

Texas Resource Management Codes

Status and Update Process

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December 2018

A REPORT TO THE GENERAL LAND OFFICE, FUNDED BY A GRANT FROM THE U.S. DEPARTMENT OF
COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION PURSUANT TO AWARD NO.
NA15NOS4190162



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Executive Summary

The Resource Management Codes (RMCs) are environmental guidelines provided to those seeking to lease or propose activities on state-owned submerged land tracts. Developed by state and federal resource agencies, the codes are a tool to assist with lease sales, environmental management, and project planning efforts. The RMCs enhance protection of natural resources and make the permitting process more efficient and transparent by providing information upfront on potential environmental restrictions for specific tracts.

RMC's were first provided to the public in 2001, and by 2013 they had become important information for the Texas state-owned submerged lands oil and gas lease sale program. In a series of 12 workshops from November 2013 to September 2014, a Data Standards Committee (DSC) of coastal experts from permitting agencies conducted a comprehensive review of the RMC. The RMC update was a data-driven process. The RMC classifications were grouped into 6 classes: Access; Dredging and Dredge Material Disposal; Miscellaneous; Oil and Gas Development; Right-of-Way; and Time Restrictions. Following

recommendations from the DSC on the criteria for assigning RMCs and type of data needed, the Harte Research Institute (HRI) developed new RMC maps by compiling available geospatial datasets, developing new datasets as needed, and applying the DSC criteria to each tract. These maps were reviewed by the DSC and amended and updated where necessary. In 2015, the new RMC maps were made available to the public through an online viewer hosted by the GLO. The DSC reconvened during 2018 to consider updates to code definitions and new datasets that should be used. In 2018, the DSC also considered how to make the online RMC viewer and underlying geospatial database a tool not just for RMC review, but also for coastal management in general. The RMC viewer seeks to centralize data for permitting and to increase efficiency in decision making by coordinating agency participation in the planning process.

The RMC system is now updated using a data-driven process by applying geospatial datasets and criteria identified by the DSC. This makes the system more complete, consistent, and sustainable for future updates. The RMC are publicly available through an online interactive mapping tool, and ways to expand the tool and underlying database to serve agency coastal management needs are under consideration. This document presents a summary of the RMC update process, the updated codes, data summary, data gap analysis, and recommendations for future updates.

This project was funded by NOAA through the Texas Coastal Management program under Section 309 of the Coastal Zone Management Act (CZMA) to help improve coastal management, protect critical enhancement areas, and to stream-line permitting and government coordination.

Background

The GLO conducts quarterly oil and gas lease sales in which any interested party may bid for the right to produce minerals from one or more state tracts on submerged coastal public land. State tracts offered for lease are located in coastal bays, estuaries, rivers inland to the limit of tidal influence, and portions of the Gulf of Mexico. A Notice for Bids listing the offered tracts is distributed before each lease sale. Interested parties research the potential mineral value of these tracts and submit competitive bids for specific tracts. The high bidder for a tract receives a mineral lease from the GLO authorizing the lessee to explore or develop that tract, with the State of Texas receiving a royalty on any minerals produced.

The Resource Management Codes (RMC), developed prior to 2001, are two-letter codes assigned to state-owned submerged land tracts in Texas to indicate state, federal, and local regulations or concerns that may affect oil and gas exploration and production. The Texas General Land Office (GLO) created the code

system to provide regulatory predictability for entities bidding for the option to explore and potentially develop state-owned mineral resources.

Prior to a lease sale, the GLO would provide the participating regulatory agencies a list of the state tracts to be offered in an upcoming sale for review and comment prior to the sale. The agencies would assign or modify the RMC for each tract indicating their concerns and forward this information to the GLO to be compiled and included in the Notice for Bids booklet distributed to potential bidders before the sale. Using the codes information in the booklet, a prospective bidder could then contact the regulatory agencies to explore the restrictions that might be applied to a tract during the COE permitting process. This advance notice, and the opportunity for a potential bidder to investigate limitations on development before bidding on a tract, would provide the desired regulatory predictability for potential state lessees.

Over time, agencies provided less feedback on code changes prior to lease sales, which rendered the RMC less adaptive to changes in the coastal environment. The RMC were last updated in their entirety in 2001, and many tracts were not considered in that update. The RMC system, therefore, needed a data-driven process to make it sustainable in providing current, consistent, and complete coverage. This process was developed and refined from 2013 to 2018.

Resource Management Code Update

Project Overview

From 2013-2014 the GLO, in partnership with the Harte Research Institute (HRI) and the Data Standards Committee (DSC), completed a comprehensive review and update of the RMC for inclusion in an online GIS viewer also developed as part of this effort. For this update, the collaborative developed and used a new data-driven process for assigning RMC. In 2018, the GLO, HRI, and the DSC revisited the RMC and made additions and refinements to the underlying geospatial data and criteria used to define codes and updated the RMC map (see Appendix A for RMC definitions and Appendix D for maps of each RMC) . RMCs are assigned to state-owned tracts in Texas bays and Gulf waters to promote best management practices for activities within the tracts to minimize adverse impacts to sensitive natural resource areas. The RMC inform users of state-owned submerged lands about ecological features associated with lease tracts which may affect a lessee's ability to engage in certain activities on those tracts. The code recommendations promote best management practices to avoid impacts to sensitive areas and define the types of sensitive

areas in need of special consideration when conducting various activities in state-owned submerged tracts.

Project Goals and Objectives

This project is part of GLO's long-term coastal planning initiative to develop data and tools for assisting natural resource stewardship. Specifically, this project aimed to update the RMC and to develop a more sustainable and robust method for future updates. In addition to providing data to comprehensively map and update the RMCs, the underlying geodatabase of natural Sensitive Areas and ancillary information (see Appendix B for Sensitive Area definitions and Appendix C for a catalog of datasets used) is valuable for GLO and the other networked agencies to enhance their management efforts. Objectives for this project were as follows:

Objective 1: Evaluate existing RMCs for current uses.

Objective 2: Develop methodology for decision criteria for application of the RMC.

Objective 3: Discover and collect relevant and necessary data.

Objective 4: Identify data gaps and recommend new acquisitions.

Objective 5: Develop RMC visualization layer/datasets.

Process Overview

Beginning in 2013 and in partnership with HRI, the GLO's Planning and Policy, Coastal GIS, and Information Systems teams began a comprehensive review and update of the RMCs (Figure 1) (see Appendix B for RMC definitions). Through this process, a Data Standards Committee (DSC) was formed to provide input on RMC definition updates and required geospatial data. The DSC thoroughly analyzed the RMCs, their definitions, relevant data availability, user requirements, and proposed a new methodology for keeping the codes up to date. A Sensitive Areas definition document was developed to standardize language and meaning across all codes. The updated RMC are grouped into 6 classes: Access; Dredging and Dredge Material Disposal; Miscellaneous; Oil and Gas Development; Right-of-Way; and Time Restrictions. Under each class, the old codes were evaluated and either updated, deemed redundant, or no longer necessary. Additional codes were added based on concerns that have emerged in the regulatory environment since the last RMC comprehensive update. Once the DSC completed the code definitions, data sets were compiled, and criteria applied that assigned codes to each submerged land lease track.

GLO staff quality controlled the data and developed a beta version of the GIS-based interactive RMC viewer for incorporation into the GLO website and access by the public of the new RMC. The DSC provided feedback on future RMC viewer modifications. Feedback was categorized as to whether the enhancement could be completed in the short-term or long-term. Short-term recommendations were incorporated, and the new RMC viewer was used for the January 20, 2015 lease sale. The new Sensitive Area definitions and RMC were included in the land tract notice mailings for bids that went out prior to the lease sale. For easy reference, the new RMC viewer included a layer identifying the tracts up for bid. Figure 1 displays the general RMC update process from 2013 through 2014. In 2018, the DSC reconvened and (1) reviewed the RMC and Sensitive Area definitions, (2) reviewed the RMC viewer, and (3) identified new datasets and information needs.

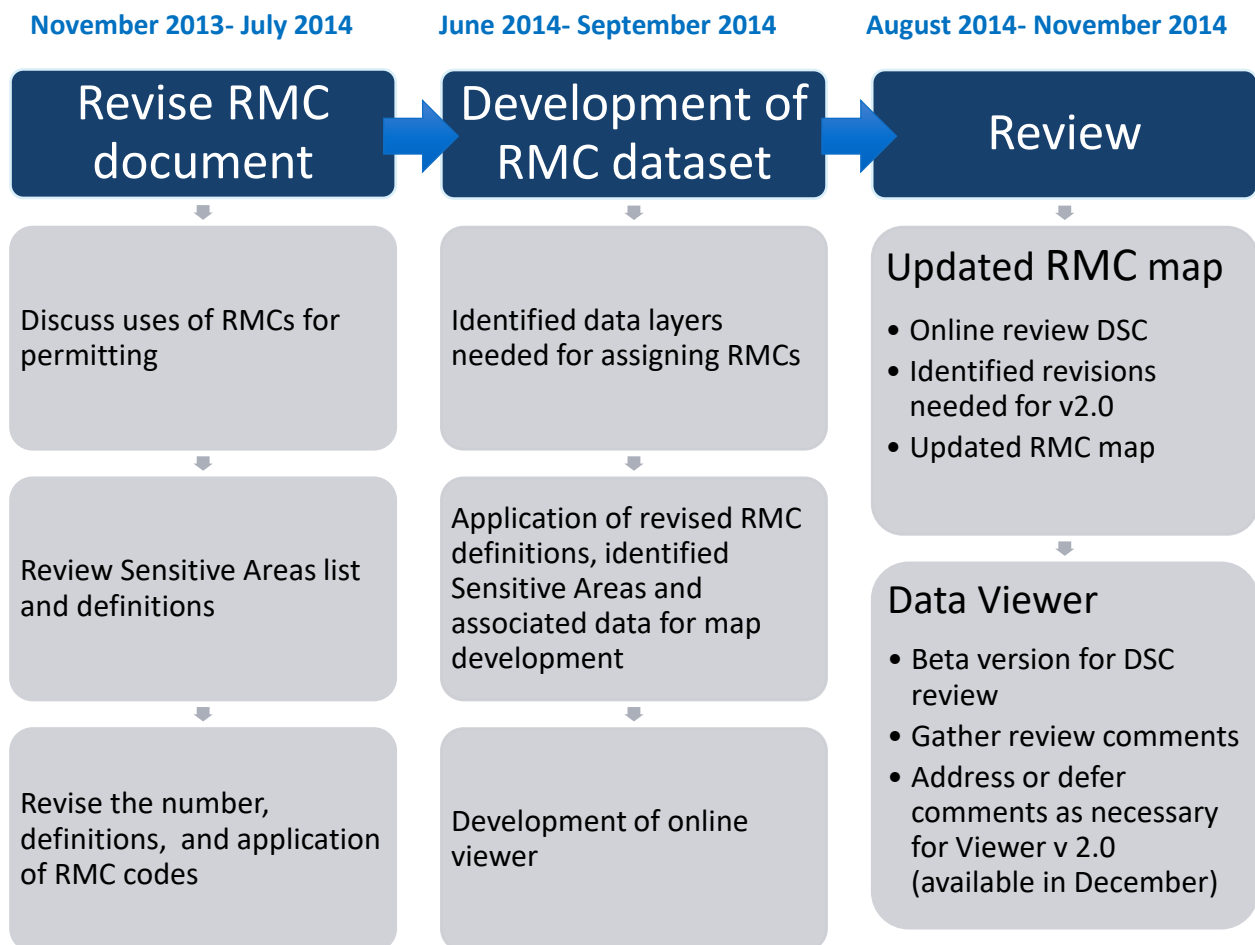


Figure 1. Timeline and summary of RMC update.

Data Standards Committee (DSC)

For this initiative, the GLO formed the DSC, a workgroup made up of representatives from the CMP-networked resource agencies, federal agencies, and GLO Coastal Resources, Energy Resources, GIS, and Asset Management Staff. The DSC met monthly from November 2013 to September 2014 to examine and redefine 35 codes, identify, compile, and develop new data sets applicable to each code, and develop the data-driven criteria to assign codes to each submerged land tract. They also reviewed the online RMC viewer employed to make the RMC publicly available. The DSC reconvened in February 2018 to review the RMC system. The DSC is comprised of people who can contribute knowledge regarding permitting and regulatory decision making as well as individuals who practice information science. Table 1 shows the DSC membership.

Participating DSC Members.

Name	Affiliation	Name	Affiliation	Name	Affiliation
Adriana Leiva	TPWD	George Martin	GLO	Robert Hatter	GLO
Alex Nunez	TPWD	Heather Biggs	TPWD	Scot Friedman	GLO
Alex Sanders	GLO	Helen Young	GLO	Sheri Land	GLO
Allison Buchtien	GLO	Jackie Robinson	TPWD	Sterling Harris	GLO
Amy Borgens	THC	Jayson Hudson	USACE	Steve Buschang	GLO
Ana Cortinas	GLO	Jerry Androy	USACE	Tiffany Caudle	UT-BEG
Ashley Correll	RRC	Jesse Arellano	GLO	Tom Calnan	USFWS
Brach Lupher	HRI	Jesse Solis	GLO	Tom Trembley	UT-BEG
Brian Koch	TSSWCB	Jim Gibeaut	HRI	Tony Williams	GLO
Carla Guthrie	TWDB	John "JD" Lopez	TPWD	William Nichols	HRI
Claire DeVaughan	USGS	Kate Zultner	GLO		
Cory Horan	TCEQ	Leslie Koza	TPWD		
Daniel Gao	GLO	Manuel Freytes	GLO		
Dave Buzan	Atkins	Mark Fisher	TXDoT		
Diana Del Angel	HRI	Pat Clements	USFWS		
Dianna Ramirez	GLO	Ray Newby	GLO		
Elizabeth Vargas	GLO	Rebecca Hensley	TPWD		

DSC Meetings

The GLO and HRI conducted a total of 12 meetings from November 2013 to November 2014 and one meeting in February 2018. During these meetings, RMC sensitive areas were defined, RMC definitions were updated, and guidance on the development of maps, data sets, and the map viewer were received. The DSC examined and redefined 35 codes, identified datasets applicable to each code, compiled and analyzed datasets to develop code-assigning criteria, and advised on RMC integration into a GIS viewer.

Meeting Summaries:

November 7, 2013

During this introductory meeting, the GLO and HRI presented an overview of the RMC and reviewed expectations for the DSC working group. The meeting was hosted at the GLO's building. The goal was to obtain the DSC's opinion on the usage and ways to improve the RMC codes. At the end of the meeting a survey was assigned to gather information on DSC member's familiarity with the RMC, tools desired for permitting, and what online mapping applications are frequently used for permitting. The team received 16 responses from the DSC prior to the next meeting.

December 12, 2013

During this meeting at the GLO, the DSC reviewed and discussed survey responses. HRI presented the proposed data-driven approach for development of new RMC maps. As an assignment prior to the next meeting, DSC reviewed the list of Sensitive Area definitions drafted by HRI and the GLO, and suggested additions. After the meeting, the DSC were given the criteria for the following codes for review before the next meeting: *Access*, *Miscellaneous*, and *Right-of-Way*. A total of 10 responses were received prior to the next meeting.

January 23, 2014

During this meeting in Austin, the DSC reviewed responses and proposed Sensitive Area definitions to be used in the RMCs. The proposed Sensitive Areas and definitions were updated to be practical in a larger scope of permitting, aside from oil and gas development. The additions to Sensitive Areas include items like critical dune areas, critical erosion areas, and flood zones. Additional responses were collected for definitions and criteria for the *Access*, *Miscellaneous* and *Right-of-Way* codes.

February 20, 2014

During the February meeting at the GLO in Austin, the DSC discussed changes to the *Access* codes.

March 20, 2014

During the March meeting at the GLO, the DSC discussed changes and updates to the following *Miscellaneous* RMC regarding marshes, submerged aquatic vegetation, state archeological landmarks, oyster reefs, and endangered species habitat. An assignment to the DSC before the next meeting consisted of a review of the RMC groups: *Dredge and Dredge Material Disposal*; *Oil and Gas Development*; and *Time Restrictions*. A total of 6 responses were obtained before the April meeting.

April 24, 2014

During the April meeting at the GLO, the DSC discussed changes and updates to the *Dredge and Dredge Material Disposal* codes. In addition, the DSC had a short discussion of potential viewer functionality.

June 4, 2014

This was a webinar held to review data needs and potential issues in updating the RMC. Issues discussed included mapping of channels, proxy for Mean Low Water, potential datasets for mapping contaminated areas, bathymetry data limitation, private oyster leases, mitigation banks, and nesting sea turtle maps.

June 11, 2014

During the June meeting in Austin, the DSC discussed changes and updates to the *Oil and Gas Development* codes. HRI presented an update on the datasets compiled and code-assigning decision matrices. Updated documents were sent out for final review which covered material earlier updated: the *Sensitive Areas* definitions, *Access* codes, *Right-of-Way* codes, and *Miscellaneous* codes.

July 17, 2014

During the July meeting at the GLO in Austin, the DSC updated the remaining codes in the *Time Restrictions* code set. Final key dates for the updates and RMC viewer were discussed. By August 4th the viewer and RMC maps would be available for review and comments from the DSC. Final comments to be submitted by August 14th and final maps would be available by August 25th.

August 7, 2014

The August meeting was held at HRI in Corpus Christi, TX. During this meeting, the DSC reviewed the RMC map update process, including the data used, and became familiar with the web-viewer under development. Each code was mapped using specified criteria- for example the presence of marsh, the presence of critical habitat for endangered species, etc. Maps for each code were presented (total of 28 maps) except for the Historical Landmarks, as well as the spatial extent of all sensitive habitats combined. Historical Landmarks maps are updated by the Texas Historical Commission. During this meeting, a few minor changes to the code and Sensitive Areas documents were also discussed. During this meeting, the DSC were shown how to use the RMC viewer and provide edits and comments within the viewer.

September 4, 2014

The September meeting was held at the GLO. During this meeting, the DSC reviewed the final edits made to the Sensitive Areas, RMC definitions and GIS maps, as proposed from the last meeting, and other comments submitted through the online viewer. Also, the process for future updates was discussed.

November 12, 2014

This was the last meeting for the DSC prior to the public release of the new codes and RMC viewer. It was held at the GLO in Austin. During this meeting, the recent RMC update process was reviewed as well as proposals for the future update process. Last changes and additions to RMC viewer V.2.0 were discussed as well. Changes such as updates to the Sensitive Area database to include “critical erosion areas” and “identified sand sources” which had been identified as needs would continue to be gathered and addressed by HRI. Other data set development or updates were deferred for future updates including the following items:

Restoration areas- data source not obtained

Mitigation areas- data source not obtained

State endangered species – data pending

February 15, 2018

This meeting was held at the GLO in Austin. The prior DSC meeting was about 3.5 years ago. The DSC reconvened for this meeting and discussed how the new RMC system was working and to make updates. During and following this meeting, the DSC reviewed RMC definitions, Sensitive Area definitions, and the status of geospatial datasets for use in the RMC assignment. There was also a discussion regarding using local datasets in addition to the state-wide datasets primarily used for assigning codes. The new RMC

viewer was also reviewed, and discussions conducted of possible functions or data and information to add to improve its use for resource management.

RMC Viewer and Geodatabase

Currently, the updated RMC and Sensitive Area layers plus layers added to address criteria other than Sensitive Areas for RMC determination, are available through the RMC Viewer (Figure 2) on the GLO's website (<http://www.glo.texas.gov/land/land-management/gis/index.html>). HRI transferred the geodatabase containing these layers to the GLO for hosting through the GLO's RMC viewer (Figure 2) and for future updates to the RMC system. The viewer is how the public accesses the RMC. The geodatabase and viewer integrates 101 datasets including a layer for each of 36 RMCs, 45 Sensitive Area layers, and 20 layers with ancillary data needed to assign RMC in each state-owned submerged land tract, thereby making the new RMC completely data driven and future updates less cumbersome, and more adaptive. The entire RMC geodatabase is cataloged, stored, and distributed on GOMaportal.org, which HRI maintains.

Future Update Process

Rather than requesting updates to the codes from the other natural resource regulatory agencies prior to a lease sale, it was decided that yearly dataset updates will be requested instead. The datasets are used as the code-assigning criteria, so any update to the underlying natural resource data will update the associated code in the specific tracts where that resource is present. Updated datasets developed or updated by the resource agencies over the last year will be requested and vetted through the DSC before being integrated into the RMC viewer. Additionally, more localized datasets may be included in future updates and viewer iterations. This revised update method will streamline requests of the agencies and keep the RMC viewer adaptive to changing environmental conditions and technology so that the RMC will remain relevant as a tool for lease sales in addition to generally navigating the regulatory environment.

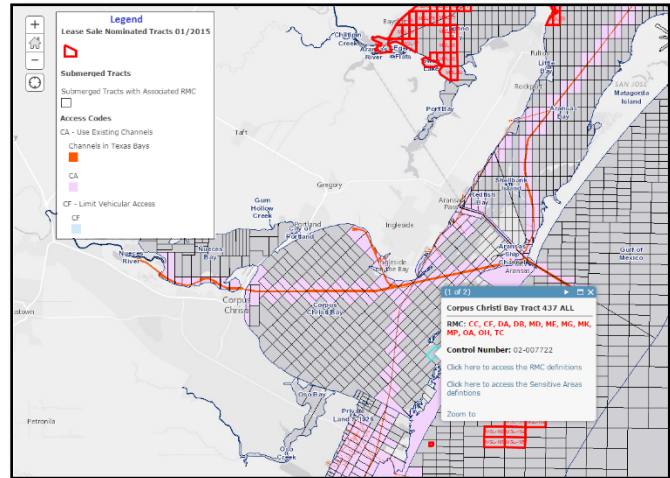


Figure 2. Screen-shot of RMC web-viewer featuring 2015 lease sale nominations and Access codes.

Lessons Learned and Recommendations

This project successfully reinvigorated the RMC and enhanced their applicability and relevancy through development of a GIS viewer for easy consumption. Defining standardized sensitive areas and methodical review of the codes themselves was a tedious and cumbersome process. The DSC expressed interest in expanding the information sharing data platform and viewer, developed through this effort to other products which integrate the goals of the various agencies, help centralize data and information, and reduce redundancy in management activities. With the groundwork in place for continuous updates of the RMC, it is recommended that communication with the DSC is sustained and requests for information and review be conducted in a consistent and timely manner. Future RMC updates should be less time-intensive, if done more frequently. Further, it is recommended that the RMC tool be expanded to be useful not only to individuals seeking permits for development activity, but also to aid natural resource agency professionals who can use the data for permitting and coastal management activities. See Appendix C for specific and recent data updates, gaps, and data quality issues that are recommended to be addressed for the RMC and overall GLO Master Planning initiative.

Appendix A: RMC Definitions

ACCESS

General Recommendations:

Access methods for development may result in loss of wetland habitat and can significantly alter coastal processes such as salinity and hydrology, which can modify the distribution and abundance of living marine resources. The placement of fill material should avoid covering sensitive areas and altering hydrology. Fill materials such as sand, gravel, rock, or similar materials for roadway construction may not be placed below mean high water or in state-owned wetlands.

Lessees must, to the greatest extent possible, use existing channels, canals, and other deep-water areas to avoid impacts to sensitive areas, and minimize initial and maintenance dredging requirements. Where construction of a new channel is unavoidable, siting to avoid impacts to sensitive areas such as bird rookeries, oyster reefs, and areas of submerged aquatic vegetation is important. In addition, canals and channels should not cut through barrier beaches, barrier islands, or other Gulf shoreline protection features.

All activities should be coordinated with the commenting agencies and should use Best Management Practices to avoid unnecessary impacts to sensitive areas. The following mitigation sequence may be applied during the evaluation of potential adverse impacts of a project: (1) avoidance of adverse impacts; (2) minimization of adverse impacts; and (3) compensation for unavoidable adverse impacts.

For information on Best Management Practices and guidelines to reduce the overall impact to the environments and facilitate permitting, please visit:

U.S. Army Corps of Engineers Galveston District construction guidelines:

<http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/ConstructionGuidelines.aspx>

Definitions and Explanations

CA - Use existing channels.

New dredging may not be authorized on this tract; however, maintenance dredging of existing and previously dredged channels may be authorized if sensitive areas are not impacted.

CC – The dredging of one channel may be authorized for development of this tract.

If no channel is present on the tract, the dredging of a single channel may be authorized to provide access if impacts to submerged aquatic vegetation and other sensitive areas are avoided.

CF- Limit vehicular access for development activities.

Vehicular access methods and staging areas should be designed to avoid impacts to sensitive areas.

DREDGING AND DREDGE MATERIAL DISPOSAL

General Recommendations:

In general, discharge of dredged material is not allowed on state-owned submerged lands. Discharge of dredged material in sensitive areas has the potential to directly bury aquatic habitats and animals, adversely impact water quality, reduce oxygen availability for aquatic species and reduce light for submerged aquatic vegetation. Sediment control techniques such as silt curtains or other barriers that minimize turbidity and migration of dredged materials into sensitive areas are encouraged and may be required. Prop-washing is not an acceptable dredging method or means of entering or traveling in tracts.

Dredged material, however, is a resource that should be used to create or restore habitat in a process called “beneficial use of dredged material”. Beneficial use of dredged material includes, but is not limited to, beach and aquatic habitat creation or restoration. If dredged material cannot be used beneficially, it should be placed in existing placement areas or upland sites where levees will contain the material.

All activities should be coordinated with the commenting agencies and should use Best Management Practices to avoid unnecessary impacts to sensitive areas. The following mitigation sequence may be applied during the evaluation of potential adverse impacts of a project: (1) avoidance of adverse impacts; (2) minimization of adverse impacts; and (3) compensation for unavoidable adverse impacts.

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Definitions and Explanations

DA – Dredging may not be allowed on this tract.

Dredging may not be authorized on this tract due to the occurrence of sensitive areas, sediment contamination or existing infrastructure. If impacts to sensitive areas occur, mitigation may be required.

DB - Dredging may not be approved in water less than 6 feet deep as measured from mean low water.

Dredging may not be approved to protect shallow water sensitive areas. This tract has shallow areas and the creation of excessively deep pockets of water could alter current patterns, cause stagnation pools and create traps for fish when tide levels drop.

MISCELLANEOUS

General Recommendations:

Miscellaneous codes include general concerns that are not activity-specific and that apply to sensitive areas and habitats along the coast. These include, but are not limited to, the following:

Coastal wetlands	Tidal sand and mud flats
Submerged aquatic vegetation	Hard substrate reefs
Cultural resources	Bird rookeries
Private oyster leases	Dredge material placement areas
Endangered species habitat	Regional designated sand sources
Designated-use areas	

Dredging may not be allowed and other construction activities should be located at safe distances from sensitive areas. Specific setback distances depend on the type of sensitive areas present. Special methods may need to be incorporated to reduce turbidity and sedimentation impacts to sensitive areas from construction activities. A survey to locate any existing sensitive areas may be required before activity commences. In addition, plans for development and routes and

methods of structure installation or construction must be included on applications for U.S. Army Corps of Engineers permits and Texas General Land Office plat maps for all state-owned submerged lands.

All activities should be coordinated with the commenting agencies and should use Best Management Practices to avoid unnecessary impacts to sensitive areas. The following mitigation sequence may be applied during the evaluation of potential adverse impacts of a project: (1) avoidance of adverse impacts; (2) minimization of adverse impacts; and (3) compensation for unavoidable adverse impacts.

For information on Best Management Practices and guidelines to reduce the overall impact to the environments and facilitate permitting, please visit:

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Definitions and Explanations

MA - No special recommendations relating to sensitive areas, other than cultural resources.

No specific concerns have been identified at this time.

MB – Avoid impacts to hard substrate reefs.

This tract contains hard substrate reefs which include rock outcrops, coral reefs, serpulid worm reefs (living or dead) and relic reef structures in intertidal or subtidal areas. Activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats.

MC – Avoid impacts to artificial reefs.

This tract contains artificial reefs; however, activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats.

MD – Avoid impacts to tidal sand and mud flats.

This tract contains tidal sand and mudflats; however, activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats.

ME – Avoid impacts to coastal wetlands.

Coastal wetlands exist within this tract; however, activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats. A survey may be required to locate existing wetlands.

MG – Avoid impacts to submerged aquatic vegetation.

Submerged aquatic vegetation, such as seagrass, has been documented on this tract; however, activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats. A survey may be required to locate existing submerged aquatic vegetation.

MI – Avoid impacts to bird rookeries.

Bird rookeries exist within this tract; however, activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats.

MJ – Cultural resources may be present.

These tracts lack sufficient data regarding the presence of submerged cultural resources. An archeological remote-sensing survey, issued under a Texas Antiquities Permit, may be required for proposed work that introduces bottom disturbing activities such as dredging and/or creation of sediment placement areas. Consult with the Texas Historical Commission for more information.

MK – Avoid impacts to cultural resources.

State Antiquities Landmarks or other cultural resources protected by state law are known to be or may be located on this tract and should not be disturbed. An archeological remote-sensing survey, issued under a Texas Antiquities Permit, may be required prior to commencement of activities. Consult with the Texas Historical Commission for more information.

ML – This tract contains private oyster leases.

Private oyster leases have been documented on this tract. Consult with the Texas Parks and Wildlife Department for more information.

MM – Avoid impacts to public oysters characterized as reefs, beds, patches, or scattered.

Oysters (reefs, beds, patches, or scattered) exist on this tract; however, activities may be permissible if best management practices are used to avoid adverse impacts to these sensitive habitats. A survey may be required to locate existing oyster cover.

MN – Work on this tract is subject to state threatened or endangered species regulations.

Activities conducted on this tract would require consultation with the Texas Parks and Wildlife Department. Laws and regulations pertaining to endangered or threatened species are contained in Chapters 67 and 68 of the Texas Parks and Wildlife Code and Sections

65.171 - 65.176 of Title 31 of the Texas Administrative Code.

MO – Work on this tract is subject to review under the Endangered Species Act.

Activities conducted on this tract would require consultation with the corresponding agency. The U.S. Fish and Wildlife Service administers the Endangered Species Act for freshwater and land-based species, while the National Marine Fisheries Service is responsible for marine species.

MP – This tract contains designated use areas.

This tract contains designated use areas such as coastal protected areas, navigation districts, patented areas, and other designated use areas, which may be subject to special recommendations. Federal, state and local government entities should be consulted regarding restrictions or special use permits.

MR– This tract contains restoration areas.

This tract contains restoration areas; activities should not be undertaken which may adversely impact restoration features or the intended recovery of the ecosystem or which may undermine the management goals established for that area.

MS – This tract contains mitigation sites.

This tract contains sites established for the purpose of providing compensatory mitigation; however, activities may be permissible if best management practices are used to avoid adversely impacting mitigation features.

MV – This tract contains identified sand sources.

This tract contains identified sand sources; however, activities may be permissible if conflicts with other uses of this area are avoided.

MX – This tract contains dredge material placement areas.

This tract contains dredge material placement areas; however, activities may be permissible if conflicts with other uses of this area are avoided.

OIL AND GAS DEVELOPMENT

General Recommendations:

All oil and gas related activities should avoid, to the maximum extent practicable, impacts to sensitive areas. In general, impacts to submerged aquatic vegetation, marsh, oysters, and other structured habitats are of particular concern. Biological monitors may be required when conducting activities. Oil and gas related activities on state-owned submerged lands may be subject to requirements of the Oil Spill Prevention and Response Act (Natural Resources Code Chapter 40), which designates the General Land Office as the lead state agency for the prevention of and response to oil spills into Texas coastal waters.

All activities should be coordinated with the commenting agencies and should use Best Management Practices to avoid unnecessary impacts to sensitive areas. The following mitigation sequence may be applied during the evaluation of potential adverse impacts of a project: (1) avoidance of adverse impacts; (2) minimization of adverse impacts; and (3) compensation for unavoidable adverse impacts.

For information on Best Management Practices and guidelines to reduce the overall impact to the environments and facilitate permitting, please visit:

U.S. Army Corps of Engineers Galveston District construction guidelines:

<http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/ConstructionGuidelines.aspx>

Definitions and Explanations

OA – Surface drilling may not be allowed.

Directional drilling from off-tract locations may be required for mineral development of this tract. Sensitive areas dominate this tract, thus drilling activity may significantly damage the ecosystem.

OH - Drill in water deeper than 6 feet as measured from mean low water or from land above mean high water.

This tract has deep-water (greater than 6 feet) areas and sensitive areas in shallow water. Drilling activities may need to be confined to the deep-water areas or adjacent uplands.

OM - Pipeline and platform construction may be prohibited on top or near oyster reefs, hard substrate reefs, artificial reefs and banks.

Construction activities may be prohibited or restricted within 500 feet of artificial or natural reefs, banks or hard bottoms to minimize damage caused by accidental discharges of hazardous substances, sedimentation, or physical impacts, and to protect fish and other organisms attracted to the area. A survey for the presence of reefs may be required.

OP - The use of high-velocity energy sources may be prohibited for performing geophysical surveys on top of or near oyster reefs, hard substrate reefs, artificial reefs and banks.

Geophysical activities may be prohibited within 500 feet of artificial or natural reefs, banks, or hard bottoms to minimize impacts to reefs and to protect fish and other organisms attracted to the area. A survey for the presence of reefs may be required. A three-year recovery period is usually required between consecutive surveys over the same geographic area.

OR – No drilling within two miles seaward of the Gulf shoreline along the Padre Island National Seashore.

Drilling activity within two miles of the Gulf shoreline along the Padre Island National Seashore is restricted to protect both the aesthetic and recreational values of the public beach. Access to minerals in the two-mile zone along the Gulf beach may be achieved by directional drilling from upland sites, if authorized by the National Park Service, or from submerged state tracts beyond the two-mile limit.

RIGHT-OF-WAY

General Recommendations:

Use of existing rights-of-way is encouraged to lessen adverse impacts to sensitive areas on state-owned submerged lands. Pipeline construction under navigation channels is subject to special routing and burial requirements. Development may be accomplished by directional drilling from parts of state tracts that are outside the federal right-of-way. All work on tracts where navigation concerns have been identified should be coordinated with the U.S. Army Corps of Engineers (USACE) Galveston District, Operations Division, local navigation districts, port authorities and the U.S. Coast Guard.

To ensure compliance with federal regulations regarding navigation channels, dredge material placement areas, anchorage areas, safety fairways, and other navigational concerns, contact the USACE Galveston District Navigation Division and the U.S. Coast Guard.

Following is a link to USACE Standard Operating Procedures for Federal Channel Setbacks:

<http://www.swg.usace.army.mil/Portals/26/docs/regulatory/Setback%20SOPs/GIWSOP.pdf>

All activities should be coordinated with the commenting agencies and should use Best Management Practices to avoid unnecessary impacts to sensitive areas. The following mitigation sequence may be applied during the evaluation of potential adverse impacts of a project: (1) avoidance of adverse impacts; (2) minimization of adverse impacts; and (3) compensation for unavoidable adverse impacts.

For information on Best Management Practices and guidelines to reduce the overall impact to the environments and facilitate permitting, please visit:

U.S. Army Corps of Engineers Galveston District construction guidelines:

<http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/ConstructionGuidelines.aspx>

RW – Navigation concerns may exist.

This tract may contain navigation channels, dredged material placement areas, safety fairways, designated channel setbacks, anchorage areas and other navigation concerns.

TIME RESTRICTIONS

General Recommendations:

Activities on some tracts may be limited to specific time periods to avoid disturbance to state or federally listed endangered or threatened species and colonial nesting waterbirds and their critical habitat. Lessees should coordinate activities with the corresponding agencies to ensure that their activities do not adversely impact endangered or threatened species or colonial nesting waterbirds. Consultation agencies include: the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the National Park Service and the Texas Parks and Wildlife Department.

All activities should be coordinated with the commenting agencies and should use Best Management Practices to avoid unnecessary impacts to sensitive areas. The following mitigation sequence may be applied during the evaluation of potential adverse impacts of a project: (1) avoidance of adverse impacts; (2) minimization of adverse impacts; and (3) compensation for unavoidable adverse impacts.

For information on Best Management Practices and guidelines to reduce the overall impact to the environments and facilitate permitting, please visit:

U.S. Army Corps of Engineers Galveston District construction guidelines:
<http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/ConstructionGuidelines.aspx>

Definitions and Explanations

TA – Drilling is prohibited within the area from two miles to three miles seaward of the Gulf shoreline of the Padre Island National Seashore during sea turtle nesting season from March 15 through September 30.

Drilling is prohibited within the area from two miles to three miles seaward from March 15 through September 30 to avoid interference with nesting sea turtles. Drilling is allowed within the area from two miles to three miles seaward from October 1 through March 14. Drilling activity in this area must begin before January 15 to ensure completion before March 15. Contact the National Park Service Division of Sea Turtle Science and Recovery for regulations and mitigation measures required for oil and gas operations to reduce the direct impacts that could occur to nesting sea turtles.

TB – Dredging, oil and gas related activity, or development operations may not be allowed during whooping crane overwintering season from October 15 through April 15. Permanent structures higher than 15 feet above ground are not allowed.

This tract contains whooping crane designated critical habitat. Most activities on this tract are restricted during the period from October 15 through April 15 to protect overwintering whooping cranes.

TC – Dredging, oil and gas related activity, development operations, or watercraft landing may be prohibited, within 1000 feet of a bird rookery during peak nesting season, which typically occurs from February 15 through September 1.

Bird rookeries are located on or near this tract. Nesting birds must be left undisturbed. Any activities may be prohibited within 1000 feet of a rookery area during the peak-nesting season from February 15 through September 1. A biological monitor may be required.

TD - Geophysical surveying may be restricted from the seaward base of the sand dunes or vegetation line Gulfward three miles during sea turtle nesting season from March 15 through September 30.

Sea turtles have been documented using the beach in or adjacent to this tract for nesting. Geophysical surveying on this tract may be restricted from March 15 through September 30 to protect nesting sea turtles. A biological monitor may be required. Contact the National Park Service Division of Sea Turtle Science and Recovery for regulations and mitigation measures required for oil and gas operations to reduce the direct impacts that could occur from crushing or covering of nests or turtles.

TE - Dredging, oil and gas related activity or other development operations may be restricted within 1000 feet of a sea turtle nesting beach from March 15 through September 30.

This tract contains areas with documented or potential sea turtle nesting beaches. Activities may be restricted within 1000 feet of a sea turtle nesting beach from March 15 through September 30. A biological monitor may be required. Contact the National Park Service Division of Sea Turtle Science and Recovery for regulations and mitigation measures required for oil and gas operations to reduce the direct impacts that could occur to nesting sea turtles.

TF – Dredging, oil and gas related activity or other development operations may be restricted during piping plover season, typically from July 15 through May 15.

This tract contains designated critical habitat for piping plovers. During this period, oil and gas related or other development activities may be restricted. A biological monitor may be required.

Desalination

General Recommendations:

House Bill 2031 (84th Legislature) directed the Texas Parks and Wildlife Department and the Texas General Land Office to develop a study ([link to study](#)) that identifies zones in the Gulf of Mexico that are appropriate for the diversion of marine seawater, and for the discharge of marine seawater desalination brine concentrate, while taking into account the need to protect marine organisms. Based on available information and known concerns, the recommended diversion and discharge zones are identical.

Results from the study inform a new expedited permit application program under development at the Texas Commission on Environmental Quality.

Definitions and Explanations

DZ – Marine Desalination Zones – Areas identified in the Gulf of Mexico that are appropriate for the diversion of marine seawater, and for the discharge of marine seawater desalination brine concentrate.

RESOURCES

U.S. Army Corps of Engineers Galveston District construction guidelines:

Project specific guidelines for Best Management Practices can be found at the following website. The guidelines are intended to reduce impacts to the environment and if incorporated, may qualify applications for nationwide or general permits and expedite review.

<http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/ConstructionGuidelines.aspx>

U.S. Army Corps of Engineers Webpage for Permit Guidance:

<http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx>

U.S. Army Corps of Engineers Webpage for Federal Regulations and Permit Guidance:

<http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/FederalRegulation.aspx>

Appendix B: Sensitive Area Definitions

RESOURCE MANAGEMENT CODES SENSITIVE AREAS

The Resource Management Codes (RMC) are recommended environmental guidelines for state-owned submerged land tracts developed by state and federal resource agencies to serve as a tool to assist with leasing state land tracts, and project planning efforts. The RMCs are intended to enhance protection of sensitive natural resources by providing recommendations to promote best management practices to minimize impacts to sensitive areas from development and oil and gas related activities. The sensitive areas used for the designations of the RMC are defined in this document.

SENSITIVE AREAS DEFINITIONS

Artificial reefs – Features constructed for the purpose of providing habitat for fish and invertebrates, typically concrete and metal installations in intertidal or subtidal areas.

Artificial reefs stabilize sediments and provide habitat for numerous fish and invertebrates as well as provide protection from predators for estuarine species.

Bank – An area of the bay or Gulf bottom substantially elevated above the surrounding bottom which tends to attract fish and other organisms.

Bay nearshore areas - Areas that extend bayward from the bay shoreline and include areas where sediment is relatively coarser and more mobile than central bay areas and may include subtidal bars.

Bay nearshore areas protect upland margins from erosion by lessening the level of wave energy arriving at the shoreline.

Bay shore areas - All areas within 100 feet landward of the high-water mark on submerged land.

Bay shore areas function as buffers, protecting upland habitats from erosion and storm damage and adjacent marshes and waterways from water quality degradation.

Bird rookeries- Rookeries are the nesting, breeding and rearing areas for colony forming birds. These areas may include dredged material disposal islands, emergent and upland vegetation and/or exposed shoreline.

Bird Rookeries provide foraging, roosting, cover and nesting habitats for colonial birds.

Coastal marshes - Coastal wetlands (see *coastal wetlands* definition) that are mostly covered with vegetation such as grasses, shrubs, or mangroves.

Coastal protected areas - Any local, state or federally managed lands in the coastal zone that are designated and used as parks, recreation areas, scientific areas, wildlife management areas, wildlife refuges, or coastal preserves. These may also include marine sanctuaries, marine protected areas and artificial reefs.

Coastal protected areas are unique coastal areas with fragile biological communities that are valued for the recreational opportunities they afford and for the diverse habitats they protect.

Coastal wetlands - Naturally occurring or restored lands that are transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or land covered by shallow water. They may be estuarine or palustrine in nature, and they may support hydrophytic vegetation. *This category includes fringing wetlands, interdune swales, mangroves and tupelo swamps. Depending on the specific wetland type, special permitting may be required.*

Coastal wetlands provide foraging, roosting, cover and nesting habitats for wildlife, sources of freshwater, convey and store floodwaters, trap sediment, reduce water pollution, sequester carbon from the atmosphere, and protect shorelines by diffusing wave energy.

Critical dune areas - Sand dune complexes on the Gulf shoreline within 1,000 feet of mean high tide including upland areas protected under the Dune Protection Act (Sections 63.001-63.181 of the Texas Natural Resources Code).

Critical dune areas are essential to the protection of public beaches, submerged land, and state-owned land, such as public roads and coastal public lands, from nuisance, erosion, storm surge, and high wind and waves. Sand dunes help prevent loss of life and property by absorbing the impact of storm surge and high waves and by stopping or delaying intrusion of water inland.

Critical erosion areas - Gulf and bay shorelines that are undergoing erosion greater than, or equal to, 2 feet per year.

Critical erosion areas require comprehensive management because loss of life and property can result if development occurs in these areas.

Critical habitat areas – Specific geographic areas that contain features essential to the conservation of federally listed threatened or endangered species and that may require special

management and protection. Critical habitat may include areas that are not currently occupied by the species but will be needed for recovery.

Dredged material placement areas – Any area, aquatic or upland, at which dredged material is utilized, or disposed.

Dredged material can be used beneficially for engineered environmental enhancement purposes such as habitat restoration and development and beach nourishment.

Gulf beaches - Natural or restored beaches bordering the Gulf of Mexico that extend inland from the line of mean low tide to the natural line of vegetation.

Gulf beaches in Texas serve as important recreational areas, provide natural protection for upland areas and landward structures during storms, habitat for benthic animals and microalgae and foraging and nesting habitat for wildlife, including threatened and endangered species, such as sea turtles and piping plovers.

Gulf nearshore areas - The area extending from mean low tide to the depth of closure on sandy beaches. The depth of closure for a given time interval is the most landward depth at which there is no significant sediment exchange between the nearshore and offshore. This area is characterized by the occurrence of breaking waves, subtidal bar formations and a substrate subject to wave-driven littoral processes.

Gulf nearshore areas are part of the beach equilibrium profile and in the area where wave energy is dissipated. This is a zone of active sediment exchange with the beach.

Hard substrate reefs - Naturally occurring features for the purpose of providing habitat for fish and invertebrates. They are hard substrate formations, such as rock outcrops, coral reefs, serpulid worm reefs (living or dead), and relic reef structures in intertidal or subtidal areas.

Hard substrate reefs stabilize sediments and provide habitat for numerous fish and invertebrates as well as provide protection from predators for estuarine species.

Identified sand sources - Areas identified as borrow sites that could supply sand (sediments) for nourishment projects.

Identified sand sources are important for their potential to provide nourishment for eroding beaches or for restoration after a storm event.

Mitigation sites – Sites for restoration, creation, enhancement, and in some circumstances, preservation of wetlands or other aquatic resources expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources.

Mitigation sites are intended to replace the chemical, physical and biological functions of wetlands and other aquatic resources which are lost through human activities.

Oysters - Natural formations of live or dead oysters or substrate placed to create or restore oyster habitat. Oysters are classified as intertidal or subtidal, reef, fringe, patch or scattered.

Oysters and oyster reef formations support the oyster fishery, serve as important habitat, foraging areas and refuge areas for many estuarine species and improve water quality.

Restoration areas – Areas modified to enhance the physical, chemical and biological characteristics of an ecosystem, with the goal of improving ecosystem function and structure.

Special flood hazard areas - Areas designated by the administrator of the Federal Insurance Administration under the National Flood Insurance Act as having special flood, mudslide (i.e., mudflow) or flood-related erosion hazards, and depicted on a Flood Hazard Boundary Map or Flood Insurance Rate Map as Zone A, AO, A1-30, AE, A99, AH, VO, VI-30, VE, V, M, or E. These areas are subject to National Flood Insurance Program regulations, floodplain management standards, and the mandatory purchase of flood insurance.

Special flood hazard areas are important because they receive the brunt high precipitation events and coastal storms, act as natural water-detention systems and serve as natural filters for upland runoff.

State species of concern habitat - Endangered species are those species the Executive Director of TPWD named as being "threatened with statewide extinction." Threatened species are those species that the TPWD Commission determined are likely to become endangered in the future.

Submerged aquatic vegetation - Rooted aquatic vegetation growing in typically inundated areas.

Submerged aquatic vegetation stabilizes shoreline sediments, reduces wave energy, traps particles and nutrients, reduces turbidity, contributes detritus to the bay food web and provides valuable refuge and nursery habitat for numerous commercial and recreational fisheries and wildlife.

Tidal sand and mud flats - Unvegetated coastal wetlands (see the coastal wetlands definition) containing silt, clay, or sand that are subject to inundation by wind-driven water level fluctuations and may be covered by algal mats (blue - green algae i.e., cyanobacteria).

Tidal sand and mud flats protect shorelines by diffusing wave energy, provide feeding grounds for coastal shorebirds, fish, and invertebrates and, when algal mats are present, serve an important role in nutrient cycling.

CULTURAL AREAS DEFINITIONS

Archeological Sites - Any land or marine-based place that contains material remains of past human life or activities in their original or historical context that are at least 50 years of age or a place that has been determined by the Texas Historical Commission to be of transcendent historical or cultural significance.

Cultural Resource - The tangible artifacts and objects of the past that relate to human life and culture.

State Antiquities Landmarks (SALs) - Archeological sites, cultural resources, and/or historic buildings that are designated by the Texas Historical Commission (THC) and receive legal protection under the Antiquities Code of Texas (the Code). The Code defines all cultural resources on non-federal public lands in the State of Texas as eligible to be designated as SALs. Historic buildings must be listed in the National Register of Historic Places before they can be designated as SALs, but archeological sites do not have the same prerequisite.

Appendix C: Data Catalog, Updates, Gaps, and Recommendations

Metadata Development

Metadata for all datasets was obtained from its source where available or developed where necessary. Development of metadata was completed using the NOAA's National Coastal Data Development Center's (NCDDC) web-based Metadata Enterprise Resource Management Aid (MERMAid) and follow Federal Geographic Data Committee (FGDC) standards.

Data Storage and Sharing

HRI maintains an internal GIS database with coastal and marine planning data for Texas. Many of these datasets in HRI database are made available through other online servers from entities like NOAA, TPWD, USFWS, USGS, and others and therefore not available for public use. However, RMC data has been made available as a package in GOMAportal.org. GOMAportal.org is a metadata catalog and data repository for Gulf of Mexico related geospatial datasets. Originally funded by the Gulf of Mexico Alliance (GOMA), to house and improve the state metadata for geospatial datasets for the Gulf of Mexico. HRI maintains GOMAportal as necessary. RMC products on GOMAportal include updated RMC datasets, sensitive areas datasets, code-specific and HRI-derived datasets specific to particular RMCs, and matching FGDC metadata. To access this dataset please refer to

https://gomaportal.tamucc.edu/gomawaf/Texas/BE_OLGP_Sub_OTLS_2017_RMC_Database.xml (for review of metadata)

https://gomaportal.tamucc.edu/gomadadata/Texas/BE_OLGP_Sub_OTLS_2017_RMC_Database.zip (for a download link)

Recent Updates, Remaining Gaps, and Recommendations

Sensitive Areas dataset additions, updates, and removals

- Added bay nearshore areas dataset. Dataset was developed by HRI and represents a footprint of mean % sand per minor bay derived from a regular grid of historic geochemistry core samples of TX submerged lands.
- Added LWRCRP inventory dataset (TPWD) to protected areas.
- Added gulf nearshore areas dataset. Dataset was developed by HRI based on 2012 BEG coastal LIDAR 0.67m contour and USACE depth-of-closure data.
- Added state species of concern habitat. Dataset compiled by HRI based on TPWD's Threatened & Endangered species list and GLO's 'species' habitat polygon dataset.
- Added armored shoreline dataset to structures (infrastructure) to satisfy RMC definition 'DA'. Dataset represents a subset of features coded as 1, 6B, 8A, or 8B in the Texas ESI shoreline dataset.
- Updated mitigation areas dataset contributed by GLO's Field Office.
- Updated restoration areas dataset contributed by GLO's Field Office.

- Updated bay shore areas dataset now based on SubOTLS 2017 instead of SubOTLS 2012 boundary.
- Updated bird rookeries dataset contributed by Texas Audubon Society and includes features from both Audubon and GLO bird rookeries datasets.
- Updated critical erosion areas dataset now based on gulf 1950's-2012 long-term shoreline change rates (BEG) instead of gulf long-term shoreline change rates from 1950's-2007 (BEG).
- Updated coastal marsh, gulf beach, hard substrate reef, tidal flat, and intertidal areas; a subset of National Wetlands Inventory (NWI) used to update RMC CF. Datasets now based on NWI May 2017 update instead of NWI 2012.
- Updated offshore oil and gas existing platforms dataset now based on BOEM platforms August 2017 instead of May 2014.
- Updated submerged aquatic vegetation (SAV)/seagrass dataset used to assign RMC MG as well as the sensitive area 'submerged aquatic vegetation'. Dataset now includes coverage of West Bay and Christmas Bay.
- Updated special flood hazard areas datasets for select counties within the TCRMP study area. Datasets based on the latest published FEMA flood maps by county as of September 2017.
- Removed deep sea corals (NCCOS) dataset from sensitive area 'hard substrate reef'.
- Removed priority protection areas (GLO Oilspill Division) dataset from sensitive areas 'coastal wetlands', 'coastal marshes', 'submerged aquatic vegetation', and 'tidal sand and mud flats'.
- Removed bridges and causeways dataset from 'structures'. Dataset was originally derived by HRI based on TxDOT roadways dataset.
- Removed windfarms (WTAMU) dataset from sensitive area 'protected areas'.

The following data gaps have been identified

- No specific dataset identified for 'sediment contamination' to satisfy RMC definition 'DA'.
- The datasets representing oysters used to assign RMCs ML, MM, OM, OP as well as the sensitive area 'oysters' are several years old. The most current features are from year 2009.
- No datasets have been included to represent cultural area definitions 'archeological sites', 'cultural resource', and 'state antiquities landmarks' (SALs).
- The extent of coverage for sensitive area 'special flood hazard areas' is limited due to no FEMA flood map data available for Galveston, Matagorda, Orange, Kenedy, and Victoria counties as of Dec 2017.

Known data quality issues and improvements

- The 'bay shore areas' sensitive areas dataset, represented by mean % sand contours per minor bay, is derived from geochemistry samples of Texas submerged lands dating back to the 1970's to early 1990's.
- The dataset used to assign RMCs MA, MJ, and MK is based on a several year-old version of SubOTLS pre-coded with RMCs MA, MJ, and MK and contains no sub-tract submerged boundaries unlike more modern versions of SubOTLS. Geometry differences, specifically differences in sub-tract lines and shoreline boundaries, introduces difficulties during overlay operations used to update RMCs MA, MJ, and MK to the most recent version of SubOTLS.

Data Catalog

HRI obtained and developed geospatial data for mapping of Sensitive Areas and RMCs. The tables below summarize geospatial data used in this project.

Geospatial Data for Sensitive Area Mapping

Sensitive Areas datasets					
Category	Title	Source	Pub	Time	Geom
Artificial Reef	Artificial Reef Locations	TPWD	2012	2012	point
Artificial Reef	GLO Non-Mineral State Lease Areas: Artificial Reef	TGLO	2017	2017	polygon
Banks	Bottom Sediment areas	NMFS, Peter Sheridan	2002	1983	polygon
Banks	Miscellaneous Banks	HRI, Harriet Nash	2013	2012	point
Bay Nearshore Areas	Mean-to-Max % Sand Contours per Major Texas Bay System	HRI	2017	2017	polygon
Bay Shore Areas	100ft Landward Buffer of State Submerged tracts	HRI	2017	2017	polygon
Bird Rookeries	TCWS Bird Rookeries	Audubon/TPWD	2016	1973-2015	polygon
Crit Dune Areas	Coastal Dune Protection Lines	TGLO	Unk	1995-Unk	line
Crit Erosion Areas	Crit erosion areas Texas Gulf Coast	HRI	2017	1950's-2012	polygon
Crit Habitat Areas	Whooping Crane	USFWS	2003	2002	polygon
Crit Habitat Areas	Piping Plover	USFWS	2001	2000-2001	polygon
Crit Habitat Areas	Piping Plover	USFWS	2009	2009	polygon
Coastal Marsh	NWI Coastal marsh	USFWS	2017	1977-2017	polygon
Coastal Prot Areas	GLO Non-Mineral State Lease Areas	TGLO	2017	2017	polygon

Coastal Prot Areas	GLO Private and State-Owned Structures and Activities Permitted	TGLO	2017	2001-2017	polygon
Coastal Prot Areas	Navigation District Areas	TGLO	Unk	Unk	polygon
Coastal Prot Areas	Marine Protected Areas	NOAA	2013	2013	polygon
Coastal Prot Areas	MANERR preserve boundary	UT-MSI	2006	Unk	polygon
Coastal Prot Areas	Redfish Bay SSA boundary	TPWD	Unk	Unk	point
Coastal Prot Areas	State parks boundaries	TPWD	Unk	1970-1995	polygon
Coastal Prot Areas	National parks boundaries	NPS	2001	2001	polygon
Coastal Prot Areas	County parks boundaries	TxDOT	Unk	Unk	polygon
Coastal Prot Areas	NWR Boundaries	TGLO	Unk	Unk	polygon
Coastal Prot Areas	LWRCRP State Inventory Boundaries	TPWD	2012	2012	polygon
Coastal Prot Areas	Artificial Reef Locations	TPWD	2012	2012	point
Coastal Prot Areas	GLO Non-Mineral State Lease Areas: Artificial Reef	TGLO	2017	2017	polygon
Cultural Historic Areas	State submerged tracts pre-coded with MJ/MK codes	THC	2017	2017	polygon
Dredged Material Placement	Dredged Material Placement Areas	USACE	1997	1986-1994	polygon
Gulf Beaches	NWI Gulf Beaches	USFWS	2017	1977-2017	polygon
Gulf Nearshore Areas	Gulf Nearshore Areas	HRI	2017	2012	polygon
Hard Sub, Natural Reef, Structures	NWI Coral, mollusk, and worm	USFWS	2017	1977-2017	polygon

Hard Sub, Natural Reef, Structures	Rock outcrops and serpulid worm reef (living or dead)	TCCC	1996	Unk	point
Hard Sub, Natural Reef, Structures	BSEE Idle Iron platforms as of 07/13/2012	BSEE Idle Iron program, NOAA NCDDC, Kate Rose	Unpub	2012	point
Hard Sub, Natural Reef, Structures	Existing OGS platforms as of 08/01/2017	BOEM	2017	2017	point
Identified Sand Sources	Identified Sand Sources	TGLO	2014	Unk	polygon
Mitigation Sites	GLO Coastal Mitigation Sites	TGLO	2018	2018	polygon
Oysters	Private Oyster Leases	TPWD Dickinson Marine Lab, Bryan Legare	Unpub	Unk	polygon
Oysters	Oyster habitat: Scattered individual clumps to solid oyster reef	TAMU-CC	2011	1969-2009	polygon
Restoration Areas	GLO Coastal Restoration Areas	TGLO	2018	2018	Polygon
Spec Flood Hzd Areas	FEMA Special Flood Hazard Areas	FEMA	2018	Unk-2018	polygon
SAV/Seagrass	NOAA Seagrass Layer 2	NOAA CSC	2018	2004, 2006-2007	polygon
SAV/Seagrass	TPWD Seagrass Layer 1	TPWD	2018	1988-2007	polygon
SAV/Seagrass	TPWD Seagrass Layer 3: West Galveston and Christmas Bays	TPWD	2018	1988-2007	polygon
State Species of Concern Habitat	State T&E Species of Concern	TPWD/TGLO	2017	2017	polygon
Tidal Sand, Algal, Mud Flats	NWI Tidal Flats	USFWS	2017	1977-2017	polygon

Geospatial Data for RMC codes

Code-Specific datasets						
Category	RMC	Title	Source	Pub	Time	Geom
Channels	CA, CC, RW	Digitized channels in TX Bays from 2009 NAIP 0.5m aerial imagery at 1:5000 scale	HRI	2014	2008-2009	line
Channels	CA, CC, RW	GIWW channel setbacks	USACE Galv District	2013	Unk	line
Intertidal Areas	CF	"Intertidal Areas" derived from NWI	USFWS	2017	1977-2017	polygon
Structures	DA	500ft buffer of ESI Shoreline Solid Structures (Armored Shoreline)	HRI/TGLO	2018	2011, 2013	line
Structures	DA	500ft buffer of GLO Non-Mineral State Lease Areas	TGLO	2017	2017	polygon
Structures	DA	500ft buffer of GLO Private and State-Owned Structures and Activities Permitted	TGLO	2017	2001-2017	polygon
Water Depth	DB, OH	Shallow Water Areas 0-6 ft from MLLW derived from Estuarine Bathymetry	NOAA	2014	1931-1992	raster, polygon
Water Depth	OH	Deep Water Areas >6 ft from MLLW derived from Estuarine Bathymetry	NOAA	2014	1931-1992	raster, polygon
Sensitive Areas	OP	500 foot buffer of data classified as hard substrate and natural reef, art reef, banks, channels, oysters, and structures	See SA table	See SA table	See SA table	point, polygon
Right-of-Way	RW	Anchorage Areas	NOAA CSC	2013	2010-2012	polygon
Right-of-Way	RW	Shipping Fairlanes	NOAA CSC	2013	2013	polygon
Right-of-Way	RW	Pipelines and misc. easements	TGLO	2018	2018	line

PINS buffer	TA	2-3 mile seaward buffer of USGS PADUS Padre Island National Seashore feature	USGS	2016	2005-2016	polygon
PINS buffer	OR	2 mile seaward buffer of USGS PADUS Padre Island National Seashore feature	USGS	2016	2005-2016	polygon
Bird Rookeries	TC	1000ft buffer of TCWS Bird Rookeries	Audubon/TPWD	2016	1973-2015	polygon
Gulf Coast Beaches	TE	1000ft seaward buffer of NWI Gulf Beaches	USFWS	2017	1977-2017	polygon
Texas Coastal Dunes	TD	3 mile buffer of Texas Coastal Dune lines	TGLO	Unk	1995-Unk	line
Oysters	MM	Public Oysters: Scattered individual clumps to solid oyster reef. Private oyster lease areas erased	NOAA/TAMU-CC	2011	1969-2009	polygon
State T&E Species Habitat	MN	State T&E Species of Concern	TPWD/TGLO	2017	2017	polygon
Cultural Historic Areas	MA, MJ, MK	State submerged tracts pre-coded with MJ/MK	THC	2017	2017	polygon

RMC Data Needs and Gap Analysis

Through the RMC process, DSC identifies information and data which would be ideal for the development of RMC maps. Although HRI obtained and derived as many of the necessary datasets. Some of the datasets were not completed or obtained for the current version of the RMC. The Identified data gaps are identified in the tables below.

Identified Data Gaps					
Type	Category	RMC	Title	Source	Geom
Code-Specific	Contaminated Areas	DA	Contaminated Areas	EPA and TCEQ	polygon or point
Sensitive Areas	Special Flood Hazard Areas	DA, OA, OH	FEMA Special Flood Hazard Areas: Orange, Galveston, Matagorda,	FEMA	polygon

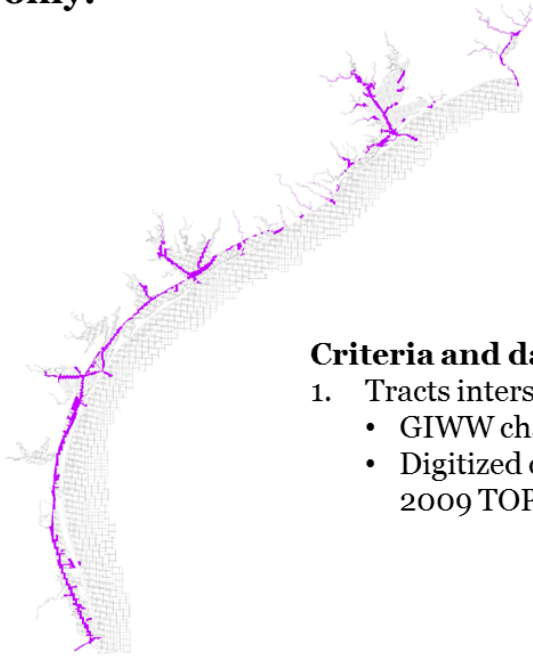
			Victoria, and Kenedy Counties		
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Gap Analysis

Title	Comments
Contaminated Areas	Could not identify dataset(s) to use for the 2017 RMC update.
Updated Estuarine Bathymetry	Currently using NOAA’s Estuarine Bathymetry datasets published in 1998, but primarily based on surveys performed in the early 1960’s and likely do not accurately represent bathymetry for major bays in recent years. A more recent bathymetric acquisition for major bays is needed.
Oysters	A more detailed and newer dataset representing features specified in the Sensitive Areas definition.
THC’s MJ/MK RMCs transferred to 2017 Sub OLTS	The process of joining THC’s pre-coded MJ/MK RMCs to Sub OLTS 2017 introduces many-to-one issues due to attribute (tract ID) and geometry (shoreline) differences between the MJ/MK tracts provided which is assigned at the tract-level and the Sub OLTS 2017 layer used for the 2017 RMC update which is assigned at the sub-tract level.
State Antiquities Landmarks (SALs)	Could not identify dataset(s) to use for the 2017 RMC update.
FEMA Special Flood Hazard Areas for Orange, Galveston, Matagorda, Victoria, and Kenedy Counties	At the time of the update, source data for these select Texas Counties was either unavailable for download, preliminary, or still under review by FEMA.

Appendix D: RMC Maps, Criteria, and Data Used

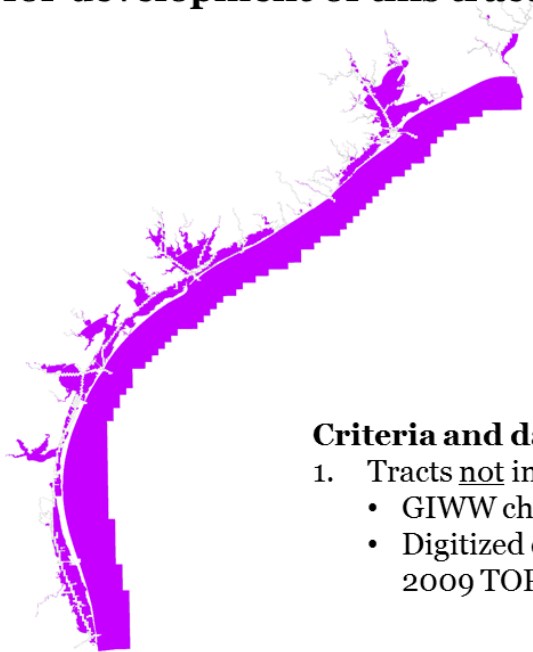
CA - Use existing and previously dredged channels only.



Criteria and data used:

1. Tracts intersected by channels:
 - GIWW channel setback (USACE 2010)
 - Digitized channels at 1:5,000 scale using 2009 TOP 0.5-meter RGB imagery (HRI 2014)

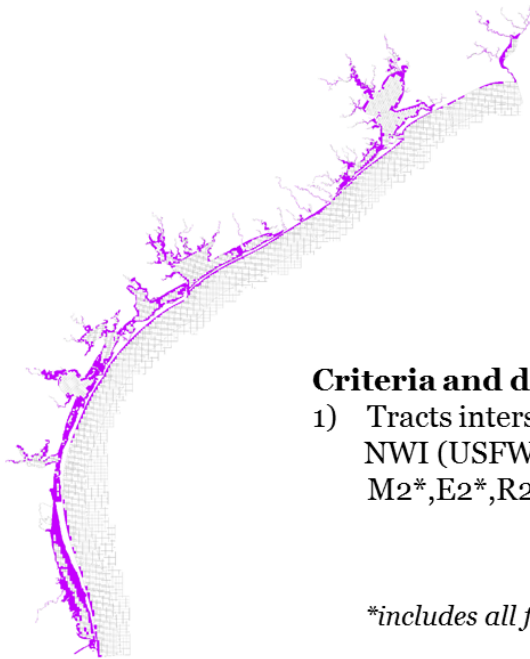
CC – The dredging of one channel may be authorized for development of this tract.



Criteria and data used:

1. Tracts not intersected by channels:
 - GIWW channel setback (USACE 2010)
 - Digitized channels at 1:5,000 scale using 2009 TOP 0.5-meter RGB imagery(HRI 2014)

CF- Limit vehicular access for development activities.

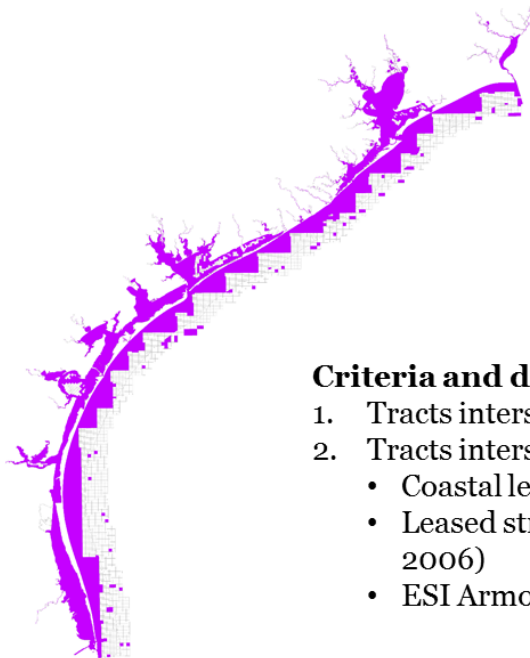


Criteria and data used:

- 1) Tracts intersected by “Intertidal Environments” NWI (USFWS 2017)
M2*,E2*,R2*,R3*,R4*,R5*,L2*,P*

**includes all features below this level of classification*

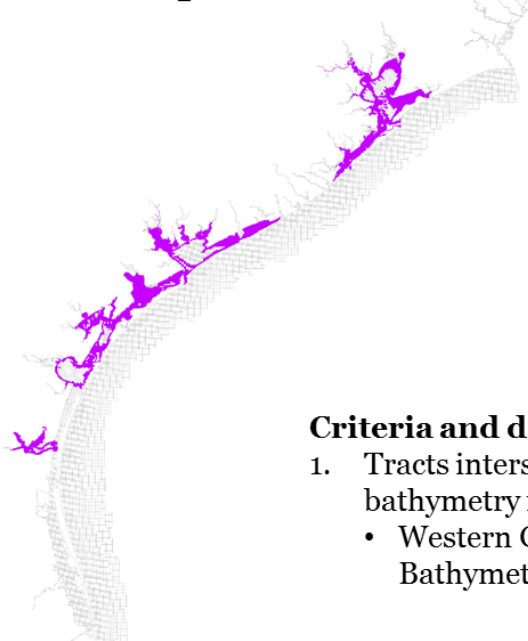
DA – Dredging may not be allowed on this tract.



Criteria and data used:

1. Tracts intersected by sensitive areas
2. Tracts intersected by existing infrastructure:
 - Coastal leases (GLO)
 - Leased structures and activities (GLO 2001 & 2006)
 - ESI Armored Shoreline (GLO)

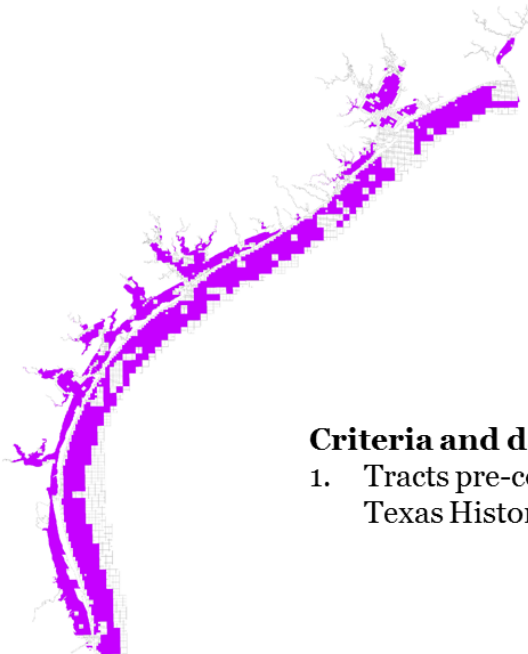
DB - Dredging may not be approved in water less than 6 feet deep as measured from mean low water.



Criteria and data used:

1. Tracts intersected by mask of 0 to 6-foot bathymetry from MLLW
 - Western Gulf of Mexico Estuarine Bathymetry (NOAA 1998)

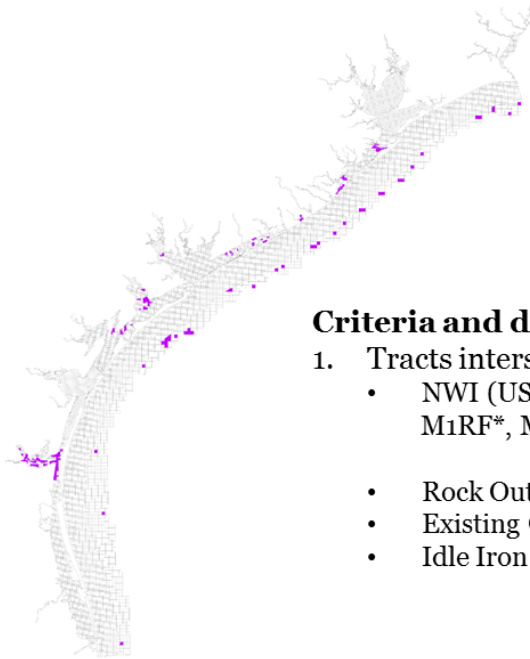
MA – No special recommendations relating to sensitive areas, other than cultural resources.



Criteria and data used:

1. Tracts pre-coded by Texas Historical Commission (THC)

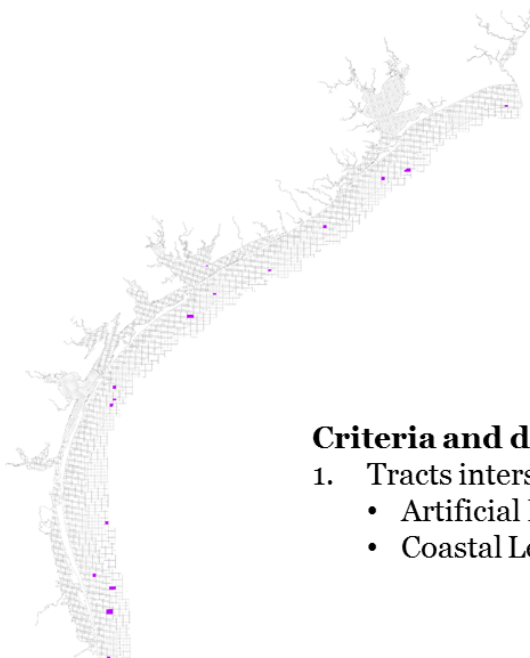
MB – Avoid impacts to hard substrate reefs.



Criteria and data used:

1. Tracts intersected by hard substrate reefs:
 - NWI (USFWS 2017) – coral, mollusk, and worm
M1RF*, M2RF*, E1RF*, E2RF*
 - Rock Outcrops and Serpulid Worms (TCCC 1996)
 - Existing OGS platforms (BOEM)
 - Idle Iron platforms (BSEE)

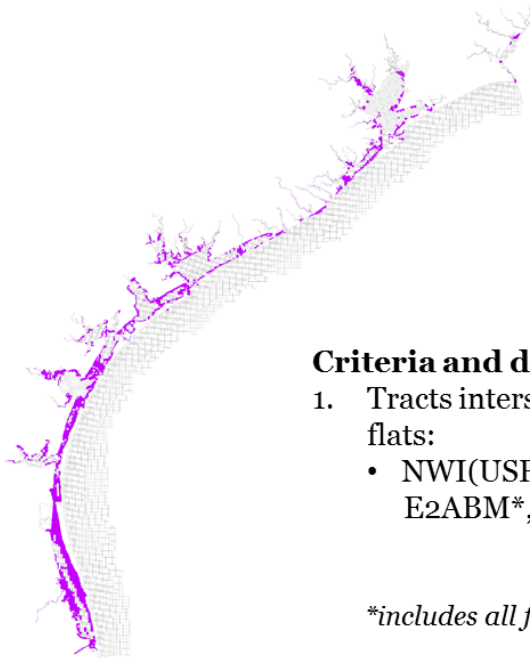
MC – Avoid impacts to artificial reefs.



Criteria and data used:

1. Tracts intersected by artificial reefs:
 - Artificial Reef (TPWD)
 - Coastal Leases – artificial reefs (GLO)

MD – Avoid impacts to tidal sand and mud flats.

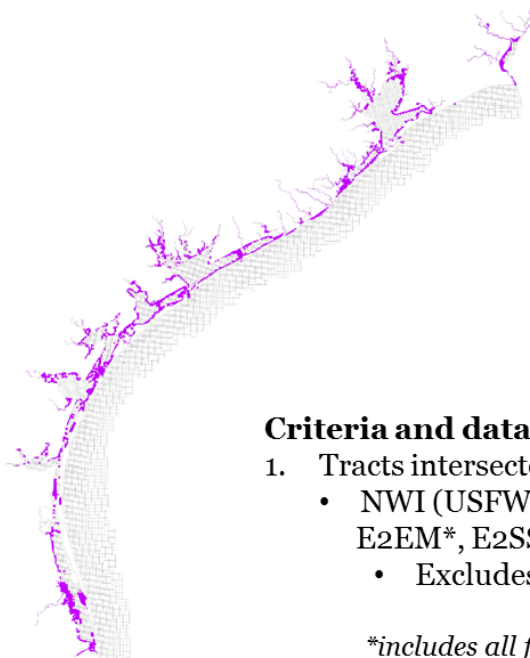


Criteria and data used:

1. Tracts intersected by tidal sand, algal, and mud flats:
 - NWI(USFWS 2017)– tidal flat
E2ABM*, E2ABN*, E2ABP*, E2AB1*, E2US*

**includes all features below this level of classification*

ME – Avoid impacts to coastal wetlands.

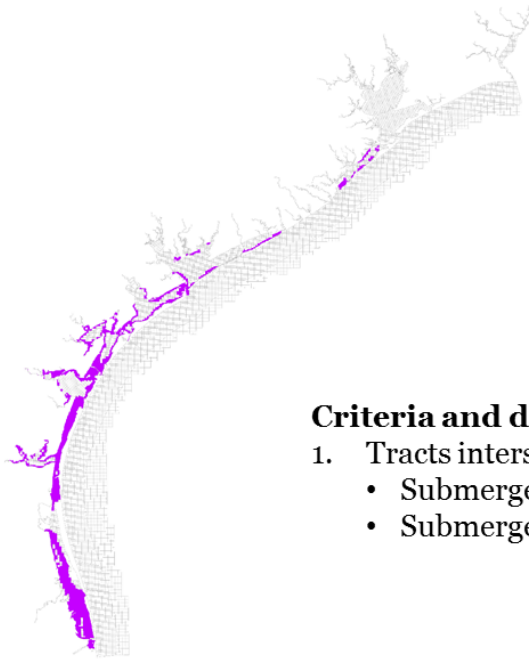


Criteria and data used:

1. Tracts intersected by coastal marsh
 - NWI (USFWS 2017) – coastal marsh
E2EM*, E2SS*, E2FO*, L2EM*, PEM*, PSS*, PFO*
 - Excludes subtidal unconsolidated bottom

**includes all features below this level of classification*

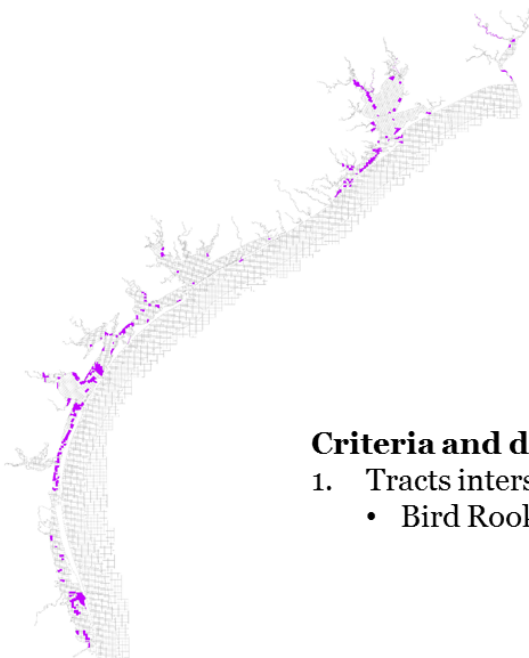
MG – Avoid impacts to submerged aquatic vegetation.



Criteria and data used:

1. Tracts intersected by seagrass/SAV:
 - Submerged Aquatic Vegetation (NOAA)
 - Submerged Aquatic Vegetation (TPWD)

MI – Avoid impacts to bird rookeries.



Criteria and data used:

1. Tracts intersected by bird rookeries:
 - Bird Rookeries (Audubon/TPWD)

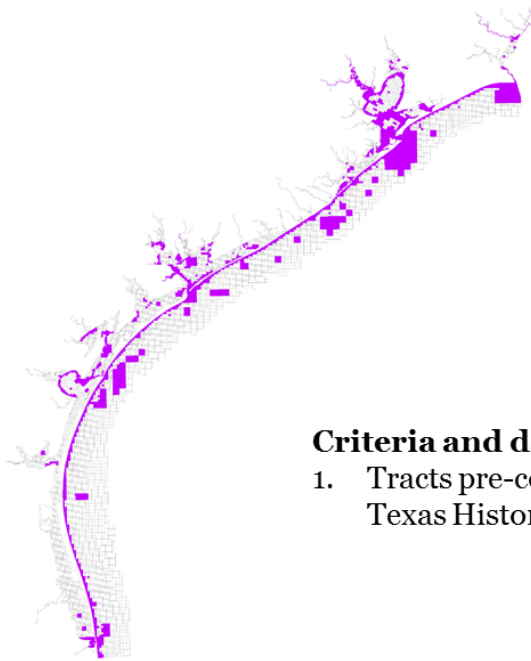
MJ – Cultural resources may be present.

Criteria and data used:

Code not assigned

Need data or criteria on how to assign this code

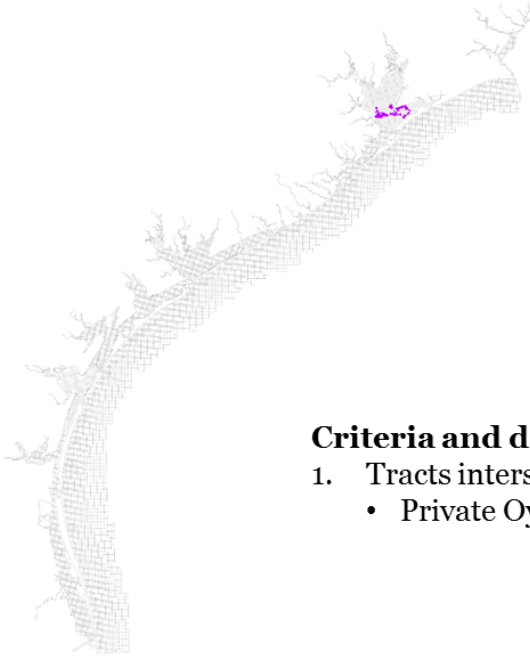
MK – Avoid impacts to cultural resources.



Criteria and data used:

1. Tracts pre-coded by Texas Historical Commission (THC)

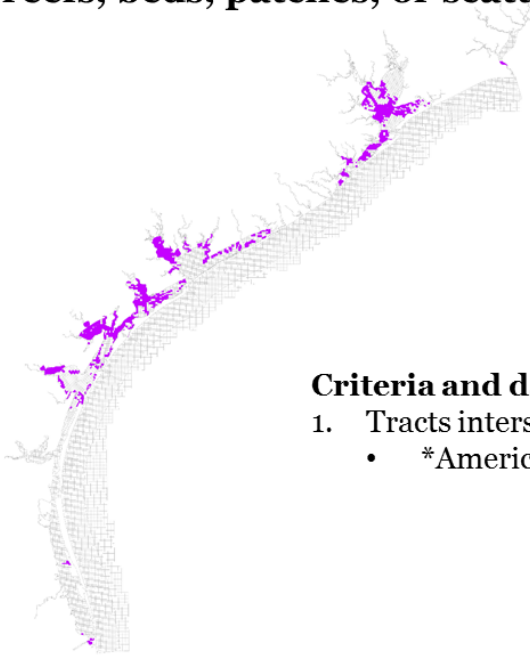
ML – This tract contains private oyster leases.



Criteria and data used:

- 1. Tracts intersected by private oyster leases:
 - Private Oyster Leases (TPWD)

MM – Avoid impacts to public oysters characterized as reefs, beds, patches, or scattered.

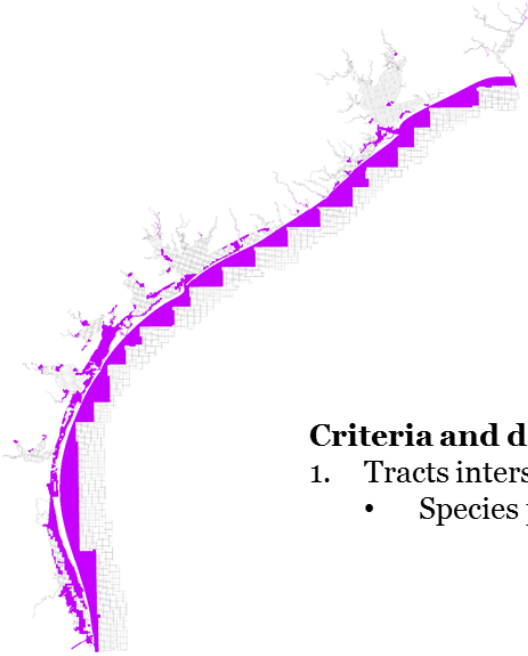


Criteria and data used:

- 1. Tracts intersected by oysters
 - *American Oysters (TAMUCC 2011)

**private oyster leases erased*

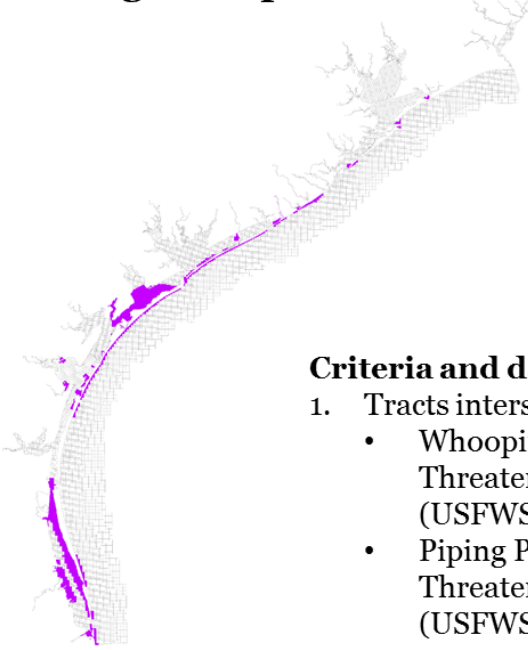
MN – Work on this tract is subject to state threatened or endangered species regulations.



Criteria and data used:

1. Tracts intersected by State T&E species
 - Species polygons (TPWD)

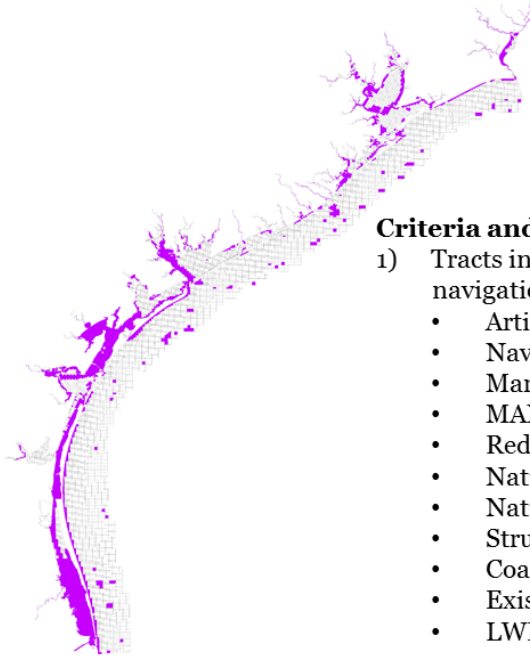
MO – Work on this tract is subject to review under the Endangered Species Act.



Criteria and data used:

1. Tracts intersected by federal endangered species:
 - Whooping Crane - Critical Habitat for Threatened and Endangered Species (USFWS 2013)
 - Piping Plover - Critical Habitat for Threatened and Endangered Species (USFWS 2013)

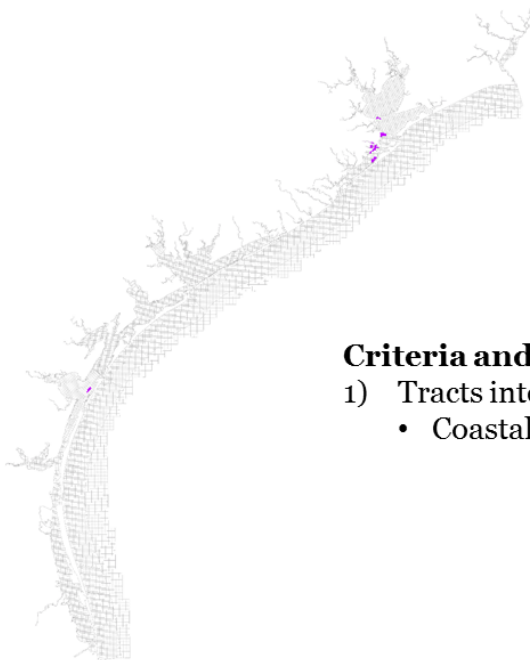
MP – This tract contains designated use areas.



Criteria and data used:

- 1) Tracts intersected by coastal protected areas, navigation districts, and other designated use areas:
 - Artificial Reefs (TPWD)
 - Navigation Districts (GLO)
 - Marine Protected Areas (NOAA)
 - MANERR boundary
 - Redfish Bay Scientific Study Area
 - National, State, & County Park Boundaries
 - National Wildlife Refuges (GLO)
 - Structures and activities (GLO)
 - Coastal Leases – artificial reefs (GLO)
 - Existing platforms (BOEM), Idle Iron (BSEE)
 - LWRCRP Inventory (TPWD)

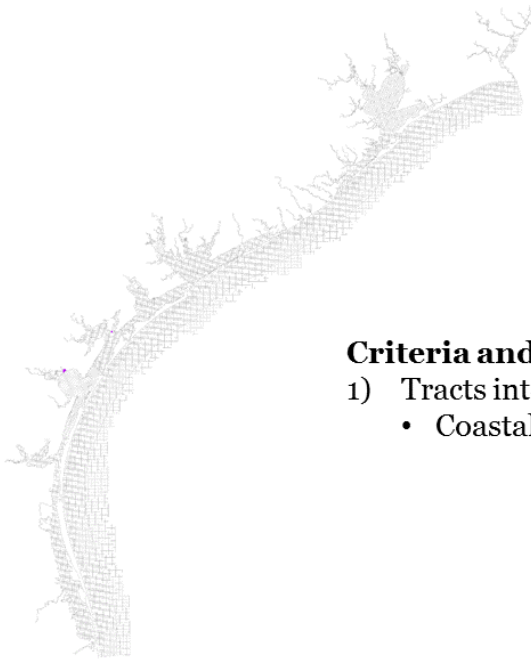
MR – This tract contains restoration areas.



Criteria and data used:

- 1) Tracts intersected by restoration areas:
 - Coastal Leases – restoration sites (GLO)

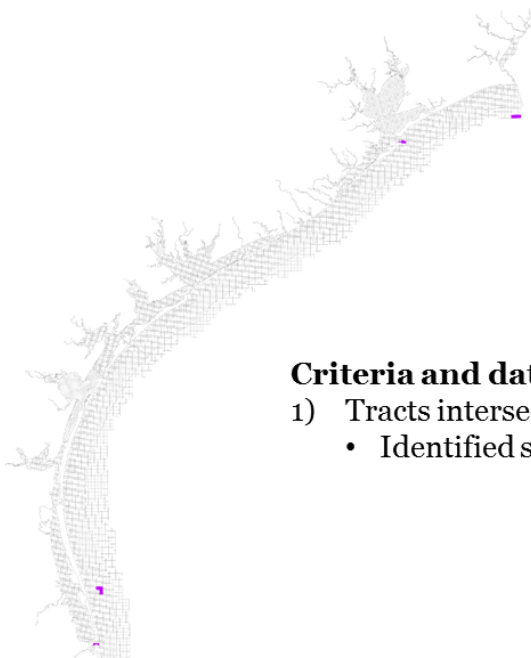
MS – This tract contains mitigation sites.



Criteria and data used:

- 1) Tracts intersected by mitigation sites:
 - Coastal Leases – mitigation sites (GLO)

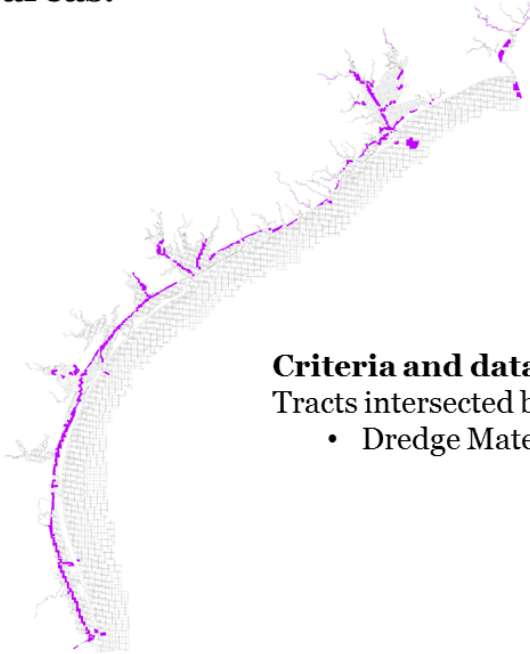
MV – This tract contains identified sand sources.



Criteria and data used:

- 1) Tracts intersected by identified sand source areas:
 - Identified sand sources (GLO 2014)

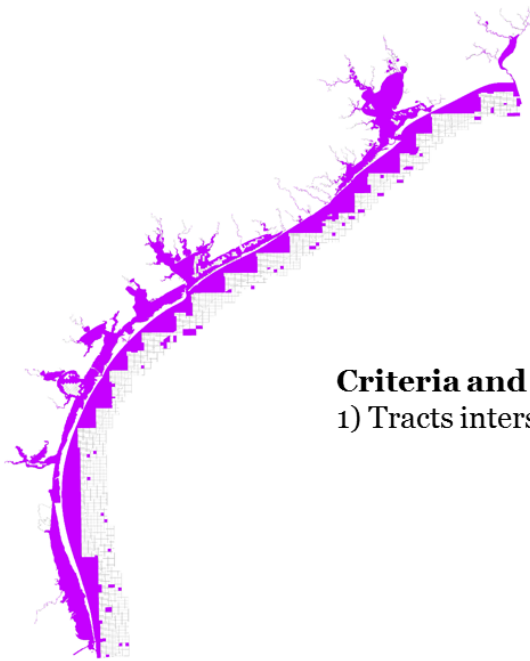
MX – This tract contains dredge material placement areas.



Criteria and data used:

- Tracts intersected by dredge material placement areas:
- Dredge Material Placement Areas (GLO)

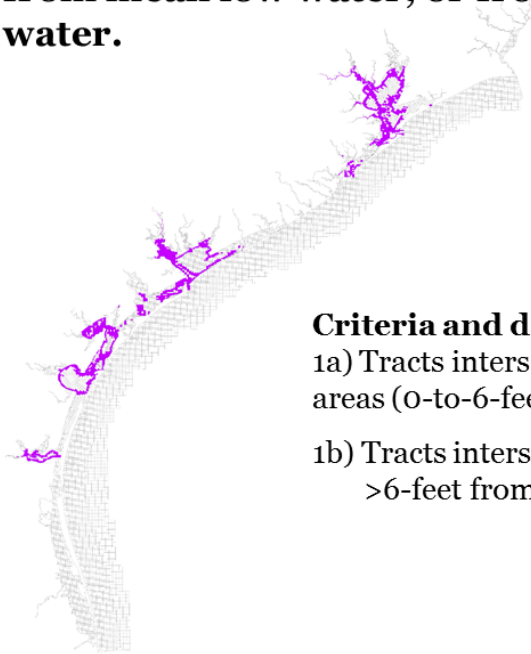
OA – Surface drilling may not be allowed.



Criteria and data used:

- 1) Tracts intersected by sensitive areas

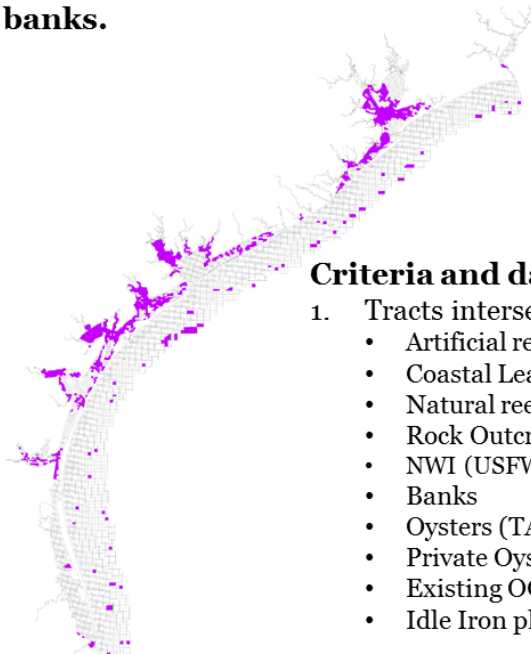
OH - Drill in water deeper than 6 feet as measured from mean low water, or from land above mean high water.



Criteria and data used:

- 1a) Tracts intersected by shallow water sensitive areas (0-to-6-feet depth from MLLW)
- 1b) Tracts intersected by deep water bay areas >6-feet from MLLW)

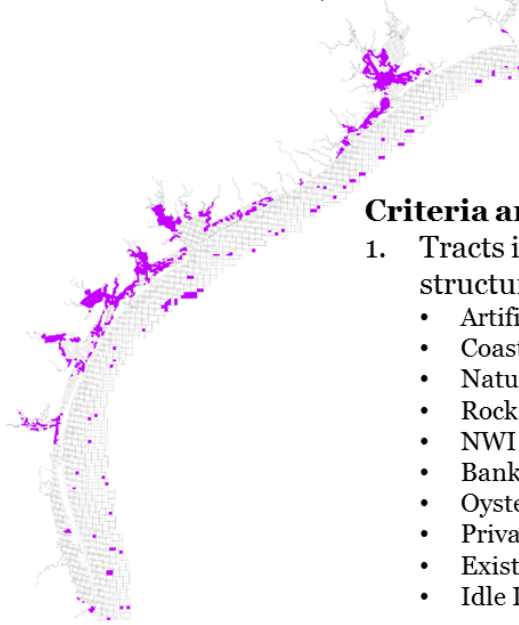
OM - Pipeline and platform construction may be prohibited on top or near oyster reefs, hard substrate reefs, artificial reefs and banks.



Criteria and data used:

1. Tracts intersected by 500-ft buffer of reef structures:
 - Artificial reefs (TPWD)
 - Coastal Leases – artificial reef (GLO)
 - Natural reefs/ hard substrate
 - Rock Outcrops and Serpulid Worms (TCCC 1996)
 - NWI (USFWS 2017) – coral, mollusk, and worm
 - Banks
 - Oysters (TAMUCC)
 - Private Oyster Leases (TPWD)
 - Existing OGS platforms (BOEM)
 - Idle Iron platforms (BSEE)

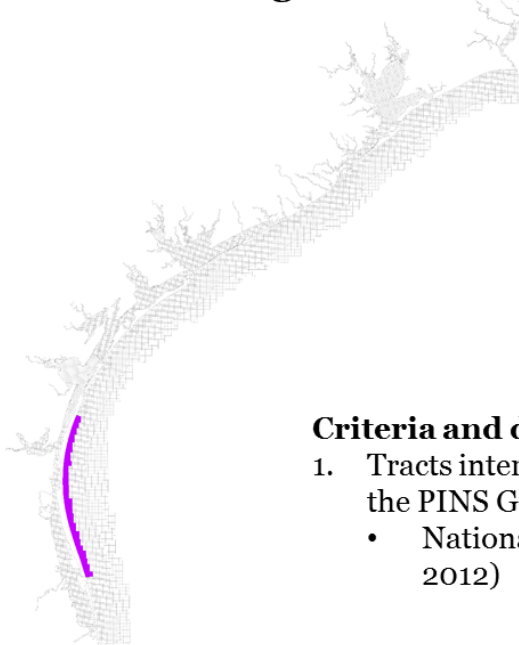
OP - The use of high-velocity energy sources may be prohibited for performing geophysical surveys on top of or near oyster reefs, hard substrate reefs, artificial reefs and banks.



Criteria and data used:

1. Tracts intersected by 500-ft buffer of reef structures:
 - Artificial reefs (TPWD)
 - Coastal Leases – artificial reef (GLO)
 - Natural reef/hard substrate (various sources)
 - Rock Outcrops and Serpulid Worms (TCCC 1996)
 - NWI (USFWS 2017) – coral, mollusk, and worm
 - Banks (various sources)
 - Oysters (TAMUCC)
 - Private Oyster Leases (TPWD)
 - Existing OGS platforms (BOEM)
 - Idle Iron platforms (BSEE)

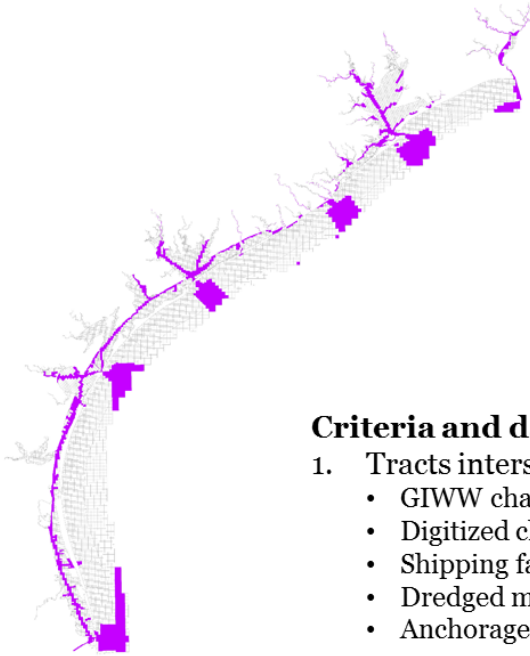
OR – No drilling within two miles seaward of the Gulf shoreline along the Padre Island National Seashore.



Criteria and data used:

1. Tracts intersected by a 2 mile seaward buffer of the PINS Gulf shoreline
 - National Protected Areas Database (USGS 2012)

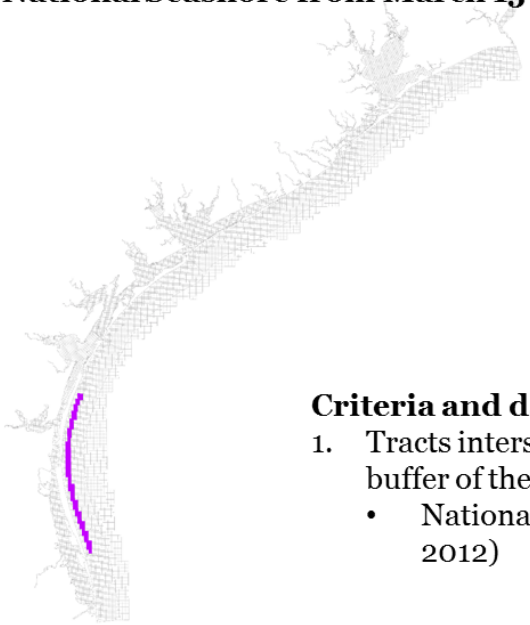
RW – Navigation concerns may exist.



Criteria and data used:

- 1. Tracts intersected by any of the following:
 - GIWW channel setbacks (USACE 2010)
 - Digitized channels (HRI 2014)
 - Shipping fairways, lanes and zones (NOAA 2013)
 - Dredged material placement areas (GLO 1997)
 - Anchorage areas (NOAA 2012)

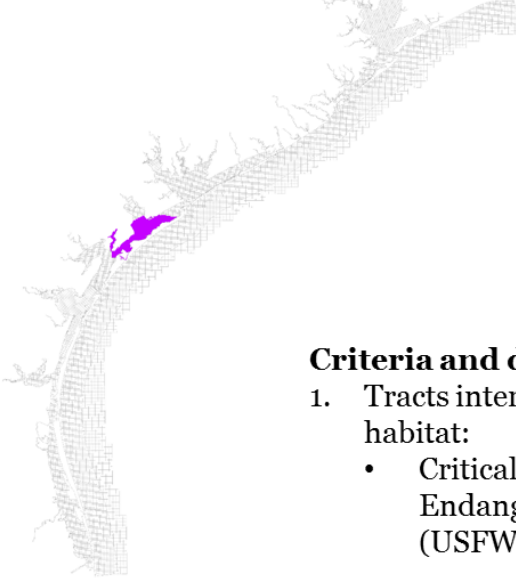
TA – Drilling is prohibited within the area from two miles to three miles seaward of the Gulf shoreline of the Padre Island National Seashore from March 15 through September 15.



Criteria and data used:

- 1. Tracts intersected by a 2-to-3 mile seaward buffer of the PINS Gulf shoreline
 - National Protected Areas Database (USGS 2012)

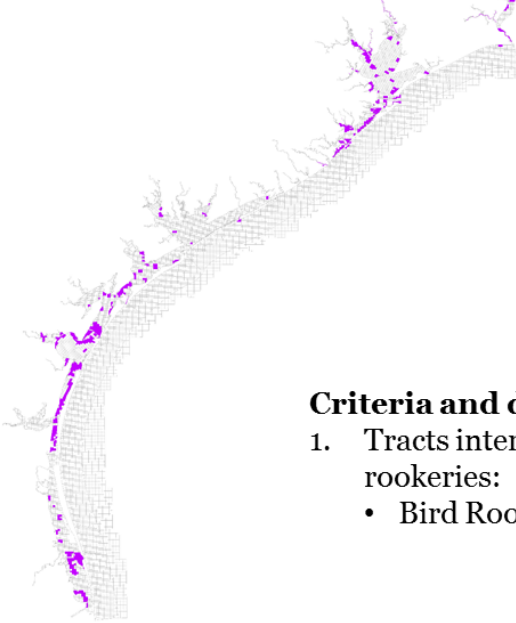
TB – Dredging, oil and gas related activity, or development operations may not occur during whooping crane overwintering season from October 15 through April 15. Permanent structures higher than 15 feet above ground are not allowed.



Criteria and data used:

1. Tracts intersected by whooping crane critical habitat:
 - Critical Habitat for Threatened and Endangered Species - Whooping Crane (USFWS 2013)

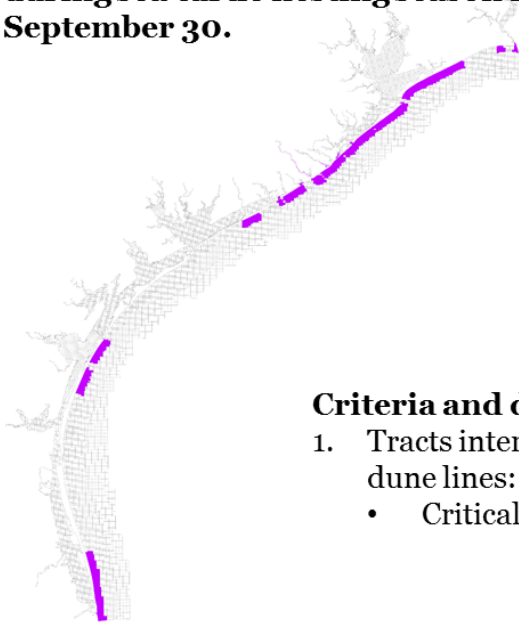
TC – Dredging, oil and gas related activity, development operations, or watercraft landing may be prohibited, within 1000 feet of a bird rookery during peak nesting season from February 15 through September 1.



Criteria and data used:

1. Tracts intersected by a 1000-ft buffer of bird rookeries:
 - Bird Rookeries (Audubon/TPWD)

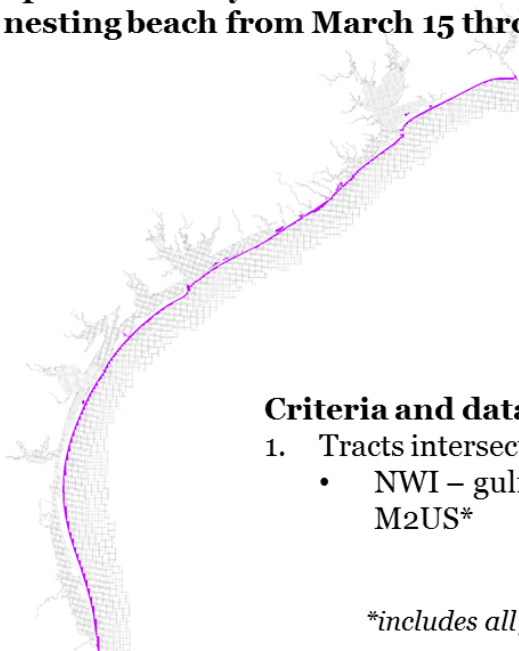
TD - Geophysical surveying may be restricted from the seaward base of the sand dunes or vegetation line Gulfward three miles during sea turtle nesting season from March 15 through September 30.



Criteria and data used:

1. Tracts intersected by a 3-mile seaward buffer of dune lines:
 - Critical dune areas (GLO)

TE - Dredging, oil and gas related activity or other development operations may be restricted within 1000 feet of a sea turtle nesting beach from March 15 through September 30.

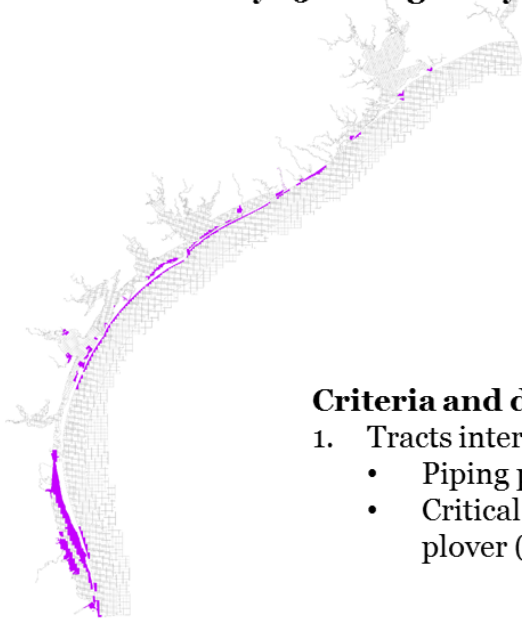


Criteria and data used:

1. Tracts intersected by a 1000-ft buffer of gulf beaches:
 - NWI – gulf beaches (USFWS 2017)
M2US*

**includes all features below this level of classification*

TF – Dredging, oil and gas related activity or other development operations may be restricted during wintering piping plover season from July 15 through May 15.



Criteria and data used:

1. Tracts intersect piping plover critical habitat
 - Piping plover critical habitat (USFWS 2001)
 - Critical habitat for the wintering piping plover (USFWS 2009)