CITY OF VIRGINIA BEACH

PLEASURE HOUSE POINT MANAGEMENT PLAN

VIRGINIA BEACH PARKS & RECREATION

PLANNING, DESIGN & DEVELOPMENT

Pleasure House Point Natural Area will be managed as a Natural Area Preserve by the City of Virginia Beach Department of Parks and Recreation. It will be open to the public from dawn to dusk. Soft trails, an ADA accessible loop trail with overlook and a non-motorized water access site are proposed as low-impact public access improvements for the property. Habitat restoration and habitat enhancement are also important objectives in the management of the property.

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CONTRIBUTORS

CITY OF VIRGINIA BEACH

PLEASURE HOUSE POINT NATURAL AREA

Located just west of the Lesner Bridge and south of the Chesapeake Bay, Pleasure House Point Natural Area is 118 acres of water, tidal marsh, sandy shores and maritime forest. This high-profile property was once being considered for a large waterfront development, but with the help of the Trust for Public Land, the Chesapeake Bay Foundation and the surrounding community, the City has preserved this land on the Lynnhaven River for generations to come.

Pleasure House Point Management Plan Committee Members

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Executive Summary

The 118-acre Pleasure House Point property was acquired and preserved in July 2012 as a collaborative effort between the Trust for Public Land, the City of Virginia Beach and the Chesapeake Bay Foundation. The property was under the threat of development for many years. Ten acres of the property was acquired by the Chesapeake Bay Foundation. The remaining 108 acres was purchased by the City of Virginia Beach and placed into public ownership thus protecting important aquatic and terrestrial habitats in the Lynnhaven watershed and providing public access to the shoreline. The site has an extensive system of estuarine emergent wetlands, tidal mudflats, and maritime forests and adds to an existing network of conserved areas along Crab Creek, Pleasure House Creek, and the Lynnhaven Bay.

A conservation easement was recorded over 84.6 acres of the Pleasure House Point property in July 2012 as part of the acquisition of the property. The conservation easement was placed on the property as a condition of a financial grant that was applied toward purchase of the property from the United States Fish and Wildlife Service through the National Coastal Wetlands Conservation Program. The conservation easement is held by the Virginia Department of Game & Inland Fisheries (VDGIF). This management plan was developed to comply with the conditions of the recorded conservation easement. The recommendations that are contained within the management plan are the result of a year long study of the property. This plan has a horizon of five years. It will be important to measure the progress made annually on the stated goals in the plan and to update the plan every five years.

The Pleasure House Point Natural Area represents a unique opportunity to showcase the beauty and function of a coastal eco-system in the midst of the highly developed waterfront community in the Bayfront area of Virginia Beach. The property has been manipulated time and time again over the past 50 years. Even with all of this intrusion, the environment has survived and flourished as a prime example of the resilience of a natural eco-system. There are many lessons to be learned from this property, as well as many actions we can take to restore and enhance the property. This document was developed with this charge in mind and outlines specific steps and priority projects to ensure that the property is properly managed and maintained for the benefit of both man and nature.

1. Background

Site Location

Pleasure House Point is located in the Chesapeake Bayfront area, the northern-most section of the City of Virginia Beach, Virginia, directly across from the southern-most tip of the Delmarva Peninsula. It is in the Ocean Park section of the Shore Drive Corridor, west of the Lesner Bridge, and can be accessed from Marlin Bay Drive. Pleasure House Point has over one and a quarter miles of tidally influenced shorelines along Crab Creek and Pleasure House Creek, just west of the Lynnhaven Inlet, where the Lynnhaven River feeds into the lower Chesapeake Bay near the bay's connection with the Atlantic Ocean.

History

The property was originally part of the Newton Estate, a larger tract of land along the western shore of Lynnhaven Inlet. Until the 1970s, the site existed in its natural condition as a partially wooded inlet overwash area with a broad expanse of wetlands adjacent to Crab Creek and Pleasure House Creek. In 1954, Princess Anne County, the Virginia Beach Erosion Commission and the U.S. Army Corps of Engineers designated the site as a "spoil site" for use in dredging the Lynnhaven Inlet. In 1970, the property was purchased by Riverwalk Corporation and F. Wayne McLeskey. After the purchase, McLeskey granted the City permission to construct a dredge material containment dike on the site to facilitate the City's prior commitment to the Corps to provide a dredge material disposal site for the Lynnhaven Inlet dredging.

Between 1971 and 1972 it is reported that over one million cubic yards of dredged material was placed over the extensive wetlands on the property behind a perimeter dike that was constructed along the shorelines of Crab Creek and Pleasure House Creek. The placement of dredged material substantially raised the overall property elevation; the material was subsequently leveled to reduce blowing sand. In 1972, the City of Virginia Beach agreed to remove between 15,000 and 35,000 cubic yards of material from the site for beach replenishment purposes, and then replace it with additional material from future dredging operations. During the 1970s, over 68,000 cubic yards of material were removed from the site, and several pits were dug on the property. Sometime during 1972, the internal ditch system that currently exists on the property was constructed. A dike to retain the dredge material was constructed from onsite sediments, leaving a large excavated ditch just behind the dike that still exists along much of the Pleasure House Creek shoreline in the central and at the eastern end of the site. In addition, drainage ditches were dug leading from Marlin Bay Drive to Pleasure House Creek. In 1977, another 154,700 cubic yards of material were placed on the site.

During the late 1970s and early 1980s, the dikes deteriorated to a degree that allowed tidal exchange into the ditches. Concerned about adverse effects to water quality, the U.S. Army Corps of Engineers directed McLeskey to prevent any tidal influence in the interior ditches. McLeskey complied by raising the invert of the culvert pipes to maintain the site in a non-tidal state. These pipes, however, have since settled, and the site is once again experiencing tidal exchange. As a result of this tidal influence, wetlands have colonized the banks of the existing interior ditch system, and the ditch system bottom has been colonized with a variety of shallow water estuarine benthic and pelagic fauna typical of the tidal waters in the area. In 1992, McLeskey and the City entered into an agreement to allow storm water from portions of the Ocean Park subdivision to be routed through the existing ditches on the property.

Pleasure House Point was acquired and preserved in July 2012 as a collaborative effort between the Trust for Public Land, the City of Virginia Beach and the Chesapeake Bay Foundation. The property was under the threat of development for many years. The purchase placed the property into public ownership, thus protecting important aquatic and terrestrial habitats in the Lynnhaven watershed and providing public access to the shoreline. The site has an extensive system of estuarine emergent wetlands, tidal mudflats, and maritime forests and adds to an existing network of conserved areas along Crab Creek, Pleasure House Creek, and the Lynnhaven Bay.

TABLE 1 – Land Cover in the Conservation Easement

Land Cover Type	Acreage	Percentage
Upland/Maritime Forest	31.1	37.0 %
Emergent Tidal Wetland	7.0	8.3 %
On-Site Open Water	4.8	5.7 %
Tidal Subaqueous Bottomland	32.6	38.5 %
Emergent Marsh Island	8.9	10.5 %
Totals	84.6	100%

Ecological Summary

The Pleasure House Point Conservation Easement Parcel contains a variety of ecologically significant habitats, including native deciduous and coniferous forests, tidal emergent and scrub shrub wetlands, mudflat and shellfish beds, and scattered salt marsh islands.

Upland/Maritime Forests - The property contains intact stands of the state rare maritime loblolly pine-hardwood forests and state imperiled maritime live oak - loblolly pine forests. These wooded areas are concentrated along the western section of the property and have been largely undisturbed during the past 80 years. Sand dunes comprise the upland habitat on the eastern section of the property. These upland habitats account for 31.1 acres of the conservation easement.

Emergent Tidal Wetlands - The property contains approximately seven acres of fringing estuarine emergent tidal wetlands along the shoreline of Pleasure House Creek. The property has been colonized by a mixture of native, opportunistic wetland and non-wetland vegetation. The wetlands present on the site consist of wetlands classified as Saltmarsh cordgrass *(Spartina alterniflora)* and Salt meadow hay *(Spartina patens)* communities by the Virginia Institute of Marine Science. The presence of several large native stands of Black needle rush *(Juncus roemerianus)* within the lower emergent salt marsh is particularly unique to this site.

Onsite Open Water - There is 4.8 acres of onsite open water. The property has two manmade inland brackish ponds and three manmade inland brackish channels. All water bodies are labeled on Map 1 on page 10. Pond 1 is the largest and western most pond. Pond 1 is hydrologically isolated except during storm events when the pond receives overwash from Pleasure House Creek. Pond 2 and Channels 1 & 2 have direct connections to storm water drainage from Marlin Bay Drive. Pond 2 is connected to Channel 1 through a water-filled ditch that extends eastward from Pond 2 and runs parallel with Pleasure House Creek. This same water-filled ditch intersects with Channel 1 and continues to extend eastward of Channel 1 running parallel with Pleasure House Creek. Channel 2 is the widest channel and is connected to a water-filled ditch that extends westward of the channel and runs parallel with Pleasure House Creek. Channel 3 is isolated from storm water drainage and has no connecting ditches. Channels 1, 2 and 3 each have a culvert that connects them to tidal exchange from Pleasure House Creek. Due to the inverts of each culvert, tidal flow moves into the channels only when Pleasure House Creek has higher than average water levels.

Tidal Subaqueous Bottomland – The property contains approximately 32.6 acres of tidal subaqueous bottomlands. This habitat consists of the muddy substrate at the bottom of Pleasure House Creek and Crab Creek. During high tides, these areas are submerged underwater with depths that do not allow for the growth of plants with root systems. During low tides, water levels recede, water depth decreases, and much of these areas become exposed mudflats. Microinvertebrates and macroinvertebrates live within and on the surface of these bottomlands and are important food sources in the estuarine ecosystem.

Emergent Marsh Islands – The property includes 8.9 acres of emergent marsh islands. These islands are heavily influenced by the tides and are regularly flooded twice a day. The islands are dominated by tall form Saltmarsh cordgrass.

Aquatic Habitat and Species

The emergent tidal wetlands, tidal subaqueous bottomlands, and emergent marsh islands make up 48.5 acres and are an ample mix of habitats that provide protection and forage areas for numerous juvenile and adult shellfish, crustacean, fish and aquatic turtle species.

Pleasure House Creek and Crab Creek are a part of the Lynnhaven River system which once supported a thriving fishery for the Eastern oyster *(Crassostrea virginica)* known worldwide commercially as the "Lynnhaven Fancies" in the early 20th century. Overharvest and disease dramatically decreased the Lynnhaven oyster stock. Increased pollutant loads from land development in the Lynnhaven watershed resulted in a significant decrease in water quality and eventual closure of almost all shellfish harvesting efforts.

Oyster restoration work in the Lynnhaven River has been accomplished through a partnership of the U.S. Army Corps of Engineers (USACE), Virginia Marine Resources Commission (VMRC), the City Of Virginia Beach, Virginia Institute of Marine Science (VIMS), Lynnhaven River NOW (LRNow), and the Chesapeake Bay Foundation (CBF). Currently, 62 acres of sanctuary oyster reef have been built. hrough the work of the City of Virginia Beach and LRNow, 42% of the Lynnhaven River meets the rigorous standard for shellfish harvest. However, Pleasure House Creek remains closed to harvesting at this time.

Oysters are what scientists call a "keystone species" in the Bay, meaning their survival is critical to the estuary's ecology. A single adult oyster can filter up to 50 gallons of water a day. Millions of them concentrated in a river such as the Severn can act as filtering factories [...] Oyster reefs also provide ideal habitat for tiny aquatic life and the fish that feed on them. A healthy oyster reef is one of the most diverse "communities" in the Chesapeake ecosystem. This concentration of life makes them favored fishing sites for watermen and anglers.
(Source: cbf.org)

The property also serves as prime habitat for the Chesapeake Bay's iconic Blue crab *(Callinectes sapidus)*, which is the focus of a multi-state recovery effort through goals outlined in the current Chesapeake Bay Agreement. The shallow near shore areas of the property along Pleasure House Creek are particularly important to the Blue crab because these areas serve as excellent nursery habitat for immature crabs.

In addition to its significant habitat for the Eastern oyster and the Blue crab, the Lynnhaven estuary is designated as Essential Fish Habitat (EFH) for various life stages of 17 federally managed species, including Red drum *(Sciaenips ocellatus)* and Summer flounder *(Paralichthys dentatus)*. The numerous and diverse fish species that occur in Pleasure House Creek and the Lynnhaven River system represent all aspects of a marine food web from minnow-like forage species such as the Mummichog *(Fundulus heteroclitus)* and Bay anchovy *(Anchoa mitchilli)*, to omnivores such as the Atlantic croaker *(Micropogon undulates)* and Spotted trout *(Cnoscion neblulosus)* to piscivorous species such as Bluefish *(Pomatomus saltatrix)* and Summer flounder *(Paralichthys dentatus)*.

The federally and state endangered Kemp's Ridley sea turtle, the federally and state threatened Loggerhead sea turtle, and the state's near threatened Diamondback terrapin have all been documented in the near shore waters of the property.

Terrestrial Habitat and Species

The property provides a refuge for a number of resident birds within the highly developed Chesapeake Bayfront area of Virginia Beach. The property lies between two sites recognized for their global significance to birds, the Outer Banks of North Carolina and the Atlantic shoreline-barrier island system of the Delmarva Peninsula. Located directly south of the Delmarva Peninsula, the property (combined with nearby First Landing State Park) provides the first suitable habitat for migratory bird species funneled into the area across the Chesapeake Bay. Bird diversity is very high during the winter with substantial increases in waterfowl and wading birds to the area, indicating that Pleasure House Point is important wintering grounds for these species.

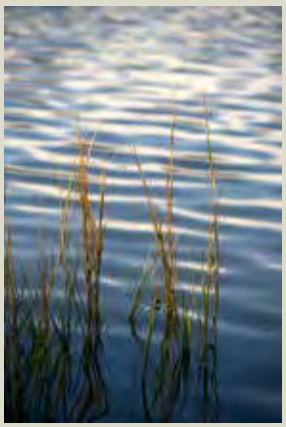
Diamondback terrapins are a species of high conservation need in Virginia. Their population decline is due to habitat loss, nest predation, collisions with vehicles, and drowning in commercial crab pots. Pleasure House Point is a rare natural area among the evermore prevalent urbanized areas of coastal Virginia and is one of only a few remaining locations in Virginia Beach with suitable Diamondback terrapin nesting habitats. Diamondback terrapin nests have been documented in sandy areas throughout the property.

Management Objectives

Pleasure House Point will be managed as a Natural Area Preserve by the City of Virginia Beach Department of Parks and Recreation. It will be open to the public from dawn to dusk. Soft trails, an ADA accessible loop trail with overlook and a canoe launch are proposed as low-impact public access improvements for the property. Habitat restoration and habitat enhancement are also important objectives in the management of the property.

A conservation easement recorded over 84.658 acres of the Pleasure House Point property in July 2012 as part of the acquisition of the property. Map 1 on page 10 shows the area covered by the recorded easement. The conservation easement was placed on the property by the United States Fish & Wildlife Service as a condition of a financial grant that was applied toward purchase of the property through the National Coastal Wetlands Conservation Program. The conservation easement is held by the Virginia Department of Game & Inland Fisheries (VDGIF). This management plan is being developed to comply with the conditions of the recorded conservation easement and the management plan has been coordinated with VDGIF. The management plan will govern operations and maintenance as well as future improvements and restoration projects on the 84.658 acre parcel known as the Conservation Easement Parcel. The site must be managed consistent with conservation goals used to rank and fund the project as listed below.

- Maintain habitat values
- Maintain Coastal Maritime Forests
- Maintain water quality
- Maintain/educational and recreational values not detrimental to other aspects



The Management Objectives that are listed below reflect the conservation goals:

- Improve public access
- Restore oyster habitat
- Enhance wetland habitat
- Maintain and enhance upland habitat for plants and wildlife
- Take initial inventory and continue to monitor plants and wildlife
- Foster public engagement
- Public outreach and education


Conservation Easement
Shore Drive
Marlin Bay Drive
Stormwater Ditch
Channel 1
Channel 2
Pond 1
Pond 2
Crab Creek
Channel 3
Pleasure House Creek
0 125 250 500
Feet
Conservation Easement Property
Inland On-site Open Water

2. Public Access

Pleasure House Point Natural Area offers extensive recreational opportunities for residents and visitors. Located along a major coastal corridor, it is easily accessible to the residents of Virginia Beach and greater Hampton Roads area. The Pleasure House Point Natural Area offers unique access to Crab Creek, Pleasure House Creek and the Lynnhaven River.

Existing Conditions

Existing Trails

The site is secured with a timber guardrail to deter unwanted motorized vehicular access. Motorized vehicles or bicycles are not permitted onsite. There are distinct trail entrances marked with trail head signs as well as multiple trail routes on the site which are all marked with way finding signage. Trash cans and dog boxes providing bags for visitors to "scoop the poop" are located at each trail head. The trail system allows visitors to enjoy forested areas, wetlands, sandy shorelines, wildlife observation, and stunning views of Crab Creek, Pleasure House Creek, and the Lynnhaven Bay. It is essential to keep the existing shoreline trail along Pleasure House Creek and Crab Creek intact in order to provide the public with the best opportunities to experience the beautiful waterfront views of the property. The system of sandy walking trails on the property connects with existing pathways along Shore Drive via Marlin Bay Drive and connects visitors to Loch Haven Neighborhood Park.

It is recommended that the shoreline trail along the eastern edge of the property be realigned in order to reduce impacts to Diamondback terrapin nesting areas, allow for regeneration of tidal wetland vegetation, and to minimize negative impacts to these habitats that could result from increased visitation to Pleasure House Point. Native plantings will be used to deter the public from using old trails no longer in use and to deter the public from deviating away from established trails into sensitive habitats. Virginia Beach Parks & Recreation will regularly monitor access points and make corrections to deter unwanted activity.

Parking Facilities

Marlin Bay Drive is a two lane divided roadway with a wide median. Parallel parking is provided along Marlin Bay Drive to accommodate over 100 cars. The parking is within the right-of-way, therefore parking will not be installed within the conservation easement area. Access to the property from the right-of-way needs to be improved with handicap ramps, walkways, and landscape requirements. Although those elements are out of the purview of the easement, they are essential for connectivity into the site.

Recreational Activities

Pleasure House Point Natural Area offers multiple passive recreational activities such as hiking, birding, fishing, and nature viewing. The views of the water are tremendous, and the winding trails through the maritime forest provide a very unique experience in a natural setting. Active recreational activities are not recommended for this site. Formalizing trails, overlooks, access points, parking, and water access will occur based on available funding and will be planned and executed to minimize impacts to the environment.

Interpretive Information

There is an extensive amount of interpretive and educational information that can be displayed for the public's knowledge. Interpretive information shall be displayed to educate the public of sensitive habitat and preservation areas related to oysters, Diamondback terrapins, and wetland plantings. Enlightening the public about migratory birds and plant life at the site is essential and will provide a unique self-directed learning experience. All signage shall include detailed graphics and photographs to ensure the message is easily understood. Placement of signs shall be in compliance with ADA standards. Virginia Beach Parks & Recreation standards for signage will be followed, and sustainable materials will be utilized.

Maintenance

Maintenance is necessary to ensure that all of the trails and access points are debris-free and safe for all users. Trails shall have clear zones on both sides and overhead, and all hazardous tree limbs will be removed. ADA accessible walkways will be kept debris-free, and all sand and earth material will be removed. The trail will be mowed two to three times a year, or as needed, to ensure the safety of users. Large holes that are deemed unsafe or collect and hold water will be corrected; this includes both natural and unnatural ruts and all trip hazards. Any obstructions to the trailheads or trails will be removed. The trail width and height will be maintained in accordance with National Park Service standards. The flora and fauna will be left as natural as possible. Waterway access areas shall be kept debris-free and safe to use, and any hazardous situations will be corrected promptly. Parking areas will be monitored for debris and kept clean. All maintenance shall be done in a manner that is of minimal disturbance to the overall environment of the park. Hand tools and small engine equipment will be used for all maintenance and only as needed. Heavy equipment will be a last resort.

Operations

Pleasure House Point Natural Area shall be inspected at a minimum of twice per week. Each trail shall be walked, and all parking areas inspected for safety hazards, debris and litter, or any other issues that may be present. All viewing platforms and waterway access sites will be inspected twice per week. Trash cans shall be emptied once per week or as needed. The dog boxes will be maintained and checked once per week for adequate bag supply. All citizens will be greeted by park staff. Park staff will ensure all park regulations are met as well as City Ordinances; i.e. pets on a leash at all times, no alcohol/drugs, no bikes, etc. All issues with any part of the park will be properly identified, logged and corrected in a timely manner.

Proposed Public Access Improvements

Proposed Trails and Overlooks

It is recommended that the existing trail system be improved by including an ADA compliant surface portion to the trail network. The trail surface should be sustainable and composed of a pervious material. Overlooks shall be incorporated into the ADA compliant access of the facility, as well as installing raised walkways to protect the wetlands and sensitive habitats onsite. Access ramps and a formalized sidewalk shall be installed along Marlin Bay Drive. This will improve pedestrian safety along the road for those accessing the park. Marlin Bay Drive is currently 10 feet wider than required for a two-lane divided roadway. It is recommended that planting areas, bike parking, pedestrian crosswalks/ramps, and the removal of impervious materials take place to improve pedestrian and vehicular traffic flow along Marlin Bay Drive. Removal of existing impervious asphalt road surfacing will allow for the construction of a wide pervious surface sidewalk and adjacent native plantings. These actions will reduce the amount of storm water runoff that ends up in Pleasure House Creek.

New Water Access Facility

The Lynnhaven River is a popular site for boating, canoeing and kayaking. An ADA compliant canoe/kayak launch area is recommended on the east side of Channel 2 at the curve in Marlin Bay Drive. Currently the Chesapeake Bay Foundation (CBF) has a separate easement along Crab Creek within the conservation easement which would allow them to construct a private water access site along Crab Creek. However, through the management planning process, CBF has agreed to participate in the planning and construction of a shared water access site for their program use as well as use by the public at the Channel 2 location instead of building a separate launch. The shared site will minimize impacts to the environment. More study is required to ensure that water access within Channel 2 is suitable and to determine if dredging is required. The water access site would include a small amount of parking, including handicapped spaces, and potentially a changing and restroom facility. The launch would also advance the implementation of the Southeast Coast Paddle Trail developed by the National Park Service (**www.secoastpaddlingtrail.com**). Pleasure House Point has been officially designated as the northern extent of this trail. It should be noted that the Channel 2 location for this facility is outside of the conservation easement boundary.

ADA Accessibility

It is essential to provide ADA-compliant access to a portion of the natural area, water access facility and overlook platforms with views of the water. The ADA parking area at the new kayak launch location will serve as the trail head for new ADA-accessible trails. Plans to increase the ADA-compliance for the site will be implemented over the next five years.

TABLE 2 – Public Access Priority Projects

Priority Ranking	Project Actions	Project Schedule
1	Install interpretive signage to help the public understand why areas of the property are sensitive and need protection.	Design: Summer 2014 by VBPR Installation: Fall/Winter 2014 by VBPR
2	Improve trails and overlooks by adding ADA compliant sections to the trail system. All trials will be built with sustainable surfaces.	Design: Summer/Fall 2014 by VBPR Construction: Spring 2015 by VBPR
3	Non-Motorized Water Access and Parking (Outside conservation easement boundary)	To be determined. Work to be done by VBPR in coordination with CBF

PROPOSED OVERLOOK POINT

PROPOSED KAYAK LAUNCH

FINAL MASTER PLAN

PLEASURE HOUSE POINT

CITY OF VIRGINIA BEACH

WPL LANDSCAPE ARCHITECTS LAND SURVEYORS CIVIL ENGINEERS

February 5, 2014
212-0216

50 0 100 FT 200

3. Habitat Restoration & Enhancement

Oyster Habitat Restoration

Oyster habitat restoration projects would improve the ecology of Pleasure House Creek by increasing not only the oyster population, but the habitat availability for the wide variety of fish and shellfish species that use oyster reefs during part of their life cycle. As an added benefit, increased oyster populations would increase the water filtration capacity of Pleasure House Creek and facilitate improvements in water quality.

Restoration of the oyster population requires two components: (1) appropriate densities of reproductive oysters in conjunction with (2) availability of oyster settlement habitat. Essentailly, larval oysters require hard substrates to bind to in order to metamorphosize and become spat. Without a substrate to bind to, oyster larvaewill die.

Concrete oyster habitat, granite, marine limestone, and oyster and clam shells have all been successfully used as substrate for oyster spat colonization in other oyster restoration projects throughout Virginia, and this plan encompasses several of these strategies as well. Lynnhaven River NOW and the Chesapeake Bay Foundation have conducted a thorough pre-restoration survey of the oyster population in Pleasure House Creek. Results of this survey will guide our plan for constructing oyster reef habitat and for stocking reproductive oysters to the creek. Oyster spawning and baby oyster attachment occurs between May and September. (I just spoke to Jackie at CBF and they do not plan to carry out a spat survey in Pleasure House Creek this summer) thus oyster habitat restoration activities should take place prior to the oyster spawning season in order to collect maximum spat set during the first year after new oyster habitat is implemented.

Oyster castles and oyster reef balls have been successfully utilized for oyster habitat restoration projects in the Hampton Roads region. Lynnhaven River NOW has had success constructing sanctuary oyster castles. Oyster castles are assembled out of 1' x 1' blocks (35 lbs. each) stacked three to four blocks tall. The blocks that make up the oyster castles are marine-safe concrete and include 10% crushed oyster shell. Three different castle shapes are typically used: eight-foot long sections with five-foot breaks between sections, five and a half-foot long sections with breaks, or three-block by three-block pyramids. The Chesapeake Bay Foundation has had success using reef balls that are 18 inches tall, 24 inches wide and 100 pounds each. Reef balls are composed of marine-safe cement and mimic the structure of natural oyster reefs with several openings on the surface. Unlike oyster castle blocks, reef balls are not stacked but tend to be laid down as a single layer. Oyster habitats can be brought by boat or by land, and assemblage of oyster castles and oyster reef balls can be done through the work of volunteers. Both oyster habitat structures have the ability to enhance oyster habitat and provide shoreline stabilization and marsh protection.

Ideal sites for oyster restoration include areas with gradual slopes composed of firm substrate (preferably sandy) and areas with low to moderate wave action. Fortunately, much of the near shore water habitats of the conservation easement parcel meet these criteria. If the substrate is not firm enough in some areas, geotextile fabrics can be placed down first and oyster habitat could be placed on top of this fabric.

In areas where there is a steep slope in the marsh toe (location where the wetland vegetation stops and open marsh sediment begins), oyster shells can be piled up against these slopes. This action could help to reduce further erosion of these steep areas, where wetland vegetation root systems are located, as well as provide substrate for oyster spat to attach to.

The results of the oyster population survey will aid in determining the best locations for oyster restoration projects. Also further study of the sediment, wave action, and accessibility of potential oyster restoration

sites in Pleasure House Creek as well as getting a better understanding of the property's hydrology and subsequent wetland restoration and enhancement projects will influence the determination of ideal oyster habitat restoration project locations.

Locations of private oyster leases are another factor that will influence where oyster restoration projects can occur. Four oyster leases are located adjacent to the Pleasure House Point Conservation Easement. Oyster Leases of Pleasure House Creek and Crab Creek can be seen on *Map 3 - Potential Oyster Restoration Areas* on page 18.

The Virginia Marine Resource Commission (VMRC) is responsible for managing oyster leases. To accomplish oyster habitat restoration goals, the City may choose to work with the current oyster lease holders, or the City could also consider applying for assignment of these oyster leases in the future. According to VMRC, any persons seeking to sell or purchase an oyster planting ground lease are responsible for negotiating the terms and conditions with the current lessee; the VMRC will not participate in any negotiations between the two parties. The physical transfer of any lease must be approved by the Marine Resources Commission by means of submittal of an application for transfer of an oyster planting ground lease. This application can be obtained from VMRC or from the internet at: **http://www.mrc.virginia.gov/forms/index.shtm#Oyster Ground Leasing**. The current year lease rent must be paid in order to transfer an oyster planting ground lease.

Oyster Habitat Restoration Pilot Project

CBF and Lynnhaven River Now (LRNow) have drafted a plan for oyster habitat restoration within the conservation easement parcel boundaries that ensures maximization of resources and builds on the technical expertise of both groups. The plan includes a mix of alternative substrates (concrete oyster habitat) and recycled oyster shells for the construction of proposed oyster habitat restoration projects. The two main goals of this project are to increase sanctuary oyster habitat and oyster broodstock in Pleasure House Creek in order to help re-establish the ecosystem services that oyster reefs provide, and to showcase various oyster shoreline restoration techniques to the community. Showcasing these shoreline restoration techniques will educate the public and hopefully inspire them to choose natural options for shoreline protection rather than unnatural bulkhead or revetment options. A majority of the oyster habitat restoration work will be conducted with the assistance of student and citizen volunteers and will therefore actively engage the community in Pleasure House Creek restoration efforts. In the future, the hope is to engage leaseholders and private shoreline owners along Pleasure House Creek as well, and encourage them to design and construct additional oyster restoration activities on sections of their leases and shorelines. The following Priority Projects give more details about each project that CBF and LRNow propose in their Oyster Habitat Restoration Pilot Plan for Pleasure House Point.

Priority Project 1:

CBF and LRNow are developing a thorough pre-restoration oyster population assessment. This information can then be compared to post-restoration oyster population assessments. These assessments will be used to measure the success of the oyster habitat restoration work that will be carried out throughout Pleasure House Creek. The oyster population survey identified densities of spat (< 1"), small (1" – 3") and large (> 3") oysters throughout Pleasure House Creek in Fall 2013 and Winter 2014. That study determined sentiment sites that can be sampled again in future years to identify spat settlement and oyster restoration success. Volunteers and interns will be used as appropriate to assist CBF and LRNow in completing the research.

Priority Project 2:

Construct an intertidal shell plant at Site A on *Map 3 - Potential Oyster Restoration Areas* on page 18. The results of the oyster spat settlement evaluation of the creek will determine if the oyster reef needs to be stocked with reproductive oysters. A Joint Permit Application (JPA) is required in order to carry out construction at Site A.

Priority Project 3:

Site C on Map 3 is where a shallow shell plant will be laid. A JPA permit is required in order to lay shell plant at this site.

Priority Project 4:

Site D on Map 3 is also known as Channel 3. It has brackish water (16 ppt and higher), firm substrate, and an open concrete pipe that facilitates tidal exchange with Pleasure House Creek. If oysters survive in this area during an experimentation phase, Site D could serve as a natural oyster hatchery. A shallow layer of oyster shell would be laid on the bottom of this channel and stocked with one-year old oysters grown by student volunteers coordinated by Oyster Reef Keepers of Virginia. This semi-enclosed channel will enhance oyster fertilization efficiency by retaining spawned gametes for longer than they would be retained in the larger river system, thus giving them a higher chance of successful fertilization. Fertilized oyster larvae would then be able to drift out into Pleasure House Creek and the greater Lynnhaven River through the existing water exchange point.

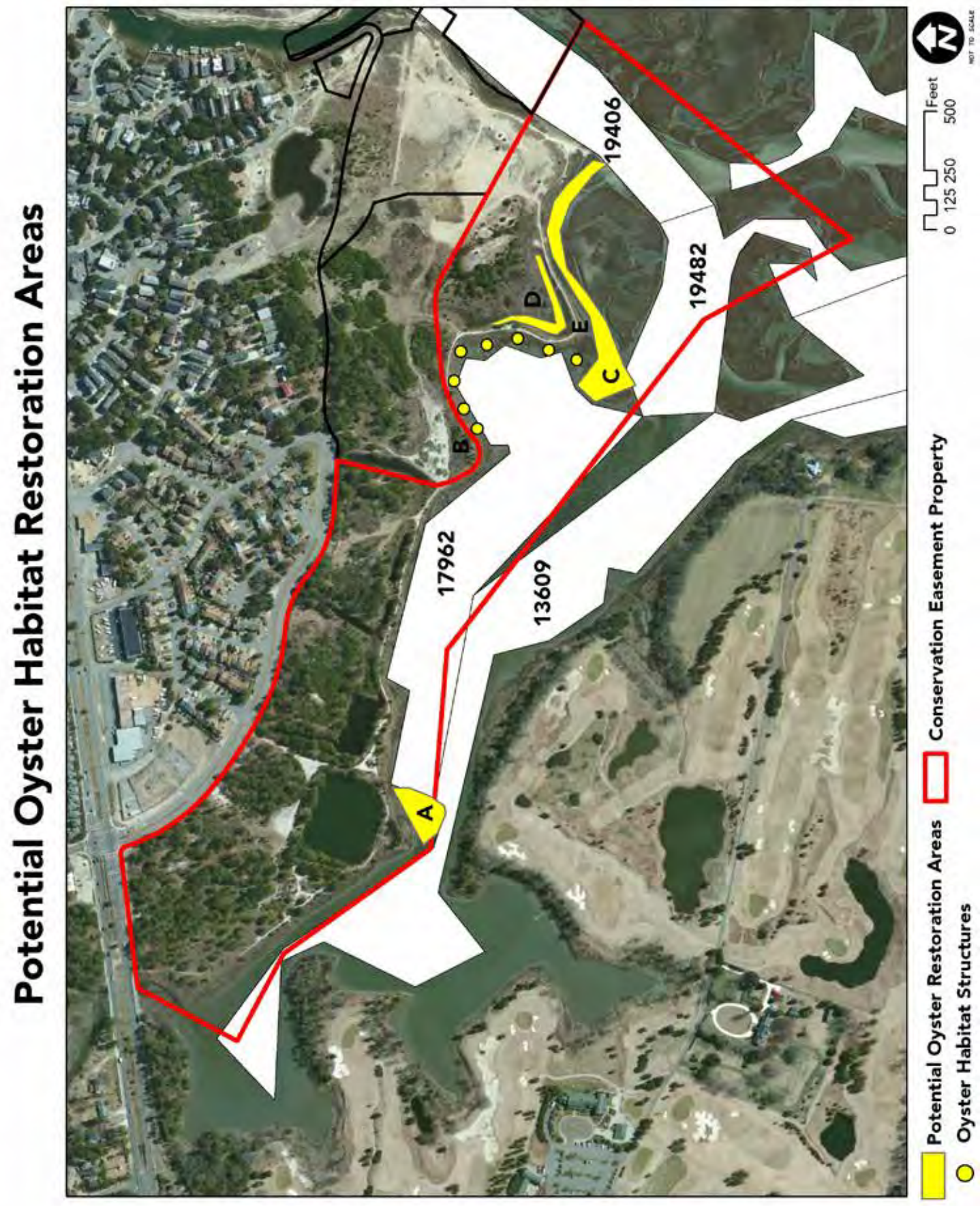
VDGIF and Virginia Beach Parks & Recreation will evaluate the possibility of breaching the berm where the existing water exchange point of Site D is located, labeled as Site E on Map 3 to allow breach would allow greater water exchange to and from Site D than currently exists.

Priority Project 5:

Site B on Map 3 has been designated to become an educational showcase area to display various types of oyster shorelines, including oyster castles, reef balls, mini-reef balls, and shell plants. These structures would be placed along the landward side of lease #17962. Oyster castles and mini-reef balls will be assembled and deployed with the assistance of community volunteers. Educational signage will be placed along the section of the Beach Trail where these oyster structures are visible. This signage will provide the public with information about the ecological value of oysters and explain the oyster shoreline strategies demonstrated at the site.

TABLE 3 – Oyster Restoration Priority Projects

Priority Projects	Project Actions	Project Schedule
1	Conduct an oyster population assessment of Pleasure House Creek	• Pre-restoration oyster population assessment - Fall 2013 by CBF and LRNow
2	Construct an intertidal shell plant at Site A	Permitting and construction by CBF and LRNow - Spring 2015
3	Site C is where a shallow shell plant will be laid	Permitting and construction by CBF and LRNow - Spring 2015
4	• Carry out oyster survival test for Site D • Lay shallow layer of oyster shell on the bottom of Site D and stock the site with one-year old oysters grown by student volunteers • Evaluate the possibility of breaching the berm at Site E	• Preliminary oyster survival test of Site D - Fall 2013 by CBF and LRNow • Oyster stocking of Site D will be coordinated by Oyster Reef Keepers of Virginia staff; timeline TBD • Evaluation of berm breach - ongoing by VDGIF and VBPR
5	Display various types of oyster shoreline projects, including oyster castles, reef balls, mini-reef balls, shell plants in Site B, and place educational signage along the section of the Beach Trail where these oyster structures are visible	Will be carried out by CBF and LRNow staff and volunteers. VBPR could provide assistance with the erection of educational signage; timeline TBD


Potential Oyster Habitat Restoration Areas
A
B
C
D
E
17962
13609
19406
19482
0 125 250 500
Feet
N
NOT TO SCALE
Potential Oyster Restoration Areas
Oyster Habitat Structures
Conservation Easement Property

Wetland Restoration

The following information was provided by former Habitat Restoration Specialist Walter Priest from the National Oceanic and Atmospheric Administration (NOAA), and it outlines design considerations for implementing wetland and aquatic habitat restoration projects at the Pleasure House Point Natural Area. The restoration goals for this area include increasing the area of tidal wetlands, improving the functional value of the existing tidal wetlands, increasing fish habitat and maintaining or improving existing water quality. The objectives of the restoration planning include an analysis of the potential restoration options for each of the five water features identified on Map 4 on page 24.

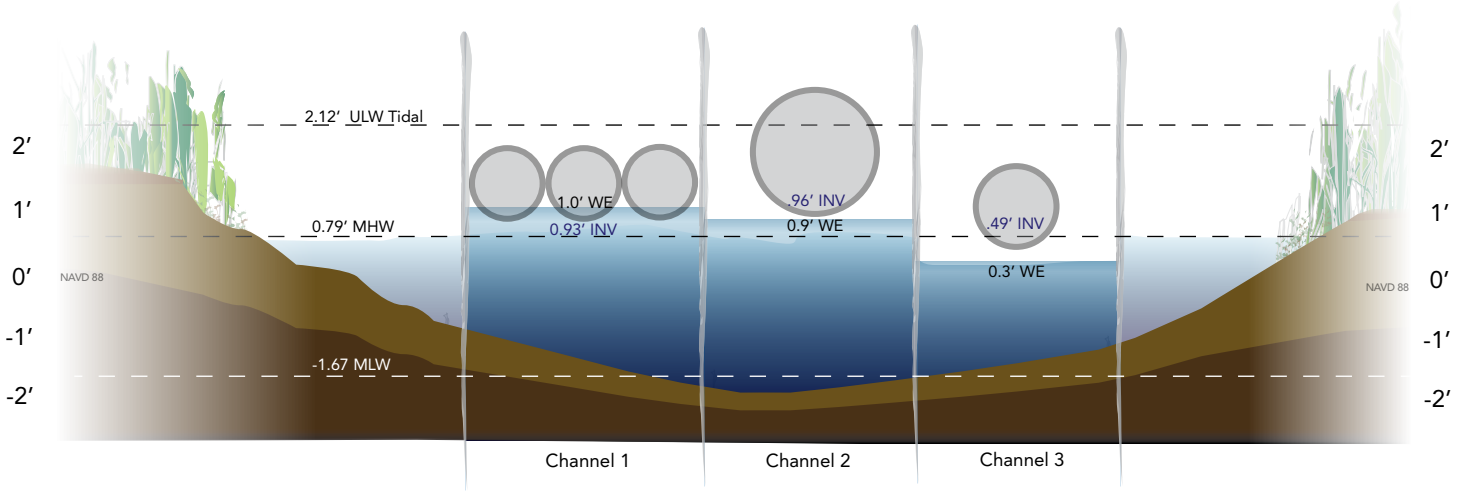
Existing Conditions

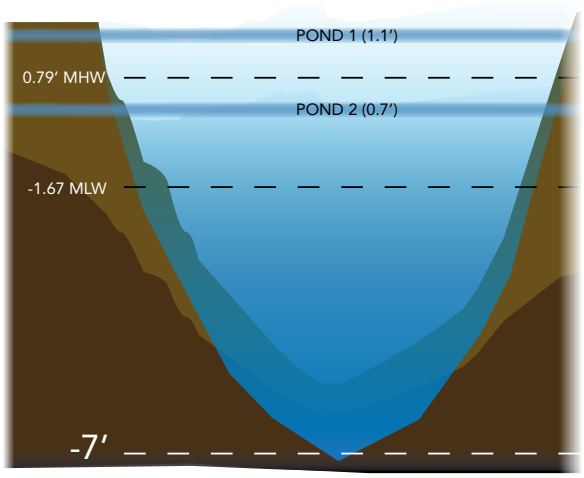
The Pleasure House Point Natural Area encompasses a range of habitats from maritime forest to tidal marshes. It has been the scene of a number of dredged material disposal episodes over the years. This placement of dredged material and the accompanying containment dike have significantly altered the topography and hydrology of the area by increasing its elevation and isolating much of the area from normal tidal inundation. In addition, sand mining operations have created two lakes on the property.

Several sets of pipe culverts have been placed in the perimeter containment dike to allow upland runoff to drain from the site. These same culverts also allow limited tidal incursions. There is also a borrow ditch immediately landward of the perimeter dike that was formed by the excavation of material to build the dike. These ditches have limited tidal connectivity but do support tidal wetland vegetation in many places. The relationships between the elevations on the site topographic survey, the tidal datum, the upper limit of tidal wetlands and the culvert elevations are depicted on page 20. The details of the culverts are given in the *Dike Culvert Characteristics Table* in Appendix 1.

Culvert Elevations

AT PLEASURE HOUSE POINT





Pond 1 & 2 Elevations

AT PLEASURE HOUSE POINT

The perimeter dike and its culverts significantly alter the tidal hydrology of the property. The culverts limit the daily inundation by the tides and maintain artificial water levels landward of the dike. The culverts and dike prevent the site from effectively draining at low tide. These conditions allow for the development of tidal wetland vegetation within the property, particularly for Channels 1 and 2. This artificially high surface water elevation very likely has an effect on groundwater elevations within the property by maintaining it closer to the surface than would be the case if the channels were allowed to drain to mean low water.

Inland ponds and channels of the property are brackish. A survey of the ponds by a fisheries biologist with the Virginia Department of Game & Inland Fisheries staff (VDGIF) found very low abundance of adult sized fish and overall insignificant fish abundance in both ponds (see Appendix 6). The fish that were found were not of economic or recreational importance. Opening up these ponds to more tidal flow is recommended to increase and enhance the fish populations of these areas.

Pond 1

Pond 1 is located on the western end of the property. It has an area of 2.06 acres and averages approximately 8′ deep (NAVD88), with a pool elevation of 1.1′ (NAVD88). Its side slopes are roughly 4:1 H:V. This pond was apparently excavated from the upland portion of the site for borrow material. From all indications observed during a site visit, it appears to be hydrologically isolated from all of the other surface water features on the property including no direct stormwater runoff. There is a low area in the southern perimeter +2.4 (NAVD 88) that probably allows overwash into the pond from Pleasure House Creek during storm events. The salinity measured by VDGIF is 15.3 ppt (see Appendix 1) which is slightly lower than the other water features. This is an indication that there is less of a hydrological connection with Pleasure House Creek. No fish were found during the VDGIF fish survey (Appendix 6) of this pond. Restoration options for Pond 1 would include opening a direct connection to Pleasure House Creek and adding fill to the side slopes to create a broader intertidal area for wetland vegetation. This would increase its value as fish habitat. The one caveat would be the depth of the pond. It would still be approximately 6′ deep at mean low water (MLW). This is the threshold for stratification that could lead to water quality issues such as low bottom dissolved oxygen levels which could decrease its habitat value.

Pond 2

Pond 2 is located just east of Pond 1. It has an area of .65 acres and is approximately 8′ deep (NAVD88) with a water level of .7′ (NAVD88). The side slopes of the pond are approximately 4:1 (H:V). It has a direct stormwater connection to a drop inlet on Marlin Bay Drive at its northwest corner. It is also connected to the interior ditch system at its southeast corner. Pond 2 has a salinity of 17.6 ppt (Appendix 1). The VDGIF fish survey of this pond found a low number of fish as well as a low diversity of fish species. Its first connection to Pleasure House Creek is through the culverts at Channel 1.

Restoration options would depend on the restoration options pursued at Channel 1. Opening Channel 1 to increased tidal flow would give Pond 2 a substantially greater tide range and increased access to fishery resources. It has the same depth issues as Pond 1. It would be roughly 6′ deep at MLW which is the threshold for stratification in small water bodies and can lead to dissolved oxygen problems. Nutrient laden stormwater runoff from Marlin Bay Drive may exacerbate these problems. The side slopes are heavily vegetated with both trees and shrub, which could also limit wetland restoration opportunities.

Channel 1

Channel 1 is the westernmost tidal connection to the property. Stormwater drainage from Marlin Bay Drive feeds into this channel from the north. The depth of Channel 1 ranges from -1.3' to .7' (NAVD88). The salinity in Channel 1 is 17.8 ppt (Appendix 1). The outfall on the sourthern end of the channel consists of three 15" steel pipes with an invert of 0.93' (NAVD88). Mean high water (MHW) is .79' (NAVD88). The controlling invert of the outfall is above MHW so that tidal exchange occurs only during spring tides and storm events. The invert also causes the water level in the ditches connecting to the channel on both sides to be ponded at slightly above MHW. The depths of the ditches to either side of Channel 1 range from -1.3' to +.06' (NAVD88), and there is an area of fill in the eastern ditch that rises to approximately 1' (NAVD88). This area of fill prevents

tidal flow between Channel 1 and Channel 2 except during spring tides and storm events. The irregular bottom elevations within the parallel ditches on either side of Channel 1 will result in ponded areas once tidal hydrology is restored to allow daily tidal exchange.

The principal restoration option at Channel 1 would involve the removal of the culverts and the restoration of unimpeded tidal access to the adjacent ditches and main channel. Opening Channel 1 would also introduce a regular tidal fluctuation in Pond 2. Regular tidal inundation would allow colonization or restoration of tidal wetlands along the intertidal fringe from mean tide level, -.49 (NAVD88), to the upper limit of wetlands, approximately +2.12 (NAVD88). Again, the shade from overhanging trees and shrubs would limit the wetland restoration potential in some areas.

Channel 2

Channel 2 is outside of the conservation easement area. This channel is located on Virginia Beach City property that has been designated as the site for non-motorized water access as well as a Virginia Beach Public Works wetland mitigation project. Channel 2 is connected to a 50'wide stormwater drainage outlet from Marlin Bay Drive. Channel 2 outfall to Pleasure House Creek contains a single 30" diameter concrete pipe with a controlling invert of .96 (NAVD88). Water is ponded landward of this culvert at an elevation of approximately .9' (NAVD88). The salinity at Channel 2 is 19.4 ppt (Appendix 1). The surface hydrology of Channel 2 is limited by a fill road at elevation +2' NAVD88 approximately 150' west of the culverts and an area of fill to the east at approximately +2' (NAVD88). Water depth in the ditch west of the main channel is roughly -.3' NAVD88. Water depths in the main channel average approximately -5' (NAVD88). Removal of the culvert at Channel 2 will have the greatest impact on wetland restoration. Not only will its removal restore tidal hydrology, but it will also be the source of hydrology for the City's mitigation bank area. As such, the new inlet must be carefully designed to provide sufficient cross-sectional area to provide enough tidal prism to flood all of the large mitigation area and effectively drain it. It also must be small to produce tidal currents with velocities sufficient to maintain the inlet without shoaling. This is important not only for providing tidal hydrology for the mitigation bank but also for unimpeded navigational access for the proposed canoe and kayak launch at the head of the storm water ditch along Marlin Bay Drive. The road fill west of the culverts should remain to isolate this new inlet from Channel 1.

Channel 3

Channel 3 is the easternmost tidal connection to the property. The outfall consists of one 12" concrete pipe with an invert of .49' (NAVD88). The internal water level is approximately .3' (NAVD88). The salinity is 19.1ppt (Appendix 1). It is, for the most part, hydrologically isolated from the rest of the internal ditch system. This is the lowest of all of the culverts and the only one with an invert below mean high water which is .79' (NAVD88). This allows for an almost daily tidal inundation of the internal ditch but the .49' invert does not allow the area to drain completely at low tide. Mean low water is -1.67' (NAVD88).

Restoration of this site would involve removing the culverts and connecting the area to mean low water elevations offshore. This could be done at the culvert site or elsewhere on the shoreline which might be more conducive for the connection. There are a number of depressions in the bottom topography ranging down to -3.5' (NAVD88). This will result in pools within the ditch at low tide if not addressed during the restoration. The removal of the culvert would allow regular tidal inundation that would increase the flooding frequency of the remnant high marsh landward of the internal ditch and allow the area to be more fully utilized by fish and crabs as well as expand tidal wetlands north east of the channel.

Ground Water

The existing hydrological conditions on the property, both surface and subsurface, are heavily influenced by the perimeter dike and the culverts which impound surface water above mean high water over much of the site. These high surface water elevations very likely have an influence on groundwater elevations in the sandy soil of the property. Higher groundwater elevations may be affecting the vegetation, making it more hydric than it otherwise might be. These factors need to be taken into account with the removal of the culverts and breaching the dikes. These restoration activities will eliminate much of this impounded surface water and allow the entire site except the ponds to drain completely at low tide. This drainage is likely to have an effect on the groundwater elevations, especially near the existing water features.

Next Steps:

The hydrology of the property is complex due to previous human facilitated manipulations of the natural hydrology. The natural hydrology was manipulated through the construction of ponds, channels, berms, and culvert pipes as well as the activities of spoil dumping and spoil extraction. Before potential wetland enhancement projects can be fully explored, additional study of the hydrologic conditions is necessary. There is a tremendous potential for wetland restoration and enhancement within the conservation easement parcel, but hydrology will change during restoration work. Planning for wetland restoration and enhancement must take into account the changes in the hydrology of site both in terms of increased ponding in some areas and increased drainage in other areas. It is important in wetland restoration and enhancement projects to maintain flow characteristics of the storm water easements. Sea level rise also needs to be addressed without removing the entire perimeter berm. Hydrology modeling should be carried out for each wetland restoration project. It is important to know the ramifications of each project before any project can be selected in order to avoid negative impacts to the rare and sensitive habitats, such as the maritime forest, on the property.

Wetland Restoration Opportunities: Map 4 on page 24 shows areas where potential wetland restoration and enhancement have been discussed. A berm breach or several berm breaches could be used to increase tidal flow to Pond 1. This action would add fish habitat to Pleasure House Creek and could increase wetland habitat in this area. It is likely that the berm will be breached at Channel 2's tidal connection pipe as part of a wetland mitigation project that will be implemented outside of the conservation easement area by Virginia Beach Public Works. Channel 2 is also the potential location for a kayak launch. If a kayak launch is constructed, the tidal connection will be maintained and routine dredging may be required to reduce sediment accretion in this channel.

Oyster habitat structures are proposed to be installed within the white box shown on Map 4 on page 24. On the landward side of these new oyster habitat structures there is an opportunity for wetland expansion. Sediment usually accumulates on the landward side of these oyster habitat structures and within a few years wetland plantings could be carried out in these areas resulting in measurable tidal wetland expansion.

In Channel 3 a berm breach is also being considered as part of the oyster restoration project proposed for Channel 3. Another result of the berm breach at this site is wetland expansion. When a section of the berm is breached between Pleasure House Creek and Channel 3 tidal flow will increase into Channel 3. This increased tidal flow will change the hydrology and vegetation northeast of Channel 3, resulting in measurable wetland expansion.

TABLE 4 - Wetland Restoration Priority Projects

Priority Ranking	Project Actions	Project Schedule
1	Pond 1 Restoration	VBPR to coordinate Pond 1 with wetland bank design and construction (begin July 2015 dependent on funding)


Potential Wetland Restoration and Enhancement Areas
Crab Creek
Channel 3
Channel 2
Channel 1
Pond 2
Pond 1
Pleasure House Creek
Oyster Habitat Structures
Wetland Expansion
Increased Tidal Flow
Potential Berm Breach Site
Conservation Easement Property
0 125 250 500
Feet

Upland Habitat Improvements

Terrestrial habitat improvement efforts will be focused on areas of higher elevation on the conservation easement property. The forests located in upland areas of the property are rare habitats that need to be protected. Invasive nonnative and aggressive native vines are the biggest threat to the forest habitats on the property. Therefore, the reduction of nonnative invasive vines and native aggressive vines from the forest habitats is important. The reduction of Carolina jasmine *(Gelsemium sempervirens)* in the Maritime forests of Area 1 as shown on Map 5 on page 27 is of the highest importance. This is where the vine is most abundant and aggressive. Mechanical control is the best way to reduce Carolina jasmine because this plant is toxic and can cause skin irritation. Carolina jasmine is an important food source for birds. Before plant removal, areas should be systematically surveyed and reduction goals determined per area with the assistance of VDGIF's Watchable Wildlife Biologist.

Major efforts will be directed towards the removal of the nonnative plant species deemed "Highly to Moderately Invasive" by the Virginia Department of Conservation and Recreation. A list of Highly to Moderately invasive nonnative plants and native aggressive plant species found on the property as well as a general guide for reduction and removal methods of these plants is provided in Appendix 2. A complete list of nonnative plant species found at Pleasure House Point is provided in Appendix 3.

Even though there are several nonnative tree species on the conservation easement parcel, it is not Virginia Beach Parks and Recreation's policy to remove trees, unless the tree is seen to be hazardous to the public.

Priority 1 Project:

Reduction of Nonnative Invasive and Native Aggressive Plant Species. Terrestrial Habitat Areas 1, 2, 3 and 4 as shown in Map 5 on page 27 are where the Parks and Recreation Department plan to take actions to reduce the nonnative invasive and native aggressive plant species at Pleasure House Point in consultation with VDGIF.

Priority 2 Project:

Improve transitional habitats for song birds along trail edges.Trail edges will provide more wildlife habitat if shrubs are planted. Wax myrtle *(Morella cerifera)* shrubs is one native species that can be planted on the west fringe of the property to obscure trails that are no longer in use.

Priority 3 Project:

Conduct a comprehensive tree survey in consultation with Virginia Department of Forestry. A comprehensive tree survey must be conducted on the property in order to proceed with planting additional native trees or thinning pine areas. The results of the tree survey will help to determine where to plant native trees and which pine areas need to be thinned and what percentage of pine trees need to be removed.

Permanent inventory plots will be established in the maritime forests and conditions at each plot will be evaluated every five years. These evaluations will aid in monitoring the health of the forests and in identifying nonnative invasive and native aggressive plant issues per area. The Area Forester from the Virginia Department of Forestry will assist Virginia Beach Parks & Recreation staff with the tree survey and the establishment of permanent inventory plots in the Maritime Forests of Pleasure House Point.

TABLE 5: Upland Habitat Improvements Priority Projects

Priority Ranking	Project Actions	Project Schedule
1	Reduction of the nonnative invasive and native aggressive plant species on the property	• VBPR will contract to remove Carolina Jasmine from Area 1 - Oct 2014 - Feb 2015 after consultation with VDGIF • Annual fall maintenance of Area 1 by VBPR Landscape Management staff to occur after initial removal efforts are carried out • Ideal time to carry out chemical and mechanical plant removal work is in the fall
2	Improve transitional habitats for song birds along trail edges	VBPR will coordinate with Public Access Plans
3	• Complete a comprehensive tree survey • Establish permanent forest inventory plots	• Utilize VBPR Landscape Management intern (timeline TBD) • Virginia Department of Forestry to assist with this work

Terrestrial Habitats

4. Plant and Wildlife Inventory

Several plant and wildlife surveys were conducted on the conservation easement parcel during 2013. A species list of the plants and wildlife found during surveys at Pleasure House Point can be found in Appendix 6. The main goal of these surveys was to take inventory of the plants and wildlife that utilize the property throughout the year. The Pleasure House Point Bio Blitz occurred on May 4, 2013, which was an organized event that brought local citizen scientists and experts of several different taxonomic groups to participate in plant and wildlife surveys on the property. The surveys that were conducted during the Bio Blitz included:

- Nonnative Plant Survey
- Native Plant Survey
- Diurnal Bird Survey
- Mammal Survey
- Diurnal Herpetological Survey
- Terrestrial Macroinvertebrate Survey (including: insects and spiders)
- Near Shore Water Aquatic FaunaSurvey (including: fish, mollusks, and crustaceans)
- Aquatic Macroinvertebrate Survey of the two brackish manmade ponds

Weather during the Bio Blitz was overcast, windy, rainy, and in the low 50s°(F) but warmed slightly towards late afternoon. Nocturnal Insect or Nocturnal Amphibian Call Surveys were not conducted as planned due to high winds. The weather conditions most likely caused an under representation of herpetological and insect species, since both taxonomic groups tend to be less active and therefore less visible in such weather conditions. Participants of the Bio Blitz are listed, along with each participant's associated organization and/or place of work, in Appendix 7. These professionals and volunteers could be asked to participate in future surveys held on the property.

Other surveys that occurred on the property in 2013 included:

- Nonnative plant survey by VBPR staff in February 2013 (Appendix 3)
- Diamondback terrapin nesting surveys were conducted in June 2013 by VBPR staff and throughout the season by LRNow staff and the public (Appendix 5)
- Bird surveys that the Virginia Beach Audubon Society members conducted on a regular basis throughout the year (Appendix 6)
- A small to medium sized mammal survey was conducted by a Christopher Newport University Mammalogy professor and CNU students from September to November 2013. (Appendix 6)
- A butterfly survey conducted by The Butterfly Society of Virginia in June 2013 (Appendix 6)
- A fish survey of the near shore waters of the property by Virginia Aquarium Acquisition and Quarantine staff in June and September 2013 (Appendix 6)
- A fish survey of the two manmade ponds by a VDGIF Fisheries Biologist in April 2013 (Appendix 6)

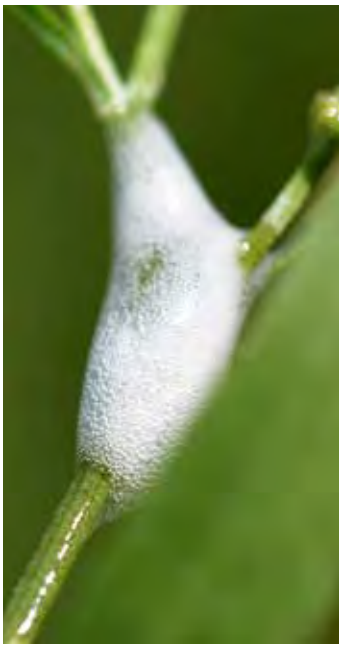
The following are surveys that have occurred and will continue to be carried out in the future as well as surveys that have not occurred but should be carried out in the future.

Diurnal Birds: The Virginia Beach Audubon Society will continue weekly bird surveys of the property through their partnership with the Chesapeake Bay Foundation.

Nocturnal Birds: An Owl Prowl occurred on November 16, 2013. No owls were found to be on the property during the Owl Prowl which only included Area 1 (see the *Terrestrial Habitats Map 5* page 27). For more information about the Owl Prowl see Appendix 6. It is recommended that another Owl Prowl or preferably an Owl Survey be conducted in early Spring 2014.

Small to medium sized mammals: Dr. Richard Sherwin, Mammalogy professor from Christopher Newport University (CNU), and students conducted small to medium sized mammal surveys during September and November 2013. The purpose of these surveys was to take inventory of the small to medium sized mammals that live on and/or utilize the property as well as make an assessment of the population size and density of

raccoons, foxes, and feral/house cats. Raccoons and foxes predate Diamondback terrapin nests and cats can drastically reduce song bird populations. Small mammal surveys could also be helpful in determining which areas to focus on during owl surveys. Owls are more likely to occur in areas where small mammals are found since small mammals are one of their main food sources. The methodology and results of these surveys can be found in Appendix 6.



Herpetological Surveys: An amphibian call survey should be conducted Spring 2014. There are members of the Herpetological Society of Virginia that have expressed interest in conducting this survey during this time. A snake survey has also been recommended for the site, and there are several VDGIF Biologists that could help with the surveys or there may be members of the Herpetological Society of Virginia that would be willing to participate in these surveys.

Near Shore Water Aquatic Fauna Surveys: VDGIF staff recommended that the initial fish survey of the near shore waters of Pleasure House Point be conducted at three different times the first year to assess what species are residents of the waters (March), what species migrate through these waters in the summer (late June), and what species migrate through these waters in the fall (late September). Virginia Aquarium Quarantine & Acquisitions Manager Jeff Thompson participated in the near shore waters fish survey during the Pleasure House Point Bio Blitz on May 4, 2013. He provided staff and interns to participate in the late summer near shore waters fish survey June 20, 2013, and conducted the fall fish survey of near shore waters on September 25, 2013. VDGIF recommends that additional fish surveys should occur every five years. Thompson has informed Virginia Beach Parks & Recreation staff that he is willing to conduct these three surveys annually in the future.

Priority 1 Project:

Determine Diamondback terrapin nesting areas on the property and evaluate strategies for additional protection. Several Diamondback terrapin nest surveys have been carried out on the property. The results of these surveys for a particular area in the eastern part of the conservation easement are contained in the *Pleasure House Point Diamondback Terrapin Nests Map* in Appendix 5. Diamondback terrapins nest in sandy areas throughout the property. We focus on the eastern sandy areas of the property just west of Crab Creek since there is currently no well-defined trail system in this area. Currently visitors walk throughout these sandy areas, over dunes, between dunes, and among vegetation which are all sensitive Diamondback terrapin nesting habitats. Establishing one well-defined and well-marked trail will reduce the pedestrian traffic and disturbance to these nesting areas.

Information about Diamondback terrapin natural history, conservation status, and nesting habitats should be provided to the public along with information about bycatch reduction devices (BRDs) for crab pots. One of the greatest threats to diamondback terrapin is drowning in crab pots. BRDs allow large crabs to enter crab pots but are too narrow to allow diamondback terrapins to enter the traps. BRDs are easy to install on crab pots and studies have shown that these devices exclude diamondback terrapins but do not reduce blue crab catches. BRDs are provided to the public for free from the Lynnhaven River Now Office or can be purchased online. Appendix 4 gives an example of what a Diamondback terrapin sign could look like which could be used and provide information on how to install BRDs to crab pots.

Priority 2 Project:

The Open Space and Natural Resources Manager housed in Virginia Beach Parks & Recreation's Park Operations Division will continue monitoring and documenting the wildlife that utilize the property throughout the year through coordinated surveys.

Priority 3 Project:

Create more habitat for wildlife. Members of the Butterfly Society of Virginia conducted a butterfly survey on July 5, 2013, at Pleasure House Point. Pat Quinn, the President of the Butterfly Society of Virginia (BSV), recommends planting Common milkweed *(Asclepias syriaca)* to entice Monarchs *(Danaus plexippus)* to use the property as a stopover location during their coastal migration to and from Mexico. Milkweed seed pods, plants, and labor could be provided to us for free from the Butterfly Society of Virginia. It is best to do planting in the spring but since these plants are hardy they could be planted any time during the year (according

to BSV member Paul Oettel). The best locations for planting milkweed plants are in areas of high public visitation and areas where Monarchs and milkweed plants would be highly visible such as meadow areas, areas along Shore Drive, areas along Marlin Bay Drive, and areas near parking lots.

Amphibians use ruts along and within trails; these ruts hold rain water during the spring and summer and are some of the only fresh water areas where amphibians can lay eggs on the property. Amphibian eggs and tad poles have been observed in several of these trail ruts that have evolved as vernal ponds on the property. To retain and enhance amphibian habitat, public trails can be redirected to avoid major ruts that create vernal ponds, and/or vernal ponds can be constructed on the property off trails. The Elizabeth River Project staff recently completed construction of vernal ponds at Paradise Creek Nature Park in Portsmouth, Va. and could provide guidance for a similar project at Pleasure House Point.

TABLE 6: Plant & Wildlife Inventory and Habitat Management Priority Projects

Priority Ranking	Project Actions	Project Schedule
1	Determine the areas of the property that are utilized by the Diamondback terrapins for nesting; consider redirecting trails away from prime terrapin nesting habitats and use education as the primary way to reduce human disturbance to these areas	• Observed nesting habits of Diamondback terrapins on the property - Summer 2014 by VBPR and LRNow • Prepare signage plans - Fall 2014 by VBPR • Install fencing/signs - Summer 2015 by VBPR
2	Continue Wildlife Surveys • Birds • Mammals • Amphibians • Fish	• Birds: year-round weekly Virginia Beach Audubon Society bird surveys - ongoing • Nocturnal bird survey should occur in Spring 2014; it is to be determined who carries out the nocturnal bird surveys • Mammal surveys: coordinate with CNU Mammalogy Professor and Animal Control to carry out small to medium sized mammal trapping during the fall and winter • Herpetological Surveys: an amphibian call survey should be conducted in Spring 2014 • Snake surveys should also be carried out at the site; it is to be determined who carries out the Herpetological surveys in 2014 • Fish: near shore waters surveys by Virginia Aquarium staff to occur in March, late June, and late September
3	Create more habitat for wildlife	• Install song bird boxes, duck boxes and osprey platforms - ongoing by VBPR • Investigate planting additional beneficial plants for wildlife - ongoing by VBPR • Creation of vernal ponds for amphibians - ongoing, VBPR will coordinate this work with Public Access plans

5. Public Engagement

The Pleasure House Point Natural Area is located in the heavily populated Bayfront area of Virginia Beach. Residents and citizens who live and work in this area are passionate about the conservation of the property and were instrumental in prompting the City to pursue the acquisition of the property for open space and public access. The process of acquisition was lengthy, lasting almost three years, and during that time period City staff continuously engaged citizens and neighborhoods in planning and visioning for the future park. The Chesapeake Bay Foundation and the Trust for Public Land were also engaged with the neighbors at this time. By working together with the neighbors, a master plan was created for the property that all stakeholders believe in and are invested in. This management plan builds off of that master plan to recommend projects and priorities that will ensure the resources on the property are properly protected and maintained. The City is committed to continuing to work with citizens closely as each planned improvement to the property is implemented and to enlist citizen volunteers to help with the various restoration and enhancement projects that are outlined in this plan. We are also fortunate to have as a long-term partner the Chesapeake Bay Foundation which is constructing the new Brock Environmental Center to house their Hampton Roads headquarters on the eastern edge of the property, outside of the conservation easement. The location of this facility is shown on the Master Plan on page 14.

There will be many different opportunities to provide environmental education in partnership with Chesapeake Bay Foundation and Lynnhaven River Now. In addition, the City will be providing outdoor programming in the park. We will continue to keep the neighbors engaged by coordinating regularly with the Bayfront Advisory Committee, the Shore Drive Community Coalition and the Ocean Park Civic League. The Bayfront Advisory Committee is appointed by City Council and provides a forum for residents and businesses in the area to discuss land use, transportation and social issues. The Shore Drive Community Coalition is a volunteer organization that coordinates among various civic groups. The Ocean Park Civic League represents the neighborhood directly adjacent to the site and the members have officially adopted the Pleasure House Point Natural Area and are responsible for conducting at least one trash clean up quarterly on the property. They are also diligent in reporting violations of the pet waste and leash laws.

The two priority projects listed below are just the beginning of a myriad of opportunities to keep citizens engaged and educated about the special environment at Pleasure House Point Natural Area.

Priority 1 Project: Disseminate information collected about the plants and wildlife found on the property to the public

Information concerning the plants and wildlife found at Pleasure House Point and the photographs that have been collected will be shared with the public. Plant and wildlife information, photographs, and a time lapse video of the changing tides of Pleasure House Creek will be placed on the City of Virginia Beach's Pleasure House Point website: **www.VBgov.com/php.** Filming for the time lapse video occurred all day on September 5, 2013, and the video was completed in October 2013. This project was coordinated by the City of Virginia Beach's Multimedia Services and the Department of Parks & Recreation.

Priority 2 Project: Entice and encourage the public to enjoy Pleasure House Point Natural Area

A tidal wetland habitat video camera with live streaming footage could be installed on the property and the video placed on the same website mentioned above. The live streaming video project is under consideration. The camera can be directed towards areas of Pleasure House Creek where oyster restoration and living shoreline projects will be carried out. This will allow the public to watch the progress of these projects, see before and after photographs, and enjoy views of the shoreline and estuary scenes as well as the plants and wildlife that utilize these habitats.

TABLE 7: Public Engagement Priority Projects

Priority Ranking	Project Actions	Project Schedule
1	Plant and wildlife information will be posted to **www.VBgov.com/php**	Ongoing by VBPR
2	Live streaming video	Timeline to be determined by VBPR

Appendices

Appendix 1: Measurement of Water Bodies at Pleasure House Point

Appendix 2: List of Highly to Moderately Invasive Nonnative Plant Species

Appendix 3: Total List of Nonnative Plant Species

Appendix 4: Diamondback Terrapin Sign and By-catch Reduction Device Information

Appendix 5: Pleasure House Point Diamondback Terrapin Nests Map

Appendix 6: List of Plants and Wildlife Observed at Pleasure House Point

Appendix 7: Pleasure House Point Bio Blitz Participants

Appendix 8: Recorded Conservation Easement

APPENDIX 1: MEASUREMENTS OF WATER BODIES

Appendix 1: Measurements of Water Bodies at Pleasure House Point

From 11am to 12pm on April 4, 2013, samples were taken at low tide by VDGIF Fisheries Biologist Chad Boyce. It was obvious from the wrack line that there had been a recent very high tide that most likely influenced the salinity of the ponds and channels. To identify the locations of the labeled bodies of water see the *PHP Conservation Easement Map* on page 10. The salinity was measured on the inland side of Channel 3 at 16 ppt on June 11 by, LRNow Oyster Restoration Coordinator Laurie Sorabella.

Location	Salinity (ppt)	Temperature (C)	Conductivity (microsiemens)	Dissolved Oxygen (mg/L)	Notes
Inland Side					
Pond 1	15.3	13.7	25.08	12.70	
Pond 2	17.6	13.2	13.17	14.03	Lots of microalgae in the pond. The large amount of pine needles and organic matter in the pond is probably responsible for the low conductivity reading.
Channel 1	17.8	13.2	28.77	14.34	Oysters seen in the channel on the inland side of the pipes.
Channel 2	19.4	12.1	31.13	17.3	Noticeably more tidal flushing here as compared to the first inland channel with a tidal pipe connection. Also saw oysters in the channel on the inland side of the pipes.
Pleasure House Creek Side					
Near Channel 3	19.1	13.9	30.56	14.96	

Dike Culvert Characteristics Table

	Culverts	Controlling invert	Interior water level
Channel 1	(3) 15" steel	.93′ NAVD88	1.0′
Channel 2	(1) 30″ concrete	.96′ NAVD88	.9′
Channel 3	(1) 12″ concrete	.49′ NAVD88	.3′

Appendix 2: List of Highly to Moderately Invasive Non-Native Plant Species

NOAA Habitat Restoration Specialist Walter Priest created this table to show results from his study of the culverts connecting Channels 1, 2 and 3 to Pleasure House Creek.

Priority Ranking	Highly to Moderately Invasive Non-Native Species	Location: Area	Primary Treatment	Secondary Treatment
1	Japanese honey suckle *(Lonicera japonica)*	1, 2, 3	Cut and remove vines	Treat regrowth with herbicide
1	English ivy *(Hedera helix)*	1, 2, 3	Cut and remove vine and roots	Treat regrowth with herbicide
2	Common reed *(Phragmites australis)*	1, 3, 4	Target young stands first; cut/mow/burn	Treat regrowth with herbicide
3	Chinese bush clover *(Lespedeza cuneata)*	On trails 1, 2, 3, 4	Manual removal of plant and roots	Possible herbicide treatment
4	Chinese privet *(Ligustrum sinense)*	2, 3	Cut/grind and treat stump with herbicide	Treat regrowth with herbicide
5	Curly dock *(Rumex crispus)*		Manual removal of plant and roots	Possible herbicide treatment
6	Multiflora rose *(Rosa multiflora)*	3	Cut/grind and treat stump with herbicide	Treat regrowth with herbicide
8	Wineberry *(Rubus phoenicolasius)*		Cut and remove vine and roots	Treat regrowth with herbicide

Methods for the Reduction of Native Aggressive Plant Species

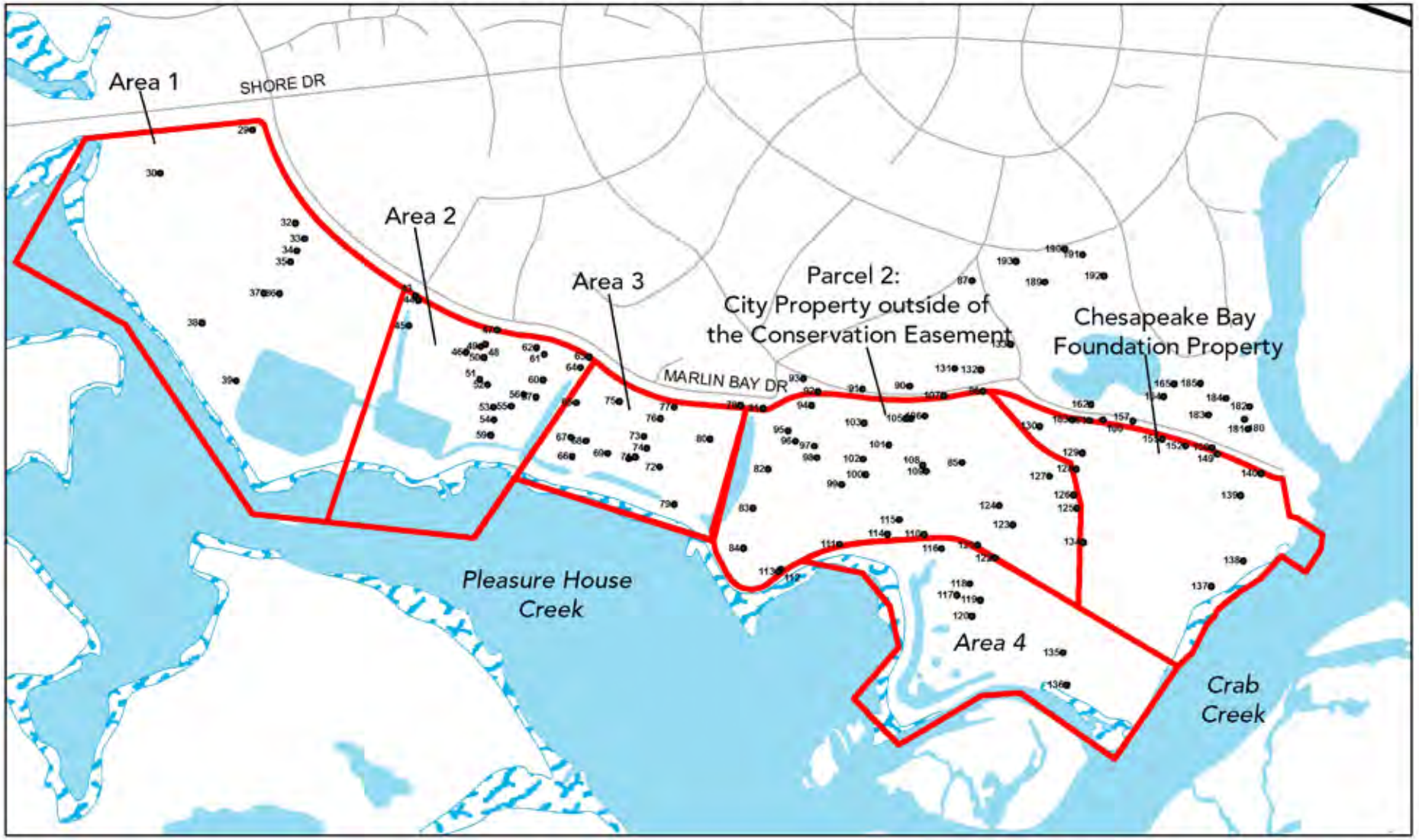
Priority Ranking	Native Aggressive Species	Location: Area	Primary Treatment	Secondary Treatment
1	Carolina jasmine/Jessamine *(Gelsemium sempervirens)*	1, 2, 3	Cut and remove vines	Treat regrowth with herbicide
2	Greenbrier Genus: Smilax	1, 2, 3	Cut and remove vines	Treat regrowth with herbicide

Appendix 3: Total List of Non-native Plant Species

This list of non-native plants was put together from the findings of plant surveys throughout the year. Plant surveys included: Non-Native Plant Surveys by VBPR Landscape Architechts Rob MacPherson and Chris Kennedy, and VBPR Planning Technician Karen Callaway on February 27 and March 4, 2013; a Plant Survey by the Pleasure House Point Bio Blitz participants (an asterisk notes plants identified during the Bio Blitz) on May 4, 2013; and LRNow Education Coordinator Jody Ullmann collected information on the plants of the property throughout the summer and fall.

Common Name	Latin Name	Vegetation Type	Level of Invasiveness
Asiatic sand sedge	*Carex kobomugi*	Sedge	Highly Invasive
Asiatic dayflower	*Commelina communis*	Herbaceous vegetation	Occasionally Invasive
Barberry	*Genus: Berberis*	Shrub	Depends on species
Bermuda grass	*Cynodon dactylon*	Grass	Not on DCR's list of invasive plants for VA
*Bird's-foot trefoil	*Lotus corniculatus*	Herbaceous vegetation	Occasionally Invasive
Blue periwinkle	*Vinca major*	Herbaceous vegetation	Occasionally Invasive
*Bulbous buttercup	*Ranunculus bulbosus*	Herbaceous vegetation	Not on DCR's list of invasive plants for VA
Callery pear	*Pyrus calleryana*	Tree	Not on DCR's list of invasive plants for VA
*Chinese bush clover	*Lespedeza cuneata*	Herbaceous vegetation	Highly Invasive
Chinese privet	*Ligustrum sinense*	Shrub	Highly Invasive
*Common reed	*Phragmites australis*	Reed	Highly Invasive
*Curly dock	*Rumex crispus*	Herbaceous vegetation	Moderately Invasive
English ivy	*Hedera helix*	Vine	Moderately Invasive
Firethorn	*Genus: Pyracantha*	Shrub	Not on DCR's list of invasive plants for VA
*German knotweed	*Scleranthus annuus*	Herbaceous vegetation	Not on DCR's list of invasive plants for VA
Glossy privet	*Ligustrum lucidum*	Shrub	Not on DCR's list of invasive plants for VA
Golden rain tree	*Koelreuteria paniculata*	Tree	Not on DCR's list of invasive plants for VA
*Hairy cat's ear	*Hypochaeris radicata*	Herbaceous vegetation	Not on DCR's list of invasive plants for VA
*Japanese honey suckle	*Lonicera japonica*	Vine	Highly Invasive
Japanese privet	*Ligustrum japonicum*	Shrub	Not on DCR's list of invasive plants for VA
Miscanthus	*Genus: Miscanthus*	Grass	Depends on species
Multiflora rose	*Rosa multiflora*	Shrub	Highly Invasive
Nandina	*Nandina domestica*	Shrub	Not on DCR's list of invasive plants for VA
Pampas grass	*Cortaderia selloana*	Grass	Not on DCR's list of invasive plants for VA
*Silk tree	*Albizia julibrissin*	Tree	Moderately Invasive
Silver berry	*Genus: Elaeagnus*	Shrub	Depends on species
Scotch broom	*Cytisus scoparius*	Shrub	Not on DCR's list of invasive plants for VA
Sweet autumn clematis	*Clematis terniflora*	Vine	Not on DCR's list of invasive plants for VA
Tree of heaven	*Ailanthus altissima*	Tree	Highly Invasive
Wineberry	*Rubus phoenicolasius*	Vine	Highly Invasive
Wisteria	*Genus: Wisteria*	Vine	Depends on species

Habitat Management of Pleasure House Point: Nonnative Invasive Plants



APPENDIX 4: DIAMONDBACK TERRAPIN SIGN

(immediately above) Example of standard interpretive signage

(above left) Diamondback terrapin hatchling by Stuart McCausland.

(above right) Diamondback terrapin laying eggs by Karen Callaway

(below right) Terrapin egg casings by Felice Bond

Appendix 4: Diamondback Terrapin Sign

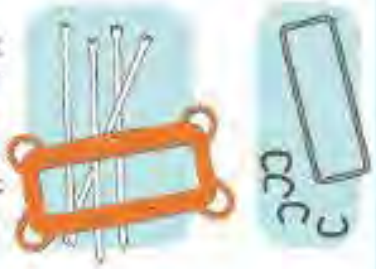
Diamondback terrapins are a species of high conservation need in Virginia. Their population decline is due to habitat loss, nest predation, collisions with vehicles, and drowning in commercial crab pots.

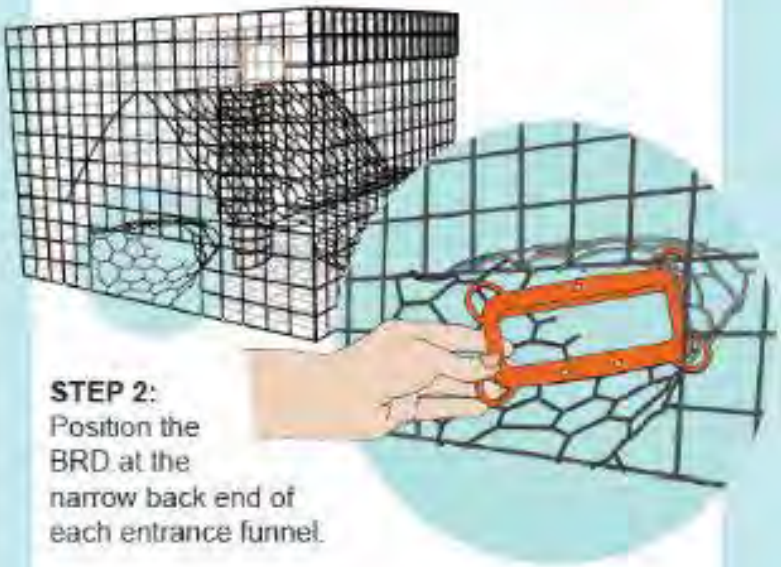
Diamondback terrapin nesting occurs from late May through late July and hatchlings emerge in the fall and some overwinter in their nests and hatch in the spring. Pleasure House Point is one of only a few remaining locations in Virginia Beach with suitable Diamondback terrapin nesting habitats. To reduce disturbances to terrapin nesting areas **please stay on trails and keep pets out of designated areas**. If you come across a Diamondback terrapin on this land is usually either a female, ready to lay eggs, or a hatchling, a recently hatched terrapin ready to get to the water. Nesting females and hatchlings are vulnerable to disturbances by humans and pets. **Please do not touch or go near the terrapins and make sure to keep pets away.** Thank you for your cooperation.

Source: Information from Virginia Marine Institute and Illustrations: (c) 2009 Kelly Finan /National Aquarium. Retrieved August 2013 from **http://www.vims.edu/research/units/projects/terrapin_brds/_docs/terrapin_bdr_brochure.pdf**

Installing a Bycatch Reduction Device (BRD) on a crab pot.

STEP 1: Obtain a 1 ¾ x 4 ¾ inch BRD (metal or plastic) for ***each*** funnel opening in the crab pot, along with heavy plastic cable ties. Hog rings or cable ties can be used to attach metal BRDs.





STEP 2: Position the BRD at the narrow back end of each entrance funnel.

STEP 3: Use heavy zip ties (cables) to loop around funnel wire and the corner of the BRD. Pull tightly and trim excess cable. Use a ***minimum of four*** cable ties or hog rings to firmly attach each excluder.

APPENDIX 5: DIAMONDBACK TERRAPIN NESTS MAP

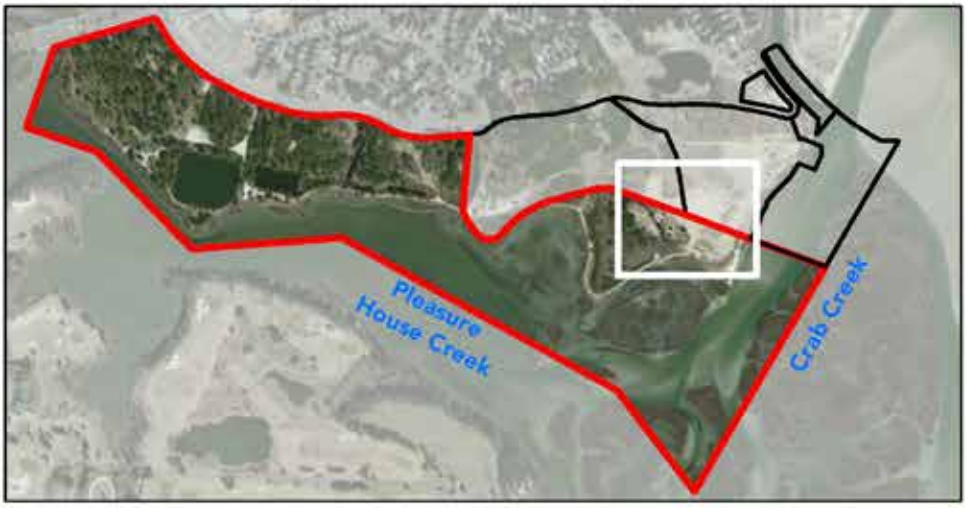
Appendix 5: Pleasure House Point Diamondback Terrapin Nests Map

A Diamondback terrapin nest survey was carried out June 5, 2013, by Virginia Beach Parks & Recreation Planning Technician Karen Callaway. In addition, the map shows several observations made by the public from April to late June through LRNow's website. LRNow asked the public to record on a map of Pleasure House Point where adult female terrapins were observed laying eggs as well as where hatchlings and egg casings were observed at the site. The following website, created by LRNow Outreach & Communications Coordinator Kris McKinnon provides information about Diamondback terrapins at Pleasure House Point and directions on how to mark sightings of terrapins or egg casings on a map of Pleasure House Point: **http://www.lynnhavenrivernow.org/diamondback-terrapins.aspx**. The map that allows the public to record terrapin related sightings at Pleasure House Point was created in April 2013 and will remain available to the public.

During the nest survey on June 5, dry discolored and weathered-looking Diamondback terrapin egg casings were found and were marked as Old Nests. When bright white egg casings were found, they were noted as New Nests. Some areas noted as New Nests had egg casings with wet yolk and practically whole eggs. These sites were most likely the victims of recent predation. Nest depressions could be old or new nests, the distinction was not obvious. During the nesting survey a Diamondback terrapin female was observed digging a hole to lay her eggs, but abandoned her activities due to disturbance by human presence.

Diamondback Terrapin Nesting Map

- Terrapin Laying Eggs
- Hatchling
- New Nest
- Old Nest
- Nest Depression



0 75 150 300 Feet

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED


Southern live oak *(Quercus virginiana)*


Sea-pink *(Sabatia stellaris)*


Sea oxeye *(Borrichia frutescens)*

Appendix 6: List of Plants and Wildlife Observed at Pleasure House Point: Native Plants

Maritime Forest Plants	
Trees/Shrubs	*Carolina jasmine or jessamine *(Gelsemium sempervirens)*
*American holly *(Ilex opaca)*	Coral honey suckle *(Lonicera sempervirens)*
Bayberry *(Myrica pensylvanica)*	*Muscadine *(Vitis rotundifolia)*
*Beach heather *(Hudsonia tomentosa)*	Poison ivy *(Toxicodendron radicans)*
*Black willow *(Salix nigra)*	Saw greenbrier *(Smilax bona-nox)*
*Eastern red-cedar *(Juniperus virginiana)*	*Sawtooth blackberry *(Rubus argutus)*
*Hackberry *(Celtis sp.)*	*Trumpet vine *(Campsis radicans)*
*Loblolly pine *(Pinus taeda)*	*Virginia creeper *(Parthenocissus quinquefolia)*
Northern red oak *(Quercus rubra)*	**Herbaceous**
*Old field balsam *(Pseudognaphalium obtusifolium)*	*Blue toadflax *(Nuttallanthus canadensis)*
Pawpaw *(Asiminia triloba)*	*Broadleaf plantain *(Plantago major)* (naturalized)
Persimmon *(Genus: Diospyros)*	*Common yellow oxalis *(Oxalis stricta)*
Sand laurel oak *(Quercus hemispherica)*	*Dogfennel *(Eupatorium capillifolium)*
*Sassafras *(Sassafras albidum)*	*Elephantopus sp.
*Shining sumac *(Rhus copallina)*	*Galium sp.
*Southern live oak *(Quercus virginiana)*	*Narrowleaf silkgrass *(Pityopsis graminifolia)*
*Southern red oak *(Quercus falcata)*	*Rough bedstraw *(Galium asprellum)*
Turkey oak *(Quercus laevis)*	*Seaside goldenrod *(Solidago sempervirens)*
*Virginia pine *(Pinus virginiana)*	*Wild lettuce *(Lactuca sp.)*
*Wax myrtle *(Myrica cerifera)*	Graminoid (grasses, sedges, and rushes)
*White mulberry *(Morus alba)*	*Bitter panicgrass *(Panicum amarum)*
*Wild black cherry *(Prunus serotina)*	*Florida sedge *(Carex floridana)*
*Yaupon holly *(Ilex vomitoria)*	Little bluestem grass *(Schizachyrium scoparium)*
Yucca *(Yucca glauca)*	*Needlerush (*Juncus roemerianus)*
Vines	*Witchgrass *(Dichanthelium sp).*
*Cat greenbriar *(Smilax glauca)*	

Wet Maritime Forest and Wetland Plants	
Trees/Shrubs	*Star chickweed *(Stellaria pubera)*
*Bigleaf marsh-elder *(Iva frutescens)*	**Graminoid (grasses, sedges, rushes)**
*Cherrybark oak *(Quercus pagoda)*	American beach grass *(Ammophila breviligulata)*
*Devil's walkingstick *(Aralia spinosa)*	Big cordgrass *(Spartina cynosuroides)*
Groundsel tree *(Baccharis halimifola)*	Black needle rush *(Juncus roemerianus)*
Hibiscus/rosemallow *(Hibiscus moscheutos)*	Bushy bluestem *(Andropogon glomeratus)*
*Sea myrtle *(Baccharis halimifolia)*	Broom sedge *(Andropogon virginicus)*
Sea oxeye *(Borrichia frutescens)*	*Olney's three-square bulrush *(Schoenoplectus americanus)*
Vines	*Path rush *(Juncus tenuis)*
*Bristly greenbrier *(Smilax tamnoides)*	Salt grass *(Distichlis spicata)*
*Southern dewberry *(Rubus trivialis)*	*Salt marsh cord grass *(Spartina alterniflora)*
Herbaceous Vegetation	*Saltmeadow haygrass *(Spartina patens)*
*Horseweed *(Conyza canadensis)*	Switch Cane *(Arundinaria gigantea tecta)*
Little yellow clover *(Trifolium sp.)*	Three-square rush *(Scirpus americanus)*
Queen Anne's lace *(Daucus carota)*	

Plants Growing in Sandy Areas	
Trees/Shrubs	Salt marsh aster *(Aster tenuifolius)*
*Water oak *(Quercus nigra)*	Seabeach evening primrose *(Oenothera humifusa)*
Beach heather *(Hudsonia tomentosa)*	Sea-pink *(Sabatia stellaris)*
Vines	Slender glasswort *(Salicornia maritima)*
Trailing fuzzy bean *(Strophostyles helvula)*	*Sundrops *(Oenothera sp.)*
Herbaceous Plants	*Virginia pinweed *(Lechea maritime)*
*American pokeweed *(Phytolacca americana)*	**Graminoid (grasses, sedges, rushes)**
Bitter sneezeweed *(Helenium amarum)*	Beach panic grass *(Panicum amarum)*
Buttonweed *(Genus: Diodia)*	*Lesser creeping rush *(Juncus repens)*
*Chrysopis c.f.	Saltmarsh bulrush *(Bolboschoenus robustus)*
*Dwarf Dandelion *(Krigia virginica)*	Sandbur *(Genus: Cenchrus)*
*Eupatorium sp.	Switch grass *(Panicum virgatum)*
*Lepidium sp.	**Cacti**
Partridge pea *(Chamaecrista fasciculate)*	*Eastern prickly pear *(Opuntia humifusa)*
*Pycnanthemum sp.	

** Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Plant Survey Group. Plant species not found during the Bio Blitz that are listed above were observed at Pleasure House Point by Pat Quinn (President, Butterfly Society of Virginia), Paul Oettel (Vice President, Butterfly Society of Virginia), Ruth Burch (Butterfly Society of Virginia), Jody Ullmann (LRNow Education Coordinator), Chris Kennedy and Rob MacPherson (VBPR Landscape Architects), Karen Callaway (VBPR Planning Technician), and CBF staff.*

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED

Bird Species

Resident Species			
Common and Scientific Name	**VA Wildlife Action Plan**	**Common and Scientific Name**	**VA Wildlife Action Plan**
American bittern (*Botaurus lentiginosus*)	Tier II	*Forster's tern (*Sterna forsteri*)	Tier IV
*American crow (*Corvus brachyrhynchos*)		*Gray catbird (*Dumetella carolinensis*)	Tier IV
*American herring gull (*Larus smithsonianus*)		*Great black-backed gull (*Larus marinus*)	
*American oystercatcher (*Haematopus palliatus*)	Tier II	*Great blue heron (*Ardea herodias*)	
*American robin (*Turdus migratorius*)		*Great egret (*Ardea alba*)	
Bald eagle (*Haliaeetus leucocephals*)	Tier II	House finch (*Haemorhous mexicanus*)	
*Belted kingfisher (*Megaceryle alcyon*)		House wren (*Troglodytes aedon*)	
Black-crowned night heron (*Nycticorax nycticorax*)	Tier III	*Killdeer (*Charadrius vociferus*)	
Black vulture (*Coragyps atratus*)		*Laughing gull (*Leucophaeus atricilla*)	
*Blue jay (*Cyanocitta cristata*)		*Mallard duck (*Anas platyrhynchos*)	
*Boat-tailed grackle (*Quiscalus major*)		Marsh wren (*Cistothorus palustris*)	Tier IV
*Brown-headed cowbird (*Molothrus ater*)		*Mourning dove (*Zenaida macroura*)	
*Brown-headed nuthatch (*Sitta pusilla*)	Tier IV	*Northern cardinal (*Cardinalis cardinalis*)	
Brown pelican (*Pelecanus occidentalis*)		Northern flicker (*Colaptes auratus*)	
Brown thrasher (*Toxostoma rufum*)	Tier IV	*Northern mockingbird (*Mimus polyglottos*)	
Canada goose (*Branta canadensis*)		Pied-billed grebe (*Podilymbus podiceps*)	
*Carolina chickadee (*Poecile carolinensis*)		Pileated woodpecker (*Dryocopus pileatus*)	
*Carolina wren (*Thryothorus ludovicianus*)		*Pine warbler (*Setophaga pinus*)	
Chipping sparrow (*Spizella passerina*)		Red-tailed hawk (*Buteo jamaicensis*)	
*Clapper rail (*Rallus longirostris*)	Tier IV	*Red-winged blackbird (*Agelaius phoeniceus*)	
*Common grackle (*Quiscalus quiscula*)		*Rock dove (*Columba livia*)	
*Common yellowthroat (*Geothlypis trichas*)		Saltmarsh sparrow (*Ammodramus caudacutus*)	Tier II
*Double-crested cormorant (*Phalacrocorax auritus*)		Seaside sparrow (*Ammodramus maritimus*)	Tier IV
Eastern bluebird (*Sialia sialis*)		*Song sparrow (*Melospiza melodia*)	
Eastern phoebe (*Sayornis phoebe*)		*Tri-colored heron (*Egretta tricolor*)	Tier III
*Eastern towhee (*Pipilo erythrophthalmus*)	Tier IV	*Tufted titmouse (*Baeolophus bicolor*)	
*European starling (*Sturnus vulgaris*)		Turkey vulture (*Cathartes aura*)	
*Fish crow (*Corvus ossifragus*)			


Skimmers & Night Heron


Unidentified bird nest


Snowy egret *(Egretta thula)*

Bird Species (cont'd)

Winter Species			
Common and Scientific Name	**VA Wildlife Action Plan**	**Common and Scientific Name**	**VA Wildlife Action Plan**
American black duck *(Anas rubripes)*		*Nelson's sparrow *(Ammodramus nelsoni)*	Tier III
*Black-bellied plover *(Pluvialis squatarola)*	Tier IV	Northern harrier *(Circus cyaneus)*	Tier III
Bonaparte's gull *(Chroicocephalus philadelphia)*		*Palm warbler *(Setophaga palmarum)*	
Brown creeper *(Certhia americana)*	Tier IV	Peregrine falcon *(Falco peregrinus)*	Tier I, State Threatened Species
Bufflehead *(Bucephala albeola)*		*Red-breasted merganser *(Mergus serrator)*, can also be found as a migrant	
*Common loon *(Gavia immer)* Seen at the site in early May (probably injured)		*Red-breasted nuthatch *(Sitta canadensis)*	
Common merganser *(Mergus merganser)*		Ring-billed gull *(Larus delawarensis)*	
Cooper's hawk *(Accipiter cooperii)*		Ring necked duck *(Aythya collaris)*	
Dunlin *(Calidris alpina)*	Tier IV	Ruddy duck *(Oxyura jamaicensis)*	
Gadwall *(Anas strepera)*		*Sanderling *(Calidris alba)*	
*Greater yellowlegs *(Tringa melanoleuca)*		Semi-palmated plover *(Charadrius semipalmatus)*	
Green-winged teal *(Anas carolinensis)*		Sharp-shinned hawk *(Accipiter striatus)*	
Hooded merganser *(Lophodytes cucullatus)*		*Short-billed dowitcher *(Limnodromus griseus)*	Tier IV
Horned grebe *(Podiceps auritus)*	Tier IV	*Swamp sparrow *(Melospiza georgiana)*	
Lesser scaup *(Aythya affinis)*		Tree swallow *(Tachycineta bicolor)*	
*Lesser yellowlegs *(Tringa flavipes)*		White-throated sparrow *(Zonotrichia albicollis)*	
Merlin *(Falco columbarius)*		Yellow-rumped warbler *(Setophaga coronata)*	

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED

Summer Species			
*American yellow warbler *(Setophaga petechial)*		Glossy ibis *(Plegadis falcinellus)*	Tier III
Barn swallow *(Hirundo rustica)*		*King rail *(Rallus elegans)*	Tier II
Black-and-white warbler *(Mniotilta varia)*	Tier IV	*Least tern *(Sternula antillarum)*	Tier II
Black skimmer *(Rynchops niger)*	Tier II	Northern parula *(Setophaga americana)*	Tier IV
*Blue-gray gnatcatcher *(Polioptila caerulea)*		*Osprey *(Pandion haliaetus)*	
Blue grosbeak *(Passerina caerulea)*		*Prairie warbler *(Setophaga discolor)*	Tier IV
Chimney swift *(Chaetura pelagica)*	Tier IV	*Royal tern *(Thalasseus maximus)*	Tier II
Common nighthawk *(Chordeiles minor)*		Ruby-throated hummingbird *(Archilochus colubris)*	
*Eastern kingbird *(Tyrannus tyrannus)*	Tier IV	*Snowy egret *(Egretta thula)*	
*Great-crested flycatcher *(Myiarchus crinitus)*		White-eyed vireo (Vireo griseus)	
*Green heron *(Butorides virescens)*	Tier IV	*Yellow-crowned night heron *(Nyctanassa violacea)*	Tier II
Migrant Species			
American redstart *(Setophaga ruticilla)*		Lark sparrow *(Chondestes grammacus)*	
*Caspian tern *(Hydroprogne caspia)*		Wilson's warbler *(Cardellina pusilla)*	

**Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Bird Survey Groups. Bird species not found during the Bio Blitz that are listed above were observed at Pleasure House Point by Virginia Beach Audubon Society members and the Master Naturalists from the Historic Rivers Chapter of Virginia Master Naturalists.*

The determinations of Resident, Winter, Summer, or Migrant species were based on range maps found in the Field Guide to Birds of North America by Edward S. Brinkley, copyright 2008.

- The Virginia Beach Audubon Society maintains a continuously updated list of birds observed at Pleasure House Point. The following website provides this list: **http://vabeach-audubon.org/php.html**.

The Virginia Wildlife Action Plan Tier information was retrieved from the following website: **http://www.bewildvirginia.org/species/** *in November 2013. The information on this website was provided by the Virginia Department of Game & Inland Fisheries and published in 2010. See the Virginia Wildlife Action Plan Tiers of Relative Conservation Need table below for descriptions of each Tier.*

Virginia Wildlife Action Plan Tiers of Relative Conservation Need

Tier	Degree of Conservation Need	Description
I	Critical Conservation Need	Faces an extremely high risk of extinction or extirpation. Populations of these species are at critically low levels, facing immediate threat(s), or occur within an extremely limited range. Intense and immediate management action is needed.
II	Very High Conservation Need	Has a high risk of extinction or extirpation. Populations of these species are at very low levels, facing real threat(s), or occur within a very limited distribution. Immediate management is needed for stabilization and recovery.
III	High Conservation Need	Extinction or extirpation is possible. Populations of these species are in decline or have declined to low levels or are in a restricted range. Management action is needed to stabilize or increase populations.
IV	Moderate Conservation Need	The species may be rare in parts of its range, particularly on the periphery. Populations of these species have demonstrated a significant declining trend or one is suspected which, if continued, is likely to qualify this species for a higher tier in the foreseeable future. Long-term planning is necessary to stabilize or increase populations.

Nocturnal Birds

An Owl Prowl occurred on November 16, 2013, at Pleasure House Point. This event was open to the public and included 5 youth, 8 adults, and 2 seniors for a total of 14 participants. The trip was led by VBPR Outdoor Programs Recreation Specialists Katie Whanger and Anne Marie Studds plus Historic River Master Naturalists Cheryl Jacobson, Susan Powell, and Shirley Devan. Presence/absence data of nocturnal bird species was recorded during this outing. Owl call recordings were played and participants listened for call back responses from owls in the area. The recordings were played only in the Maritime forests of Terrestrial Habitat Area 1 (see *Terrestrial Habitat Areas Map* on page 31). The call recordings that were played included the calls of Screech owls *(Genus: Megascops)*, Northern saw-whet owls *(Aegolius acadicus)*, Barred owls *(Strix varia)*, and Great horned owls *(Bubo virginianus)*. The group heard a Barred owl respond to the recorded Barred owl call several times with only a one note call back. It sounded like this owl was fairly far away, between 1 to 5 miles away, however it is not unlikely that Barred owls visit Pleasure House Point at some point during the year.

Mammalian Species

Medium to Large Sized Mammals
Domestic cat *(Felis catus)*
Eastern cottontail rabbit *(Sylvilagus floridanus)*
*Eastern grey squirrel *(Sciurus carolinensis)*
Grey fox *(Urocyon cinereoargenteus)*
Hispid cotton rat (*Sigmodon hispidus)*
House Mouse *(Mus musculus)*
*Muskrat *(Ondatra zibethicus)*
*Opossum *(Didelphis virginiana)*, jaw bone found
*Raccoon *(Procyon lotor)* (tracks seen)
*White-tailed deer *(Odocoileus virginianus)* skull found, but no rubs or obvious signs of foraging.

**Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Mammal Survey Group. Felice Bond also contributed to this list during the Bio Blitz and Dr. Richard Sherwin, a Mammalogy professor from Christopher Newport University (CNU), contributed to this list by conducting a small to medium sized mammal trapping study at the site.*

Christopher Newport University Fall 2013 Mammal Survey:

Project Summary written by Ambre Delpopolo (graduate student working with Dr. Richard Sherwin)

Pleasure House Point, Virginia Beach, Virginia

GOAL: Provide Virginia Beach Parks & Recreation with a mammal species inventory for Pleasure House Point. The site, which consists of tidal marsh, sandy beach, and maritime forest, is currently under conservation easement. The City wants to turn the area into a natural area, but first wants to better understand what mammals inhabit the area.

METHODS

Small Mammals

- Deployed Sherman live traps (small aluminum box traps) able to accommodate mammals the size of grey squirrels and smaller
- Traps were checked within 24 hours of having been set
- All animals were released immediately after having been identified
- Three weeks of sampling were conducted
  - Weeks 1 (Sept 17 - 19) and 2 (Sept 24 - 26): traps baited with bird seed
  - Week 3 (Nov 12 - 13): traps baited with peanut butter and oats
- Trap lines
  - Traps were set along trap lines marked with flagging tape
  - Double saturation (setting of two traps at each station) was used to increase probability of capture
  - Weeks 1 and 2: Four traps lines established, consisting of 90 total traps
    - Trap line 1: 18 flagged stations/36 traps
    - Trap line 2: 7 flagged stations/14 traps
    - Trap line 3: 10 flagged stations/20 traps
    - Trap line 4: 10 flagged stations/20 traps
  - Week 3: Two additional trap lines established in a different habitat type, consisting of 40 total traps
    - Trap line 5: 10 flagged stations/20 traps
    - Trap line 6: 10 flagged stations/20 traps
  - 490 total project trap nights (1 trap night = 1 trap set for 1 night)
    - 360 traps nights across weeks 1 and 2
    - 130 trap nights on week 3

Medium-to-Large Mammals

Trap Line 6
Female Hispid Cotton Rat

- Live traps were not set for larger mammals
  - Raccoons must be euthanized if captured and domestic cats must be relinquished to Animal Control
- Instead, stationary camera traps were placed on existing game trails
- Four cameras traps deployed for two months (Sept 17 - Nov 13)
- Traps baited with corn and fox urine as attractants

Trap Line	1	2	3	4	5	6
# of Traps	36	14	20	20	20	20

Results

SMALL MAMMALS	Trap Line	Species	Notes
Weeks 1 & 2	3	1 grey squirrel *(Sciurus carolinensis)*	• Native species • Bot fly larvae present
Week 3	5	1 house mouse *(Mus musculus)*	• Non-native species
	6	5 hispid cotton rats *(Sigmodon hispidus)*	• Native species • 1 female with 2 newborn pups • 1 adult male • 1 juvenile male

MEDIUM-TO-LARGE MAMMALS	Trap Line	Species	No. Animals Captured
Species captured on photographs **Grey Fox** *(Urocyon cinereoargenteus)* • Seen numerous times at camera traps 1 and 3 • Largest density observed: 1 adult **Grey Squirrel** *(Sciurus carolinensis)* • Seen numerous times at camera traps 1, 2, and 3 • Largest density observed: 2 adults **Eastern Cottontail** *(Sylvilagus floridanus)* • Observed on 2 occasions at camera trap 3 • Largest density observed: 1 adult **Raccoon** *(Procyon lotor)* • Observed numerous times at camera traps 1 and 3 • Largest density observed: 1 adult accompanied by 4 juveniles • Observed once at camera trap 3 • Largest density observed: 1 adult	1	N/A	0
	2	N/A	0
	3	Grey Squirrel	1
	4	N/A	0
	5	House Mouse	1
	6	Hispid Cotton Rat	5

Camera Trap	Species	Maximum Density
1	Grey Fox Grey Squirrel Raccoon	1 2 3
2	Grey Squirrel	1
3	Domestic Cat Eastern Cottontail Grey Fox Grey Squirrel Raccoon	1 1 1 2 5
4	N/A	N/A

Conclusions

SMALL MAMMALS

Only 1 grey squirrel was captured on traps line 1-4 across 3 weeks of sampling

- This poor success rate is likely due to the substrate type found in the region of sampling
- The densely-packed sandy substrate does not provide the most suitable habitat for many small mammals and precludes the presence of many of these organisms.
- This is consistent with the species of animals observed along these trap lines, too. Arboreal, tree-dwelling, species were primarily observed using the camera traps.

On week 3, trap lines 5 and 6 were established in a new habitat type – meadow habitat with tall, mature grasses.

- The meadow habitat of trap lines 5 and 6 was better suited to the lifestyles of VA's small mammal species, which explains our significantly higher success rate along those trap lines.

MEDIUM-TO-LARGE MAMMALS

Domestic cats

- Only 1 domestic cat was observed on the camera traps across the two months that sampling occurred. It is likely that the neighborhood offers more, easily accessed, resources to the cats and limits their interest in Pleasure House Point. Furthermore, the presence of the grey fox within the habitat most likely dissuades domestic cats from entering the site.

Grey foxes

- It is likely that the foxes seen on the camera traps are pictures of the same animal as grey foxes are solitary animals, except during the breeding season (December - March).

Raccoons

- The largest number of raccoons that were seen at one time was a family of five. The peak time for raccoon breeding is March and the offspring stay with the mother until after their first winter. Once large enough, the offspring forage with their mother at night; this activity is what the camera traps captured on film.

Incidental species

The camera traps also captured incidental pictures of several bird species

- American Crow
- Northern Cardinal
- Brown Thrasher
- Eastern Towhee
- Carolina Wren

Little brown skink *(Scincella lateralis)*

Eastern Box turtle *(Terrapene carolina)*

Herpetological Species

Common Name (*Genus species*)	VA Wildlife Action Plan, State & Federal Conservation Status
Turtles	
Eastern Box turtle *(Terrapene carolina)*	Tier III
Diamondback terrapin *(Malaclemys terrapin)*	Tier II, "Near Threatened"
Loggerhead sea turtle *(Caretta caretta)*	Tier I, State and Federally Threatened
Kemp's Ridley sea turtle *(Lepidochelys kempii)*	State and Federally Endangered
Snakes	
*Black snake seen: either a Northern black racer *(Coluber constrictor constrictor)* or Black rat snake *(Pantherophis obsoletus)*	
Northern water snake *(Nerodia sipedon)*	
Lizards	
*Little brown skink *(Scincella lateralis)*	
*Broad-headed skink *(Plestiodon laticeps)*	
Six-lined racerunner *(Cnemidophorus sexlineatus)*	
Frogs	
Cope's gray tree frog *(Hyla chrysoscelis)*	

** Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Herpetological Survey Group. Herpetological species not found during the Bio Blitz that are listed above were observed at Pleasure House Point by Chad Boyce (Fisheries Biologist with the VDGIF), and Karen Callaway (Planning Technician with the VB Parks and Rec).The sea turtle species listed above were tracked close to the near shore waters of Pleasure House Point by the Virginia Aquarium's Sea Turtle Tracking Program. The Cope's gray tree frog was identified by a tadpole field guide and the help of The Virginia Herpetological Society.*

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED


Needham's skimmer
(Libellula needhami)


Carpenter bee
(Genus: Xylocopa)


Black widow spider
(Latrodectus mactans)

The Virginia Wildlife Action Plan Tier information was retrieved in October 2013 from the following website: **www.bewildvirginia.org/species/**. The information on this website was provided by the Virginia Department of Game & Inland Fisheries and published in 2010. See the *Virginia Wildlife Action Plan Tiers of Relative Conservation Need* table (page 57) for descriptions of each tier.

Terrestrial Macroinvertebrates (including: Insects and Spiders)

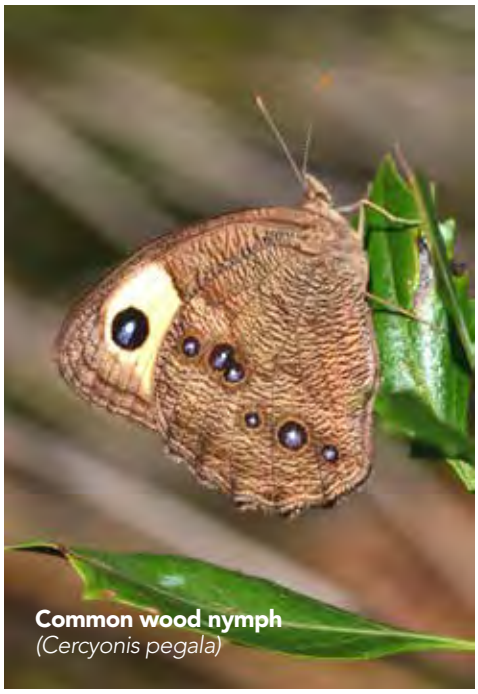
Aphidlike Insects
*Scale insect *(Superfamily: Coccoidea)*
*Waxscale *(Ceroplastes ceriferus)*
Dragonflies and Damselflies
Common whitetail *(Plathemis lydia)*
Eastern pondhawk *(Erythemis simplicicollis)*
Great blue skimmer *(Libellula vibrans)*
Needham's skimmer *(Libellula needhami)*
True bugs
*Assassin bug *(Family: Reduviidae)*
Cicada *(Family:Cicadidae)*
Spittle bug *(Superfamily: Cercopoidea)*
Water nymphs and Larvae
*Mosquito larvae *(Family: Culicidae)*
Cockroaches
*American cockroach *(Periplanetas americana)*
*Instar cockroach *(Order: Blattaria)*
*Woods roach *(Family: Blattedae)*

Spiders
*Black widow spider *(Latrodectus mactans)*
*Common house spider *(Achaeranea tepidariorum)*
*Crab spider *(Family: Thomisidae)*
Golden orb web weaver *(Agriope aurantia)*
*Sow bug killer spider *(Dysdera crocata)*
*Wolfspider *(Order: Zycosidae)*
Bees and Wasps
*American bumble bee *(Genus: Bombus)*
Carpenter bee *(Genus: Xylocopa)*
Honey bee *(Genus: Apis)*
Potter wasp *(Family: Vespidae)*
Wasps *(Genus: Polistes)*

**Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Insect Survey Group. Insect species not found during the Bio Blitz that are listed above were observed at Pleasure House Point by Stuart McCausland (Former Entomologist with Virginia Department of Health and Master Naturalist with the Tidewater Chapter of Virginia Master Naturalists) and Karen Callaway (VBPR Planning Technician); and during a butterfly survey conducted on July 5, 2013, by members of The Butterfly Society of Virginia: Pat Quinn (President of The Butterfly Society of Virginia), Ruth Burch (a member of the Butterfly Society of Virginia), and Paul Oettel (Vice President of the Butterfly Society of Virginia).*


Blow fly *(Family: Calliphoridae)*


Bagworm
(Thyridopteryx ephemeraeformis)


Common wood nymph
(Cercyonis pegala)

Terrestrial Macroinvertebrates (including: Insects and Spiders) (cont'd)

Butterflies and Moths
Cabbage white *(Pieris rapae)*
Cloudless sulphur *(Phoebus sennae)*
Common wood nymph *(Cercyonis pegala)*
Common buckeye *(Junonia coenia)*
Eastern black swallowtail *(Papilio polyxenes)*
Palamedes swallowtail *(Papilio palamedes)*
Skipper *(Family: Hesperiidae)*
Spicebush swallowtail *(Papilio toilus)*
Zebra swallowtail *(Eurytides Marcellus)*
Caterpillars
Bagworm *(Thyridopteryx ephemeraeformis)*
*Eastern tent caterpillar *(Malacosoma americanum)*
Centipedes and Millipedes
*Centipede *(Class: Chilopoda)*
*Garden centipede *(Lithobius forficatus)*
Millipede *(Class: Diplopoda)*

Beetles
*Ground beetle *(Genus: Pterostichus)*
June beetle *(Cotinis nitida)*
Scarab beetle *(Family: Scarabaeidae)*
*Small beetle *(Family: Carabidae)*
*Soldier beetle *(Family: Cantharidae)*
*Soft-wing beetle *(Order: Coleoptera)*
Flies
*Antlion *(Family: Myrmeleontidae)*
Bee fly *(Family: Bombyliidae)*
Blow fly *(Family: Calliphoridae)*
*House fly *(Musca domestica)*
*Picture wing fly *(Order: Diptera)*
Midges *(Family: Chironomidae)*
Syrphid fly *(Family: Syrphidae)*
Tachina Flies *(Family: Tachinidae)*
Ants and Termites
*Ants *(Family: Formicidae)*
*Eastern subterranean termite *(Reticulitermes flauipes)*
Woodlice
*Sow bug *(Genus: Armadillidium)*

Pleasure House Point Near Shore Waters Aquatic Fauna Survey Areas

Near Shore Waters Aquatic Fauna Surveys

Spring Survey: Resident Fish Species

All species listed below (noted with asterisks) were found during the May 4, 2013, Pleasure House Point Bio Blitz by the Near Shore Waters Aquatic Fauna Survey Group. Most fish and crabs that were captured in the seine nets were small sized juveniles. "Nothing really unusual noted. Water temperature was cooler, and the water was clearer than normal. Fewer mummichogs were observed than were expected. Lots of oysters were observed growing, many more than in past years. That is a good sign for the water quality." - Jeff Thompson, Virginia Aquarium Acquisition & Quarantine Manager

Survey Area 1: Capture Method - seine net dragging from 10:15 am to 10:40 am, low tide, water temperature: 55°F, wind speed: 15 knots, and air temperature: 53°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna	Notable Observations
*Atlantic silverside	*(Menidia menidia)*	1	2 inches	
*Bay anchovy	*(Anchoa mitchilli)*	1	2 inches	Dead
*Blue crab	*(Callinectes sapidus)*	1	1 ½ inches	Male
*Eastern oyster	*(Crassostrea virginica)*	7	4 inches	Attached to log
*Grass shrimp	*(Genus: Palaemonetes)*	125 +	1 inch	2 Females (had eggs)/1 male
*Marsh periwinkle snail	*(Littoraria irrorata)*	Many		Not on grass
*Mummichog	*(Fundulus heteroclitus)*	4	2 -3 inches	
*Spot	*(Leiostomus xanthurus)*	50 +	1 to 1 ½ inch	
*White mullet	*(Mugil curema)*	3	1 inch	Males

Survey Area 2: Capture Method - seine net dragging from 11:10am to 11:15am, low tide, water temperature: 55°F, wind speed: 15 knots, and air temperature: 53°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
*Blue crab	*(Callinectes sapidus)*	1	½ inches
*Comb jelly	*(Phylum: Ctenophora)*	Many	½ inches
*Grass shrimp	*(Genus: Palaemonetes)*	50+	½ inches
*Mummichog	*(Fundulus heteroclitus)*	2	1 inch
*Sand shrimp	*(Crangon crangon)*	1	1 ½ inches
*Spot	*(Leiostomus xanthurus)*	4	2 inches
*White mullet	*(Mugil curema)*	2	1 inch

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED

Survey Area 3: Capture Method - seine net dragging from 11:20am to 11:25am, low tide, water temperature: 55°F, wind speed: 15 + knots, and air temperature: 55°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
*Atlantic silverside	*(Menidia menidia)*	1	1 ½ inches
*Grass shrimp	*(Genus: Palaemonetes)*	12	½ inches
*Spot	*(Leiostomus xanthurus)*	100 +	½ inches +

Survey Area 4: Capture Method - seine net dragging from 11:35am to 11:45am, low tide, water temperature: 55 F, wind speed: 15 + knots, and air temperature: 55 F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
***Spot**	**(*Leiostomus xanthurus*)**	**5**	½ inches

Survey Area 5: Capture Method - seine net dragging from 11:45am to 11:50am, low tide, water temperature: 55°F, wind speed: 15 + knots, and air temperature: 55°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna	Notable Observations
*Atlantic silverside	*(Menidia menidia)*	6	2 inches	
*Blue crab	*(Callinectes sapidus)*	3	2 ½ inches	Males
*Mud snail	*(Ilyanassa obsolete)*	2		
*Spot	*(Leiostomus xanthurus)*	25 +	Small ½ inches	

Late Summer Survey: Residents and Summer Fish Migrants

Late Summer Survey occurred on June 20, 2013. Seining of the near shore waters was conducted by Maureen Fender, Katie Glanton, Nicole Clanton, and Alison McNaught from the Virginia Aquarium's Quarantine and Acquisitions Department.

Survey Area 1: Capture Method - seine net dragging from 1:10pm to 2:30pm, low tide, water temperature: 76°F, wind speed: 5-10 knots, and air temperature: 84°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Banded hermit crab	*(Pagurus annulipes)*	1	
Bay anchovy	*(Anchoa mitchilli)*	4	2-2 ¾ inches
Blue crab	*(Callinectes sapidus)*	34	½ - 5 inches
Eastern oyster	*(Crassostrea virginica)*	many	5 inches
Feather blenny	*(Hypsoblennius hentzi)*	1	2 inches
Grass shrimp	*(Genus: Palaemonetes)*	230+	
Mud snail	*(Ilyanassa obsolete)*	3	½ inch
Mummichog	*(Fundulus heteroclitus)*	47	1 ½ - 4 inches
Pinfish	*(Lagodon rhomboides)*	30	1 - 2 ½ inches
Spot	*(Leiostomus xanthurus)*	253	½ - 3 inches
Striped killifish	*(Fundulus majalis)*	11	2 ½ - 3 ½ inches
Tongue fish	*(Family: Cynoglossidae)*	1	3 ½ inches
Winter flounder	*(Pseudopleuronectes americanus)*	11	2 - 4 ½ inches

Survey Area 2: Capture Method - seine net dragging from 2:47pm to 2:57pm, low tide but rising, water temperature: 73°F, wind speed: 5-10 knots, and air temperature: 84°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Blue crab	*(Callinectes sapidus)*	1	3 inches
Jelly	*(Phylum: Ctenophora)*	1	
Marsh crab	*(Sesarma reticulatum)*	1	½ inch
Marsh periwinkle snail	*(Littoraria irrorata)*	1	
Mud snail	*(Ilyanassa obsolete)*	2	
Mullet	*(Family: Mugilidae)*	2	2 - 2 ½ inches
Mummichog	*(Fundulus heteroclitus)*	1	3 inches
Pinfish	*(Lagodon rhomboides)*	8	1 ½ - 2 ½ inches
Spot	*(Leiostomus xanthurus)*	9	2 – 4 ½ inches
Striped killifish	*(Fundulus majalis)*	5	2 – 3 ½ inches

Survey Area 3: Capture Method - seine net dragging from 3:00pm to 3:30pm, low tide but rising, water temperature: 73°F, wind speed: 2-5 knots, and air temperature: 84°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Atlantic silverside	*(Menidia menidia)*	21	1 - 3 inches
Banded hermit crab	*(Pagurus annulipes)*	1	
Blue crab	*(Callinectes sapidus)*	13	1 – 4 inches
Mud snail	*(Ilyanassa obsolete)*	1	
Mullet	*(Family: Mugilidae)*	6	1 ½ - 3 inches
Mummichog	*(Fundulus heteroclitus)*	57	1 ½ - 2 ½ inches
Pinfish	*(Lagodon rhomboides)*	28	2 – 2 ½ inches
Spot	*(Leiostomus xanthurus)*	42	2 – 3 inches
Spot fin mojarra	*(Eucinostomus argenteus)*	1	1 ½ inches
Striped killifish	*(Fundulus majalis)*	13	2 – 4 inches
Tongue fish	*(Family: Cynoglossidae)*	1	3 inches

Survey Area 4: Capture Method - seine net dragging from 3:38pm to 3:44pm, rising tide, water temperature: 75°F, wind speed: 5 knots, and air temperature: 84°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Atlantic silverside	*(Menidia menidia)*	2	2 inches
Banded hermit crab	*(Pagurus annulipes)*	1	
Blue crab	*(Callinectes sapidus)*	6	½ - 1 inch
Mummichog	*(Fundulus heteroclitus)*	1	2 ½ inches
Pinfish	*(Lagodon rhomboides)*	1	2 ½ inches
Spot	*(Leiostomus xanthurus)*	1	
Striped killifish	*(Fundulus majalis)*	2	2 inches

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED



Survey Area 5: The tide was too high and the current was too strong to seine in this survey area. If we were able to seine in this area we would likely find observations similar to Survey Area 4.

Fall Survey: Resident and Fall Migrant Fish Species

Fall Survey occurred September 25, 2013. Seining was conducted by Jeff Thompson and Maureen Fender from the Virginia Aquarium's Quarantine and Acquisitions Department. A juvenile Red drum *(Sciaenops ocellatus)* was captured in the near shore waters of Pleasure House Point by a local fisherman in early September.

Survey Area 1: Capture Method - seine net dragging from 9:42am to 10:00am, low tide but rising, water temperature: 73°F, wind speed: 0-5 knots, and air temperature: 65°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Atlantic silverside	*(Menidia menidia)*	16	3-4 inches
Blue crab	*(Callinectes sapidus)*	1	¼ inches
Eastern oyster	*(Crassostrea virginica)*	many	5 inches+
Grass shrimp	*(Genus: Palaemonetes)*	16	1 inch
Mummichog	*(Fundulus heteroclitus)*	1	
Striped killifish	*(Fundulus majalis)*	1	2 inches
Striped mullet	*(Mugil cephalus)*	1	2 inches
White shrimp	*(Litopenaeus setiferus)*	60+	3-4 inches

Survey Area 2: Capture Method - seine net dragging from 10:19am to 10:28am, low tide but rising, water temperature: 70°F, wind speed: 0-5 knots, and air temperature: 70°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Atlantic silverside	*(Menidia menidia)*	75+	3 inches
Blue crab	*(Callinectes sapidus)*	1	5 inches
Grass shrimp	*(Genus: Palaemonetes)*	9	1-1 ½ inches
Jelly	*(Phylum: Ctenophora)*	2	
Pinfish	*(Lagodon rhomboides)*	1	4 inches
Spot	*(Leiostomus xanthurus)*	2	4 inches
Spot fin mojarra	*(Eucinostomus argenteus)*	1	
Striped killifish	*(Fundulus majalis)*	4	1 inch
Striped mullet	*(Mugil cephalus)*	5	2-4 inches

Survey Area 3: Capture Method - seine net dragging from 10:34am to 10:44am, low tide but rising, water temperature: 70°F, wind speed: 0-5 knots, and air temperature: 70°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Atlantic silverside	*(Menidia menidia)*	27	3 inches
Jelly	*(Phylum: Ctenophora)*	1	
Long-clawed hermit crab	*(Pagurus longicarpus)*	1	
Mud snail	*(Ilyanassa obsolete)*	4	
Mummichog	*(Fundulus heteroclitus)*	15	2-3 inches
Pinfish	*(Lagodon rhomboides)*	4	4 inches
Spot	*(Leiostomus xanthurus)*	4	4 inches
Striped killifish	*(Fundulus majalis)*	8	2-4 inches
Striped mullet	*(Mugil cephalus)*	6	2-3 inches

Survey Area 4: Capture Method - seine net dragging from 10:51am to 10:53am, low tide but rising, water temperature: 70°F, wind speed: 0-5 knots, and air temperature: 70°F.

Common Name	Scientific Classification	Tally	Length of aquatic fauna
Atlantic silverside	*(Menidia menidia)*	29	3 inches
Blue crab	*(Callinectes sapidus)*	1	1 inch (male)
Jelly	*(Phylum: Ctenophora)*	3	
Long-clawed hermit crab	*(Pagurus longicarpus)*	7	
Mud snail	*(Ilyanassa obsolete)*	7	
Spot fin mojarra	*(Eucinostomus argenteus)*	1	1 inch
Striped killifish	*(Fundulus majalis)*	3	2 inches

Survey Area 5: The tide was too high and the current was too strong to seine in this survey area. If we were able to seine in this area we would likely find observations similar to Survey Area 4.

The following table lists mollusks and crustaceans of near shore waters that were not documented during the Near shore waters seining surveys.*Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Macroinvertebrate Survey Group. Aquatic fauna species of near shore waters not found during the Bio Blitz that are listed above were observed at Pleasure House Point by Karen Callaway (VBPR Planning Technician).

Mollusks and Crustaceans of Near Shore Waters
*Blue mussel *(Mytilus edulis)*
*Wharf crab (*Sesarma cinereum)*
Ribbed mussel *(Geukensia demissa)*
Red-jointed fiddler crab *(Uca minax)*

APPENDIX 6: LIST OF PLANTS & WILDLIFE OBSERVED

Fish Survey of Brackish Man-made Ponds

On April 16, 2013, a Fish Survey was conducted in the two manmade ponds at Pleasure House Point. Expertise and supplies were provided by Virginia Department of Game & Inland Fisheries Fisheries Biologist Chad Boyce.
Capture method: monofilament sinking gill nets, water temperature: low 60s°F, and air temperature: 65°F.

Initial observations by Chad Boyce: *Not much forage in the ponds for fish. There was a lack of fish eating birds surrounding the ponds, such as cormorants.*

Pond 1:
Net was set from 9:26am until approximately 10:26am.
No fish caught. Only comb jellies were caught in the nets.

Pond 2:
Net set at 10:00am until approximately 11:00am.
There was a lot of algae in the pond. Dipped a net in the algae to see what was there and a grass shrimp was found. Chad expected to see more small fish and more grass shrimp near the edges of the pond and within the algae.

Three Atlantic menhaden *(Brevoortia tyrannus)*, one Gizzard shad *(Dorosoma cepedianum)*, and comb jellies were found in this net. Atlantic menhaden and Gizzard shad are both native fish species. The fish were most likely trapped in the manmade lake during an over wash event last year and over wintered. All fish were juveniles from last year.

Fish of Brackish Inland Ponds
Atlantic menhaden *(Brevoortia tyrannus)*
Gizzard shad *(Dorosoma cepedianum)*
Aquatic Macroinvertebrates of Brackish Inland Ponds
*Bristle worm *(Class: Polychaeta)*
*Comb Jelly *(Phylum: Ctenophora)*
*Fish and fish larvae (possible)
*Grass shrimp *(Genus: Palaemonetes)*
*Moss animals *(Phylum: Bryozoa)* (possible)
*Mussels *(Family: Mytilidae)*
*Predaceous diving beetle *(Family: Dytiscidae)*
*Scuds *(Genus: Gammarus)*
*Snails *(Class: Gastropoda)*
*Soft shell clam *(Mya arenaria)*
*Stinging nettle *(Chrysaora quinquecirrha)*
*Waterboatman beetles *(Gyrinus natator)*

* Asterisks note species that were found during the Pleasure House Point Bio Blitz by the Macroinvertebrate Survey Group.

Appendix 7: Pleasure House Point Bio Blitz Participants

Plant Survey Group Participants:

Darren Loomis, Biologist with the Virginia Department of Conservation and Recreation
Mike Aherron, Area Forester with Virginia Department of Forestry
Robert Atkinson, Botany Professor from Christopher Newport University (CNU)
Brittany Bower, Botany student from CNU
Justin Weiser, Botany student from CNU
Mellony Seidal, Botany student from CNU
Kristina Kowalski, Botany student from CNU
Jessica Lauer, Botany student from CNU
Corinna Green, Botany student from CNU
Steve Stasulis, President of the South Hampton Roads Chapter of The Virginia Native Plant Society.

Bird Survey Group Participants:

Sharon Plocher, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Jennifer Trevino, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Nancy Barnhart, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Inge Curtis, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Susan Powell, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Lester Lawrence, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Shirley Devan, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Jessica Spickler, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Angier Brock, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists

Mammal Survey Group Participants:

Mike Millin, Master Naturalist with the Historic Rivers Chapter of the Virginia Master Naturalists
Jeanne Millin, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Felice Bond, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists (Not in this survey group but documented signs of mammal during the Bio Blitz.)

APPENDIX 7: PHP BIO BLITZ PARTICIPANTS

Herpetological Survey Group Participants:

Felice Bond, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Tom Bond, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Dean Shostak, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Abigail Shostak, Daughter of Dean Shostak (over 12 years old)
Lester Lawrence, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Joanne Langford, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Susan Engle-Hill, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Darren Loomis, Biologist with the Virginia Department of Conservation and Recreation (Not in this survey group but documented herpetological species during the Bio Blitz)

Terrestrial Macroinvertebrate Survey Group Participants:

Dean Shostak, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Adrienne Frank, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Gary Driscole, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Stuart McCausland, Former Entomologist with Virginia Department of Health and Master Naturalist with the Tidewater Chapter of Virginia Master Naturalists
Felice Bond, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Tom Bond, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Clyde Marsteller, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Christine Macchia, Master Naturalist with the Tidewater Chapter of Virginia Master Naturalists

Aquatic Macroinvertebrate Survey Group Participants:

Jody Ullmann, Master Naturalist: Tidewater Chapter of Virginia Master Naturalists and Lynnhaven River NOW Education Coordinator
Bruce Glendening, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Walter Harris, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Gwendolyn Harris, Master Naturalist with the Historic Rivers Chapter of Virginia Master Naturalists
Ellis Pawson III, Educator at the Virginia Aquarium

Near Shore Waters Aquatic Fauna Survey Group Participants:

Jeff Thompson, Acquisition & Quarantine Manager with the Virginia Aquarium
Nicholas Liakos, Acquisition & Quarantine employee with the Virginia Aquarium
Michael Moore, Open Spaces and Resources Manager with the Virginia Beach Parks & Recreation

Appendix 8: Recorded Conservation Easement

PREPARED BY: VIRGINIA BEACH
CITY ATTORNEY'S OFFICE

20120711000766540 1/23
City of Virginia Beach
07/11/2012
08:22:31 AM ESMT
Tina E. Sinnen, Clerk

GPIN: 14892797360000

Exempted from recordation tax
under the Code of Virginia (1950), as amended,
Sections 58.1-811 (A) (3), 58.1-811 (D) and 10.1-1803
and from Circuit Court Clerk's fee under Section 17.1-266

THIS DEED OF EASEMENT (this "Easement"), made this 9th day of June, 2012, between, the TRUST FOR PUBLIC LAND "Grantor"; and the COMMONWEALTH OF VIRGINIA BOARD OF GAME AND INLAND FISHERIES, an agency of the COMMONWEALTH OF VIRGINIA ("Grantee") (the designations "Grantor" and "Grantee" refer to Grantor and Grantee and their respective successors and assigns), witnesseth:

RECITALS:

R-1 Grantor is the owner in fee simple of real property situated in the City of Virginia Beach , Virginia, containing in the aggregate 84 acres, more or less, as further described below (the "Property"), and desires to give and convey to Grantee a perpetual conservation and open-space easement over the Property as herein set forth;

R-2 The Property is composed of a globally rare maritime forest community, coastal wetlands, tidal shoreline, ponds, marsh islands and subaqueous lands along and in Pleasure House Creek, and protection of the Property under easement will preserve and manage these significant natural features and conservation values in perpetuity for the benefit of fish and wildlife dependent thereon;

R-3 The Property contains 7,920 linear feet of frontage along Pleasure House Creek, a tributary to the Lynnhaven River. The protection and management of the Property as a natural area will help protect the water quality and prevent further pollution of Pleasure House Creek, the Lynnhaven River and the Chesapeake Bay;

R-4 Chapter 461 of the Acts of 1966, codified in Chapter 17, Title 10.1, Sections 10.1-1700 through 10.1-1705 of the Code of Virginia, as amended (the "Open-Space Land Act"), authorizes the acquisition of interests in real property, including easements in gross, as a means of preserving natural areas and open-space land;

R-5 Pursuant to Virginia Code §29.1-103, the Board of Game and Inland Fisheries is authorized to acquire property interests for public use, and further as a public body as defined in the Open-Space Land Act, may hold conservation and open-space easements for the purposes set forth in Section I herein;

R-6 This conservation and open-space easement is being granted in order to help ensure that the Property is protected and managed in perpetuity consistently with the purposes of the following federal and state funding programs which contributed grants and loans for the preservation of the Property, and other relevant natural resource polices:

(i) The Virginia Department of Environmental Quality administers the Virginia Water Facilities Revolving Fund Program (the "Fund"), which was authorized in Sections 62.1-224 through 62.1-232 of the Code of Virginia, as amended, for the purposes of water quality protection, including for the purpose of providing loans for the acquisition of real property interests to protect or improve water quality and prevent pollution of state waters. The Fund is providing a loan for the acquisition and protection of the Property and this conservation and open space easement and the associated restrictions herein will

help ensure the Property is managed consistent with the water quality and pollution prevention purposes of the loan;

(ii) The Department of Interior, acting by and through the United States Fish and Wildlife Service (the "Service"), administers the National Coastal Wetlands Conservation Grant Program ("NCWCG") under Title 16, Chapter 59A, Section 3954 of the United States Code to provide grants to ensure long term conservation of coastal wetland ecosystems. The Service is providing grant number F12AP00492 (C-18-L-1) dated June 11, 2012 through the Virginia Department of Game and Inland Fisheries, the Grantee herein, for the acquisition and protection of the Property, and this conservation and open space easement and the associated restrictions herein will help ensure the Property is managed consistently with the coastal wetland ecosystem protection purposes of the grant; and

(iii) The Virginia Land Conservation Foundation ("VLCF") was authorized in Sections 10.1-1017 through 10.1-1026 of the Code of Virginia to provide funding to protect land for open space and other purposes, and provide land for recreation in the Commonwealth of Virginia. The VLCF is providing a grant for the acquisition and protection of the Property, and this conservation and open space easement and the associated restrictions herein will help ensure the Property is managed consistent with the open space and recreational purposes of the grant, including access to coastal waters of the Commonwealth of Virginia.

R-7 The Property serves as an important migratory bird stopover site that provides suitable habitat for several fish and bird species, which have been identified by Grantee in the Virginia Wildlife Action Plan as "Species of Greatest Conservation Concern" and

protection of the Property from intense uses will preserve this important function and habitat;

R-8 The Property will be conveyed to the City of Virginia Beach, Virginia concurrently with the conveyance of this conservation and open space easement and will be made available for public uses that are consistent with protection and management of the conservation values of the Property, including trails for non-motorized recreational use, and protection of the Property hereunder will enable and enhance such public use;

R-9 The property contains sensitive environmental features including wetlands, floodplain, surface waters and Chesapeake Bay Resource Protection Area (RPA) lands designated for protection as conservation lands by the City of Virginia Beach Comprehensive Plan adopted on December 8, 2009 (the "Comprehensive Plan"), and as required under Section 10.1-1701 of the Open-Space Land Act, the use of the Property as a natural area conforms to the Comprehensive Plan, and the Property is located within an area that is designated as Suburban Focus Area 1.1 on the City's future land use map.

R-10 Pursuant to Sections 10.1-1700 and 10.1-1703 of the Open-Space Land Act, the purposes of this conservation and open space easement (as defined below in Section I) include retaining and protecting the conservation values of the Property, including a globally rare maritime forest community, coastal wetlands, tidal shoreline, ponds, marsh islands and subaqueous lands, and the limitation on division, construction and commercial and industrial uses contained in Section II ensures that these conservation values will be protected in perpetuity forest, as more particularly set forth below.

R-11 Grantor and Grantee desire to protect in perpetuity the conservation values of the Property as specified in Section I by restricting the use of the Property as set forth in Section II.

R-12 Grantee, by acceptance of this Easement, designates the Property as property to be retained and used in perpetuity for the preservation and provision of natural areas and open-space land pursuant to the Open-Space Land Act.

NOW, THEREFORE, in consideration of the foregoing recitals incorporated herein and made a part hereof and in consideration of the mutual covenants herein and their acceptance by Grantee, Grantor does hereby give, grant and convey to Grantee a conservation and open-space easement in gross (this "Easement") over, and the right in perpetuity to restrict the use of, the Property, which is described below and consists of 84.658 acres located in the City of Virginia Beach, Virginia, near Shore Drive (State Route #60), fronting on Pleasure House Creek and the Lynnhaven River and on Marlin Bay Drive, to-wit:

> ALL THAT certain piece or parcel of land designated and described as "PARCEL 1 84.658 ACRES" on that certain plat entitled: "RESUBDIVISION OF PLEASURE HOUSE POINT VIRGINIA BEACH, VIRGINIA," dated June 29, 2012, Scale: 1" = 100', prepared by WPL Landscape Architecture, and duly recorded in the Clerk's Office of the Circuit Court of the City of Virginia Beach, Virginia, as Instrument Number 20120710000764410.
>
> The Property is known as GPIN: 1489-27-9736-0000 among the land records of the City of Virginia Beach, Virginia.

SECTION I – PURPOSE

The purpose of this Easement is to protect in perpetuity the conservation values of the Property, including coastal wetlands, maritime forest, and other significant natural

features, and to protect and enhance water quality and prevent further pollution of state waters. The Easement shall be administered for the long-term conservation of said lands and waters, and the hydrology, water quality, and fish and wildlife dependent thereon. The Easement shall ensure that the activities that interfere with these purposes are precluded. The Easement shall protect the conservation values of the Property in perpetuity by imposing the restrictions on the use of the Property as set forth in Section II and providing for their enforcement in Section III. The conservation values are described in the recitals and are documented in the Baseline Document Report described in Section IV.

SECTION II – RESTRICTIONS

Restrictions are hereby imposed on the use of the Property pursuant to the public policies and funding programs set forth above. The acts that Grantor covenants to do and not to do upon the Property, and the restrictions that Grantee is hereby entitled to enforce, are and shall be as follows:

1. **DIVISION.** Separate conveyance of a portion of the Property or division or subdivision of the Property is prohibited.

   Boundary line adjustments with adjoining parcels of land are permitted and shall not be considered separate conveyances of portions of the Property or divisions or subdivisions of the Property, provided that Grantee approves such adjustments, is made party to any deed creating a boundary line adjustment, and at least one of the following conditions is met:

(i) The entire adjacent parcel is subject to a recorded conservation and open-space easement owned by Grantee; or

(ii) The proposed boundary line adjustment shall have been reviewed and approved in advance by the Board of Game and Inland Fisheries.

2. MANAGEMENT PLAN

(i) Before making any permanent improvements to the Property, the Grantor shall prepare a written management plan (the "Management Plan") for the Property to be approved by the Grantee. The Management Plan shall be consistent with the continued preservation of the conservation values of the Property and have a primary purpose of protecting and enhancing the coastal wetlands, maritime forest, migratory bird stopover habitat and other significant natural features of the Property and the water quality of Pleasure House Creek, and a secondary purpose of public access for non-motorized recreational and educational uses consistent with the continued preservation of the Property's natural features. No permanent buildings, structures, roads or utilities, other than the following specified below and as approved by Grantee in the Management Plan, are allowed on the Property. The Management Plan may be amended, in writing and with approval from Grantee, from time to time, and all references herein to the Management Plan include the original plan and all amendments thereto.

(a) **Launching Piers for non-motorized watercraft**. No more than two (2) launching piers for non-motorized watercraft for public recreational and/or educational use. The Management Plan will identify location, size and other construction details and will be subject to approval by the Grantee. Grantee will

base approval of such piers on factors including, but not limited to, the scale of the structure(s), construction methods and planned levels of activity to ensure that the scope and future use will not adversely affect conservation values.

(b) **Trails and Related Structures.** Trails, footpaths and related structures including but not limited to signs, informational kiosks, and overlooks, if approved by the Grantee as part of the Management Plan. The Management Plan will identify location, size and other construction details of such trails and structures.

(c) **Roads and Utilities.** Roads and utilities, if reasonably necessary for maintenance and administrative purposes and used for these purposes only, and if approved by the Grantee as part of the Management Plan

(d) **Activities on the Property**. The Management Plan will include a process for determining what types of educational/social activities are consistent with the conservation values.

(ii) Prior to the development and approval of the Management Plan, Grantor shall have the right to implement limited improvements to protect the conservation values and to manage public use of the Property as more particularly described in the preliminary management plan (the "Preliminary Management Plan"), which is attached hereto as Exhibit A and made a part hereof.

3. ACTIVITIES ON THE PROPERTY.

(i) All primary and accessory activities or uses associated with the operation and maintenance of a public natural area for non-motorized recreational activities are permitted including, but not limited to, hiking, fishing, kayaking, canoeing, bird

watching, nature study, wildlife photography and educational/social activities, provided that such activities are not in conflict with the conservation purposes of, or restrictions set forth, in this Easement. Vehicular use except for that reasonably required to manage the Property is prohibited. Biking and equestrian use on the Property are prohibited activities. Industrial or commercial activities are prohibited, with the exception of the following:

(a) activities to restore or enhance wetlands, streams, ponds, or waterways or to restore, enhance, or develop other ecosystem functions on the Property including, but not limited to, wetland and stream bank restoration, biological carbon sequestration and biodiversity restoration, bank stabilization, shore protection and replenishment, and aquatic habitat restoration; provided, however that (i) such activities establish, promote or enhance ecosystem functions of the Property, and (ii) are not in conflict or inconsistent with the conservation purposes of or the restrictions set forth in this Easement, and (iii) have been approved by Grantee as part of the Management Plan;

(b) fishing (including, without limitation, shellfish harvest) shall be permitted subject to appropriately granted leases or permits issued by any political subdivision or agency of the Commonwealth of Virginia.

(c) activities related to maintenance and enhancement of existing storm water drainage areas on the Property. Enhancements to these drainage areas may be for quantity or quality purposes, provided that (i) such activities are not in conflict or inconsistent with the conservation purposes of or restrictions set forth in this Easement and that prior written approval for same shall have been obtained

from Grantee or (ii) they are within and pursuant to stormwater drainage easements that were in existence prior to the date this Easement is recorded in the Clerk's Office of the Circuit Court of the City of Virginia Beach, Virginia.

4. **MANAGEMENT OF FOREST.** Any forest management activities proposed for the Property shall be conducted in accordance with the Management Plan approved by Grantee, including but not limited to the removal of any trees or vegetation. Notwithstanding the foregoing, neither the Management Plan nor prior approval of Grantee shall be required for the: (i) removal of dead, diseased or dying trees or removal of trees posing an imminent hazard to the health or safety of persons; or (ii) maintenance of existing trails as identified in the Preliminary Management Plan prior to the development and approval of the Management Plan.

5. **RIPARIAN BUFFER.** To protect water quality a 100-foot buffer shall be maintained along the Property's Pleasure House Creek shoreline as measured from the top of the bank from the high water mark, and a 100-foot buffer strip shall be maintained along the edge of wetlands on the Property in a landward direction from the edge of the wetlands. No buildings, structures, or roads shall be allowed in the riparian buffer, other than the piers, trails and trail related structures that are allowed under Section II, Paragraph 2(i) (a) and (b) if approved by Grantee as part of a Management Plan. No removal of native vegetation shall be allowed in the riparian buffer unless as part of an approved management activity as described in Section II, Paragraph 3(i) (a) and (c).

6. **GRADING, BLASTING, FILLING AND MINING**. Surface mining, subsurface mining, or drilling for oil or gas on the Property is prohibited. Grading, blasting, filling, or earth removal shall not be permitted to materially alter the topography

of the Property, except for the restoration, enhancement, or development of ecosystem functions on the Property as permitted and limited under Section II, Paragraph 3 (i)(a) and (c) above, and if approved as part of the Management Plan.. Limited earth disturbance is allowed if reasonably necessary for the purposes of Section II, Paragraph 2(i)(a) through (c) above, or for bank stabilization, shore protection and replenishment, and erosion and sediment control, and if approved as part of the Management Plan.

7. ACCUMULATION OF TRASH. Accumulation or dumping of trash, refuse, junk or toxic materials is not permitted on the Property. This restriction shall not prevent generally accepted forest or wildlife management practices.

SECTION III – ENFORCEMENT

1. RIGHT OF INSPECTION. Representatives of Grantee may enter the Property from time to time for purposes of inspection (including photographic documentation of the condition of the Property) and enforcement of the terms of this Easement after permission from or reasonable notice to Grantor or Grantor's representative; provided, however, that in the event of an emergency, entrance may be made to prevent, terminate or mitigate a potential violation of these restrictions with notice to Grantor or Grantor's representative being given at the earliest practicable time.

2. ENFORCEMENT. The Grantor and Grantee shall endeavor to resolve all disputes among themselves by negotiation. In the event the Grantor and Grantee are unable to resolve any dispute by negotiation after having attempted to do so for at least 90 days following written notice of the dispute from one party to the other, the parties shall engage in non-binding mediation in the City of Virginia Beach (or in another

location as agreed upon by the parties) with a mediator jointly selected and with fees split equally among participating parties. Should the dispute remain unresolved more than 30 days after the conclusion of non-binding mediation, or for more than 150 days after the written notice of the dispute, or if the parties are not able to select a mediator, then the Grantor or the Grantee may bring an action against the other party to this Easement to seek compliance with the terms of this Easement, including, without limitation, the restoration of the Property to its status prior to the violation. Nothing herein shall be construed as a waiver of the Commonwealth's sovereign immunity or any immunity granted to the City by the Commonwealth of Virginia statutes and case law to the extent that it applies. The Grantee agrees that the right to commence litigation to enforce the terms of this Easement against the City is governed by the Virginia Conservation Easement Act, Va. Code § 10.1-1013 and the Virginia Open-Space Land Act, Va. Code § 10.1-1700, *et seq.*

SECTION IV – DOCUMENTATION

Grantee has documented the condition and character of the Property, including the conservation values, in a Baseline Documentation Report prior to the recordation of this Easement. The Baseline Documentation Report may be used to determine compliance with and enforcement of the terms of this Easement; however, the parties are not precluded from using other relevant evidence or information to assist in that determination. The parties hereby acknowledge that the Baseline Documentation Report contained in the files of Grantee is an accurate representation of the Property.

SECTION V – GENERAL PROVISIONS

1. DURATION. This Easement shall be perpetual. It is an easement in gross that runs with the land as an incorporeal interest in the Property. The covenants, terms, conditions and restrictions contained in this Easement are binding upon, and inure to the benefit of, the parties hereto and their successors and assigns, and shall continue as a servitude running in perpetuity with the Property. The rights and obligations of an owner of the Property under this Easement terminate upon proper transfer of such owner's interest in the Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

2. TITLE. Grantor covenants and warrants that Grantor has good title to the Property, that Grantor has all right and authority to grant and convey this Easement and that the Property is free and clear of all encumbrances (other than restrictions, covenants, conditions, and utility and access easements of record) including, but not limited to, any mortgages or deeds of trust not subordinated to this Easement. This Easement is conveyed subject to all such restrictions, covenants, conditions and easements of record, insofar as they may lawfully affect the Property.

3. ACCEPTANCE. Grantee accepts this conveyance pursuant to Virginia Code Section 29.1-104, which acceptance is evidenced by the signature of the Director of the Department of Game and Inland Fisheries as authorized by §29.1-109.B.5.

4. INTERACTION WITH OTHER LAWS. This Easement does not permit any use of the Property that is otherwise prohibited by federal, state, or local law or regulation. Neither the Property, nor any portion of it, has been or shall be dedicated as

open space within, or as part of, a residential subdivision or any other type of residential or commercial development; dedicated as open space in, or as part of, any real estate development plan; or dedicated for the purpose of fulfilling density requirements to obtain approvals for zoning, subdivision, site plan, or building permits. No development rights that have been encumbered or extinguished by this Easement shall be transferred to any other property pursuant to a transferable development rights scheme, cluster development arrangement or otherwise.

5. CONSTRUCTION. Any general rule of construction to the contrary notwithstanding, this Easement shall be liberally construed in favor of the grant to effect the purposes of the Easement and the policy and purposes of Grantee. If any provision of this Easement is found to be ambiguous, an interpretation consistent with the purpose of this Easement that would render the provision valid shall be favored over any interpretation that would render it invalid. Notwithstanding the foregoing, lawful acts or uses consistent with the purpose of and not expressly prohibited by this Easement are permitted on the Property.

6. REFERENCE TO EASEMENT IN SUBSEQUENT DEEDS. This Easement shall be referenced by instrument number or other appropriate reference in any deed or other instrument conveying any interest in the Property. Failure of Grantor to comply with this requirement shall not impair the validity of the Easement or limit its enforceability in any way.

7. NOTICE TO GRANTEE AND GRANTOR. For the purpose of giving notices hereunder the current address of Grantee is 4010 West Broad Street, Richmond Virginia

23230, and any notice to Grantor shall be given to the recipient at the address of the Trust for Public Land, which is currently:

Trust for Public Land
Attention: Director, Chesapeake Field Office
660 Pennsylvania, S.E.
Suite 401
Washington, DC 20003

It is anticipated that the Trust for Public Land will convey the Property to the City of Virginia Beach. Any notice to the Grantor after such conveyance by Trust for Public Land shall be sent to:

City of Virginia Beach
Attention: Director of Parks & Recreation
2408 Courthouse Drive
Municipal Center, Building 21
Virginia Beach, VA 23456

In addition, Grantor agrees to notify Grantee in writing before exercising any reserved right that Grantor believes may have an adverse effect on the conservation or open-space values or interests associated with the Property (the purpose of requiring such notice is to afford Grantee an adequate opportunity to monitor such activities to ensure that they are carried out in a manner consistent with the purpose of this Easement; such notice shall describe the proposed activity in sufficient detail to allow Grantee to judge the consistency of the proposed activity with the purpose of this Easement).

Failure of Grantor to comply with these requirements shall not impair the validity of the Easement or limit its enforceability in any way.

To the extent any activity requires consent in advance by Grantee unless otherwise provided herein, the Grantor shall provide ninety (90) days' advance written notice to

Grantee. If the Grantee does not respond within ninety (90) days of such notice, Grantor may proceed with such requested activity without such activity giving rise to any claim for damages, costs or penalties.

8. NO MERGER. Grantor and Grantee agree that in the event that Grantee acquires a fee interest in the Property, this Easement shall not merge into the fee interest, but shall survive the deed and continue to encumber the Property.

9. ASSIGNMENT BY GRANTEE. Grantee may not transfer or convey this Easement unless the Grantee first receives approval of such transfer from the Director of the Virginia Department of Environmental Quality and the Regional Director of the U.S. Fish and Wildlife Service and conditions such transfer or conveyance on the requirement that all restrictions and conservation purposes set forth in this Easement are to be continued in perpetuity.

10. CONVERSION OR DIVERSION. Grantor and Grantee intend that this Easement be perpetual and acknowledge that no part of the Property may be converted or diverted from its natural area and open-space use except in compliance with the provisions of Section 10.1-1704 of the Open-Space Land Act, which does not permit loss of open space, and with the approval of the Director of the Virginia Department of Environmental Quality and the Regional Director of the U.S. Fish and Wildlife Service and the Executive Secretary of the Virginia Land Conservation Foundation in accordance with their respective requirements, including the provisions of the Notice of Grant Agreement recorded of even date herewith, in all respects.

11. EXTINGUISHMENT. Notwithstanding the provisions of Section 10.1-1704 of the Open-Space Land Act, should an attempt be made to extinguish this Easement in

whole or in part, such extinguishment can be carried out only by judicial proceedings. Should an attempt be made to extinguish this Easement in whole or in part, such extinguishment shall be in accordance with the Notice of Grant Agreement recorded of even date herewith.

12. AMENDMENT. Grantee and Grantor may amend this Easement to enhance the Property's conservation values or add to the restricted property by an amended deed of easement, provided that no amendment shall (i) affect this Easement's perpetual duration, (ii) conflict with, be contrary to or inconsistent with the conservation purpose of this Easement, or (iii) reduce the protection of the conservation values. No amendment shall be effective unless documented in a notarized writing executed by Grantee and Grantor and recorded in the Clerk's Office of the Circuit Court of the City of Virginia Beach, Virginia.

13. SEVERABILITY. If any provision of this Easement or its application to any person or circumstance is determined by a court of competent jurisdiction to be invalid, the remaining provisions of this Easement shall not be affected thereby.

14. ENTIRE AGREEMENT. This instrument sets forth the entire agreement of the parties with respect to this Easement and supersedes all prior discussions, negotiations, understandings, or agreements relating to the easement.

15. CONTROLLING LAW. The interpretation and performance of this Easement shall be governed by the laws of the Commonwealth of Virginia.

16. RECORDING. This Easement shall be recorded in the land records in the Clerk's Office of the Circuit Court of the City of Virginia Beach, Virginia, and Grantee may re-record it any time as may be required to preserve its rights under this Easement.

17. COUNTERPARTS. This Easement may be executed in one or more counterpart copies, each of which, when executed and delivered shall be an original, but all of which shall constitute one and the same Easement. Execution of this Easement at different times and in different places by the parties hereto shall not affect the validity of the Easement.

WITNESS the following signatures and seals: [Counterpart signature pages follow.]

[Counterpart signature page 1 of 2]

THE TRUST FOR PUBLIC LAND

By _____
Name Michael C. Zender
Title Senior Counsel

COMMONWEALTH OF VIRGINIA,
CITY/COUNTY OF Virginia Beach, TO WIT:

The foregoing instrument was acknowledged before me this 26th day of June, 2012 by Michael C. Zender (name), Senior Counsel (title) of The Trust for Public Land.

_____
Notary Public
Laurie J.-O Johnson

My commission expires: 1/31/2017
Registration No. _____

(SEAL)

Laurie JoAnne-Orner Johnson
NOTARY PUBLIC
State of Minnesota
My Commission Expires 1-31-2017

[Counterpart signature page 2 of 2]

Accepted:
COMMONWEALTH OF VIRGINIA BOARD OF GAME AND INLAND FISHERIES

By: Matthew H. Koch
MATTHEW H. KOCH, COO

COMMONWEALTH OF VIRGINIA,
CITY/~~COUNTY~~ OF Richmond, TO WIT:

The foregoing instrument was acknowledged before me this 29th day of June, 2012 by Matthew H. Koch, a Deputy Director/Staff Attorney of the Commonwealth of Virginia Board of Game and Inland Fisheries.

ANGELE M. GOFF COMMONWEALTH OF VIRGINIA ID# 298739 NOTARY PUBLIC

Angele M. Goff
Notary Public

My commission expires: August 31, 2013
Registration No. 298739

(SEAL)

EXHIBIT A

PRELIMINARY MANAGEMENT PLAN for
LYNNHAVEN ESTUARY PROTECTION PROJECT
3957 Marlin Bay Drive, Virginia Beach, Virginia (aka Pleasure House Point)
GPIN: 14892797360000 (Parcel 1), SITE SIZE: 84 Acres

PURPOSE:
This Preliminary Management Plan is being prepared by the City of Virginia Beach Parks and Recreation Department for the Virginia Department of Game and Inland Fisheries ("VDGIF") as required by the Deed of Easement for conservation and open space. This Preliminary Management Plan is necessary due to the anticipated high level of public use once the property is transferred to the City and opens to the public in July 2012. It outlines short-term strategies and improvements that will be employed by Parks and Recreation staff responsible for managing the site as a Public Natural Area.

TERM:
This Preliminary Management Plan is expected to cover operations for 1-3 years after acquisition of the property. During this 1-3 year period, the Virginia Beach Department of Parks and Recreation staff will develop a Final Management Plan with the help and guidance of the VDGIF to address long-term management of wildlife habitat, public access and natural resource preservation. The time frame and provisions of the Preliminary Management Plan may be amended upon mutual agreement of Virginia Beach Parks and Recreation Department and the Virginia Department of Game and Inland Fisheries.

MANAGEMENT PROVISIONS:

1. ***Storm water Management Easements –*** There are existing storm water management easements located over some of the ditches and pond area on the site. Although no maintenance work is scheduled to occur within the next three years, the city reserves the right to schedule and execute work that is necessary for proper drainage through the site. Except in the case of an emergency, the city will notify VDGIF of the nature and extent of the work prior to commencing the work.
2. ***Priority Maritime Forest Areas*** – The priority maritime forest areas have been identified on the site map. Disturbance in these areas will be minimal. No new trails will be created within these areas. No vegetation will be removed with the exception of removal of hazard trees. The public will not be encouraged to use the existing trails in this area to preserve the habitat value. The Final Management Plan may open up some trails through this area, but only after additional study of the area is completed.
3. ***Hours Open to Public***– The site will be open to the public from dawn to dusk.
4. ***Bicycles*** – Signage will be provided prohibiting bicycles on Parcel 1. Bike racks will be provided at trailheads. Parks and Recreation will monitor the site for bicycle use on a regular basis.
5. ***Litter Removal*** – Parks and Recreation employees will monitor the site to remove litter on a regular basis. There will be no trash cans located within Parcel 1. If litter becomes a problem, trash cans may be located at or near trailheads. Parks and Recreation will work with existing civic organizations to encourage "carry in-carry out" philosophy and to enlist volunteers to help with regular litter pick-ups. Parks and Recreation may also elect to erect "Scoop the Poop" boxes along the periphery of the site.

6. ***Habitat Restoration Projects*** – Virginia Beach Parks and Recreation does not contemplate any large scale habitat restoration projects on the site during the period that the Preliminary Management Plan is in effect. If there are proposals/projects generated by interested citizens or environmental groups, these will be reviewed jointly by VDGIF and Parks and Recreation to determine appropriateness of location and methods. The main reason for the joint review is to ensure that these projects will fit into the long-term management strategies for the site and are consistent with federal grant conditions. Virginia Beach Department of Parks and Recreation will ensure that all required permits for restoration projects (including erosion and sediment control) are granted prior to starting work. The Final Management Plan will include a comprehensive habitat restoration strategy.
7. ***Standard Public Usage Regulations***–Examples of the standard regulations are as follows: No trespassing after posted closing time; pets must always be on a leash; do not litter; no alcoholic beverages; no motorized vehicles; no fires; no feeding of the wildlife.
8. ***Maintenance Vehicle Access***–Parks and Recreation maintenance trucks will not be allowed on the site; however small motorized carts will be allowed for maintenance and patrol of the site. Pick-up trucks will be used only when necessary for maintenance and be limited to the main trail north of the ponds.
9. ***Parking and Access***–Parking and access will be allowed in designated areas along Marlin Bay Drive. To eliminate issues related to unauthorized access, Parks and Recreation will be installing a wood guardrail that eliminates the ability to access the site with an ATV or truck. Parallel parking is allowed along Marlin Bay Drive. There will be a new concrete sidewalk constructed in the right-of-way along Marlin Bay Drive to allow for users to safely travel along Marlin Bay Drive and go into the property at designated entrances
10. ***Trails***–There is an existing trail network that is heavily used. A network of trails east of the main entrance will be signed and maintained for public use. These trails have been identified on the site map. We will be required to remove some concrete and other debris to ensure there are no tripping hazards along these trails. Also, some mowing, trimming and limbing of low-hanging branches will be required. For now, no surfaces will be applied for trail usage.

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