

Texas Coastal Bend Live Oak – Red Bay Community Conservation Plan

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The views expressed herein are those of the authors and do not necessarily reflect the views of CBBEP or other organizations that may have provided funding for this project.

TEXAS COASTAL BEND LIVE OAK - RED BAY COMMUNITY CONSERVATION PLAN

FINAL REPORT

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Prepared by The International Crane Foundation under a contract with the Coastal Bend Bays & Estuaries Program

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PREFACE

The authors of this report would like to thank the Coastal Bend Bays & Estuaries Program, Inc. for providing the funding to complete this preliminary plan. The International Crane Foundation, Texas Program, was contracted to develop a geographic information system (GIS) project database and facilitate the stakeholder involvement to identify important areas for protection, restoration, and/or development using natural features. Additional support was provided by International Crane Foundation, as well as Leiden Conservation Foundation, Houston Zoo, Susan B. Vaughan Foundation, and Brown Foundation. Additional expertise was provided by Nelida Spurrell as a subcontractor, as well as several Mid-Coast Texas Master Naturalists – notably Kris and Ray Kirkwood, Ron Smudy, Neil Amsler. Words along cannot convey the beauty of this unique landscape and the multitude of plants and animals that depend on it. We thank the following photographers for their willingness to share their art: Sally Mitchell, Ben Horstmann, Pam Fulcher, and Liz Smith (see Appendix 9 for photo credits by page.) We are hopeful that the information and mapping project will provide the tools and impetus that will promote conservation and stewardship activities to maintain this unique Live Oak-Red Bay Woodland coastal community.



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EXECUTIVE SUMMARY



The Texas Coastal Bend Live Oak -Redbay Woodland (Quercus fusiformis -Persea borbornia Forest) is classified by the Ecological Mapping Systems of Texas as "deep sand live oak forest and woodland" is an imperiled plant community at global and state levels. Historically, this habitat occurred in much of the barrier strandplain peninsulas, some portions of barrier islands and sandy areas of the Coastal Bend. Live Oak - Redbay woodlands are still extensive on Blackjack Peninsula within the Aransas National Wildlife Refuge (ANWR), where development is extremely limited. Portions of Lamar Peninsula still maintain extensive coverage of Live Oak – Redbay woodlands within one unit of ANWR. Goose Island State Park, a conservation easement on private land as well as lowdensity rural residential areas. On Live Oak and Encinal peninsulas located southward along the coast, coastal development and transportation infrastructure has fragmented and reduced the extent of this unique woodland community. The ultimate value of Live Oak – Redbay Woodlands more

than just the tree and shrub canopy; this woodland is comprised of a rich variety of shrubs, forbs, and wildflowers and grasses that support a biodiverse food web that supports both resident and migrating wildlife. Coastal Bend Live Oak - Redbay woodlands are also threatened by disease, severe weather events (e.g., drought and hurricanes), fire suppression, and invasive species. Urban development that results in selective clearing of the understory or complete habitat removal has the greatest adverse effect on habitat function and ecosystem health. Without any conservation planning approach in place, loss and degradation of Live Oak – Redbay woodland community will undoubtedly continue.

Therefore, the objectives of this project were to: 1) construct a map product using a geographic information system (GIS) approach that provides the necessary spatial information to display locations where Live Oak - Redbay woodland habitat previously occurred, and use the map to assist stakeholders representing a cross-section of nature- and development-focused interests to

prioritize areas for conservation and restoration strategies; 2) develop an educational brochure that highlights the value of this rare ecological community as well as provides information linkages to restore live oak, redbay, and associated understory species on a site-based oak motte scale; and, 3) produce a report with pertinent information and site inventory that would be useful to generate funding and partnerships to implement the conservation plan.



We used several publicly-available, spatial databases and resources to develop a GIS map product for use in stakeholder workshops to develop a site inventory encompassing Blackjack, Lamar and Live Oak peninsulas within Aransas County, Texas. Two physical layers, deep coastal sands and live oak forest woodland and shrubland, represented the potential and actual Live Oak – Redbay woodland area. The percentage of these unique woodlands encompassing this sandy substrate vary

amongst peninsulas. Blackjack and Lamar Peninsulas have very similar amounts of Live Oak communities that occupy the deep coastal sands, 84.6% and 84.9% respectively, while Live Oak Peninsula has only 64.2%. We then focused on mapping both tax exempt and protected lands as well as county and city parks, and Aransas Pathway and Texas Coastal Birding Trail sites. The extent of tax exempt parcels in relation to each peninsulas' size ranges from 100% on Blackjack Peninsula, to 14% on Lamar, and 5% on Live Oak Peninsula. One-hundred percent of Blackjack Peninsula is as this landform is part of the US Fish and Wildlife Service refuge system. Lamar Peninsula is the smallest landform with 20% area protected, whereas 0.64% of Live Oak Peninsula land has protected status. Live Oak Peninsula has the most parks, Aransas Pathway sites and Texas Coastal Birding Trail sites of the three peninsulas. All of this information was used to assist stakeholders in identifying additional areas for protection, restoration and enhancement. Google Earth compatible files of each GIS layer for use in future workshops.

For first two workshops in May 2019, participants were selected for their involvement in natureand conservation-related organizations in Aransas County. During these workshops, the participants identified a total of 39 sites, both from the map and from the written response sheets. Twenty-one sites were selected for inclusion in this project that has specific location and conservation recommendations and 18 sites that were more general were not included and saved in an appendix. A one-page information sheet for each of the 21 sites was created describing location, size, description, land ownership, conservation strategies and potential partner involvement. Eighteen sites were identified as needing protection, eight sites to be considered for restoration, and six sites to be considered for developing with natural features. All three options were designated for two sites, five sites for both protection and restoration opportunities, and one site for restoration and develop with natural features. Five sites were selected for protection only, and two sites recommended for development with natural features. In the second two workshops in June 2019, we invited leaders in development, realty, business, and government for their input on next steps in the conservation planning. At the beginning of the workshops, we asked them to gauge baseline preferences about protection, restoration and development enhanced using natural features across both peninsulas as well as for residential and commercial areas. Participants generally were consistent with their answers across all questions or by question within the group. Notably, the average percentage for protecting Lamar was higher than on Live Oak Peninsula. We provided the an overview and report section on the site inventory and requested additional input, gathered information requests for the educational brochure, and mapped connectivity corridors between sites on Live Oak and Lamar peninsulas. All comments were either summarized within the report or added to respective appendices for future use. The education brochure content for this report was created primarily to increase public awareness of the rare and unique value of Live Oak – Redbay woodlands for both resident and migratory birds. "Beyond the Tree: The Live Oak Community" highlights the benefits of multiple understory plants for food and shelter, and provides links to for further information to restore Live Oak – Redbay woodlands, as well as training and volunteer opportunities to become more engaged in restoration projects. All the participants in the workshops provided ample suggestions to create a connectivity corridor of sites throughout Live Oak and Lamar Peninsula. The report provides testimonials from workshop participants on what Live Oak, Lamar, and Blackjack Peninsula mean to them.

"Home of the Big Tree. Diverse wildlife. Pockets of serenity. Last stands of habitat."



INTRODUCTION



The Texas Coastal Bend Live Oak - Redbay Woodland (*Quercus fusiformis - Persea borbornia* Forest) is an imperiled plant community that is classified by the Ecological Mapping Systems of Texas as "deep sand live oak forest and woodland". Historically, this habitat occurred in much of the barrier strandplain peninsulas, some portions of barrier islands and sandy areas of the Coastal Bend. Live Oak - Redbay woodlands are still extensive on Blackjack Peninsula within the Aransas National Wildlife Refuge (ANWR), where development

is extremely limited. Portions of Lamar Peninsula still maintain extensive coverage of Live Oak – Redbay woodlands within one unit of ANWR, Goose Island State Park, a conservation easement on private land as well as low-density rural residential areas. On Live Oak and Encinal peninsulas located southward along the coast, coastal development and transportation infrastructure has fragmented and reduced the extent of this unique woodland community. The ultimate value of Live Oak – Redbay Woodlands more than just the tree and shrub canopy; this woodland is comprised of a rich variety of shrubs, forbs, and wildflowers and grasses that support a biodiverse food web that supports both resident and migrating wildlife. Texas Parks and Wildlife Department (TPWD) and Nature Serve (2001) rank this community type as G2 S2, which indicates "imperiled" at the global and state levels. Coastal Bend Live Oak - Redbay woodlands are also threatened by disease, severe weather events (e.g., drought and hurricanes), fire suppression, and invasive species. Urban development that results in selective clearing of the understory or complete habitat removal has the greatest adverse effect on habitat function and ecosystem health.

The CBBEP Habitat and Living Resources Implementation Team prioritized funding this project in Spring 2017, and the CBBEP Bays Council approved the project later that summer. A significant timeline setback occurred in late August as a result of the direct landfall of Hurricane Harvey within the project area. This project was developed to create a dynamic template to identify areas and develop a site inventory to promote the conservation and restoration of Live Oak - Redbay woodlands within the CBBEP area. These unique woodlands



provided protection from Category 4 storm winds in many areas within Hurricane Harvey's

path, yet not without some significant damage to the canopy branches or entire trees from numerous tornadoes. Complete removal of trees was necessary to clear roadways, repair power lines, and remove mountains of debris. Within urban areas, more trees were removed to repair or completely rebuild homes and businesses; large incinerators were set up to burn a vast majority of the trunks and branches from old and young trees. As a result, much of the understory of remaining trees was cleared and invasive grasses (primary guineagrass) has gained a substantial foothold where redbay and yaupon naturally occurred. These unexpected conditions necessitates a more holistic approach to the conservation and restoration of this already rare woodland community.

Therefore, the objectives of this project were to: 1) construct a map product using a geographic information system (GIS) approach that provides the necessary spatial information to display locations where Live Oak - Redbay woodland habitat previously occurred, and use the map to assist stakeholders representing a cross-section of nature- and development-focused interests to prioritize areas for conservation and restoration strategies; 2) develop an educational brochure that highlights the value of this rare ecological community as well as provides information linkages to restore live oak, redbay, and associated understory species on a site-based oak motte scale; and, 3) produce a report with pertinent information and site inventory that would be useful to generate funding and partnerships to implement the conservation plan.

PROJECT AREA

The Texas coast comprises one of the five states in the United States bordering the northwestern portion of the Gulf of Mexico. Coastal forests are defined as wooded vegetation extending along the Gulf shoreline and inland about 100 miles (Gauthreaux 1975) and are essential habitats as stopover sites for migratory landbird species (Barrow et al. 2005). Key habitats along the central Texas shoreline include Live Oak Woodlands (Figure 1) and are classified as "Sporadic common/abundant – prevailing winds determine if the area is used by moderate to large numbers of migrants". Live Oak Woodlands between lower Coloradao River and Nueces River basins are listed as threatened by development for several decades (Collins 1987; Barrow et al. 2005).



Figure 1. Coastal forests around the Gulf of Mexico (adapted from Barrow et al. 2005).

BARRIER STRANDPLAIN PENINSULAS

This coastal band of live oak woodland habitat occurs primarily along deep coastal sands on five peninsulas along the mainland separated by shallow lagoonal bays and parallel with barrier peninsulas and islands (Wilkinson et al. 1975). Identified as the Ingleside Strandplain, these extensive sands were deposited in the Pleistocene as a sand sheet along the Gulf shorelines. These soil types are primarily classified as Galveston Series and described as >95% sand particles with very deep deposits, somewhat excessively drained, very rapidly permeable soils. Present rivers cut through the sand as sea level dropped and created these peninsulas, which include Seadrift-Port O-Connor Ridge, Blackjack Peninsula, Lamar Peninsula, Live Oak Peninsula, and Encinal Peninsula. Vegetation within the soil series was described as native rangeland, with occasional clumps of dwarf live oak and redbay. Early in the Texas state conservation planning process, the vegetation dominating these strandplains was listed as a priority habitat. Originally termed Coastal Live Oak – Red bay Series by Diamond (1993), they were later classified as Upland Live Oak Savanna Community along the central Texas coast (Bezanson 2000). The Coastal Bend Bays & Estuaries Program, Inc. (CBBEP) area encompasses all the peninsulas with the exception of Seadrift-Port O'Connor Ridge.

ARANSAS COUNTY

The project extent was further defined as those peninsulas located within Aransas County to encompass Blackjack and Lamar peninsulas and a majority of Live Oak Peninsula. The decision to use a geopolitical boundary was primarily related to the availability of digitized parcel data, interest and willingness of local communities to participate in the conservation stakeholder process and the increasing development potential in Live Oak and Blackjack peninsulas.

The largest portion of the Aransas National Wildlife Refuge is located on Blackjack Peninsula. The Refuge was established in 1938 to protect habitat for waterfowl and other wildlife. The extensive sandy soils historically supported native range, however, much of the uplands are now transitioning into live oak scrub, or "running live oak". The refuge staff maintains a continual management burn program to restore the uplands to a live oak savanna and coastal prairie. The mature Live Oak – Redbay woodland community is generally located at the higher elevation northern and southern areas.

Lamar Peninsula is primarily sandy at the higher elevations and well-established Live Oak – Redbay woodland community occurs through the upland areas. The famous Big Tree live oak is located within one of the tracts of Goose Island State Park and is estimated to be over 1,000 years old.

Live Oak Peninsula is also predominantly sandy in the uplands, and mature Live Oak - Redbay woodlands are located at the northern and southern extent as well as along the northern area of the eastern bluffs in Fulton and Rockport. This peninsula is the most populated area in Aransas County, and the economy is primarily supported by the tourism industry. The southern third of the peninsula is located in San Patricio County and is not included in this project area.



Figure 2. Project area defined by Aransas County boundary and barrier strandplain peninsulas within the Aransas County.



METHODS

GIS MAP DEVELOPMENT

We used the most current and publicly available spatial data files that represented Live Oak -Redbay woodland physical, biological, and anthropogenic environments within Aransas County (Table 1). This approach provides pertinent information for conservation planning and produce output maps in ArcGIS PRO 2.3.3 (ESRI, 2019: Redlands, California, US). To develop the project boundary layer, which all layers were clipped to, Aransas County was extracted from the Texas Department of Transportation (TxDOT) Detailed County file. A comprehensive soil database for Aransas Counties was downloaded from the Natural Resource Conservation Service's (NRCS) Web Soil Survey. From this database, two soil types (Falfurrias and Galveston Mustang) were selected to show location and extent of deep coastal sands and merged in the project database. These two soil types are closely associated with Live Oak - Redbay woodland potential (March and Smith 2011). The remaining soil types are not typically associated with the Live Oak - Redbay woodland and were merged to represent "Other" and masked as gray tone on the output maps. Using vegetation data from the Ecological Mapping System provided by Texas Parks and Wildlife (TPWD), Live Oak woodland and Live Oak shrubland classes were extracted to represent the Live Oak-Red Bay woodland habitat.

| Data Source | Layer | Website |
|-------------|------------------|---|
| NRCS | Web Soil Survey | https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx |
| TNRIS | StratMap | https://tnris.org/stratmap/land-parcels/ |
| TPWD | Ecological | https://tpwd.texas.gov/landwater/land/programs/landscape- |
| | Mapping System | ecology/ems/ |
| TxDOT | County; Roadways | http://gis-txdot.opendata.arcgis.com/datasets/ |
| USGS | PAD-US | https://gapanalysis.usgs.gov/padus/data/ |

Table 1. Publicly-available GIS data sources downloaded for this project.

We downloaded the protected lands layer from the United States Geological Survey's (USGS) Protected Area Data of the United States (PAD-US) website. Individual land parcel data (StratMap) was available through Texas Natural Resources Information System (TNRIS) and provided by the Aransas County Appraisal District website and filtered to create the following layers reference and map creation: city/county parks, additional protected parcels, tax exempt lands maps and, ultimately to create the stakeholder-derived site inventory. We created two point layers using latitude and longitude coordinates system to represent the following pertinent data layers: Central Texas Coastal Birding Sites (<u>https://tpwd.texas.gov/huntwild/wildlife/wildlife-trails/ctc/aransas-loop</u>), Aransas Pathways Sites (<u>http://aransaspathways.com/</u>) and combined them into one shapefile.

KEY ECOLOGICAL SPECIES SYNTHESES

We downloaded Annotated County Lists of Rare Species for Aransas County from the Texas Parks & Wildlife database (<u>https://tpwd.texas.gov/gis/rtest/</u> accessed April 18, 2019) and extracted the information pertaining to the woodland-specific habitat use and various listing designations. Records for each listed species were researched using the following databases: iNaturalist - <u>https://www.inaturalist.org;</u> VertNet - <u>http://portal.vertnet.org;</u> GBIF - <u>https://www.gbif.org;</u> iDigBio - <u>https://www.idigbio.org;</u> Arcos - <u>https://arctos.database.museum;</u> Smithsonian - <u>https://collections.nmnh.si.edu;</u> UT Plant Resource Center - <u>https://prc-symbiota.tacc.utexas.edu).</u>

We developed the bird species list beginning with Aransas National Wildlife Refuge checklist <u>https://www.fws.gov/uploadedFiles/species-Birds_2010.pdf,</u> and focused on the Forest/Woodland and Brushland habitat use and nesting status (Regular, Past, blank). We generalized relative abundance and timing of occurrence from Audubon website (<u>https://www.audubon.org/bird-guide</u>). A similar approach was used for the ANWR butterfly list <u>https://www.fws.gov/uploadedFiles/species-ButterflyDragonfly_2008.pdf</u>, using the Aransas National Wildlife Refuge checklist (, developing the species list for butterflies that use vegetation indicative of Live Oak – Redbay woodlands including flowering plants as a nectar source and flowers, leaves, stems as caterpillar host source (<u>https://plants.sc.egov.usda.gov/java/;</u> <u>https://www.wildflower.org/plants/</u>, Lehman et al. 2005; Tveten and Tveten. 1996; Wauer 2004). Geographic and ecological locations for specific habitats were added for Texas Coastal Bend from Lehman et al. (2005).

STAKEHOLDER WORKSHOP DEVELOPMENT

We organized and implemented a minimum of four workshops to engage local members of the county in identifying a portfolio of sites to be conserved, restored, or developed using nature features (i.e., Live Oak – Redbay woodland community components). The focus in the first two workshops was to provide mapping materials and associated datasheets (Appendix 1) to an invited group of conservation-minded stakeholders.

Two Live Oak-Redbay Woodland Conservation Plan Workshops were held on May 15, 2019 at the Texas A&M Agrilife Extension Office. We organized the two workshop times to accommodate different schedules of the participants – one was held at 2:00 PM and the second at 5:00 PM. We invited the workshop participants by focusing on conservation-minded stakeholders based in Aransas County: Texas Mid-Coast Master Naturalists (TMCMN) website, Facebook page for the Bent Oaks Conservancy (a local group focusing on the Bent Oaks Rookery), and word of mouth at local conservation meetings. We also included personal email invitations for those who had signed up at events where the International Crane Foundation was speaking.



The workshop began and concluded with time for participants to visit tables with three educational opportunities: a native plant propagation project for restoration funded by CBBEP with TMCMN Ray Kirkwood, a diversity of guidance information and website lists for 'wildscaping' backyard areas for birds with TMCMN Kris Kirkwood, and an educational resource table with Ginger Easton-Smith from the Texas A&M Agrilife Extension, Aransas County.

Once workshop participants gathered, ICF-Texas Program presented information covering the motivation behind this project, natural history of Live Oak - Redbay habitat and its plant and animal inhabitants, natural history of the Live Oak and Lamar Peninsulas, and concluded with the guidelines and instructions for the workshop. After taking time for questions, the stakeholders divided into three groups to begin the site inventory process.

Three large (3 FT X 2 FT) maps were located on each table that focused on Live Oak Peninsula within Aransas County and Lamar Peninsula. They included multiple layers which were arranged from topmost to bottom and identified: cities and major landmarks, Live Oak woodland habitat, Live Oak shrubland habitat, and the Galveston-Mustang soil areas that, when visible, represented areas which were previously Live Oak - Redbay woodland or could be restored in the future.



We provided each participant a set of worksheets with specific instructions on what focus areas to label on the maps and response sheets as well as instructions to follow a color coding system that corresponded to various pen colors provided (Appendix 1). Participants were asked to both locate and label the area on the map and write why they chose these sites on their individual worksheets for both Live Oak and Lamar Peninsula including: their favorite places with Live Oak woodlands, places with Live Oak woodlands that they would like to see

protected, places which have Live Oak trees but limited understory or other habitats that they would like to see restored, and land that they know is for sale, has been purchased, and/or will be developed that they would like to see developed in a way that uses natural features.

While participants were working, ICF-Texas Progam staff and TMCMN volunteers were available for assistance. They aided in finding areas on the map, discussing ownership and protection of the land. We displayed the ArcGIS project file with layers of detailed data (ownership, exempt status, etc. described in previous section) upon a projector screen to aid in locating specific geographic locations and aid in transferring the worksheet information into the digital layer.

Seven participants attended the first workshop, and five attended the second workshop. Records. Each participant signed in with their name and email and provided the same information on their worksheets with their name and email recorded as well. The participants identified over 35 unique sites on their worksheets and the maps, as well as 'voted' for many sites by writing them on their sheets or initialing next to already identified areas on the maps. These marked areas were narrowed down to ensure all sites were within the project focus using factors such as presence of Live Oak woodlands, possibility of Live Oak restoration, and whether or not the area is currently protected.

The next two Live Oak - Redbay Woodland Conservation Plan Workshops were held on June 14, 2019 at the Texas A&M Agrilife Extension Office. We organized the two workshop times to accommodate different schedules of the participants – one was held at 2:00 PM and the second at 5:30 PM. We invited workshop participants in these designated stakeholder groups: realtors and developers, local government employees, state and federal employees (park and refuge related), university employees, and conservation-minded individuals. The invitation lists were generated by our contractor, Nelida Spurrell, who has extensive networking in the area including realtors and developers as she is a licensed realtor as well as an active Texas Mid-Coast Master Naturalist. Custom invitations for each stakeholder group were created and sent out, inviting RSVP's, and a reminder email to each group was sent one day before the meeting.

The workshop began and concluded with time for participants to visit tables with three educational opportunities: a native plant propagation project for restoration funded by CBBEP with TMCMN Ray Kirkwood, a diversity of guidance information and website lists for 'wildscaping' backyard areas for birds TMCMN Ray Kirkwood, and an educational resource table from the Texas A&M Agrilife Extension, Aransas County with Ginger Easton-Smith.



Once workshop participants gathered, ICF-Texas Program presented information covering the motivation behind this project, natural history of Live Oak - Red Bay woodlands and the plant and animal inhabitants, as well as natural history of the Live Oak and Lamar Peninsulas project area. After taking time for questions, we gave out response sheets (Appendix 2) to each participant and proceeded with each of the following steps.

First, we asked each participant to individually identify percentages of Live Oak - Redbay Woodland which should be protected and restored on Live Oak and Lamar Peninsulas, and percentages of both commercial and residential developments that should be enhanced with native understory plants to create a Live Oak - Redbay motte for birds and butterflies.

Next, we handed out maps that showed lands on both Live Oak and Lamar peninsula which were designated as protected, parks, and tax exempt. Participants took time to look at these maps, discuss them with each other and workshop leaders, then write down if anything on the maps surprised them and if they saw anything missing on the maps.

We then separated the participants into two groups and gave each group a large (3' x 2') map which showed all of our GIS layers include Live Oak - Redbay Woodlands, Live Oak -Redbay Shrublands, protected lands, tax exempt lands, and stakeholder identified conservation interest parcels. We discussed with participants the importance of connectivity to this plant community and to wildlife. We asked participants to discuss within their groups and identify areas on the map that had potential for habitat connectivity linking protected areas, stakeholder sites, and/or public access (roadway right-of-ways, parks, etc.).



We next handed out to each group booklets which included maps and information about all 21 stakeholder identified sites of conservation interest identified in the first two workshops and included in this plan. During this time, we explained the process of the first meetings and how the stakeholder sites were collected and indexed. On the response sheets, we indicated which of these 21 areas were designated by stakeholders to be of interest for Restoration and/or Develop with Natural Features. We asked participants to record on their response sheets any notes or suggestions around these 10 sites, including ideas for development and information they may know about the site such as ownership or project progress.

To conclude the workshop, we asked the entire group to both discuss and record their input on this project's educational brochure. We asked what they would like more information about, prompting discussions around what they knew least about before our presentation. We then asked them to choose what category the educational brochure if it could only cover one of the following: Protect, Restore, or Enhance. They were asked to describe their reasoning behind this choice.

Six participants attended the first workshop, and six attended the second workshop. Each participant signed in with their name and email and provided the same information on their worksheets with their name and email recorded as well.





EDUCATIONAL BROCHURE DEVELOPMENT

Our approach to defining the purpose of the brochure content was refined by the workshop participants' questions and identifying information that would motivate individuals, organized groups and the community to conserve and restore Live Oak – Redbay woodlands on Live Oak, Lamar and Blackjack Peninsulas. The importance of this unique community was highlighted



briefly explaining the importance to both migrating songbirds (highlighting Rubythroated Hummingbirds, birdwatching, photography and nature enthusiasts) and ecotourism (highlighting Hummerbird Festival, bird and butterfly walks, federal, state and county/city park use). The information resources available from a diversity of organizations and the spatial range of conservation/restoration options to include:

• restoring or maintaining the Live Oak - Redbay woodlands, benefits of having diversity of plants within a Live Oak -Redbay motte, natural privacy for individual lots and landscaping options in public and commercial properties to maintain our unique coastal Live Oak – Redbay woodland identity

• conserving larger tracts of land that connect lands already protected or not dedicated for development (federal, state, county, parks, churches, drainage/utility/roadway easements)

During all the workshops, we continued to encounter a lack of awareness of the unique contributions that Live Oak – Redbay Woodlands provide to this community, both ecologically and aesthetically. While most of our stakeholders knew what a Live Oak tree was, few understood the importance of the Live Oak – Redbay woodland and Live Oak Motte concept. Therefore, we focused our information on these points and identified educational resources in the educational brochure.



RESULTS

GIS MAP PRODUCT

We used three physical and biological parameters to characterize and compare among the three peninsulas in the project area. The extent of the project area includes 93, 581 acres across three peninsulas (Table 2). Blackjack Peninsula is the largest (48%), followed by Live Oak Peninsula (40%), and Lamar Peninsula is the smallest (12%) (Table 2, see Figure 2). The three peninsulas vary in coverage of Galveston-Mustang and Falfurrias deep sand, which is the primary soil characteristic of these barrier strandplain peninsulas. Blackjack Peninsula coverage is approximately 60%, Live Oak Peninsula is roughly 45%, and Lamar Peninsula is about 35% and these areas are primarily located along the higher elevation areas (Table 2, Figure 3). Live Oak – Redbay woodlands are located on these deep coastal sands along the central Texas coast and the percentage of these unique woodlands encompassing this sandy substrate vary amongst peninsulas. Blackjack and Lamar Peninsulas have very similar amounts of Live Oak communities that occupy the deep coastal sands, 84.6% and 84.9% respectively, while Live Oak Peninsula has only 64.2% (Table 2, Figure 4).

We then used two land ownership parameters (tax exempt- and protected land parcels) to characterize the location and extent of publicly-owned lands and/or permanently conserved lands within and among the peninsulas in the project area. The first parameter involved land parcels that listed as tax exempt; these tracts were identified and mapped to determine where they were located and what type of status was listed. The extent of tax exempt parcels in relation to each peninsulas' size ranges from 100% on Blackjack Peninsula, to 14% on Lamar, and 5% on Live Oak Peninsula with varying number of tax exempt parcels on each peninsula (38,



34 and 459 parcels, respectively) (Table 2, Figure 5). The percentage of protected land parcels were same for Blackjack Peninsula (100%) designated as one land parcel totaling 44,964 ac, as this landform is part of the US Fish and Wildlife Service refuge system (Aransas National Wildlife Refuge) (Table 2, Figure 6). Lamar, the smallest peninsula in the project area, follows with 20% area protected combined within 9 land parcels totaling 2,208 ac. Live Oak Peninsula, that encompasses 37,516 ac, has 240 ac of protected lands (<1%) in 9 land parcels.

There are 32 county and city parks of varying sizes (196 ac total) on Live Oak Peninsula, while there are 3 county parks (15 ac total) on Lamar Peninsula and none on Blackjack Peninsula (Table 2, Figure 7). The most Aransas Pathways sites (12) are located on Live Oak Peninsula, followed by 3 on Lamar Peninsula and 1 on Blackjack Peninsula (Table 3, Figure 8). Central

Texas Coastal Birding sites within the project area exhibited a similar distribution among the peninsula (5, 3, and 1 sites, respectively) (Table 2, Figure 9) and all Central Texas Coastal Birding sites are represented within the Aransas Pathways layer.

All GIS layers have been saved as Google Earth compatible files (*.kmz) in Appendix 3.



| GIS Layers | Live Oak | Lamar | Blackjack |
|------------------------------------|--------------|--------------|--------------|
| | Peninsula | Peninsula | Peninsula |
| Size (acres) | 37,516 acres | 11,101 acres | 44,964 acres |
| | (40.0%) | (12.0%) | (48.0%) |
| Sand (types combined) (acres) | 16,999 acres | 3,880 acres | 27,194 acres |
| | (45.3%) | (35.0%) | (60.5%) |
| Live Oak Tree & Shrub (acres) | 10,907 acres | 3,294 acres | 23,002 acres |
| | (64.2%) | (84.9%) | (84.6%) |
| Tax Exempt (acres) | 2,000 acres | 1,586 acres | 44,964 acres |
| | (5.3%) | (14.3%) | (100%) |
| Tax Exempt (# parcels) | 459 | 34 | 38 |
| Protected Lands (acres) | 240 acres | 2,208 acres | 44,694 acres |
| | (0.64%) | (19.9%) | (100%) |
| Protected Lands (# parcels) | 12 | 9 | 1 |
| Parks (acres) | 196 acres | 15.7 acres | 0 acres |
| | (0.5%) | (0.1%) | (0%) |
| Parks (#) | 32 | 3 | 0 |
| Aransas Pathways (#) | 12 | 3 | 1 |
| Central Coastal Birding Trails (#) | 5 | 2 | 1 |

Table 2. Summary of the areal extent (and number, if applicable) of Live Oak, Lamar, and Blackjack Peninsulas and each GIS feature layer.





Figure 3. Deep coastal sands (combining Falfurrias and Galveston-Mustang series) within Aransas County Blackjack, Lamar and Live Oak Peninsulas in Aransas County.



Figure 4. Live Oak – Redbay Woodlands overlaying coastal sand (showing Live Oak Woodland and Shrubland) within Blackjack, Lamar and Live Oak Peninsulas in Aransas County.



Figure 5.Tax-exempt lands sites within the Live Oak – Redbay woodlands on Blackjack, Lamar and Live Oak Peninsulas in Aransas County.



Figure 6. Protected lands sites within the Live Oak – Redbay woodlands on Blackjack, Lamar and Live Oak Peninsulas in Aransas County.



Figure 7. County and city parks sites within the Live Oak – Redbay woodlands on Blackjack, Lamar and Live Oak Peninsulas in Aransas County.



Figure 8. Aransas Pathway sites and Central Texas Coastal Birding Trail sites within the Live Oak – Redbay woodlands on Blackjack, Lamar and Live Oak Peninsulas (Table 3).

| No. | Aransas Pathway Site | Texas Coastal Birding Trail Site |
|-----|--|----------------------------------|
| 1 | Holiday Beach Pond | Yes |
| 2 | The Big Tree | |
| 3 | Goose Island State Park | Yes |
| 4 | Howard Murph Park | Yes |
| 5 | Airport Road | |
| 6 | Linda Castro Sanctuary | |
| 7 | Henderson Nature Site | |
| 8 | Shellcrete Birding Site | |
| 9 | Rockport Demo Garden and Wetlands Pond | Yes |
| 10 | Old Salt Lake Road | |
| 11 | Memorial Park | |
| 12 | Moore's Pond | |
| 13 | Ivy Lane | |
| 14 | Connie Hagar Sanctuary | Yes |
| 15 | Aransas Woods | Yes |

Table 3. Aransas Pathway sites and Central Texas Birding Trail Sites (see Figure for locations).

KEY ECOLOGICAL SPECIES SYNTHESES

Species of Concern. Several databases were used to identify and designate the occurrence of rare and endangered species within the Live Oak – Redbay woodland habitat. We identified the following species as being listed for Aransas County.

Black-spotted newt (Notophthalmus meridionalis)

Federal Status: none; State Status: Threatened

Texas Species of Greatest Conservation Need: Yes

Endemic: No; Global Rank: G1 – Critically Imperiled- At high risk of extinction due to extreme rarity (often 5 or fewer populations, very steep declines, or other factors

State Rank: S2 – Imperiled – imperiled in the nation or state/province of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

The black-spotted newt may be found in resacas and bodies of water with firm bottoms and little or no vegetation; in wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions where the absence of predatory fish is probably important. This amphibian aestivates in the ground during dry periods and are found in Texas in the Gulf Coastal Plain south of the San Antonio River. There have been eight records of the black-spotted newt occurring north of Highway 186, although these records are extremely dated. One specimen observed was observed in the Rockport (1930), two in Kingsville (1935), and five around Rivera (1985). More recent sightings of the black-spotted newt (2008-) have been recorded around Port Mansfield and further south.

Sheep Frog (Hypopachus variolosus)

Federal Status: none; State Status: Threatened Texas Species of Greatest Conservation Need: Yes Endemic: No; Global Rank: G5 – Secure – Common; widespread and abundant State Rank: S2 – Imperiled – imperiled in the nation or state/province of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

The sheep frog's habitat is described as predominantly grassland and savanna and is typically found underground in burrows or cavities in areas with moist microclimates. This species does not have any records in Aransas County, although, there are historic records from the 1950's in San Patricio County. Recent observations of this species since 2013 have been recorded in counties nearby Aransas, San Patricio and Refugio, including west of Highway 77. Many of the recent observations are recorded vocalizations as this species spends most of their time underground and emerge after heavy rains.



<u>White-tailed Hawk (Geranoaetus albicaudatus)</u> (previously Buteo albicaudatus)

Federal Status: none; State Status: Threatened Texas Species of Greatest Conservation Need: Yes Endemic: No; Global Rank: G4 – Apparently Secure, G5 - Secure

State Rank: S4B – Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors B- Breeding

The White-tailed Hawk occurs near the coast on prairies, cordgrass flats, and scrub-live oak; further

inland, the habitat includes prairies, mesquite and oak savannas, and mixed savanna-chaparral. The white-tailed hawk has been recorded in the Coastal Bend as far back as the late 1800's. It can be seen year-round in the Coastal Bend and South Texas region.

Manfreda Giant-skipper (Stallingsia maculosus)

Federal Status: none; State Status: none

Texas Species of Greatest Conservation Need: Yes

Endemic: No; Global Rank: Critically Imperiled- At high risk of extinction due to extreme rarity (often 5 or fewer populations, very steep declines, or other factors

State Rank: S1- Critically Imperiled – Critically imperiled in the nation or state/province because of extreme rarity (oftern 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

There are 15 records of this species from the late 1950's and early 1960's located in Sinton. Aransas County is on the list for this species but no physical record was located to confirm it's presence. This species is named for its host plant, spice lily or Texas tuberose (*Manfreda maculosa*). If you find this host plant, you are likely to find *S. maculosus*.

Aransas Short-tailed Shrew (Blarina hylophaga plumbea)

Federal Status: none; State Status: none

Texas Species of Greatest Conservation Need: Yes

Endemic: Yes; Global Rank: G5 - Secure, T1 - Subspecies critically endangered; Q -

questionable taxonomy

State Rank: S1- Critically Imperiled

The first reported sighting of this species was in 1940 on the Aransas National Wildlife Refuge. It has been intermittently reported throughout the years on the refuge with the most recent occurrence in 2003. The short-tailed shrew excavates burrows in sandy soils underlying mottes of live oak trees or in areas with little to no ground cover, raising 2-3 litters of 4-6 young per year.



Ocelot (Leopardus pardalis)

Federal Status: LE – Federally Endangered; State Status: Endangered Texas Species of Greatest Conservation Need: Yes Endemic: No; Global Rank: G4 – Apparently secure State Rank: S1- Critically Imperiled

The ocelot is restricted to mesquite-thorn scrub and live-oak mottes and avoids open areas. The species is very secretive in its movement and travels

through dense mixed brush below four feet, thorny shrublands and dense chaparral thickets. No ocelot records were located within Aransas County. Most records in Texas occur in Cameron, Willacy, and Kenedy counties. This species is predominately along the border in Brownsville and at Laguna Atascosa National Wildlife Refuge.



Red Wolf (Canis rufus)

This species was not indicated in the State database, although there are 16 records of red wolves being seen in the Coastal Bend from the 1940's including 11 observations in Aransas County at the Aransas National Wildlife Refuge, three in Calhoun County, one in Refugio County, and one from Nueces County. There has not been any recent sighting of this species.



<u>Texas Scarlet Snake (Cemophora coccinea</u> <u>lineri)</u>

Federal Status: none; State Status: Threatened Texas Species of Greatest Conservation Need: Yes Endemic: Yes; Global Rank: G5T2 – Secure, Informal taxonomic status State Rank: S1 – Critically imperiled, S2 -Imperiled

The Texas scarlet snake occurs only along Gulf Coast and uses mixed hardwood scrub on sandy soils. This species' earliest record was in 1952

in Rockport and have been documented intermittently through the years in Rockport and surrounding areas. The most recent sighting occurred within the Aransas National Wildlife Refuge in 2019.





Timber Rattlesnake (Crotalus horridus)

Federal Status: none; State Status: Threatened Texas Species of Greatest Conservation Need: Yes Endemic: No; Global Rank: G4 – Apparently secure State Rank: S4 – Apparently secure Although this species is listed in the TPWD Aransas County database, there are no records of this species in Aransas County. The closest occurrence of the Timber rattlesnake to this area was from 1976, east of Goliad in Victoria County.

Elmendorf's Onion (Allium elmendorfii)

Federal Status: none; State Status: none Texas Species of Greatest Conservation Need: Yes Endemic: Yes; Global Rank: G2 – Imperiled – at high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors

State Rank: S2 - Imperiled

Elmendorf's onion occurs in grassland openings within in oak woodlands on deep, loose, well-drained sands. In the Texas Coastal Bend, the range is located on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands. There are three observations of this plant recorded in Refugio in 2004.



Tree Dodder (Cuscuta exaltata)

Federal Status: none; State Status: none Texas Species of Greatest Conservation Need: Yes Endemic: No; Global Rank: G3 – Vulnerable – At moderate risk of extinction due to extreme rarity (often 5 or fewer populations, very steep declines, or other factors) State Rank: S3 - Vulnerable

Tree dodder is parasitic annual plant on various tree species including oak, hackberry and persimmon. The earliest

specimen record for the Coastal Bend is from 1922 in Aransas Pass. This species' earliest definite record in Aransas County was in 1975. There are also records of this species in the 1990's from Refugio County south of Sinton and in San Patricio County on the naval station in Ingleside. The most recent record of this tree dodder was on Lamar Peninsula in 2010.

Resident and Migratory Birds. Several databases were used to identify bird species and characterize habitat used within the Live Oak – Redbay woodland habitat. One hundred one bird species (27%) were extracted from the Aransas National Wildlife Refuge bird checklist (391 spp.) (Appendix 4). Forty-seven species use Forest/Woodland only, with over half as migrating warblers. The remainder include three species (barred owl, golden-fronted woodpecker, summer tanager) listed as breeding regularly in that habitat and a variety of migrating vireos, thrushes and tanagers as well as overwintering woodpeckers, redbreasted nuthatch and creeper. Two warbler species, orangecrowned and pine warblers are present throughout the winter.





Forty-five species use Forest/Woodland as their primary habitat followed by Brushland as their secondary habitat. Twenty-two species are regular nesters included redshouldered hawk, Inca dove, yellow-billed cuckoo, three owl species (barn owl, eastern screech-owl, great horned owl), common pauraque, ruby-throated and buff-bellied hummingbirds, ladder-backed woodpecker, great crested and great-crested flycatcher, white-eyed vireo, Carolina chickadee, tufted and black-crested titmice, Carolina wren, blue-gray gnatcatcher, long-billed thrasher, Swainson's warbler, and northern cardinal. The remaining hawks listed, most flycatchers, tanagers, and most warblers

migrate through our area. Both species of kinglets, American robin, gray catbird, brown thrasher,

cedar waxwing, and three warblers (yellow-rumped, Wilson's and black-and-white warblers) use these habitats throughout the winter. Both the northern and Louisiana waterthrush use Forest/Woodland habitat followed by Aquatic/Marsh habitat during migration.

Seven species use Brushland followed by Forest/Woodland; two species that occur year-round including common ground-dove and Bewick's wren. Spotted and eastern towhees, chipping and white-throated sparrows, and dark-eyed juncos are present during the winter.

Of 96 species of butterflies in 11 groups listed on the Aransas National Wildlife Refuge checklist, 39 species (40.6%) use woodlands and shrublands along the coast with at least one species representing each group (Appendix 5). Eleven species were included in the Typical Brushfoot group (Family Nymphalidae) that includes familiar species such as red admiral, viceroys, leafwings, emperors, and American snout. These species are closely associated with woodlands, riparian areas, and nectar on understory plants as well as some on rotting leaves, sap, and dung. Five species of swallowtails (Family Pipilionidae) are also associated with oak mottes on coastal sands (spicebush and Palamedes swallowtails), mottes (giant swallowtails), riparian woodlands (eastern Tiger Swallowtail) and pipevine swallowtail using woodland and brush edge in sandy areas. Two of the six species of skippers (Horace's and mournful duskywings) are limited to oaks habitats. The turk's cap white-skipper uses the turk's cap flowers for nectaring and young leaves, flowers and fruits as caterpillar food.






STAKEHOLDER WORKSHOPS 1 & 2 OVERVIEW

A total of four stakeholder workshops were held May 15 and June 14, 2019 at two times each data to accommodate participant schedules. The goal of the May 15, 2019 meeting was to engage participants to share their favorite sites that have Live Oak – Redbay woodlands, collect stakeholder-suggested sites of conservation interest, including those which should be protected, restored, and residential/commercial location that could be developed with natural features. The participants of Workshops 1 and 2 were selected for their involvement in nature- and conservation-related organizations in Aransas County. During these workshops, the participants identified a total of 39 sites, both from the map and from the written response sheets. Twenty-one sites were selected for inclusion in this project that has specific location and conservation recommendations and 18 sites were excluded that were more general, encompassed more than on landowner, yet can be used as templates for multiple site conservation strategies (Appendix 6).

SITE INVENTORY

Stakeholders at the first two workshops identified 21 sites on both Live Oak and Lamar Peninsula to be considered for conservation, restoration and/or development with natural features (Table 4). For each site location, two maps identify the county parcel boundary as related to the stakeholder suggestion and identification, shown in a red line. The first map identifies this county parcel boundary over currently available satellite imagery from Google Earth. The second map is a GIS product which identifies the Live Oak Woodland (dark green) and Live Oak Shrub (medium green) habitats present both surrounding and within the parcel. Eighteen sites were identified as needing protection, eight sites to be considered for restoration, and six sites to be considered for developing with natural features. All three options were identified for Sites 1 and 2, five sites for protection and restoration opportunities, and one site for restoration and develop with natural features. Five sites were selected for protection only, and two sites recommended to develop with natural features. Two sites are already designated as Aransas Pathways and Great Texas Coastal Birding Trail sites and four sites listed as Aransas Pathways.



| Map Id. No. | Peninsula | Name | Protect | Restore | Develop w/ Natural Features | Aransas Pathways Site | Great Texas Coastal Birding Trail Site |
|-------------------|-----------|---|-------------------------|-------------------------------|--------------------------------------|-----------------------------|---|
| 1 | Live Oak | Camp Aranzazu | X | X | Х | | |
| 2 | Live Oak | HEB Live Oak Lodge | X | X | X | | |
| 3 | Live Oak | Howard Murph Park | X (county- owned) | | X | X | Х |
| 4 | Live Oak | TXDOT former bypass (for sale) | X | | | | |
| 5 | Live Oak | Linda Castro Sanctuary | X (ADJ. CO. LAND) | | | X | |
| 6 | Live Oak | 1 st Baptist Church | X (IS EXEMPT) | X | | | |
| 7 | Live Oak | Episcopal Church | X (IS EXEMPT) | | | | |
| 8 | Live Oak | Memorial Park | X | Х | | | |
| 9 | Live Oak | Aransas Pathways – Kayak Site | Х | | | Х | |
| 10 | Live Oak | Little Bay Primary School (for sale) | | | Х | | |
| 11 | Live Oak | Bent Oaks | Х | | | | |
| 12 | Live Oak | Pearl Pt Development (Hwy 35 Bypass & Pearl St) "Harvey" | | | X | | |
| 13 | Live Oak | 1011 Henderson Rd | Х | Х | | X | |
| 14 | Live Oak | Wings Rescue | Х | Х | | | |
| 15 | Live Oak | Bahia Bay entrance | X | Х | | | |
| 16 | Lamar | Goose Island State Park | | X (PK RD 13 MEDIA N) | | X | X |
| 17 | Lamar | 12&8 th St Pasture | Х | | | | |
| 18 | Lamar | Big Tree Natural Area (GISP) | X | | | Х | |
| 19 | Lamar | Hwy 35 & Seaside Loop S Live Oak | X | | Х | | |
| 20 | Lamar | 1854 Lamar Section W Lamar (created general polygon) | Х | | | | |
| 21 | Lamar | Newcomb Point (created polygon) | X | | | | |

Table 4. Potential sites on Lamar and Live Oak Peninsulas identified through Stakeholder input for protection, restoration and use of natural features in the development design.

Site 1: Live Oak – Red Bay Woodland Site, Camp Aranzazu (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.112537 Approximate Longitude: -97.040063 Total Acres: 85

Site Description: Camp Aranzazu is a facility with substantial acreage and that provides camping and environmental education opportunities for adults and children with special needs and chronic illnesses. The site includes many large Live Oak-Red Bay mottes and is on one of the highest elevations on Live Oak Peninsula.

Landowner Ownership: Private - Camp Aranzazu Inc., Non-Exempt

Conservation Strategies:

- Protect: Currently has emphasis on nature and preserves natural features. The geographic location at the confluence of Copano Bay and Aransas Bay provides an excellent stopover site for migrating songbirds; conservation easement could be considered.
- Restore: Could restore areas which were cleared or add mottes underneath.
- Develop with natural features: If there are areas that will be developed in the future, try to preserve as many trees and mottes as possible.

Site 2: Live Oak – Red Bay Woodland Site, HEB Live Oak Lodge (Live Oak Peninsula)





Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.105526 Approximate Longitude: -97.027234 Total Acres: 80

Site Description: The HEB Live Oak Lodge is a private lodge, campground, and retreat area owned by the HEB corporation and available for HEB employees and partners by private booking through the corporation. The site includes many large Live Oak-Red Bay mottes and about half of the understory has recently been cleared. The geographic location at the confluence of Copano Bay and Aransas Bay provides an excellent stopover site for migrating birds.

Landowner Ownership: Private (includes commercial) – H E Butt Grocery, Non-Exempt

Conservation Strategies:

- Protect: The geographic location at the confluence of Copano Bay and Aransas Bay provides an excellent stopover site for migrating songbirds.
- Restore: Restore open areas with mottes about half of the understory that has Live Oaks was cleared after Hurricane Harvey.
- Develop with Natural Features: If there are areas that will be developed in the future, try to preserve as many trees and mottes as possible.

Site 3: Live Oak – Red Bay Woodland Site, Murph Park (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.095683 Approximate Longitude: -97.051563 Total Acres: 8 (Most likely less, not specifically laid out on map)

Site Description: Full name, Howard Murph Memorial Park. Small park with a parking area, picnic tables, wooded areas, and access to the bay. Adjacent to airport. Designated as both an Aransas Pathways Site and a part of the Texas Parks and Wildlife Great Texas Coastal Birding Trail.

Landowner Ownership: (County) Aransas County - Exempt

Conservation Strategies:

- Protect: Already protected as county land; maintain natural areas for wildlife and people use.
- Restore: Not designated
- Develop with natural features: If there are areas that will be developed in the future, try to preserve as many trees and mottes as possible.

Stakeholder Suggested Potential Partner Involvement: Aransas Pathways, Town of Fulton

Site 4: Red Bay Woodland Site, TXDOT Former 35 Bypass Extension (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.108815 Approximate Longitude: -97.032562 Total Acres: 60

Site Description: This site is an area that was designated as an extension to Highway 35 Bypass, but the project has not moved forward as a road development. It includes many areas of undeveloped woodlands.

Landowner Ownership: not designated in database

Conservation Strategies:

- Protect:: Valued for its undeveloped natural areas and connectivity. Could be used for a hike/bike trail. Could become a part of Aransas Pathways after protected
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Aransas Pathways, City of Rockport, Town of Fulton, TXDOT

Site 5: Red Bay Woodland Site, Linda Castro Sanctuary (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.073902 and 28.074626 Approximate Longitude: -97.042305 and -97.043684 Total Acres: 3.6 acres adjacent owned by county, adjacent 1.4 ac owned by county

Site Description: This site is a nature sanctuary encompassing multiple habitats including live oak, prairie and freshwater pond present and is excellent for birding and wildlife. Designated as a part of Aransas Pathways.

Landowner Ownership: (County) Aransas County - Exempt

Conservation Strategies:

- Protect: Add county parcel adjacent to site; Valued for its birding and accessibility (benches, shelter, parking area.) Diverse habitat. Area has Live Oak and Redbay present.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Aransas Pathways, Aransas County, Master Naturalists

Site 6: Red Bay Woodland Site, 1st Baptist Church (Enterprise Street) (Live Oak Peninsula)

Live Oak St



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.038963 Approximate Longitude: -97.053771 Total Acres: 11

Site Description: This site is a church located near multiple parks with live oaks (no mottes) bordering the interior property.

Landowner Ownership: (Private) First Baptist Church - Exempt

Conservation Strategies:

- Protect: Already Exempt, protect remaining Live Oak Red Bay Woodland Community; serve as an example for other Church Exempt properties
- Restore: Add mottes to cleared live oaks.
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Mid-Coast Master Naturalists, church members

Site 7: Live Oak – Red Bay Woodland Site, St. Peter's Episcopal Church (Live Oak Peninsula)





Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.03942 Approximate Longitude: -97.056073 Total Acres: 10

Site Description: This site is a church located near multiple parks with live oak habitat including mottes still left on property.

Landowner Ownership: (Private) Episcopal Church Corporation - Exempt

Conservation Strategies:

- Protect: Already Exempt, protect remaining Live Oak Red Bay Woodland Community; serve as an example for other Church Exempt properties
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Mid-Coast Master Naturalists, church members

Site 8: Live Oak – Red Bay Woodland Site, Memorial Park (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.03976, 28.040082, and 28.03959 Approximate Longitude: -97.05992, -97.064903, and -97.061722 Total Acres: 9, 11, 9 – 29 ac total

Site Description: This site is a large and well-known city park which includes sports fields, a dog park, and a habitat preservation area with ponds and nature trails. Valued for the back area of the park which was left more naturalistic than the developed and cleared front of the park.

Landowner Ownership: (City) City of Rockport - Exempt

Conservation Strategies:

- Protect: Continue protection of back of park and leave it undeveloped.
- Restore: Restore areas where mottes have been cleared, replace cleared areas with native plants.
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: City of Rockport

Site 9: Live Oak – Red Bay Woodland Site, Aransas Pathways – Kayak Site at the end of Airport Rd (Live Oak Peninsula)

(map not provided for this site)

Approximate Latitude: 28.088472 Approximate Longitude: -97.060472 Total Acres: Unknown – this is a site which is a small part of a larger tract of county-owned land and its official borders are currently unknown.

Site Description: This is a small site at the intersection of Airport Road and Copano Bay where kayaks can be launched, some live oaks exist on the site. Designated as a part of Aransas Pathways.

Landowner Ownership: (County) Aransas County - Exempt

Conservation Strategies:

- Protect: Continue Aransas Pathways protection.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Aransas Pathways

Site 10: Live Oak – Red Bay Woodland Site, Little Bay Primary School (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.044463 Approximate Longitude: -97.041995 Total Acres: 4

Site Description: This is the site of a former elementary school known as Little Bay Primary School. The area is fenced off and listed as for sale. There are currently Live Oaks on the property.

Landowner Ownership: (Private) Rockport Land Trust - Exempt

Conservation Strategies:

- Protect: Not designated
- Restore: Not designated
- Develop with natural features: When a buyer is found and development begins, preserve the current Live Oaks and use other natural features.

Stakeholder Suggested Potential Partner Involvement: Future developer

Site 11: Live Oak – Red Bay Woodland Site, Bent Oaks (Fulton Beach Rd & Maple St) (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.038676 Approximate Longitude: -97.040975 Total Acres: 7.9

Site Description: This site has characteristic tall 'bent' Live Oak trees which serve as a rookery for various bird species including herons and egrets. Official name is "Bent Oaks Rookery Park." It was secured to be protected with a \$2.995 million purchase by the city of Rockport.

Landowner Ownership: (City) City of Rockport - Exempt

Conservation Strategies:

- Protect: Continue the protection for this iconic and notable area, was hard fought to gain its protection. Valuable as habitat/nesting area, tourist attraction, and excellent birding.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: City of Rockport

Site 12: Live Oak – Red Bay Woodland Site, Pearl Point Development (Hwy 35 Bypass & Pearl St) (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.056383 and 28.056958 Approximate Longitude: -97.06838 and -97.070559 Total Acres: 14.6 and 13.6 acres

Site Description: This is a currently undeveloped area with extensive live oak – redbay woodland, which is planned to be developed into a large apartment complex. It is a 35 total acre master planned community with 456 apartments. Current planning for natural features focuses on mowed lawns and non-native plants such as palms.

Landowner Ownership: (Private) Rockport Harvey Housing LLC - Non-Exempt

Conservation Strategies:

- Protect: Not designated
- Restore: Not designated
- Develop with natural features: Develop using native plants such as Live Oaks with mottes intact instead of clear-cutting and non-native plantings. Use natural hedges. Try to preserve as much of the currently intact Live Oak Woodland as possible.

Stakeholder Suggested Potential Partner Involvement: Landowner, City of Rockport

Site 13: Live Oak – Red Bay Woodland Site, 1011 Henderson Rd (Live Oak Peninsula)





Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.058458 Approximate Longitude: -97.043684 Total Acres: 11

Site Description: This site can potentially be used for connectivity to other Aransas Pathways sites. Designated as a part of Aransas Pathways.

Landowner Ownership: (County) Aransas County - Exempt

Conservation Strategies:

- Protect: Ensure protection of current habitat.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Aransas Pathways, Aransas County

Site 14: Live Oak – Red Bay Woodland Site, Wings Rescue (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.009449 Approximate Longitude: -97.068493 Total Acres: 1

Site Description: This is a site known for its rescue and rehabilitation of injured and orphaned birds in the Rockport-Fulton area. Although the site is small, its connection to the natural world in the form of bird care makes it a well-known natural space throughout the community.

Landowner Ownership: (Private) Wings Rescue Center - Non-Exempt

Conservation Strategies:

- Protect: Continue current protection of natural spaces including Live Oak.
- Restore: Not designated
- Develop with natural features: Not designated

Site 15: Live Oak – Red Bay Woodland Site, Bahia Bay entrance (Live Oak Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 27.96739 Approximate Longitude: -97.097301 Total Acres: 0.5

Site Description: This site was suggested by two stakeholders during the conservation plan workshop. They live in the area of Bahia Bay and noticed the Live Oaks at the entrance had recently been cleared and would like to see the rest of the area protected as well as restored.

Landowner Ownership: (Private) Bahia Bay Property Owners Association - Non-Exempt

Conservation Strategies:

- Protect: Protect the remaining intact Live Oak.
- Restore: Restore the Live Oak areas that were cleared, including adding mottes and replanting trees.
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Bahia Bay homeowners, Mid-Coast Master Naturalists

Site 16: Live Oak – Red Bay Woodland Site, Goose Island State Park (Lamar Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.132525 Approximate Longitude: -96.98575 Total Acres: 25

Site Description: This site is a well-known and popular state park which many stakeholders want to see continually protected and supported. It was frequently listed as a 'favorite' of stakeholders and is valued for its natural areas including Live Oak habitat, wetlands, and coastal areas. Designated as both an Aransas Pathways Site and a part of the Texas Parks and Wildlife Great Texas Coastal Birding Trail.

Landowner Ownership: (State) Texas Parks & Wildlife Department - Exempt

Conservation Strategies:

- Protect: Continue to support current protections given by the state.
- Restore: support the restoration of understory plants to park
- Develop with natural features: Not designated.

Stakeholder Suggested Potential Partner Involvement: Aransas Bird and Nature Club, Mid-Coast Master Naturalists

Site 17: Live Oak – Red Bay Woodland Site, Pasture Located between 12th & 8th St in Lamar (Lamar Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.150396 Approximate Longitude: -96.975691 Total Acres: 24

Site Description: This site is known for the Whooping Cranes that frequent the pasture during their winter stay. It is across from the Big Tree Natural Area and is a frequent birding spot. Although most of it has been cleared, it is valued for its visiting Whooping Cranes and its connection to the nearby Big Tree area.

Landowner Ownership: Private - Ault Stanley A Etux Ruth W - Non-Exempt

Conservation Strategies:

- Protect: Bring this site into some kind of protection which would prevent future development many methods have been proposed including purchasing the land, purchasing a conservation easement, or annexing it into state or federal lands. The main focus is that the community and visitors frequently visit this site from the public roadway primarily to view Whooping Cranes and do not want to see the Whooping Cranes displaced.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Greater community of Lamar, Aransas Pathways, Goose Island State Park

Live Oak – Red Bay Woodland Site 18, Big Tree Natural Area (Lamar Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.152317 and 28.154476 Approximate Longitude: -96.976349 and -96.976554 Total Acres: 6 and 71, 77 total

Site Description: This is the site of the iconic "Big Tree" which is the largest Live Oak in the state of Texas. It is a popular tourist destination. In addition to the area open to the public where the tree can be viewed, there is a large undeveloped area of land surrounding it which is not open to the public. The non-public area includes Live Oak habitat. A stakeholder suggested that they would like to see the TPWD plan for this area executed – unsure of the full content of this plan. Designated as a part of Aransas Pathways.

Landowner Ownership: (State) Texas Parks & Wildlife Department - Exempt

Conservation Strategies:

- Protect: Continue to support current protections given by the state, make sure the non-public area continues to be undeveloped.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Texas Parks and Wildlife, residents of Lamar and Blackjack peninsulas, surrounding private landowners

Site 19: Live Oak – Red Bay Woodland, Hwy 35 & Seaside Loop S - Live Oak (Lamar Peninsula)



Red line designates county parcel boundary; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.155153 Approximate Longitude: -96.995229 Total Acres: 52

Site Description: This is a site on Lamar Peninsula is a large area of Live Oak habitat surrounding a marsh which could be developed.

Landowner Ownership: (Private) Hidden Oaks RV Preserve LLC - Non-Exempt

Conservation Strategies:

- Protect: Protect the area from development and leave the Live Oak habitat intact.
- Restore: Not designated
- Develop with natural features: If developed, request the RV Park developers leave the Live Oak habitat and keep the marsh as intact as possible.

Stakeholder Suggested Potential Partner Involvement: Community of Lamar

Site 20: Live Oak – Red Bay Woodland Site, 1854 Lamar Section (Lamar Peninsula)



Red line designates multiple parcel boundaries; Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.146751 Approximate Longitude: -97.014046 Total Acres: 265

Site Description: This site on Lamar Peninsula has limited Live Oak habitat, but what is remaining could be protected. While much of this area has been developed there is an opportunity to protect the natural areas left.

Landowner Ownership: Unknown

Conservation Strategies:

- Protect: Protect the undeveloped areas which contain Live Oak habitat from future development.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Aransas First, Community of Lamar, Texas Parks and Wildlife, Aransas Pathways

Site 21: Live Oak – Red Bay Woodland Site, Newcomb Point (Lamar Peninsula)



Red line designates site boundary (no county parcel information); Live Oak Woodland (dark green) and Live Oak Shrub (medium green) designate mapped Live Oak – Redbay Woodland Community areas

Approximate Latitude: 28.148299 Approximate Longitude: -97.020318 Total Acres: 76

Site Description: This site on Lamar Peninsula was identified due to being a bird habitat and occasional area where Whooping Cranes are observed. While it is mostly coastal, there is some remaining Live Oak habitat.

Landowner Ownership: Unknown

Conservation Strategies:

- Protect: Protect the area from any future development and have it remain in a natural state.
- Restore: Not designated
- Develop with natural features: Not designated

Stakeholder Suggested Potential Partner Involvement: Community of Lamar, Texas Parks and Wildlife, Aransas Pathways

STAKEHOLDER WORKSHOPS 3 & 4 OVERVIEW

The goal of the two workshops on June 14, 2019 was to gather leaders in development, realty, business, and government to overview and discuss the previously selected sites, gather information requests for the educational brochure, propose connectivity corridors between sites on Live Oak and Lamar peninsulas, and gauge baseline preferences about protection and restoration across both peninsulas, homes, and businesses.

We gave the participants five response questions (see Appendix 2 for individual questions); four of these questions had written responses and one question was related to connectivity on information and maps provided. Question 1 had six parts (A-F), each of which asked for a numerical percentage response from the participants: Protect ____% of Live Oak – Redbay Woodland Community on A. Live Oak Peninsula in Aransas County), B. Lamar Peninsula. Restore ____% of Live Oak – Redbay Woodland Community on C. Live Oak Peninsula in Aransas County), D. Lamar Peninsula. How much E. Residential development and F. Commercial development with Live Oak trees should be enhanced with native understory plant to create a Live Oak – Redbay motte for birds and butterflies?

Overall, individual responses for each question were consistent, with percentages being consistently high, medium or low (Table 4). Group responses regarding the percentage of protection, restoration, and enhancement needed for Live Oak – Redbay woodlands on Live Oak and Lamar peninsulas were fairly similar (low and high ranges). Average percentages were slightly higher for protection than for restoration and enhancement. Answers to same questions for each peninsula were similar, with higher percentage for protecting Lamar Peninsula.

| Participant | A. Protect | B. Protect | C. Restore | D. Restore | E. Enhance | F. Enhance |
|-------------|------------|------------|---------------|---------------|-------------|------------|
| | Live Oak | Lamar | Live Oak | Lamar | Residential | Commercial |
| | Peninsula | Peninsula | Peninsula (%) | Peninsula (%) | (%) | (%) |
| | (%) | (%) | | | | |
| 1 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | 75 | 100 | 75 | 100 | 100 | 100 |
| 4 | 30 | 35 | 15 | 20 | 20 | 10 |
| 5 | 50 | 50 | 30 | 40 | | |
| 6 | 45 | 65 | 25 | 25 | 45 | 65 |
| 7 | 45 | 65 | | | 30 | 40 |
| 8 | 75 | 95 | 75 | 85 | 75 | 65 |
| 9 | 60 | 75 | 40 | 50 | 30 | 30 |
| 10 | 75 | 80 | 50 | 25 | 80 | 80 |
| 11 | 50 | 50 | 25 | 25 | 25 | 25 |
| 12 | 100 | 100 | 100 | 100 | 75 | 100 |
| Lowest | 30 % | 35 % | 15% | 20% | 20% | 10% |
| Highest | 100 % | 100 % | 100% | 100% | 100% | 100% |
| Average | 67 % | 76 % | 58% | 61% | 62% | 61% |

Table 5. Participant responses regarding their opinion of how much Live Oak – Redbay woodlands should be protected, restored and enhanced on Live Oak and Lamar peninsulas.

Question 2 asked participants to discuss and respond to individual maps they were given which showed tax exempt lands (see Figure 5), protected lands (see Figure 6), and park lands (see Figure 7). They discussed the following two sub-questions in their breakout groups as well as wrote responses.

"Did anything on these maps surprise you?" Seven respondents out of twelve indicated they were surprised at the overall lack of or very little park and protected lands. Two respondents indicated they were not surprised. One respondent was surprised at the amount of Live Oak still present around Highway 35. One responded was surprised at the lack of natural corridors.

"Do you see anything missing?" was the second sub-question, with more varied responses than the first. Responses of areas directly missing from the map include: potential protected land, privately owned land, school land under "tax exempt", and the Big Tree Natural Area. Responses which could be interpreted as additive to the map include: corridor connecting the protected lands, storefront development of public access interactive areas along bay shorelines (shoreline corridor), and zoning designation. Two responses which are interpreted as critiques or suggestions are: No indication which "Tax Exempt" lands are used for what purpose, to consider potential for enhancement e.g., and Little Bay Shores, the neighborhood behind HEB and Old Rockport should be protected and kept single family homes. One final responded said they did not see anything missing that they knew about. Individual comments for each site discussed are included in Appendix 7.



Workshop participants developed several linkages among the 21 sites, Aransas Pathway and Texas Coastal Birding Trail sites often using road right-of-ways to connect these areas (Figure 9). On both Lamar and Live Oak peninsulas, the proposed connectivity loops are intended to provide a corridor that could be used for recreational hiking and biking. Existing sites can be used as start/stop points, or resting areas.

In Question 3, participants were asked to identify potential connectivity of Live Oak-Redbay Woodland Habitat, whether by connecting stakeholder-identified sites, tax exempt sites, parks, protected lands, or any other potential they could see on the map. We received 14 comments on the map directly suggesting connectivity potential. The following responses were captured and summarized from written notes and handwritten drawings on the maps.

The following suggestions were noted for connectivity on Live Oak Peninsula:

- 1. Two respondents suggested using state owned land under an easement which extends from the end of Highway 35, around the Aransas County Airport, and to the bridge to Lamar in order to create a wildlife corridor and/or hike and bike trails. This land was part of a previous project to extend Highway 35 and its ownership is unknown.
- 2. "Old Rockport" neighborhood a mostly developed neighborhood with many individual oak trees, suggested connectivity through enhancing wildlife habitat at residences and in any public spaces.
- 3. Officially connect the Connie Hagar sanctuary to Cove Harbor water bird boardwalk and deck, currently connected via a utility easement.
- 4. Two respondents suggested a connection plan for Aransas Woods with surrounding lands included for sale lands and tax exempt lands.
- 5. Connect areas along Highway 35, south of Aransas Woods to Aransas County boundary currently zoned as commercial, should preserve tree cover.
- 6. Connect Ivy Lane wildlife and birding site to the Highway 35 Bypass undeveloped corridor via the side of the current Highway 35.
- 7. Connect Aransas Woods to the Connie Hagar Sanctuary and extend to Old Rockport neighborhood.

The following suggestions were noted for connectivity on Lamar Peninsula:

- 1. Connect 12th street across from Big Tree Natural Area to Palmetto Street
- 2. Create a wildlife corridor from the western point of Lamar Peninsula (two stakeholder identified sites) underneath the bridge and along the coastline to Goose Island State Park
- 3. Create a living shoreline walking path along Lamar Beach Road
- Connect 12th street area across from Big Tree Natural Area to Palmetto Street then to Goose Island State Park with a corridor
- Create a large rectangle of connectivity between Goose Island State Park, Palmetto Street, 12th Street, and Big Tree Natural Area

The degree of overlap provided us with good information to develop two connectivity loops on each peninsula (Figure 9).



Figure 9. Proposed routes on Live Oak and Lamar peninsulas to connect existing sites as a hike and bike trail.

Question 4 asked participants to review stakeholder-identified sites which had been indicated as potentials for restoration and/or development with natural features. We instructed participants to focus on the areas they knew best and that they did not need to write a response for every single site. Three respondents did not fill out this section – one of those left it blank, and two of those wrote that they did not have any contributions to this section and that they came here to learn. Details provided by workshop participants for each site are provided in Appendix 7.

EDUCATIONAL BROCHURE

Question 5 asked participants to help identify information they would like to see in the educational brochure about Live Oak-Redbay Woodlands. Both sub-questions were designed to help us narrow the best focus for the educational brochure.

The first sub-question asked "What would you like to have more information about?" The following lists those responses in categories we identified once reviewing the responses.

How to landscape and restore:

- 1. How to landscape residences and business sites with natives
- 2. List of natives, butterfly/bird/bee loving natives highlighted
- 3. How to create mottes
- 4. How to restore disturbed land back to native area
- 5. Native landscaping for avian diversification
- 6. Pictorial examples of mottes, enhanced vs restored vs protect
- 7. How to wildscape to get birds and butterflies in your yard

Providing resources:

- 1. Local resources
- 2. Where to find native plant ID info/websites
- 3. Resources available locally and on web
- 4. Where to purchase native plants
- 5. List of natives, butterfly/bird/bee loving natives highlighted

Educating or advocating to specific audiences (developers, landowners, HOA's, land purchasers)

- 1. Effect of HOA regulations to restrict native landscaping
- 2. Educate and influence HOAs to benefit of natives
- Brochure for someone who has just bought a parcel identified by stakeholders as an area that should be preserved or enhanced/restored
- 4. How to change a private land into conservation easements



Overall general education and information:

- 1. Native plants support native habitat. Food and protection for birds/ butterflies/ pollinators/ lizards. Entire ecology grounded in the plants. Way more fun and lively than non-natives that just sit there and are of no use to critter. Want butterflies? Want hummingbirds? Plant native.
- 2. Incorporate natives (some) into traditional sterile residence landscapes and dispel myths about native plants.
- 3. Why mottes and connectivity are so important
- 4. Local birds / local habitat
- 5. Also keeps our soil from eroding
- 6. Trees drink up 20+ gallons fully grown, great since we have a high water table
- 7. Oak wilt info
- 8. Basics of what it is, what species (plants and animals), places to see natural LORB
- 9. Incorporate natives (some) into traditional sterile residence landscapes and dispel myths about native plants.

Summary:

Overall, education and general information: 9

Overall, how to landscape and restore: 7

Overall, providing resources: 5

Overall, educating specific audiences (HOA, developers, land purchasers): 4





The next sub-question asked participants "If the brochure can only cover one objective, which should it be?" and asked them to explain their answer.

Protect – Number of Votes: 4 (5 counting the 'All Three' vote) Why:

- Provides greatest benefit at least cost!
- Protect so you don't have to restore or enhance
- Need to educate people on how important it is to protect natural habitat. Much easier than restoration. (This responder ranked the options – 1 Protect, 2 Enhance, 3 Restore)
- Live Oak / Red Bay is in critical danger of elimination by development. Like in Flour Bluff. When it is gone, it cannot be replaced.

Restore – Number of Votes: 4 (6, counting the 'All Three' and 'Both Restore and **Enhance' votes**)

W<u>hy:</u>

- We had too much damage from 'the' and 'after' the hurricane and lack of ordinances and local plans to protect, new development coming from Ingleside to Rockport and too many reasons to maybe be too difficult or too late for do something about it, but I do also believe it should be at least protect and restore together.
- Very useful, there are many areas that need restoration, there is interest in restoration
- Too late to Protect •

• Restoration will automatically enhance and educate the public about the need for natives Enhance – Number of Votes: 1 (3, counting the 'All Three' and 'Both Restore and **Enhance' votes**)

Why:

Too late to protect. Restore, where possible • let nature take its course. I want to enhance my land to diversify wildlife. PS - we have 2 full grown quarterhorses. (Not a given option) All three – Number

of Votes: 1

Why:

All three – simply by making it a fact • sheet which covers all three = final result. Educate community (especially children). Build an appreciation for our native trees and the importance of mottes.

(Not a given option) Both Restore and

Enhance - Number of Votes: 1 Why:

- What can landowners do currently to enhance their properties. And Go from St. Augustine to natural vegetation (Not a given option) Abstained from voting: 2

During preparation for Workshops 1 and 2, we created the following graphic to illustrate birds that utilize different levels of vegetation within a Live Oak-Redbay Woodland Motte (Figure 10). Without these vegetation layers beneath a live oak tree, the bird diversity decreases substantially. We included this graphic in the hope that it can be useful for those using this report as a resource for their educational and land protection projects.



Figure 10. Representative species that illustrate the diverse bird community and use various layers of vegetation in a Live Oak – Redbay woodland.

The following page shows the final educational brochure created as a result of the stakeholder input and for distribution to increase awareness of Live Oak – Redbay Woodlands on Blackjack, Lamar and Live Oak Peninsulas in Aransas County. A 8.5 in X 11 in printable LORB_Brochure.pdf document is provided in Appendix 8.

The topics for the educational brochure were shaped and driven by the stakeholder input at Workshops 3 and 4. The workshops indicated respondents were most interested in included overall categories narrowed down to: education and general information, how to landscape and restore, providing resources, and educating specific audiences such as Home Owner's Associations and Land Purchasers. Because the nature of this brochure is to be as widely distributable and as generally targeted as possible, the decision was made to eliminate the final category. The workshops also indicated the focus for the brochure should be on protection and restoration, and enhance was eliminated as a category. The next steps were to design information which covered the next three categories, integrate information about this overall project, and overall create a simplistic and easy to read brochure (Figure 11).

The design of the educational graphic showing birds at different stratifications of Live Oak-Redbay Woodland Mottes was adapted in the design of the inside of the educational brochure. The design choice was made to create the inside as a smooth-flowing poster style image instead of breaking it up into three panels. Eye-catching and informative images such as a real Live Oak Tree, real understory plants, and illustrated birds and butterflies were included. Colorful blocks organized the pertinent written information.

The three main text boxes cover three respective categories. The first text box informs the reader of the complex plant community combining Live Oak trees and understory plants into a motte, and explains their significance. The second text box informs the reader that the Live Oak-Redbay

Woodland is in danger due to clear-cutting and replacing the understory with mowed grass, that it is unique to the coastal bend, and encourages them to support community efforts to protect it. The final text box at the bottom of the page highlights "You can help!" by encouraging readers to plant six listed native plants in order to restore mottes and explaining the benefits of doing so which are beautification, providing resources to native wildlife, and natural disaster resiliency. Additionally, a side text box with an arrow asks readers if they would like



diverse wildlife like the birds and butterflies listed at their Live Oak tree – not motte, as the focus of that text box is on those who are doing individual restoration of cleared understory trees – and directs them to the back of the brochure for resources for their restoration project.

The illustrated birds and butterfly species were chosen by Dr. Liz Smith as birds native (resident or migratory) to Aransas County which were also recognizable and charismatic. The six native plant species were chosen as examples due to their importance to Live Oak-Redbay Woodlands, native status, and the overall ease for the average reader to find these plants at nurseries or other local sources.

The front of the brochure is designed to be eye-catching and informative. The intriguing title "Beyond the Tree", used both on the outside and inside, starts at the familiar and valued Live Oak tree and encourages readers to think 'beyond' just that species. The three taglines highlight why this woodland community is important to the landscape, animals, and to human values. The bottom phrase encourages further action and informs the reader of what the inside contents of the brochure are.



The inside flap of the brochure explains more

about the project. It explains the funding by the Coastal Bend Bays & Estuaries Program. It explains the stakeholder involvement in the project. It gives the reader direction on accessing the full text of the project and highlights specific aspects which can be useful in grants. And finally it explains the involvement of the International Crane Foundation and encourages the reader to expect further projects encompassing new habitats.

The back of the brochure lists three local resources within Aransas County that readers can refer to for information, training, and volunteer opportunities. These resources were selected for their involvement in the project and what they can offer to the community at large. The three resource organizations selected are the Mid-Coast chapter of the Texas Master Naturalists, the Aransas-San Patricio Chapter of the Texas Master Gardeners, and the Aransas Pathways project. Each section includes a logo, a URL to visit, and the mission statement of the organization. Overall, one of the main goals of the brochure was to be brief and succinct – a small space of a tri-fold brochure must be focused and give only the most necessary information. Topics were combined and overall the brochure is meant to be both generally informational and a starting point for those most interested in restoration and protection.







Figure 11. Two-sided, tri-fold education brochure that provides an understanding of the importance of Live Oak – Redbay woodland community and provides next steps toward conserving and restoring this rare community in the Texas Coastal Bend. First image is outside page of brochure and second image is "inside" page of brochure.



Figure 11 (continued).
At the beginning of both workshops, we asked respondents "Write on an index card what Live Oak, Lamar, and/or Blackjack Peninsula means to you". The following are their testimonials:

- "The Last Best Place on the Texas Coast."
- "The local ecosystem supports abundant wildlife and provides beauty to support good mental health."
- "Living in approximate center of Live Oak Peninsula on 2.1 acres. Our retirement home. Many relatives on Lamar Peninsula. Like it for the wildlife and climate, and proximity to the National Seashore and Sea Turtle activities. Marine life, littoral, estuarine, shore, inland. Just such a unique environment to live in and partake of."
- "Live Oak peninsula draws me in with the beautiful wind swept oak trees and the abundant natural resources that provides habitats for birds and recreational opportunities for people"



- "This is home. It is somewhere I want to live in for peace and beauty. Wildlife and vegetation is what makes it feel special." (Lamar Peninsula)
- It's my home (Lamar Peninsula)
- It's a place to spend time outside and enjoy all the birds, animals, and water and plants. Live Oak
- Brings me peace. (Blackjack Peninsula)

- I live on Live Oak peninsula and love the <u>trees</u>, the birds, and that it is a peninsula the interaction with the water.
- I find it to be a very beautiful and peaceful place to live.
- Home in all its best meanings. Nature. Healing Atmosphere. Wildlife. A place to learn.
- Live Oak and the other peninsulas provide me a place to live and study an existing, threatened native bio system.
- Live Oak. It is our home!
- A very important habitat with unique species of animals depending on the conservation of the resources in this forest system to survive and thrive (Live Oak Peninsula)





- To me as a citizen-home owner provides protection to my assets from hurricanes, enhances quality of life (Live Oak Peninsula)
- Home of the Big Tree. Diverse wildlife. Pockets of serenity. Last stands of habitat. (Lamar Peninsula)
- Preservation of pristine areas for wildlife, native plants and trees, fishing...
- Birds. Trees. Salt water. Fishing. Boating. Friendly people. Wildlife. In other words, all of it is Paradise.

DISCUSSION & RECOMMENDATIONS

GIS MAP PRODUCT

The development of site inventories for the purpose of protection and restoration are most effective when incorporating GIS technology as a summary of information from multiple sources, identifying key characteristics of each site, and as a tool for adding sites and/or checking progress on site activities. The added value of building a GIS project with multiple layers is balanced by the availability and accuracy of the spatial datasets. In this project, we used publicly available data that can be reproduced independently and updated as newer versions become available. Many of these publicly-available databases are large-scale projects that incorporate vast amounts of acreage at a state or national scope to develop. In turn, this does not provide the level of finer detail needed at the local scope to accurately assess particular questions. However, these databases do provide a fundamental basis to assess the general Live Oak – Redbay Woodland community assemblage, management, and conservation questions within the project area.

<u>Soils</u>. The Galveston-Mustang and Falfurrias are deep coastal sands which are located at the center of the peninsulas and exhibit highest elevations within the project area. It is hard to assess the quality of information this database provides as it is subterranean by nature. This information is provided at a national scope and since they cannot collect soil samples for every location they will sometimes use plant associations to determine the soil type.

<u>Vegetation</u>. We used Live Oak Tree and Live Oak Shrub as proxies for Live Oak – Redbay woodlands. There is a strong correlation of live oak woodlands occurring in areas where deep coastal sands are located. There are only a few instances in which the live oak woodlands are growing in other soil types (grayed). However, at the fine scale of each of the site inventories, individual live oak trees were not classified in the data. The areas where deep sands are located on Live Oak Peninsula with no Live Oak growth can



potentially be explained by heavy development of the area.

<u>StratMap</u>. The land parcel database used in this project is a valuable tool, however, in areas of increasing development may be inaccurate due to the complexity involved in updating the information. For example, identified land parcels from local stakeholders show that one area could be owned by multiple individuals, but within the StratMap it is identified as one tract of land. This proves problematic when using the StratMap to identify areas of restoration or connectivity, as the ownership and amount of land is uncertain.

<u>Tax Exempt and Protected Lands</u>. The amount of tax exempt and protected lands amongst the peninsulas vary greatly between peninsulas, which can likely be explained by extensive urbanization and development on Live Oak Peninsula and complete protection on Blackjack Peninsula through Aransas National Wildlife Refuge. Lamar Peninsula has the next most tax exempt and protected lands with patchy urbanization. Most of the tax exempt and protected areas include the Lamar Unit of the Aransas National Wildlife Refuge, Goose Island State Park, state-owned lands, nongovernmental protected lands and conservation easements on private lands. Live Oak Peninsula has the most urbanization and human impact, which leads to very little protected land. Although, there are many tax exempt parcels on Live Oak Peninsula. There are 13 times more exempt parcels than the Lamar Peninsula, which emphasizes the level of urbanization and human impact there is on Live Oak Peninsula. The database used for identifying protected lands is developed at a national level and is updated every couple of years. Since it is periodically updated, the most recent version may not include the latest acquisitions by government agencies or non-government organizations that would receive protected status.

There are 32 city and county parks located on Live Oak Peninsula but total less 1.0% of the total available area. They are tiny segmented parcels scattered throughout the peninsula. On Lamar Peninsula, those numbers decrease significantly, however, Goose Island State Park provides recreational opportunities for a modest entry fee.

STAKEHOLDER WORKSHOPS

A total of four stakeholder workshops were held, with two on May 15th and two on June 14th. The goal of the May 15th meeting was to collect stakeholder sites of conservation interest, including those which should be protected, restored, developed with natural features, or those sites which were considered 'favorites'. The goal of the June 14th meeting was to gather leaders in development, realty, business, and government to overview and discuss the previously selected sites, gather information requests for the educational brochure, propose connectivity between sites, and gauge baseline preferences about protection and restoration across both peninsulas, homes, and businesses.



Workshops 1 and 2, Benefits and Positive Outcomes:

- ICF collected a large amount of map data from a small amount of participants
- Participants were informed and knowledgeable about conservation issues and their local landscape
- Participants were engaged and interested in conservation
- Participants were excited to learn more about the Live Oak-Redbay Woodlands
- Participants were eager to label the maps



Workshops 1 and 2, Drawbacks and Challenges:

- Some participants did not read written directions carefully, and mistakes were found on the response sheets
- Some participants did not listen closely to verbal instructions, and mistakes were found on the response sheets and maps
- Though we offered the option of exploring the in-depth GIS maps and locations, no participants chose to use them
- Some participants had trouble interpreting the color coding on the map and identified non-Live Oak habitats

Workshops 3 and 4, Benefits and Positive Outcomes:

- Many participants were interested in learning more about Live Oak-Redbay Woodlands
- Was attended by the manager of Goose Island State Park
- Was attended by councilman of the City of Rockport
- Received a good amount of high quality data from the low amount of participants

Workshops 3 and 4, Drawbacks and Challenges:

• Only one realtor or developer attended the workshops

- Business leaders were not represented at the workshops
- Very few city or county officials attended the workshops
- Strong personalities in the room led to a couple instances of derailing of conversation



Workshops, Benefits and Positive Outcomes:

- All workshops included residents and frequent visitors of both Live Oak and Lamar Peninsulas
- Excellent engagement and passion from participants
- Overall, a great amount of data was provided
- Participants were excited about the project
- Participants enjoyed seeing maps and learning more about lands in their communities
- Participants engaged with partner organizations who had informational tables set up at workshops
- Attendance at all four of the workshops, showing the time separation was important for people to have their choice of attending.

All Workshops, Drawbacks and Challenges:

- Low turnout for all workshops. We believe this is due to a multitude of factors, including but not limited to:
 - Advertising and invitations were only done through email. This was a targeted choice but still could have led to lower turnout.
 - Ease of cancellation we received many cancellations or 'can not attend' emails right before the workshops.
 - Assumption that there were other opportunities to contribute outside of the workshops. We did not give this as an option and emphasized the importance of

these workshops, but received some responses that indicated interest in 'future' events or progress.

While the passion and knowledge was appreciated, many participants were very focused on telling us about past projects, personal projects, or other issues outside of the narrow scope of this project. Though we clearly laid out limitations, expectations, and what this project would do, participants were sometimes more interested in expressing concerns about other local planning efforts underway.



- Some participants misunderstood the scope of this project and assumed it to be much more general in its focus, even after extensive explanation. These participants wanted to discuss overall conservation policies and laws, philosophical and principle-focused conservation ideology, and/or conservation issues related to non-Live Oak habitat or outside of Aransas County.
- Some participants misunderstood the role of the International Crane Foundation in this project as well as our role on a city and county level. Some of these participants thought the International Crane Foundation: would give them grants for projects, was in charge of legal enforcement of conservation laws or other policies, would be turning this project into a legally enforceable policy, would be executing conservation of each area, and/or was deciding future development plans on a city level.
- It was difficult for some participants to understand that this project's goal was to inform and serve as a resource for the public, not to be an enforceable law or policy. We tried to balance emphasizing importance of this project with caveats about its scope, and feel some participants conflated the importance with its level of enforceability.

SITE INVENTORY

The process in identifying sites with three categories presented a learning challenge at the beginning, however, the participants worked in groups and developed a process to locate 21 sites for potential conservation, restoration and/or development with natural features (Table 4). The importance of using a satellite image as a base map in the site inventory portfolio provided more vegetation detail at the scale of the parcels than the vegetation base map. Additional mapping should be conducted when the site is evaluated further for a conservation strategy.

This process can be, and should be, continued to increase local participation and increase the number of sites; future versions can be updated as more workshops are conducted. It became obvious that more education is needed for the general public to understand how unique and rare Live Oak – Redbay woodland communities are, and how they contribute to our aesthetic beauty and as a destination for permanent residents and visitors.

At the beginning of this project, one of the objectives involved identifying sites for restoration to be used in another ongoing CBBEP project contracted to Texas Mid-Coast Master Naturalists (led by Ray Kirkwood). After the destruction of Hurricane Harvey in August 2019, the cleanup of entire homes and businesses, toppled trees, and debris resulted in the devastation of the Live Oak – Redbay understory vegetation. An invasive grass, guinea grass, quickly established under live oak trees and into adjacent prairie, yard, and right-of-ways. The restoration of this woodland community will take many years and concentrated effort by volunteers, home and business owners. Thus, the importance of this Live Oak – Redbay project has increased, both as a hands-on project that can volunteers can engage in and help the recovery of our native woodlands. For more information, contact the CBBEP and TMCMN on their websites.

EDUCATIONAL BROCHURE

The range of interests in the development of this project's brochure focused on an "introductory" message to provide linkages to this report and appendices, the brochure, and to the partners invested in the protection and restoration of Live Oak – Redbay woodlands in the Texas Coastal Bend. We are exploring the best venue for distributing the brochures and will continue to work with our partners to provide these as key locations. At this point, our primary distribution will be focused on the Hummerbird Festival held every September in Rockport, Texas. We suggest that the current TMCMN project develop another brochure and website



information that would include their suggestions for plant propagation training, design of nursery tables, and list of resources for plant materials.

The success of these project is entirely dependent upon generating interest and engagement of residential, commercial, and as plans for future development continue in Aransas County. Our recommendations for local organizations which could aid in future community workshops and conservation projects are listed below. Please note that these groups are listed for collaborative opportunities for individual and grant-funded projects, and are not organizations which give out grants.

- Rockport City Council
 - o https://www.cityofrockport.com/70/City-Council
- Rockport Mayor
 - Email: <u>Mayor@CityOfRockport.com</u>
- Rockport Realtor's Association Board
 - Contact Information: https://www.usamls.net/rockport/default.asp?content=contact&menu_id=56084
- Aransas County Commissioner's Court
 - o http://www.aransascountytx.gov/commissioners/
- Rockport-Fulton Chamber of Commerce
 - Contact Information: (<u>president@1rockport.org</u>)
- City of Rockport Parks Board
 - Contact Information: (parks@cityofrockport.com)
- Town of Fulton Council and Mayor
 - Contact Information: <u>https://www.fultontexas.org/people/</u>
- Aransas Pathways
 - o Contact Information: info@aransaspathways.com
- Texas Master Naturalist Mid Coast Chapter
 - Contact Information: <u>https://midcoast-tmn.org/contact-us/</u>
- Aransas/San Patricio Texas Master Gardeners
 - More information: <u>http://aspmastergardeners.org/</u>
- Texas Agrilife Extension Office
 - More Information: <u>https://aransas.agrilife.org/</u>
- Friends Of Connie Hagar
 - Contact information: (361) 229-5484 ; friendsofconniehagar@live.com
- Friends of Aransas Wildlife Refuge
 - More information: <u>https://friendsofaransas.wildapricot.org/</u>; <u>https://www.facebook.com/friendsofaransas/</u>
- University of Texas Marine Science Institute
 - More Information: <u>https://utmsi.utexas.edu/</u>
- Aransas County Navigation District
 - Contact information: <u>aransasnav1@yahoo.com</u>

Finally, we would like to reiterate the main impetus behind the International Crane Foundation requesting the lead on this CBBEP project focused on a terrestrial habitat. Our Texas Program's main species target involves the federally endangered Whooping Crane of which the last, naturally sustaining wild population winters only in the Texas Coastal Bend. However, this species depends upon the health of the coastal ecosystem to assure its continued recovery. The continued development and the associated traditional straight-ditch drainage of the uplands of coastal peninsulas can decrease the quality of coastal marshes, seagrasses, and bays. The ICF Texas Program is using the approach detailed in this CBBEP report to extend into coastal prairies and marshes that provide the interface between the uplands and the bays. Therefore, these results and recommendations form the first phase of a comprehensive conservation plan for Live Oak and Lamar peninsulas as well as Seadrift – Port O'Connor Ridge and similar coastal habitats in Matagorda Bay System.



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Appendix 1: Stakeholder Workshop Response Sheet 1

<u>Live Oak – Redbay Woodland Conservation Plan Response Sheet 1</u>

Full Name and Initials:

Email:

1. Where are your favorite natural places on Live Oak Peninsula with Live Oak habitat?

Please label these places by drawing a circle around each one on the map with a black pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short location description and why it is one of your favorites (value of natural landscape, beauty, spiritual connection, etc.)

| Add | Give Name, general location | Briefly describe why? |
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Which of these favorite places <u>could you not live without?</u> Please place a star in the left margin!

Live Oak – Redbay Woodland Conservation Plan Response Sheet 1

Full Name and Initials:

Email:

2. Where are your favorite natural places on Lamar Peninsula with Live Oak habitat?

Please label these places by drawing a circle around each one on the map with a black pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short location description and why it is one of your favorites (value of natural landscape, beauty, spiritual connection, etc.)

| Add | Give Name, general location | Briefly describe why? |
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Which of these favorite places <u>could you not live without?</u> Please place a star in the left margin!

<u>Live Oak – Redbay Woodland Conservation Plan Response Sheet 1</u>

Full Name and Initials:

Email:

3. Where are places on Live Oak Peninsula that have Live Oak habitat that you would like to see protected?

Please label these places by drawing a circle around each one on the map with a blue pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short location description and why it is one of your favorites (value of natural landscape, beauty, spiritual connection, etc.)

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<u>Live Oak – Redbay Woodland Conservation Plan Response Sheet 1</u>

Full Name and Initials:

Email:

4. Where are places on Lamar Peninsula that have Live Oak habitat that you would like to see protected?

Please label these places by drawing a circle around each one on the map with a blue pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short location description and why you would like to see it protected.

| Add | Give Name, general location | Briefly describe why? |
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Live Oak - Redbay Woodland Conservation Plan Response Sheet

Full Name and Initials:

Email:

5. Where are places on Live Oak Peninsula that have Live Oak trees, but limited understory or other habitats, that you would like to see restored?

Please label these places by drawing a circle around each one on the map with a red pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short description of the kind of restoration you would like to see.

| Add | Give Name, general location | Briefly describe restoration possibilities: |
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Live Oak - Redbay Woodland Conservation Plan Response Sheet

Full Name and Initials:

Email:

6. Where are places on Lamar Peninsula that have Live Oak trees, but limited understory or other habitats, that you would like to see restored?

Please label these places by drawing a circle around each one on the map with a red pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short description of the kind of restoration you would like to see.

| Add | Give Name, general location | Briefly describe restoration possibilities: |
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Live Oak – Redbay Woodland Conservation Plan Response Sheet 1

Full Name and Initials:

Email:

7. Do you know of any land that is for sale, has been purchased, and/or will be developed on

Live Oak Peninsula that you would like to see developed in a way that uses natural features?

Please label these places by drawing a circle around each one on the map with a purple pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short description of the kind of development you would like to see (native plant landscaping, living hedges/fences, preserving specific features, etc.)

| Add Initials | Give Name, general location | Briefly describe development possibilities: (Continue on back if needed) |
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Live Oak – Redbay Community Conservation Plan Response Sheet 1

Full Name and Initials:

Email:

8. Do you know of any land that is for sale, has been purchased, and/or will be developed on

Lamar Peninsula that you would like to see developed in a way that uses natural features?

Please label these places by drawing a circle around each one on the map with a purple pen. Then write your initials and the corresponding number inside the circle. On this sheet, write the name of each place and a short description of the kind of development you would like to see (native plant landscaping, living hedges/fences, preserving specific features, etc.)

| Add Initials | Give Name, general location | Briefly describe development possibilities: |
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Appendix 2: Stakeholder Workshop Response Sheet 2

Live Oak - Redbay Woodland Conservation Plan Response Sheet 2

Full Name and Initials:

Email:

1. Review and Refine Primary Objectives: (Individual)

Please write down the amount of each area you believe should be protected, restored, or enhanced.

Protect _____% of Live Oak – Redbay Woodland Community on Live Oak Peninsula (in Aransas County)

Protect _____% of Live Oak - Redbay Woodland Community on Lamar Peninsula

Restore _____% of Live Oak – Redbay Woodland Community on Live Oak Peninsula (in Aransas County)

Restore _____% of Live Oak – Redbay Woodland Community on Lamar Peninsula

How much of a residential property or development with Live Oak trees should be enhanced with native understory plants to create a LORB motte for birds and butterflies? _____%

How much of a commercial development with Live Oak trees should be enhanced with native understory plants to create a LORB motte for birds and butterflies? _____%

Live Oak – Redbay Woodland Conservation Plan Response Sheet 2

Full Name and Initials:

Email:

2. Discuss current protected, park and tax exempt lands that include Live Oak – Redbay Woodlands (Breakout Group)

Did anything on these maps surprise you?

Do you see anything missing?

Live Oak – Redbay Woodland Conservation Plan Response Sheet 2

Full Name and Initials:

Email:

4. Review areas for Motte restoration and developing with natural features concept. These categories and sites were selected by community stakeholders.

"Restore" : to return to a previous naturalistic state, especially by planting native understory plants to create a Motte.

"Develop using Natural features" : when developing the area, leave a pre-determined amount of the natural landscape intact and use native plants for landscaping needs.

- HEB Live Oak Lodge Restore
 - Notes and Suggestions:
- Pearl Point Apartment Development Develop using Natural Features
 - Notes and Suggestions:
- Memorial Park Restore
 - Notes and Suggestions:

- Little Bay Primary Develop using Natural Features
 - Notes and Suggestions:

- Camp Aranzazu Restore, Develop using Natural Features
 - Notes and Suggestions:
- First Baptist Rockport church Develop using Natural Features
 - Notes and Suggestions:
- St. Peter's Episcopal church Develop using Natural Features
 - Notes and Suggestions:
- Wings Rescue Restore
 - Notes and Suggestions:
- Bahia Bay Entrance Restore, Develop using Natural Features
 - Notes and Suggestions:
- Goose Island State Park Restore
 - Notes and Suggestions:

5. Identify information needs to develop education brochure.

What would you like to have more information about? (Such as: how to create mottes, native landscaping, or local resources to contact)

If the brochure can cover only <u>one</u> objective, which should it be? Please circle one and write why you selected it.

Protect

Restore

Enhance

Why?

APPENDIX 3 (SEPARATE FOLDER)

APPENDIX 4

Appendix 4. Bird checklist providing habitat preferences and nesting information from Aransas National Wildlife Refuge Bird Checklist. species highlighted in yellow primarily use Forest/Woodland; species highlighted in green use Forest/Woodland followed by Brushland; species highlighted in blue use Forest/Woodland then Aquatic and Marsh; and, species highlighted in gray use Brushland then Forest/Woodland habitat preference. Additions are indicated in red, deletions are marked as a strikethrough (<u>https://www.audubon.org/bird-guide</u>).

| | | | Relative | |
|---------------------------|------------------|-----------------|-----------------------|----------|
| | | | Abundance/ | Nesting |
| Common Name | Habitat 1 | Habitat 2 | Timing | Status |
| Wild Turkey | Forest/Woodland | Brushland | Year-round | |
| Sharp-shinned Hawk | Forest/Woodland | Brushland | Year-round | |
| Cooper's Hawk | Forest/Woodland | Brushland | Year-round | |
| Red-shouldered Hawk | Forest/Woodland | Brushland | Year-round | Regular |
| | | | common | |
| Broad-winged Hawk | Forest/Woodland | Brushland | migrant | |
| Rock Pigeon | Forest/Woodland | Brushland | migrant | |
| Common Ground-Dove | Brushland | Forest/Woodland | Year-round, | Past |
| | | | common | |
| Inca Dove | Forest/Woodland | Brushland | Year-round | Regular |
| Yellow-billed Cuckoo | Forest/Woodland | Brushland | Common | Regular |
| | | | breeding | |
| Black-billed Cuckoo | Forest/Woodland | Brushland | Uncommon | Regular |
| | | | migrant | |
| Groove-billed Ani | Forest/Woodland | Brushland | Uncommon | |
| Born Orvil | Equat/Woodland | Druchland | winter Common worr | Deculor |
| Balli Owl | Forest/woouraliu | Drusilialiu | common year- | Regulai |
| Eastern Screech-Owl | Forest/Woodland | Brushland | Common year- | Regular |
| | | Diubiliuliu | round | noguna |
| Great Horned Owl | Forest/Woodland | Brushland | Common year- | Regular |
| | | | round | U |
| Barred Owl | Forest/Woodland | | Uncommon | Regular |
| | | | year-round | |
| Common Pauraque | Forest/Woodland | Brushland | Common year- | Regular |
| | | | round | |
| Chuck-will's-widow | Forest/Woodland | Brushland | Common | |
| | | D | migrant | |
| wnip-poor-will | Forest/woodland | Brusmand | Uncommon | |
| Ruby-throated Humminghird | Forest/Woodland | Brushland | Uncommon | Regular |
| Ruby-unbaced Hummingond | | Drusinand | breeding | Regular |
| Green Violetear | Forest/Woodland | Brushland | N Mexico. | |
| | | | nomadic | |
| Buff-bellied Hummingbird | Forest/Woodland | Brushland | Year-round | Regular |
| | | | uncommon | <u> </u> |
| Rufous Hummingbird | Forest/Woodland | Brushland | Winter NE Gulf | |
| | | | of Mexico | |

| | | | Relative | |
|---------------------------|-----------------|------------|-----------------------------|---------|
| | TT 1 • 1 | TT 1 1 4 0 | Abundance/ | Nesting |
| Common Name | Habitat I | Habitat 2 | Timing | Status |
| Red-headed Woodpecker | Forest/Woodland | | Uncommon winter | |
| Acorn Woodpecker | Forest/Woodland | | | |
| Golden-fronted Woodpecker | Forest/Woodland | | Year-round | Regular |
| Yellow-bellied Sapsucker | Forest/Woodland | | Common winter | |
| Red-naped Sapsucker | Forest/Woodland | | | |
| Ladder-backed Woodpecker | Forest/Woodland | Brushland | Uncommon year-round | Regular |
| Downy Woodpecker | Forest/Woodland | | Uncommon all | |
| Northern Flicker | Forest/Woodland | Brushland | Common winter | |
| Pileated Woodpecker | Forest/Woodland | | Uncommon E Tx year-round | |
| Olive-sided Flycatcher | Forest/Woodland | Brushland | Common migrant | |
| Eastern Wood-Pewee | Forest/Woodland | Brushland | Common migrant | |
| Yellow-bellied Flycatcher | Forest/Woodland | Brushland | Common | |
| Acadian Flycatcher | Forest/Woodland | Brushland | Common migrant | |
| Alder Flycatcher | Forest/Woodland | Brushland | Common migrant | |
| Willow Flycatcher | Forest/Woodland | Brushland | Common migrant | |
| Least Flycatcher | Forest/Woodland | Brushland | Common migrant | |
| Eastern Phoebe | Forest/Woodland | Brushland | Common Winter | |
| Great Crested Flycatcher | Forest/Woodland | Brushland | uncommon | Regular |
| Brown-crested Flycatcher | Forest/Woodland | Brushland | Uncommon breeding | Regular |
| White-eyed Vireo | Forest/Woodland | Brushland | Common year- round | Regular |
| Yellow-throated Vireo | Forest/Woodland | | Common migration | |
| Plumbeous Vireo | Forest/Woodland | | | |
| Blue-headed Vireo | Forest/Woodland | | Common winter | |
| Warbling Vireo | Forest/Woodland | | Common migrant | |
| Philadelphia Vireo | Forest/Woodland | | Uncommon | |
| Red-eyed Vireo | Forest/Woodland | | Common | |
| Yellow-green Vireo | Forest/Woodland | | Rare S Tx | |
| Blue Jay | Forest/Woodland | Brushland | Uncommon | |
| | | | winter | |

| | | | Relative | |
|---|---|------------------------|--|-----------|
| | | | Abundance/ | Nesting |
| Common Name | Habitat 1 | Habitat 2 | Timing | Status |
| Green Jay | Forest/Woodland | | Uncommon | ? |
| Devela Mantin | E = == = (XV = = 11 = = 1 | Dura 1-1 1 | year-round | Dest |
| Purple Martin | Forest/woodland | Brushland | Common | Past |
| Northan Daugh winged | Equat/We addard | Davahland | breeding Crantel and | |
| Northern Kougn-winged | Forest/woodland | Brushland | Grassiana | |
| Bank Swallow | Forest/Woodland | Bruchland | Common | Possible |
| Dank Swanow | | Drusinand | migrant | 1 OSSIDIC |
| Cliff Swallow | Forest/Woodland | Brushland | Uncommon | Regular |
| | | Drusinana | breeding | Regulai |
| Barn Swallow | Forest/Woodland | Brushland | Uncommon | Regular |
| | | | breeding | 8 |
| Carolina Chickadee | Forest/Woodland | Brushland | Common year- | Regular |
| | | | round | U |
| Tufted Titmouse | Forest/Woodland | Brushland | Uncommon | Regular |
| | | | year-round | |
| Black-crested Titmouse | Forest/Woodland | Brushland | Common year- | Regular |
| | | | round | |
| Red-breasted Nuthatch | Forest/Woodland | | Uncommon | |
| | | | Winter | |
| Brown Creeper | Forest/Woodland | | Uncommon | |
| | | | Winter | |
| Bewick's Wren | Brushland | Forest/Woodland | Common year- | Regular |
| | | | round | |
| Carolina Wren | Forest/Woodland | Brushland | Uncommon | Regular |
| | | D 11 1 | year-round | |
| House wren | Forest/Woodland | Brushland | Common winter | |
| Winter Wren | Forest/Woodland | Brushland | Uncommon | |
| | | D 11 1 | winter | |
| Golden-crowned Kinglet | Forest/woodland | Brushland | Uncommon | |
| Dubu manus d Kin alat | Equat/We addard | Davahland | winter Communitation | |
| Ruby-crowned Kinglet | Forest/woodland | Brushland | Common winter | D |
| Blue-gray Gnatcatcher | Forest/Woodland | Brushland | Uncommon | Past |
| | | | year-rouna, different in div | |
| Veen | Forest/Woodland | | aijjereni inaiv. | |
| Veery | Forest/ woouland | | wigrant | |
| Grav-cheeked Thrush | Forest/Woodland | | Common | |
| Gray checked Thrush | | | miorant | |
| Swainson's Thrush | Forest/Woodland | | Common | |
| | - or obtaining | | | |
| | | | migrant | |
| Hermit Thrush | Forest/Woodland | Brushland | <i>migrant</i> <i>Common winter</i> | |
| Hermit Thrush Wood Thrush | Forest/Woodland | Brushland | Common winter | |
| Hermit Thrush Wood Thrush | Forest/Woodland Forest/Woodland | Brushland Brushland | Common winter Common migrant | |
| Hermit Thrush Wood Thrush Clay-colored Thrush | Forest/Woodland Forest/Woodland Forest/Woodland | Brushland Brushland | Common winter Common migrant Rare from NE | |

| | | | Relative | |
|--------------------------------|-----------------|-----------|---|---------|
| Common Name | Habitat 1 | Habitat 2 | Abundance/ | Nesting |
| American Robin | Forest/Woodland | Brushland | Common Winter | Status |
| Grav Cathird | Forest/Woodland | Brushland | Common Winter | |
| Brown Thrasher | Forest/Woodland | Brushland | Common Winter | |
| Long-billed Thrasher | Forest/Woodland | Brushland | Southernmost Tx | Regular |
| European Starling (non-native) | Forest/Woodland | Brushland | Common year- round | Regular |
| Cedar Waxwing | Forest/Woodland | Brushland | Common winter, sporadic movement | |
| Blue-winged Warbler | Forest/Woodland | | Uncommon migrant | |
| Golden-winged Warbler | Forest/Woodland | | Uncommon migrant | |
| Tennessee Warbler | Forest/Woodland | | Common migrant | |
| Orange-crowned Warbler | Forest/Woodland | | Common winter | |
| Nashville Warbler | Forest/Woodland | | Common migrant | |
| Northern Parula | Forest/Woodland | | Common migrant | |
| Tropical Parula | Forest/Woodland | | Uncommon breeder, S Tx | |
| Yellow Warbler | Forest/Woodland | | Common migrant | |
| Chestnut-sided Warbler | Forest/Woodland | | Common migrant | |
| Magnolia Warbler | Forest/Woodland | | Common migrant | |
| Black-throated Blue Warbler | Forest/Woodland | | Uncommon migrant | |
| Yellow-rumped Warbler | Forest/Woodland | Brushland | Common winter | |
| Black-throated Gray Warbler | Forest/Woodland | Brushland | Uncommon migrant | |
| Golden cheeked Warbler | Forest/Woodland | | Migrant interior west of Gulf coast | |
| Black-throated Green Warbler | Forest/Woodland | | Common migrant | |
| Townsend's Warbler | Forest/Woodland | | | |
| Blackburnian Warbler | Forest/Woodland | | Uncommon migrant | |
| Yellow-throated Warbler | Forest/Woodland | | Uncommon migrant | |
| Pine Warbler | Forest/Woodland | | Uncommon winter | |

| | | | Relative | |
|-------------------------|------------------|------------------|---------------------|---------|
| | | | Abundance/ | Nesting |
| Common Name | Habitat 1 | Habitat 2 | Timing | Status |
| Prairie Warbler | Forest/Woodland | Brushland | | |
| Bay-breasted Warbler | Forest/Woodland | | Common | |
| | | | migrant | |
| Blackpoll Warbler | Forest/Woodland | | Uncommon | |
| | | | migrant E Tx | |
| Cerulean Warbler | Forest/Woodland | | Uncommon | |
| | | | migrant | |
| Black-and-white Warbler | Forest/Woodland | Brushland | Uncommon | |
| | | | winter | |
| American Redstart | Forest/Woodland | | Common | |
| | | | migrant | |
| Prothonotary warbler | Forest/woodland | | Common | |
| Worm esting Worklor | Equat/Woodland | | <i>migrant</i> | |
| worm-eating warbier | Forest/woodialid | | Uncommon | |
| Sweinson's Warblar | Eorost/Woodland | Bruchland | Common | Dogular |
| Swamson's warbier | | Drusilialiu | wigrant | Regulai |
| Ovenhird | Forest/Woodland | Brushland | Common | |
| Ovenond | | Drusilland | miorant | |
| Northern Waterthrush | Forest/Woodland | Marsh | Common | |
| | | ivia bii | migrant | |
| Louisiana Waterthrush | Forest/Woodland | Marsh | Uncommon | |
| | | | migrant | |
| Kentucky Warbler | Forest/Woodland | | Common | |
| | | | migrant | |
| Connecticut Warbler | Forest/Woodland | | | |
| Mourning Warbler | Forest/Woodland | | Common | |
| | | | migrant | |
| Hooded Warbler | Forest/Woodland | Brushland | Common | Past |
| | | | migrant | |
| Wilson's Warbler | Forest/Woodland | Brushland | Uncommon | |
| | | | winter | |
| Canada Warbler | Forest/Woodland | | Common | |
| | | | migrant | |
| Red faced Warbler | Forest/Woodland | | | |
| Painted Redstart | Forest/Woodland | | | |
| Yellow-breasted Chat | Forest/Woodland | Brushland | Uncommon migrant | Regular |
| Summer Tanager | Forest/Woodland | | Common breeder | Regular |
| Scarlet Tanager | Forest/Woodland | | Common | |
| | | | migrant | |
| Western Tanager | Forest/Woodland | | Uncommon | |
| | | | migration | |
| Spotted Towhee | Brushland | Forest/Woodland | Uncommon | |
| | | | winter | |

| | | | Relative | |
|----------------------------|-----------------|-----------------|-----------------|---------|
| | | | Abundance/ | Nesting |
| Common Name | Habitat 1 | Habitat 2 | Timing | Status |
| Eastern Towhee | Brushland | Forest/Woodland | Common winter | |
| Chipping Sparrow | Brushland | Forest/Woodland | Common winter | |
| Brewer's Sparrow | Brushland | Forest/Woodland | | |
| White-throated Sparrow | Brushland | Forest/Woodland | Common winter | |
| Dark-eyed Junco | Brushland | Forest/Woodland | Uncommon | |
| | | | winter | |
| Crimson-collared Grosbeak | Forest/Woodland | Brushland | NE Mexico, S Tx | |
| Northern Cardinal | Forest/Woodland | Brushland | Common year- | Regular |
| | | | round | |
| Rose-breasted Grosbeak | Forest/Woodland | | Common | |
| | | | migrant | |
| Black-headed Grosbeak | Forest/Woodland | Brushland | | |
| Purple Finch | Forest/Woodland | Brushland | E Tx | |
| House Finch | Forest/Woodland | Brushland | Rare coastal | |
| Pine Siskin | Forest/Woodland | Brushland | Uncommon | |
| | | | winter | |
| Lesser Goldfinch | Forest/Woodland | Brushland | Rare coastal | |
| American Goldfinch | Forest/Woodland | Brushland | Common winter | |
| House Sparrow (non-native) | Forest/Woodland | Grassland | Common year- | |
| | | | round | |





APPENDIX 5
Appendix 5. Butterfly and moth checklist (ANWR) associated plant relationships (Lehman et al. 2005; Tveten and Tveten. 1996; Wauer 2004), and habitat use (<u>https://plants.sc.egov.usda.gov/java/; https://www.wildflower.org/plants/</u>).

| Common Name | Scientific Name | Abundance | Food Plants and/or Larval Hosts | Habitat Affinities |
|------------------------------|---------------------------|-----------|--|--|
| Swallowtails (Family Papilio | nidae) | | | |
| Eastern Tiger Swallowtail | Papilio glaucus | Stray | Ash, black cherry, various other trees | riparian |
| Pipevine Swallowtail | Battus philenor | Abundant | Various pipe-vines in the genus Aristolochia | Sandy soils in openings and prairies, edge of brush |
| Spicebush Swallowtail | Papilio troilus | Stray | Spicebush and sassafrass in woodlands. Red bay and sweet bay reported. | Common in deep coastal sands , usually with oak |
| Palamedes Swallowtail | Papilio palamedes | Abundant | Red bay . Sassafrass and sweet bay also reported | Common in deep coastal sands , usually with oak |
| Giant Swallowtail | Papilio cresphontes | Abundant | Cultivated citrus, lime prickly-ash, common hop- tree | -; various soils in brushy thickets, mottes , wooded stream beds; occasional on sand along streams |
| Whites and Sulphurs (Family | Pieridae) | | | Sucurity |
| Falcate Orangetip | Anthocharis midea | Uncommon | Spring-cress and other wild mustards | Near streams, river terraces |
| Large Orange Sulphur | Phoebis agarithe | Abundant | Woody legumes | brushy |
| Statira Sulphur | Aphrissa statira | Stray | Scarletbush, Nectar from red flowers | Hammocks, coastal dunes, shell middens |
| Hairstreaks (Family Lycaenie | dae, Subfamily Theclinae) | | | |
| Oak Hairstreak | Satyrium favonius | Rare | Various oaks (larva), flower nectar | oaks |
| Soapberry Hairstreak | Phaeostrymon alcestis | Common | Western soapberry | Frequent in sandy mottes and woods or along streams |
| Red-Banded Hairstreak | Calycopis cecrops | Stray | Sumacs, wax myrtle, crotons, oaks | oaks |

| Common Name | Scientific Name | Abundance | Food Plants and/or Larval Hosts | Habitat Affinities |
|------------------------------|------------------------------|----------------|--|--|
| Dusky-Blue Groundstreak | Calycopis isobeon | Abundant | Dead leaves and fruits | General |
| Blues (Family Lycaenidae, S | Subfamily Polyommatinae) |) | | |
| Marine Blue | Leptotes marina | Rare | Many legumes, legwort | brushy |
| Ceraunus Blue | Hemiargus ceraunus | Abundant | Numerous herbaceous and woody legumes | brushy |
| Reakirt's Blue | Echinargus isola | Common | Variety of legumes | brushy |
| Metalmarks (Family Riodin | ae) | | | |
| Rounded Metalmark | Calephelis perditalis | Uncommon | Boneset (Crucita) | Frequent various soils in thickets, mottes , and low woods , sometimes in openings |
| Longwings and Fritillaries (| Family Heliconiidae) | | | |
| Gulf Fritillary | Agraulis vanillae | Common | Passion-flower species | Frequent in live oak mottes |
| Julia Heliconian | Dryas iulia | Stray | Passion-flowers | Woodland, edges |
| Variegated Fritillary | Euptoieta claudia | Abundant | Passion-flower , violets, pansies, etc | Woodland, edges |
| Crescents, Checkerspots, an | nd Patches (Family Nymph | <u>alidae)</u> | | |
| Elada Checkerspot | Texola elada | Rare | Hairy tube-tongue, flower nectar | Ditch banks Guadalupe R, often shaded |
| Typical Brushfoots (Family | Nymphalidae) | | | |
| Question Mark | Polygonia interrogationis | Uncommon | Elm and hackberry species. Nettle, false nettle, and hops | woods |
| Red Admiral | Vanessa atalanta | Common | Nettle, false nettle, and pellitory | Various soils in pastures and woods |
| American Lady | Vanessa virginiensis | Abundance | Everlasting, cudweed, pussytoes, evax, and other Asteraceae. | (2nd– occasional in sandy woods along the coast |
| White Peacock | Anartia jatrophae | Common | Water hyssop (Bacopa), Ruellia, and Lippia, shepherds needle | Open wetlands, riparian |

| Common Name | Scientific Name | Abundance | Food Plants and/or Larval Hosts | Habitat Affinities | | |
|---|-----------------------------|-------------------|---|--|--|--|
| Viceroy | Limenitis archippus | Common | Limited to willows that generally grow only in moist soils | Wetlands, riparian | | |
| Common Mestra | Mestra amymone | Common | Noseburn | Various soils pastures and woods | | |
| Goatweed Leafwing | Anaea andria | Uncommon | Crotons including goatweed | Adjacent to wooded areas, feeds on ripe fruit and sap, regularly perches on woody plants | | |
| Hackberry Emperor | Asterocampa celtis | Common | Hackberry species | Hackberry woodlands - rarely found far from them | | |
| Empress Leilia | Asterocampa leilia | Uncommon | Elm (larva), Sap, dung, and flower nectar (adult) | Hackberry woodlands , perches on higher vegetation, but also commonly perches on roadways and trails | | |
| Tawny Emperor | Asterocampa clyton | Common | Hackberry species | Hackberry woodlands , feeds on fresh sap | | |
| American Snout | Libytheana carinenta | Abundant- Rare | Hackberry species | Hackberry woodlands | | |
| <u>Satyrs (Family Satyridae)</u> | | | | | | |
| Carolina Satyr | Hermeuptychia sosybius | Common | Limited to grasses | Shady woodlands, sometimes ventures into more open areas such as roadsides, trails, and gardens | | |
| Gemmed Satyr | Cyllopsis gemma | Uncommon | Limited to grasses | Woodland butterfly, rarely visits flowers in open areas | | |
| Spread-wing Skippers (Fami | ly Hesperiidae, Subfamily I | <u>Pyrginae)</u> | | - | | |
| Sickle-Winged Skipper | Eantis thraso | Common | Various citrus trees and pricklyash | brushy | | |
| Horace's Duskywing | Erynnis horatius | Common | Limited to Oaks | oaks | | |
| Mournful Duskywing | Erynnis tristis | Uncommon | Limited to Oaks | oaks | | |
| Turk's Cap White-Skipper | Heliopetes macaira | Uncommon | Mallows, especially Turk's Cap | Along edges of wooded areas and trails | | |
| Grass Skipper (Family Hesperiidae, Subfamily Hesperiinae) | | | | | | |

| Common Name | Scientific Name | Abundance | Food Plants and/or Larval | Habitat Affinities |
|----------------------|---------------------|-----------|---------------------------|---------------------------------|
| | | | Hosts | |
| Least Skipper | Ancyloxypha numitor | Uncommon | Limited to grasses | Moist sites such as ditches and |
| | | | | wetland edges |
| Fawn-spotted Skipper | Cymaenes odilia | Stray | Limited to grasses | Low-growing wildflowers, |
| | | | | perch on ground, especially |
| | | | | shaded grassy areas |



APPENDIX 6

Appendix 6. Sites identified by stakeholders at June 15, 2019 workshop that were not specific to a single or grouped parcels, yet should be considered as developing conservation strategies for multiple sites.

| Site | Reason Not Included | Type of Site | Suggestions for Site |
|---------------------------|---------------------------|------------------------|----------------------|
| | | | Туре |
| Residential areas along | This area included very | Roadway, Residential | Encourage individual |
| Fulton Beach Road | minimal Live Oak | | residents to restore |
| Alexa Deceleration | habitat | D l | mottes |
| Along Roadways – | 100 general and | Roadway | Restore mottes to |
| General and Highway 55 | overarching, not able to | | to Doodwow |
| Aronaca Dathyuaya Sitaa | Tag gaparal and many | Drotastad Area | lo Koadways |
| Aransas Paulways Siles - | sites do not include Live | Protected Area | restore moties m |
| all | Oak Habitat | | protected, managed |
| | Oak Habitat | | example of methods |
| | | | for land protection |
| | | | and managing |
| | | | protected lands in |
| | | | education |
| Rockport Country Club | Minimal Live Oak | Individual residences, | Encourage individual |
| Residences and Golf | Habitat, potential issues | cleared managed | residents to restore |
| Course | with restoration on a | property | mottes |
| | cleared Golf Course, and | | |
| | potential issues with | | |
| | residential area with a | | |
| | homeowner's | | |
| | association | | |
| Rockport Harbor Area | No Live Oak Habitat | Non-Live Oak | Use as example of |
| | present | | developed former |
| | | | Live Oak land in |
| | | D | education |
| Ivy Lane | Protections already in | Protected Area | Restore mottes in |
| | place | | protected, managed |
| | | | areas. Use as |
| | | | example of methods |
| | | | and managing |
| | | | protected lands in |
| | | | education |
| Trail North and East of | Ambiguous location | Problematic | cudeation |
| Aquatic Center | small land area | Identification. Small | |
| 1 | | Land | |
| Navigation District lands | No Live Oak Habitat | Non-Live Oak | Use as example of |
| downtown Rockport | present | | developed former |
| - | • | | Live Oak land in |
| | | | education |
| All Roadways with Live | Too general and | Roadway | Restore mottes to |
| Oak that have mustang | overarching, not able to | | Live Oak Trees next |
| grape dominance | map | | to Roadways |

| Site of Angled Sand | Area is mostly already | Developed area | The site highlighted |
|--------------------------|--------------------------|--------------------------|------------------------|
| Mint | decimated, potential | | on the map was an |
| | problem with publicly | | area home to an |
| | listing site of a | | endangered species |
| | threatened species | | of mint called Angled |
| | | | Sand Mint. The area |
| | | | has been developed |
| | | | for residential and |
| | | | business purposes. |
| | | | There is a potential |
| | | | issue with publicly |
| | | | listing its location. |
| "For Sale Bypass Pearl & | Ambiguous location, | Problematic | This location was |
| Mkt" | difficulty mapping | Identification | only written and not |
| | | | labeled on the map. It |
| | | | was not explained |
| | | | any further and was |
| | | | potentially listed on |
| | | | the wrong page. |
| Business Hwy 35 & FM | Duplicate to existing | Included in another site | No suggestion |
| 1069 | stakeholder site | | (encompassed in |
| | | | other site) |
| Connie Hagar Sanctuary | Protections already in | Protected Area | Restore mottes in |
| | place | | protected, managed |
| | | | areas. Use as |
| | | | example of methods |
| | | | for land protection |
| | | | and managing |
| | | | protected lands in |
| | | | education |
| Sea Gun Marina | No Live Oak Habitat | Non-Live Oak | This area had no sand |
| | present | | layer or Live Oak |
| | | | layer present and is |
| | | | not a restoration |
| | | | candidate |
| Johnson Ranch | Protections already in | Protected | This fairly well- |
| | place | | known location on |
| | | | Lamar Peninsula is |
| | | | already under a |
| | | | conservation |
| | | | easement |
| Add Greenway Corridors | Duplicate to existing | Included in another site | No suggestion |
| from "Whooping Crane | stakeholder site | | (encompassed in |
| Pasture" | | | other site) |
| Aransas NWR Lamar | Protections already in | Protected | Use as example of |
| Unit | place, Unable to fulfill | | methods for land |
| | stakeholder request due | | protection and |
| | to current regulations | | managing protected |
| | (asked for public access | | lands in education |
| | to property) | | |

| Area between Lamar and | No Live Oak Habitat | Non-Live Oak | This area had no sand |
|------------------------|---------------------|--------------|-----------------------|
| Holiday Beach present | | | layer or Live Oak |
| | | | layer present and is |
| | | | not a restoration |
| | | | candidate |



APPENDIX 7

Appendix 7. Suggestions provided by workshop participants for the 21 sites from original Stakeholder Workshop Response Sheet 2.

HEB Live Oak Lodge – Restore

- Notes and Suggestions:
 - Mottes and butterfly/hummingbird gardens
 - Understory restoration would encourage more birds and butterflies which enhances experience for folks staying there
 - I would love to see this restored it is very visible to the public and would be a great demonstration site. Also, would be good PR for HEB
 - Restore
 - Same as Memorial Park, over mowed, needs to be enhanced with native motte

<u>Pearl Point Apartment Development – Develop using Natural Features</u>

- Notes and Suggestions:
 - Do not clear cut land before building
 - Create park areas
 - Keep walking trails native
 - Believe this is a lost cause where every tree will be eliminated that is not forcibly protected by RP City Tree Ordinance. They're already developed a grid landscape for extensive parking areas. This is largely a salvage effort. Mark Uhr is partner/developer, not a friend of trees or native habitat.
 - Stop, stop, stop
 - Probably too late for this
 - Replace <u>all</u> of the oaks and other natives that were recently destroyed.
 - I noticed parts of that project was to keep a buffer of trees and plants and last I saw they cut down most vegetation (native) and left very few trees

• <u>Memorial Park – Restore</u>

- Notes and Suggestions:
 - Create mottes in some areas
 - Butterfly gardens
 - Native understory should be enhanced/developed in areas not devoted already to parking and ballparks.
 - Stop unnecessary weed eating
 - Plant understory plants
 - Restore/add mottes
 - Parts of the public access areas are over moved, should have motte restoration / enhancing and leave it native, excess of mosquito control needs to stop.

• <u>Little Bay Primary – Develop using Natural Features</u>

- Notes and Suggestions:
 - Kacee Jackson (owner)

- Natural garden center
- Demo center
- Classes and workshops
- Suggest Fulton school afford better site for enhancement
- Stop paving
- Has been purchased. Would like to see it developed using natural features if buyer could be contacted.
- Restore.
- Davalos (Name of developer or owner, not sure)
- Enhancing needed but Live Oak Elementary neighborhood has more potential for conservation as it has conservation easements already nearby into Ivy Lane Sanctuary
- Remove invasive plants (Brazilian pepper, Chinese tallow, salt cedar) rplace with salt tolerant natives.

• <u>Camp Aranzazu – Restore, Develop using Natural Features</u>

- Notes and Suggestions:
 - Create gardens for campers
 - Beautiful property. Excellent prospect for native enhancement. Owns beach at Copano Bay too.
 - It's been developed with hardscape

• <u>First Baptist Rockport church - Develop using Natural Features</u>

- Notes and Suggestions:
 - Let understories regrow
 - Probably more feasible when Samaritan and other relief groups have moved on.
 - Great idea. Very visible to public and this church seems to be very community-minded.
 - The Tule creek corridor between these [this church and St. Peter's] are being taken over by guinea grass, cat tails, and many invasives, needs control

• <u>St. Peter's Episcopal church - Develop using Natural Features</u>

- Notes and Suggestions:
 - Already doing a good job of implementing.
 - The Tule creek corridor between these [this church and First Baptist] are being taken over by guinea grass, cat tails, and many invasives, needs control

• Wings Rescue – Restore

- Notes and Suggestions:
 - Natives to attract birds and butterflies and insects
 - Not much property to work with.
 - TMN'ers volunteering there good "in" for restoring

• <u>Bahia Bay Entrance - Develop using Natural Features</u>

• Notes and Suggestions:

- Plant native shrubs and trees and understories
- Total saltwater coastal, outside Live Oak / Red Bay. But could be enhanced with native understory.

• <u>Goose Island State Park – Restore</u>

- Notes and Suggestions:
 - Guinea grass eradication is chronic problem. Best option is at new expansion near Big Tree.
 - Tule creek hike and bike trail
 - Invasive removal and install native plants to enhance
 - See how this guinea grass restoration is working
 - 3rd year guinea grass eradication
 - Native re-seeding
 - Protect roads leading to Goose Island and Big Tree
 - I didn't like the loop/plan for the new land behind Big Tree. I think will have too much foot traffic from visitors.
 - Remove invasives
 - Promote native understory plants



APPENDIX 8 (SEPARATE FOLDER)

APPENDIX 9

| Page Number | Photographer | Species Identification |
|-------------|--|------------------------------|
| | | (if applicable) |
| i | Liz Smith | |
| ii | Sally Mitchell | |
| iv | Ben Horstmann | Magnolia Warbler |
| V | Liz Smith | |
| vi | Sally Mitchell | |
| vii | Sally Mitchell | Golden-fronted Woodpecker |
| viii | Sally Mitchell | |
| 1 | Sally Mitchell | |
| 5 | Sally Mitchell | |
| 7 | Liz Smith | Fox Squirrel |
| 8 | Anna Turkett | |
| 9 (top) | Ben Horstmann | Chestnut-sided Warbler |
| 9 (bottom) | Anna Turkett | |
| 10 | Ben Horstmann | Yellow Warbler (left) and |
| | | Golden-winged Warbler |
| | | (right) |
| 11 (top) | Liz Smith | Ruby-throated Hummingbird |
| 11 (bottom) | Sally Mitchell | Golden-fronted Woodpecker |
| 12 | Pamela Fulcher | Gray Fox |
| 13 | Liz Smith | |
| 14 | Pamela Fulcher | Gray Fox |
| 25 (middle) | Liz Smith | Barred Owl |
| 25 (bottom) | Sally Mitchell | Ladder-backed Woodpecker |
| 26 (top) | Liz Smith | Turk's Cap Skipper |
| 26 (bottom) | Liz Smith | Gulf Fritillary (left), |
| | | Goatweed Leafwing (right) |
| 27 | Liz Smith | White-tailed Deer |
| 54 | Liz Smith | Yellow-rumped Warbler |
| 55 | Sally Mitchell | Monarch Butterfly (top) |
| 56 | Liz Smith | Zebra Longwing |
| 58 | Sally Mitchell | |
| 59 | Sally Mitchell | Northern Cardinal |
| 60 | Ben Horstmann | Tennessee Warbler |
| 63 | Liz Smith | Yellow-bellied Sapsucker |
| | | (left). Eastern Screech Owl |
| | | (right) |
| 64 | Sally Mitchell | Great Southern White (left). |
| | ······································ | Rose-breasted Grosbeak |
| | | (right) |
| 65 | Sally Mitchell | Coral Bean |
| 66 | Sally Mitchell | Great Egrets |
| 00 | Sully Mitchell | Sicul Egiclo |

| Ap | pendix | 9. | Index | of | Photo | Credit | by | Page |
|----|--------|----|-------|----|-------|--------|----|----------|
| | 1 | | | | | | ~ | <u> </u> |

| 67 | Sally Mitchell | Ruby-throated Hummingbird |
|-------------|----------------|--------------------------------|
| | | and Green Anole |
| 68 | Liz Smith | Northern Mockingbird |
| 69 | Sally Mitchell | Great Egret (left), Great Blue |
| | | Heron (right) |
| 70 | Sally Mitchell | Northern Mockingbird |
| 72 (top) | Sally Mitchell | |
| 72 (bottom) | Pamela Fulcher | |
| 97 | Ben Horstmann | Kentucky Warbler (left), |
| | | Bay-breasted Warbler (right) |
| 102 | Sally Mitchell | Common Mestra |
| 106 | Sally Mitchell | |
| 110 | Sally Mitchell | |