

Appendix A - Ecosystem Restoration Alternatives

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Region 1 (Orange, Jefferson, Chambers, Harris, Galveston and Brazoria Counties)					
Wetland (Estuarine Intertidal and Emergent Marsh)	B4	Brazoria Co. Bay Shoreline Protection (0.9 mi)	Shoreline protection would preserve special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344), and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) Area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 3) Area is part of the Brazoria NWR; 4) Shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	The project area is located in the Brazoria National Wildlife Refuge, which is recognized by the Western Hemisphere Shorebird Reserve Network as a Site of International Importance because it supports more than 100,000 shorebirds annually (Mid-Coast NWR management plan). Project would contribute to Texas Mid-Coast NWR management plan goal of maintaining natural hydrologic functions through erosion control and reduction of saltwater intrusion (USFWS 2014).	SCARCITY: This measure would protect Bastrop Bay, located in vital complex of coastal wetlands harboring more than 300 bird species. Estuarine intertidal and emergent marsh fringing this bay is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (PLAN RECOGNITION). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/SPECIAL STATUS SPECIES: The Texas Mid-Coast NWR Complex as a Site of International Importance because it annually supports more than 100,000 shorebirds protected by the Migratory Bird Treaty Act. (USFWS 2014.). HYDROLOGIC CHARACTER: It would prevent an adverse change in the hydrologic character of the Bay, by preventing the creation of a large opening to the GIWW. GEOMORPHIC CONDITION: It would also maintain the narrow landform that protects the Bay from the GIWW, by greatly slowing erosion caused by vessel wakes in the GIWW and wind fetch in the Bay.
Wetland (Estuarine Intertidal and Emergent Marsh)	B6	Brazoria Co GIWW Breakwaters (3.3 mi)	The protected area contains special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) area is Habitat of Major Concern under North American Waterfowl Management Plan; 3) Area crosses through the Brazoria NWR; 4) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 5) The Service recognizes the Texas Mid-Cast NWR Complex as a Site of International Importance because it annually supports more than 100,000 shorebirds. (USFWS 2014).	Ducks Unlimited has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect Brazoria Co GIWW shorelines. The project area passes through the Brazoria and San Bernard NWRs, which are recognized by the Western Hemisphere Shorebird Reserve Network as a Site of International Importance because it supports more than 100,000 shorebirds annually (midcoast NWR management plan). Project would contribute to Texas Mid-Coast NWR management plan goal of maintaining natural hydrologic functions through erosion control and reduction of saltwater intrusion (USFWS 2014).	SCARCITY: This measure would protect shorelines of the Brazoria and San Bernard NWRs, located in vital complex of coastal wetlands harboring more than 300 bird species. Estuarine intertidal and emergent marsh in the NWRs is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (PLAN RECOGNITION). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ SPECIAL STATUS SPECIES: The Texas Mid-Cast NWR Complex as a Site of International Importance because it annually supports more than 100,000 shorebirds protected by the Migratory Bird Treaty Act. (USFWS 2014.). HYDROLOGIC CHARACTER: It would prevent an adverse change in the hydrologic character of the NWR's, by preventing the creation openings to the GIWW. GEOMORPHIC CONDITION: It would also maintain landforms that protect the NWRs from the GIWW, by greatly slowing erosion caused by vessel wakes in the GIWW.
Wetland (Estuarine Intertidal and Emergent Marsh)	B7	Brazoria Co GIWW Island Restoration in West Bay (131 ac)	The new island habitat would contain special aquatic sites such as wetlands and vegetated shallows, recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) the island is located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) Area crosses through the Brazoria NWR; 4) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	Ducks Unlimited has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect Brazoria Co GIWW shorelines. The Gulf Intracoastal Canal Association recognizes the importance of maintaining the "inland" nature of the GIWW; restoring the island would protect navigation of the waterway.	SCARCITY: This measure would create estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The new island would provide additional wintering habitat for migratory waterfowl, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ GEOMORPHIC CONDITION: It would create a new landform that protects the mainland north of the GIWW, by greatly slowing erosion caused by vessel wakes in the GIWW.

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Wetland (Estuarine Intertidal and Emergent Marsh)	C1	Chambers Co Bay Shoreline Protection (22 mi)	Shoreline protection would preserve special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) area is Habitat of Major Concern under North American Waterfowl Management Plan; 3)shoreline protection would preserve portions of the crosses through the Moody and Anahuac National Wildlife Refuges (NWR) and the Candy Abshier Wildlife Management Area. (Moody, Anahuac and McFaddin NWRs collectively are known as the Chenier Plain NWR Complex) ; 4) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; The Service recognizes the Anahuac NWR as a Shorebird Site of International Importance because it annually supports more than 100,000 shorebirds (USFWS 2008).	The measure would protect the Anahuac NWR, designated as a "Shorebird Site of International Importance" by the Western Hemisphere Shorebird Reserve Network in 2005. The area is important habitat for ten shorebird species identified as "highly imperiled" or of "high concern" by the U.S. Shorebird Conservation Plan, developed by wide array of state and federal agencies, NGO's and individual researchers.	SCARCITY: This measure would protect the north shore of East Bay which has experienced a shoreline erosion rate of up to 4.5 feet per year since 1970. The breakwaters would protect the shoreline of the Moody and Anahuac National Wildlife Refuges (NWR) and the Candy Abshier Wildlife Management Area, preventing the erosion of approximately 600 wetland acres over the 50 year period of analysis. allow vegetated waters on the edges of the island. Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CONDITION: It would prevent an adverse change in the hydrologic character of the NWR's, by preventing the creation openings to the GIWW. GEOMORPHIC CONDITION: It would also maintain landforms that protect the NWRs from the GIWW, by greatly slowing erosion caused by vessel wakes in the GIWW. PLAND RECOGNITION: Thirty-two species of shorebirds regularly occur on the refuge complex, ten of which are "highly imperiled" or of "high concern" under the U.S. Shorebird Conservation Plan.
Wetland (Estuarine Intertidal and Emergent Marsh)	G9	Galveston Co Marsh Restoration on Bolivar Peninsula (1,995 ac)	The restored areas would contain special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the restored areas are located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) shallow vegetated waters designated Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act would be created within and adjacent to the restored marshes.	Ducks Unlimited has recognized the severity of wetland impacts along the Gulf Coast. Preservation and restoration of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to restore these areas.	SCARCITY: This measure would restore 1,955 acres of estuarine intertidal and emergent marsh, which is recognized as exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ GEOMORPHIC CONDITION: It would maintain landforms that support marsh habitat.
Wetland (Estuarine Intertidal and Emergent Marsh)	G10	Galveston Co - Galveston Island Bayside Marsh Restoration (2,466 ac)	The restored areas would contain special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the restored areas are located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) shallow vegetated waters designated Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act would be created within and adjacent to the restored marshes.	Protection and restoration of wetlands and seagrass meadows (along with oyster reef) are identified in the Galveston Bay Plan (GBNEP 1994) for special conservation and restoration efforts. Texas Parks and Wildlife, National Marine Fisheries Service and local non-governmental associations have sponsored similar projects at Jumbile, Carancahua, Dalehite, Bird Island and Starvation Coves. These projects have been successful in restoring marsh edge and encouraging seagrass growth. The projects described here would provide similar benefits over a longer planning horizon. Ducks Unlimited has recognized the severity of wetland impacts along the Gulf Coast. Preservation and restoration of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to restore these areas.	SCARCITY: This measure would restore 2,466 acres of estuarine intertidal and emergent marsh, which is recognized as exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would restore marsh and preserve contiguous Galveston island habitat in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ GEOMORPHIC CONDITION: It would maintain landforms that support marsh habitat.

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Wetland (Estuarine Intertidal and Emergent Marsh)	G11	Galveston Co -West Bay Marsh Restoration (6,002 ac)	The restored areas would contain special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the restored areas are located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) shallow vegetated waters designated Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act would be created within and adjacent to the restored marshes.	Protection and restoration of wetlands and seagrass meadows (along with oyster reef) are identified in the Galveston Bay Plan (GBNEP 1994) for special conservation and restoration efforts. The Pierce marsh restoration project is located in an area acquired by the Galveston Bay Foundation and the Nature Conservancy. It is recognized as providing important foraging, resting and breeding habitat for nearly 300 species of birds (http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/texas/placesweprotect/pierce-marsh-preserve.xml). A 63-acre marsh restoration project has been completed in the area, funded by the Natural Resource Damage Assessment from the 1990 Galveston Bay oil spill, the Galveston Bay Estuary Program, the Natural Resources Conservation Service, and the USFWS. Ducks Unlimited has recognized the severity of wetland impacts along the Gulf Coast. Preservation and restoration of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU and the Galveston Bay National Estuary Program have sponsored similar projects in Galveston Co and opportunities may exist to partner with them to restore these areas.	SCARCITY: This measure would restore just over 6,000 acres of estuarine intertidal and emergent marsh, which is recognized as exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would restore marsh and preserve West Bay habitats in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ GEOMORPHIC CONDITION: It would maintain landforms that support marsh habitat and protect the mainland and the I45 causeway from storm surge impacts.
Wetland (Estuarine Intertidal and Emergent Marsh)	G12	Galveston Co GIWW Breakwaters, West Bay and Bolivar Peninsula (27.5 mi)	Area is Habitat of Major Concern under North American Waterfowl Management Plan; 2) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	Protection and restoration of wetlands and seagrass meadows (along with oyster reef) are identified in the Galveston Bay Plan (GBNEP 1994) for special conservation and restoration efforts. Ducks Unlimited has recognized the severity of wetland impacts along the Gulf Coast. Preservation and restoration of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to construct these breakwaters	SCARCITY: This measure would prevent further erosion of estuarine marshes adjacent to the GIWW in West Bay and on Bolivar Peninsula. Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CONDITION: It would prevent an adverse change in the hydrologic character of the adjacent marshes by preventing the creation openings to the GIWW and the introduction of higher salinity waters. GEOMORPHIC CONDITION: It would also maintain landforms that protect the marshes from the GIWW, by greatly slowing erosion caused by vessel wakes in the GIWW.
Wetland (Estuarine Intertidal and Emergent Marsh)	G13	Galveston Co GIWW Island Restoration in West Bay and Bolivar Peninsula (393 ac)	The new island habitat would contain special aquatic sites such as wetlands and vegetated shallows, recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) the island is located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act;	Protection and restoration of wetlands and seagrass meadows (along with oyster reef) are identified in the Galveston Bay Plan (GBNEP 1994) for special conservation and restoration efforts. Ducks Unlimited has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect Brazoria Co GIWW shorelines. The Gulf Intracoastal Canal Association recognizes the importance of maintaining the "inland" nature of the GIWW; restoring the island would protect navigation of the waterway.	SCARCITY: This measure would create estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The new islands would provide additional wintering habitat for migratory waterfowl, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES: These islands would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/. GEOMORPHIC CONDITION: The measure would create landforms on which marsh could be restored.

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Wetland (Estuarine Intertidal and Emergent Marsh)	J3	Jefferson Co - GIWW Breakwaters (1.9 mi)	Shoreline protection would preserve special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) area is Habitat of Major Concern under North American Waterfowl Management Plan; 3) shoreline protection would preserve portions of the McFaddin National Wildlife Refuge and the J.D. Murphree Wildlife Management Area.; 4) the area contains shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 5) preservation of wetlands within the McFaddin NWR would help fulfill one of the primary goals of the Texas Chenier Plain Refuge Complex, of which McFadden is a part (USFWS 2008).	Ducks Unlimited (DU) has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect remaining GIWW shorelines in this county. The Gulf Intracoastal Canal Association recognizes the importance of maintaining the "inland" nature of the GIWW; restoring the island would protect navigation of the waterway.	SCARCITY: The breakwaters would protect the shorelines of the McFaddin NWR and the J.D. Murphree Wildlife Management Area, preventing the erosion of approximately 761 estuarine marsh acres over the 50 year period of analysis. Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would connect non-continuous breakwater segments already in place and preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008). HYDROLOGIC CONDITION: It would prevent an adverse change in the hydrologic character of the adjacent marshes, by preventing the creation openings to the GIWW and the introduction of higher salinity waters. GEOMORPHIC CONDITION: It would also maintain landforms that protect the marshes from the GIWW, by greatly slowing erosion caused by vessel wakes in the GIWW.
Wetland (Estuarine Intertidal and Emergent Marsh)	J4	Jefferson Co - GIWW Island Restoration (42 ac)	The new island habitat would contain special aquatic sites such as wetlands and vegetated shallows, recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) the island is located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act;	Ducks Unlimited has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and further opportunities may exist to partner with them. The Gulf Intracoastal Canal Association recognizes the importance of maintaining the "inland" nature of the GIWW; restoring the island would protect navigation of the waterway.	SCARCITY: This measure would create estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The new island would provide additional wintering habitat for migratory waterfowl, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES and PLAN RECOGNITION: These islands would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ GEOMORPHIC CONDITION: The measure would create a new landform for marsh creation.
Wetland (Estuarine Intertidal and Emergent Marsh)	J5	Jefferson Co - Marsh Restoration (9,304 ac)	Marsh restoration would preserve special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan; 3) the project would restore a large portion of the Texas Point National Wildlife Refuge; 4) the area contains shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 5) preservation of wetlands within the Texas Point NWR would help fulfill one of the primary goals of the Texas Chenier Plain Refuge Complex, of which Texas Point is a part (USFWS 2008).	Ducks Unlimited has recognized the severity of wetland impacts associated with marsh loss in the region. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect remaining GIWW shorelines in this county.	SCARCITY: This measure would restore approximately 9,304 acres estuarine marsh acres over a 50 year period of analysis. Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh at the confluence of the principal routes for both the Central and Mississippi Flyways for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008). GEOMORPHIC CONDITION: The measure would maintain and increase the elevation of landforms that support marshes in the area.

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Wetland (Estuarine Intertidal and Emergent Marsh)	J7	Jefferson Co Shoreline Ridge Restoration (33.8 mi)	Restoration of the Gulf shoreline ridge would preserve special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan; 3) the project would protect thousands of acres in the Texas Point and McFadden NWRs, the J.D. Murphree WMA, and Sea Rim State Park; 4) the area contains shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 5) preservation of wetlands within the McFaddin and Texas Point NWR would help fulfill one of the primary goals of the Texas Chenier Plain Refuge Complex, of which both NWRs are a part (USFWS 2008).	Restoration of this shoreline ridge is part of the Salt Bayou Watershed Restoration Plan (2013), a plan developed by the Salt Bayou Workgroup (Jefferson County, National Marine Fisheries Service, the Texas GLO, Texas Parks and Wildlife Department, Texas Water Development Board, USFWS and Ducks Unlimited). Ducks Unlimited has recognized the severity of wetland impacts associated with marsh loss in the region. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect remaining GIWW shorelines in this county. USFWS has recognized the severity of impacts associated with Gulf breaches of the beach ridge, and has built small scale clay-core dune projects at specific locales along this shoreline.	SCARCITY: This measure would create estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The restored beach ridge would protect wintering habitat for migratory waterfowl, in this extensive wetland complex. This project would preserve marsh at the confluence of the principal routes for both the Central and Mississippi Flyways for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008).HYDROLOGIC CONDITION: This measure would prevent an adverse change in the hydrologic character of the estuarine marshes by preventing the creation of openings to the Gulf of Mexico and the introduction of ocean salinity waters and wave energy into the marsh complex. GEOMORPHIC CONDITION: The measure would protect the landform that supports the extensive marsh complex; it would prevent the incursion of ocean salinity waters, which kill marsh vegetation, leading to the collapse of peat soils, and the conversion of marsh to open water.
Wetland (Estuarine Intertidal and Emergent Marsh)	J8	Jefferson Co Hydrologic Restoration of Salt Bayou (siphons under GIWW)	Restoration of freshwater inflows would help to preserve special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan; 3) the project would protect thousands of acres in the Texas Point and McFadden NWRs, the J.D. Murphree WMA, and Sea Rim State Park; 4) the area contains shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 5) preservation of wetlands within the McFaddin and Texas Point NWR would help fulfill one of the primary goals of the Texas Chenier Plain Refuge Complex, of which both NWRs are a part (USFWS 2008).	The inverse siphons are recommended by the Salt Bayou Watershed Restoration Plan (2013), a plan developed by the Salt Bayou Workgroup (Jefferson County, National Marine Fisheries Service, the Texas GLO, Texas Parks and Wildlife Department, Texas Water Development Board, USFWS and Ducks Unlimited). Jefferson County sponsored extensive modeling, conducted by the Texas Water Development Board, which evaluated the effectiveness of this proposal, and helped to determine the siphon locations and inflow amounts. USFWS has recognized the severity of impacts caused by the lack of freshwater inflows and has developed plans and specifications and obtained necessary permits for the siphons.	SCARCITY: This measure would preserve estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The hydrologic restoration would protect wintering habitat for migratory waterfowl, in this extensive wetland complex. This project would preserve marsh at the confluence of the principal routes for both the Central and Mississippi Flyways for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008).HYDROLOGIC CONDITION: This measure would restore the hydrologic character of the estuarine marshes by introducing freshwater inflows into the marsh complex. GEOMORPHIC CONDITION: The measure would protect the landform that supports the extensive marsh complex; it would prevent the loss of marsh vegetation from salinity stress, which leads to the collapse of peat soils, and the conversion of marsh to open water.
Wetland (Estuarine Intertidal and Emergent Marsh)	O1	Orange Co - GIWW Breakwaters (3.3 mi)	Shoreline protection would preserve special aquatic sites such as wetlands, mud flats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan; 3) the project would protect an area leased by Texas Parks and Wildlife and managed for fish and wildlife habitat;	The significance of this area for fish and wildlife habitat is demonstrated by Texas Parks and Wildlife's leasing and management for these purposes. Texas Parks and Wildlife has expressed concern over erosion of this shoreline and the threat it poses to estuarine wetland habitat. Ducks Unlimited has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and opportunities may exist to partner with them to protect remaining GIWW shorelines in this county.	SCARCITY: This measure would preserve approximately 50 acres estuarine marsh acres over a 50 year period of analysis. Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh at the confluence of the principal routes for both the Central and Mississippi Flyways for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008). .HYDROLOGIC CONDITION: This measure would protect the Old River marshes from intrusion of higher salinity waters from the

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
					Sabine-Neches Waterway navigation channel. GEOMORPHIC CONDITION: The measure would protect the marsh landform from erosion caused by wind fetch across Sabine Lake.
Wetland (Estuarine Intertidal and Emergent Marsh)	O2	Orange Co - GIWW Island Restoration (131 ac)	The new island habitat would contain special aquatic sites such as wetlands and vegetated shallows, recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) the island is located in a Habitat of Major Concern under North American Waterfowl Management Plan; 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act;	Ducks Unlimited has recognized the severity of wetland impacts associated with GIWW erosion and the need for shoreline protection. Preservation of Gulf Coast wetland habitats is one of DU's highest conservation priorities (http://www.ducks.org/conservation/conservation-initiatives/gulf-coast-initiative). DU has sponsored similar projects in Jefferson Co and further opportunities may exist to partner with them. The Gulf Intracoastal Canal Association recognizes the importance of maintaining the "inland" nature of the GIWW; restoring the island would protect navigation of the waterway.	SCARCITY: This measure would create estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh at the confluence of the principal routes for both the Central and Mississippi Flyways for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). This area is an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ GEOMORPHIC CONDITION: The measure would create a new landform for marsh creation.
Region 2 (Matagorda, Jackson, Victoria, Calhoun Counties)					
Oyster Reef	M3	Matagorda Co- Matagorda Bay Half Moon Reef Phase 3 (75 ac)	Magnuson-Stevens Fishery Conservation Act recognizes oyster reef as one category of essential fish habitat; 2) NOAA's National Shellfish Initiative - NOAA's Office of Habitat Conservation is working all along the East, West and Gulf Coasts to protect and restore oyster populations.	The Nature Conservancy has already restored approximately 42 acres of Half Moon Reef in Matagorda Bay. Part of this restoration effort was conducted under the Texas Coastal Impact Assistance Program (CIAP), under which USFWS provides federal grant programs to restore coastal habitats as mitigation for impacts associated with offshore oil production. An additional 30 acres was restored in partnership with USACE under the Estuary Restoration Program (Estuary Restoration Act of 2000). TPWD considers oysters to be important habitat in Texas' bays and estuaries (http://www.tpwd.state.tx.us/fishboat/fish/didyouknow/oysterarticle.phtml). 90% of public reef areas utilized by commercial and recreational fishermen are found in Galveston, Matagorda and San Antonio Bays.	SCARCITY: Historically, Matagorda Bay had massive and extensive oyster reef; today almost all of the fossilized oyster shell has been removed by shell mining and few live reefs remain (TNC 2014). Oyster reef habitat is one of the most important habitats in Texas bays, playing an essential role in maintaining the health and productivity of these estuarine ecosystems. One average-sized oyster can filter up to 50 gallons of water a day while feeding, reducing phytoplankton biomass resulting from nutrient loading as well as suspended solids from municipal wastewater and storm water runoff. CONNECTIVITY: this project would add about 75 acres to about 72 acres that have already been constructed, enlarging this reef to the largest in Matagorda Bay. Oyster reef provides estuarine shell substrate, a category of EFH occurring within the study area. SPECIAL STATUS SPECIES: The reefs that oysters build also provide a complex three-dimensional structure above the soft bay bottom sediments, creating habitat that may be colonized by other mollusks, barnacles, and other invertebrates. Oyster reef habitat now limits production of reef-associated fish and crustaceans in the southeast United States (Peterson, Grabowski and Powers 2003. Density and biomass of most fishes and crustaceans were significantly higher in oyster reef than over nonvegetated bottom. Richness was highest in oyster reef, followed by marsh edge, and lowest on non-vegetated bottom (Stunz et al 2010).
Rookery Island	M4	Matagorda Co - Dressing Point island restoration (25 ac)	Clean Water Act (33 USC 1344) - Dressing Point contains special aquatic sites such as mud flats and vegetated shallows; 2) shallow waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 3) North American Waterfowl Management Plan (2012)-Gulf Coast Joint Venture-Texas Mid-Coast Initiative Area (2012)- restoration of Dressing Point is a recommended action because it is a known important nesting colony of Reddish Egret, a priority species for the program; 4) Dressing Point is located in the Big Boggy NWR, a priority purpose of which is protecting habitat for migratory birds;	National Audubon Society identifies Dressing Point as a globally Important Bird Area (http://netapp.audubon.org/iba/Site/1573). 2) USFWS has provided funding under the Coastal Wetlands Planning, Protection and Restoration Program (CWPPRP) to Ducks Unlimited for assistance in restoring Dressing Point Island (http://www.federalgrants.com/Dressing-Point-Island-Restoration-47539.html). 3) Identified as potential project by GLO Technical Advisory Committee.	SCARCITY: Status and trends of Christmas Count studies from 1965-2011 (Niven and Butcher 2011) found that wintering saltwater specialists are declining. Fourteen species of Charadriiformes have declined by 40% over this period. Six species of Anseriformes have declined by about 25%, and Pelecaniformes have decreased by about 17% over this period. These declines are most likely associated with the widespread loss of rookery islands to erosion, RSLC, predation and disturbance. Dressing Point is recognized by Audubon Society as important habitat for Black Skimmer, Black-crowned Night-Heron, Brown Pelican, Caspian Tern, and Great Blue Heron, Great Egret, Laughing Gull, Reddish Egret, Roseate Spoonbill, Royal Tern, Sandwich Tern, Snowy Egret, Tricolored Heron, White Ibis and White-faced Ibis. Audubon Society identifies Dressing Point Island as threatened by erosion, subsidence, and sea level rise, especially associated with tropical storms (http://netapp.audubon.org/iba/Reports/1573). CONNECTIVITY: Measure would restore the sustainability of an existing, important rookery island. SPECIAL SPECIES STATUS: The Gulf Coast Joint Venture recognizes it as important habitat for the Reddish Egret; this species designated a Bird of Conservation Concern (USFWS 2008). GEOMORPHIC CONDITION: This

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
					measure would restore an eroded landform, and increase the elevation of the island in the bay.
Estuarine Waters and Estuarine Intertidal Marsh	M5	Matagorda and Calhoun Counties – Hydrologic restoration of aquatic habitat	Preservation of aquatic habitat in Matagorda, East Matagorda, Tres Palacios, Carancuhua or Lavaca Bays would: 1) restore special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 3) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 4) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	Aquatic restoration and water quality improvements of Matagorda Bay and East Matagorda Bay are objectives of the Lower Colorado River Authority. Water quality improvements in San Antonio Bay is an objective of the San Antonio Bay Foundation; they would like to remove log jams in the Guadalupe and Antonio Rivers which reduce freshwater inflow into the bay (Public comment received during scoping period, August 2014).	Matagorda, East Matagorda, Tres Palacios, Carancuhua ,Lavaca and San Antonio Bays are an important mosaic of highly productive wetlands, open estuarine water, islands, prairie, and river and bay shorelines. SCARCITY: This measure would restore estuarine intertidal marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The restored marsh and aquatic habitat would provide additional wintering habitat for migratory waterfowl, restoring the sustainability of an existing bird corridor, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES and PLAN RECOGNITION: This marsh would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico’s Yucatan Peninsula, thus preserving habitat covered by international treaty. Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CHARACTER: the restored marsh would improve water quality in the Colorado River, Tres Palacios Creek, and Caney Creek tidal segments, and in East Matagorda, Keller, and Carancahua Bays which have been identified by TCEQ as having impaired water quality. The deltaic wetlands function to filter excess nutrients, sediment, and contaminants from runoff entering the bays from farmland within the drainage basin.

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Wetland (Estuarine Intertidal and Emergent Marsh) (Whooping Crane Habitat)	CA3	Calhoun Co. – Matagorda Island Restoration	Preservation of whooping crane habitat at the head of San Antonio Bay, recognized as a threatened species under the Endangered Species Act; 2) the USFWS Aransas NWR, located just 18 mi to the east contains designated critical habitat for the whooping crane; 3) Preservation of aquatic habitat along Matagorda Island would help to restore special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344), and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 4) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 5) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 6) US Senate Resolution 23 Jun 2004 authorized ER study of Nueces River Basin - this included protection and restoration of the delta.	GLO Technical Advisory Committee; Gulf of Mexico Regional Fishery Management Council; Area is on Great Texas Coastal Birding Trail. Waters are recognized as impaired by TCEQ. International Crane Foundation - Limited and threatened wintering habitat on the Gulf coast is one of the greatest challenges facing North America's tallest bird (Whooping Crane Conservation Association; http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/texas/newsroom/critical-wintering-grounds-for-rare-whooping-cranes-protected-in-texas.xml . Aquatic restoration and water quality improvements are objectives of the Coastal Bend Bays and Estuaries Program (CBBEP).	Matagorda Island is an important mosaic of highly productive wetlands, open estuarine water, islands, and bay shorelines. SCARCITY: There is only one self-sustaining wild population of Whooping Cranes in the world, the Aransas-Wood Buffalo National Park population, which nests in the Wood Buffalo National Park and adjacent areas in Canada and winters in coastal marshes in Texas in the Aransas National Wildlife Refuge and adjacent areas (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B003 .) The whooping crane breeds in Canada and then migrates 2,400 miles south to the Texas Gulf Coast. The whooping crane population dropped from 1,500 to just 20 birds between 1850 and 1941 (USFWS). Since then, cooperative conservation efforts between the U.S. and Canada have increased the population significantly. Today, there are roughly 400 wild cranes in North America. This measure would restore estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). This measure would restore estuarine intertidal marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The restored marsh and aquatic habitat would provide additional wintering habitat for migratory waterfowl, restoring the sustainability of an existing bird corridor, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES and PLAN RECOGNITION: This marsh would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CHARACTER: the restored marsh would improve water quality in the tidal segment, which has been identified by TCEQ as having impaired water quality.
Wetland (Estuarine Intertidal and Emergent Marsh)	CA4	Calhoun Co – breakwaters protecting Redfish Lake on Carancahua Bay (3 mi)	Shoreline protection would preserve special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344), and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	GLO Technical Advisory Committee; Gulf of Mexico Regional Fishery Management Council. Carancahua Bay Protection Association concerned about restoration of this area. TCEQ lists Carancahua Bay as impaired water body.	SCARCITY: The breakwaters would protect the shorelines of Redfish Lake, preventing the erosion of approximately 300 estuarine marsh acres. Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008). HYDROLOGIC CONDITION: It would prevent an adverse change in the hydrologic character of the adjacent marshes, by preventing the creation of openings to the larger bay and the introduction of higher salinity waters. Water quality is a concern in the area. Marsh preservation would contribute to improved water quality. GEOMORPHIC CONDITION: It would also maintain landforms that protect Redfish Lake, by greatly slowing erosion caused by wind erosion. Redfish Lake is an important nursery area for the bay.

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Wetland (Estuarine Intertidal and Emergent Marsh)	CA5	Calhoun Co-breakwaters protecting Keller Bay (3 mi)	Shoreline protection would preserve 1) special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 3) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 4) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	Identified as site of concern by the general public during scoping meeting in Palacios, Texas (Aug 11, 2014).	SCARCITY: The breakwaters would protect erosion of narrow peninsula protecting Keller Bay from erosive wind and wave action of larger Matagorda Bay system, protecting a quiet, shallow bay of 4,100 acres. The bay is fringed by spartina alterniflora and spartina patens, and seagrass is present in protected areas (http://www.globalrestorationnetwork.org/database/case-study/?id=287) Estuarine intertidal and emergent marsh is exceptionally scarce and declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: This project would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty (SPECIAL STATUS SPECIES and PLAN RECOGNITION). http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ . Migrant passerines that use the complex include many species of warblers, vireos, tanagers, thrushes, and buntings, including many Avian Species of Conservation Concern (USFWS 2008). HYDROLOGIC CONDITION: It would prevent an adverse change in the hydrologic character of the bay, by preventing the creation openings to the larger bay and consequent erosion Water quality is a concern in the area. Marsh preservation would contribute to improved water quality. GEOMORPHIC CONDITION: It would also maintain landforms that protect Keller Bay, by greatly slowing erosion caused by wind erosion. Keller Bay is an important nursery area for the bay.
Rookery Island	CA6	Calhoun County-restoration of Chester (formerly Sundown) Island and breakwaters (30 acres)	Addition of 30 acres and protection for this important rookery island in Matagorda Bay near the Matagorda Ship Channel would: 1) restore special aquatic sites such as mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344); 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 4) North American Waterfowl Management Plan (2012)-Gulf Coast Joint Venture-Texas Mid-Coast Initiative Area (2012)- restoration of Sundown Island is a recommended action because it is a known important nesting colony of Reddish Egret, a priority species for the program.	Owned by GLO and managed by Audubon Society's Texas Coastal Sanctuaries Program. 1) Recognized as a Globally Important Bird Area by the National Audubon Society (http://netapp.audubon.org/IBA/Site/1562). 2) Identified as potential project by GLO Technical Advisory Committee; 3) GLO has identified this a priority restoration project.	SCARCITY: Status and trends of Christmas Count studies from 1965-2011 (Niven and Butcher 2011) found that wintering saltwater specialists are declining. Fourteen species of Charadriiformes have declined by 40% over this period. Six species of Anseriformes have declined by about 25%, and Pelecaniformes have decreased by about 17% over this period. These declines are most likely associated with the widespread loss of rookery islands to erosion, RSLC, predation and disturbance. Chester Island is recognized by Audubon Society as important breeding habitat for Reddish Egret, Black Skimmer, Royal, Sandwich, and Caspian Terns. Audubon Society identifies Dressing Point Island as threatened by erosion, subsidence, and sea level rise, especially associated with tropical storms (http://netapp.audubon.org/IBA/Site/1562). CONNECTIVITY: Measure would restore the sustainability of an existing, important rookery island. SPECIAL SPECIES STATUS: The Gulf Coast Joint Venture recognizes it as important habitat for the Reddish Egret; this species designated a Bird of Conservation Concern (USFWS 2008). GEOMORPHIC CONDITION: This measure would restore an eroded landform, and increase the elevation of the island in the bay.
Region 3 (Aransas, Refugio, San Patricio, Nueces, Kleberg)					

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Oyster Reef	A1	Aransas County - Copano Bay Oyster Reef restoration (150 ac)	1) Magnuson-Stevens Fishery Conservation Act recognizes oyster reef as one category of essential fish habitat; 2) NOAA's National Shellfish Initiative - NOAA's Office of Habitat Conservation is working all along the East, West and Gulf Coasts to protect and restore oyster populations; 3) TCEQ has identified Copano Bay as having impaired use for oyster harvesting because of high concentrations of bacteria in bay waters. Additional oyster reef would improve water quality in the bay (TCEQ 2013); 4) Oyster reef would improve habitat for blue crabs, which are an important food source for the federally-endangered Whooping Crane.	The Nature Conservancy has identified oyster reef restoration in Copano Bay as a priority Gulf of Mexico restoration project. TPWD has established that oysters provide important habitat in Texas' bays and estuaries (http://www.tpwd.state.tx.us/fishboat/fish/didyouknow/oysterarticle.phtml). 90% of public reef areas utilized by commercial and recreational fishermen are found in Galveston, Matagorda and San Antonio Bays.	SCARCITY: The Gulf of Mexico provides almost all of the total oyster production in the US, and more than half of the oyster producing areas are permanently or conditionally closed (USEPA 1999). Globally, an estimated 85% of oyster reefs have been lost, more than any other marine habitat (TNC 2014). Oysters are considered a "keystone species" due to their critical roles in maintaining water quality and biodiversity and cycling water and nutrients within an ecosystem (SeaGrant, 2014). CONNECTIVITY: This project would enlarge reef restored by TNC, and thus would directly improve connectivity of this habitat type in Copano Bay. SPECIAL STATUS SPECIES: Oyster reef increases habitat for blue crabs, which are an important food source for the federally-endangered Whooping Crane. Oyster reef provides estuarine shell substrate, a category of EFH occurring within the study area. Oyster reef habitat now limits production of reef-associated fish and crustaceans in the southeast United States (Peterson, Grabowski and Powers 2003. HYDROLOGIC CHARACTER: additional oyster reef would improve water quality in Copano Bay, identified as an impaired water body by TCEQ (2013). GEOMORPHIC CONDITION: The reefs that oysters build also provide a complex three-dimensional structure above the soft bay bottom sediments, creating habitat that may be colonized by other mollusks, barnacles, and other invertebrates. It will increase the diversity of bottom habitat types in Copano Bay.
Wetland (Estuarine Intertidal and Emergent Marsh)	N3	Nueces Co - Nueces River Delta breakwaters (3.5 mi)	Preservation of the Nueces River delta would preserve special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344), and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 4) Endangered Species Act - the area contains habitat for the threatened piping plover; 5) US Senate Resolution 23 Jun 2004 authorized ER study of Nueces River Basin - this included protection and restoration of the delta.	Protection and restoration of the Nueces Delta are one objective of the Coastal Bend Bays and Estuaries Program (CBBEP). Large tracts at the delta front are owned by Nueces Delta Preserve, owned and managed by CBBEP.	The Nueces River Delta represents a unique mosaic of highly productive wetlands, open water, islands, prairie, and river and bay shorelines. The delta front shoreline is receding 8.2 ft/yr, threatening to open this area to higher salinity waters of Nueces Bay, reducing diversity. SCARCITY: This measure would restore estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The restored marsh would provide additional wintering habitat for migratory waterfowl, restoring the sustainability of an existing bird corridor, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES and PLAN RECOGNITION: This marsh would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. (http://www.fws.gov/southwest/refuges/texas/texasmidcoast/) HYDROLOGIC CHARACTER: the restored marsh would improve water quality in the tidal Nueces River segment, which has been identified by TCEQ as having impaired water quality. The deltaic wetlands function to filter excess nutrients, sediment, and contaminants from runoff entering the river and Nueces Bay from farmland within the drainage basin. GEOMORPHIC CONDITION: The measure would preserve the Nueces River delta landform.
Rookery Island	N4	Nueces Co – breakwaters protecting Shamrock Island, Corpus Christi Bay (2.0 mi)	This project would install breakwaters to protect special aquatic sites such as mud flats and vegetated shallows; that are recognized as federally significant by the Clean Water Act (33 USC 1344); 2) Shamrock Island shallow waters behind the breakwaters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 3) the Gulf Coast Joint Venture-Texas Mid-Coast Initiative (2012) recommends restoration of Sundown Island because it is a known important nesting colony of Reddish Egret, a priority species for the program; 4) Shamrock Island Habitat and Enhancement Project constructed rock breakwaters on north and northwest	Shamrock Island has been acquired by the Nature Conservancy which established the Shamrock Island Preserve. The Preserve is managed by the Audubon Society, which has identified it as an Important Bird Area." TNC has worked with Texas Audubon Society, CBBNEP and Shell Oil to fund previous restoration efforts. Saving Important Bird Areas" is a conservation goal of the National Audubon Society's Strategic Plan 2012-2015 (http://www.audubon.org/sites/default/files/documents/audubon_strategic_plan_-_web_2012.pdf). The island is on the Texas Coastal Birding Trail.	Shamrock Island Preserve is one of the most important colonial bird-nesting islands on the Texas coast (TNC 2014). Over 25,000 birds nest there annually and at least 21 species use the island., including the state threatened reddish egret and white faced ibis. Since detachment from Mustang Island, the north and northwest areas of Shamrock Island have experienced considerable beach erosion and loss of wetlands, losing approximately 17 acres between 1950 and 1997. Without proactive measures, this trend of erosion will continue, resulting in the loss of all valuable habitats found on the Island, including submerged and emergent wetlands, beach areas, and adjacent uplands (GLO 2014). SCARCITY: Status and trends of Christmas Count studies from 1965-2011 (Niven and Butcher 2011) found that wintering saltwater specialists are declining. Fourteen species of Charadriiformes have declined by 40% over this period. Six species of Anseriformes have declined by about 25%, and

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
			<p>side as part of mitigation for the Packery Channel project; 5) Restoration of Shamrock Island is one objective of the CBBNEP.</p>		<p>Pelecaniformes have decreased by about 17% over this period. These declines are most likely associated with the widespread loss of rookery islands to erosion, RSLC, predation and disturbance. Shamrock island is recognized by Audubon Society as important habitat for skimmers and four species of terns, including more than 8,000 pairs of royal terns in some years. Grassy flats harbor laughing gulls; brushy uplands provide nesting cover for great blue herons, little blue herons, tri-colored herons, black-crowned night herons, great egrets, snowy egrets, reddish egrets, white-faced ibis and roseate spoonbills. Seagrass meadows behind breakwaters, provide essential forage for redhead ducks, and nursery, foraging and refuge areas for many estuarine fish and invertebrates. Audubon Society identifies Dressing Point Island as threatened by erosion, subsidence, and sea level rise, especially associated with tropical storms (http://netapp.audubon.org/iba/Reports/1573). CONNECTIVITY: Measure would restore the sustainability of an existing, important rookery island. SPECIAL SPECIES STATUS: The Gulf Coast Joint Venture recognizes it as important habitat for the Reddish Egret; this species designated a Bird of Conservation Concern (USFWS 2008). GEOMORPHIC CONDITION: This measure would restore an eroded landform, and increase the elevation of the island in the bay. The island contains beach quality habitat used by Colonial waterbirds considered important indicator species for health of estuaries since they are top predators in aquatic systems (Kushlan 2012)</p>
<p>Estuarine Waters and Estuarine Intertidal Marsh</p>	<p>N5</p>	<p>Aransas and Nueces Counties – Hydrologic restoration of aquatic habitat</p>	<p>Preservation of aquatic habitat in Nueces, Corpus Christi, Aransas or Copano Bays would help to restore special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344), and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 2) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 3) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 4) US Senate Resolution 23 Jun 2004 authorized ER study of Nueces River Basin - this included protection and restoration of the delta.</p>	<p>Aquatic restoration and water quality improvements are objectives of the Coastal Bend Bays and Estuaries Program (CBBEP).</p>	<p>Nueces, Corpus Christi, Aransas and Copano Bay are an important mosaic of highly productive wetlands, open estuarine water, islands, prairie, and river and bay shorelines. SCARCITY: This measure would restore estuarine intertidal marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The restored marsh and aquatic habitat would provide additional wintering habitat for migratory waterfowl, restoring the sustainability of an existing bird corridor, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES and PLAN RECOGNITION: This marsh would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CHARACTER: the restored marsh would improve water quality in the tidal Nueces River segment, which has been identified by TCEQ as having impaired water quality. The deltaic wetlands function to filter excess nutrients, sediment, and contaminants from runoff entering the river and Nueces Bay from farmland within the drainage basin.</p>

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Wetland (Estuarine Intertidal and Emergent Marsh) (Whooping Crane Habitat)	R1	Refugio Co - Aransas River Delta Marsh Restoration (375 ac)	Preservation of whooping crane habitat at the head of San Antonio Bay, recognized as a threatened species under the Endangered Species Act; 2) the USFWS Aransas NWR, located just 18 mi to the east contains designated critical habitat for the whooping crane; 3) Marsh restoration in the Aransas River delta would preserve special aquatic sites such as wetlands, mudflats and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344), and would preserve exceptionally scarce and declining estuarine intertidal and emergent marsh as determined by the latest USFWS/NOAA status and trends report; 4) the area is Habitat of Major Concern under North American Waterfowl Management Plan (NATIONAL PLAN RECOGNITION); 5) shallow vegetated waters are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act.	GLO Technical Advisory Committee; Gulf of Mexico Regional Fishery Management Council; Area is on Great Texas Coastal Birding Trail. Waters are recognized as impaired by TCEQ. International Crane Foundation - Limited and threatened wintering habitat on the Gulf coast is one of the greatest challenges facing North America's tallest bird (Whooping Crane Conservation Association; http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/texas/newsroom/critical-wintering-grounds-for-rare-whooping-cranes-protected-in-texas.xml .	SCARCITY: There is only one self-sustaining wild population of Whooping Cranes in the world, the Aransas-Wood Buffalo National Park population, which nests in the Wood Buffalo National Park and adjacent areas in Canada and winters in coastal marshes in Texas in the Aransas National Wildlife Refuge and adjacent areas (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B003 .) The whooping crane breeds in Canada and then migrates 2,400 miles south to the Texas Gulf Coast The whooping crane population dropped from 1,500 to just 20 birds between 1850 and 1941 (USFWS). Since then, cooperative conservation efforts between the U.S. and Canada have increased the population significantly. Today, there are roughly 400 wild cranes in North America. This measure would restore estuarine intertidal and emergent marsh, an exceptionally scarce resource which is declining nationally, with the greatest losses occurring on the Gulf Coast (Dahl and Stedman 2013). CONNECTIVITY: The restored marsh would provide additional wintering habitat for the whooping crane and other migratory waterfowl, restoring the sustainability of an existing bird corridor, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters on the edges of the island. SPECIAL STATUS SPECIES and PLAN RECOGNITION: This marsh would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico's Yucatan Peninsula, thus preserving habitat covered by international treaty. http://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CHARACTER: the restored marsh would improve water quality in the tidal Aransas River segment and Copano Bay, which have been identified by TCEQ as having impaired water quality. The deltaic wetlands function to filter excess nutrients, sediment, and contaminants from runoff entering the river and Copano Bay from farmland within the drainage basin. GEOMORPHIC CONDITION: The measure would restore the Aransas River delta landform
Wetland (Estuarine Intertidal and Emergent Marsh) Whooping Crane Habitat	R2	Refugio County, Breakwaters for habitat preservation of Guadalupe River delta habitat (1.3 mi) and restoration of Guadalupe River flows to delta by closing Traylor Cu	Preservation of whooping crane habitat at the head of San Antonio Bay, recognized as a threatened species under the Endangered Species Act; 2) the USFWS Aransas NWR, located just 5.5 mi to the south , contains designated critical habitat for the whooping crane; 3) NRCS purchased and is protecting/restoring 11,000 acres of whooping crane habitat in Welder Flats on east San Antonio Bay shoreline; 4) Welder Flats Wildlife Management Area is also located on east San Antonio Bay shoreline; 5) portions of the Guadalupe River delta are protected by the Guadalupe Wildlife Management Area..	The Guadalupe Delta Shoreline and Traylor Cut projects are included in the "Habitat Conservation and Coastal Public Access Plan for the San Antonio Bay System, prepared by the San Antonio Bay Partnership (Stanzel et al., 2014). This partnership includes the Coastal Bend and Bays Estuaries Program, National Marine Fisheries, and the Texas Coastal Management Program. International Crane Foundation - Limited and threatened wintering habitat on the Gulf coast is one of the greatest challenges facing North America's tallest bird (Whooping Crane Conservation Association; http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/texas/newsroom/critical-wintering-grounds-for-rare-whooping-cranes-protected-in-texas.xml . The Nature Conservancy has purchased Falcon Point Ranch (Welder Flats on San Antonio Bay) where 10 percent of the remaining flock (25-30 birds) overwinters. The significance of the Guadalupe Delta natural environment and habitats has been recognized by the State of Texas by the establishment of WMA units in the delta.	SCARCITY: There is only one self-sustaining wild population of Whooping Cranes in the world, the Aransas-Wood Buffalo National Park population, which nests in the Wood Buffalo National Park and adjacent areas in Canada and winters in coastal marshes in Texas in the Aransas National Wildlife Refuge and adjacent areas (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B003 .) The whooping crane breeds in Canada and then migrates 2,400 miles south to the Texas Gulf Coast The whooping crane population dropped from 1,500 to just 20 birds between 1850 and 1941 (USFWS). Since then, cooperative conservation efforts between the U.S. and Canada have increased the population significantly. Today, there are roughly 400 wild cranes in North America. CONNECTIVITY: This measure would protect a large salt marsh area located approximately 5.5 miles from the Aransas NWR, and thus would provide critical link for expanding habitat between the refuge on the west side of San Antonio Bay and other protected areas on the east side of the same bay system. Based on the number of breeding pairs (which are territorial), new overwintering habitat will be needed to accommodate the increase in population. SPECIAL SPECIES STATUS: The measure would protect a 6,800 salt marsh from erosion, maintaining habitat for blue crabs, a nearly exclusive food source for whooping cranes. HYDROLOGIC CHARACTER: The breakwaters would protect the marsh from higher salinities, improving habitat for blue crabs. The coastal marshes provide excellent habitat for crabs if salinity levels remain moderate, which is determined primarily by the amount of freshwater inflows into the Guadalupe and San Antonio Basins. GEOMORPHIC CONDITION: the breakwaters would preserve the delta landform from erosion.

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Seagrass Beds	SP1	San Patricio Co - Dagger and Ransom Islands Breakwaters protecting seagrass beds in Red Fish Bay (4.6 mi)	Breakwaters would preserve special aquatic sites such as wetlands and vegetated shallows recognized as nationally significant by the Clean Water Act (33 USC 1344) and would exceptionally scarce and declining seagrass beds as determined by USEPA (1999); 2) shallow waters in the bay are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 3) area is Habitat of Major Concern under North American Waterfowl Management Plan; 4) Designated by the State as the Redfish Bay State Scientific Area; 5) Endangered Species Act - the measure would protect feeding and resting habitat for the threatened green and endangered Kemp's ridley sea turtles.	Red Fish Bay is recognized by the state of Texas as a State Scientific Area (http://www.tpwd.state.tx.us/landwater/water/habitats/seagrass/general/index.phtml). Project suggested by GLO Technical Advisory Committee; Gulf of Mexico Regional Fishery Management Council. TPWD has instituted a public information campaign on the importance of protecting seagrass from recreational boating impacts in Redfish Bay.	SCARCITY: Seagrass habitat loss ranges from 20% to 100% over the last 50 years for most estuaries in the northern Gulf of Mexico (USEPA 1999). The decline is related primarily to coastal population growth and development but some losses are attributable to hurricanes, storms and salinity change. Since approximately 95% of the seagrass acreage in the Gulf of Mexico is located in Florida and Texas (USEPA 1999), all seagrass beds in Texas should be considered nationally significant. CONNECTIVITY: This measure would restore the suitability of the existing Redfish Bay system by protecting Ransom and Dagger Islands. These islands partially shelter Redfish Bay, an area of significant ecological importance. Submerged seagrass meadows are a dominant, unique subtropical habitat in many Texas bays and estuaries. These marine plants play critical roles in the coastal environment, including nursery habitat for estuarine fisheries, a major source of organic biomass for coastal food webs, effective agents for stabilizing coastal erosion and sedimentation, and major biological agents in nutrient cycling and water quality processes (http://www.tpwd.state.tx.us/landwater/water/habitats/seagrass/). SPECIAL STATUS SPECIES: the federally-listed, threatened green and endangered Kemp's ridley sea turtles would benefit from this measure, as they feeds in shallow-waters with seagrass meadows and rests along rock outcrops such as jetties or breakwaters. HYDROLOGIC CHARACTER: Breakwaters would prevent openings developing in the islands which would allow higher salinity waters and wave energy to enter the calm, seagrass meadows behind the islands. GEOMORPHIC CONDITION: Breakwaters would prevent erosion of the island landforms which protect Redfish Bay.
Region 4 (Kenedy, Willacy, Cameron Counties)					

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
Wetland (Estuarine Tidal Mud Flats)	CM2	Cameron Co- Hydrologic Restoration of Bahia Grande – enlarging pilot channel (0.5 mi)	Hydrologic restoration would improve habitat for prey species of the federally endangered northern Aplomado falcon, recognized as nationally significant under the Endangered Species Act; 2) restoration would create special aquatic sites such as marsh, mud flats and vegetated shallows, considered nationally significant under the Clean Water Act (33 USC 1344); 3) area is Habitat of Major Concern under North American Waterfowl Management Plan; 4) Located in the Laguna Atascosa NWR;5) restoration is part of USWFS Bahia Grande Restoration Plan.	An award-winning partnership, consisting of over 50 federal, state and local agencies, private companies, and individuals sponsored restoration efforts. Partners included USFWS, Cameron Co, NOAA, Brownsville Navigation District, Ocean Trust of Texas, and University of Texas-Brownsville. Initial phases of restoration included construction of a pilot channel reestablishing tidal circulation to the Brazos Island Harbor Ship Channel, dredged channels to reestablish internal circulation, and wetland restoration. Enlargement of the pilot channel Identified as potential project by GLO Technical Advisory Committee. Recommended by USFWS comment received during scoping period, August 2014.	SCARCITY: The Bahia Grande is part of a unique aquatic habitat—the southern end of the Texas portion of the Laguna Madre, one of perhaps six hypersaline lagoons in the world. Salinity in the Lower Laguna Madre generally ranges from 31 to 37 parts per thousand (ppt), with an average annual salinity of 33 ppt; however, salinity can vary wildly depending on rainfall and freshwater inflow, ranging from extremes of as low as 2 ppt after major tropical storms or hurricanes to as high as 120 ppt during extreme drought. The Bahia Grande complex is a 15,000-acre shallow bays and wetlands complex located north of the Brownsville Ship Channel and immediately west of the Lower Laguna Madre. The construction of the Brownsville Ship Channel in the 1930s, placement of dredged material along the north side of the ship channel, and the construction of State Highway (SH) 48 isolated Bahia Grande from the Laguna Madre, effectively cutting off the natural hydrologic connection. This transformed the Bahia Grande from a wetland complex rich in biological resources to a 6,500-acre dry and barren salt/mudflat that was only periodically inundated during substantial precipitation events and occasional storm surges. The U.S. Fish and Wildlife Service (USFWS) purchased the Bahia Grande in 1998, incorporated the area into the Laguna Atascosa National Wildlife Refuge (LANWR), and initiated the largest estuary restoration project in the U.S in conjunction with several local, state, and federal agencies. CONNECTIVITY: hydrologic restoration of this wetland area would provide additional wintering habitat for migratory waterfowl, restoring the sustainability of an existing bird corridor, and contribute to diversity of Essential Fish habitat types by creating shallow vegetated waters. SPECIAL STATUS SPECIES and PLAN RECOGNITION: This marsh would preserve marsh in the principal Central Flyway route for waterfowl in winter, and an entry point for neotropical migratory songbirds tired from a 600-mile Gulf crossing from Mexico’s Yucatan Peninsula, thus preserving habitat covered by international treaty. Ithttp://www.fws.gov/southwest/refuges/texas/texasmidcoast/ HYDROLOGIC CHARACTER: Enlargement of the pilot channel would restore full tidal flows into this area, preventing super high salinities which occur during the summer months under existing flow conditions.
Rookery Islands	CM3	Cameron Co – Breakwaters protecting Bird and Heron Islands in Bahia Grande (0.8 mi)	1) Endangered Species Act - Would increase critical habitat for the wintering piping plover, recognized as threatened in Cameron Co, in an area adjacent to designated critical habitat, . 2) Clean Water Act (33 USC 1344) - area contains special aquatic sites such as wetlands, mud flats and vegetated shallows; 3) shallow waters in the bay are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 4) area is Habitat of Major Concern under North American Waterfowl Management Plan;	Identified as an important restoration action by the Final Environmental Assessment for the Bahia Grande Hydrologic Restoration project (USFWS 2005). Identified as potential project by GLO Technical Advisory Committee; Three Islands is located in an area considered important for eco-tourism and bird watching.	SCARCITY: Status and trends of Christmas Count studies from 1965-2011 (Niven and Butcher 2011) found that wintering saltwater specialists are declining. Fourteen species of Charadriiformes have declined by 40% over this period. Six species of Anseriformes have declined by about 25%, and Pelecaniformes have decreased by about 17% over this period. These declines are most likely associated with the widespread loss of rookery islands to erosion, RSLC, predation and disturbance. The Bahia Grande is recognized by USFWS as important habitat for the threatened wintering piping plover, as well as other shorebirds, wading birds and waterfowl. CONNECTIVITY: Measure would restore the sustainability of an existing, important rookery island. The project size is located within 11,000 acres Bahia Grande, and will benefit the habitat of the largest contiguous estuarine marsh in Texas, providing benefits for waterfowl, fisheries, wading birds, piping plover, and recreational hunting and fishing. The Lower Laguna Madre area contains important habitat for migratory and resident waterfowl and shorebirds, as well as wading birds. It is an important migration corridor for other birds such as peregrine falcons, ospreys and swallow-tailed kites, and is an important resting and feeding area for trans-Gulf neo-tropical migrant bird species. SPECIAL SPECIES STATUS: USFWS has determined that habitat for the piping plover would be improved by this restoration project (USFWS 2005). HYDROLOGIC CHARACTER: the project would restore tidal flows to near historic levels, and permit full restoration of this rare, hypersaline estuarine ecosystem. GEOMORPHIC CONDITION: This measure would restore an eroded landform, and increase the elevation of two

Resource	Alt. No.	Location	Institutional Recognition	Public Recognition	Technical Recognition
					islands in the Bahia.
Rookery Island	CM4	Cameron Co – restoration of Three Islands in Laguna Madre (330 ac)	1) Endangered Species Act - Would increase critical habitat for the wintering piping plover, recognized as threatened in Cameron Co, in an area adjacent to designated critical habitat, . 2) Clean Water Act (33 USC 1344) - area contains special aquatic sites such as wetlands, mud flats and vegetated shallows; 3) shallow waters in the bay are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 4) area is Habitat of Major Concern under North American Waterfowl Management Plan;	Identified as potential project by GLO Technical Advisory Committee; Three Islands is located in an area considered important for eco-tourism and bird watching.	SCARCITY: Status and trends of Christmas Count studies from 1965-2011 (Niven and Butcher 2011) found that wintering saltwater specialists are declining. Fourteen species of Charadriiformes have declined by 40% over this period. Six species of Anseriformes have declined by about 25%, and Pelecaniformes have decreased by about 17% over this period. These declines are most likely associated with the widespread loss of rookery islands to erosion, RSLC, predation and disturbance. The lower Laguna Madre bay system, made up of a number of islands, has significant erosion damage in size, configuration and vegetation, making it much less suitable for nesting colonial waterbirds. SPECIAL STATUS SPECIES: Twenty-two species of colonial waterbirds, including the threatened piping plover, brown pelican, reddish egret, tricolored heron, roseate spoonbill and white ibis will benefit directly from these restoration projects. This restoration and enhancement is critical for the colonial waterbird nesting habitat. The Gulf Coast Joint Venture recognizes it as important habitat for the Reddish Egret; this species designated a Bird of Conservation Concern (USFWS 2008). HYDROLOGIC CHARACTER: The minimum present rate of sea level rise in Laguna Madre (3.4mm/year) exceeds the historical sedimentation rates for most of the flats. If future sea-level rise is faster than the rates of aggradation, then the wind and tidal flats will be more frequently flooded and will eventually be permanently submerged. GEOMORPHIC CONDIDTION: This long-term island habitat restoration and revegetation project aims to improve nesting conditions for colonial waterbirds by raising the elevation and planting appropriate native plants, thus further reducing damage due to erosion.
Rookery Island	W1	Willacy Co – breakwaters protecting Mansfield Bird Island in Lower Laguna Madre (0.3 mi)	1) Endangered Species Act - Would increase critical habitat for the wintering piping plover, recognized as threatened in Cameron Co, in an area adjacent to designated critical habitat, . 2) Clean Water Act (33 USC 1344) - area contains special aquatic sites such as wetlands, mud flats and vegetated shallows; 3) shallow waters in the bay are designated Essential Fish Habitat under Magnuson-Stevens Fishery Conservation and Management Act; 4) area is Habitat of Major Concern under North American Waterfowl Management Plan;	Identified as potential project by GLO Technical Advisory Committee; Three Islands is located in an area considered important for eco-tourism and bird watching. The project will benefit estuarine marsh, fisheries, aquatic resources, water quality, freshwater inflow, seagrass restoration and erosion control (citation submission R4-12 to GLO Technical Advisory Committee.	SCARCITY: Status and trends of Christmas Count studies from 1965-2011 (Niven and Butcher 2011) found that wintering saltwater specialists are declining. Fourteen species of Charadriiformes have declined by 40% over this period. Six species of Anseriformes have declined by about 25%, and Pelecaniformes have decreased by about 17% over this period. These declines are most likely associated with the widespread loss of rookery islands to erosion, RSLC, predation and disturbance. The lower Laguna Madre bay system, made up of a number of islands, has significant erosion damage in size, configuration and vegetation, making it much less suitable for nesting colonial waterbirds. SPECIAL STATUS SPECIES: Twenty-two species of colonial waterbirds, including the threatened piping plover, brown pelican, reddish egret, tricolored heron, roseate spoonbill and white ibis will benefit directly from these restoration projects. This restoration and enhancement is critical for the colonial waterbird nesting habitat. The Gulf Coast Joint Venture recognizes it as important habitat for the Reddish Egret; this species designated a Bird of Conservation Concern (USFWS 2008). HYDROLOGIC CHARACTER: The minimum present rate of sea level rise in Laguna Madre (3.4mm/year) exceeds the historical sedimentation rates for most of the flats. If future sea-level rise is faster than the rates of aggradation, then the wind and tidal flats will be more frequently flooded and will eventually be permanently submerged. GEOMORPHIC CONDIDTION: This long-term island habitat restoration and revegetation project aims to improve nesting conditions for colonial waterbirds by raising the elevation and planting appropriate native plants, thus further reducing damage due to erosion. Erosion is a concern along the remaining 2 emergent acres of Mansfield Bird Island. A breakwater has already been built around the northeast and east side of the island. The goal of this project is to protect the remaining 2 emergent acres of Mansfield Bird Island, from continued erosion.