

Resource Management Codes

Data Standards Committee Procedures and Update Process

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Executive Summary

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 the leasing of state lands, and with project planning. The RMC 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 RMC underwent a comprehensive review through a series of 10 workshops from November 2013-September 2014, by a Data Standards Committee (DSC) of coastal experts and relevant permitting agencies. 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 type of information and data needed, the Harte Research Institute developed the RMC maps compiling, and in some cases developing, identified necessary datasets. These maps were reviewed by the DSC and amended and updated where necessary. Data development was achieved with the assistance of the GLO, metadata was developed where necessary, and datasets unavailable or still needed, are reported in the data gap analysis section. A data was compiled into a GIS RMC viewer.

The RMC viewer seeks to centralize data for permitting and to increase efficiency in decision making by coordinating agency participation in the planning process. Currently the updated RMC maps and sensitive area maps are available in the RMC viewer located on the General Land Office's website.

This document describes the process for updating the RMC and presents the up-to-date RMC codes which were amended and in some cases developed by the DSC. A data summary, gap analysis, and recommendations for future updates are also included.

This project was funded by NOAA through the Texas Coastal Management program under Section 309 of the 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) 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 potential bidders before the sale. Using the codes information in the booklet, a prospective bidder could then contact any or all of 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, there was less and less feedback provided from the agencies with code changes and review prior to a lease sale, which rendered them less adaptive to changes in the coastal environment. The RMC were last updated in their entirety in 2001.

Resource Management Code Update

Project Overview

From 2013-2014 the GLO, in partnership with the Harte Research Institute, completed a comprehensive review and update of the Resource Management Codes (RMC) for inclusion in a GIS viewer developed as part of this effort. The RMC are assigned to state-owned tracts in Texas bays and Gulf waters, and 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

As part of GLO's long-term planning initiative, a GIS decision support tool will be developed, in partnership with the Harte Research Institute, to assist coastal natural resource planning. Updating the Resource Management Codes will serve as the base for this decision support tool in addition to providing a common geodatabase of natural resource information for GLO and the other networked agencies.

The overall goal of this project is to improve coastal planning in Texas through the development of web-based spatial tools. One such tool is a GIS viewer to display the updated RMC.

Objective 1: Evaluate existing RMCs for current uses.

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

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

In partnership with the Harte Research Institute (HRI), the Planning and Policy Team, Coastal GIS, and Information Systems completed a comprehensive review and update of the RMCs. Through this process, a Data Standards Committee (DSC) was formed to provide input on RMC definition updates and data layer incorporation. The DSC thoroughly analyzed the RMCs, their definitions, relevant data availability, viewer 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 codes definitions were solidified, data sets for each code were identified to spatially map the designation for assigning that code in a land lease track. Data decision models were developed for each code and integrated into a GIS viewer to populate all the codes across state-owned submerged lands.

GLO staff quality controlled the data and developed a beta version of the RMC viewer for incorporation onto the GLO website. The DSC provided feedback on future viewer modifications. The feedback was categorized to 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.

The diagram below outlines the general RMC update process.

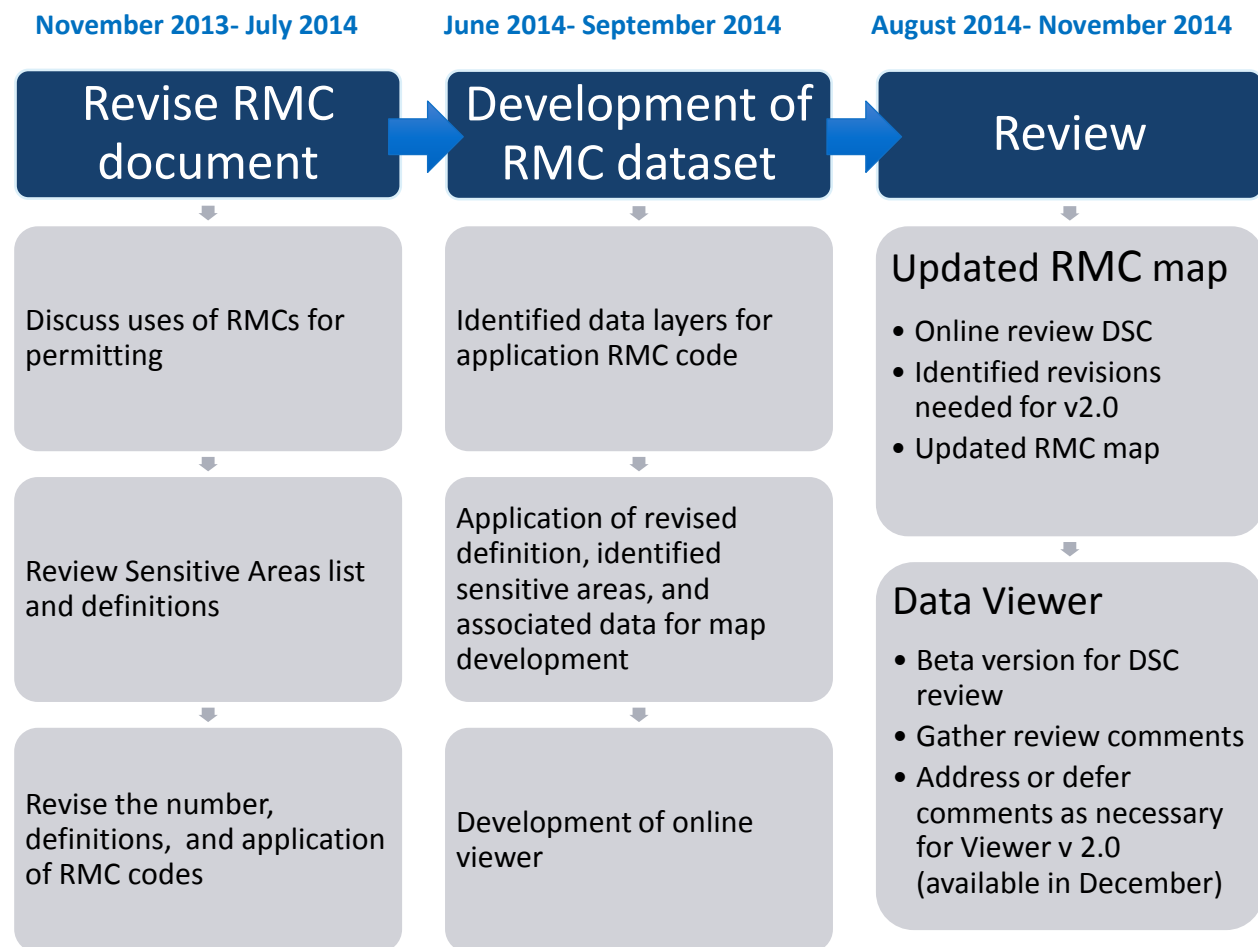


Figure 1. Timeline and summary of RMC update.

Data Standards Committee (DSC)

For this initiative, the GLO formed the Data Standards Committee, 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, who met monthly to examine and redefine 35 codes, identify and compile 141 data sets applicable to each code and develop the data driven code-assigning criteria for integration into a GIS viewer.

The DSC was comprised of people who could contribute to the subject matter relate to permitting and regulatory decision making as well as individual who practice information science. These include members from a number of state and regulatory agencies including, Texas Parks and Wildlife, Texas Railroad Commission, Texas Historical Commission, General Land Office Permitting and Leasing among others.

Table 1. 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 meeting from November 2013 to November 2014. 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 data sets applicable to each code and compiled and analyzed datasets to develop code-assigning criteria for integration into a GIS viewer.

Meeting summaries are presented below.

Meeting Summaries:

November 7, 2013

During this introductory meeting the GLO and HRI presented an overview of RMC and reviewed expectation for the DSC working group. The meeting was hosted at the General Land Office'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 gather information on their familiarity with the RMC, what tools are 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 data driven approach for development of the 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 the meeting in Austin, TX, 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 use for the *Access*, *Miscellaneous* and *Right-of-Way* codes.

February 20, 2014

During the February meeting at the GLO in Austin TX, 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, TX, 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 TX, 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 will be available for review and comments from the DSC. Final comments to be submitted by August 14th and final maps will 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; the data used, and became familiar with the web-viewer being developed. 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) with the exception of 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 documents and sensitive areas document 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, held at the GLO in Austin, TX. During this meeting the RMC update process was reviewed as well as 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 map to include “critical erosion areas” and “identified sand sources” which had been identified as needs would continue to be gathered and address 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

RMC Viewer

Natural resource data layers were collected and overlaid with the GLO submerged land tracts. The produced maps featured areas where the land tracts intersected sensitive natural resource areas. The viewer integrates 141 datasets as the criteria used 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 GIS decision-support tool with the updated RMCs will aid in environmental

reviews of permits and development activities, particularly in sensitive habitat and resource areas. The developed RMC viewer provides assistance to resource managers, planners and industry with the permitting process and coastal resource management decisions by promoting best management practices for activities within the state-owned land tracts to minimize adverse impacts to sensitive natural resource areas.

Currently the updated RMC maps and sensitive area maps are available on the General Land Office's website at <http://www.glo.texas.gov/energy-business/oil-gas/mineral-leasing/leasing/index.html>.

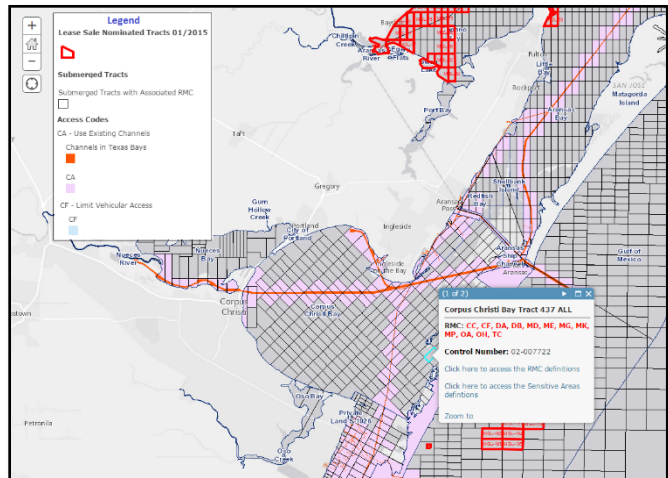


Figure 2. Screen-shot of RMC web-viewer featuring 2015 lease sale nominations and Access codes.

Future Update Process

Rather than requesting updates to the codes from the other natural resource regulatory agencies prior to a leave sale, it was decided that yearly data set updates will be requested instead. The data sets 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. Additional 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.

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 individual seeking permits for development activity, but to also contain functionality and data desired by natural resource agency professionals who can utilize the data in permitting and coastal management activities.

Sensitive Areas Definitions

The RMC 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 designation RMC codes are defined below:

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 commission to be of transcendent historical or cultural significance.

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.

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

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 - Areas of 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 provide for the replacement of the chemical, physical and biological functions of wetlands and other aquatic resources which are lost as a result of authorized impacts.

Oysters - Natural or artificial formations of live or dead oysters on oyster shell or cultch materials. 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.

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 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.

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.

RMC Definitions and Maps

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/RegulatoryBranch/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.

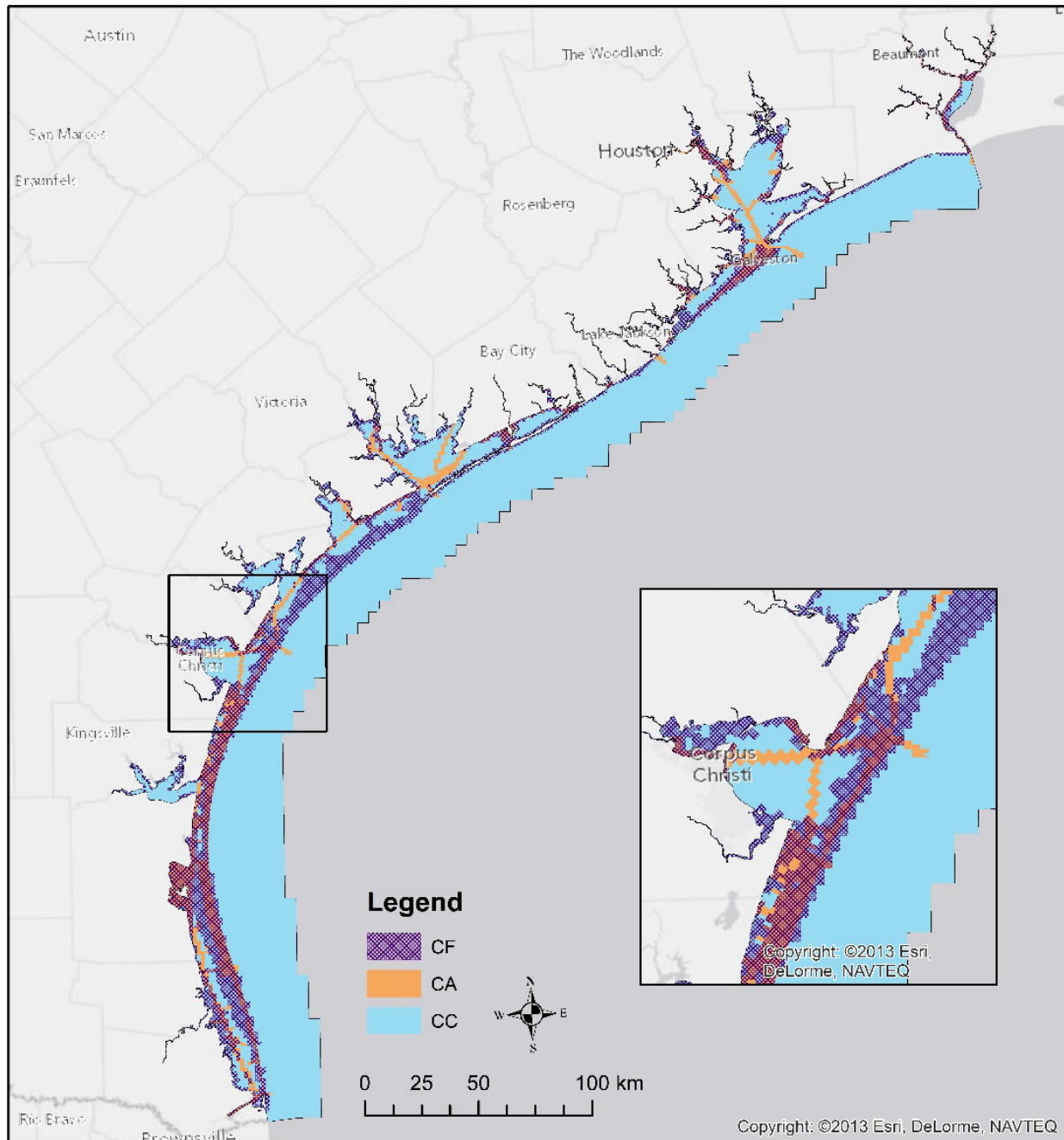


Figure 3. Access Code Maps: CA, CC, CF. Close-up map featuring Corpus Christi Bay.

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.

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

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.

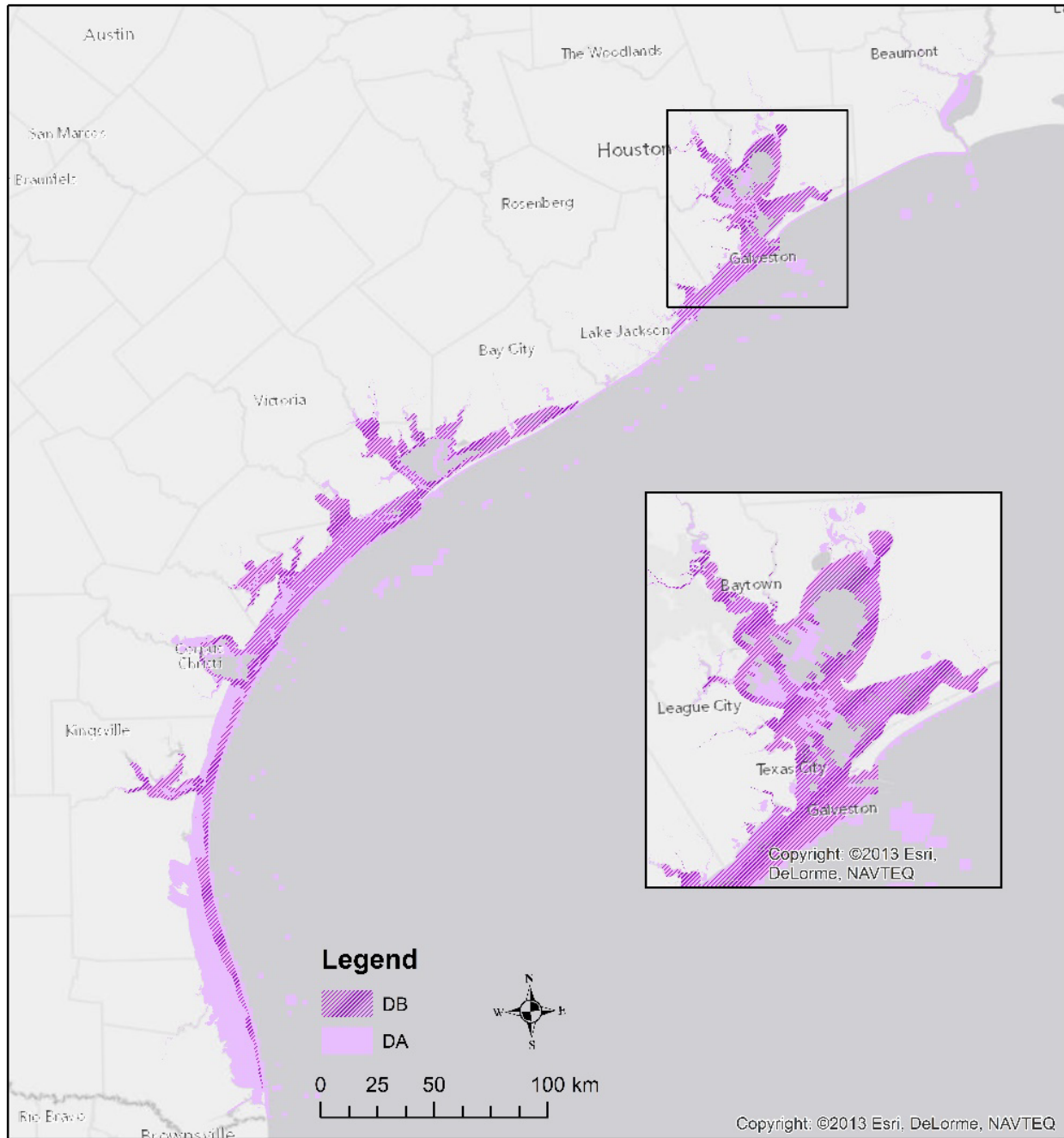


Figure 4. Map of Dredging and Dredge Material Disposal Codes: DA and DB. Close-up featuring Galveston Bay.

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:

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

Definitions and Explanations

MA - No special recommendations.

No specific concerns have been identified at this time.

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.

MJ – Cultural resources may be present

These tracts have a low potential to contain State Antiquities Landmarks, or other cultural resources protected by state law. 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.

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.

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.

MP – This tract contains designated use areas.

This tract contains designated use areas such as coastal protected areas, navigation districts, patented areas, mitigation sites, 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.

MT – 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.

MH – Avoid impacts to hard substrate reefs.

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

MI – 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.

MB – Avoid impacts to bird rookeries.

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

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.

MS – 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.

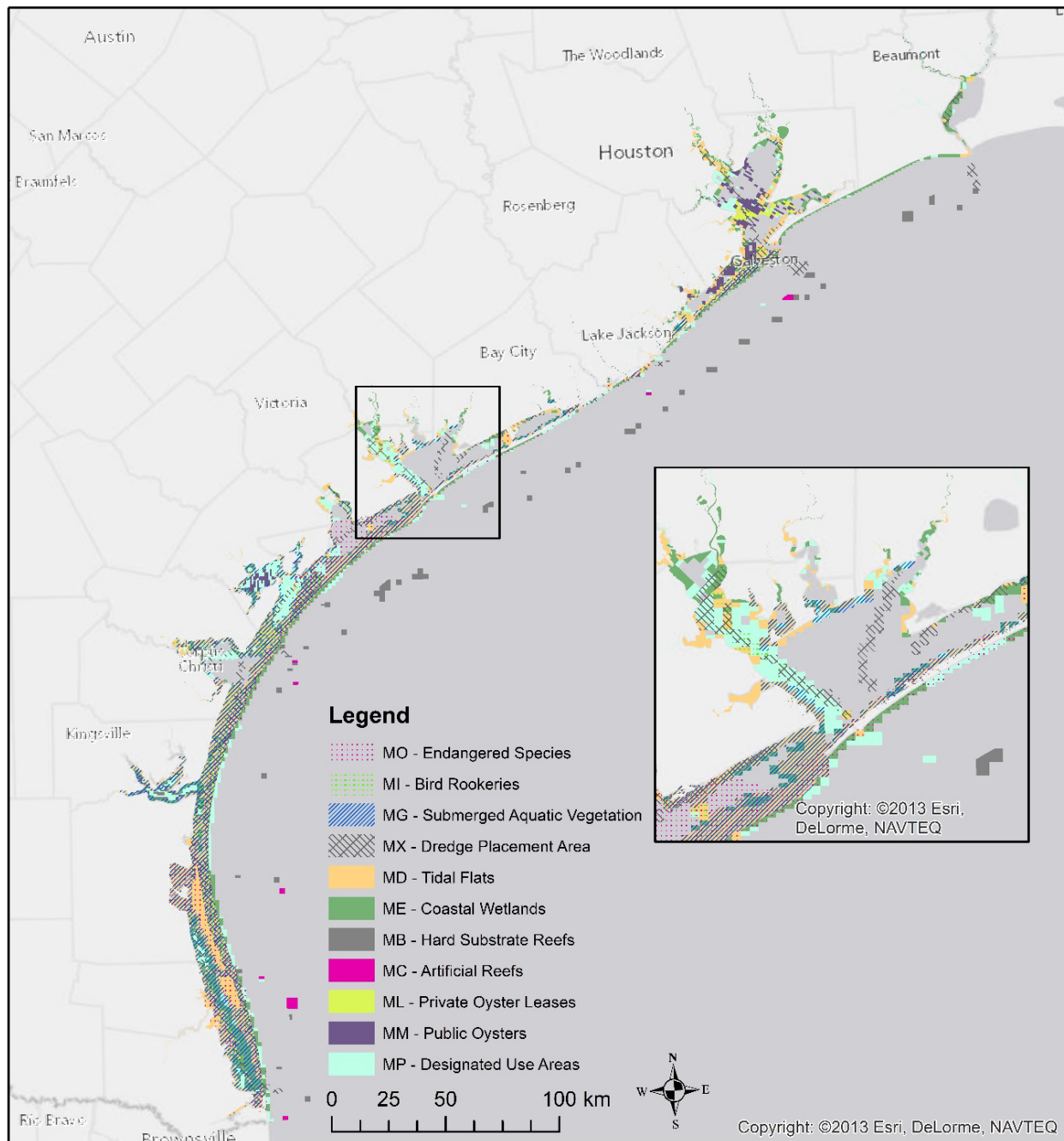


Figure 5. Map of Miscellaneous codes: MB, MC, MD, ME, MG, MI, ML, MM, MO, MP, MX. Close-up map featuring Matagorda Bay.

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.

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U.S. Army Corps of Engineers Galveston District construction

guidelines: <http://www.swg.usace.army.mil/BusinessWithUs/RegulatoryBranch/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.

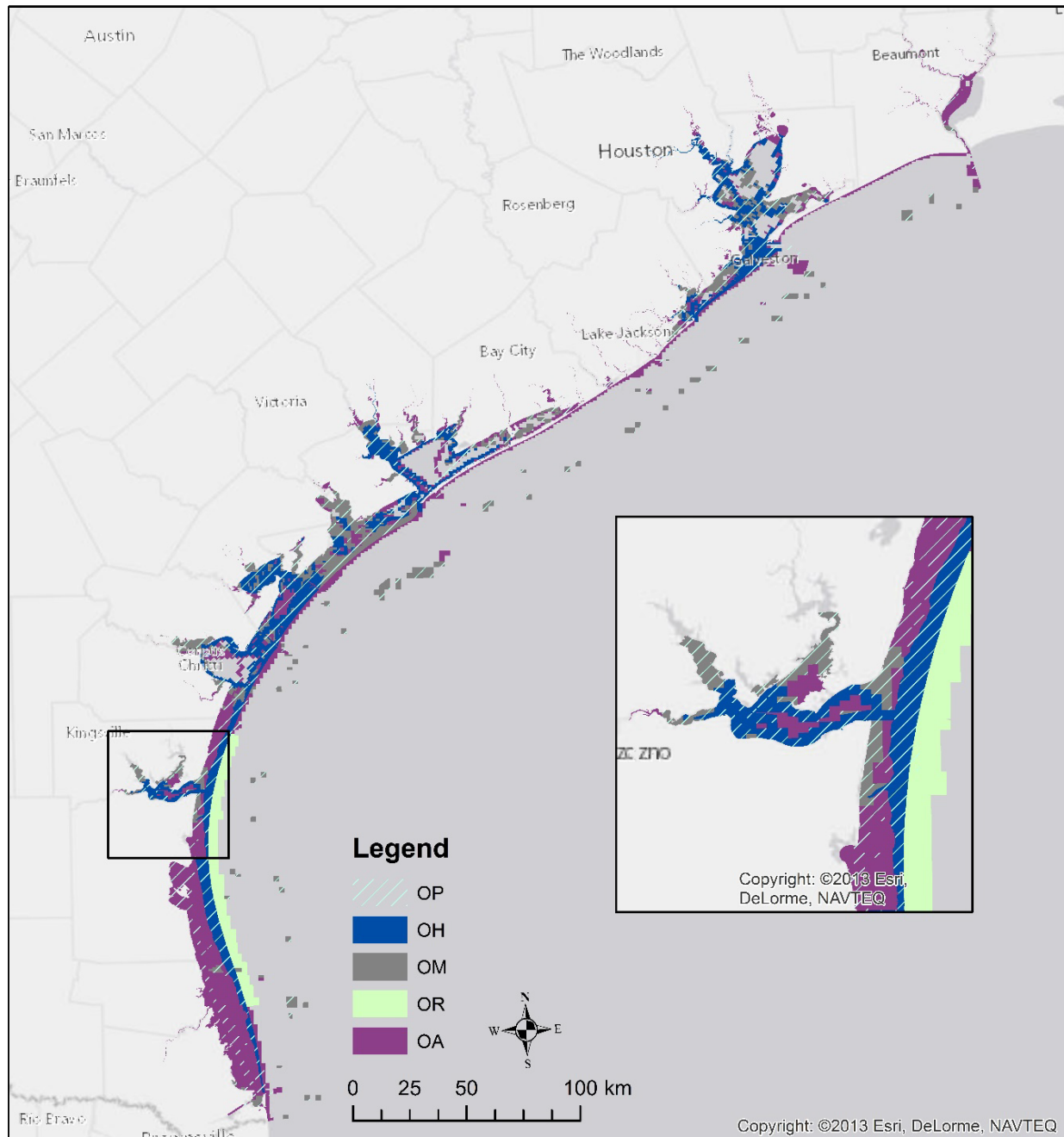


Figure 6. Map of Oil and Gas Development Codes: OA, OH, OM, OG, and ON. Close-up map features Baffin Bay.

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.

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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.

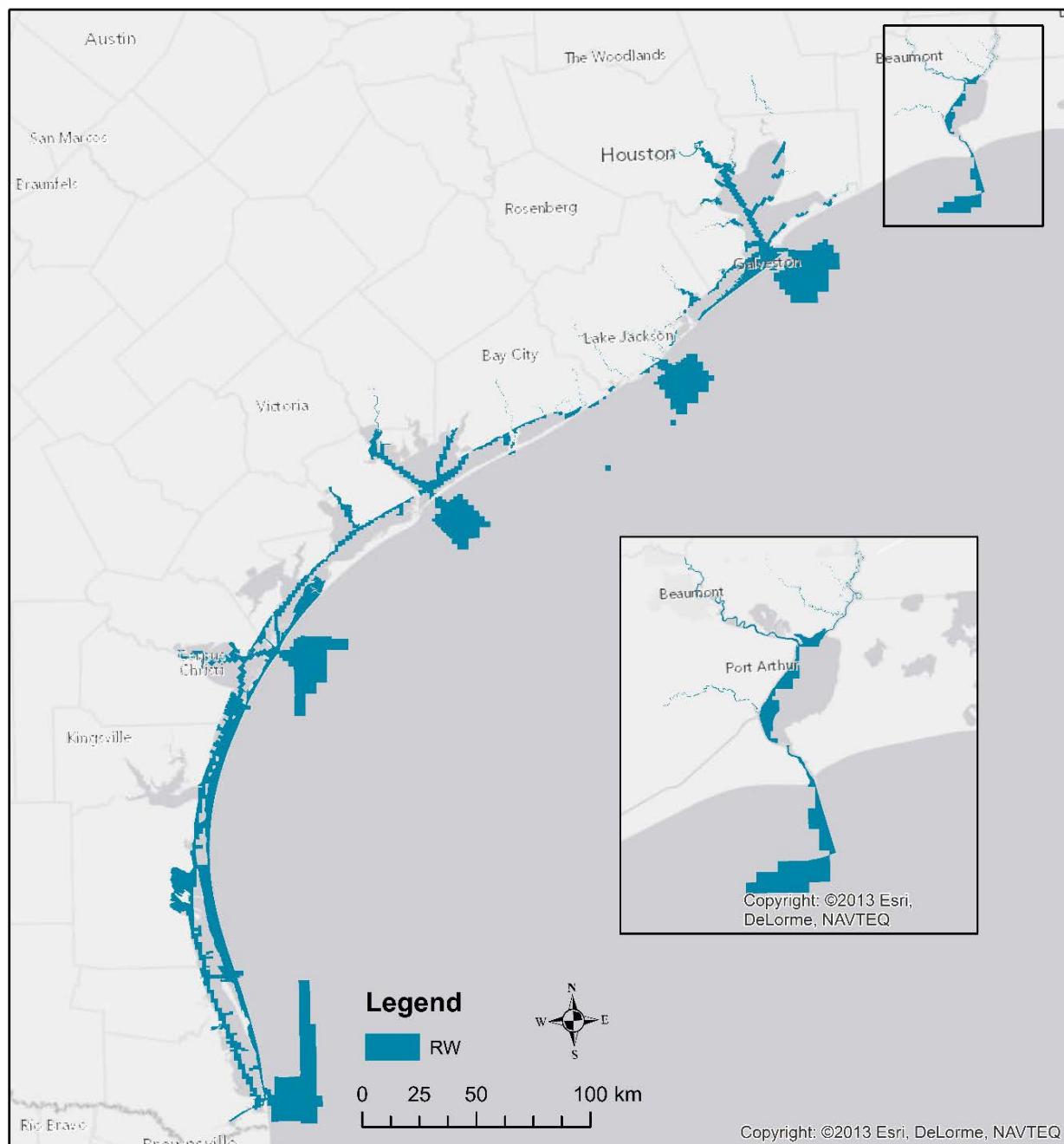


Figure 7. Map of Right-of Way code: RW. Close-up map featuring Sabine Lake.

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.

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U.S. Army Corps of Engineers Galveston District construction

guidelines: <http://www.swg.usace.army.mil/BusinessWithUs/RegulatoryBranch/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.

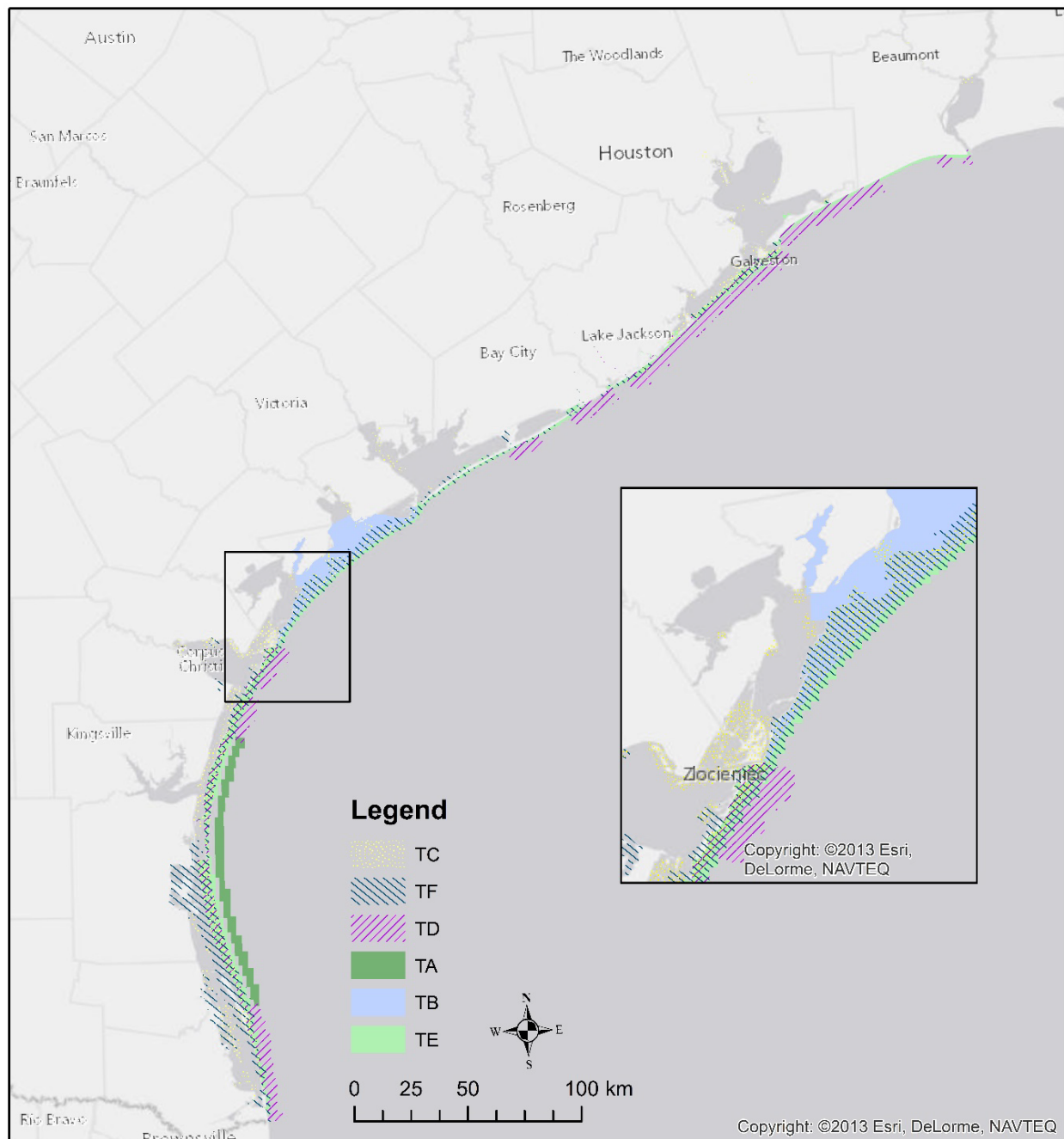


Figure 8. Map of Time Limitations: TA, TB, TC, TD, TE, and TF. Close-up featuring Aransas Bay.

GIS Data Acquisition, Development, and Needs

The goal of the RMC data gathering and development activities were to identify synthesize biological, physical, jurisdictional and other marine resources management data for the Texas coastal area as they pertain to RMCs. The second phase of the RMC process was the data gathering and development phase. This phase consisted of the development of a single database containing all data identified by the DSC through the development of the Sensitive Areas document and RMC criteria documents. DSC members assisted in the delivery and sharing if data where needed.

Data Summary

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

Table 2. Geospatial Data for Sensitive Area Mapping

Sensitive Areas datasets					
Category	Title	Source	Pub	Time	Geom
Artificial Reef	Artificial reef	TPWD	Unpub	Unk	point
Banks	Bottom Sediment areas	NMFS, Peter Sheridan	2002	1983	polygon
Banks	Unamed Bank	HRI, Harriet Nash	Unk	Unk	point
Banks	South Banker Bank	HRI, Harriet Nash	Unk	Unk	point
Banks	Northwest Gulf of Mexico Reefs and Banks	HRI, Harriet Nash	Unk	Unk	point
Bay Shore Areas	100ft Landward Buffer of State Submerged tracts	HRI	2014	2014	polygon
Bird Rookeries	Bird Rookeries	TGLO/TPWD/USFWS/TCWS	Unk	1982-1996	polygon
Crit Dune Areas	Coastal Dunes	TGLO	Unk	1995-Unk	line
Crit Erosion Areas	Crit erosion areas Upper Coast	HRI	2014	2007, 2009-2011	line
Crit Erosion Areas	Crit erosion areas Mid &	HRI	2014	2007, 2011	line

	Lower Coast				
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	PPA Coastal marsh	TGLO and TPWD	1995	1995	polygon
Coastal Marsh	NWI Coastal marsh	USFWS	Unk	1977-2014	polygon
Coastal Prot Areas	State-owned structures and activities permitted	TGLO	2001	2001	polygon
Coastal Prot Areas	Navigation districts	TGLO	Unk	Unk	polygon
Coastal Prot Areas	Marine Protected Areas	NOAA	2013	2013-Unk	polygon
Coastal Prot Areas	Wind farms	AEI, West Texas A&M Univ	2012	Unk	point
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	PPA Sensitive coastal habitat and species areas adjacent to coastal bays	TGLO and TPWD	1995	1995	polygon
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 Wetlands	NWI Coastal wetlands	USFWS	Unk	1977-2014	polygon
Coastal Wetlands	PPA Coastal wetlands, mangrove, fringe, interdune swale	TGLO and TPWD	1995	1995	polygon
Cultural Historic Areas	State submerged tracts (pre-2014) with MJ/MK codes	THC	2001	2008	polygon

Dredged Material Placement	Dredge Material Placement Areas	USACE	1997	1986-1994	polygon
Gulf Beaches	NWI Gulf beaches	USFWS	Unk	1977-2014	polygon
Hard Sub, Natural Reef, Structures	NWI Coral, mollusk, and worm	USFWS	Unk	1977-2014	polygon
Hard Sub, Natural Reef, Structures	PPA Hardreef, hard substrate	TGLO and TPWD	1995	1995	polygon
Hard Sub, Natural Reef, Structures	Deep sea coral	NOAA, Peter J. Etnoyer	2009	2008	point
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 platforms as of 05/28/2014	BOEM	2013	2014	point
Identified Sand Sources	Identified Sand Sources	TGLO	Unpub	Unk	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
Spec Flood Hzd Areas	FEMA Special Flood Hazard Areas	FEMA	1998	Unk	polygon
SAV/Seagrass	PPA SAV and seagrass	TGLO and TPWD	1995	1995	polygon
SAV/Seagrass	NOAA SAV	NOAA CSC	2007	2007	polygon
SAV/Seagrass	TPWD SAV	TPWD	Unk	1988-2007	polygon

Tidal Sand, Algal, Mud Flats	PPA Tidal, sand, and algal mud flats	TGLO and TPWD	1995	1995	polygon
Tidal Sand, Algal, Mud Flats	NWI Tidal flats	USFWS	Unk	1977-2014	polygon

Table 3. Geospatial Data for RMC codes

Code-Specific datasets						
Category	RMC	Title	Source	Pub	Time	Geom
Channels	CA, CC	Digitized channels in TX Bays from 2009 NAIP 0.5m aerial imagery at 1:5000 scale	HRI	2014	2008-2009	line
Channels	CA, CC	GIWW channel setback North AO Update	USACE Galv District	2013	Unk	line
Channels	CA, CC	GIWW channel setback South AO Update	USACE Galv District	2013	Unk	line
Intertidal Areas	CF	"Intertidal Areas" derived from NWI	USFWS	Unk	1977-2014	polygon
Structures	DA, OP	500ft buffer of bridges and causeways derived from roadways	TxDOT	2014	2013	line
Structures	OP	500ft buffer of State-owned structures and permitted activities	TGLO	2001	2001	polygon
Structures	DA, OP	Coastal Leases points: State and Private-owned Structures	TGLO	2001	Unk	point

Channels	OP	500 foot buffer of hard substrate/reefs, art reefs, banks, channels, oysters, and structures	See SA table	See SA table	See SA table	point, polygon
Channels	OP	500ft buffer of Digitized channels in Texas Bays from 2009 NAIP 0.5m aerial imagery at 1:5000 scale	HRI	2014	2008-2009	line
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
Right-of-Way	RW	Anchorage Areas	NOAA CSC	2013	2010-2012	polygon
Right-of-Way	RW	Shipping Fairlanes	NOAA CSC	2013	2013	polygon
PINS buffer	TA	2-3 mile seaward buffer of USGS PADUS Padre Island National Seashore feature	USGS	2014	2005-2012	polygon
PINS buffer	OR	2 mile seaward buffer of USGS PADUS Padre Island National Seashore feature	USGS	2014	2005-2012	polygon
Bird Rookeries	TC	1000ft buffer of Colonial Waterbird (gulls, terns, wading birds) Rookeries	TGLO/TP WD/USFWS/TCWS	Unk	1982-1996	polygon
Gulf Coast Beaches	TE	1000ft seaward buffer of National Wetlands Inventory "gulf beaches"	USFWS	Unk	1977-2014	polygon
Texas	TD	3 mile buffer of Texas Coastal	TGLO	Unk	1995-	line

Coastal Dunes		Dune lines			Unk	
Oysters	MM	Public Oysters: Non-reef shells-on-mud features	NOAA/TA MU-CC	2014	1969-2009	polygon
Oysters	MMb	Public Oysters: Reef features	NOAA/TA MU-CC	2014	1969-2009	polygon
Cultural Historic Areas	MA, MJ, MK	State submerged tracts pre-coded with MJ/MK	THC	Unpub	2014	polygon

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. But, 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, select sensitive areas dataset, HRI-derived dataset specific to particular RMCs, Matching FGDC metadata, and Excel data catalog spreadsheet. To access this dataset please refer to

<http://gomaportal.org/geoportal/catalog/search/resource/details.page?uuid=%7B17119625-C498-450B-859F-5801D176BB9B%7D>

RMC Data Needs and Gap Analysis

Through the RMC process, DCS 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
Code-Specific	Mitigation Areas	MP	Mitigation Sites	USACE and TGLO	polygon
Code-Specific	Restoration Areas	MR	Restoration Areas	TGLO	polygon
Sensitive Areas	Bay Nearshore Areas	DA, MA, OA, OH	Bay Nearshore Areas	HRI	polygon
Sensitive Areas	Gulf Nearshore Areas	DA, MA, OA, OH	Gulf Nearshore Areas	HRI	polygon
Sensitive Areas, Code-Specific	Critical Habitat Areas	MN	State Species of Concern Habitats	TPWD	polygon
Code-Specific	Water Depth	OH	Updated Estuarine Bathymetry	TGLO	polygon
Code-Specific	Cultural Historic Areas	MA, MJ, MK	RMCs assigned to 2014 Sub OLTS	THC	polygon
Sensitive Areas	Special Flood Hazard Areas	DA, MA, OA, OH	FEMA Special Flood Hazard Areas: Refugio County	FEMA	polygon

Gap Analysis

Title	Comments
Contaminated Areas	Could not identify dataset(s) to use for the 2014 RMC update.
Mitigation Sites	Could not obtain dataset(s) for the 2014 RMC update. A single GIS dataset needs to be developed from multiple sources and formats.
Restoration Areas	The Texas GLO was initially interested in seeing this dataset developed.
Bay Nearshore Areas	HRI is capable of developing this dataset.
Gulf Nearshore Areas	HRI is capable of developing this dataset.
State Species of Concern Habitats	Could not obtain dataset(s) from TPWD's Texas Natural Diversity Database for the 2014 RMC update possibly due to the sensitive nature of the data.
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.
THC's MJ/MK RMCs transferred to 2014 Sub OLTS	The process of joining THC's MJ/MK RMCs to Sub OLTS 2014 is an inaccurate process due to attribute (tract ID) and geometry (shoreline) differences between the Sub OLTS layer the Texas Historical Commission uses and the Sub OLTS 2014 layer used for the 2014 RMC update.
FEMA Special Flood Hazard Areas: Refugio County	An updated SFHA dataset for Refugio County was still being debated during 2014 RMC update and therefore was not included in the 2014 RMC update.

RMC Future Update Process

The RMC update process took approximately 1 year to complete through a series of 12 meeting from November 2013 to November 2014. Future updates, if made more frequently can possibly be achieved through email communication, webinars, and one in person meeting per review cycle. The review cycle may take from 4-6 weeks.

1. Review period will be announced by GLO. Submerged lands of the Texas Gulf Coast are dynamic environments which are constantly changing due to natural coastal processes and human activity. In an attempt to maintain up-to-date RMC and natural resource information it is recommended that the review cycle be conducted every year or every two years. State and federal agencies will be prompted to review RMC documents, list of datasets, and maps to submit recommendations. The reviews may before the oil gas lease sales are held quarterly in January, April, July, and October. The DSC may have 2-3 weeks to review material.
2. Compile and classify comments. Once the review period is up the GLO will obtain all comments and recommendation. Based on budget, availability of resources or new information some changes may be feasible to make while others may not be possible to complete. Comments will be classified as follows:
 - a. Group 1: These changes are required and data/information is available to make the update.
 - b. Group 2: The proposed changes are necessary but the resources are not currently available. These changes will be deferred for a later version.
 - c. Group 3: These comments present general information and may not be requesting a particular change.
 - d. Group 4: These comments are not relevant to the RMC update.
3. Group 1 comments will be addresses and the Group 2 through 4 comments will be reported to the DSC. The GLO can request any additional information or data from the DSC to fulfill Group 1 changes.
4. Present revised documents and maps to DSC for final review and make any additional changes as necessary.
5. Once documents and maps are updated the RMC viewer and web-based documents will be updated before the lease sale.

6. Update data needs report and consider these data gaps in data collection and research funding.

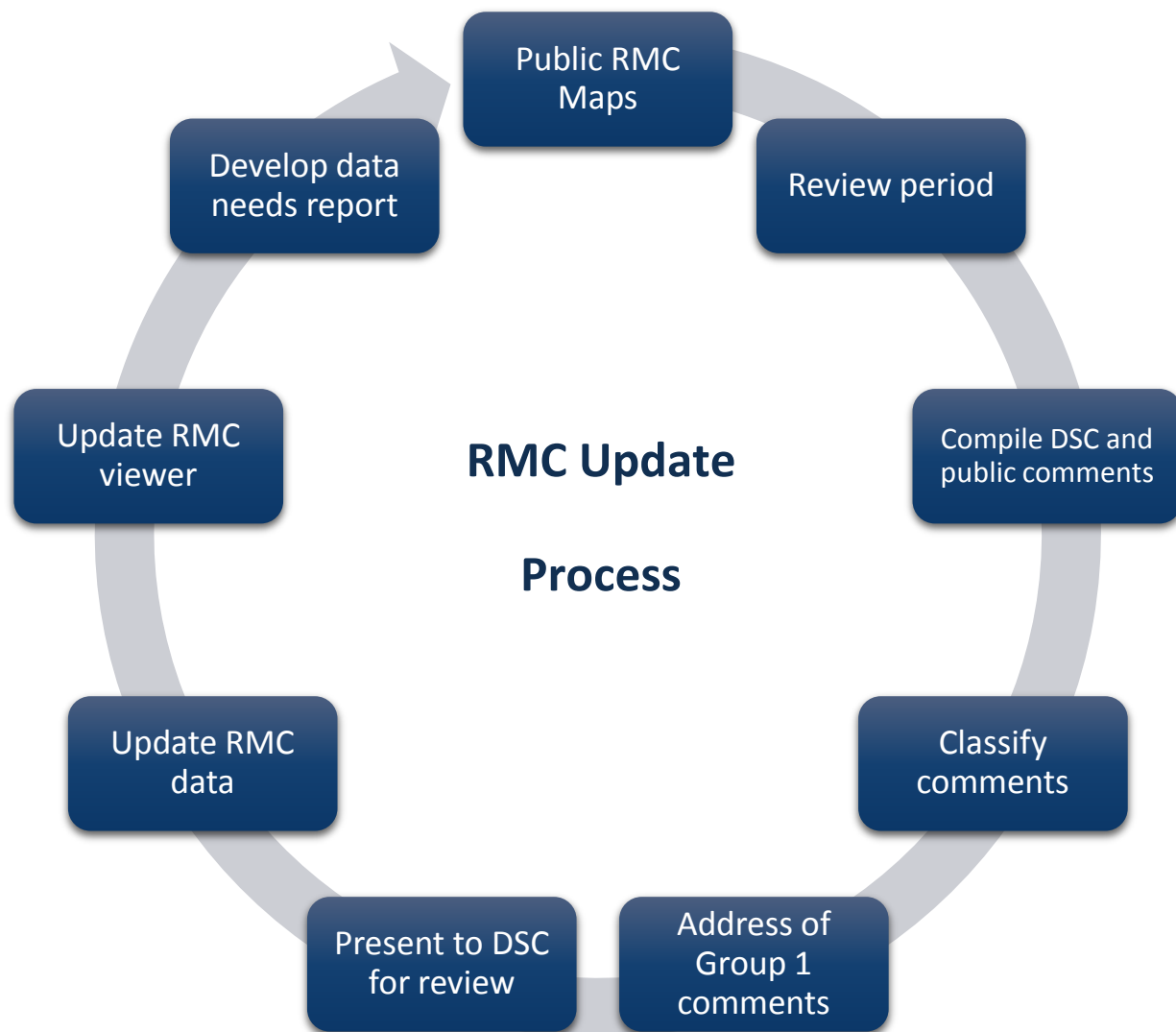


Figure 9. Review cycle for RMC datasets involves a review period, compilation of public and DSC comments, comment classification, and update.