Proposed Rookery Protection and Habitat Restoration Plan for Rockport's Bent Oaks Rookery Park

Prepared by Patrick Hartigan, Mid-coast Chapter, Texas Master Naturalist
August, 2022 Draft

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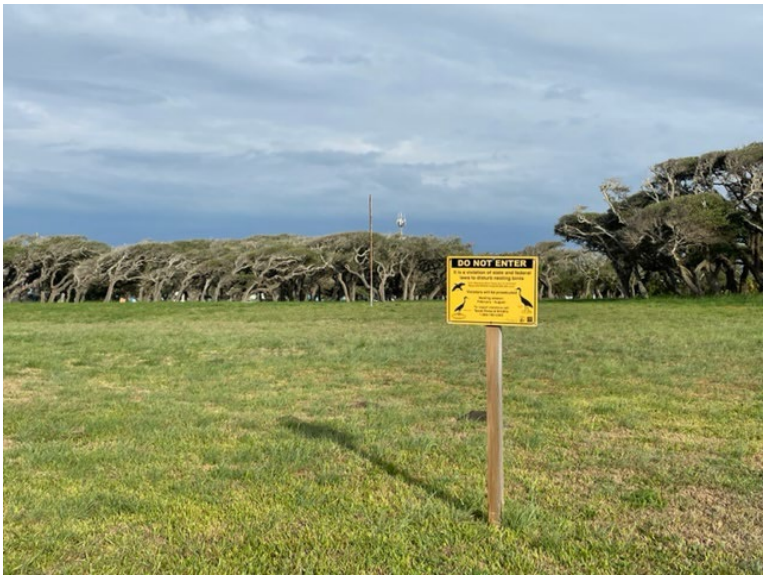
EXECUTIVE SUMMARY

Picturesque, windswept oaks along the Little Bay shoreline greet visitors to Bent Oaks Rookery Park, a Rockport treasure. From January to August, the park's live oak woodland hosts a large colony of nesting herons and egrets, known as a rookery, a unique natural attraction of the area. This 8.66 acre property was purchased by the City of Rockport in 2015 to "preserve the trees and rookery."



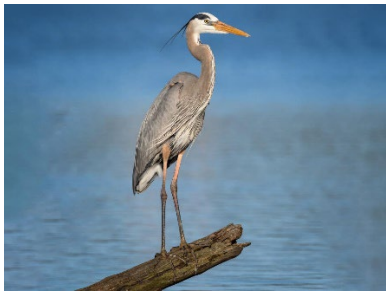
The rookery and the woodland are, however, threatened by a variety of factors, both natural and human-caused. The live oak woodland is deteriorating, which can reduce available nesting habitat, and the rookery is susceptible to disruption. In response to these threats, a protection and restoration plan is proposed with the primary goals to:

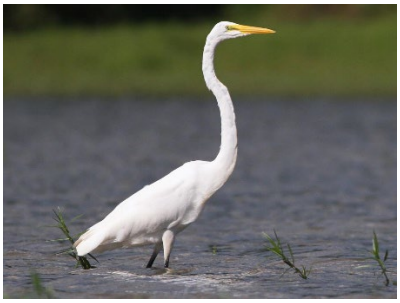
- Improve protection of the rookery
- Restore and expand the live oak woodland

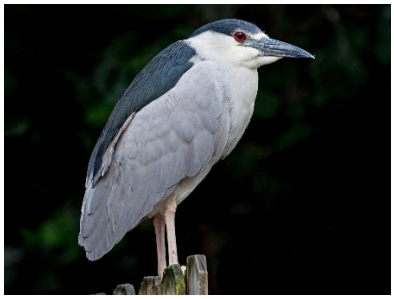
An investment in Bent Oaks Rookery Park today should be seen as one that would benefit Rockport's current and future residents and visitors, helping preserve a quality of life envied by many, while also boosting the area's nature tourism industry.

BACKGROUND AND HISTORY

The rookery was first detected in 2007, and represents a population of herons and egrets displaced from other sites, largely due to human-related disturbance. In a typical year, there may be >100 nesting pairs of three species – Great Blue Heron (*Ardea Herodias*), Great Egret (*Ardea alba*) and Black-crowned Night-Heron (*Nycticorax nycticorax*).


Great Blue Heron

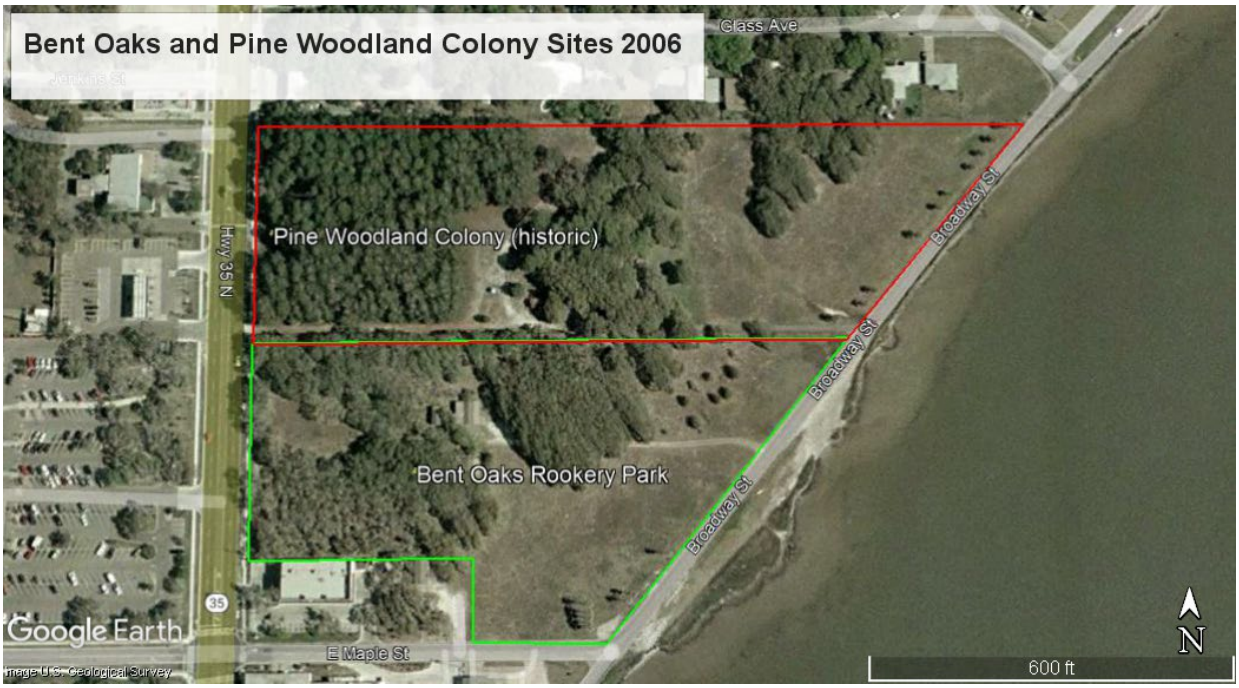

Great Egret

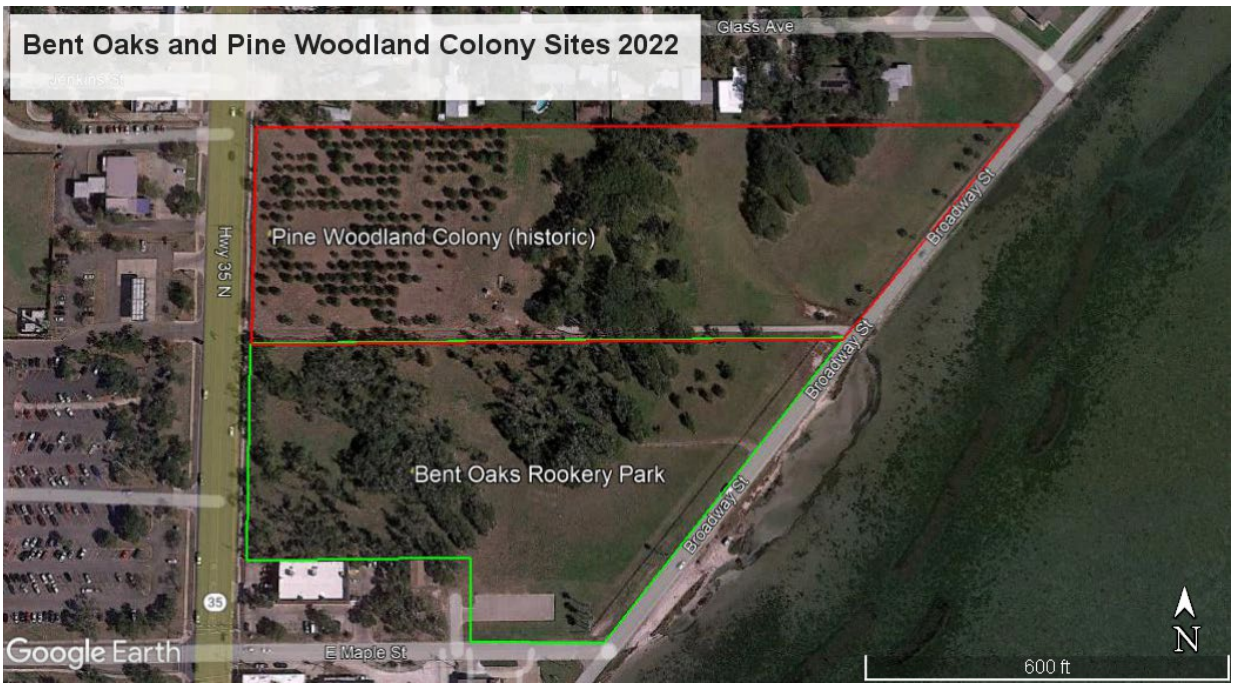

Black-crowned Night-Heron

The Bent Oaks woodland suffered significant damage from Hurricane Harvey in 2017, and appears to be in decline, with dead and diseased trees present. A canopy area of over 4 acres prior to Hurricane Harvey is now down to ~3 acres, a loss of more than 20%. Natural regeneration of the trees does not appear to be occurring; thus, the long-term survival of the woodland and the rookery are in doubt.

Prior to ca. 2011, another rookery existed on ~2.5 acres of pines on the western part of private property that abuts Bent Oaks to the north. Known as the Pine Woodland Colony, the rookery was lost when the pine trees were removed. It is possible that some birds from that rookery relocated to the Bent Oaks property. A grove of live oaks is also present on this property, to the east of the pine trees, but apparently has not been used for nesting by herons and egrets, likely because of human disturbance. The property is zoned Hotel/Motel and, due to its proximity to the Bent Oaks rookery (some nests are within ~30 feet of the property boundary), its development could pose a serious threat to the rookery.

Note: Acreage values are estimates from Google Earth imagery.





In summary, the woodland area potentially available for nesting herons and egrets has decreased by >50% in the last 15 years, from over 6 acres at two adjacent properties to approximately 3 acres at the Bent Oaks site. And, as noted, the woodland at Bent Oaks appears to be in a state of decline. Though some regeneration of pine trees is occurring, a return of a rookery to the adjacent private property seems unlikely, especially as it is zoned for high-intensity development.

The City of Rockport Parks and Leisure Department has recognized the challenges facing Bent Oaks Rookery Park, and has begun identifying needed actions, such as better perimeter security, improving

woodland health, and improving the public viewing area. In concert with those efforts, a restoration and management plan is proposed with the following goals:

- Improve protection of the rookery
- Restore and expand the live oak woodland
- Conduct monitoring, assess future threats, and practice adaptive management

GOAL 1. IMPROVE PROTECTION OF THE ROOKERY

Proposed primary activities:

- Prohibit and limit access to the rookery, especially during the critical nesting period January-May when herons and egrets are most likely to abandon nests
- Install fencing along the entire property boundary to deter human-related encroachment and disturbance of the rookery
- Report disturbance of the rookery to appropriate law enforcement officials
- Deter and control rookery predators
- Continue providing nesting material to the rookery

Prohibit and limit access to the rookery

- January – April: Prohibit all access to the rookery area (except for public viewing area) during this critical nesting period. No mowing or maintenance should occur during this period.
- May-August: Allow mowing and maintenance, but only if absolutely necessary, in order to minimize nests disturbance.
- September – December: allow access for necessary maintenance, plantings, tree health monitoring.

Heron species tend to desert nests and entire rookeries if repeatedly disturbed during the periods of pair formation, nest construction, or egg laying. Adults do not develop a strong attachment to the nest until young are present. Consequences of rookery desertion may include total reproductive failure in relocated rookeries, reduced numbers of nesting pairs and reduced reproductive output per pair, and isolation of breeding populations. Once young have hatched, alarming them may cause them to leave the nest and fall to the ground where they are most susceptible to predation. (this paragraph was excerpted from *Guidelines for Protection & Mitigation of Impacts to Great Blue Heron Rookeries in Vermont*, Vermont Fish & Wildlife Department. 2002).

Install fencing along the entire property boundary in order to deter human-related encroachment and disturbance of the rookery

Other than along Broadway Street, the perimeter of the park is open and unfenced, and people have been observed walking in the rookery area during nesting season. Fence installation and maintenance should only occur in the September-December time period, in order to prevent disturbance of the rookery.

Notify appropriate law enforcement officials when disruption of the rookery by human-related activities is observed

Human presence may cause significant disruption to the rookery, and can be a violation of federal and state wildlife laws. In such cases, it is important to expeditiously contact a Texas Game Warden; as of August of 2022, the following are listed for Aransas County:

Ashton Gulczewski 361-205-4454
Philip Hunt 361-205-4002
Dustyn Jansky 361-205-5635
Zachary Martin 361-205-7361
Justin Solis 361-463-0386

As this list is subject to change, to find the latest information go to the following website and do a search for Aransas County: https://tpwd.texas.gov/warden/

Deter and control rookery predators

Tree climbing mammalian predators may represent the greatest risk to the rookery, especially raccoons. Feral cats, dogs, foxes and coyotes can also impact nesting success of the rookery. Fire ants have created problems at rookery islands in the region, and are present at the park.
Proposed actions:

- Consider installing predator guards around nesting trees to deter raccoons, cats, and other predators. This technique has been used successfully at heron rookeries elsewhere.
- Conduct trapping and removal if predators are detected, but do so carefully during critical nesting period of January – April.
- Discourage through signage and public education feeding of wildlife and dumping of food waste at the park, which can attract raccoons and other predators.
- Treat fire ant mounds as needed, during the period September-December


Metal predator guard

Hawks and owls may also prey on rookery birds, but these should be tolerated as part of the natural order. Black-crowned Night-Herons, which nest at the Bent Oaks rookery, are known to be nest predators, though evidence of that occurring at Bent Oaks is lacking. This should be accepted as an unavoidable and natural condition, requiring no action.

Other animals that may be present at the park, but present little or no threat to the rookery include:

- Snakes – snakes are preyed upon by herons and egrets, and are not listed as predators of concern by Coastal Bend and Bays Estuaries Program (CBBEP) for nesting colonies it monitors in the region
- Moles and pocket gophers – their presence is often indicated by tunnels at the soil surface but these mostly subterranean mammals are not a threat to the rookery and, in fact, can be prey items of the herons and egrets.
- Squirrels – considered to be generally benign; may assist is spreading oak acorns for natural regeneration.

Continue providing nesting material to the rookery

For several years, Rockport Parks staff, Texas Master Naturalists, and local citizens have collected and deposited nesting material at the Bent Oaks site. This is seen as a beneficial activity, as collection of nesting material requires a significant expenditure of energy by herons and egrets, who may sometimes have to fly several miles to find suitable material.

GOAL 2. RESTORE AND EXPAND THE LIVE OAK WOODLAND

Proposed primary activities:

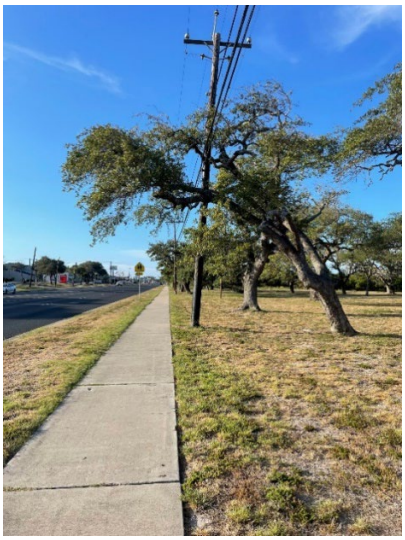
- Assess the current health of live oak woodland, and take appropriate action
- Restore and expand live oak woodland

Assess the current health of the live oak woodland, and take appropriate action

The live oak woodland needs to be surveyed for dead or diseased trees, and also trees that may be safety hazards to the public or rookery. Appropriate action could include treatment, pruning, or removal. If warranted, dead trees can be left in place to provide wildlife habitat.

- A post-hurricane Harvey survey by the Texas A&M Forest Service (TAFS) reported the presence of the hypoxylon canker, and infected trees may be weakened or dying. Several dead trees are currently present at the park. An on-site meeting with TAFS and City of Rockport staff is scheduled in September, 2022. Annual tree health assessments are recommended.
- Several live oaks are leaning over or near the sidewalk adjacent to Business Highway 35, and may constitute hazards to the public and utility lines. These should be assessed at the TAFS meeting in September, 2022.

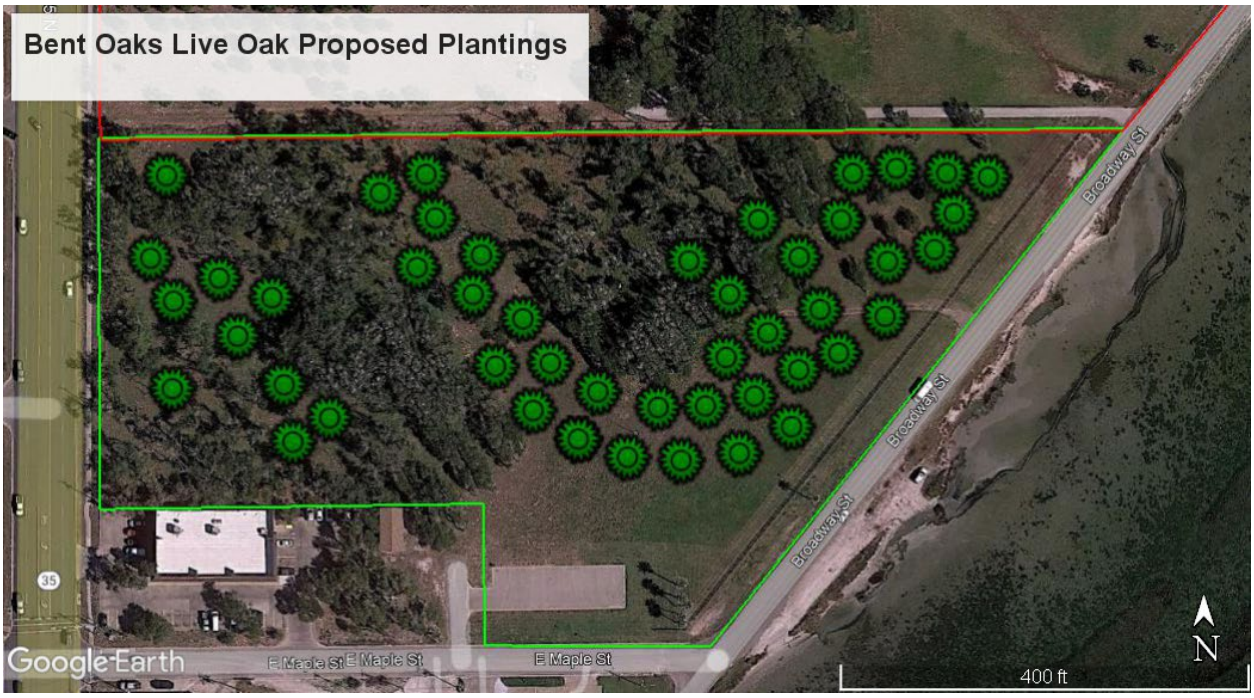
Apparently dead oaks



Leaning oaks near sidewalk

Restore and expand the live oak woodland

The goal is to increase the canopy area of the live oak woodland, to offset past losses and increase the buffer distance between Bent Oaks and the adjacent private property, which may become a Hotel/Motel development. A possible planting plan of approximately 50 live oaks is illustrated below, assuming mature oaks with a canopy diameter of ~40 feet, and spacing between trees of ~35-50 feet. The timeframe for creating the restored and expanded live oak woodland would likely be at least 25 years. The planting plan may change after an assessment of the health of the existing woodland is completed.



In order to allow natural regeneration of the woodland to occur, and to prevent damage to existing and new trees, the following mowing and maintenance practices are proposed:

- No mowing or use of weeding equipment within 3 feet of individual trees or groups of trees.
- Increase mowing height to 4-5 inches, to reduce risk of striking bark and lateral roots of oaks.
    - Justin Butts, local gardening expert, also argues that a higher mowing height is healthier for the grass, improves ability to survive drought conditions, reduces susceptibility to weed invasion, and can reduce mowing frequency, a potential cost savings. A change in mowing practices could also be considered for other local parks and preserves.
- No mowing and maintenance activities during the critical nesting period January – April
- Allow mowing and maintenance May – August around but not directly under oak trees, and only if absolutely necessary, so as to minimize rookery disturbance.
- No spraying for oak worms, caterpillars, mosquitos or other insects, to prevent introducing toxins into the Bent Oaks food chain.

New plants can be installed, either by seeding or planting nursery-grown plants, in the September-December time period to avoid disturbing the rookery. Locally-sourced plants should be selected, i.e., those that are native to the Texas Coastal Bend and adapted to local conditions (e.g., sandy soil, salty air, climate). Sources of seeds and plants are being investigated, and donation of plants from public and/or private sources is possible, including from the Texas A&M Forest Service and the Mid-coast Chapter, Texas Master Naturalist program.

Native Understory Plant Community – Yes or No?

An issue that should be addressed is whether to also create a native, understory plant community as part of restoring and expanding the live oak woodland. A native live oak woodland would typically have an understory of smaller trees and shrubs, including redbay (*Persea borb*onia), wax myrtle (*Morella cerifera*), American beautyberry (*Callicarpa americana*), coast laurel oak (*Quercus laurif*olia), dwarf

palmetto (*Sabal minor*), and yaupon (*Ilex vomitoria*). This plant community is unique and imperiled, classified as the Texas Coastal Bend Live Oak - Redbay Forest, and found in only 5 Texas counties. While there are numerous ecological advantages of a native understory, the key issue is whether the plants could increase the likelihood of rookery predation. Despite literature reviews and correspondence with others, the author of this report is not aware of any clearcut answer to this question. As a matter of prudence, it is proposed to defer planting a native understory until more knowledge is gained, through site monitoring and expert guidance.

Planting and Management Notes:

- The location and type of utilities at the site will need to be determined ("Dial Before You Dig") prior to any site work commencing.
- An irrigation system may be warranted for survival and growth of newly planted trees. Well water is available nearby. Mature live oaks usually do not need irrigating.
- Fertilization of newly planted trees could be recommended after meeting with forestry professionals, but may not be necessary.
- It should be anticipated that high vegetation may emerge between mowing/maintenance periods, especially during wet years. This should be tolerated as necessary to prevent disturbance of the active rookery, with signage installed to the effect "*Habitat Restoration and Rookery Protection Area: Please Do Not Disturb*", or similar. If mowing is deemed necessary, the following are recommended:
    - Assuming a perimeter fence is installed, mowing of high vegetation during the nesting season should be limited to outside the fence adjacent to the public viewing area parking lot, and should cease immediately if disturbance of nesting birds is observed.
    - If no perimeter fence is present, mowing of high vegetation should be limited to the immediate vicinity of the public viewing area (within 25 feet of the parking lot), and should cease immediately if disturbance of nesting birds is observed
- Undesirable invasive plants should be prevented from gaining a foothold in the park, including:
    - Brazilian peppertree (*Schinus terebinthifolius*)
    - Chinese Tallowtree (*Sapium sebiferum*)
    - Chinaberry (*Melia azedarach*)

  When small, these can often be removed by hand-pulling. Invasive grasses may also become an issue, including Guineagrass (*Urochloa maxima*), Johnson grass (*Sorghum halepense*), and Old World bluestems (various genera). Once established, these can be extremely difficult to control. Early detection monitoring and control can minimize their impacts but, in a worse case scenario, they may have to be tolerated during the nesting season.
- Over a period of time, rookery birds may also damage nesting trees (excrement, defoliation), but this should be tolerated as a natural condition. At some point, woodland conditions may deteriorate to the point that herons and egrets may abandon the site. Some rookeries persist for decades; the Bent Oaks rookery has existed since 2007. Once recovered, such woodlands may be re-used in the future.

Other Potential Action Items

In the open areas not targeted for tree planting, the proposed mowing regime could result in a native wildflower/pollinator meadow, a positive development. From personal observations, native wildflowers are already present, thus seeding or planting is unnecessary.

- A sub-area of the wildflower meadow could be designated as a “Monarch Waystation”, and planted with native milkweeds (the butterfly’s required host plant). The Monarch butterfly, the State insect of Texas, was recently classified as an Endangered Species by the IUCN. Also recall that the City of Rockport declared itself a Monarch friendly city in 2015. Waystation plants and guidance can be provided by Texas Master Naturalist members.

Local youth organizations have expressed interest in participating in “kids planting acorns” events at the park, thus a planting area could be designated for that purpose.

GOAL 3. CONDUCT MONITORING, ASSESS FUTURE THREATS, AND PRACTICE ADAPTIVE MANAGEMENT

Proposed primary activities:

- Monitor nesting success/failure of the heron-egret rookery
- Monitor health of the live oak woodland plant community
- Assess potential future threats to the rookery and woodland (land use changes, sea level rise, climate change, plant adaptability)
- Practice adaptive management to adjust project goals and actions

Monitor nesting success/failure of the heron-egret rookery

Monitoring of the heron-egret rookery should be conducted throughout the nesting season on an annual basis. Monitoring is currently conducted by a Texas Master Naturalist. Monitoring results should be disseminated to local media and project partners.

Monitor health of the live oak woodland

Regular “health checks” of the woodland plant community should be conducted by knowledgeable people, to detect problems and respond accordingly. The Texas A&M Forest Service may be able to provide training and assistance. The results of these check ups should be disseminated to local media and project partners.

Assess potential future threats to the rookery and woodland

The Society for Ecological Restoration emphasizes the need to anticipate future environmental conditions for ecological restoration projects. An assessment of potential future conditions is provided as an appendix to this report. Based on that assessment, it is proposed to proceed with restoration and management project. Assessments should be updated periodically as better information becomes available.

Practice adaptive management to adjust project goals and actions

Any restoration and management project must address uncertainties in outcomes and, as knowledge is gained from experience, monitoring and assessment, the need to adjust goals and actions may become apparent. This process is known as “adaptive management” and is defined as the following (Society for Ecological Restoration):

Adaptive management *– an ongoing process for improving management policies and practices by applying knowledge learned through the assessment of previously employed policies and practices to future projects and programs. It is the practice of revisiting management decisions and revising them in light of new information.*

PROJECT FUNDING, RESPONSIBILITIES, SCHEDULE

A detailed budget can be developed once a plan has been adopted. The City of Rockport Parks and Leisure Department has budgeted for park improvements. The Bent Oaks Conservancy may also have funds available.

It is recommended that the City of Rockport and/or project partners pursue grant opportunities to supplement the municipal budget. Numerous grant opportunities exist from state, federal, private, and NGO sources.

A table of proposed responsibilities by entity is shown below.

A detailed schedule can be developed once a plan has been adopted, but tree plantings could begin as early as the fall-winter of 2022.

Goals, Action Items, and Responsibilities Table		
Goal	Action Item	Lead Responsibility*
Improve protection of the rookery	Prohibit and limit access to the rookery	City of Rockport maintenance staff; park visitors
	Install fencing along the entire property boundary	City of Rockport
	Notify appropriate law enforcement officials when disruption of the rookery by human-related activities is observed	Visitors, City of Rockport staff, MCTMN in coordination with Texas Game Wardens
	Deter and control rookery predators	City of Rockport (could be in conjunction with other entities, e.g. Aransas County Animal Control)
	Continue providing nesting material to the rookery	City of Rockport and MCTMN
Restore and expand the live oak woodland	Assess the current health of live oak woodland, and take appropriate action	Texas A&M Forest Service (could train City of Rockport staff and MCTMN members)
	Restore and expand the live oak woodland	• Site utilities mapping – City of Rockport • Maintenance practices – City of Rockport • Acquisition and planting of trees – City of Rockport and MCTMN

		• Irrigation and fertilization – City of Rockport • Control of invasive plants – joint effort between City of Rockport and MCTMN • Sponsored youth planting events – MCTMN, Aransas County Independent School District
Conduct monitoring, assess future conditions, and practice adaptive management	Monitor nesting success/failure of the heron-egret rookery	Texas Colonial Waterbird Survey, MCTMN
	Monitor health of the live oak woodland	Texas A&M Forest Service (could train City of Rockport staff and MCTMN members)
	Assess potential future threats to the rookery and woodland	• "Rookery protection buffer" for adjacent private property – property owner with City of Rockport; see Appendix • Continued periodic assessment – to be determined (MCTMN, CBBEP?)
	Practice adaptive management to adjust project goals and actions	City of Rockport, MCTMN

* MCTMN = Mid-coast Chapter, Texas Master Naturalist

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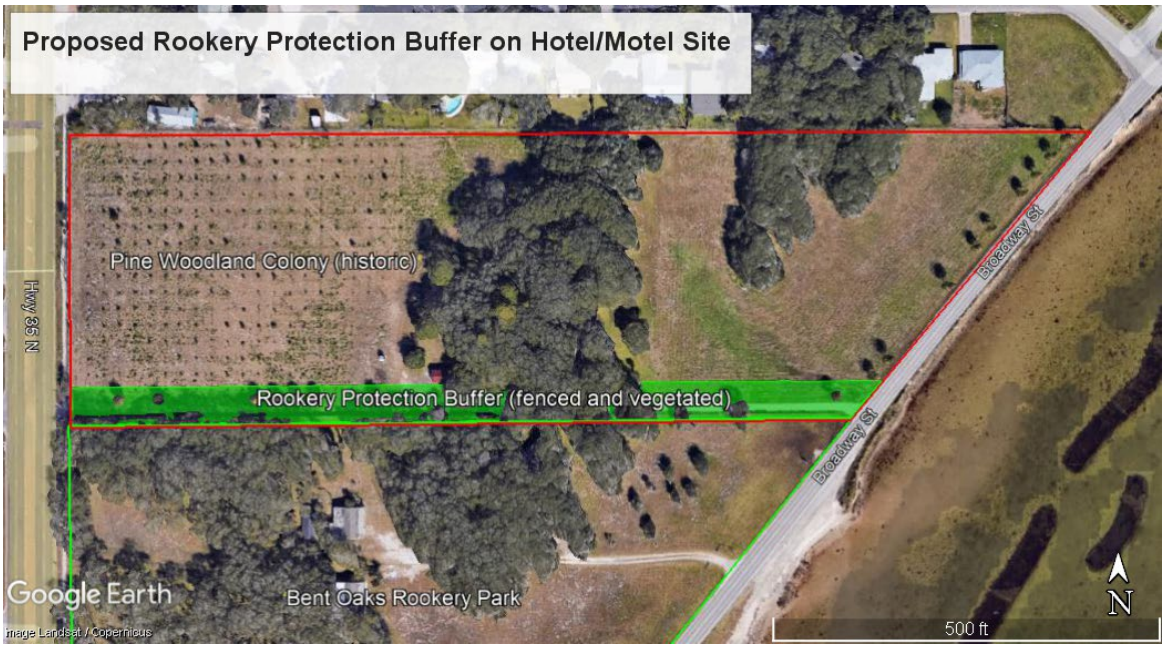
APPENDIX A. ASSESSMENT OF POTENTIAL FUTURE THREATS TO THE ROOKERY AND WOODLAND

The success of the protection and restoration efforts could be threatened by future conditions. Based on guidance from the Society for Ecological Restoration and others, the following were assessed:

- Future land use changes
- Sea level rise and storm surge
- Plant adaptability to climate change

Future land use changes

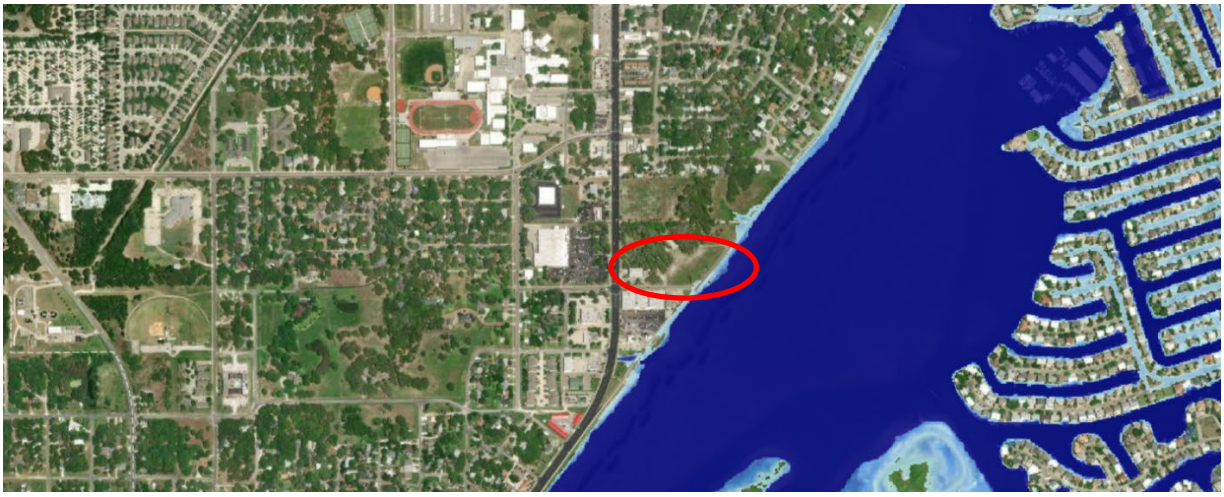
As parkland, the Bent Oaks property is protected from development. However, the adjacent property to the north is zoned for Hotel/Motel development, and such development could seriously disrupt the Bent Oaks rookery during and after construction. Assuming that the property will be developed, potential impacts to Bent Oaks rookery could be reduced by requesting that a "rookery protection buffer" be established and maintained along the boundary of the two properties. A minimum buffer width of 50 feet is proposed, a figure derived from personal observations of the Bent Oaks rookery, as nests appear to be 75 feet or more from the nearest evidence of human activity (e.g., street, building, parking lot, sidewalk), and that the nearest nests to the property boundary are ~30 feet away. Thus, creating a 50 feet buffer on the private property should ensure at least 75 feet distance between human activities and nests. A fence 50 feet inside the private property would provide additional protection of the rookery from disturbance. The buffer vegetation should ideally mimic a live oak-redbay woodland, with native trees and understory. The proposed buffer would be ~1.1 acres in size, or about 11% of the ~10 acre hotel/motel site. The following figure illustrates the buffer:



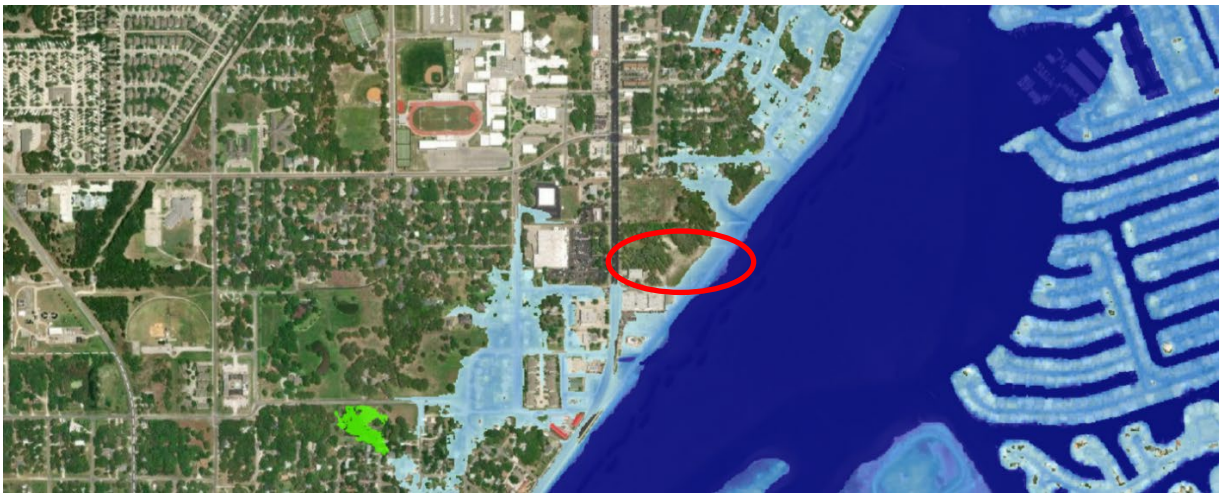
Note: Based on historic behavior, it is highly unlikely that the buffer would attract nesting herons and egrets, which could be a concern for workers and occupants of hotel/motel development.

Sea level rise and storm surge

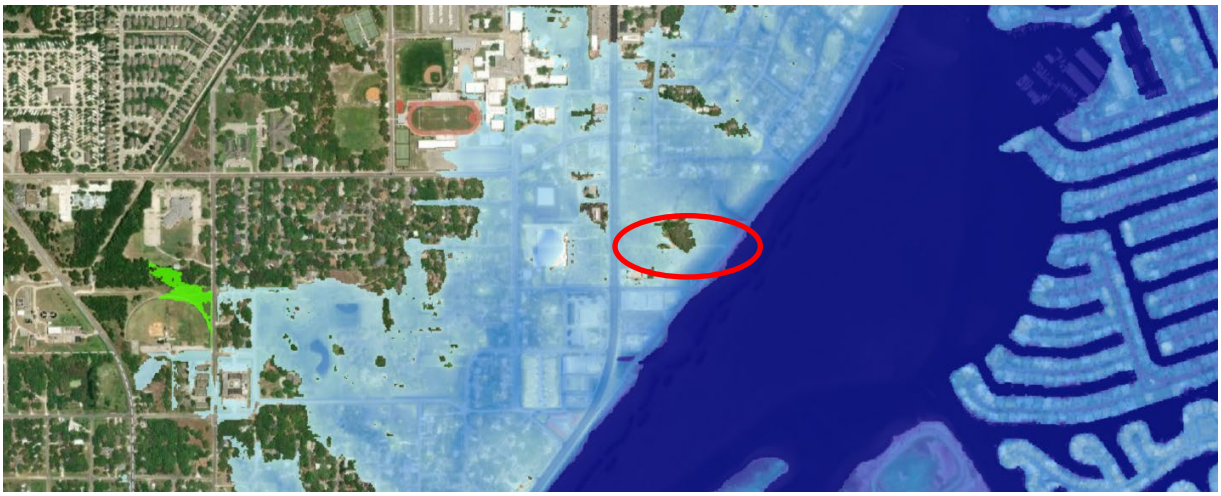
Sea level rise and storm surges could impact the Bent Oaks site in the future, through rising waters, wave action, erosion, and saltwater intrusion. In order to assess these potential impacts, sea level rise projections from the Texas General Land Office (GLO) "Clean Coast Texas" program were used in conjunction with the Sea Level Rise Viewer tool developed by the National Oceanic and Atmospheric Administration (NOAA). The term "sea level rise" accounts for both rising water levels and land subsidence, the latter which can be exacerbated by groundwater withdrawal, a common practice along the Texas coast. The GLO uses the year 2100 for planning purposes and, from a January, 2022 GLO webinar "Causes and Impacts of Local/Relative Sea Level Rise on the Texas Coast," a rise of ~ 3 feet is predicted for Rockport by 2100 for an "Intermediate" scenario, while a value of ~ 6 feet is predicted for an "Intermediate-High" scenario. Those values were input into NOAA's Sea Level Rise Viewer to visualize potential impacts to the Bent Oaks site, as shown in the figures below. As can be seen, the Bent Oaks site is minimally affected by a rise of 3 feet, but is somewhat impacted along Broadway Street by a rise of 6 feet. The NOAA tool was then used to estimate a sea level rise value that would significantly impact the site, found to be ~9 feet, which would equate to the "High" scenario.



Scenario 1. Intermediate Sea Level Rise of 3 feet by 2100 at Bent Oaks Rookery Park (red oval)



Scenario 2. Intermediate-High Sea Level Rise of 6 feet by 2100 at Bent Oaks Rookery Park (red oval)



Scenario 3. High Sea Level Rise of 9 feet by 2100 at Bent Oaks Rookery Park (red oval)

Storm surge was evaluated using the National Hurricane Center's (NHC) Storm Surge Risks Maps (described in https://www.nhc.noaa.gov/pdf/Storm_Surge_Risk_Map_Update_June_2022.pdf). The NHC mapping tool predicts that Bent Oaks Rookery Park would not become inundated until a Category 3 or higher hurricane occurs (a downloadable graphic from the website was unavailable). This information may be of limited value, as the wind impacts of hurricanes of that strength are likely to cause significant damage, regardless of storm surge. As hurricanes are expected but unpredictable, and live oak woodlands have weathered many such events, further analysis is not considered useful.

Plant adaptability to climate change

Climate change predictions for Texas include higher temperatures, more intense storms but also more severe droughts, all which can affect plant communities. Regarding the Bent Oaks Rookery Park, the question is "will the live oak woodland adapt to climate change?"

Part one of attempting an answer is to review how plants are currently rated, in terms of heat tolerance and water requirements. It is assumed that the live oak of the Texas Coastal Bend is Q*uercus virgininana/fusilformis* or *Quercus fusilformis*, two very similar species or hybrids. Texas A&M and the Lady Bird Johnson Wildflower Center rate this oak as having low water requirements, with high to very high heat tolerance. In addition, coastal live oaks are also salt tolerant. Thus, it appears that live oaks may be well adapted to climate change in the Texas Coastal Bend. Understory plants associated with live oaks, such as redbay, wax myrtle, laurel oak, and Texas palmetto are rated as less tolerant of dry conditions than live oaks, and may be less adaptable to climate change.

As a second source of information, the "Climate Change Atlas" developed by the U.S. Forest Service was utilized. The atlas rates the adaptability and possible range changes of trees in North America, with a resolution down to the local level, thus projections for the Rockport area are available. From that atlas, the live oak rating of Medium, which is between the High and Low ratings.

Given the above, it is argued that live oak woodlands have a good likelihood of adapting to climate change.

Summary and Conclusions

Based on these projections, and assuming a time frame of at least 25 years for an oak woodland to reach maturity, it is recommended that restoration proceed, as the Bent Oaks site should remain largely viable, except possibly under “High” sea level rise conditions and Category 3 or higher hurricanes.