ENVIRONMENTAL ASSESSMENT **May 2012**

JUG BAY MARSH BOARDWALK AND OBSERVATION PLATFORM

Jug Bay Wetlands Sanctuary, Anne Arundel County Department of Recreation and Parks (Maryland)

Office of Ocean and Coastal Resource Management
National Ocean Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

LIST OF TABLES

I. INTRODUCTION

The Chesapeake Bay National Estuarine Research Reserve (CBNERR-MD or "the Reserve") is a federal-state partnership between the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (NOAA OCRM) and the Maryland Department of Natural Resources (DNR). The Reserve consists of three components: Monie Bay in Somerset County, Otter Point Creek in Harford County, and Jug Bay in Prince George's and Anne Arundel Counties (Figure 1).

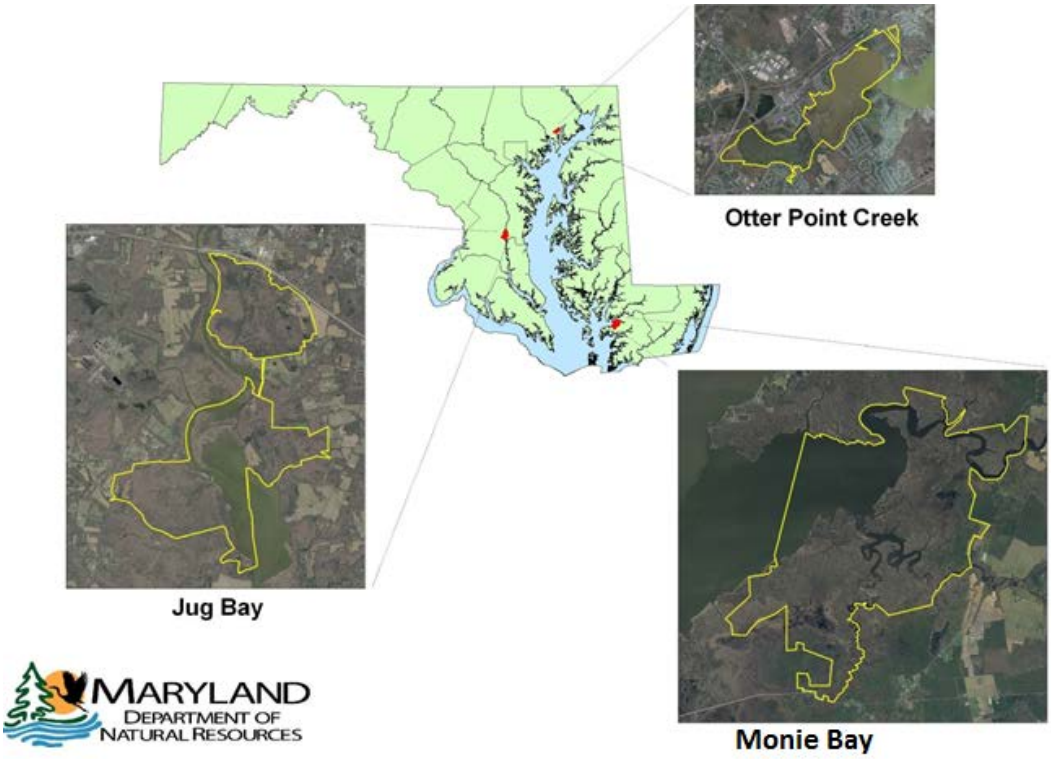


Figure 1. Geographic distribution of the three components of the Chesapeake Bay National Estuarine Research Reserve in Maryland.

The National Oceanic and Atmospheric Administration proposes to fund enhancement of visitor access and support Reserve stewardship, education, outreach, and training programs at the Jug Bay Wetlands Sanctuary (JBWS – Anne Arundel County), a portion of the Jug Bay component. The Jug Bay component is located in southern Anne Arundel County (Figure 2). The Glendening Preserve is an addition (2001) to the original Sanctuary and currently has no suitable access to the fresh water marshes that dominate the river front. It was added in part to allow for public access and enhanced education so that the other parts of JBWS could be kept at lower use for long term research and monitoring.

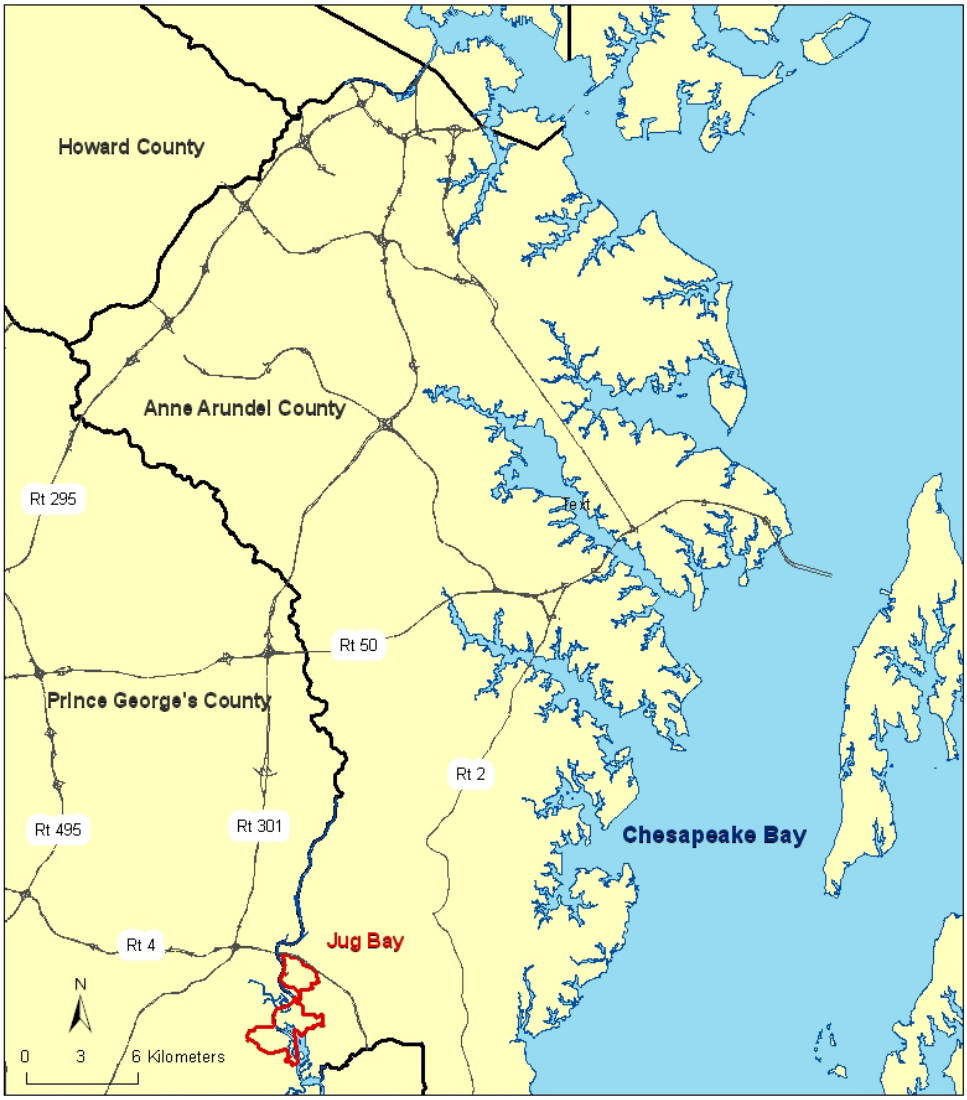


Figure 2. Location of the Jug Bay component of CBNERR is split between southern Anne Arundel County and Prince George's County.

The mission of CBNERR-MD is to improve coastal resource management by increasing scientific understanding of estuarine systems and making estuarine research relevant, meaningful, and accessible to managers and stakeholders. The proposed action will address the following goals and strategies as identified in the Reserve's federally approved management plan (2008):

> **GOAL 1** Strengthen the protection and management of the Reserve to advance estuarine conservation, research, education and coastal training.

Strategy: Maintain and build appropriate educational facilities, infrastructure, and interpretive displays.

GOAL 3 Enhance peoples' ability and willingness to make informed decisions and take responsible actions that affect Maryland's coastal communities and ecosystems.

Strategy: Provide education programs where students and teachers develop real-life estuarine resource management questions and answer them using authentic estuarine science data.

Strategy: Work with schools to help them provide "meaningful bay experiences" for students. A meaningful bay experience must include rigorous academic learning standards, promote a sense of wonder, and nurture a sense of community that will connect students to the Bay and move them to take action toward its protection and restoration.

Strategy: Build and maintain educational facilities and interpretive displays.

Strategy: Provide meaningful bay experiences for the public and decision-makers to inspire interest in changing behavior to protect coastal and estuarine resources. A meaningful bay experience promotes a sense of wonder and nurture a sense of community that will connect participants to the Bay and move them to take action toward its protection and restoration.

Strategy: Complement existing education programs with additional community education opportunities, including targeting underserved populations.

Strategy: Continue to implement educational programs that improve awareness and build community-level support for estuarine and coastal stewardship.

To help achieve Goal 1, the Glendening Preserve was added in part to allow for public access and enhanced education so that the other parts of JBWS could be kept at lower use for long term research and monitoring. Experiential learning and bringing people to the site can ignite and foster a sense of stewardship resulting in the behavior change that Goal 3 describes.

This Environmental Assessment (EA) will assess the impacts and alternatives associated with providing federal funding for the expansion of visitor access and improved Reserve programming at the Glendening Preserve within JBWS. The EA will consider how alternatives were developed and assess three alternatives: marsh boardwalk and observation platform (preferred alternative), platform only, and no action alternative.

a. Proposed Action

The National Oceanic and Atmospheric Administration will provide funding to the Maryland Department of Natural Resources to construct a proposed marsh boardwalk and observation platform at the Glendening Preserve within JBWS. The proposed action also includes the removal of an existing catwalk and hunting blind. The proposed action is the preferred alternative. The Glendening Preserve is an addition (2001) to the original Sanctuary and currently has no suitable access to the fresh water marshes that dominate the river front. These new facilities will be used by the general public visiting the site and for targeted stewardship, education, outreach and training activities conducted by JBWS and Maryland DNR staff. The proposed marsh boardwalk and observation platform could also be a site on the Patuxent River Paddling Trail. Installation of a boardwalk will increase safety as reserve staff will no longer use the catwalk. The removal of the catwalk will lessen impacts from soil compaction and disturbance to plants.

b. Alternatives

Two additional alternatives are considered: a platform alternative and a no-action alternative. Under the platform-only alternative, an identical observation platform as in the preferred alternative would be constructed in the same location. The remaining elements of the preferred alternative, such as the boardwalk, would not be included in this alternative. With a no-action alternative, NOAA would not support funding of the proposed project and Maryland DNR would take no-action to construct a new marsh boardwalk and observation platform unless non-federal funds could be obtained in order to accomplish the task.

This Environmental Assessment (EA) document has been prepared in conformance with requirements for implementation of the National Environmental Policy Act (NEPA) and National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6, Environmental Review Procedures for Implementing the NEPA, and analyzes the potential for significant environmental impacts to the human environment by the proposed action along with the alternative actions of a platform-only alternative and taking no action.

c. Findings

Minor adverse impacts are expected to the man-made and natural environment as a consequence of implementing the preferred alternative of the proposed project. The project would result in shading of 1,320 ft^2 of marsh by an elevated boardwalk and platform that will still allow for light penetration to the marsh surface due to the structures' height. The overall environmental impact would be minimal. The platform only alternative and the no-action alternative will result in additional impacts to marsh sediment and plants due to the continued use of an existing catwalk.

The preferred alternative is compatible with all local zoning and land use plans. No adverse impact to water quality, wetlands or sensitive ecological habitat and species should result from construction.

No properties that are listed in or eligible for listing in the National Register of Historic Places would be affected by the proposed project, and local visual esthetics will not be impaired.

Significant individual and/or cumulative environmental effects would not result from implementation of the proposed action, and preparation of a Finding of No Significant Impact (FONSI) is warranted.

II. PURPOSE AND NEED

a. Purpose

NOAA will provide funding to the Reserve through the Maryland Department of Natural Resources (DNR) to increase public access and staff access to the fresh water marshes in the Glendening Preserve portion of JBWS. Access will provide for targeted stewardship, education, outreach and training activities conducted by JBWS and DNR staff.

The McCann Wetlands Study Center at JBWS houses interpretive exhibits, research facilities, meeting space and administrative offices but is only open to the public for specific events and by appointment. The Plummer House in the Glendening Nature Preserve, also part of JBWS, serves as a general point of contact for the public. Unlike the McCann Wetlands Study Center, the Glendening Preserve is open to the public seven days a week, allowing greater visitor access to the reserve. Presently, there is no suitable access to the marsh from the Plummer House. Access will allow visitors into the marsh and Jug Bay through Old Galloway Creek while providing the Reserve and Sanctuary staff the opportunity to enhance stewardship, education, outreach, and training opportunities.

In addition to the public access features outline above, the Plummer House provides offices and storage facilities for Reserve staff. Enhanced access is required to targeted habitat for staff to conduct invasive species monitoring and if necessary removal, including the continued efforts to manage the invasive purple loosestrife (*Lythrum salicaria*). At present, Reserve staff must travel from the McCann Wetlands Study Center to access this area by water. Increased access would allow the Reserve to more efficiently and effectively manage their stewardship activities through providing greater ease of access and by entering previously unreachable areas for enhanced management of invasive species.

Enhanced public and staff access will address one of the priorities of the Reserve's facility plan. This plan includes the augmentation and improvement of facilities at the Jug Bay component. Table 1 lists guiding principles used in facility construction.

Table 1. CBNERR-MD Guiding Principles for Construction and Site Improvements (Reserve Management Plan 2008).
Improvements and facilities will be sited and designed to avoid negative impacts to core areas and to minimize degradation to the integrity and viability of the natural resources in the Reserve.
Maintain and improve existing facilities to maximize their potential to serve Reserve needs.
Support research activities related to the Reserve and the Chesapeake Bay estuary.
Support education focused on Reserve goals and objectives.
Support and control public access to meet Reserve goals and objectives.

link: http://www.dnr.state.md.us/bay/cbnerr/Management_Plan_2008.asp

b. Need

Currently there is no public land access to the fresh water marshes that dominate the river front in this part of the Sanctuary. Unlike the central part of the Sanctuary the Glendening Preserve is open to the public seven days, a week allowing greater visitor access to the reserve. The proposed action seeks to improve coastal resource management by increasing scientific understanding of estuarine ecosystems and making estuarine research and ecological resources more accessible.

III. ALTERNATIVES

a. Preferred Alternative – Marsh Boardwalk and Observation Platform

NOAA proposes to fund the Maryland DNR and Anne Arundel County Department of Recreation and Parks to construct a new marsh boardwalk and observation platform and the removal of an existing catwalk and hunting blind (at 38^{o} 48’ 5’’ N, 76^{o} 42’ 12’’W) (Figure 3), with all construction activities taking place inside the current boundaries of the Glendening Preserve of the Jug Bay Wetlands Sanctuary. This is the preferred alternative of NOAA, Maryland DNR, and Anne Arundel County Department of Recreation and Parks. The Glendening Preserve was incorporated into the Jug Bay Wetlands Sanctuary in 2001, and was officially included as part of CBNERR in 2008.

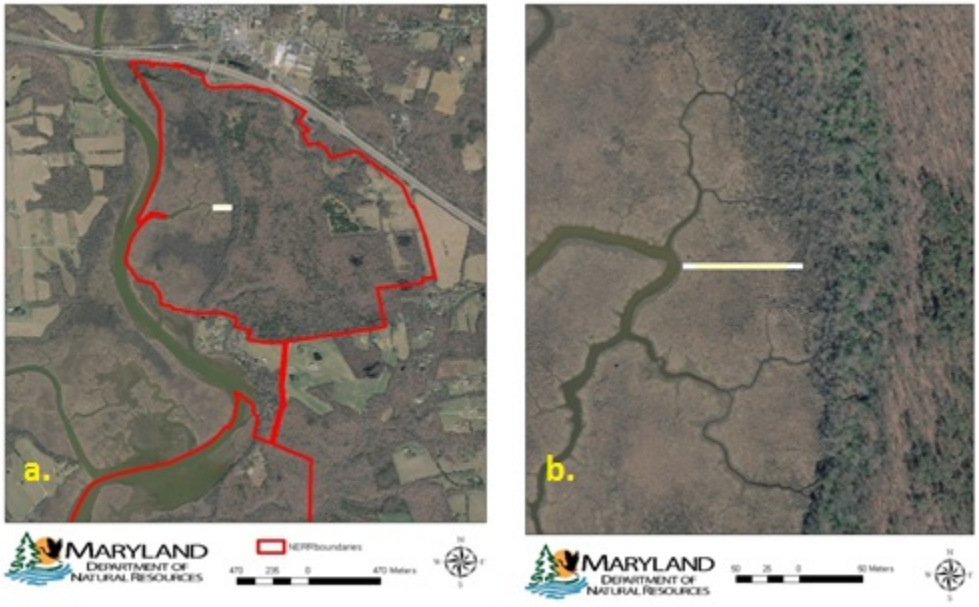


Figure 3. Location of preferred alternative (a) within the Glendening Preserve (1:16,000 scale) and (b) relative to Galloway Creek (1:1,800 scale).

The preferred alternative site for the boardwalk and low platform is in the tidal wetland on the northwest edge of the Reserve, to the west of the Cliff Trail (Figure 4). The wetland here consists of a large variety of mostly herbaceous plant species, including cattails, arrow arum, wild rice, annual flowering plants and sedges. The tidal amplitude is about 0.75 meter. The wetland area is very open and provides a 360 degree view of the marshes, the river valley and the surrounding hardwood forests. The boardwalk would originate on shore at the base of a hill that slopes gradually down about 150 feet from the Cliff Trail on the bluff. A set of steps had previously been built in a ravine that runs downhill from the Cliff Trail to the catwalk (Figure 5). The first 75 feet of the boardwalk would be constructed through swamp and scrub wetland. The majority

of the boardwalk would be constructed through tidal marsh. The boardwalk would run in a westerly direction and terminates at a 40 ft. wide tidal channel. An observation platform would be built on the edge of the channel at the end of the boardwalk. The channel is wide enough for six to eight canoes or kayaks to tie up so that the paddlers can disembark and climb onto the platform.

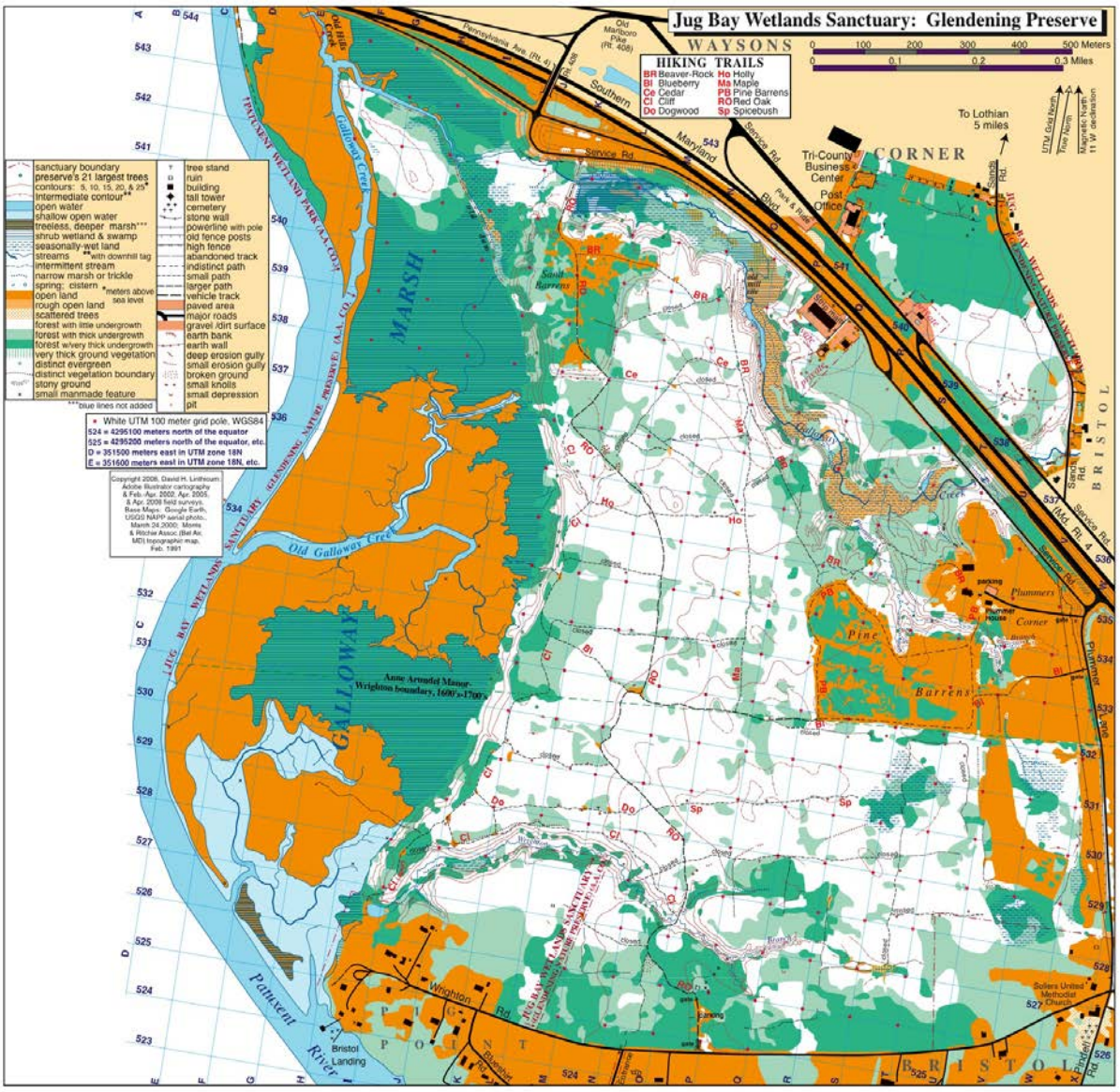


Figure 4. Map showing the location of trails on the Glendening Preserve of the Jug Bay.

No other land sites are available for a marsh boardwalk as the pre-existing Cliff Trail is the only land access from the Plummer House/visitor parking area to the marsh area. The boardwalk originates on shore at the base of a bluff along the Cliff Trail. The path from the bluff slopes gradually downhill and is approximately 150 feet in length with a 45 foot vertical drop. The boardwalk will be 3 feet wide and 3 feet off the marsh sediment. It would extend 450 feet to the

edge of the creek where the platform would be constructed. The platform would be approximately 10 feet by 12 feet, and would be approximately 6 feet above the marsh. The height of the structures is that height recommended by Maryland Department of the Environment to allow light to reach the underlying marsh plants. The platform would be accessible by steps leading up from a boardwalk. It would provide a view of the surrounding marsh and river and the wildlife that live there, such as great blue herons, migrating birds, and osprey. It would be the only access to the wetland in the Glendening Preserve. The platform would be designed to hold a maximum of 6 to 10 people at one time. The platform can also accommodate visitors who arrive via canoe and kayak.

Figure 5. Existing steps on the Cliff Trail, leading to the proposed project area.

Additionally, the Reserve would be able to use its shallow water pontoon boat to bring participants of Reserve programs to the boardwalk and platform during high tides. Arrival to the platform via boat provides access to those unable to arrive from the trail and boardwalk due to disabilities.

Currently there is an old duck hunter's catwalk located at the site of the planned boardwalk (Figure 6). This consists mainly of planks laid directly on the marsh, which hunters used to access the marsh for hunting and led to an old duck blind. The catwalk would be removed under the preferred alternative. The new structure will be used by the general public visiting the site and for targeted education, outreach, and Coastal Training Program activities conducted by CBNERR staff (including both DNR and JBWS staff). The boardwalk will also provide access to the marsh and river for CBNERR research and stewardship programs. Activities such as invasive monitoring and control (i.e., purple loosestrife and phragmites) and turtle monitoring would access the marsh by this boardwalk.

Construction would include sinking long 4x4 inch posts deep into the marsh sediments for both the platform and the boardwalk. Both would be built by hand to minimize disturbance and cut costs. Materials used would be lumber treated with the current industry recommendations for use in the wetlands environment. A construction specialist with the Anne Arundel County Department of Recreation and Parks would oversee the construction. The Maryland Department

of the Environment has reviewed the plans and issued a Wetland Permit (attached as Appendix 1 and excerpted Figure 7). The bearing capacity is estimated to be 100 lbs./square foot.

The approximate lifespan is 15 years. Sea level rise in Maryland is expected to be about 3.5 feet in 100 years, so about 6 inches in 15 years. As noted above, the boardwalk would be approximate 3 feet off the marsh, and would not be built higher for safety reasons. The observation deck would be six feet off the marsh and would have railings around the edge. Boardwalks are continuously maintained by volunteers, and existing boardwalks at Jug Bay Wetlands Sanctuary have weathered numerous hurricanes.

Figure 6. Existing duck hunting catwalk at the site of the preferred alternative.

b. Platform Alternative

Under this alternative, an identical (10 x 12 ft.) observation platform would be constructed in the same location as in the preferred alternative (Figure 4). However, no marsh boardwalk would be constructed; there would only be access to the tidal creek, no direct marsh access for visitors or Reserve activities would be available. Rather than access to the observation platform from either the water or the proposed marsh boardwalk originating from the Cliff Trail, access would be limited from Old Galloway Creek only under this alternative.

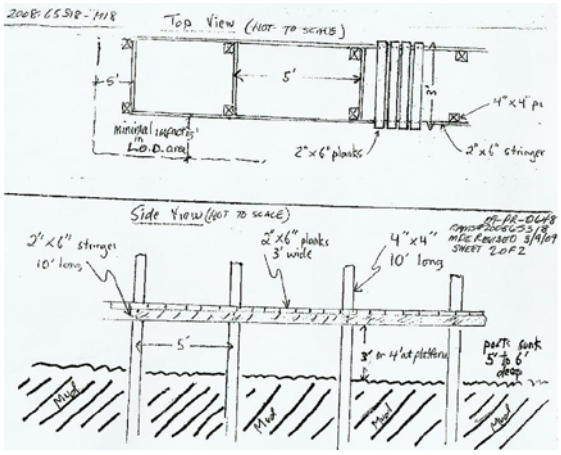


Figure 7. Boardwalk and platform drawing (from Appendix 1).

This is not a preferred alternative, because the platform would not be accessible by visitors on shore. The platform without a boardwalk could only be used by those in boats. This would defeat the purpose of the boardwalk of providing access to school groups, volunteers and researchers who visit the Reserve by car or bus. Additionally, a "platform only" alternative would make it impossible for groups of canoeists or kayakers from accessing the platform on water and then hiking to the Reserve visitor's center where they would learn about the NERR program and other estuarine-related topics. Financially, this alternative would not be feasible for the state and local partners to execute and maintain. Additional funding would be required to bring participants and Reserve staff to the platform via pontoon boat. If pontoon boat is the only mechanism to conduct programming, either programs will be severely limited due to resource

limitations or additional resources must be dedicated. Even with additional resources, access is limited by tides under this alternative. Logistically, the platform will serve the same purpose and address the existing need as the preferred alternative, as but to a lesser extent than the preferred alternative. Fewer people would be able to access the marsh and the Reserve would offer fewer additional programs.

The construction methods and cost for a "platform only" alternative would be higher than the preferred plan because all materials and workers would have to be delivered to the site by boat. Also, the old planks that formed the hunter's catwalk would not be removed although the hunting blind would be.

c. No-Action Alternative

Under the no-action alternative, NOAA would not support funding of the proposed project and Maryland DNR would take no-action to construct a new marsh boardwalk and observation platform unless non-federal funds could be obtained in order to accomplish the task. The hunting blind would remain in place. Also, the Reserve would not reach the education, outreach and training goals for the Jug Bay component as outlined in the goals of the NOAA-approved management plan.

IV. DESCRIPTION OF THE AFFECTED ENVIRONMENT

a. Natural Environment

1. Wetlands

Jug Bay is a tidal wetland complex surrounded by upland forest and farm fields. Tidal wetland plant species include wild rice (*Zizania aquatica*), cattails (*Typha* sp.), pickerelweed (*Pontederia cordata*), spatterdock (*Nuphar advena*), rose mallow (*Hibiscus moscheutos*), and common reed (*Phragmites australis*). The dominant plant is wild rice. This, along with other seed-bearing plants such as water millet (*Echinochloa walteri*) and smartweed (*Polygonum punctatum*), is food for as many as 25,000 birds during the winter months. The non-native haplotype of *Phragmites australis* has invaded Jug Bay and scientists believe it has the potential to alter ecosystem structure and function and pose a threat to the integrity of the reserves. Purple loosestrife (*Lythrum salicaria*) is another invasive species that has begun to infiltrate some areas of the Jug Bay marsh.

2. Water Resources

Jug Bay is a broad shallow embayment of the Patuxent River, which is a tributary of the Chesapeake Bay. Most of Jug Bay is very shallow, ranging from about 1 to 3 feet (0.3 to 1.0 m) deep at high tide, but where the Western Branch enters the Patuxent channel the depth exceeds 25 feet (8 m) deep. It is a tidal freshwater wetland complex with approximately 410 acres of open water and 1,000 acres of vegetated wetlands. The entire complex is influenced by semi-diurnal tides with a two foot (0.6m) tidal fluctuation. The salinity of the water ranges from 0 to 1.0 ppt (tidal fresh). The wetlands north of Jug Bay are palustrine and riverine, and those to the south approach oligohaline.

The Patuxent River, Two Run Branch, Pindell Branch, Black Walnut Creek, Swan Point Creek, and Deep Creek all flow into Jug Bay. Agricultural runoff, sewage treatment plant effluent, and other upriver sources result in elevated levels of nutrients and sometimes high turbidity. With respect to water quality, the Patuxent River tidal fresh segment in which Jug Bay is located is listed as "impaired" (Category 4) for the open water fish and shellfish subcategory due to high levels of total nitrogen and total phosphorus (www.mde.state.md.us).

> "In accordance with recent US Environmental Protection Agency guidance, Maryland's current List of Impaired Surface Waters [303(d) List] is contained in an Integrated Report that describes five different categories of water quality, including: Category 1 - waters attaining all standards; Category 2 - waters attaining some standards; Category 3 - waters with insufficient information to determine if water quality standards are attained; Category 4 – impaired or

threatened waters that do not need or have already completed a TMDL; Category 5 [the historical 303(d) List] - impaired waters for which a TMDL is required." Source: (http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/Programs/WaterPrograms/TMDL/Maryland%20303%20dlist/index.aspx).

This segment does meet some total suspended solids designated uses, but there is insufficient data to evaluate others; it does meet the submerged aquatic vegetation restoration goal. During the low-flow periods of the summer months, increased water temperatures and excessive nutrient levels result in algal blooms in the area and reduced water clarity.

3. Biological Resources

The Jug Bay core area provides habitat for a wide diversity of fauna. It is located within the Atlantic Flyway and is a haven for more than 280 species of birds. In winter it is an important site for waterfowl feeding. Jug Bay is designated as an Audubon Important Bird Area (IBA); over 100 native species are documented as confirmed or probable breeders. Jug Bay is located at the farthest point upriver that provides good spawning grounds for striped bass (*Morone saxatilis*). Other fish species found in Jug Bay include smallmouth bass, crappie, yellow and white perch, and channel catfish. Mammals at the Jug Bay site include raccoons, muskrats, opossum, beavers, minks, river otters, red and gray foxes, skunks, white tail deer, and bats.

Maryland Department of Natural Resources Wildlife and Heritage Service staff (Kerry Wixted and Katharine McCarthy) surveyed the proposed site of the marsh boardwalk at the Glendening Preserve, Jug Bay Wetlands Sanctuary in Anne Arundel County for state rare, threatened and endangered and federally threatened and endangered species. The first survey was conducted on September 16, 2010 and follow-up surveying was conducted in 2011. The Jug Bay Wetlands Sanctuary Director Christopher Swarth and the CBNERR Stewardship Coordinator participated in the surveying efforts.

There are no federally-listed threatened or endangered species at the proposed project site (Table 2 and Appendix 4). The only federally-threatened plants that occur in Anne Arundel County are *Aeschynomene virginica* (sensitive joint-vetch), *Helonias bullata* (swamp pink); neither of these occur at the site. The federally-endangered species *Schwalbea americana* (chaffseed) is now extirpated from the county, and there are no other federally endangered plants occurring in the county.

Consultation with U.S. Fish and Wildlife Service confirms that no federal threatened or endangered species occur in the project area and there will be no impact under the Migratory Bird Treaty Act (MBTA) (Appendix 4). Bald eagle (*Haliaeetus leucocephalus*) and Atlantic shortnose sturgeon (*Acipenser brevirostrum*) are species of concern but will likely not be affected by the proposed action. The nearest bald eagle nest is over two miles away from the

proposed project site and Maryland DNR Fisheries Service does not have evidence that sturgeon is present in the project area.

4. Ecologically Sensitive Resources

The ecosystem where the boardwalk and observation deck would be sited is a tidal fresh marsh. The Patuxent River wetlands at Jug Bay are designated by the State of Maryland as wetlands of special state concern and as Natural Heritage Areas. Natural Heritage Areas are regulated by the State of Maryland so that species structure and composition are maintained.

This area lies within a designated Natural Heritage Area, and was purchased for the purpose of conserving the natural values of the property. The site is located between two known populations of Maryland state-listed endangered anglepod (*Matelea carolinensis*); the GPS coordinates for these known populations are available for use in planning the boardwalk route, and the boardwalk will be constructed to avoid them. Other possible plants of concern that could occur in the general area include climbing milkweed (*Matelea oblique*), red turtlehead (*Chelone oblique*), coast sedge (*Carex exilis*), shoreline sedge (*Carex hyalinolepis*), hop-like sedge (*Carex lupuliformis*), inflated sedge (*Carex vesicaria*), velvety sedge (*Carex vestita*), white fringed orchid (*Platanthera blephariglottis*), yellow fringed orchid (*Platanthera ciliaris*), and the pale green orchid (*Platanthera flava*). A survey for the *Matelea* spp., *Chelone obliqua* and *Carex* spp. of concern was conducted on September 16, 2010 by the Maryland Department of Natural Resources Wildlife and Heritage Program. This survey indicated a possible presence of *Carex lacustris*, a State Rare plant, widely distributed in this marsh. This fruits in the late spring (late May-June). An area near the duck blind that does NOT have the *Carex* was flagged as a way of marking a possible location for the platform that would avoid impacts to the *Carex*. *Platanthera flava*, also a state rare species, is known to occur in the tidal swamp to the north along the Patuxent, just north of the Route 4 crossing. The water level was too high during surveys on September 16, 2010 to assess the distribution of this orchid, or to look for *Chelone obliqua*, a state threatened plant known to occur at Jug Bay. *Chelone* flowers in August-September; the reddish-pink flowers make this plant easy to distinguish from the common turtlehead. Follow up surveys did not locate any of these species of concern in the immediate area of the project.

Protection measures have been adequately discussed with experts from the Maryland Department of Natural Resources Wildlife and Heritage Service Heritage Division and taken into account. The potential boardwalk route and observation deck location will be planned to avoid impacts to any state species of concern. The Maryland Department of Natural Resources Wildlife and Heritage Service Heritage Division has no further concerns regarding state or federally listed species at this time. (See Appendix 4)

Table 2. Protected Species that may occur near the proposed site

Scientific Name	Common Name	Global Rank	State Rank	State Status	Federal Status
Carex exilis	Coast Sedge	G5	S1	E	
Carex hyalinolepis	Shoreline Sedge	G4G5	S2S3		
Carex lupuliformis	Hop-like Sedge	G4	S2		
Carex vesicaria	Inflated Sedge	G5	S1	T	
Carex vestita	Velvety Sedge	G5	S2	T	
Chelone obliqua	Red Turtlehead	G4	S1	T	
Matelea carolinensis	Anglepod	G4	S1	E	
Matelea obliqua	Climbing Milkweed	G4?	S1	E	
Platanthera blephariglottis	White Fringed Orchid	G4G5	S2	T	
Platanthera ciliaris	Yellow Fringed Orchid	G5	S2		
Platanthera flava	Pale Green Orchid	G4	S2		

5. Floodplains and Wetlands

The entire project is located within a wetland, which is inundated with the tides twice a day, and is described in Wetlands(1) above. The project does not occur in the floodplain area outside the wetland. The U.S. Army Corps of Engineers, Baltimore District, has determined that the proposed work meets the terms and conditions of the Maryland State Programmatic General Permit-3 (Appendix 1) for construction in the floodplain area within the wetland. However, the permits have expired and Maryland and Anne Arundel County officials are in the process of renewing permits.

6. Soil and Geology

Jug Bay lies in the Atlantic Coastal Plain. The geology of the area consists of a wedge-shaped mass of unconsolidated sedimentary deposits of the Quaternary, Tertiary, and Cretaceous periods, which overlie older crystalline rocks of Precambrian or Early Paleozoic era. The unconsolidated deposits are stratified layers of sand, gravel, silt, and clay. In the region of Jug

Bay, crystalline rocks have not been penetrated by drilling, and little information is available regarding their character. The surface deposits are Quaternary river terrace and lowland estuarine deposits of gravel, sand, and silt. Possible underlying formations in the Jug Bay area might be the Calvert and Nanjemoy Formations over Aquia Greensand and Monmouth Formations, over Raritan and Magothy Formations, over the Patapsco and Arundel Formations, over the Patuxent Formation.

The predominant soils in the Jug Bay component are classified as Tidal marsh (Tm). Soil materials range from sand to clay and in some areas they are mucky or peaty.

b. Human Environment

1. Zoning and Land Use

Anne Arundel County (2009 population estimate: 521,209 U.S. Census Bureau) is located on the Chesapeake Bay 24 miles (39 km) from Baltimore and 33 miles (52 km) from Washington, DC. Annapolis is the county seat and the state capital. JBWS is located in the unincorporated community of Lothian in the southern portion of the county.

The proposed project area within the Glendening Preserve of the JBWS is maintained for preservation and park activities. The land is owned and managed by the Anne Arundel County Department of Recreation and Parks and is zoned under the jurisdiction of Anne Arundel County as Residential Agriculture (RA). This zoning district is generally intended to preserve agricultural lands and provide for very low-density rural single-family detached residential development **(**Permit Uses Code Reference - 18-4-106, Anne Arundel County Code 2005) For the purposes of the long-term land use planning, Anne Arundel County has designated this site as Open Space (Permit Uses Code Reference - 18-9-202, Anne Arundel County Code 2005). A small portion (approximately one-sixth) of the Glendening Preserve was formerly farmed, mowed and developed (residential and agricultural facilities). The majority of the Preserve is comprised of wetlands and forested lands. The Glendening Preserve is protected by a conservation easement between Anne Arundel County and the State of Maryland Department of National Resources.

2. Visitor Use

In an effort to preserve the unique and fragile environment of the Sanctuary and allow for ongoing research undisturbed by visitor use, JBWS has been designated as a limited access facility. Jug Bay waterways currently serve as recreational areas for boaters and anglers. Fishing is not permitted from the JBWS. Hunting is prohibited within JBWS. Access to open water is limited by accessibility from land. Paddle sports, hiking, birdwatching and wildlife viewing are some of the accepted visitor uses for the Sanctuary. The Glendening Preserve has been designated for greater visitor use. With the McCann Wetland Study Center only open via appointment, the Glendening Preserve serves as the major public access point for the Sanctuary.

Programmatic uses of JBWS include education and research activities led by Reserve and Sanctuary Staff.

3. Cultural Resources

Artifacts found in Jug Bay indicate the presence of Native Americans in the immediate area as early as 7,500 years before present. At the time of the first European settlements, Jug Bay was a part of the Piscataway Indians' hunting and gathering range. Bristol Landing, just north of Jug Bay, was an important tobacco shipping point during the 1800's and early 1900's.

Native American artifacts found in the Jug Bay area include axe heads, pottery, and projectile points. According to the Maryland Historical Trust, there are five known archeological sites within or adjacent to the Jug Bay component of the Chesapeake Bay National Estuarine Research Reserve in Maryland. It is possible that additional sites may be present. There are no sites on the National Register of Historic Places in the immediate area of the proposed action (see Appendix 3).

4. Visual, Scenic or Aesthetic Resources

The Glendening Preserve of JBWS protects an area of natural beauty and provides opportunities for the public to enhance their awareness and appreciation of the aesthetics of Jug Bay. The ecosystem where the boardwalk and observation deck would be sited is a tidal fresh marsh. The Patuxent River wetlands at Jug Bay are designated by the State of Maryland as wetlands of special state concern and as Natural Heritage Areas. Without the boardwalk, visitors would not be able to access the marsh or its views from the Glendening Preserve portion of the Reserve. Access to more southern marshes are provided from the lower portion of the Sanctuary, but not the Glendening Preserve area. The boardwalk will allow visitors to the Glendening Preserve portion of JBWS to use a multisensory approach to experience the naturalness; seeing, hearing, smelling and feeling the environment to gain an understanding and appreciation of the estuary.

V. ENVIRONMENTAL IMPACTS

a. Natural Environment

a.1 Wetlands

a.1.1 Preferred Alternative

No significant impacts to the wetlands by the Preferred Alternative are expected. The boardwalk and deck will at some points during the day shade 1,320 square feet of the marsh. However, the height of the structures is that height recommended by Maryland Department of the Environment, which should allow light to reach the underlying marsh plants. Thus, this temporary shading of a very small portion of the marsh is not expected to cause any significant impact. The observation platform and the boardwalk will both be built by hand to minimize disturbance. No large machinery will be brought into the marsh; the boardwalk will be built without using large boats, pile drivers or barges that might rest on the marsh. Instead, workers will use hand tools to place wooden posts in the mud. Workers will walk directly in the mud or else on 4x8 ft. floating plastic platforms that are used on a temporary basis and which are moved outward across the marsh as the posts and planking are put in place. The boardwalk will be 3 ft. wide. A wetland area slightly wider than this (perhaps to 10 ft. wide) may be disturbed during construction and will result in a disturbed area of approximately 2,000 ft^2 for the boardwalk. The platform will disturb about 120 ft^2.

Impact will occur during the construction process and to a lesser extent afterwards. Placing posts within the sediment may harm or kill a limited number of invertebrates within the sediment but this will be highly localized to the location of posts. Materials used will be lumber treated with the current industry recommendations and complying with state regulations for use in the wetlands environment. Over time some chemicals and metals may leach into the sediment immediately surrounding the posts. This will be localized and minimal. Most invertebrate species within the sediment are mobile within the substrate and can avoid these areas. The boardwalk and observation deck will be built on 4x4-inch posts so as not to disrupt water flow; the tides will continue to flow under the boardwalk and observation deck.

Increased education programming facilitated by the boardwalk and observation deck is expected to have positive impacts on these and other wetlands by teaching students, teachers, decision-makers, and the public how to change their behavior to protect and restore estuarine resources, including wetlands. The sighting of the boardwalk will also provide better access for wetland restoration projects such as invasive plant removal.

a.1.2 Platform Alternative

There would be fewer direct impacts expected as the platform is part of the preferred alternative. With the elimination of the boardwalk from this alternative, impacts associated with the construction of the boardwalk will not occur. Impacts from construction of the platform are the same as the impacts from construction of the platform portion of the preferred alternative, approximately 120 ft^2 in area. However, Reserve staff will continue to use the existing catwalk

to access areas of the marsh to conduct stewardship (invasive species) work. Continued use of the catwalk will result in additional soil compaction and erosion in the wetlands.

a.1.3 No-Action Alternative

There would be no construction impacts under the no-action alternative. However, minor adverse impacts to the wetlands by the No-Action Alternative are expected. Continued travel along the wooden planks placed on the marsh as a hunter catwalk could compact soils and cause erosion in the wetlands.

a.2 Water Resources

a.2.1 Preferred Alternative

Minor adverse impacts to the water resources by the Preferred Alternative are expected. The height of the structures is that height recommended by Maryland Department of the Environment. The observation platform and the boardwalk will both be built by hand to minimize disturbance. Turbidity due to the project will be short-lived and minimized to the extent possible. Materials used will be lumber treated with the current industry recommendations and state regulations for use in the wetlands environment although some localized leaching is expected to occur. The boardwalk and observation deck will be built on 4x4 posts so as not to disrupt water flow; the tides will continue to flow under the boardwalk and observation deck. The primary non-point source pollution to this marsh is due to run off from farms and developed areas, with nitrogen and phosphorus being the dominant pollutants. This project is not expected to increase non-point source pollution. The flow of water under the boardwalk and platform will not be altered because of the wide spacing of vertical posts. Under flood conditions the boardwalk may be underwater for brief periods. Plant debris (stalks, leaves, etc.) and branches may lodge under the boardwalk during floods, but this will not cause any significant environmental damage.

A 2008 NOAA document (Kelty and Bliven) notes: "Sanger and Holland (2002) report that, 'it is unlikely that the bioaccumulation of dock leachates by marine biota is having or is likely to have an impact on living resources in South Carolina estuaries and tidal creeks.' Reasons given are that the leaching generally occurs only when the dock is new, that the size of the area around the dock that might be affected is small, and high rates of tidal flushing will dilute and flush any accumulations in the water column." This would also be true in the Patuxent River estuary, where flushing rates are high.

Flooding below the level of the walking surface of the boardwalk would result in relatively little buoyancy/uplift, but some side drag on the boardwalk support posts. Net weight is still downward and soil friction on each post would prevent upward lift and sideward motion, allowing for transfer of bending moment to the soil; major flotsam and logs would not be carried out into the marsh during such tidal exchanges. Reserve staff and volunteers would be responsible for removing such debris once environmental conditions allowed to be done so

safely. With deeper and faster flood waters, flood water may cover the wood walking surface and the buoyancy uplift would increase and, depending upon the flood current velocity, there could be much more side drag due to fluid flow. Debris accumulation may further increase the side drag and impact of a larger floating object(s), causing the boardwalk to move, scouring and causing damage in the Preserve's wetlands. Floating debris damage (natural damages) can occur in the wetlands under such even if the boardwalk and platform were not there. Therefore, while the presence of the boardwalk may increase damage under such conditions, natural damage would be significant under these conditions and the Reserve would need to implement debris removal and habitat restoration efforts regardless.

Increased education programming facilitated by the boardwalk and observation deck is expected to have positive impacts on these and other water resources by teaching students, teachers, decision-makers, and the public how to change their behavior to protect and restore estuarine resources, including water resources.

The Plummer House at the Glendening Preserve has restroom facilities that can accommodate the anticipated increased visitor use. During the refurbishment of the Plummer House, the septic system was completely redesigned and relocated to have a lower impact on water quality. The new system incorporates denitrificaiton in the processing of waste. Minor adverse impacts from human sewage are expected under the preferred alternative as the septic system will have an increased usage as compared to the minimal use by staff currently.

a.2.2 Platform Alternative

Fewer impacts are expected than with the preferred alternative. With less access to the marsh, fewer people will visit the Glendening Preserve and there will be fewer users of the Plummer House restroom facilities and water resources. Turbidity and leachate impacts will be fewer than the preferred alternative as only a platform would be constructed. There would be no boardwalk.

a.2.3 No-Action Alternative

Fewer impacts are expected. With less access to the marsh, fewer people will visit the Glendening Preserve and there will be fewer users of the Plummer House restroom facilities and water resources. There will be no turbidity and leachate impacts under the no-action alternative.

a.3 Biological Resources

a.3.1 Preferred Alternative

No significant impacts to the biological resources by the Preferred Alternative are expected. The height of the structures is that height recommended by Maryland Department of the Environment, which should allow light to reach the underlying marsh plants and migrating animals to pass unhindered below the structures. The boardwalk will provide opportunities for basking, traveling, and roosting, and these opportunities may provide both positive and negative

impacts that are difficult to predict due to predator-prey interactions and other factors. There will be no impacts to threatened or endangered species as the U.S. Fish and Wildlife service has determined that none are present in the project area and that the proposed project will have no effect on migratory birds (Appendix 4).

The observation platform and the boardwalk will both be built by hand to minimize disturbance to plants and animals. Construction will be done by hand and will not include pile drivers or other large machinery and so will be significantly quieter than the motor boats passing by the marsh. Nonetheless, construction timing will avoid breeding seasons of songbirds to avoid any impacts due to noise disruption. Construction noise will consist of sounds from hammers, from a post pounder used to set vertical posts into the mud, and from battery-powered hand drills. While there will be some noise, it is unlikely to carry for more than a quarter mile. Decibel levels for a hammer and post pounder are estimated to be less than 90 db, and these noises will be intermittent and not constant. For example, it takes about 4 blows to set a nail and each plank will have 6 nails placed. Hammering will only take place every five minutes or so, as new planks are laid in place. A vertical post requires about 15 blows by the post pounder to set the post at the desired depth. A battery-powered drill will be used for some work as well. It is not as loud as a hammer. On shore, we will occasionally use a gasoline-powered generator to run a circular saw. The noise from the generator will be temporary and only needed when special cuts are needed. Work will take place primarily during the non-breeding season so no nesting birds or turtles will be disturbed.

Turbidity due to the project will be short-lived and minimized to the extent possible. Materials used will be lumber treated with the current industry recommendations for use in the wetlands environment. Vertical posts may sever some plant rhizomes, but the vast majority of plants so affected will recover. Some plants will be compressed. Most of these species are perennials with substantial root and rhizome systems within the mud. Constructing similar boardwalks within the sanctuary has shown that plants recover quickly and will not suffer permanent damage. Small invertebrates in the mud may be pushed deeper or to the sides of the posts.

The boardwalk and platform are high enough so that fish, turtles, snakes and mammals such as muskrats, beavers, river otters and rice rats can easily move underneath it. Animal movements or nests will not be significantly impacted. Boardwalks in the Patuxent River region are often used by raccoons and river otters. Raccoons are omnivores and they will readily excavate turtle nests. There are very few turtle nests in the wetlands, so the boardwalk will not provide easy access for raccoons to find their nests. River otters eat fish and crayfish; the boardwalk will not significantly alter their access to these prey.

Increased education programming facilitated by the boardwalk and observation deck is expected to have positive impacts on these and other biological resources by teaching students, teachers, decision-makers, and the public how to change their behavior to protect and restore estuarine

resources, including biological resources. The boardwalk will also provide better access for wetland restoration projects such as invasive plant removal.

a.3.2 Platform Alternative

No additional impacts would be expected as the platform is part of the preferred alternative. The area of impact would be less (120ft^2 versus 2,120ft^2) for the platform alternative as compared to the preferred alternative. The elimination of the boardwalk from the project's scope would mean that construction time would be reduced under the platform alternative and therefore any disturbance to wildlife would be reduced. Under this alternative the catwalk will not be removed and continued travel along wooden planks placed on the marsh could compact soils that would adversely impact a small number of invertebrate infauna.

a.3.3 No-Action Alternative

Minor adverse impacts to the biological resources by the No-Action Alternative are expected. Under this alternative the catwalk will not be removed and continued travel along the wooden planks placed on the marsh could compact soils that would adversely impact a small number of invertebrate infauna.

a.4 Ecologically Sensitive Resources

a.4.1 Preferred Alternative

No significant impacts to the ecologically-sensitive resources by the Preferred Alternative are expected. The height of the structures is that height recommended by Maryland Department of the Environment, which should allow light to reach the underlying marsh plants and migrating animals to pass unhindered below the structures. The observation platform and the boardwalk will both be built by hand to minimize disturbance. Materials used will be lumber treated with the current industry recommendations for use in the wetlands environment and will comply with all state and federal requirements.

Increased education programming facilitated by the boardwalk and observation deck is expected to have positive impacts on these and other ecologically-sensitive resources by teaching students, teachers, decision-makers, and the public how to change their behavior to protect and restore estuarine resources, including ecologically-sensitive resources.

a.4.2 Platform Alternative

There would be fewer direct impacts expected as the platform is part of the preferred alternative. With the elimination of the boardwalk from this alternative, impacts associated with the construction of the boardwalk will not occur. The area of impact would be less (100ft^2 versus 2,100ft^2) for the platform alternative as compared to the preferred alternative. However, Reserve staff will continue to use the existing catwalk to access areas of the marsh to conduct stewardship

(invasive species) work. The catwalk will disturb a limited number of marsh plants and macroinvertebrate infauna.

a.4.3 No-Action Alternative

No significant impacts to the ecologically-sensitive resources by the No-Action Alternative are expected. However, continued travel along the wooden planks placed on the marsh as a hunter "catwalk" could compact soils that would adversely impact a small number of marsh plants and invertebrate infauna.

a.5 Floodplains and wetlands

The entire project is located within a wetland, which is inundated with the tides twice a day, and is described in number a.1 above. The project does not occur in the floodplain area outside the wetland.

a.5.1 Preferred Alternative

There are no floodplains in the proposed project area.

a.5.2 Platform Alternative

There are no floodplains in the proposed project area.

a.5.3 No-Action Alternative

There are no floodplains in the proposed project area.

a.6 Soil and Geology

a.6.1 Preferred Alternative

No significant impacts are expected to the sediment or underlying geology.

a.6.2 Platform Alternative

No impacts are expected to the sediment or underlying geology.

a.6.3 No-Action Alternative

No significant impacts are expected to the sediment or underlying geology.

b. Human Environment

b.1 Zoning and Land Use

b.1.1 Preferred Alternative

The planned construction that would take place at the site is considered compatible with the current zoning. No impacts to zoning and land use would result.

b.1.2 Platform alternative

The planned construction that would take place at the site is considered compatible with the current zoning. No impacts to zoning and land use would result.

b.1.3 No-Action Alternative

No construction would take place under the no-action alternative and as such no impacts to zoning and land use would result.

b.2 Visitor Use

b.2.1 Preferred Alternative

The preferred alternative is expected to have a minor positive impact on the human environment. The proposed boardwalk and marsh observation platform will allow for increased education and training program activities, addressing specific goals and objectives of the Reserve's NOAA-approved Management Plan. The observation platform will also provide land access from the water for shallow water crafts (canoes and kayaks) so visitors can tie up and visit the marsh, uplands, and Plummer House at the Glendening Preserve from the Patuxent River. With limited access to education and interpretive materials at the McCann Wetlands Study Center, a marsh boardwalk and observation platform in the Glendening Preserve will afford more opportunities for the public to visit, exposing a wider audience to important estuarine education messages that highlight the key natural features and estuarine processes in the area.

Boat access during high tides ensures that the preferred alternative is accessible for persons with disabilities.

b.2.2. Platform Alternative

This alternative is likely to have a positive, though limited, impact on this aspect of the human environment. A platform would only partially service the purpose and need of the proposed action. Without a marsh boardwalk from the Plummer House and visitor parking area, the observation platform is available only via boat (motor) or paddling (canoe and kayak) during certain high tides. This alternative limits access severely, both for visitors and Reserve staff. Visitors do not have access to the marsh and Reserve staff will continue to use the limited catwalk. Also, visiting the platform encourages visitors to explore the marsh. Without a boardwalk, visitors may decide to traipse through sensitive areas while a boardwalk would direct their exploration with minimal impact. Reserve staff will not have access to their facilities/resources at Plummer House for education, stewardship and training activities at the platform without a marsh boardwalk connecting the Plummer house to the observation platform.

b.2.3 No-Action Alternative

The no-action alternative will result in no additional visitation.

b.3 Cultural Resources

b.3.1 Preferred Alternative

Cultural resources such as archaeological sites and artifacts will be protected by limiting visitor impact in the marsh, keeping any archaeological sites undisturbed. The site of the preferred

alternative has not been identified as a known archeological site. The Maryland Historical Trust, which operates as the Maryland State Historic Preservation office under the National Historic Preservation Act, has reviewed the Glendening Preserve and recommends that known historical sites be avoided by any proposed development of reserve facilities. Any sites discovered during construction will be protected according to Maryland Historical Trust standards. The preferred alternative would therefore have no impact on cultural resources.

NOAA determined that the Proposed Action would have no adverse effect on historic properties, and submitted this finding to the Maryland Historic Trust (MHT). The MHT concurred with this determination on September 29, 2010 in a Maryland Historical Trust cultural resources project review form (See Appendix 3**)**.

b.3.2 Platform Alternative

No additional impacts would be expected as the platform is part of the preferred alternative. Because the Platform alternative would involve a smaller footprint than the Proposed Action in the same area, this alternative would also have no adverse effect on historic properties.

b.3.3 No-Action Alternative

No construction would take place under the no-action alternative and as such no new impacts to cultural resources are anticipated.

b.4 Visual, scenic, or aesthetic resources

b.4.1 Preferred Alternative

No major adverse impacts due to the aesthetic effects of the proposed project are expected. Minor aesthetic/scenic visual impacts could be associated with the inclusion of a boardwalk and platform. To the greatest extent possible, the boardwalk and platform will blend in with other infrastructure and the surrounding environment through using natural colors and materials. The low platform will only be 6 feet above the marsh mud, so its visual impact is similar to that of the duck blinds that have been in the area for many decades. There are no houses in the regions where the boardwalk will be built and the boardwalk will not be visible from Route 4 (Hill's Bridge), the only roadway in the vicinity, which is 0.8 miles away. The catwalk boards would be removed, getting rid of that unsightly feature.

The proposed action will result in increased access to South Duck Trail and Old Galloway Creek, allowing for users to experience a view of the surrounding marsh and river that is otherwise inaccessible at this time.

Due to the construction of the marsh boardwalk and observation platform, there will be no increase in the amount of lighting. There will be a temporary increase in noise pollution associated with the construction, such as the sound of hand hammering. Pile drivers and other

heavy equipment will not be used. This increase in noise is expected to be minimal (less than 90 db), would only occur during the construction phase, and would be no louder than the motorized boats which already access Jug Bay. Once completed the boardwalk will receive foot traffic from the trail system, which is typically very light and usually small groups. Occasionally Jug Bay will have guided groups access the boardwalk. The low frequency of such groups is expected to have no significant impact.

b.4.2 Platform Alternative

Visual and aesthetic impacts similar to but somewhat less than those associated with the preferred alternative are expected with the platform alternative. Without the marsh boardwalk component, fewer infrastructures will be present and thus will not impair views and aesthetics as much as a platform and a boardwalk.

b.4.3 No-Action Alternative

No construction would take place under the no-action alternative, and as such, no impacts would occur to noise and light emissions.

c. Cumulative Effects

Past actions in the project area include the renovation of a residential home, the Plummer House, to accommodate office and meeting space as well as bathroom facility upgrades. Low-impact bayscaping surrounds the facility and solar panels have been installed. These two features are used as demonstration projects to enhance local stewardship of Jug Bay's natural resources.

Ongoing actions in the project area include: use of Plummer House office space by Maryland DNR and Anne Arundel County staff; training and education activities at the Plummer House, including use of bayscaping and alternative energy demonstration sites; mowing of meadow to maintain early succession habitat managed for species of concern; recreational activities (paddle sports, birdwatching/wildlife viewing, trail walking) in the marsh and uplands; stewardship activities including invasive species monitoring and removal; biological monitoring and research; meeting space at Plummer House for local groups and organizations; and visitor services at Plummer House on an limited basis (when staff or volunteers are present).

Future projects in the area include the removal and replacement of two barns at the Plummer House which are presently used for storage. These barns are in a deteriorating condition and without investment in upkeep will have to be removed eventually. Removal will improve human safety by eliminating a potentially dangerous infrastructure in the future. There are long-term plans to replace these buildings with education and research facilities in the existing barn footprints. At this time no funding sources for these projects have been identified.

Although the preferred alternative discussed herein will have some localized and minimal negative impacts, the marsh boardwalk and platform will have a minor net positive effect to the human environment as the removal and the discontinued use of the existing catwalk will eliminate an ongoing negative impact of soil compaction and erosion.

VI. MITIGATION MEASURES

Every effort will be made to mitigate the impact of the boardwalk. Construction will take place in the winter, where possible, to minimize the impact on nesting birds. CBNERR staff has consulted with Maryland Wildlife and Heritage Service and will construct the boardwalk to minimize impacts of nearby state species of concern. Any additional repair and maintenance (board replacement, raising of boardwalk, etc.) will also be done within an environmental window that avoids impacts to the wildlife resources of the project area.

Reserve staff will conduct routine monitoring of the boardwalk and platform for environmental and human impacts. A memorandum of understanding is in place between the Maryland Department of Natural Resources and the Anne Arundel County Department of Recreation and Parks which addresses the roles and responsibilities of the Reserve operations at Jug Bay. The County will maintain the boardwalk, including routine clean-up of trash, debris, mold, moss and animal scat and be responsible for long-term upkeep. Any cleaning will be done in an environmentally benign manner with biodegradable materials suitable for use in wetlands.

The research and monitoring staff will periodically survey the project area and will work with a state certified biologist to transplant any impacted plant (i.e., shaded plants). On a multi-year cycle, soil samples can be taken to test for leaching of chemicals from building materials and water samples taken for water quality impacts. The Sanctuary has conducted extensive research on turtle populations within the project area and will continue to monitor these populations.

VII. COMPLIANCE WITH OTHER ENVIRONMENTAL AND ADMINISTRATIVE REVIEW REQUIREMENTS

a. NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

The entire project is located within a wetland, which is inundated with the tides twice a day. The use of funds for acquisition or construction of buildings in special flood hazard areas is prohibited by the NFIP in communities not identified as participating in the Flood Insurance Program by the NFIP's Community Status Book. Anne Arundel County does participate in the NFIP (http://www.fema.gov/cis/MD.html). No buildings will be constructed in the floodplain; the proposed project is a boardwalk in a wetland. The project will comply with applicable regulations.

b. COASTAL BARRIERS RESOURCE ACT (CBRA)

All proposed projects located on undeveloped coastal barrier islands as designated in the CBRA system must be consistent with the purposes of minimizing the loss of life, wasteful federal expenditures and damage to fish, wildlife and other natural resources in order to be eligible to receive federal funds. The area of the proposed project site is not on land designated as being an undeveloped coastal barrier island (CBI) and thus CBRA does not apply.

c. ENDANGERED SPECIES ACT (ESA) AND MIGRATORY BIRD TREATY ACT (MBTA)

No federally threatened and endangered species are found within the project area (see Appendix 4). As a result of coordination work done with the U.S. Fish and Wildlife Service, it is determined that the project complies with the ESA and the MBTA.

d. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Fishing activities are not allowed within the JBWS. Essential Fish Habitat will not be affected by the project because none is present.

e. COASTAL ZONE MANAGEMENT ACT (CZMA)

As required by Section 307 (d) of the CZMA, state and local governments applying for federal funding for a project affecting the coastal zone shall indicate the views of the appropriate state agency concerning the relationship of the proposed activity to the state's approve coastal management program. Under NOAA's Federal Consistency provisions (15 CFR 930), Federal agencies are required to determine whether certain proposed direct federal actions, permits and/or funded projects would directly impact coastal zones. Maryland DNR

has found the Reserve management plan, including the Reserve's facility plan, to be consistent with state coastal zone management program. The proposed project is contained within this Reserve Facility Plan.

f. NATIONAL HISTORIC PRESERVATION ACT (NHPA)

A National Register of sites and buildings of significant importance to the United States' history has been compiled by the Secretary of the Interior under the provisions of Sector 106 of the National Historic Preservation Act of 1966. The proposed project will have no impact on National Register sites.

NOAA determined that the Proposed Action would have no adverse effect on historic properties, and submitted this finding to the Maryland Historic Trust (MHT). The MHT concurred with this determination on September 29, 2010 in a Maryland Historical Trust cultural resources project review form (See Appendix 3**)**.

g. ENVIRONMENTAL JUSTICE

In order to be consistent with the President's Executive Order on Environmental Justice 12898 (February 11, 1994) and the Department of Commerce's Environmental Justice Strategy, applicants must ensure that their projects will have no disproportionately high and adverse human health or environmental effects on minority or low income populations. As this project is consistent in use and type with existing zoning and land use regulations there will be no adverse impacts on any minority or low income populations that may be located within close proximity of the site.

Minority and low-income school children and adults from both counties would benefit from the marsh boardwalk through CBNERR programs. CBNERR's Jug Bay component is located in Prince George's and Anne Arundel Counties. Prince George's County is 85 percent minority (65 percent African American) and Anne Arundel County is 30 percent minority (15 percent African American). The boardwalk would allow them greater access to the marsh and the water from the Glendening Preserve, and to the Glendening Preserve from the water. Both counties have growing Latino populations, and CBNERR has designed and marketed Spanish-English bilingual programs for Latino visitors.

h. EXECUTIVE ORDER 12866

No significant regulatory action is constituted by the proposed project as defined by this executive order because: 1) it will not have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities; 2) it will not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) it will not materially alter the

budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; and 4) it will not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

i. COMMERCE PRE-AWARD NOTIFICATION REQUIREMENTS FOR GRANTS AND COOPERATIVE AGREEMENTS

Published by the Department of Commerce in the Federal Register, October 1, 2001 (66 FR 49917), as amended October 30, 2002 (67 FR 66109), is a set of requirements applicable to all federal financial assistance awards issued by the Department. These will be addressed as Special Award Conditions on financial assistance awards.

VIII. CONCLUSION: FINDING OF NO SIGNIFICANT IMPACT

The National Oceanic and Atmospheric Administration proposes to fund enhancement of visitor access and support Reserve stewardship, education, outreach, and training programs at the Jug Bay Wetlands Sanctuary (JBWS – Anne Arundel County), a portion of the Jug Bay component of the Chesapeake Bay National Estuarine Research Reserve in Maryland. Three alternatives were considered for the proposed project: marsh boardwalk and observation platform (preferred alternative), observation platform without a connecting boardwalk, and a no-action alternative.

Significant individual and/or cumulative environmental effects would not result from implementation of the preferred alternative, and preparation of a Finding of No Significant Impact (FONSI) is warranted.

NOAA Administrative Order (NAO) 216-6 (revised June 20, 1999) provides eleven criteria for determining the significance of the impacts of a proposed action. These criteria are discussed below as they relate to the proposed project.

a. Has the agency considered both beneficial and adverse effects (A significant effect may exist even if the Federal agency believes on balance the effect will be beneficial)?

The agency has considered both beneficial and adverse effects and no significant effects are anticipated. Beneficial effects include increased access for education and training that will result in enhanced understanding and stewardship of the ecosystem and its resources. Greater access for stewardship activities will enhance ecosystem function. Removal of existing catwalk and hunting blind will eliminate negative impacts caused by the existing, deteriorating structure. Replacement by a boardwalk will enhance safety for Reserve staff implementing stewardship and research. Adverse effects include impacts to a small number of plants and animals but mitigation measures (transplantation, monitoring of key species, etc.) are in place. None of these effects are considered significant.

Individual effects will not be cumulatively significant. Although there are other boardwalks and platforms within the larger Jug Bay area, there are no other boardwalks or platforms within the Glendening Preserve. Jug Bay is already an impaired system due to excess nutrient loading. The preferred alternative of the proposed project will not have any impact on this element of water quality within Jug Bay. Cumulative impacts of future construction projects do not exist as no future construction projects are under consideration for the Glendening Preserve at this time. Within the marsh, the nearest structure is several miles south of the proposed project area. These infrastructures are within distinct marsh subunits. While they both connect with Jug Bay, the two areas are ecologically distinct and

proposed project should have no cumulative effect relative to the existing boardwalk and platform.

b. To what degree would the proposed action affect public health and safety?

With the removal of a deteriorating catwalk, there will be a small increase in public safety and staff safety due to the use of a properly engineered boardwalk and platform.

c. To what degree would the proposed action affect unique characteristics of the geographic area in which the proposed action is to take place?

The proposed project helps to secure the unique characteristics by eliminating the catwalk and installing an elevated boardwalk. Adverse effects include impacts to a small number of plants and animals but mitigation measures (transplantation, monitoring of key species, etc.) are in place. None of these effects are considered significant.

d. To what degree would the proposed action have effects on the human environment that are likely to be highly controversial?

None. The project is supported by the public, state, and county (based on comments from a public meeting – Appendix 5).

e. What is the degree to which effects are highly uncertain or involve unique or unknown risks?

None. There is a similar boardwalk and platform at another component of JBWS. This infrastructure is in similar habitat as the proposed action. It is highly certain that the proposed action and the existing infrastructure will have similar impacts (minimal adverse impacts). The proposed action presents no unknown risks as the existing infrastructure provides an understanding of the risks involved.

f. What is the degree to which the action establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

None. There already exists a boardwalk and platform in a different part of JBWS. The proposed project has already been reviewed and approved in the Reserve's Management Plan.

g. Does the proposed action have individually insignificant but cumulatively significant impacts?

No. Individual impacts are likely to be insignificant (shading of individual plants, localized leaching) and can be monitored (assaying soil for presence of leachate) and addressed (transplantation of affected plants by a state certified biologist).

h. What is the degree to which the action adversely affects entities listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historic resources?

None. NOAA determined that the Proposed Action would have no adverse effect on historic properties, and submitted this finding to the Maryland Historic Trust (MHT). The MHT concurred with this determination on September 29, 2010 in a Maryland Historical Trust cultural resources project review form (See Appendix 3).

i. What is the degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected?

None. There are no federally-listed threatened or endangered species in the project area (See Appendix 4).

j. Does the proposed action have a potential to violate Federal, state, or local law for environmental protection?

No. The proper permits have been secured by the Maryland Department of Environment and the United States Army Corps of Engineers. The proposed action is in compliance with the Coastal Zone Management Act, Endangered Species Act, Magnuson-Stevens Fisheries Conservation Act, Coastal Barriers Resource Act, and National Historic Preservation Act. The project has been reviewed at the state and local level and no violation of state or local law for environmental protection is threatened.

k. Will the proposed action result in the introduction or spread of a non-indigenous species?

No. This project will facilitate the control and removal of invasive species by Reserve staff.

Finding of No Significant Impact

Environmental Assessment
Jug Bay Marsh Boardwalk and Observation Platform

NOAA has prepared the attached Environmental Assessment (EA) for the National Estuarine Research Reserve System which conforms to the procedural and technical requirements set forth in NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act, and NEPA. The proposed action is funding enhancement to visitor access and in support of stewardship, education, outreach, and training programs at the Jug Bay Wetlands Sanctuary (JBWS – Anne Arundel County), a portion of the Jug Bay component of the Chesapeake Bay National Estuarine Research Reserve in Maryland. The EA assesses the potential environmental impacts of the construction of a marsh boardwalk and observation platform, the preferred alternative for NOAA, Maryland Department of Natural Resources, and Anne Arundel County Department of Recreation and Parks.

Having reviewed the EA, I have determined that the project assessed within will not have a significant impact on the quality of the human environment. Therefore, the preparation of an Environmental Impact Statement for the proposed action is not required by Section 102(2)(c) of the National Environmental Policy Act or its implementing regulations.

For Assistant Administrator for National Ocean Service, NOAA

6/11/12
Date

IX. LIST OF PREPARERS

Elizabeth L. Ebersole, Reserve Manager. Chesapeake Bay National Estuarine Research Reserve in Maryland; Maryland Department of Natural Resources

Helen Farr, NEPA Specialist. Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration

Michael Migliori, Program Specialist. Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration

Patmarie Nedelka, NEPA Coordinator. Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration

Chris Snow, Stewardship Coordinator. Chesapeake Bay National Estuarine Research Reserve in Maryland; Maryland Department of Natural Resources

Christopher Swarth, Park Superintendent. Jug Bay Wetlands Sanctuary, Anne Arundel County Parks and Recreation Department

David Winandy, NEPA Coordinator. National Ocean Service Management and Budget Office, National Oceanic and Atmospheric Administration

X. REFERENCES

Chesapeake Bay National Estuarine Research Reserve in Maryland Management Plan (2008) http://nerrs.noaa.gov/Doc/PDF/Reserve/CBM_MgmtPlan.pdf

http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/Programs/WaterPrograms/TMDL/Maryland%20303%20dlist/index.aspx

Kelty, Ruth, and Steve Blivern (2008). *Environmental And Aesthetic Impacts of Small Docks and Piers* NOAA Coastal Ocean Program Decision Analysis Series No. 22 available online at http://coastalscience.noaa.gov/documents/dockpier.pdf

APPENDIX 1. Maryland Department of the Environment Wetland Permit

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

May 14, 2009

Anne Arundel County Recreation and Parks/Chris Swarth
1361 Wrighton Road
Lothian, MD 20711

Re: MDE Authorization No: 09-PR-0648
RAMS Tracking No.: 200865318

Dear Mr. Swarth,

Your application to alter tidal wetlands has been evaluated by the Tidal Wetlands Division. Your State license or permit authorizing work in tidal wetlands is attached. Your project qualifies for federal approval under the Maryland State Programmatic General Permit (MDSPGP), permit attached. You should not begin any work until you have obtained all necessary State, local and federal authorizations.

Please take a moment to read and review your authorizations to insure that you understand the limits of the authorized works and all of the general and special conditions. If you are aggrieved by the Department's decision to authorize this project subject to the conditions set forth in the attached license, you may petition the circuit court in the county where the land is located within 30 days after receiving the license. Please call me at 410-537-3835 with any questions.

Sincerely,

Richard J. Ayella, Chief
Tidal Wetlands Division

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

TIDAL WETLANDS LICENSE 09-PR-0648
Pier and Piling Construction

Licensee: AA COUNTY RECREATION AND PARKS/CHRIS SWARTH
Address: 1361 Wrighton Road
Lothian, MD 20711

Under the authority of the Board of Public Works of the State of Maryland and in accordance with Title 16, Wetlands and Riparian Rights, Environment Article, Annotated Code of Maryland and COMAR 23.02.04 and COMAR 26.24 and the conditions of this license, the licensee is authorized to perform the following activity:

To construct a 450-foot long by 3-foot wide with a 10 X 10-foot "T" head boardwalk over marsh within a maximum of 460 feet channelward of the mean high water line as depicted on the attached MDE revised plans dated 3/9/09. The project is located in the Patuxent River at the Jug Bay-Glendenning Nature Preserve, Anne Arundel County, Lothian, Maryland.

By applying for and receiving this Wetland License the licensee shall be considered to have knowledge of and to have accepted the special and general conditions of this license. Licensee agrees that all work shall be performed in compliance with these conditions.

This license is subject to the following conditions:

SPECIAL CONDITIONS

A. All work shall be permitted under, and in accordance with, the Critical Area requirements of the local jurisdiction where the project is located. This authorization does not constitute authorization for disturbance in the 100-foot Critical Area Buffer. "Disturbance" in the Buffer means clearing, grading, construction activities, or removal of any size of tree or vegetation. Any anticipated Buffer disturbance requires prior written approval, before commencement of land disturbing activity, from the local jurisdiction in the form of a Buffer Management Plan.

B. Minimal disturbance is recommended for the marsh surrounding the proposed walkway and platform. The walkway shall be elevated three feet above the marsh substrate. The platform shall be elevated a minimum of four feet above the marsh substrate. No marsh shall be filled.

dredged, altered or destroyed except the small amount necessary for the emplacement of the support piles. Best management practices shall be employed to minimize disturbance. Marsh mats shall be utilized if heavy machinery is involved in the construction. Original contours shall be reinstated with the appropriate native plants if any marsh is damaged.

GENERAL CONDITIONS

A. The licensee shall obtain an approved sediment and erosion control plan from the local soil conservation district when the area disturbed is greater than 5000 square feet;

B. The licensee certifies real property interest in the contiguous upland;

C. This license is valid only for use by the licensee of the Maryland Department of the Environment. Permission for transfer of the license shall be obtained from the Water Management Administration. The terms and conditions of this license shall be binding on any assignee or successor in interest of the license;

D. The licensee acknowledges that this license does not transfer any property interest in State tidal wetlands. This license allows the licensee to use State tidal wetlands only for the structure or activity authorized herein and in no way limits the use of waters of the State by the public;

E. The construction of any structure or the performance of any activity under this license shall be evidence that the licensee has accepted all of the terms and conditions herein;

F. This license is void if the licensee fails to obtain all required State, Federal and local approvals before beginning work on the licensed structure or activity;

G. The licensee shall allow representatives of the Maryland Department of the Environment to enter the property at reasonable times to inspect the ongoing or completed work under the license;

H. The licensee shall make every reasonable effort to design and construct the structure or perform the activity authorized in this license in a manner which minimizes adverse impacts on natural resource values, including water quality, plants, wildlife, plant and wildlife habitat, and on historic property values;

I. The licensee shall notify the Water Management Administration, Compliance Program (410) 537-3510 at least 5 days before beginning the structure or activity;

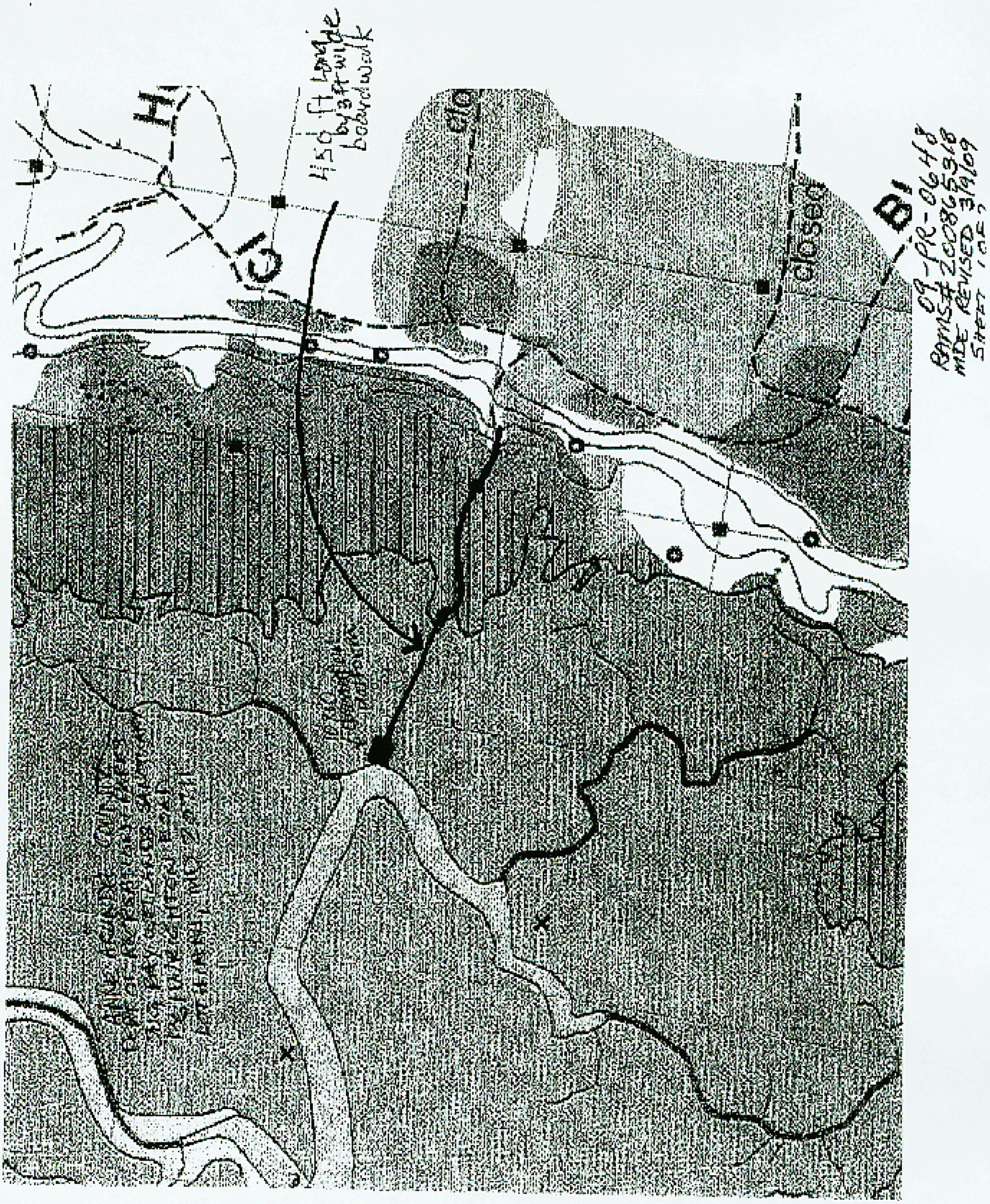
J. This license expires 3 years after the date of issuance. The licensee shall complete construction of the activity authorized under this license within the allowed 3 years, otherwise a new general license shall be obtained;

K. The Maryland Department of the Environment may suspend or revoke this license upon written finding for good cause that suspension or revocation is in the State's best interest;

L. This license provides no justification or assurances for future dredging. All dredging projects will be evaluated on the biological and physical characteristics of the site at the time an application is made.

Robert Tabisz
Chief, License and Permit Section
Tidal Wetlands Division

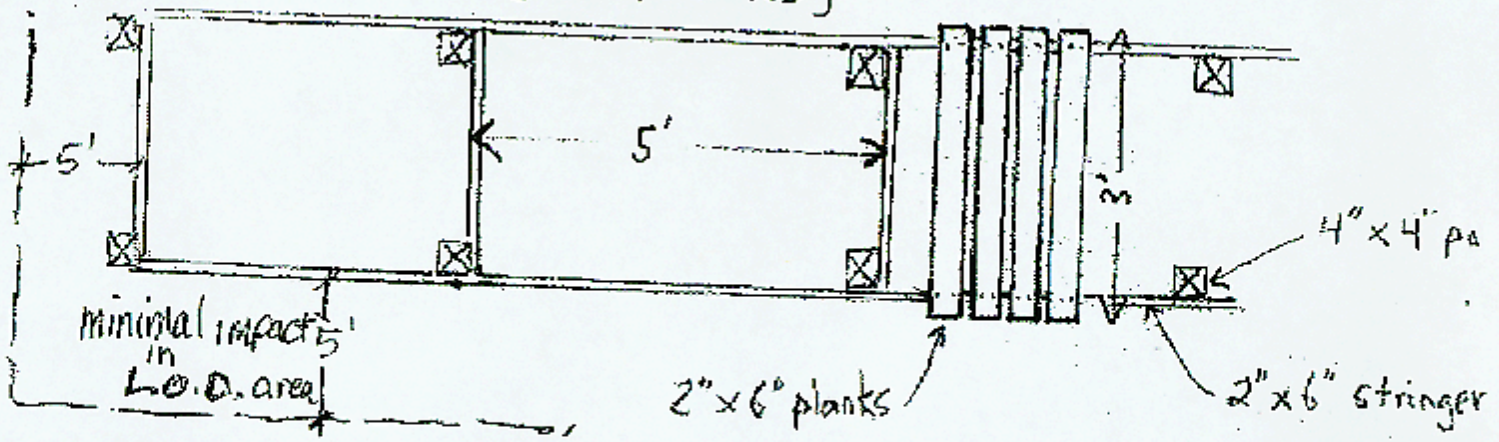
Date of Issuance: May 14, 2009
RAMS Tracking No.: 200865318
rhc



150 ft long
by 3 ft wide
boardwalk
closed
09-PR-0648
RAMS#200865318
MDE REVISED 3/9/09
SHEET 1 OF 2

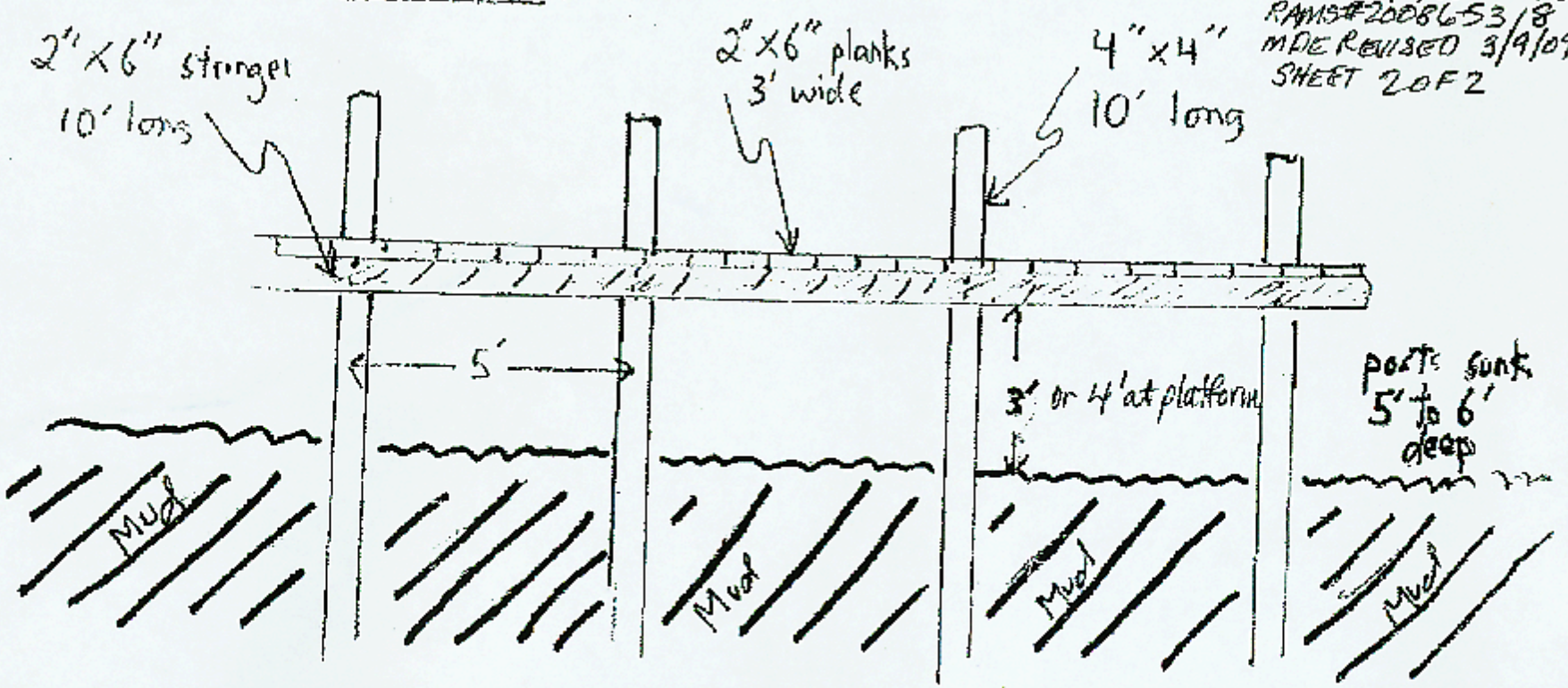
2008-65318-M18

Top View (NOT TO SCALE)



Side View (NOT TO SCALE)

09-PR-0648
RAMS#200865318
MDE REVISED 3/9/09
SHEET 2 OF 2



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

REPLY TO
ATTENTION OF

IMPORTANT INFORMATION ABOUT YOUR PROJECT

Corps Permit Tracking No.: 200865318 Date: May 14, 2009

Permittee/Project Name: AA DPW, MDSPGP-3 Category and Activity No.: I-A3

Dear Applicant:

The U. S. Army Corps of Engineers, Baltimore District, has determined that the proposed work meets the terms and conditions of the Maryland State Programmatic General Permit-3 (MDSPGP-3), provided the work is completed in compliance with the plan(s) **(enclosed)**, the standard MDSPGP-3 conditions **(enclosed)**, the applicable MDSPGP-3 activity-specific conditions **(enclosed)**, and special conditions **(enclosed, if applicable)**. This MDSPGP-3 verification is provided pursuant to Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act. If any of the information contained in your application and/or plans is later found to be in error, the MDSPGP-3 authorization for your project may be modified, suspended, or revoked.

As a condition of the MDSPGP-3 authorization, you, the permittee, are required to complete and sign the enclosed Compliance Self-Certification Form regarding the completed work and any required mitigation, and return to the above address **within 60 days** following completion of the authorized work and any required mitigation.

In addition, **please note**, if you sell the property associated with this permit, when the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new property owner(s). Although the construction period for work authorized by this MDSPGP-3 is finite, the permit itself, with its limitations, does not expire. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, you must have the transferee (new owner) provide a mailing address and telephone number along with their signature and date in the space provided below, and mail a copy to the above address.

Your MDSPGP-3 authorization is valid until September 30, 2011 unless the MDSPGP-3 is modified, reissued, or revoked. You must remain informed of the changes to the MDSPGP-3. When changes to the MDSPGP-3 occur, a public notice announcing the changes will be issued. If you have commenced construction or are under contract to commence construction of this authorized work prior to the expiration, modification, or revocation date of the MDSPGP-3 itself, you have 12 months from the effective date of the MDSPGP-3's expiration, modification or revocation to complete the work under the present terms and conditions of this MDSPGP-3.

In order for this authorization to be valid, you must obtain all required Federal, State, and local permits.

William P. Seib
Acting Chief, Regulatory Branch

TRANSFEREE SIGNATURE _____ DATE _____ AREA CODE / TELEPHONE NO. _____

PRINTED NAME _____ ADDRESS _____

APPENDIX 2. List of Rare, Threatened, and Endangered Species in Anne Arundel County, Maryland

Current and Historical Rare, Threatened, and Endangered Species Of Anne Arundel County, Maryland*

April 2010

Maryland Department of Natural Resources
Wildlife and Heritage Service

Scientific Name	Common Name	Global Rank	State Rank	State Status	Federal Status
Animals					
Ambystoma tigrinum	Eastern Tiger Salamander	G5	S2	E	
Autochton cellus	Golden-banded Skipper	G4	SH	X	
Celithemis martha	Martha's Pennant	G4	S1		
Celithemis ornata	Faded Pennant	G5	SH		
Epitheca costalis	Slender Baskettail	G5	S1		
Erythrodiplax minuscula	Little Blue Dragonlet	G5	S1		
Etheostoma vitreum	Glassy Darter	G4G5	S1S2	T	
Falco peregrinus anatum	American Peregrine Falcon	G4T4	S2	I	
Fundulus luciae	Spotfin Killifish	G4	S2?		
Gallinula chloropus	Common Moorhen	G5	S2B	I	
Gomphaeschna antilope	Taper-tailed Darner	G4	S2		
Gomphus rogersi	Sable Clubtail	G4	S2	I	
Graptemys geographica	Northern Map Turtle	G5	S1	E	
Haliaeetus leucocephalus	Bald Eagle	G5	S3B		
Helocordulia selysii	Selys' Sunfly	G4	S2	T	
Hydrochara occultus	A Hydrophilid Beetle	GNR	SU		
Ixobrychus exilis	Least Bittern	G5	S2S3B	I	
Ladona exusta	White Corporal	G4	S1	E	
Laterallus jamaicensis	Black Rail	G4	S1	E	
Libellula flavida	Yellow-sided Skimmer	G5	S2S3		
Meropleon titan	A Noctuid Moth	G2G4	S2S4		
Nannothemis bella	Elfin Skimmer	G4	S1	E	
Nehalennia gracilis	Sphagnum Sprite	G5	S2		
Nehalennia integricollis	Southern Sprite	G5	S1S2		
Nerodia erythrogaster erythrogaster	Red-bellied Watersnake	G5T5	S2S3		
Ophiogomphus incurvatus incurvatus	Appalachian Snaketail	G3T2T3	S1	E	
Percina notogramma	Stripeback Darter	G4	S1	E	
Pituophis melanoleucus	Northern Pinesnake	G4	SH		
Podilymbus podiceps	Pied-billed Grebe	G5	S2B		
Porzana carolina	Sora	G5	S1B		
Somatochlora provocans	Treetop Emerald	G4	S1	E	
Sperchopsis tessellatus	A Hydrophilid Beetle	GNR	S2		
Sphodros rufipes	Red-legged Purse-web Spider	G4	S1S2		
Sternula antillarum	Least Tern	G4	S2B	T	
Stygobromus indentatus	Tidewater Amphipod	G3	S1		
Stylurus laurae	Laura's Clubtail	G4	S2S3		

Plants

Aeschynomene virginica	Sensitive Joint-vetch	G2	S1	E	LT
Agalinis setacea	Thread-leaved Gerardia	G5?	S1	E	
Agrimonia microcarpa	Small-fruited Agrimony	G5	SU		
Agrimonia striata	Woodland Agrimony	G5	S1	E	
Amianthium muscitoxicum	Fly-poison	G4G5	S2?		
Antennaria solitaria	Single-headed Pussytoes	G5	S2	T	
Aristida lanosa	Woolly Three-awn	G5	S1	E	
Arundinaria gigantea	Giant Cane	G5	S2		
Bidens mitis	Small-fruited Beggar-ticks	G4?	S1	E	
Calopogon tuberosus	Grass-pink	G5	S1	E	
Carex exilis	Coast Sedge	G5	S1	E	
Carex hyalinolepis	Shoreline Sedge	G4G5	S2S3		
Carex lupuliformis	Hop-like Sedge	G4	S2		
Carex vesicaria	Inflated Sedge	G5	S1	T	
Carex vestita	Velvety Sedge	G5	S2	T	
Castanea dentata	American Chestnut	G4	S2S3		
Chamaedaphne calyculata	Leatherleaf	G5	S1	T	
Chelone obliqua	Red Turtlehead	G4	S1	T	
Corallorhiza wisteriana	Wister's Coralroot	G5	S1	E	
Cuscuta coryli	Hazel Dodder	G5?	SH	X	
Cuscuta indecora	Pretty Dodder	G5	S1?		
Cuscuta polygonorum	Smartweed Dodder	G5	S1	E	
Cyperus retrofractus	Rough Cyperus	G5	S2		
Desmodium humifusum	Trailing Tick-trefoil	G1G2Q	SH	X	
Desmodium pauciflorum	Few-flowered Tick-trefoil	G5	S1	E	
Desmodium strictum	Stiff Tick-trefoil	G4	S1	E	
Dichanthelium leucothrix	Roughish Panicgrass	G4?Q	SU		
Diplazium pycnocarpon	Glade Fern	G5	S2	T	
Eleocharis albida	White Spikerush	G4G5	S2	T	
Eleocharis halophila	Salt-marsh Spikerush	G4	S1	E	
Eleocharis intermedia	Matted Spikerush	G5	S1	E	
Eleocharis rostellata	Beaked Spikerush	G5	S2?		
Eriocaulon aquaticum	Seven-angled Pipewort	G5	S1	E	
Festuca paradoxa	Cluster Fescue	G5	SU	X	
Galium hispidulum	Coast Bedstraw	G5	S1	E	
Gaylussacia brachycera	Box Huckleberry	G3	S1	E	
Gentiana villosa	Striped Gentian	G4	S1	E	
Geum aleppicum	Yellow Avens	G5	S1	E	
Gymnocladus dioicus	Kentucky Coffee-tree	G5	S1		
Helianthemum bicknellii	Hoary Frostweed	G5	S1	E	
Helonias bullata	Swamp Pink	G3	S2	E	LT
Hexalectris spicata	Crested Coralroot	G5	SH	X	
Iris verna	Dwarf Iris	G5	S1	E	
Juncus caesariensis	New Jersey Rush	G2	S1	E	
Juncus pelocarpus	Brown-fruited Rush	G5	S1	E	
Krigia dandelion	Potato Dandelion	G5	S1	E	
Lechea tenuifolia	Narrow-leaved Pinweed	G5	SH	X	
Leptochloa fusca ssp. fascicularis	Long-awned Diplachne	G5T5	SU		
Lupinus perennis	Wild Lupine	G5	S2	T	
Lygodium palmatum	Climbing Fern	G4	S2	T	

Matelea carolinensis	Anglepod	G4	S1	E	
Matelea obliqua	Climbing Milkweed	G4?	S1	E	
Monotropsis odorata	Sweet Pinesap	G3	S1	E	
Najas gracillima	Thread-like Naiad	G5?	SU	X	
Nymphoides aquatica	Larger Floating-heart	G5	S1	E	
Oligoneuron rigidum	Hard-leaved Goldenrod	G5	SH	X	
Orthilia secunda	One-sided Pyrola	G5	SH	X	
Platanthera blephariglottis	White Fringed Orchid	G4G5	S2	T	
Platanthera ciliaris	Yellow Fringed Orchid	G5	S2	T	
Platanthera flava	Pale Green Orchid	G4	S2		
Pluchea camphorata	Marsh Fleabane	G5	S1	E	
Polanisia dodecandra	Clammyweed	G5	S1	E	
Polygonum ramosissimum	Bushy Knotweed	G5	SH	X	
Potamogeton foliosus	Leafy Pondweed	G5	S1	E	
Potamogeton perfoliatus	Clasping-leaved Pondweed	G5	S2		
Potamogeton richardsonii	Redheadgrass	G5	SH	X	
Potamogeton spirillus	Spiral Pondweed	G5	S1		
Prunus maritima	Beach Plum	G4	S1	E	
Ranunculus ambigens	Water-plantain Spearwort	G4	SH	X	
Rhynchosia tomentosa	Hairy Snoutbean	G5	S2	T	
Rhynchospora cephalantha	Capitate Beakrush	G5	S1	E	
Rhynchospora globularis	Grass-like Beakrush	G5?	S1	E	
Sagittaria calycina	Spongy Lophotocarpus	G5	S2		
Salix humilis var. tristis	Dwarf Prairie Willow	G4G5	S1		
Sarracenia purpurea	Northern Pitcher-plant	G5	S2	T	
Schoenoplectus smithii	Smith's Clubrush	G5?	SU	X	
Schoenoplectus subterminalis	Water Clubrush	G4G5	S1	E	
Schwalbea americana	Chaffseed	G2G3	SX	X	LE
Scleria triglomerata	Tall Nutrush	G5	S1S2		
Silene nivea	Snowy Campion	G4?	S1	E	
Smilax pseudochina	Halberd-leaved Greenbrier	G4G5	S2	T	
Solidago hispida	Hairy Goldenrod	G5	SH	X	
Solidago speciosa	Showy Goldenrod	G5	S2	T	
Sporobolus asper	Long-leaved Rushgrass	G5	S1		
Stachys hyssopifolia	Hyssop-leaved Hedge-nettle	G4G5	SU		
Stenanthium gramineum	Featherbells	G4G5	S1	T	
Symphyotrichum concolor	Silvery Aster	G5	S1	E	
Symphyotrichum praealtum	Willow Aster	G5	S1		
Thelypteris simulata	Bog Fern	G4G5	S2	T	
Tofieldia racemosa	Coastal False Asphodel	G5	SX	X	
Trachelospermum difforme	Climbing Dogbane	G4G5	S1	E	
Triadenum tubulosum	Large Marsh St. John's-wort	G4?	S1		
Trichostema setaceum	Narrow-leaved Bluecurls	G5	S1		
Triosteum angustifolium	Narrow-leaved Horse-gentian	G5	S1	E	
Utricularia cornuta	Horned Bladderwort	G5	SH		
Utricularia fibrosa	Fibrous Bladderwort	G4G5	S1	E	
Viola septentrionalis	Northern Blue Violet	G5	SU		
Vitis cinerea	Graybark	G4G5	SU		
Xyris smalliana	Small's Yelloweyed-grass	G5	S1	E	

* This report represents a compilation of information in the Wildlife and Heritage Service's Biological and Conservation Data system as of the date on the report. It does not include species considered to be "watchlist" or more common species.

APPENDIX 3. Maryland Historical Trust Cultural Resources Project Review

PROJECT REVIEW FORM

Request for Comments from the Maryland Historical Trust/ MDSHPO on State and Federal Undertakings

MHT USE ONLY
Date Received: 9/14/10 Log Number: F NOAA DLM 20100466

Print Form

Submit hard copy of form and all attachments to:
Beth Cole, MHT, 100 Community Place, Crownsville, MD 21032

Section A: General Project Information

Project Name: Jug Bay Wetlands Sanctuary boardwalk and observation deck: CENAB-OP-RMN
County: Anne Arundel

☐ This is a new submittal **OR** This is additional information related Project Log Number: MDE 09-PR-0648 RAMS # 200865318

Section B: Primary Contact Information

Contact Name: Elizabeth Ebersole or Chris Swarth
Company/Agency: CBNERR/MD DNR/Anne Arundel County
Mailing Address: 580 Taylor Avenue
City: Annapolis
State: Maryland
Zip: 21401
Email: bebersole@dnr.state.md.us
Phone Number: +1 (410) 260-8720
Ext.:

Section C: Description of Undertaking

Location - Attach a map, preferably a section of a USGS quad, showing the location and boundaries of the project

Address: Parris N. Glendening Nature Preserve, Jug Bay Wetlands Sanctuary, Plummer
City/Vicinity: Lothian

List all federal and state agencies / programs (funding, permits, licenses) involved in this project (e.g. Bond Bill Loan of 2009, Chapter #; Transportation Enhancement Grant; HUD/CDBG; MDE/COE permit; etc.).	Agency Type	Agency/Program/Permit Name	Project/Permit/Tracking Number (if applicable)
	Federal	NOAA	
	State	MD DNR	
	State	MDE	09-PR-0648 RAM #2008-65318 M18

Proposed Work - Attach project description, scope of work, site plans / drawings

This project includes (check all applicable): ☒ **New Construction** ☐ **Demolition** ☐ **Remodeling/Rehabilitation**

This project involves: ☐ **State or Federal Rehabilitation Tax Credits**

☒ **Properties subject to an easement held by MHT, MET, or another entity**

Bristol

Section D: Identification of Historic Properties

This project involves: ☐ **Properties designated as historic by a local government, listed in the National Register, or included in Maryland Inventory of Historic Properties**

Property/District Name:

The subject property ☐ **has** ☐ **has not** been the subject of previous archeological, architectural, or historical investigations.

Please describe:

Attachments ☒ **Map** ☒ **Project Description/Scope of Work** ☒ **Site Plans/Drawings**

☒ **Photographs** - Attach prints or digital photographs showing the project site including images of **all** buildings and structures, preferably keyed to a site plan

☒ **Conditions** - Attach a brief description of past and present conditions of the project area (wooded, mined, developed, agricultural uses, etc) including construction dates of buildings, if known (all marshland)

MHT Determination MHT Reviewer: David Brenner Date: 9/29/10

☐ There are **NO HISTORIC PROPERTIES** in the area of potential effect
☐ The project will have **NO EFFECT** on historic properties
☒ The project will have **NO ADVERSE EFFECT** on historic properties
☐ The project will have **NO ADVERSE EFFECT WITH CONDITIONS**
☐ **MHT REQUESTS ADDITIONAL INFORMATION**
☐ The project will have **ADVERSE EFFECTS** on historic properties

Adjacent to 18AN19 - Multi component

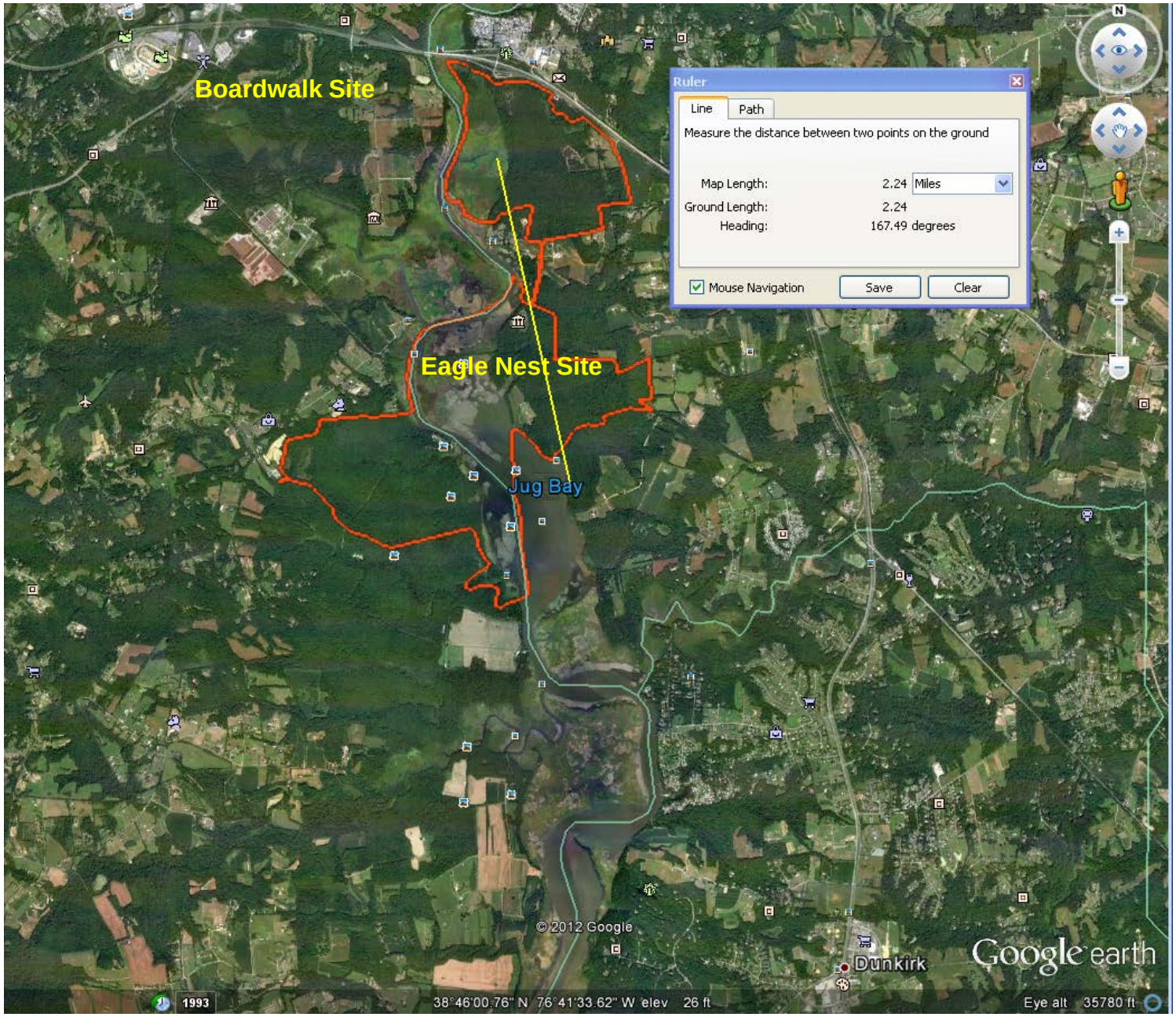
Appendix 4. Threatened and Endangered Species Review

On Wed, Mar 14, 2012 at 12:08 PM, <Julie_Thompson@fws.gov> wrote:

Pat-
I just checked with one of my staff and there are NO USFWS federally listed endangered or threatened species located at the proposed project site. You may, however, want to speak to Craig Koppie (410-573-4534) in our office about minimizing disturbance to any nesting bald eagles, if they are nearby. You can print this e-mail as meeting your requirements under ESA for our agency. NOAA could have listed species (atlantic sturgeon) that you may have to consult on. Let me know if you need anything else!

Julie Thompson Slacum
Division Chief, Strategic Resource Conservation
United States Fish and Wildlife Service
177 Admiral Cochrane Drive
Annapolis, MD. 21401
410-573-4595
cell: 410-980-7394

Patmarie Nedelka <patmarie.nedelka@noaa.gov


Boardwalk Site
Eagle Nest Site
Jug Bay
Ruler
Line
Path
Measure the distance between two points on the ground
Map Length: 2.24 Miles
Ground Length: 2.24
Heading: 167.49 degrees
Mouse Navigation
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© 2012 Google
Dunkirk
Google earth
1993
38°46'00.76" N 76°41'33.62" W elev 26 ft
Eye alt 35780 ft

From: Richardson, Brian
Sent: Monday, March 19, 2012 1:29 PM
To: McGinty, Margaret
Cc: Snow, Chris
Subject: RE: Sturgeon Habitat

You could potentially see Atlantic sturgeon in any of the tidal Chesapeake Baywaters so I would not say that they could not occur there. It is unlikely though. That far upstream is closer to spawning habitat than foraging habitat and there is zero evidence of any spawning population in Maryland tribs. Shortnose sturgeon have been observed in the Potomac and upper Bay, primarily north of the BayBridge. My personal opinion? I concur….no sturgeon concerns.
BR
Brian Richardson
Maryland DNR Fisheries Service
904 South Morris Street
Oxford, MD 21654
(o) 410.226.0078 x104
(c) 410.530.0215
(f) 410.226.0120

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

February 10, 2012

Chris Snow, Stewardship Coordinator
Chesapeake Bay National Estuarine Research Reserve in Maryland
580 Taylor Avenue, E-2
Annapolis, MD 21401

Dear Mr. Snow:

Maryland Department of Natural Resources Wildlife and Heritage Service staff (Kerry Wixted and Katharine McCarty) surveyed the proposed site of the marsh boardwalk at the Glendening Preserve, Jug Bay Wetlands Sanctuary in Anne Arundel County for state rare, threatened and endangered and federally threatened and endangered species. The first survey was conducted on September 16, 2010 and follow-up surveying was conducted in 2011. The Jug Bay Wetlands Sanctuary Director Christopher Swarth and the CBNERR Stewardship Coordinator participated in the surveying efforts.

Regarding federally threatened and endangered species, there are none occurring at the site. The only federally-threatened plants that occur in Anne Arundel County are *Aeschynomene virginica* (sensitive joint-vetch), *Helonias bullata (*swamp pink). The federally-endangered species *Schwalbea americana* (chaffseed) is now extirpated from the county, and there are no other federally endangered plants occurring in the county.

However, the site is located between two known populations of Maryland state-listed endangered anglepod (*Matelea carolinensis*); the GPS coordinates for these known populations are available for use in planning the boardwalk route, and the boardwalk will be constructed to avoid them. Other possible plants of concern that could occur in the general area include climbing milkweed (*Matelea oblique*), red turtlehead (*Chelone oblique*), coast sedge (*Carex exilis*), shoreline sedge (*Carex hyalinolepis*), hop-like sedge (*Carex lupuliformis*), inflated sedge (*Carex vesicaria*), velvety sedge (*Carex vestita*), white fringed orchid (*Platanthera blephariglottis*), yellow fringed orchid (*Platanthera ciliaris*), and the pale green orchid (*Platanthera flava*). A survey for the *Matelea* spp., *Chelone obliqua* and *Carex* spp. of concern was conducted on September 16, 2010 by the Maryland Department of Natural Resources Wildlife and Heritage Program. This survey indicated a possible presence of *Carex lacustris*, a State Rare plant, widely distributed in this marsh. This fruits in the late spring (late May-June). An area near the duck blind that does NOT have the *Carex* was flagged as a way of marking a possible location for the platform that would avoid impacts to the *Carex*. *Platanthera flava*, also a state rare species, is known to occur in the tidal swamp to the north along the Patuxent, just north of the Route 4 crossing. The water level was too high during surveys on September 16, 2010 to assess the distribution of this orchid, or to look for *Chelone obliqua*, a state threatened plant known to occur at Jug Bay. *Chelone* flowers

in August-September; the reddish-pink flowers make this plant easy to distinguish from the common turtlehead. Follow up surveys did not locate any of these species of concern in the immediate area of the project. Protection measures have been adequately discussed with CBNERR DNR and Jug Bay Wetlands Sanctuary staff and taken into account. We have no further concerns or comments regarding state or federally listed species at this time. Feel free to contact us if you have any questions.

Sincerely,

Timothy Larney
Habitat Conservation Program Manager
Wildlife and Heritage Service
tlarney@dnr.state.md.us

APPENDIX 5. List of Agencies and Persons Consulted

Richard J. Ayella, Chief, Tidal Wetlands Division, 410-537-3000, rayella@mde.state.md.us
Maryland Department of the Environment, 1800 Washington Boulevard, Baltimore, MD 21230

Elizabeth Cole, Administrator, 410-514-7631, bcole@mdp.state.md.us
Review and Compliance (R&C), Maryland Historical Trust, 100 Community Place, Crownsville, MD 21032

Dixie Henry, Preservation Officer, 410-514-7638, dhenry@mdp.state.md.us
Review and Compliance (R&C), Maryland Historical Trust, 100 Community Place, Crownsville, MD 21032

Roland Limpert, Environmental Specialist, 410-260-8333, rlimpert@dnr.state.md.us
Maryland Department of Natural Resources, Chesapeake and Coastal Services, Environmental Review, 580 Taylor Avenue, B-3, Annapolis, MD 21401

Katherine McCarthy, Southern Regional Ecologist, RTE Expert, 410-260-8569, kmccarthy@dnr.state.md.us
Maryland Department of Natural Resources, Wildlife and Heritage Service, Heritage Division, 580 Taylor Avenue, E-1, Annapolis, MD 21401

Briand Richardson 410-226-0078 ext.104 brichardson@dnr.state.md.us
Maryland Department of Natural Resources, Fisheries Service
904 South Morris Street, Oxford, MD 21654

Julie Thompson Slacum, Division Chief, Strategic Resource Conservation, 410-573-4595
Julie_thompson@fws.gov
United States Fish and Wildlife Service
177 Admiral Cochrane Drive, Annapolis, MD 21401

Kerry Wixted, Southern Regional Biologist, RTE Expert, 410-260-8566, kwixted@dnr.state.md.us
Maryland Department of Natural Resources, Wildlife and Heritage Service, Heritage Division, 580 Taylor Avenue, E-1, Annapolis, MD 21401

APPENDIX 6. Public Comment and Responses

Meeting Minutes

CBNERR Management Plan Informational Meetings

Anita Leight Estuary Center: Abingdon, MD
February 20th, 2007
7:00-9:00pm

Beth Ebersole Reserve Manager gave a power point presentation highlighting the management goals and the areas of focus for CBNERR. This presentation also highlighted the boundary changes through maps and a draft management plan was left at the site for review.

Questions/Comments

1. Matt Kropp (Harford County DPZ) asked the Reserve Manager to highlight major changes from the 1990 plan.
   Answer: Major Changes included the boundary changes for the Reserve; better defined the goals and objectives of the reserve; includes potential facility expansion (new canoe shed, boardwalk to connect the Leight Center to the Pier property and a pavilion at the Pier property.
2. Matt Kropp (Harford County DPZ) .Are their additional areas that are being considered in this management plan for acquisition? Participant commented that the county/Reserve should look into what is occurring on a piece of property that is adjacent to the reserve and next to Home Depot. This property is primarily wetlands and currently the county is blocking permits to develop due to floodplain and wetland issues. Also, it may be worthwhile developing a partnership with the SHA on lands that they own that are adjacent to the Reserve to increase its boundaries.
3. Bernie Bodt, Isaak Walton League Member: The Reserve should be aware that there is an island in Otter Point Creek and technically within the Reserve boundaries that is privately owned. The IWLA in partnership with the Harford Land Trust has been interested for years in purchasing this land. However, have been unsuccessful because there are 30 heirs to property and the Land Trust felt that since critical area laws would prevent any development from taking place on the island it was not a high priority. The IWLA also acquired 17 acres in 2005 adjacent to the Bosely Conservancy that is upland habitat. Should this be added for consideration for boundary expansion in the next revision? Also Harford County owns a piece of property adjacent to the Reserve that is ½ wetland, ½ upland area. The upland area is going to be used as athletic fields but should the Reserve pursue adding the wetland portion to the Reserve. It should be noted that this land was originally designated by the county to be part of the Reserve but after they realized there was certain uses prohibited (athletic fields) they did not pursue the boundary expansion. Also, there is much outreach/education that

needs to be done in the community and within the county government to make sure that the continued protection of the lands occurs.

4. Ed Morgereth, Biohabitat commented that there has been a shift in the management of protected land from that of wildlife/habitat control to restoration/preservation. How is the Reserve managed and what restoration plans are planned? Reserve is managed to preserve/restore the natural processes and restoration/monitoring activities include SAV restoration and fish larval studies.

Maryland Department of Natural Resources
Chesapeake Bay National Estuarine Research Reserve – Maryland
Public Informational Meeting, Updated Management Plan
Otter Point Creek, February 20, 2007

SIGN-IN SHEET

NAME	AFFILIATION	E- MAIL	ADDRESS	PHONE
Elizabeth Ebersole	MdDNR-CBNERR	bebersole@dnr.state.md.us	580 Taylor Ave 21401 Annapolis Md	410-260-8720
Candace Morrell	MD-DNR-CBNERR	cmorrell@dnr.State.md.us	7701 Lake Shore Owings, MD 20736	410-260-8712
Shanna Schoen	OPC-ACLEC	Srschoen@harfordcountygov	700 otter point Rd Aberdeen, MD 21609	410-612-1688
Sasha Bishton	CBNERR	SBishton@dnr.State.md.us	580	
Sharyn Sprigg	OPCA	SSPRAG@JHMI.edu	620 Falconbridge Joppa, MD 21085	410-679-9492
Bart Merrick	CBNERR	bmerrick@dnr.State.md.us	204 E. Fairmont Ave. Baltimore, MD 21231	410-558-0745
Bernie Bodt	IWLA-Hartford Cty	bodtdock@comcast.net	2917 Churchville Rd Churchville, MD 21028	410-734-7702
Michele Dobson	Harford County DPW	mgdobson@harfordcountymd.gov	212 S. Bond Street Bel Air MD 21014	410 638 3545
Matt Kropp	Harford County DPZ	MTKropp@HarfordCountyMD.GOV	220 S. MAIN ST BEL AIR 21014	410 638-3103 1364
Ed Morgereth	Biohabitats	emorgereth@biohabitats.com	2081 Clipper Park Rd Balt., MD 21211	410-554-0156

Meeting Minutes

CBNERR Management Plan Informational Meetings

Jug Bay Wildlife Sanctuary
February 21, 2007
7:00-9:00 pm

Beth Ebersole Reserve Manager gave a power point presentation highlighting the management goals and the areas of focus for CBNERR. This presentation also highlighted the boundary changes through maps and a draft management plan was left at the Jug Bay and Patuxent River Park for review.

Questions/Comments
Marie McGlone, Friends of Croom: Represents a citizen group from PG County and expressed concerns by her group of fragmentation of key ecological areas along the Patuxent River. Highlighted a 200 acre parcel along Croom Rd and Croom Station Rd that the state may be in negotiations in partnership with PG county to buy from developers, she requested that Reserve might be able to follow up on the status of this. Greg Lewis site manager of PRP agreed to follow up on this. Suggested that the Reserve work more actively on the PG county side to acquire land to expand the boundary of the Reserve in the next 5 years. Also asked why the entire PRP was not a part of the Reserve system and Greg Lewis commented that this maybe possible in the next 5 years given current success and that the boundary should be expanded further south to include both sides of Mataponi Creek but that would require additional support within DNR because that includes Merkle Wildlife Management Area.

Greg Lewis: Manager PRP
With the boundary expansion in PRP of 455 acres the entire Black Walnut Creek watershed is within the reserve and this expands the potential of long-term research and monitoring.

Dennis Whigam: SERC
The scope of research should be expanded to include the impacts of climate change and the impacts of salt water intrusion on each of the individual sites. This information should through outreach be made available to the public

Al Tucker: Friends of Jug Bay
Question: Are there resources available to reach the coastal decision makers? The key focus should be to develop educational programs to reach both the public and decision makers and that the science needs to translated into a format that all can understand and respond to. The ultimate goal should be that this information will then influence behavior change.

Lindsey Funk: Staff JBWS
Commented on the need through CTP to influence behavior of citizens/decision-makers. There are many issues to focus on but could include, smart growth principals, critical area laws and designations, public transportation and the lack thereof in MD and construction practices specifically silt fences and how the are currently ineffective.

Chris Swarth: Manager JBWS
Went over the boundary expansion in detail.

Jeff Campbell: FOJB
Commented on the need for information management and that better integration of existing data needs to occur.

Maryland Department of Natural Resources
Chesapeake Bay National Estuarine Research Reserve – Maryland
Public Informational Meeting, Updated Management Plan
Jug Bay Wetlands Sanctuary, February 21, 2007

SIGN-IN SHEET

NAME	AFFILIATION	E- MAIL	ADDRESS	PHONE
Dennis Whigham	Smithsonian Envt.	Whighamd@si.edu	SERC Box 28 Edgewater 21037	443-482-2226
Peggy BROSNAN	FOJB	Peggybrosnan@yahoo.com	6020 Pindell RD. Bristol MD 20711	410 741 9639
Tom Englar	FOJB	Ktenglar@comcast.net	12451 Uncle Charlies Spur Prince MD 20754	301-855-8503
Mike Quinlan	FOJB	mikemq@aol.com	12508 Caswell Bowie, MD 20715	301-661-3826
DAVID DAVIS	FOJB	ddedge@netzero.com	1044 PAM ANN LN Lothian 20711	410-741 0208
Jeff Campbell	Volunteer	jeffcetel@comcast.net	6412 Four Foot TR Columbia, MD 21045	410 455-3687
Susan Blackstone	FOJB	scblackstone@yahoo.com	1636 Shore Dr Edgewater, MD 21037	410 956-4742
Lindsay Hollister	JBWS	rpfunk27@aacounty.org	1361 Wrighton Rd Lothian MD 20711	410-741-9330
Ben Hollister	"	"	"	"
Judy Burke	FOJB		1357 Wrighton Lothian 20711	410741 0748
Kathy Elliott	Volunteer FOTO	Kelleth1@Comcast.net	1713 Fillmore Ct Crofton, MD	410-721-2082
Dave Linthicum	"	DaveLinthicum@earthlink.net	6020 Pindell Rd, Bristol 20711	410 741 9639
Peggy Brosnan	"			

Maryland Department of Natural Resources
Chesapeake Bay National Estuarine Research Reserve – Maryland
Public Informational Meeting, Updated Management Plan
Jug Bay Wetland Sanctuary, February 21, 2007

Comment SIGN-UP Sheet

ORDER	NAME	AFFILIATION	WOULD YOU LIKE TO PROVIDE A VERBAL COMMENT TONIGHT?
1.	MARIE McGLONE	FRIENDS OF CROOM	YES
2.	Greg Lewis	PRP	yes
3.	Dennis Whigham	Smithsonian	Yes
4.	AL TUCKER	FOJB	Yes
5.	Lindsay Funkhouser	JBWS	Yes
6.	Chris Swarth	JBWS	Yes
7.	Jeff Campbell	citizen	Yes
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