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**EAST GULF COASTAL PLAIN STRATIGRAPHIC RECONCILIATION INITIATIVE
ANNUAL REPORT, YEAR 1**

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by

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INTRODUCTION

With funding from the U.S. Geological Survey (USGS) GeoFramework Initiative (GFI), the Geological Survey of Alabama (GSA), in partnership with the Mississippi Department of Environmental Quality Office of Geology (MDEQ) and the Florida Geological Survey (FGS), are partnering on a 2-year, tri-state stratigraphic correlation initiative. The study area (fig. 1) and its geology includes the East Gulf Coastal Plain lithostratigraphic units (Cenozoic and Mesozoic surface to basement) in Mississippi, Alabama, and Florida panhandle.

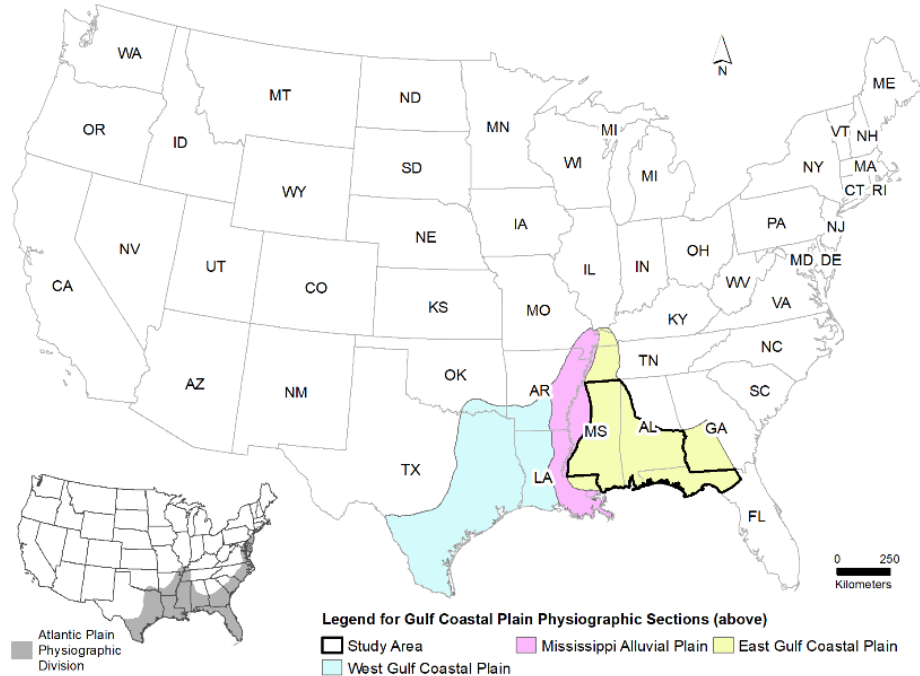


Figure 1.—The project study area (bold outline) in the East Gulf Coastal Plain (yellow) physiographic section in Mississippi, Alabama, and Florida panhandle.

ACCOMPLISHMENTS AND OBJECTIVES

The objectives for the first year of this project focus on reviewing the current status of state and regional stratigraphy, identifying needed changes to the current stratigraphic charts and nomenclature, and collaborating to begin making those changes. More specifically, the objectives include:

- Organizing project participants, planning, and goals;
- Inventorying and compiling data and supporting documentation, publications, and other resources to support stratigraphic review, correlations, and reconciliations;
- Holding Workshop #1 to review project goals, identify critical stratigraphic issues, and collaborate with individuals with multiple disciplinary focus areas;
- Compiling preliminary state stratigraphic tables based on workshop planning and findings while continuing frequent interstate consultations and focus on issues identified at the workshop;
- Reviewing Geolex geologic unit descriptions; and
- Holding Workshop #2 to reconcile preliminary regional stratigraphic charts.

All objectives above were accomplished to date, with the exception of Workshop #2. The second workshop, originally planned for August, will be held at a later date (see the “Goals Not Yet Met” section for more information on this). The project’s first year has been productive, with many accomplishments that would not have been as successful or possible without funding through USGS GFI. Below are some of those accomplishments.

DEFINING AND COORDINATING THE PROJECT TEAM

While the Geological Survey of Alabama is the lead on the project, subcontracts were arranged with the Mississippi and Florida state surveys as those states comprise an integral part of this regional project. This collaborative aspect helps maximize interstate cooperation and problem solving, and ensures the best regional stratigraphic products possible. Additionally, the Florida survey subcontracted with an external geologist who studies Florida panhandle geology and paleontology. The project team includes staff with diverse backgrounds and capabilities. Listed below are some of the project’s team members:

Alabama – Berry H. ‘Nick’ Tew, Jr. (GSA State Geologist and stratigrapher); Sandy Ebersole (Geologic Investigations Program director, principal investigator, geologist); Greg Guthrie (Groundwater Assessment Program director and hydrogeologist); and T. Lynn Harrell, Jr.

(paleontology collections curator and geologist) lead the Alabama team. Graduate geology students (Rita Adamec, Will Priakos, and Ben Engleman) and one undergraduate geology student (Chase Egli) are also assisting on the project.

Mississippi – David Dockery (MDEQ State Geologist, stratigrapher, paleontologist, and author of the book *The Geology of Mississippi* is the Mississippi team leader.). James Starnes (geologic mapper and stratigrapher) is also assisting with geologic maps and stratigraphic questions.

Florida – Guy ‘Harley’ Means (FGS State Geologist and stratigrapher); Casey Albritton (environmental consultant and geologist), and Scott Barrett Dyer (geologist) are part of the Florida team. Jon Bryan (geologist, paleontologist, and author of the *Florida Roadside Geology* book at South Florida College) also helps lead the Florida team.

Coordination and communication among the team members has resulted in a more thorough understanding of regional stratigraphic correlations, identification and sharing of resources and references, some of which were not known beforehand by all team members, and growth of working research partnerships applicable to this and other projects.

RESOURCES FOR STRATIGRAPHIC CORRELATIONS

A number of resources have been identified as sources of information and data useful in stratigraphic correlations along and across strike. These will be beneficial for compiling new stratigraphic charts and cross sections for this project. Some of the resources identified and discussed include:

- Literature such as publications, unpublished studies and reports, and field trip guidebooks;
- Unpublished and published in-state and regional stratigraphic charts;
- Water well drillers logs;
- Published and unpublished cross sections;
- Biostratigraphic data associated with water wells;
- Hydrocarbon, continuous core borehole, water well databases, and associated digital logs;
- Core and well cuttings;
- Paleontology collections; and
- Significant surface exposures and outcrops such as river bluffs and quarries that have historical significance in coastal plain mapping and stratigraphy.

WORKSHOP #1

Although a two-day workshop was originally planned, due to scheduling limitations, the workshop was instead held as a single, day-long workshop on May 24th, 2022, at the Geological Survey of Alabama, Tuscaloosa, and was attended by geologists and paleontologists from all three states. Topics of discussion included a review of the project objectives and timeline, documentation of methods and findings, Geologic Names Lexicon (Geolex) reviews, wells and cross-section line placement for the regional effort, and stratigraphic correlation methods. The largest portion of the day focused on review of each state's stratigraphic chart and any plans for revisions and correlation needs.

PRELIMINARY STRATIGRAPHIC CHARTS

Team members have revisited and discussed (at the workshop and pre- and post-workshop discussions) published and unpublished state and regional stratigraphic charts. Charts and needs for updates to correlations, nomenclature, and definitions have been discussed over email, phone calls, visits, and in person. Early rough drafts of regional stratigraphic charts were compiled and used as guides at the workshop. These included both lithostratigraphic charts as well as multi-taxonomic biostratigraphic charts. Stratigraphic revisions of note thus far include splitting, lumping, revisiting or revising unit definitions, updating unit rankings, and proposing new names or changes to names. Many of these are planned to be incorporated into this project's final deliverables as well as in peer-reviewed publications.

Discussions and ideas of age characteristics to include in revisions and updates to state and regional charts include:

- Micro and nannofossil ranges and first/last occurrences (e.g., foraminifera, calcareous nannoplankton, ostracods, etc.);
- Macrofossil ranges and first/last occurrences for standard index taxa (e.g., ammonites, bivalves, North American Land Mammal stages, etc.);
- Regional stage names;
- Radiometric information (e.g., radioisotopes, Sr-isotopes, etc.); and
- Macrofaunal guide fossils important in identifying certain units in the study area.

Additional items of interest to be included in stratigraphic charts and manuscripts associated with this project include geomorphic features such as coastal terraces correlated with Atlantic terraces (for example, the Pamlico terrace) and the Daugherty karst terrane in Alabama and Florida.

Specific outcrops with significant regional geologic and stratigraphic importance were also discussed. These included, for example, K-Pg Boundary sites, the Eocene-Oligocene Boundary Interval (a critical transition in geologic history, and exceptionally well-preserved in the study area); and the Chattahoochee-Apalachicola River Basin Section (a connecting link between the Gulf and Atlantic coastal plains).

REGIONAL CROSS SECTIONS

States identified wells and placement of cross section lines (fig. 2) that are assisting in correlating stratigraphy. Staff have acquired and digitized electric logs for these water and oil and gas wells, are working to identify tops for the stratigraphic units, and are correlating tops from well to well in Neuralog and Petra software. Additionally, staff are examining core and sample logs and comparing those to outcrop lithologic descriptions and e-log signatures.

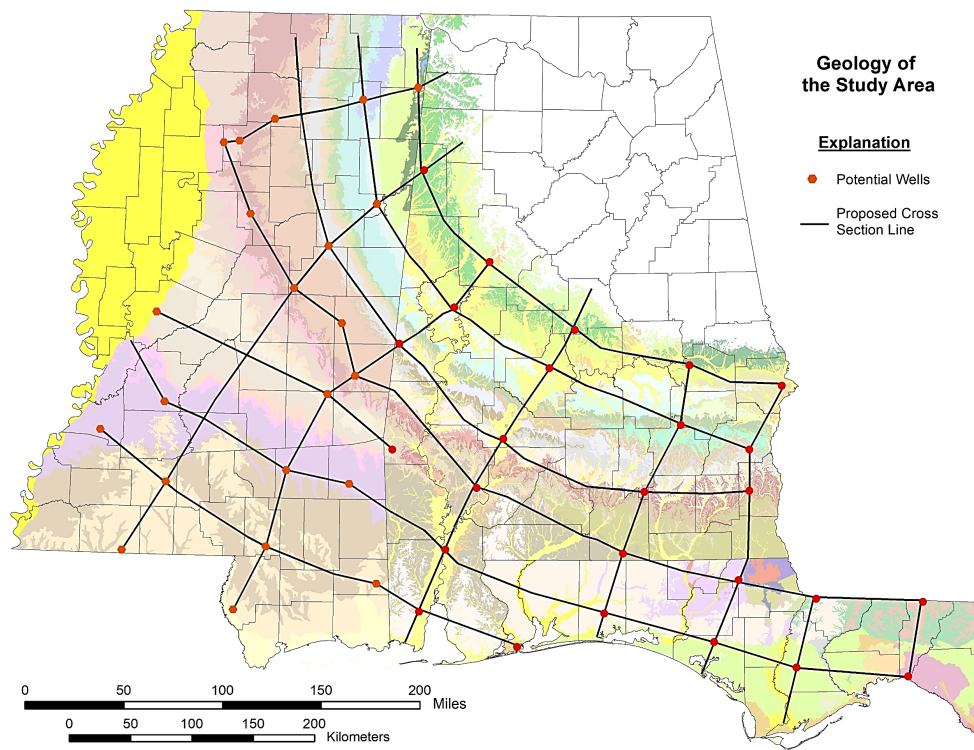


Figure 2.—Estimated cross-section lines (black) connecting water and oil and gas wells (red points) discussed at the workshop. These illustrate locations of cross sections to be compiled in this project to illustrate stratigraphic correlations across the tri-state study area. Modified from (Fenneman and Johnson, 1946).

GEOLEX REVIEW

Study area geologic units have been examined in the USGS Geolex system. Along with the lithologic descriptions and summaries given on the Geolex pages, the publications cited are being acquired for additional review of details that may relatedly help with stratigraphic correlations. Discussions with USGS Geolex staff are ongoing as project team members weigh which units need updates in the system.

MANUSCRIPTS FOR STRATIGRAPHIC REVISIONS

Article manuscripts are being drafted for stratigraphic revisions. These manuscripts, when completed in the next reporting period, will be submitted to peer-review publication outlets. Some of the manuscripts are being formatted for submission to the USGS bulletin publication *Stratigraphic Notes*. Examples of some of the manuscripts currently being compiled address changes to stratigraphic divisions to better correlate across state lines (for example, splitting the Lisbon Formation in Alabama into the four formations recognized in Mississippi), better defining lateral extent (e.g., of the McShan Formation), and proposed new names (e.g., ones occurring in literature for many years as “the lower unnamed member of the x Formation).

WORKSHOP #2 PLANNING

Planning is underway for the next workshop. The second workshop will focus on reviews of the items below:

- Subsurface cross sections compiled from well e-logs and any needed revisions to these;
- Stratigraphic manuscripts for publications being written by team members;
- The newest versions of the states’ stratigraphic columns;
- Newest version of the regional stratigraphic columns;
- Updated versions of the chrono and biostratigraphic charts;
- Aquifer discussions and needs; and
- Additional topics for discussion as the three states recommend.

GOALS NOT YET MET

Workshop #2 was originally planned for August 2022. However, because of some staff changes and delays in progress, the team has decided to delay the second workshop until late fall 2022 or early winter 2023. We do not foresee this as causing any hardship, but this likely will

benefit the quality of work by allowing adequate time to address additional needs in data and information compilation over the summer.

ADDITIONAL INFORMATION

No additional costs or cost overruns are anticipated.

ANTICIPATED ACTIVITIES OR ADJUSTMENTS TO THE PROGRAM FOR THE NEXT BUDGET PERIOD

Planned activities for the next budget period will focus on completing the project. Tasks will include the following:

- Additional virtual meetings and a possible field trip(s) will be conducted to further discuss topics and updates;
- Workshop #2 will be held;
- Final completion of all regional stratigraphic charts and cross sections;
- Submission of publications to USGS for units needing updates in Geolex;
- Final compilation of supporting documentation;
- Submission of any publication manuscripts; and
- Final report summarizing deliverables, including updated rock unit descriptions, state stratigraphic tables, regional stratigraphic correlation chart and cross sections, supporting data documentation, and a draft plan created for future projects to resolve outstanding issues identified in this project.

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