core borings)	N/A	N/A	N/A	N/A	
	Make sure that the date in the file name matches the date provided in the attribute table					
	Make sure that the data type in the file name matches the type in the attribute table (i.e. if ELSBB is used in the file name, ELSBB should also be the data type in the attribute table)					
	Verify that all fields are filled out using the correct formats as shown in the EDD's and attribute specifications for each data type					
	Check spelling and grammar in the attribute table					
	Verify that all fields are complete					
Additional Comments						

Figure 3. QA/QC form used for APTIM's first and second reviews.

Data Set	
Short dataset description	
QAQC Item	
Check the reports to ensure that all data types discussed in the report are included in the data that has been formatted	
Check the data values (contained in the shapefiles) - max/min of elevation data - max/min of percent sand - max/min of thickness values - thickness totals with core length	
Z datum for core borings and survey data	
Supporting information is documented to allow a user to find all the data associated with a project - for example: data urls are populated; different data types from the same study are linked together, data in the docs folder is discoverable from the attribute table	
Review APTIM QAQC sheets	
Comments	

Figure 4. QA/QC form used for TWI's final review.

Activity 1.6: Meetings

Weekly meetings were held with CPRA's project manager. Monthly teleconferences were held with the CPRA team to report the status of this project and to review the status of each of the subtasks. The meetings were typically held around the middle of each month. In addition, a monthly report was provided to CPRA at the end of each calendar month to summarize the status of the project. These reports included a summary of milestones accomplished and plans for the next steps. In addition to the weekly and monthly meetings, several additional meetings were attended at CPRA's request, and several presentations and publications were developed. These are summarized in Table 5 below.

Table 5. Summary of additional meetings, presentations, and publications.

Title	Presentation/Publication	Date
LASARD Storage of Data	Meeting	July 2023
LASAAP Report Discussion	Meeting	August 2023
Presentation by Dr. Edrington	Meeting	August 2023
CPRA LASMP Update to BOEM	Meeting	September 2023
NGOM2 Meeting	Meeting	September 2023
QC of previously submitted sediment sample datasets	Meeting	November 2023
LASAAP Demo	Meeting	November 2023
BISM Monthly Meeting	Meeting	November 2023
QC of previously submitted sediment sample datasets	Meeting	December 2023
LASARD Gap Assessment Discussion	Meeting	February 2024
LASAAP Report Discussion	Meeting	March 2024
Linking Borrow Sources to the CMP	Meeting	April 2024

Activity 1.7: Reporting

This document satisfies the requirement for a final status report.

Activity 1.8: Project Controls

Throughout this phase of LASARD, APTIM provided progress reports with the monthly invoices as well as monthly meeting agendas and monthly meeting minutes.

Future Work

Future work is anticipated to include:

- Cataloging of newly available data.
- Formatting of any newly cataloged data.
- Continue formatting UNO sediment sample datasets identified by TWI.
- Formatting the suspended sediment sample datasets into the new EDD once finalized by CPRA.
- Revisiting the grab samples within the SSD Map boundaries to populate the newly added fields.
- Coordination and support to update the EDD standards for the Borrow Area/Deposit dataset type.
- Coordination and support to update the EDD standards for the Survey Trackline dataset type.
- Annual revision to the SSD Map, volume estimates and report.
- SSRA evaluation based on the updated SSD Map.
- LASAAP support as needed.

Literature Cited

Aptim Environmental & Infrastructure, LLC (APTIM), 2024a. Gap Assessment Methodology - Survey Tracklines. Report prepared for Louisiana Coastal Protection and Restoration Authority. 11p.

APTIM, 2024b. Louisiana Sediment Availability and Allocation Program (LASAAP): Report on Statewide Sediment Availability Analysis. Boca Raton, Florida: Aptim Environmental & Infrastructure, LLC, 44p. (Prepared for Coastal Protection and Restoration Authority of Louisiana).

Aptim Environmental & Infrastructure, LLC (APTIM), 2023a. Compilation of Existing Geoscientific Data in Ship Shoal, Louisiana. Report prepared for Louisiana Coastal Protection and Restoration Authority. 25pp.

Aptim Environmental & Infrastructure, LLC (APTIM), 2023b. Gap Assessment of Geoscientific Data in Coastal Louisiana. Report prepared for Louisiana Coastal Protection and Restoration Authority. 70p.

APTIM, 2022a. *Report on Louisiana Surficial Sediment Distribution (SSD) Map Compilation.* Boca Raton, Florida: Aptim Environmental & Infrastructure, LLC, 254p. (Prepared for Coastal Protection and Restoration Authority of Louisiana).

APTIM, 2022b. Louisiana Sediment Availability and Allocation Program (LASAAP): Report on Statewide Sediment Availability Analysis. Boca Raton, Florida: Aptim Environmental & Infrastructure, LLC, 98p (Prepared for Coastal Protection and Restoration Authority of Louisiana).

Aptim Environmental & Infrastructure, Inc. (APTIM), 2020. Louisiana Sediment Availability and Allocation Program (LASAAP): Sediment Resource Analysis Tool Development and Barataria Basin Pilot Study

Results. Final Report prepared for Louisiana Coastal Protection and Restoration Authority (CPRA) and Gulf of Mexico Alliance (GOMA). CPRA Contract #4400017001 and GOMA Contract GSC-121813, Task 10. 53p.

Forrest, B.M., Khalil, S.M., Mathews, T.N., Rocky, W., and Raynie, R.C. 2023. Louisiana Sand Resources Database (LASARD): A Comprehensive Database to Support Ecosystem Restoration. Proceedings of Coastal Sediments 2023. World Scientific Publishing Company, 2791-2804 pp.

Khalil, S.M., Raynie, R.C., and Forrest, B.M. 2023. Regional sediment management for sedimentological restoration of a degrading delta plain. Proceedings of Coastal Sediments 2023. World Scientific Publishing Company, 2819-2832 pp.

Khalil, S.M., Finkl, C.W., Roberts, H.H., and R.R. Raynie, 2010. “New approaches to sediment management on the inner continental shelf offshore coastal Louisiana.” Journal of Coastal Research, 26(4), 591-604.

NOAA and USGS. 2020. Council Monitoring and Assessment Program (CMAP): A Framework for Using the Monitoring Program Inventory to Conduct Gap Assessments for the Gulf of Mexico Region. National Oceanic and Atmospheric Administration and U.S. Geological Survey. NOAA Technical Memorandum NOS NCCOS 284. Silver Spring, MD. 55p. doi: 10.25923/mrdd-h727

Attachment 1

Data Catalog