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# Wetland Mitigation Bank Prospectus

Wetland Mitigation Bank

NASA – John C. Stennis Space Center

Hancock County, Mississippi

“MVK-2019-217”

Prepared for



May 17, 2019

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# I. PROJECT DESCRIPTION AND OBJECTIVE

This prospectus has been developed to establish guidelines and responsibilities for the use, operation, and maintenance of the proposed Single User Wetland Mitigation Bank to be maintained and managed by the National Aeronautics and Space Administration (NASA) Stennis Space Center (SSC) located in Hancock County, Mississippi. The SSC Single User Mitigation bank will be identified henceforth as the SSCMB. The primary objective of this proposed mitigation bank will be to offset unavoidable impact to waters of the United States, which remain after all appropriate and practicable avoidance and minimization has been achieved. Also, given that much of the land within the NASA Buffer Zone is, or has historically been under timber management, the overall goals of the proposed mitigation bank will be:

- to continue managing lands that NASA has already successfully restored and enhanced after impacts from long-term logging and silvicultural practices and bring these established sites into an approved mitigation bank, and
- to establish how potentially new properties will be incorporated into this proposed mitigation bank and restore them to sustainably functioning wet pine savannah and pine flatwood ecosystems that contribute to regional biodiversity and watershed function.

NASA currently has land set aside to offset impacts which occur within the Stennis Fee Area. The Project Location Map included as **Figure 1** illustrates the location of these sites. Some of these sites have been actively managed since the late 1980's. The NASA SSC Fee Area (Service Area) includes the main space center property represented by 13,800 acres established in 1961 by the U.S. government for use by NASA to support the development and testing of rocket engines for the space program and other related industries. The SSC Buffer Zone includes a +/-125,000 acre exclusion zone that surrounds the SSC Fee Area within which habitable structures are prohibited, and limited land use activities and other special use covenants are required for land owners. These sites include pine flatwoods, wet pine savannahs and peripheral buffers that include bottomland hardwoods and uplands. These sites are currently referred to and approved as **“Special Mitigation Sites”** by the U.S. Army Corps of Engineers (USACE) – Vicksburg, MS District. The amount of land currently within the special mitigation sites includes approximately 1,053 acres under the ownership of the United States Government (NASA), the bank Sponsor. The tracts and the associated acreages of each mitigation site are as follows:

<u>Mitigation Site</u>	<u>No. of Tracts</u>	<u>Acreage</u>	<u>Map Figure No.</u>
EMTF	1	184	3
ASRM	1	132	4
Pearlington Phase 1	1	115	5A, 5B and 5C
Pearlington Phase 2	1	272	5A, 5B and 5C
<u>Pearlington Phase 3</u>	4	<u>67, 76, 74 and 133 = 350</u>	5A, 5B and 5C
<b>Total</b>		<b>1,053</b>	

In order to bring these mitigation sites into a more formal wetland mitigation banking program consistent with the guidelines set forth in the 2008 Wetland Mitigation Rule [33 CFR Part 332], NASA desires to develop this Single User Mitigation Bank. Credits that will be applied to projects to offset unavoidable impacts to Waters of the United States, including wetlands, which result from activities authorized under Section 404 of the Clean Water Act for site development and infrastructure projects that take place entirely within the SSC Fee Area.

## **II. BANK ESTABLISHMENT AND OPERATION**

### **Existing Mitigation Sites**

The primary resource type within NASA's "existing" mitigation sites is wet pine savannah. These sites have been established by restoration and enhancement programs within lands impacted by historical timber management practices throughout the SSC Buffer Zone and the SSC Fee Area. NASA initially started developing mitigation strategies for construction projects within the SSC Fee Area through restoration activities associated with the ASRM site and the EMTF site. The planning and expansion of additional mitigation sites within the SSC Fee Area that included the Pearlington I, II and III sites was extended in the mid to late 1990's through approximately 2002 under the USACE General Permit CELMK-OD-FE 14-GPD-53 (GP-53).

In 2007, NASA developed and implemented a more comprehensive Mitigation Site Monitoring Program (**SAMP**) that outlined the restoration and management procedures that NASA would utilize to maintain these mitigation sites established for compensatory mitigation to offset unavoidable impacts within the NASA Fee area. The SAMP also detailed the monitoring procedures and protocols that would be utilized to assess overall wetland functions and evaluate the success of the restoration efforts. Annual and semiannual monitoring reports were submitted to the USACE-Vicksburg District from 2007 through 2018.

Long-term management of the Special Mitigation Sites has incorporated the following methods:

- The removal of remnant pine plantation practices,
- Re-establishment of Longleaf Pine species,
- The renewal and maintenance of an effective prescribed burn regimen,
- The restoration of natural wetland hydrology, and
- The encouragement of more desirable wetland vegetation, including pitcher plants.

### **Future Mitigation Sites**

If NASA determines that there is a need for future compensatory mitigation, NASA may include additional sites as an addendum to this mitigation instrument. Proposal for the inclusion of new lands into the mitigation bank would be coordinated through the interagency review team (IRT). Site selection will also include the following criteria:

- Sites with similar or “In-Kind” hydrology, soils, and vegetation,
- Watershed features such as aquatic habitat diversity and habitat connectivity,
- Mitigation site size and location relative to hydrologic sources including water right availability and other ecological features;
- Compatibility with adjacent land uses and watershed management plans; and
- Potential effects the compensatory mitigation will have on other ecologically important resources and habitats, cultural sites, as well as listed threatened and endangered species, etc.

Mitigation credits for the proposed SSCMB will be provided primarily through restoration and enhancement of sites impacted by logging and timber management practices and related land use activities. Credit determination that would be potentially produced by the new mitigation sites will be conducted using the best available methodology at that time. Site assessment methodology is subject to change as methodologies for assessing wetland impacts and mitigation bank credits are updated and modified by the USACE.

Specific performance criteria for each new mitigation site will be developed and included in the Site Development Plan and Long-Term Management Plan based on best available methodologies for assessing the functions and values of each site. Performance standards will be developed for each new mitigation bank site that will include, but will not be limited to the following:

- **Vegetation** – Vegetation will be assessed per current USACE delineation criteria, established canopy cover, and dominant species composition appropriate for this region.
- **Hydrology** – Minimum inundation/saturation durations will be determined to correlate to wetland types proposed for establishment.
- **Upland Buffer** – Native species cover and fullness as appropriate for this site.

Future mitigation bank sites will be evaluated by the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, January 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual, and the Atlantic and Gulf Coastal Plain Region (Version 2.0; Environmental Laboratory, November 2010). Land impact and credit assessment are subject to change and will reflect the best available methodology. Compensation credits for unavoidable project related impacts within the SSC Fee Area will be determined by USACE during the project permitting process.

Monitoring of any new mitigation project site shall occur for a period of 10 years for forested wetland systems from the first growing season after the completion of the approved planting plan. Monitoring reports would be provided to the USACE as stipulated in the banking instrument. Monitoring would occur until a successful demonstration of the performance standards is provided to the USACE as indicated in the banking instrument.

### **III. BANK SERVICE AREA**

The service area for the proposed SSCMB will be exclusively for unavoidable impacts that result from projects located within the NASA Fee Area. **Figure 2** illustrates the locations of the current Special Mitigation Sites within the SSC Buffer Zone, as well as those within the SSC Fee Area. **Figures 3 and 4** include aerial photographs of the two SSC Fee Area mitigation sites (i.e. EMTF and ASRM). **Figures 5 (a), (b) and (c)** include aerial photographs of the three Pearlington, Mississippi mitigation site (i.e. Pearlington I, II and III).

### **IV. GENERAL NEED AND TECHNICAL FEASIBILITY**

The original reason for the development of the special mitigation sites began in the late 1980's as NASA saw the opportunity and the feasibility of restoring and managing previously impacted and degraded portions of the SSC Fee area to offset impacts from an expanding list of construction and development projects from SSC contractors within the Fee Area. The SSC Fee Area sites afforded NASA with a unique opportunity, given its local natural resource and conservation assets, to restore the degraded wetland functions of portions of its own property while providing its SSC technology contractors with mitigation credit purchase options for wetland impacts from construction projects in close proximity to the mitigation sites. The special sites provided "In-Kind" mitigation resources.

As the progressive success of the SSC Fee Area mitigation sites (ASRM and EMTF) grew and the increased need to bring additional land into mitigation also became apparent, NASA began to survey and assess other sites within the Fee Area, as well as properties that it owned within the Buffer Zone. In addition to the 13,800 acre NASA SSC Fee Area, the U.S. government also owns numerous tracts of land within the +/- 125,000 acre SSC Buffer Zone. Many of these tracts are either generally small, too isolated, or are located within physiographically unsuitable sites that would potentially restrict successful restoration efforts as a long-term mitigation site. There is still an abundant amount of acreage within the Buffer Zone that needs to be assessed for potential future mitigation use. Nevertheless, the three Pearlington sites were deemed to be technically feasible as long-term mitigation sites given their proximity to the Fee Area (within 4.0 miles), the similar or "in-kind" vegetative, soil, hydrologic and geomorphic characteristics. The three Pearlington mitigation sites were also selected given the negligible risk of increased municipal development and land use changes within the Pearlington community.

### **V. BANK OWNERSHIP**

The current owner and sponsor of the subject parcels of land within this proposed SSCMB is the United States Government. NASA's SSC has operated and managed these mitigation sites as the U.S. government's representative and sponsor/long-term steward of these lands. NASA will continue to be the sponsor and long-term steward of these current Special Mitigation Sites, and will be the owner/sponsor of new lands that it may potentially bring into this proposed umbrella mitigation bank. The current NASA agency representative and contact information is as follows:

**NASA – John C. Stennis Space Center**  
**Environmental Office**  
**Building 1100, Office 3012**  
**Stennis Space Center, Mississippi 39529**  
**Mr. Hugh Carr – Agency Representative and Mitigation Bank Manager**  
**Mr. Adam Murrah – Alternate Agency Representative**  
**(228) 688-2466**  
**Email – [hugh.v.carr@nasa.gov](mailto:hugh.v.carr@nasa.gov); [adam.w.murrah@nasa.gov](mailto:adam.w.murrah@nasa.gov)**

## **VI. QUALIFICATIONS OF BANK SPONSOR**

NASA has managed these special mitigation sites for over the past 20 years. NASA's environmental compliance and land resource management group will continue to be responsible for the physical operations and stewardship of these special mitigation sites. This group has successfully managed NASA's land and natural resource management concerns, timber management programs, as well as the wetland mitigation programs.

## **VII. ECOLOGICAL SUITABILITY**

NASA's current Special Mitigation sites consist of five different and mostly non-contiguous sites. Much of the land near Pearlinton, MS is, although parceled as independent tracts, actually adjoining tracts of land. Each of these sites were evaluated for potential development and inclusion as a Special Mitigation site based on its location and the physical distance from future impacts within the SSC Fee Area, its potential ability to meet NASA's site restoration goals, and the physical, chemical and biological aspects of these sites to achieve sustainable functions and values of a wetland. Future sites that NASA desires to bring into mitigation will also be based on the following criteria:

- Location of the mitigation bank site related to its potential service area and relative to the locations of potential impacts to wetlands within the SSC Fee Area,
- Suitability of the proposed site to meet the SSCMB's primary goals and objectives,
- Physical, chemical, and biological characteristics to support desired aquatic functions,
- Source and adequacy of hydrology,
- Technical feasibility and methodologies required for establishing the site (restoration, creation, enhancement, and/or preservation),
- Potential inclusion of upland tracts to act as buffer zones and to enhance overall ecological functioning of the proposed site,
- Compatibility with adjacent land uses, both current and future, and the
- Presence and/or protection of cultural resources and threatened and endangered species.

Each new mitigation bank site will have its own individual Site Development and Long-Term Management Plan that addresses the components of the 2008 Final Mitigation Rule. The main components of these plans will include, but will not be limited to, site location maps, the service area, site goals and objectives, baseline conditions of the site, as well as the size and types of potential wetlands to be developed. The Site Development and Long-Term Monitoring Plans will also include preliminary conceptual engineering design and vegetation restoration plans, wetland impacts by type of aquatic resources suitable for compensation, methods for determining credits and debits, accounting procedures, performance standards for determining credits, reporting and monitoring protocols.

## **VIII. WATER RIGHTS ASSURANCES**

This is not applicable.

## **IX. REFERENCES**

60 FR 58605-58614. November 28, 1995. Federal Guidance for the Establishment, Use and Operation of Mitigation Banks.

73 FR 19670. April 10, 2008. Compensatory Mitigation for Losses of Aquatic Resources.

Alabama-Mississippi Mitigation Banking Review Team, Mitigation Performance Standards for Wet Pine Flats, March 30, 2015.

Applied Geotechnologies, Inc, NASA-Stennis Space Center. Special Area Management Plan for Potential Wetland Mitigation Areas, John C. Stennis Space Center, Mississippi, March 2007.

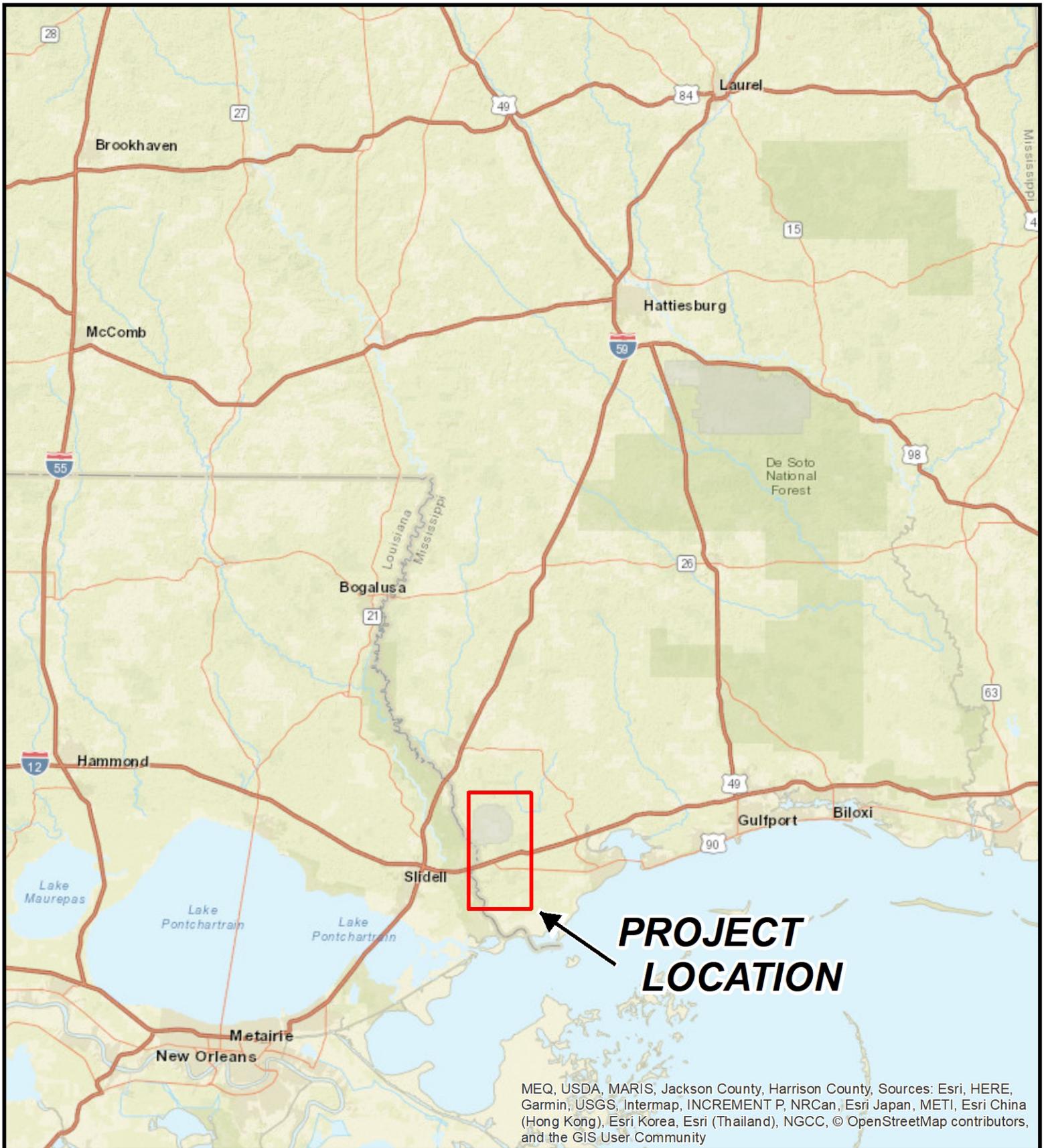
Environmental Laboratory. January 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi.

Environmental Laboratory. August 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0. U.S. Army Corps of Engineers Research and Development Center, Vicksburg, Mississippi.

Reinhardt, R.D., Reinhardt, M.C., and Brinson, M.M. (2002). A Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Wet Pine Flats on Mineral Soils in the Atlantic and Gulf Coastal Plains. ERDC/EL TR-02-9, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

U.S. Army Corps of Engineers, 1996. Charleston Method for Determination of Compensatory Mitigation Credit Factors. Charleston District, Corps of Engineers. RB-SOP-96-1.

## **List of Figures**



MEQ, USDA, MARIS, Jackson County, Harrison County, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

**Figure 1**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas  
 Source: SSC NASA & ESRI World Street Map  
 Map Date: February 9, 2019

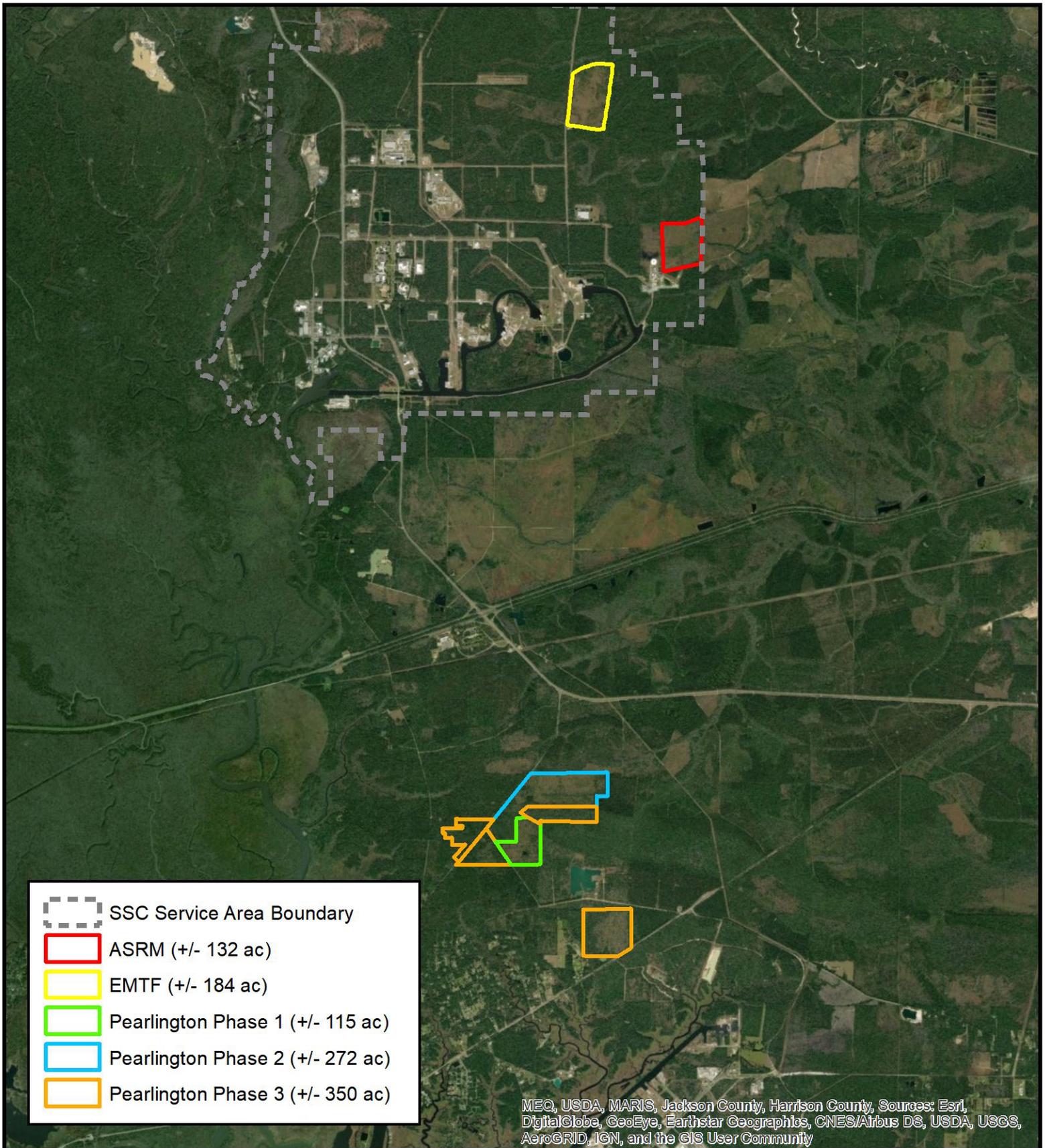


**PROJECT LOCATION  
 MAP**



**Wetland Mitigation  
 Bank Prospectus**

Location: NASA - John C. Stennis  
 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS

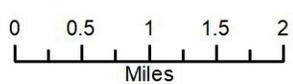


-  SSC Service Area Boundary
-  ASRM (+/- 132 ac)
-  EMTF (+/- 184 ac)
-  Pearlington Phase 1 (+/- 115 ac)
-  Pearlington Phase 2 (+/- 272 ac)
-  Pearlington Phase 3 (+/- 350 ac)

MEQ, USDA, MARIS, Jackson County, Harrison County, Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Figure 2**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas  
 Source: SSC NASA & ESRI World Imagery  
 Map Date: April 2, 2019

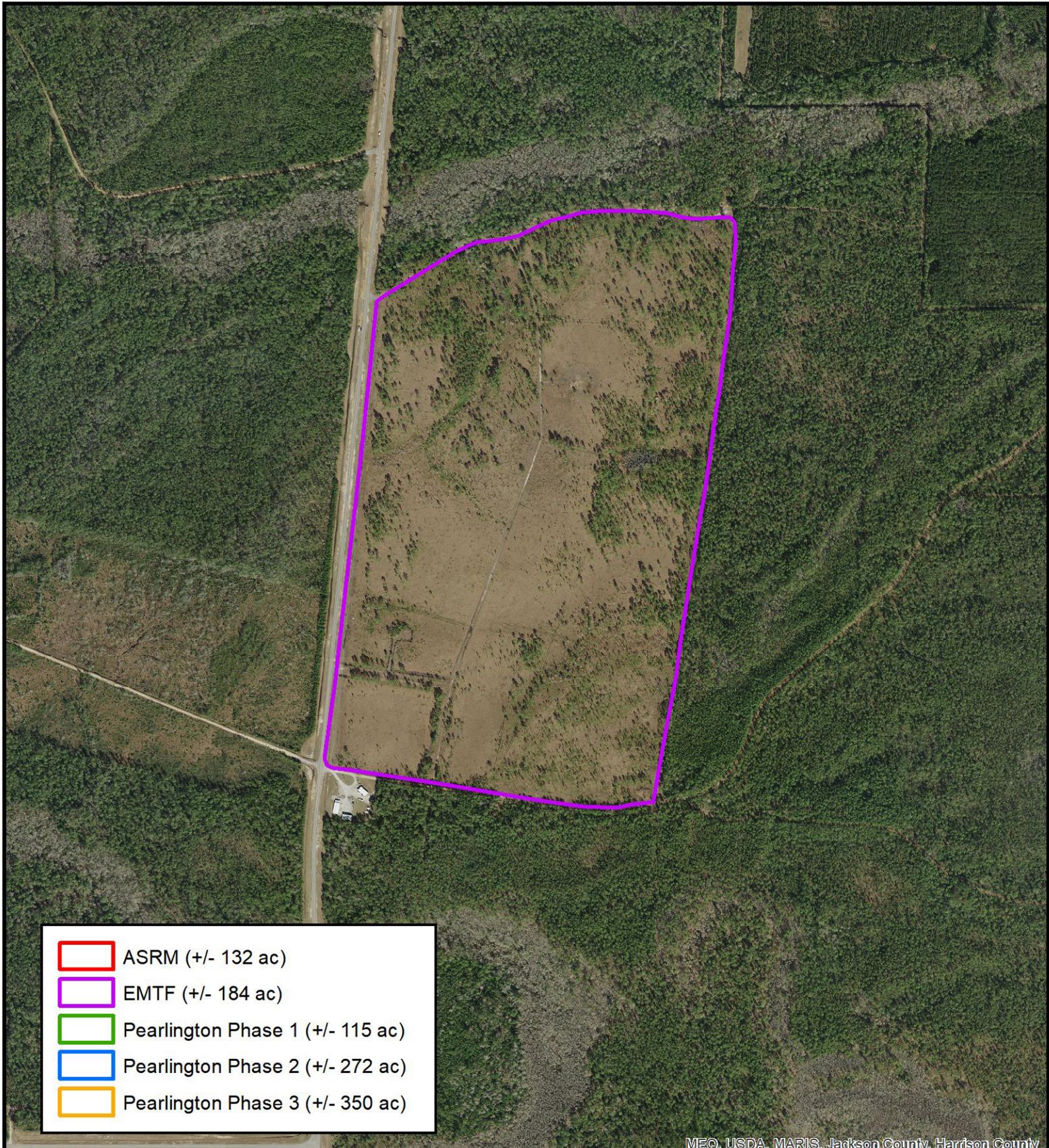


**SPECIAL MITIGATION  
 AREA SITES & SERVICE  
 AREA MAP**



**Wetland Mitigation  
 Bank Prospectus**

Location: NASA - John C. Stennis  
 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS

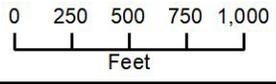


- ASRM (+/- 132 ac)
- EMTF (+/- 184 ac)
- Pearlington Phase 1 (+/- 115 ac)
- Pearlington Phase 2 (+/- 272 ac)
- Pearlington Phase 3 (+/- 350 ac)

MEQ, USDA, MARIS, Jackson County, Harrison County

**Figure 3**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas & 2017 High Res Ortho Imagery  
 Source: SSC NASA & MARIS/Surdex  
 Map Date: April 2, 2019

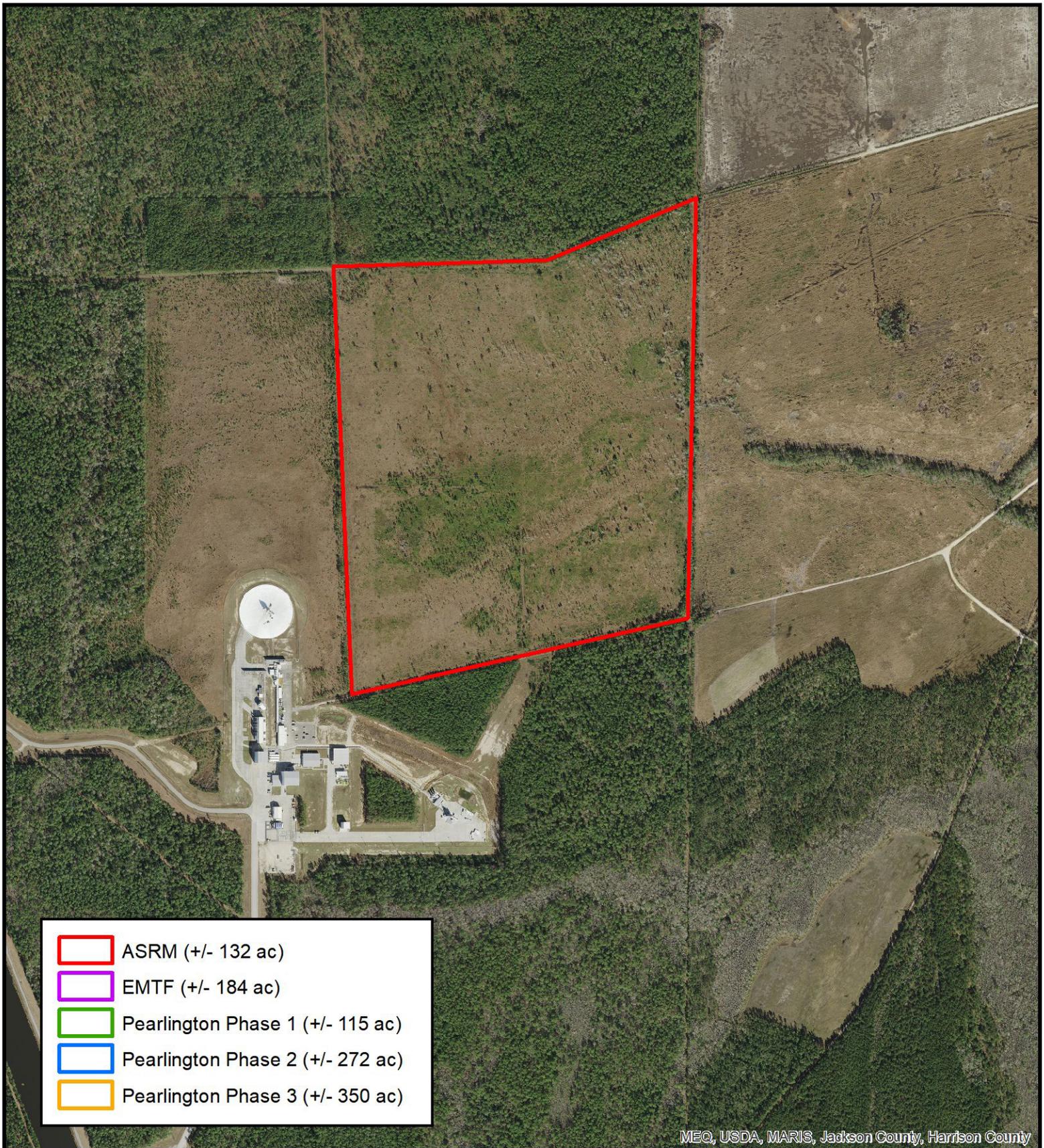


**CURRENT AERIAL  
 PHOTO MAP  
 (EMTF Site)**



**Wetland Mitigation  
 Bank Prospectus**

Location: NASA - John C. Stennis  
 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS

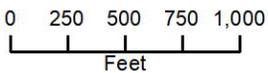


MEQ, USDA, MARIS, Jackson County, Harrison County

- ASRM (+/- 132 ac)
- EMTF (+/- 184 ac)
- Pearlinton Phase 1 (+/- 115 ac)
- Pearlinton Phase 2 (+/- 272 ac)
- Pearlinton Phase 3 (+/- 350 ac)

**Figure 4**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas & 2017 High Res Ortho Imagery  
 Source: SSC NASA & MARIS/Surdex  
 Map Date: April 2, 2019

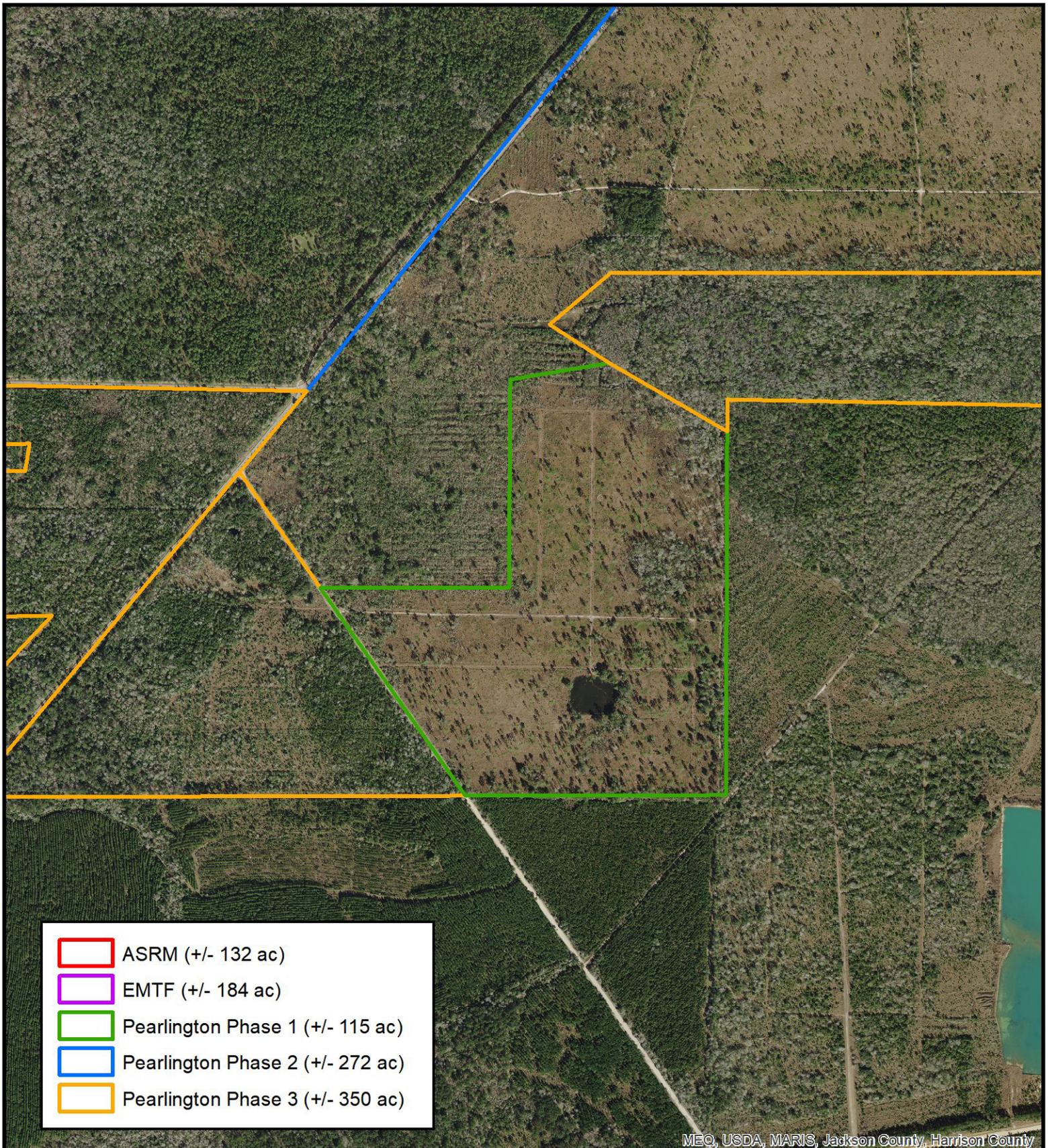


**CURRENT AERIAL  
 PHOTO MAP  
 (ASRM Site)**



**Wetland Mitigation  
 Bank Prospectus**

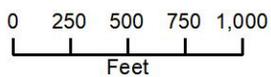
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 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS



MEQ, USDA, MARIS, Jackson County, Harrison County

**Figure 5A**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas & 2017 High Res Ortho Imagery  
 Source: SSC NASA & MARIS/Surdex  
 Map Date: April 2, 2019

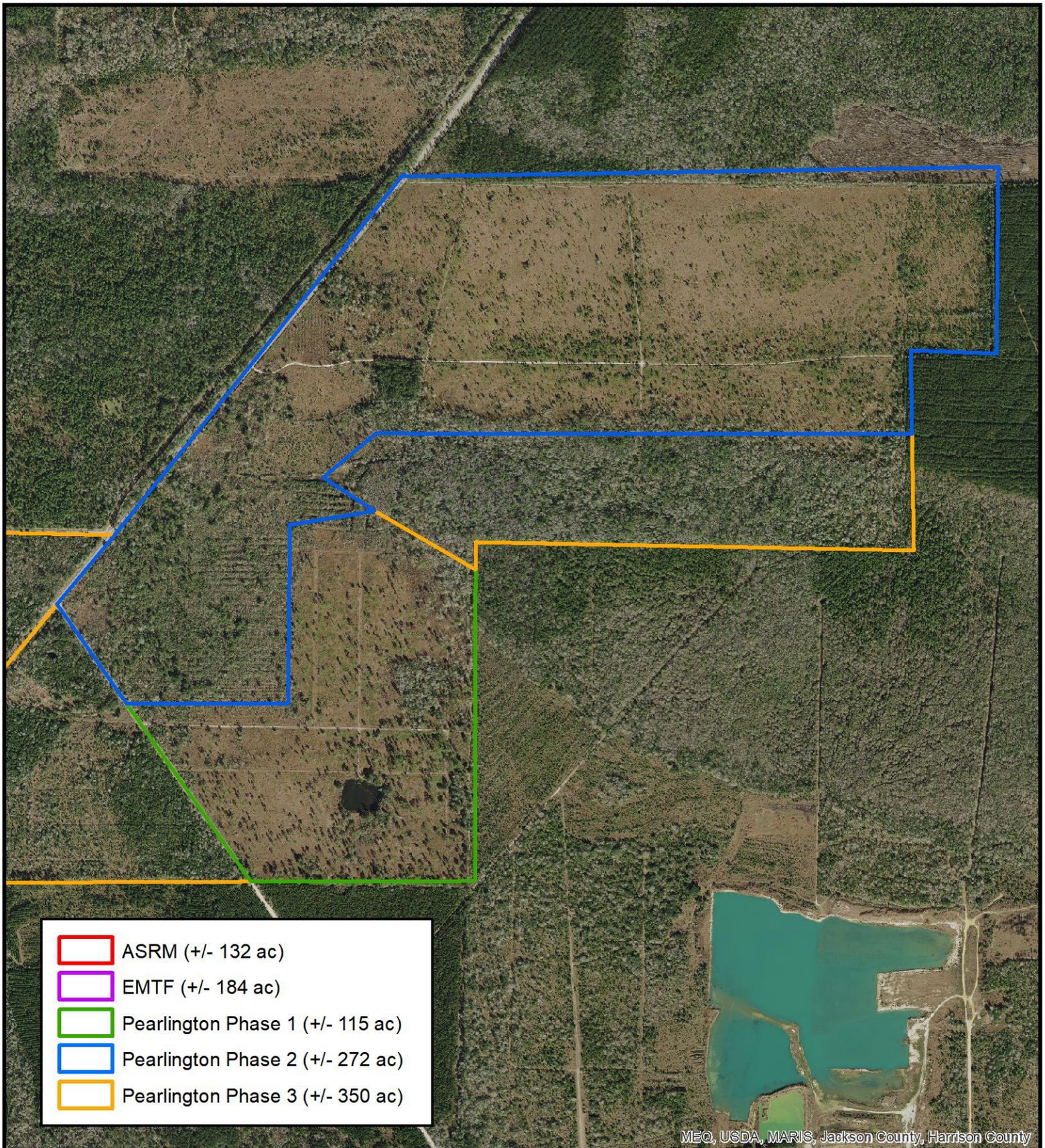


**CURRENT AERIAL  
 PHOTO MAP  
 (Pearlington I Site)**



**Wetland Mitigation  
 Bank Prospectus**

Location: NASA - John C. Stennis  
 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS



MEQ, USDA, MARIS, Jackson County, Harrison County

- ASRM (+/- 132 ac)
- EMTF (+/- 184 ac)
- Pearlington Phase 1 (+/- 115 ac)
- Pearlington Phase 2 (+/- 272 ac)
- Pearlington Phase 3 (+/- 350 ac)

**Figure 5B**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas & 2017 High Res Ortho Imagery  
 Source: SSC NASA & MARIS/Surdex  
 Map Date: April 2, 2019



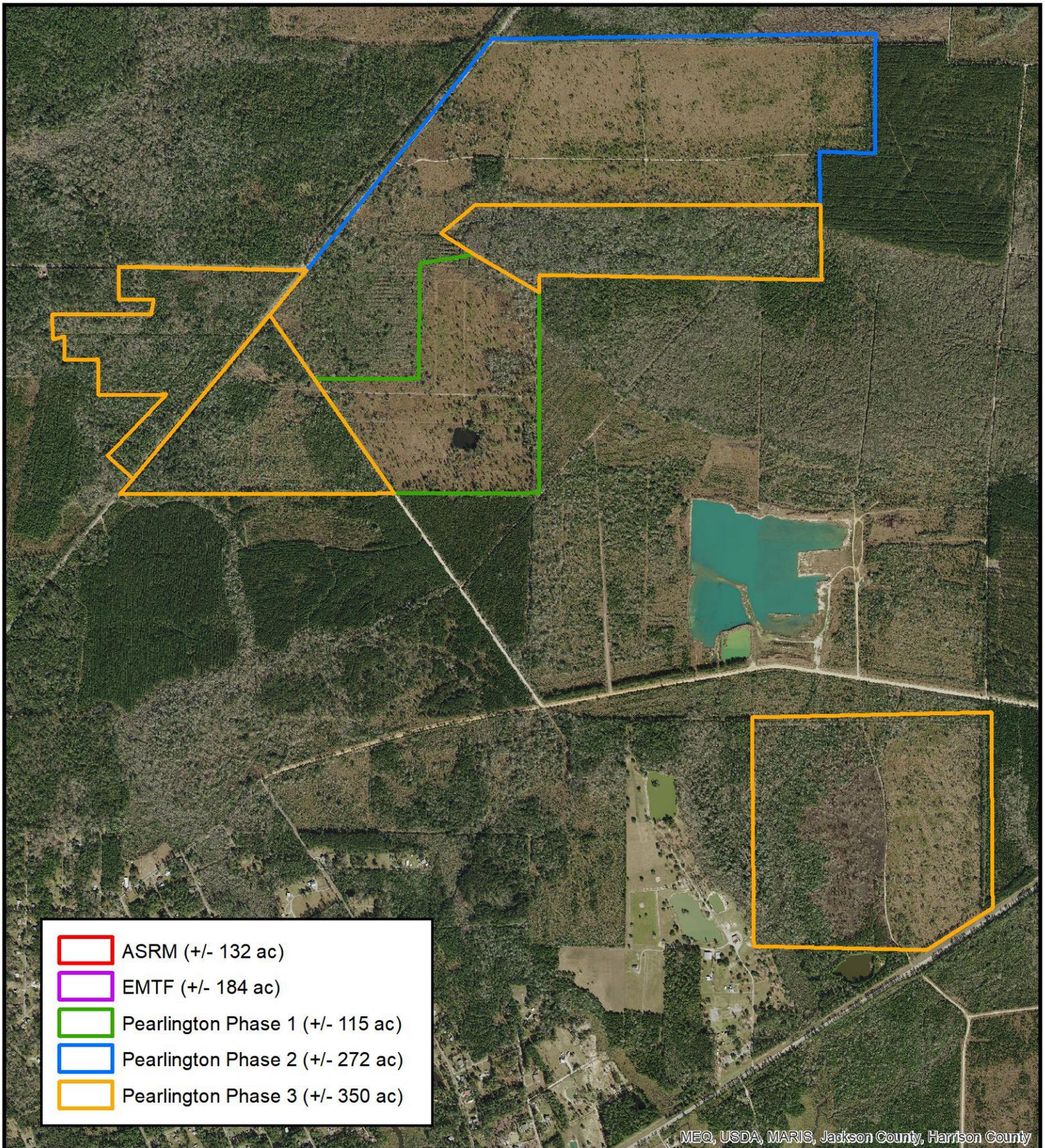
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**CURRENT AERIAL  
 PHOTO MAP  
 (Pearlington II Site)**



**Wetland Mitigation  
 Bank Prospectus**

Location: NASA - John C. Stennis  
 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS

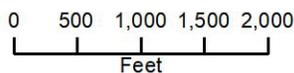


MEQ, USDA, MARIS, Jackson County, Harrison County

- ASRM (+/- 132 ac)
- EMTF (+/- 184 ac)
- Pearlington Phase 1 (+/- 115 ac)
- Pearlington Phase 2 (+/- 272 ac)
- Pearlington Phase 3 (+/- 350 ac)

**Figure 5C**

Purpose: Mitigation Bank Prospectus  
 Base Map: SSC Provided Bank Areas & 2017 High Res Ortho Imagery  
 Source: SSC NASA & MARIS/Surdex  
 Map Date: April 2, 2019



**CURRENT AERIAL  
 PHOTO MAP  
 (Pearlington III Site)**



**Wetland Mitigation  
 Bank Prospectus**

Location: NASA - John C. Stennis  
 Space Center  
 Sections: Multiple;  
 Township-7/8/9-South; Range-16-West  
 County: Hancock County, MS