

**Fort Monroe Natural Resources Working Group (NRWG) Report**

**Presented to the Fort Monroe Federal Area Development Authority (FMFADA)**

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## **EXECUTIVE SUMMARY:**

This report presents several recommendations for the preservation, reclamation, interpretation, and recreational use of natural, cultural and historic resources at Fort Monroe. It recommends graded recreational use in the Parks and Recreation areas (PR areas, as defined by the Fort Monroe Reuse Plan), with minimal disturbance and maintenance of a natural setting at the northern end of the property, moderate impact recreation (e.g. picnicking, camping, beach use) in the area north of the old officers club, and more intensive recreation (organized sports, heavy use beaches, festivals) in the area south from the club to the north boundary of the Wherry District. In addition, the report recommends upgrading many of the existing recreational facilities on the Fort. These recommendations include expanding the campground, increasing capacity for launching of powered and unpowered watercraft, and increasing marina capacity. The report recommends construction and signage of a Fort-wide hike and bike trail system that will explore and connect, both physically and experientially, the cultural and natural assets of the Fort property. Ecotourism will be an important part of the Fort Monroe recreation palette. These activities should be considered as part of the overall interpretative plan. The construction of the northern connector road which would lead to the existence of a through road bisecting the property would seem incompatible with the anticipated recreational use as a whole and particularly for the planned restoration, education, and conservation activities at the north end of the property. It is recommended that access to the northern end of the property from Buckroe Beach be provided by foot/bicycle path.

Major natural resources on the Fort property include the marshes in Mill Creek and the relatively undeveloped dune, foredune and marsh fringe areas at the northern end of the property. Important natural resources (e.g. ancient live oaks) also exist elsewhere on the property. Because of the highly impacted nature of the Fort property in general, it is important that the remaining natural features be protected and conserved. Renovation and new construction on the Fort should be undertaken with the idea of minimizing impact on these natural features. This report suggests several green alternatives for construction, landscaping and control of runoff from the Fort property. Significant environmental restoration is also possible. Restoration projects recommended by this report include removal of invasive plant species, restoration of areas of maritime forest and/or meadow in parts of the PR area, development of a vegetated buffer and removal of the hardened shoreline along Mill Creek. Restoration projects are especially important for the northern, naturalistic end of the property and all restoration projects should be designed with a strong educational component in mind.

The historic, cultural and natural resources at Fort Monroe provide a wealth of opportunities for formal and informal education. The report identifies several broad interpretive themes for public programming, ranging from habitat restoration to climate change. It provides examples of the archaeological, natural history, and wildlife qualities of Old Point Comfort and shows how they relate to visitor experiences. The report makes recommendations for several potential activities and programs, including summer camps, teacher development institutes, and family festivals. Infrastructure, possibly including an environmental education center in a new or existing building, will be needed to support these programs.

Highlighted action items for FMFADA:

- 1.) Development of north end of property (options given).
- 2.) Access to north end of property from Buckroe Beach (preferred option is bicycle and foot access only)
- 3.) Beach and other access along promenade from the Wherry District south (options given)
- 4.) Feasibility/appropriateness of a powered small craft launch into Mill Creek at the south end of Stillwell Blvd near the entrance to the property (study needed).
- 5.) An education/nature center (options given)
- 6.) Duck Hunting
- 7.) Boating in Mill Creek

## **Introduction**

This document presents several recommendations for the preservation, reclamation, interpretation, and recreational use of natural, cultural and historic resources at Fort Monroe. In describing the various tracts of land at Fort Monroe and Old Point Comfort, this document follows the zone and land use plans as laid out in the Fort Monroe Reuse Plan (FMRP) of August 2008. In the FMRP, two similar, but not identical, land use plan maps are presented: one that is designated the Land Use Plan and one that divides the property into Management Zones (Zones A-E). For purposes of this report, the main distinction between these maps is the that the area designated for recreation in the Land Use Plan (Parks and Recreation (PR) areas 1 and 2) consists of Management Zone A in its entirety (PR area 1) and the northern “panhandle” of Management Zone B (PR area 2). To simplify nomenclature, this report will refer to areas of the fort by the names designated in the Land Use Plan.

The recommendations of the group are divided into four areas: 1.) Land Use, Construction, Recreation, and Access; 2.) Environmental Issues; 3.) Archaeological Issues; and, 4.) Educational and Interpretation.

## **Description of Natural Areas, Resources, and Prehistoric Archaeological Features**

**General.** In geologic/geographic terms, ~~the~~ Old Point Comfort is a peninsula formed from a modified barrier island. To the north, the property is connected to Buckroe Beach by a narrow sand spit. To the east and south, the property fronts on the Chesapeake Bay and Hampton Roads. To the west, the property is bordered by a tidal lagoon, Mill Creek. Two bridges across the south end of Mill Creek connect the property to the town of Phoebus.

The south end of the property is extensively developed and includes the fort itself and numerous building inside and outside the walls of the Fort. Major landform modifications include the moat around the fort and the land created by artificial fill, especially in the North Gate area. In addition, a seawall, known as the promenade, separates most of the fort property from the Chesapeake Bay beaches. The property north of the Wherry District is less modified by construction (a few buildings, softball fields, an airstrip, and several concrete gun emplacements), however, much of the land, particularly the airstrip, is underlain by artificial fill. The northernmost part of the property, beyond the north end of the promenade, is the least modified, but it is transected by a road, includes a number or recently added streetlights, and was used as a site for dumping of debris at various times in the past.

In addition to the seawall, which runs along approximately 75% of the bayfront, the Chesapeake Bay beachfront has been modified by the construction of several breakwaters and piers and by beach augmentation with dredged sand. The Mill Creek waterfront, especially towards the south, is largely hardened with concrete caps and/or fronted with concrete or other hard debris. At the northernmost end of the property, the Mill Creek shoreline has a largely unmodified, natural configuration.

**Open Space.** Approximately 50% of the Fort Monroe property consists of open space. Most of this is at the north end of the property (PR areas 1 and 2), but the parade ground (inner fort), Continental Park (historic village), and beaches along the Chesapeake Bay frontage are also significant contributors. Planning for recreation and land use outside of the PR areas will be dictated largely by economic development and historic preservation concerns and will be mentioned here only with regard to specific issues.

The area north of the Wherry District, designated Parks and Recreation (PR) Areas 1 and 2 comprise the largest tracts of open space on the property. Some of this space, particularly at the northernmost end of the property (commonly referred as Dog Beach) is in a relatively undisturbed natural state. The areas immediately adjacent to the Wherry district include many established recreational facilities (e.g. softball fields) and includes the base airstrip. The area between the developed south end and the more natural north end consists of some low-impact facilities such as the picnic areas, mowed fields, and a full service campground.

The geographic progression from higher use/impact areas near the Wherry district to lower use/impact areas at the north end of the fort has guided our thinking regarding the future use of the open space. In short, it is felt that the current use patterns be carried forward after base closure. Recommendations as to how this could be accomplished are detailed in this report.

**Beaches and Dunes.** Nearly two miles of beach bordering the Chesapeake Bay are the jewel of Fort Monroe and probably represent its greatest potential for outdoor recreation. In the Dog Beach area, the beaches grade landward into active and vegetated dunes. At present, these are the only active dunes on the property. South of Dog Beach, and extending past the Wherry Quarter into the Historic Village area, the beaches are separated from the rest of the property by a concrete promenade that also serves as a seawall. The length and width of the beaches at Fort Monroe has increased subsequent to recent construction of breakwaters and augmentation with dredged sand.

**Open Water.** The Fort Monroe property is a peninsula approximately two miles in length connected by a sand spit to the Buckroe Beach area to the north. To the east, the property fronts on the Chesapeake Bay. To the west, the property is bounded by Mill Creek, a large but generally shallow tidal creek with some significant areas of emergent (marsh) vegetation.

**Marsh.** There are several large areas of emergent marsh vegetation in Mill Creek, especially in its northern and western reaches. In addition, there are areas of the creek bordering the northern portion of Old Point Comfort that contain some marsh with areas of tidal flats that appear to be excellent candidates for marsh restoration.



*Beach plum*

**Flora and Fauna.** The Army conducted an inventory of flora and fauna in 1998, and this report is included as appendix A. No endangered species occur as residents on the fort, although endangered bird species visit the property from time to time, particularly during migration. One outstanding floral feature is the presence of the northernmost stands of Live Oak in the state. These include at least one tree that was present prior to the founding of the Jamestown Colony.

**Prehistoric Archaeology.** The Army conducted an extensive archaeological survey of the fort proper and the surrounding residential areas in 1999 (appendix B). This survey uncovered several prehistoric sites, but no evidence of permanent habitation. There has been essentially no archaeological study of the property north of the Wherry District.

## Recommendations

### Part One: Land Use, Construction, Recreation, and Access

#### **Introduction**

Once it reverts to the Commonwealth in 2011, Old Point Comfort and Fort Monroe will become a major recreational asset for the Hampton Roads area, for Virginia, and for the entire nation. This land use and recreation proposal is designed to ensure access to and facilities for a wide range of outdoor recreation activities including fishing, boating, sunbathing, swimming, camping, birding, hiking, biking, organized sports or simply sitting back and enjoying a quiet beach or marsh. Old Point Comfort is almost uniquely suited to provide this range of outdoor experiences in a conveniently located, accessible, and compact setting.

#### **Recreational use and associated infrastructure and modifications of Parks and Recreation (PR) areas 1 and 2**

At present, development and recreational use of the PR areas ranges from minimal impact in the north to heavy impact in the south. The recommendations for the recreational use of the PR areas follow the current use patterns. For purposes of the discussion below, the north end of the property is defined as the area north of the end of the promenade. The central area is defined as the area south from the end of the promenade to the old officers club. The southern area extends south from the old officers club to the border of the Wherry District (Fig. 1, area map).

**North End.** The north end of the PR area is the most natural and least developed portion of the property. While not a pristine natural site, it does offer the opportunity to provide a lower impact “natural area” and associated activities, including examples of resource reclamation. It is also the area within Fort Monroe that most lends itself to environmental education. While there is road access to this portion of the property, parking and other support facilities are limited. The development of additional parking would be difficult and disruptive to the remaining natural dune features. With this in mind, it is felt that there are three potential alternatives for this area ranging from a more intensive use to one slanted towards a more natural and educational experience. These alternatives are outlined as follows:

1. Expanded day use for beach areas. Under this option the existing parking areas would be redefined to allow for maximum parking. Several dune crosswalks would be developed to connect the lots with the beach area on the Bay. Several nature trails would be developed into appropriate areas of the shoreline on Mill Creek for wildlife viewing. It is also anticipated that a small restroom facility and/or several SST’s would need to be developed to support the use. While this approach would allow for enhanced and heavier beach use, it also expands vehicle traffic into this part of the property and removes

the opportunity of creating a more passive natural area experience with the associated educational and restoration opportunities. It also, in many respects, just reproduces the heavier beach and recreational use proposed for the southern end of the PR area.

2. Controlled Access with Natural Area development, passive beach use and surf casting. Under this option the natural features of this part of the property would be emphasized with a more passive range of uses. Parking would be allowed only in the existing areas by permit with sites more clearly defined. Again cross walks would be developed for access to beach areas. Under this proposal, one portion of the northern beach would be designated for surf fishing. The remaining beach areas would provide for a lower impact use and a less crowded more natural beach experience. They could also be used for a variety of educational activities. The Mill Creek side of the property would contain trails and a viewing platform for wildlife. This option would allow for a nice blend of uses and enhance the educational and restoration options while still allowing for some enhanced beach accessibility through the permitted use of the designated parking areas. In addition to the trails and dune cross walks, this option would also require the development of a few SST's at appropriate locations.
3. Eliminate vehicle access and enhance natural area – under this option the road would be closed to the northern end of the beach to vehicular traffic. Access would be limited to walking or biking and the existing parking areas would be reclaimed. This would allow for the maximum in restoration of the dunes and marsh areas and potentially offer the most in terms of show and tell for environmental and restoration activities. Appropriate trails as well as a viewing platform would be developed on the Mill Creek side for marsh and wildlife observation. Adequate dune crosswalks would be constructed on the Bay side and an SST would be centrally located. This option would be the most restrictive with respect to beach access and reduce significantly the ease of reaching the beaches on the northern end of the property. These would only be accessible by foot or bike which while providing a more natural, less crowded experience, would greatly limit beach accessibility to families carrying their normal beach “stuff”. It would also limit surf fishing use due to the distance one would need to carry their gear.

It should be noted that under any of the above options, an educational/interpretive site on the Mill Creek side at the beginning of the northern PR areas should be developed. This should include a hand launch site for paddle craft to access trails through the marsh area and for interpretive water trips. It should contain a structure for providing environmental/cultural educational information and be able to handle school or other groups. The nature and design of this facility will be dependent on the management and types of programs to be offered. It is also recommended that the marsh shoreline be restored by removing extraneous rock and concrete.



*Dog Beach*

**Central Area.** An expansion of existing recreational uses (camping, picnicking, informal sports) is proposed for the central PR area. The campground should be expanded to 48 units, as provided for in the long-range Army plan. Restroom and shower facilities should be built to service the campground. Another set of restrooms should service the group picnic areas and the large open festival/group camping/informal recreation field north of the group picnic area. Thought should also be given to the development of Yurts with views of the Bay on the eastern side of the property. The northern part of the large mowed area on the Chesapeake Bay side of the central area should be managed as an unmowed/seasonally mowed tall grass field or be allowed to revert to maritime forest habitat. There is a small boat storage facility in this area which could be converted into an accommodation for racing sculls to support high school programs and also serve as a possible rental space for private rowers. It may be that one of the existing buildings could be converted into a shell storage facility. In addition, a small launch facility with piers will need to be provided to support the shells. This area of Mill Creek would seem to lend itself to the development of a rowing course for possible competitive events. It is expected that some additional, but carefully designed, parking will be needed in this area for beach access and picnic opportunities. Wheelchair ramps traversing the promenade will be needed to provide access to beaches and handicapped parking places

will be needed at the base of the ramps. The central PR area, specifically the area of Mill Creek shoreline just north of the campground, is one preferred site for an enclosed marsh overlook platform/blind. This overlook will be designed to accommodate relatively large groups (e.g. school or scout groups).



*Mill Creek, fringing marsh*

**South End.** The south end of the PR area will continue to be the high use area for day use recreational activities, including organized sports and festivals. If any additional sports fields are needed they should be located in this area. This is also the best location for the addition of any major parking areas. New sports fields should be built as close as possible to the Wherry Quarter and none planned beyond the north end of the airstrip. The area just north of the airstrip and just south of the campground would be an ideal location for a playground, although expansion of the small playground near the picnicking and camping areas may suffice.

At present, there is limited beachfront in the Southern PR area. Plans exist for breakwaters designed to trap sand and create beaches in this area, and this group supports these plans. The extant beaches at and just south of the old officers club will likely experience heavy use in summer months and will be candidates for lifeguard staffing, at least during times of peak usage. Shuttles from the more distant parking areas (including parking areas outside the PR areas) to all beaches should be considered during peak season.

Once the beaches in the southern PR are replenished, several beach access ramps that cross the promenade will be necessary. Handicapped parking spaces should be available

at the base of these ramps. In addition to parking areas, construction in the southern area could include restroom, changing, and shower facilities, seasonal food stands and other standard park amenities. The south end will be the preferred location for a fishing pier. Several structures that remain seaward of Battery DeRussy are potential vacation rental units. Management /renovation issues related to these structures is beyond our scope, however, ramp/stair access to the beach from these buildings is desirable.

The major structures in the PR are several Endicott batteries, the old officer's club, and the base airstrip. The Endicott batteries, with one exception, are no longer in use and are currently reverting to their natural state in that they are largely overgrown by herbaceous and woody plants. The future of these batteries must be considered by the HPAG.

The old officers club should be made available to patrons of the PR area for dining. Use of the pool use and other facilities should be restricted to campers and other overnight residents of the area. This facility is also suitable for rental for special occasions, catering etc.

The airstrip is a potential multi-use feature. During peak season, it could be considered as an additional parking area. However, it can also be cordoned off for a variety of events and festivals that require a hard surface. Once parking and other use needs are determined, it may be that some of the northern end of the air strip could be removed and the area vegetated to provide a buffer for the expanded campground.

### **Nature center**

FMFADA should consider the renovation of an extant building or the construction of a new building to serve as a nature/education center. This center would support public and educational programming tied to the natural areas of the fort. The center could host exhibits, classrooms, and education staff offices. It might also serve as a contact station, natural area HQ, and other administrative functions. Details of the potential educational uses of such a facility are outlined in Part Three of the recommendations below.



*Beach along Promenade*

### **Beaches south of the PR areas**

At present, much of the most desirable beach area, especially beaches that can be easily accessed by large numbers of visitors, lie outside the PR area. These beaches, recently augmented by dredging and breakwater construction, extend from the Wherry district south to the southern end of the promenade. These beaches will be the most attractive heavy-use recreational beaches on the Fort Property for the next ten or more years until the southern PR breakwaters are built.

A significant issue for FMFADA will be the management of public access to these beaches. Issues of particular concern include parking and infrastructure. One option is to host the beach amenities (restrooms, changing rooms, parking areas, food stands etc.) in the southern PR as outlined above and provide shuttle service to the beach. A second option would be to relocate some of these facilities in the Wherry District. In any event, it will be necessary to provide access ramps crossing the promenade at several locations and handicapped parking at the base of these ramps. At least some restroom facilities will almost certainly be required.

## **Outdoor (non–historic) recreational use and associated infrastructure and modifications, other areas**

Although much of the outdoor activity at Fort Monroe will be in the PR areas, facilities and opportunities for outdoor recreation exist elsewhere on the Fort. In particular the major existing and proposed boating support facilities are in the North Gate and Historic village areas.



*Beach and Navy dock at marina*

**Marina.** The marina along McNair Road in the historic area will be a profit center for FADA. We recommend that several improvements and additions be made to the marina.

1. Day-use and transient slips should be made available for Fort visitors. Bicycle rentals should be available nearby.
2. If not available, a public pump-out station should be provided in order to support the possible designation of Hampton roads as a no-discharge zone. Funding for both the pump-out station and the day-use berths may be available from the U.S. Fish and Wildlife Service’s Boating Infrastructure Grant (BIG) program.
3. The number of permanent berths should be expanded as feasible.
4. The use of nearby non-contributing buildings for marina support facilities (e.g. dry stack boat storage) should be considered.
5. Marina parking is a likely problem. FADA will need to consider this in any marina plan.

**Stillwell Road Small Craft Launch.** The Virginia Outdoors Plan indicates a high demand for trailer-launch facilities in Hampton Roads. At present, access to the Bay from the Hampton side is limited and many Hampton boaters must travel through the tunnel to Virginia Beach to launch a boat into Bay waters, a trip that takes 1-3 hours, depending on traffic. A prime site for a trailer-launch boat ramp and boat trailer parking is in the North Gate area near the junction of Stillwell Road and East Mercury Blvd. The area proposed for the launch is already highly impacted and is used, in part, for boat trailer parking at present. The Stillwell Road location will allow for easy access to preferred fishing grounds with minimal disturbance of Mill Creek or the more sensitive parts of the property. This boat launch will be a profit center. It is likely that parking for up to 80 trailers could be accommodated and appropriate launch fees charged. As a green consideration, a combination fish cleaning/recycling station should be provided at this site. Saltwater Fishing funds may be available to help develop this boat launch.

There are, however, a couple of issues with the proposed boat ramp. First, the ramp is located near a proposed gateway area to the fort property. There are plans for extensive landscaping and other “welcoming” amenities in this area. With careful site planning it seems these two uses could be reconciled. Placement of the ramp further up Stillwell Road is a possibility, but would require much more extensive construction, including the relocation of the road itself.

The second concern is the clearance for boats underneath the two bridges that span Mill Creek. A study of how this would impact/restrict use of a Mill Creek launch needs to be undertaken.

**Stillwell Road Hand Launch.** The hand launch ramp for kayaks, personal sailcraft, etc. on Stillwell Road (at the boundary between the North Gate and Wherry areas) needs to be upgraded and parking needs assessed. This would be the primary location for folks wishing to come in and paddle the marsh and creek area on their own. It would also serve to separate those visitors from people coming in to use the beaches or for educational tours and programs farther to the north in the PR areas. This should reduce use conflicts and the amount of traffic moving further into the PR area. Adequate parking needs to be designated in this location along with a small restroom facility.

**Other.** Chesapeake Bay beaches and fishing piers are a major recreational resource in the Wherry and Historic Village areas. A policy for access to beaches and piers located from the Wherry district south to Continental Park must be formulated. If these are to be public access areas, public restrooms, access ramps, parking facilities etc. will be all needed.

The extant recreational facilities (e.g. the bowling alley) at the north end of the Wherry District just south of the airfield constitute a major “non-historic” recreation opportunity. Although these facilities lie outside the scope of this report, we recommend that they be considered together with outdoor recreation in any overall recreation plan.

**Recreational use of adjacent waterways and emergent marshes: Mill Creek and Chesapeake Bay.** The Fort is bounded by Mill Creek, a large, but relatively shallow tidal creek, to the west and by Chesapeake Bay to the east. The fort property extends to the low tide mark in the Bay and about halfway across Mill Creek. The western side of Mill Creek is a residential area with numerous boat docks.

Current recreational use of Mill Creek outside the boundaries of the Fort includes boating, fishing and duck hunting. For a number of years an annual power boat race has been held on Mill Creek. The low overhead clearance of the Mercury Boulevard and Rte.143 bridges limits sailboat access.

Emergent marsh islands and peninsulas are one of the outstanding natural features of the portion of Mill creek within the northern part of Fort boundaries. These are valuable as viewsapes, ecotourist attractions, and educational opportunities. Access to the marshes may include signed aquatic “trails” for kayaks. Viewing platforms/blinds constructed at water’s edge will allow visitors a close up view of the marsh and its wildlife without impinging on the marsh proper.

Mill Creek includes long stretches of open and relatively calm water and would be an ideal site for a rowing/sculling course. Scull racing is under consideration as a sports program in several area schools.

Boating usage on Mill Creek must respect the needs of local residents and the traditional uses of the Creek waterways but also address marsh and wildlife conservation and the concerns of ecotourists and users of small unpowered craft. Possible management options for the portion of the Creek adjacent to Fort Monroe include no wake zones and buoying off portions of the creek at its northern end for non-powered use only. These management techniques will require the discussion and concurrence of the various stakeholders.

Chesapeake Bay waters in the vicinity of the Fort are used for pleasure boating and fishing. Access to the Bay for these purposes is discussed above and includes marina and boat launch facilities, designated surf casting beaches, and construction of a fishing/viewing pier.

### **Ecotourism and wildlife-based recreation**

Ecotourism (examples include birdwatching, wildlife watching, geo-caching, and nature photography) is a low impact, low capital cost, high economic return activity. Furthermore, many ecotourism activities are year-round. Birdwatching activity, for example, peaks in the spring and fall and remains strong throughout the winter. We recommend that ecotourism be strongly encouraged at Fort Monroe. Ecotourism will be a major activity at the north end of the recreation area, but ecotourists will utilize the entire property.



*Gulls on sand bar*

Bird watching is a popular activity and the varied habitats (marsh, beach, lagoon, Live Oak stands, grassy areas, brushy areas) at Fort Monroe suggest that it will be an excellent and popular birdwatching site, similar to places like Chincoteague NWR, but far more accessible. The Delmarva Peninsula is one of the most significant migratory flyways on the Atlantic coast. Large numbers of neo-tropical migrant and raptors are funneled along this peninsula every autumn eventually crossing over the Chesapeake Bay at the Southern Tip. At less than 20 miles from the southern tip of the Delmarva Peninsula Fort Monroe is a potentially important landfall for these migrating birds. The protected waters and marshes of Mill Creek are attractive to a variety of winter waterfowl. The Army biological survey does not include a seasonal assessment of bird species and numbers on the Fort. We recommend that a seasonal bird checklist, similar to that developed for many national wildlife refuges, be developed for Fort Monroe. This list will serve to advertise the birdwatching opportunities at the Fort to the birdwatching public.

Habitat restoration throughout the property, but especially in the dunes and in reforested or tall grass tracts will allow native wildflowers to become established. In addition to their intrinsic beauty, native wildflowers found along shorelines are a key habitat resource for migrating monarch butterflies, a beautiful, well known and charismatic species. The story of the monarch's migration is compelling and is often

utilized in science education. Enhancing habitat for this species would provide an important educational resource.

The trail system (including aquatic trails) needs adequate and accurate signage regarding natural features. Pull-outs at strategic places along roadways (e.g. along Mill Creek on Stillwell Rd.) will provide opportunities for wildlife observation and educational signage.

Marsh access will be an important part of the ecotourism experience, providing the opportunity for visitors to view charismatic and obvious species such as turtles, herons, ducks and egrets. Wildlife photographers are particularly drawn to marsh habitats. A kayak/canoe marsh trail will provide visitors an opportunity for a quiet and solitary wildlife experience in the marsh.

Currently, a limited amount of infrastructure exists at Fort Monroe to support wildlife viewing. Utilizing the limited pathways and the viewing platform already located on the property, the creation of new trails could improve wildlife viewing opportunities, as well as provide additional hiking and walking trails. Covered observation platforms will facilitate wildlife observation in Mill Creek.

As ecotourism and related programming evolve and grow, support facilities will be required. At the outset, these may be as simple as information kiosks. However, FMFADA should consider construction of a nature center, probably in the area north of the campground and close to or connected with the observation platform. This will serve as an informational facility for casual visitors; a gathering and orientation place for groups, an educational programming center, and launch area for eco kayak tours.

## **Trails**

It will be possible to visit nearly every corner of the Fort Monroe property along a series of biking and hiking trails. The trail system will extend from a foot/bicycle portal connecting the Buckroe Beach area with the natural area at the north end of the property all the way to a series of historical and architectural trails traversing the Fort proper and the Historic Village at the south end.

A signed trail system should be built behind the dunes at the north end of the PR area. This system should include both bicycle and handicapped accessible sections. These trails will be tied into foot/bicycle/wheelchair accessible portals to the Buckroe Beach area to the north and the promenade and campground to the south. Trails in the central PR area may include explorations of the vegetated Endicott batteries, a trail through maritime forest/ grassland areas and a trail paralleling the Mill Creek shoreline.

The promenade will be a major walking/biking attraction at Fort Monroe, providing continuous views of the Bay, opportunities to view the Endicott Batteries, and a direct route between the northern natural area and the more developed areas to the south, all the way to Continental Park. The promenade is wide enough to have a designated bicycle lane and should be opened to bicycle traffic, with the understanding that pedestrians have the right of way. The promenade bicycle route may be incorporated into a property-wide bike trail system serving both recreational and transportation functions.

It is important that the trail system be relatively seamless. Signage style, for example, should be the same in the historic and natural areas. The recreational area trail

system should be integrated into and signed consistently with any historic or other trails developed on the Fort Monroe property. Trails in the historic areas are likely to bring visitors into contact with interesting natural and/or archeological features. As these trails are being developed, a naturalist should be consulted. In the same way, historic features in the natural areas should also be highlighted. Fort Monroe lies at a crossroads of history and nature and the trail system here may link into regional trail systems, such as the Virginia Birding Trail, and the John Smith Trail.

## **Roads**

We recommend a connection to the Buckroe Beach area by a foot/bicycle trail that will tie into the property-wide trail system. We recommend against the construction of a new roadway connecting the north end of the property with the Buckroe Beach area (FMRP, page 7.4). (Note: because of regulatory considerations, the Marine Resources Commission is specifically excluded from endorsement of this recommendation.).

The proposed use of the north end of the property as a natural area and a site for marsh and other restoration is incompatible with the presence of a through road. There are safety issues with a through highway traversing heavily used parking, campground and picnic areas, especially since that highway would lie between these areas and the beaches. It is also noted that for traffic control and management of a site, that a single vehicular access point allows for the best management and control. This is the preferred option when planning and developing Virginia's state parks. This site is already set up in this manner and creating a through road has a strong potential for creating user conflicts and resource management issues that do not now exist. There will be adverse environmental impacts, especially to the marsh and dunes, from the construction and presence of the northern connector road. The north end of the property will be, de facto and by design, the most attractive area to wildlife on the property.

Options for access to the north end of the property via the existing road were outlined above.

Traffic to the beach and outdoor recreation areas should be routed onto Stillwell Road. This will serve to separate beach and ecotourism traffic from residential and historic tourism traffic.

Pedestrians and traffic will, of necessity, be in close proximity, especially in the picnic, campground, and beach access areas. Safety issues must take priority when deciding traffic rules. Low speed limits and enforced pedestrian crossing zones are a must. Traffic control devices may be needed/desirable, especially from the old officers club north.

## **Part Two: Environmental and Archaeological Issues**

### **Environmental resources**

In addition to well the documented historical and cultural value of Fort Monroe, the site also represents a potentially significant natural resource. With a variety of habitat types, Fort Monroe offers excellent opportunities for wildlife based recreation and conservation.

Mill Creek and its associated wetlands and mudflats represent a significant habitat feature. The creek acts habitat and a nursery for a number of fish and invertebrate species – these in turn support birds such as Osprey, herons and egrets. A fringe marsh exists along much of the shoreline (especially along the Northern end) and a number of marshy islands provide breeding habitat for birds such as clapper rail. Mill Creek is relatively shallow with extensive exposed mudflats at low tide. This provides excellent foraging habitat for a variety of marsh and shorebirds.

In areas the shoreline of the creek is marked by buffers of shrubby early successional habitat with some larger trees. While relatively small, these areas provide potential breeding habitat for early successional species such as eastern towhee and brown thrasher. These areas also provide stopover and foraging areas for migratory songbirds. The largest of these buffer areas may represent the early successional stages of a Coastal Maritime Forest ecosystem, an increasingly threatened habitat type.

The beaches at the northern end of Fort Monroe are marked by fairly well developed set of dunes. The waters offshore of the beaches are utilized as foraging areas by a variety of seabirds including brown pelicans, terns, gulls and black skimmers. The beaches themselves provide foraging habitat for shorebirds. The dunes themselves offer habitat for songbirds and butterflies.

The foredunes are generally well vegetated with native beach grasses, providing good stabilization. The dune crowns and back dune area are characterized by a variety of herbaceous plants, vines shrubs and stunted trees. In places the back dunes are dominated by invasive vegetation such as turf grass and fennel *Foeniculum vulgare*.

The open space in the central and southern parts of the PR area is mostly open field maintained by regular mowing. A significant resource in these areas is the Loblolly Pine and, especially, Live Oak groves in and around the camping areas, picnic areas, and old officers club. They provide welcome shade to visitors and are important foraging habitat for a variety of birds. The central and southern PR areas also host the Endicott batteries, which are locally overgrown with brushy successional vegetation. This provides shelter and food for a variety of wildlife.

From the Wherry District south, little in the way of natural environments remains. However, there are several important resources in this highly impacted area. First, the ancient Live Oak groves inside the Fort proper are a natural resource nearly unique to the region. In addition, many of the trees within the Fort and Historic Village, although planted, are nevertheless native species. All of these trees, but especially the Live Oaks, will be a magnet for migratory birds, not to mention an integral part of the local viewscape.

## **Environmental preservation and impact minimization.**

Fort Monroe is, from an environmental perspective, a heavily impacted site. Given this, it is important that the surviving environmental resources be carefully managed and protected.

First and foremost among environmental priorities is the preservation (and restoration, see below) of the northern part of the PR area and its adjacent marshes as a natural area. This area contains much of the marsh, all of the dunes, and the only surviving fragment of maritime forest on the property. It is the only large tract on the property that remains in anything approaching a natural state. Preservation of this area will preclude any significant new construction aside from carefully planned trails (possibly including a small marsh viewing platform), necessary public use support facilities and any work necessary for restoration and/or preservation of key environmental features. This work may include, for example, removal of a recently installed series of streetlights.

Another environmental priority is the protection of marshes in other parts of Mill Creek. Any educational or recreational resources that use the marshes must, first and foremost, not harm the marshes. For this reason, we recommend that the marsh kayak trail not impinge on areas of extant marsh vegetation and, if necessary be moved as marsh vegetation occupies new areas. In addition, we recommend that the marsh be viewed from a shoreline platform or blind rather than from a boardwalk built into the marsh proper.

There are relatively few mature trees on the property and these should be protected during construction and renovation of buildings. Live Oaks represent a species of special interest to the Fort and should be considered untouchable during any renovation or new construction.

In the PR areas (and perhaps elsewhere) new construction should where possible occur on land built on artificial fill. Permitting for new construction should specifically consider impacts on local plants and wildlife.

There are several new innovations and techniques to help reduce the environmental impact of storm water runoff that we suggest should be considered in the overall plan. It is best to maximize the infiltration of storm water and capture any pollutants using control measures, often referred to as “environmental site design,” that promote the slowing down, spreading out, and soaking in of the runoff. A few practices to consider include, 1) preserving vegetation, buffers, and open space, 2) maintaining grass channels and swales, 3) constructing rain gardens, 4) creating bioretention areas, 5) using permeable pavement and pavers, 6) utilizing green roofs, and 7) disconnecting or redirecting downspouts that empty over pavement and instead direct the runoff to vegetative areas. The quality of the inevitable runoff can be improved by minimizing pesticide and fertilizer use and keeping use and parking of cars to a minimum. FMFADA should consider the construction of cisterns to hold runoff so that it can be recycled for irrigation of lawns and sports fields.

The U.S. Green Building Council is developing their criteria for rehabilitated buildings seeking Leadership in Energy and Environmental Design (LEED) certification. Given the amount of redevelopment anticipated at Fort Monroe, this presents an opportunity to establish the first LEED certified buildings through reuse. Including

LEED certified buildings in your plan would provide both economic and environmental benefits to Fort Monroe.

We suggest you consider building from the “Clean Marina” status already approved for the Old Point Comfort Marina and work with local partners to establish a “no discharge zone” for Mill Creek and the portion of the Chesapeake Bay located between the marina and the Hampton Roads Bridge Tunnel. “No discharge zones” offer an important educational tool and help to directly address the Bay’s most significant pollution problem – excess nutrients – by requiring boaters to dispose of their waste through pump-out facilities. In planning for expansion of the marina or the addition of a public boat ramp, planning also for additional pump-out facilities to be included would greatly help to support the establishment of a “no discharge zone” around Fort Monroe.

### **Environmental restoration and enhancement**

Fort Monroe represents a significant natural resource, with a variety of habitat types and an ideal location within many bird species migratory routes. In the coming months and years, Virginia has a tremendous opportunity to undertake significant natural resource restoration activities at Fort Monroe. We hope that the following suggestions can help provide useful information, analysis, and suggestions during the planning process.

Following a review of Fort Monroe, we offer the following general suggestions for restoration activities, which could benefit local water quality and restore native wildlife habitats, and thus providing increased opportunities for wildlife-based recreation. Although we have several suggestions, from smaller projects to much larger undertakings, we hope that you will carefully consider each restoration suggestion as they may work together to further enhance the local environment.

**North End Natural Area: General Restoration.** The proposed natural area at the north end of the property is an excellent site for a variety of environmental restoration projects, several of which are outlined below. The natural area would also benefit from the removal of several man-made features/structures. First, there are several debris piles located between the dunes and the marsh at the north end. Construction debris is visible in several of the piles. For safety, esthetic, and environmental reasons, we recommend that these piles be removed. Second, a series of streetlights was recently installed along the road in the proposed natural area. We recommend that these lights and their concrete bases be removed. If lighting is needed for the bike/hike trail through the area is should be directed low intensity light that is contained within the trail area.

**Living Shoreline Restoration.** The area located near the north end of the property lends itself well to constructing a living shoreline project along Mill Creek. Living shorelines not only protect the marsh shoreline from erosion but also provide a wealth of wildlife habitat. A great deal of shoreline hardening, or concrete “caps,” and various piles of concrete refuse are located along the Mill Creek shoreline. In many places, this concrete capped shoreline is showing signs of wear, undercutting, and erosion, which will eventually lead to its failure. Although this may be a more long-term project, we suggest that the concrete portions be removed and a natural or living shoreline be restored along

this stretch. A living shoreline offers a more sustainable approach to preventing erosion, and this stretch in particular may be ideally suited for a low-marsh-toe sill with a living shoreline constructed landward.



*Hardened shoreline, Mill Creek*

**Oyster Reef Restoration.** As part of a living shoreline, we also suggest building an intertidal, sanctuary, oyster reef just offshore in Mill Creek. An oyster reef project at this site could be highly visible to visitors from the nearby bird observation platform and a welcome opportunity for environmental education. An active oyster reef can also provide positive water quality benefits in Mill Creek, since adult oysters are known to filter up to 60 gallons of water per day.

**Riparian Buffer Restoration.** The existing riparian shoreline along Mill Creek is marked by buffers of shrubby, early successional habitat, including some larger trees. While these areas are relatively small, they provide potential breeding habitat for early successional species of birds, such as the eastern towhee and brown thrasher. These buffer areas also provide important stopover and foraging areas for migratory songbirds.

In an effort to protect local water quality and improve wildlife habitat, we suggest developing wide, native vegetation, riparian buffers, along the Mill Creek shoreline. Natural shoreline restoration and riparian buffers provide valuable wildlife habitat and can help to protect the shoreline and infrastructure from damage during major storm

surges. Riparian buffers can also filter runoff, reducing the flow of excess nutrients to our waters. Ideally, the entire shoreline should be buffered with native vegetation.

Given the unique location of the property, the current native plant community species mix, and the presence of the very old Live Oak trees throughout the property, it is likely that the historic ecosystem may have been a Maritime Forest. It would be ideal to confirm this information and then strive to fully restore a maritime forest habitat as part of the long-term plan for Fort Monroe. A restored forest would offer critical wildlife habitat and a buffer from nearby development. Also, the existing road could serve as a recreational foot or bike path through the natural area. Groves of live oak and loblolly pine trees exist on Fort Monroe, and all efforts should be taken to preserve these historic trees. In general, trees provide welcome shade to visitors and represent a foraging habitat for a variety of birds, but in addition, these live oak trees especially hold an important place in the historic theme of the property. Along the shoreline, in areas where viewsheds of Mill Creek are desirable and encouraging tree growth is not an option, low-growing herbaceous plants could be utilized to provide habitat and water quality benefits.

**Beach and Dune Protection & Restoration.** Beaches are one of the most attractive locations for outdoor recreation, including wildlife viewing, swimming, surf casting, and simple relaxation. Beaches and dunes are also utilized as breeding habitat for sensitive bird species, such as the piping plover. While the current habitat does not support breeding of this species, restoration effort may create suitable conditions. Removal of the dense and invasive vegetation and requiring leashes for all domesticated pets would create conditions more favorable to a variety of wildlife species. Additional dune crossings should also be considered to allow for visitors to conveniently access the beaches, without trampling and crushing sensitive dune vegetation. Wildlife viewing can be enhanced in the beach areas through careful placement of additional viewing platforms, perhaps in combination with the dune crossing structures.

**Native Plant Restoration.** An aggressive invasive species, *Phragmites australis* is located along the northern shoreline of the fringe marsh. Control of this problematic invasive will allow beneficial native marsh vegetation such as *Spartina alterniflora* and *Juncus roemerianus* to thrive, providing improved wildlife habitat.

Much of the upland riparian buffer area is significantly impacted with invasive species as well. Shrubby growth of Amur Honeysuckle, *Lonicera maackii*, dominates much of the upland buffer along the creek. A shorter-term, but more labor-intensive, project may be to physically remove the non-native vegetation (i.e. non-native Honeysuckle) located in the “Parks & Recreation” area of Fort Monroe and replace it with native plants appropriate to the habitat. Native plants such as American Beach Plum have already been established in the dune area and similar efforts should be expanded. This can be an excellent activity for volunteers to perform, while building partnerships and providing public education along the way. Additionally, volunteers could plant native beach grass plugs on the bayside of the “Parks & Recreation” area, which could help to reduce further dune erosion.

Current landscaping guidelines at Fort Monroe specify the use of native vegetation. This practice benefits a number of species and greatly enhances populations of native pollinators, like honey bees and butterflies. The continued use of native

vegetation should be specified in future landscaping standards for Fort Monroe. Gardens that illustrate good conservation landscaping practices can be established at the visitor center(s), as well as the grounds of other existing buildings throughout Fort Monroe. New gardens can be planned as habitat demonstration areas that illustrate how native plants can be used in more traditional landscape settings.

Demonstration gardens, interpretive signage, and appropriately spaced paths can enhance the opportunity for visitors to learn more about how Fort Monroe is working to support native habitat landscaping and protecting local water quality, while highlighting educational programs such as VDGIF's Habitat at Home© and the Alliance for the Chesapeake Bay's BayScapes project. Habitat demonstration gardens can provide a unique alternative to traditional landscape design at Fort Monroe, because they mimic on a small scale the natural vegetation that historically graced the site in a way that links the land-use of the past with techniques for a more sustainable future.

Extensive open areas maintained by regular mowing and mostly used for informal recreation exist in the Park & Recreation area of Ft. Monroe. Many native plant species were observed in the mowed areas, but the heavy mowing severely inhibits their growth. While much of this space is necessary to support recreation activities, simply not mowing designated areas would allow native plants to quickly restore themselves to their natural range in many areas of the Fort. The resulting warm season grass/wildflower meadows would be aesthetically pleasing and support pollinators such as butterflies and grassland species such as bluebirds and tree swallows. This habitat can be further enhanced through the place of nest boxes. Areas that will remain in turf management would still benefit from the creation of hedgerows consisting of native shrubs such as Eastern red cedar and myrtle. These would provide windbreaks and shelter for wildlife as well as important fall and winter food sources.

### **Archaeological issues.**

There is little reason to believe that any permanent Native American settlements were established on the Fort Monroe property. Furthermore, most temporary sites that were established would have been in an unstable, shifting dune environment and it is unlikely that many such sites would be preserved, especially at the north end of the property. The two sites discovered in the 1999 Phase 1 inventory should be marked and signed. These sites can serve as touchstones for programs and other informational pieces designed to explore and explain Native American culture and resource use in the region.

**Background.** In a review of the Phase I Inventory for Fort Monroe (Balicki et. al. 1999), two loci contained evidence of Native American occupation: 44HT27-8 (Middle Woodland and Late Woodland) and 44HT27-11 (terminal Late Woodland). A complete lack of earlier Archaic components suggests that the land form developed more recently. In addition, the lack of potable water on the island discouraged long-term occupation by the aboriginals.

The Middle Woodland Period (500 BC – AD 900) of Virginia's Coastal Plain is usually characterized as a band level hunting and gathering society with a riverine focus. With a fission / fusion model of settlement, large base camps assembled in the spring in association with anadromous fish runs (Stewart 1992:12-16, McLearn 1992:41-47,

Blanton 1992:65-73) and divided into smaller groups for the remainder of the year. The harvesting of shellfish was also of high importance. As the large base camps were usually settled in association with the saltwater /freshwater interface of major rivers, the Fort Monroe area would have been occupied by a smaller foraging group likely focusing on available fish and the oysters in Mill Creek.

The Late Woodland Period (AD 900 – AD1600) can be characterized as a horticulture society with a heavy reliance on hunting and gathering. Based on swidden agriculture, corn and beans formed the mainstay of the diet (McKnight and Gallivan 2007). On Virginia's Coastal Plain, society was organized at the chiefdom level under the leadership of Powhatan, the paramount chief (Turner 1992:106-121). Settlements can be characterized by large aggregations of people (in the hundreds) found for much of the year in villages or dispersed towns. Again, Fort Monroe would have been utilized as a hunting and gathering station with the exploitation of the local fish and shell fish although the intensity would be lessened by horticultural production. Fish would remain important while shellfish would become a "starving" food item exploited in times of stress. Such a system would continue through the terminal Late Woodland when the area was under the control of the chief of the capital town of Kecoughtan.

As for the use of plants by aboriginal peoples at Fort Monroe, Rountree (2007:49) best sums it up in stating:

One place people – men, women, and children – had little reason to go for plant foods was the beach. The same was true of the dunes and sandy lands behind them, which offered little to eat and had soil poor for gardening.

Hence, one can expect little in the way of gathering to have occurred at Fort Monroe by Native Americans.

## **Part Three: Education and Interpretation**

### **Introduction**

The historic, cultural and natural resources at Ft. Monroe provide a wealth of interpretive themes and opportunities. Relating the use of natural resources to the historical changes at the Fort would provide a unifying element between these diverse resources. The use of natural resources by native peoples and the change in habitats on the site are one avenue to explore.



*Algernone Oak and Parade Ground*

Large scale conservation issues such as Chesapeake Bay Preservation, Habitat Loss and Pollution also provide valuable interpretive messages that can be viewed through the lens of specific conditions at Ft. Monroe. Interpretation that identifies charismatic/sensitive species and explains key habitat features should also be incorporated into any interpretive plan.

The Natural Resources Working Group recommendations are intended to contribute to the overall interpretive plan for Fort Monroe. This part of the document is intended to: identify broad interpretive themes; provide ideas and examples considering the archaeological, natural history, and wildlife qualities of Old Point Comfort; describe visitor experiences; and, make recommendations for potential activities and programs.

Despite its small size, a surprising array of habitats and natural features can be found on the north end of Old Point Comfort. North of the campground and south of Buckroe Beach, is largely undeveloped and will provide an excellent site for nature study, and educational programming on intercoastal marsh, bay, tidal, lowland, and beach ecosystems. Proximity to surrounding water bodies give various areas of the Old Point Comfort distinctly different plant populations. Along the Chesapeake Bay side, sandy beaches extend the length of the island. Beyond the beach, natural and human-made dunes protect inland habitats and intertidal wetlands and marshes, allowing shrub thickets, grasses, and fragmented areas of small trees to thrive. The following concepts will be designed to be environmentally responsible and in keeping with the historic integrity of the property.

### **Visitor Activities and Attractions**

The following list contains some examples of activities, attractions, and audiences:

1. Taking advantage of the Fort-wide trail system, nature hikes would be a great way to use the trails within the beach-dune-marsh complex that would highlight important natural features. The hikes will provide an outdoor activity for casual visitors and visiting school groups, as well as providing access to more serious eco-tourists. The hikes would include a boardwalk above the marsh, mudflat, and shallow water areas of northern Mill Creek. The gazebo/blind could serve as an outdoor classroom as well as a site for wildlife observation.
2. A small, purpose-built or extant interpretive center would provide orientation and an overview for visitors and a gathering place for school groups. It will be a key resource for the education of the general public and the casual visitor about Mill Creek and important lower Chesapeake Bay ecosystems, and an indoor site for environmental education programming (e.g. teacher and student study areas). The nature center would also have limited facilities for preparation and display of specimens for study and education programming (e.g. dip net tanks etc.). A trail from the nature center will lead to an outdoor amphitheater suitable for demonstrations and lectures for groups of up to 100. Demonstration aquaria in the nature center could include:

- a. *Shad tank*. Similar to “trout in the classroom” or “oysters in the classroom”, but tied into a shad restoration program.
  - b. *Chesapeake Bay Touch Tank*. Staff led hands-on experience with living creatures of the bay.
  - c. *Marsh/oyster tank*. Living marsh display with a living oyster reef and associated plants and animals.
3. Researchers and educators from partnering organizations would set up demonstrations to illustrate “best practices” in beach and wetland conservation and wildlife management.
4. Fort Monroe should be included in the Virginia Birding & Wildlife Trail. This statewide trail highlights the best wildlife viewing sites in Virginia. The trail can be viewed as an important component of promoting Fort Monroe as a destination for nature-based tourism. Given the historic context of the Fort and Old Point Comfort in general, the John Smith trail, currently under development, should also include the waterways around the Fort.

### **Public Programs**

1. *Community Nature Initiative*. Much research is currently underway to reconnect children and adults with nature. This program would offer children, youth and adults an interactive approach to outdoor learning. Through providing opportunities for quality family outdoor experiences, promoting healthy lifestyles, and increasing the value of Fort Monroe's green spaces.
2. *Virginia Master Naturalist Chapter*. Develop a Master Naturalist chapter for Fort Monroe. This organization, trained by local and state natural resource educators and scientists, Fort Monroe master naturalists could monitor projects, lead tours, and act as volunteers during workshops and other special events.
3. *Family Festivals*. Themed, family festivals should be held throughout the year highlighting nature and archaeology. Working with local governments, FMFADA and the other Fort Monroe museums and businesses, we propose to develop a series of festivals (e.g. “Marsh Madness”). These will help to foster both community involvement and economic development.
4. *Teacher Professional Development Institutes*. These include Global Learning and Observation to Benefit the Environment and Virginia Science Standards Institute and programs similar to the Virginia Resource Use Education Council Chesapeake Bay Academies, all of which have a classroom and an outdoor component and are available for graduate credit through colleges and universities. Other institutes can be developed with other partners.
5. *Summer Schools and Camps*. Natural history curricula include a variety of topics in archeology, earth sciences and life sciences. Partnership opportunities here are virtually unlimited as the programs can be specific or general and keyed to any age group, including K-16 students, adults, and seniors.

## **Potential Interpretive Themes**

**The Dynamic Chesapeake Bay Ecosystem.** The largest estuary in the United States, the Chesapeake Bay ecosystem is a dynamic interface of a complex set of biological, geological, and human factors that shape the Bay over time. Key interpretive concepts include: energy flow and trophic dynamics; uniqueness of estuarine ecosystem; the role the Bay has as a nursing grounds for many species; seasonal variations in water properties; causes and effects of eutrophication; and, factors that affect the health of commercial species such as oysters, shad, and bluefish.

**Sea Surf to Salt Marsh.** From Dog Beach to Mill Creek, Old Point Comfort supports a diverse range of thriving ecosystems and habitats. Key concepts include: estuarine, salt marsh, and beach-dune ecosystem dynamics; food chains and webs; shoreline physical factors including waves, currents, and sand erosion and deposition; and, marsh and estuarine nutrient production.

**East Coast Flyway.** Old Point Comfort is located in the middle of one of the most active and diverse migrating bird flyways in North America. Bird watching, a growing outdoor activity and one of the most popular eco-tourist activities, will be unparalleled. This will include promoting the site with nature and birding organizations, keying some of the signs for birders, developing a site bird list and organizing a spring birding festival.

**Shifting Sands and Changing Climate.** Researchers, educators, and students will be able to collect data and investigate current research and the factors affecting sea level rise and how it will impact Tidewater and the whole eastern seaboard. Barrier islands and spits, such as Old Point Comfort and Willoughby Spit, owe their existence to dynamic interacting forces of water, earth, and sky. Visitors will explore the forces of nature that have shaped and reshaped this dynamic region.

**Habitat Restoration and Environmental Stewardship.** Habitat restoration efforts often take place in remote places where the public does not often go. Fort Monroe has the opportunity to conduct many of its restoration projects in close proximity to thousands of visitors, and to include hundreds of volunteers along the way. The habitat restoration and runoff mitigation activities could be showcased as examples of best practices and serve as outstanding educational and outreach opportunities, while simultaneously helping to restore the Chesapeake Bay. Natural resource agencies welcome any opportunity to engage their volunteers in restoration activities. By involving volunteers, you could help further the educational and outreach opportunities for the public to learn about habitat restoration, water quality practices, and more about Fort Monroe. Many of these projects also lend themselves to the restoration grant sources that natural resource agencies are familiar with. Grant opportunities may provide much of the needed funding for your projects, as well as additional opportunities to develop local partnerships as part of the grant process.

**Chesapeake Bay Geologic History.** The rocks and sands of the bay and coastal plain document millions of years of environmental and evolutionary change. Old Point

Comfort is a great place to showcase Coastal Plain paleontology, fossil collections, and to showcase new discoveries as they are made. The geologic record of the Chesapeake Bay is punctuated by the impact of a massive meteorite that struck the mouth of the Bay some 36 million years ago. Visitors will explore the timing and scale of this major event and its immediate and ongoing effects on the geology and hydrology of the Bay.

**The Crows Nest.** Over a relatively short period of time, Old Point Comfort has seen an amazing assortment of major events that have shaped the history of North America. The rivers of Virginia and the Chesapeake Bay have been at the confluence of various significant cultures. From the Clovis people to the Powhatan Kingdom; from the colonials to the soldiers of the American Civil War; and, from coal tanker captains to the Chesapeake Bay watermen, Old Point Comfort has been at an ideal vantage point to see it all. Visitors will explore the history of the inhabitants and how human presence has shaped the cultural and natural history of the region.

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