# Appendix D
# Environmental Documentation

1. **Poplar Island Environmental Restoration Project EIS Record of Decision**

2. **Poplar Island Environmental Restoration Project GRR Record of Decision**

3. **Environmental Correspondence Letters and Emails**

4. **Updated Air Quality Analysis**

5. **Poplar Island July 2012 Species List**

6. **Environmental Hypotheses Tables**

7. **Fish Utilization at Poplar Island**

8. **Bird Nesting on Poplar Island**

# D1

# PROJECT MANAGEMENT PLAN
# POPLAR ISLAND ENVIRONMENTAL RESTORATION PROJECT

## ATTACHMENT B

## RECORD OF DECISION

## POPLAR ISLAND
## TALBOT COUNTY, MARYLAND
## ENVIRONMENTAL RESTORATION PROJECT

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

REPLY TO
ATTENTION OF

# RECORD OF DECISION

## POPLAR ISLAND
## TALBOT COUNTY, MARYLAND
## ENVIRONMENTAL RESTORATION PROJECT

I have reviewed the report entitled Poplar Island, Maryland, Environmental Restoration Project, Integrated Feasibility Report and Final Environmental Impact Statement, and correspondence received in response to coordination of the document. Based on my review, and the views of interested agencies and the concerned public, I find the plan recommended by the District Engineer, Baltimore District, Army Corps of Engineers to be justified, in accordance with environmental statutes, and in the public interest. Thus, I approve that plan for construction.

This project is authorized under Section 204 of the Water Resources Development Act of 1992, Beneficial Uses of Dredged Material (Public Law 102-580). The recommended plan uses clean dredged material from the Chesapeake Bay channels of the Baltimore Harbor and Channels Federal Navigation Project to recreate habitat in Talbot County, Maryland by restoring Poplar Island. The proposed plan recommended by the District Engineer consists of the following features:

- Creation of a 1,110 acre dredged material placement area within a 35,000-foot armored perimeter dike around Poplar Island's 1847 footprint, consisting of 550 acres of wetlands and 550 acres of upland habitat;

- Creation of interior dikes and control structures to separate upland and wetland cells;

- Monitoring framework to: 1) ensure regulatory compliance; 2) ensure the successful creation of beneficial habitat; 3) confirm the expected impacts; and, 4) provide operational input for habitat management.

In addition to a "no action" alternative, the Section 204

feasibility study evaluated various alternatives to restore island habitat in the Chesapeake Bay using clean dredged material from Chesapeake Bay Channels of the Baltimore Harbor and Channels Federal Navigation Project. Specifically, the Corps investigated various placement site alternatives throughout the bay and their associated habitat creation and restoration opportunities. The Corps also evaluated different sizes of islands at the Poplar Island location. These islands (820, 1,110, and 1,340 acres) were also varied to contain different mixes of upland and wetland habitats and to have different elevations. All of these alternatives are discussed in the project integrated feasibility report and environmental impact statement, and are incorporated into the ROD by reference. The recommended plan, the 1,110-acre plan described above, is the environmentally preferable alternative since it optimizes environmental outputs while providing badly needed dredged material placement capacity.

A phased construction concept was briefly discussed in the report at the request of the non-Federal sponsor. However, this concept was not identified as the preferred method of construction due to its greater cost (about $10 million). However, due to potential funding constraints, it is possible that the project could proceed under a phased construction approach with the objective being to achieve the full 1,110-acre project. Environmental impacts associated with phased construction are not expected to vary significantly from the impacts associated with single-phase construction. It is not anticipated that the borrow areas will be dredged to a depth that would result in significant anoxic conditions. If anoxic conditions occur, effects will be temporary and seasonal. Also, as a result of phased construction, Coaches Island could experience increased erosion. However, hydrodynamic modeling performed during the feasibility study indicated that tidal flows around the project would be similar to those resulting from the construction of the overall project. The presence of the connector dike would prevent erosion in the gap between Poplar Island and Coaches Island.

Specific monitoring studies will be developed in consultation with an interagency advisory committee over the life of the project. A site management plan for performing inspections, habitat and dike maintenance, revegetation and natural recolonization efforts, pest control , remedial actions in the event of major damage, as well as any other activities will be developed to adaptively manage and operate the site.

I have reviewed and evaluated documents concerning the proposed action; views of other interested agencies; and the various practicable means to avoid or minimize environmental harm from the construction of this project.

All practicable means to avoid or minimize adverse environmental effects have been incorporated into the recommended plan. The public interest will best be served by implementing the improvements identified and described in the Section 204 feasibility report and environmental impact statement.

H. Martin Lancaster
Assistant Secretary of the Army
(Civil Works)

4 SEP 1998
DATE

# D2

# RECORD OF DECISION

## GENERAL REEVALUATION REPORT AND SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE POPLAR ISLAND ENVIRONMENTAL RESTORATION PROJECT

## CHESAPEAKE BAY, TALBOT COUNTY, MARYLAND

The integrated General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS) for the Poplar Island Environmental Restoration Project (PIERP), dated September, 2005, provides documentation in support of expansion of the Poplar Island, Maryland dredged material beneficial use site in Talbot County, Maryland. Based on the report, the reviews of other Federal, State, and local agencies, input from the public, and the review of my staff, I find the plan recommended by the Chief of Engineers to be technically feasible, economically justified, in compliance with applicable environmental statutes, and in the public interest. Thus, I approve the Poplar Island Environmental Restoration Project Expansion for construction.

The U.S. Army Corps of Engineers (USACE) along with the Maryland Port Administration (MPA) as the non-Federal sponsor initiated the Poplar Island Expansion Study to address the dredged material placement capacity shortfall documented in the Baltimore Harbor and Channels Dredged Material Management Plan (DMMP) and Tiered Environmental Impact Statement (USACE, 2005). The expansion of the PIERP was one of four alternatives recommended in the DMMP that was applicable to the upper Chesapeake Bay approach channels to the Port of Baltimore. The GRR/SEIS documents the National Environmental Policy compliance for the proposed expansion of the PIERP, provides information specific to the actions of the GRR, and supplements the Poplar Island Restoration Study, Maryland: Integrated Feasibility Report and Environmental Impact Statement (USACE/MPA, 1996). The expansion study was conducted under the existing Poplar Island project authorization, Section 537 of the Water Resources Development Act (WRDA) 1996, as amended, which allows the U.S. Army Corps of Engineers to protect, restore, and create aquatic and ecologically related habitat. The project consists of:

1) construction of a northern lateral expansion of approximately 575 acres of remote island habitat that incorporates an open-water embayment to accommodate about 28 million cubic yards of dredged material from Chesapeake Bay approach channels to the Port of Baltimore located outside (east) of the North Point – Rock Point line and south of the Sassafras River;

2) placement of dredged material from the southern approach channels to the Chesapeake and Delaware (C&D) Canal and other Federal navigation projects under conditions described in the GRR and SEIS;

3) construction of a 5-foot vertical raising of the PIERP upland cells (Cells 2 and 6) and incorporation of design modifications required for PIERP completion;

4) development of recreational and educational features consistent with ecosystem restoration policy.

The GRR/SEIS provides detailed analysis of three alternatives, in addition to the no action alternative. The alternatives consisted of various orientations and scales for island modification along with combinations of lateral and vertical expansion. The alternatives that were evaluated in detail as a basis for plan selection were:

Alternative 1: 575-acre lateral expansion with 60 percent wetlands, 40 percent uplands; plus a 5-ft vertical expansion;
Alternative 2: 575-acre lateral expansion with 50 percent wetlands, 50 percent uplands; plus a 5-ft vertical expansion;
Alternative 3: 575-acre lateral expansion with 29 percent wetlands, 47 percent uplands, 24 percent open-water embayment; plus a 5-ft vertical expansion;
No Action Alternative: (existing project at its authorized configuration): 1,140 acres at 50 percent wetlands, 50 percent uplands.

Alternative 3 is the recommended plan and the environmentally preferable alternative because it would increase the complexity and diversity of habitat types with the lateral expansion, would impact the least amount of benthic habitat, and would produce the greatest number of environmental benefits.

Currently, dredged material from eight Federal navigation channels in the upper Chesapeake Bay is authorized for placement at PIERP. Acceptance of dredged material from the southern approach channels to the C&D Canal and from other Federal, State, County, or local navigation projects was considered as part of the GRR/SEIS. The lateral and vertical expansion components of the recommended plan were designed to accommodate the additional annual placement need of approximately 1.2 million cubic yards (mcy) of dredged material from the southern approach channels to the C&D Canal (south of the Sassafras River), following the mandatory closure of Pooles Island in 2010. In addition, dredged material from other Federal navigation channels is recommended for placement at the PIERP if the material undergoes and passes the required sediment quality evaluations and if other local beneficial uses and placement options are not feasible in the vicinity of the Federal navigation projects.

Under the auspices of the GRR, USACE-Baltimore District assessed the current project and recommended several additional actions required to complete the existing project: raising the existing temporary upland dikes from +23 ft MLLW to +25 ft MLLW to allow for placement and consolidation of the dredged material necessary to reach the original upland target elevation of 20 feet; dredging of a new southern access channel and turning basin to accommodate the closure of Cell 6; restoration of internal borrow sites within wetland Cell 4; construction of temporary cross dikes within wetland Cell 5;

and constructing new discharge, pier, and bulkhead structures to accommodate the closure of Cell 6. These actions will require borrow of sand from outside the existing project footprint, but are necessary actions to successfully complete the existing PIERP.

The recommended plan represents a cost-effective and environmentally beneficial plan to provide approximately 28 mcy of additional placement capacity at Poplar Island and extend the life of the project by approximately 7 years. In addition, this project will create remote island wetland and upland habitat and will include an open-water embayment that will increase habitat diversity. The entire project will continue to be adaptively managed to maximize habitat benefits and dredged material capacity in the most cost-effective manner.

All practicable means were employed to avoid or minimize the environmental and socioeconomic harm from implementing the recommended plan. Environmental monitoring will be performed to ensure regulatory compliance, to document the creation of beneficial habitat, to confirm the expected findings of no significant negative impacts, and to provide operational input on the success of habitat creation and potential changes which will increase the habitat value and utilization.

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resource Council's Principles and Guidelines. All applicable laws, Executive Orders, regulations and local government plans were considered in the evaluation of the alternatives. Based on review of these evaluations, I find that the public interest would be best served by implementing the recommended plan. This Record of Decision completes the National Environmental Policy Act process.

11 October 2006
Date

John Paul Woodley Jr.
John Paul Woodley
Assistant Secretary of the Army
(Civil Works)

# D3

# United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

September 21, 2012

Ms. Robin Armetta
Environmental Protection Specialist
U.S. Army Corps of Engineers
Baltimore District, Planning Division
P.O. Box 1715
Baltimore, MD 21203-1715

*RE: Poplar Island in Maryland*

Dear Ms. Armetta:

This responds to your letter, received September 19, 2012, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened within the vicinity of the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project impact area. Therefore, no Biological Assessment or further section 7 Consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. For information on the presence of other rare species, you should contact Lori Byrne of the Maryland Wildlife and Heritage Division at (410) 260-8573.

Effective August 8, 2007, under the authority of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (Service) removed (delist) the bald eagle in the lower 48 States of the United States from the Federal List of Endangered and Threatened Wildlife. However, the bald eagle will still be protected by the Bald and Golden Eagle Protection Act, Lacey Act and the Migratory Bird Treaty Act. As a result, starting on August 8, 2007, if your project may cause “disturbance” to the bald eagle, please consult the “National Bald Eagle Management Guidelines” dated May 2007.

If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), please contact the Chesapeake Bay Ecological Services Field Office at 410-573-4573 for technical assistance. The Eagle Management Guidelines can be found at: **http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.**

In the future, if your project can not avoid disturbance to the bald eagle by complying with the Eagle Management Guidelines, you will be able to apply for a permit that authorizes the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally where the take to be authorized is associated with otherwise lawful activities.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if construction in wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Trevor Clark at (410) 573-4527.

Sincerely,

G. LaRouche

Genevieve LaRouche
Supervisor

## Armetta, Robin E NAB

**From:** Christine Vaccaro [christine.vaccaro@noaa.gov]
**Sent:** Thursday, September 20, 2012 11:28 AM
**To:** Armetta, Robin E NAB
**Subject:** Re: Poplar Island Questoin (UNCLASSIFIED)

I think you can do that--update the information with the new listing information for Atlantic sturgeon, etc. and then state that if it is necessary, consultation will occur.

Alternatively, if the Corps believes that the project will have no effect on Atlantic sturgeon based on your assessment of the impacts to shortnose sturgeon and the similarity in life histories, the Corps can simply make a "no effect" determination on Atlantic sturgeon. Especially if the project has not changed. If you feel that it "may affect", you should eventually come to us for consultation where we will concur with a not likely to adversely affect finding. However, if you believe it is a truly "no effect" situation, you can make that determination. NMFS is not able to concur with a "no effect" though--it is something the Corps does on its own. Under the ESA, if something is "no effect", we just do not see it or consult on it.

So, you have several choices on how you would like to proceed.

Cheers,
Chris
Chris Vaccaro
Fisheries Biologist
Protected Resources Division
NOAA Fisheries/NERO
Gloucester, MA
Phone: 978-281-9167
Email: christine.vaccaro@noaa.gov

On Thu, Sep 20, 2012 at 11:22 AM, Armetta, Robin E NAB <Robin.E.Armetta@usace.army.mil> wrote:

> Classification: UNCLASSIFIED
> Caveats: NONE
>
> Hi Chris,
>
> Thank you so much. This NEPA update is for a larger report. The project design did not change since 2005 but the cost did, and as a result, we need to write a report explaining why the costs went up. After talking with our office of council folks, they suggested we should update sections of the NEPA that might have changed since 2005 such as rare, threatened, and endangered species. It only has to be a couple of sentences but we do want to touch on any updates if any.
>
> That being said, in my write up, would it be safe to say that since 2005, the Atlantic Sturgeon has been added to list of aquatic species to be aware.
>
> Would it be possible to state that the Atlantic Sturgeon has a relatively similar life history to the shortnose sturgeon, and as a result the impacts of the proposed project on the

Atlantic sturgeon should be minimal but that more formal consultation with the NMFS will continue to more?

What would be the best way to summarize this new information. I am trying to get this information in my report by the end of the week, so even if I can get the formal consultation process started until later, I wanted to tell the correct story of any new updates.

What are your thoughts.

Sincerely,
Robin

Robin Armetta
Environmental Protection Specialist
USACE, Baltimore District, Planning Division
Phone: 410-962-6100
Email: Robin.E.Armetta@usace.army.mil

-----Original Message-----
From: Christine Vaccaro [mailto:christine.vaccaro@noaa.gov]
Sent: Thursday, September 20, 2012 11:10 AM
To: Armetta, Robin E NAB
Subject: Re: Poplar Island Questoin (UNCLASSIFIED)

Hi Robin,
Julie forwarded your email to me. I actually handle all the ACOE actions in the Baltimore District now.

As far as new information since 2005, we do have Atlantic sturgeon listed as of February of this year. Atlantic sturgeon have relatively similar life history to shortnose sturgeon, although there is a larger marine component and their population is broken into Distinct Population Segments. Here is some background information from our website: http://www.nero.noaa.gov/prot_res/atlsturgeon/

If you are again doing updates to your report, you should include Atlantic sturgeon and would like need to initiate consultation with us again ( a new listing constitutes grounds for re-initiation of consultation). I can't imagine impacts would be any different than for what we've said for shortnose sturgeon as the Chesapeake Bay is not spawning grounds for Atlantics. But, to cover your bases, consultation is suggested.

Let me know if I can be of any further help.

Cheers,
Chris

Chris Vaccaro
Fisheries Biologist
Protected Resources Division
NOAA Fisheries/NERO
Gloucester, MA
Phone: 978-281-9167
Email: christine.vaccaro@noaa.gov

On Thu, Sep 20, 2012 at 11:02 AM, Julie Crocker <julie.crocker@noaa.gov> wrote:

for you :)

---------- Forwarded message ----------
From: Armetta, Robin E NAB <Robin.E.Armetta@usace.army.mil>
Date: Thu, Sep 20, 2012 at 10:38 AM
Subject: Poplar Island Questoin (UNCLASSIFIED)
To: "julie.crocker@noaa.gov" <julie.crocker@noaa.gov>

Classification: UNCLASSIFIED
Caveats: NONE

Hi Julie,

I just left a voice message for you but I thought I would also send you an email as well. My name is Robin Armetta, I work at the Baltimore District for the Corps of Engineers and one of my projects I am working on is Poplar Island. I working on try to update some of the Project's NEPA information such as species (rare, threanted, and endangered) and wanted to touch base with you for species under NOAA jurisdiction that we need to be aware of. The last update we did for the project was in 2005 when we did a report to proposed a lateral expansion of the project. Here is what stated in the report:

"As far as aquatic species are concerned, in 2005, the only other species to be aware of was the Shortnose Sturgeon. Because Shortnose Sturgeon are only expected to be transient to the area, no impacts to this species are anticipated from the lateral expansion. In agency coordination, National Marine Fisheries Service (NMFS) stated that no sea turtles and/or Shortnose Sturgeon have been encountered in previous dredging operations at Poplar Island and that no direct effects to Shortnose Sturgeon and/or sea turtles are likely to result from the required dredging operations for the project. As a result of the agency correspondence, the USACE has determined, and NMFS has concurred, that the proposed northern lateral expansion is not likely to adversely affect any threatened or endangered species within the jurisdiction of NOAA and that no further consultation pursuant to Section 7 of the Endangered Species Act was required."

I wanted to see if things have changed since then. Are there any new species that we need to be aware of since we coordinated with you back in 2005? Any information you might have would be great.

Sincerely,
Robin

Robin Armetta
Environmental Protection Specialist
USACE, Baltimore District, Planning Division
Phone: 410-962-6100
Email: Robin.E.Armetta@usace.army.mil

Classification: UNCLASSIFIED
Caveats: NONE

--
Julie Crocker

Protected Resources Division
Northeast Regional Office
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Classification: UNCLASSIFIED
Caveats: NONE

# D4

### 3.1.9 Air Quality

The PIERP is located in Talbot County, Maryland, which is part of the Eastern Shore Intrastate Air Quality Control Region (AQCR). The AQCR is in attainment for all of the National Ambient Air Quality Standard (NAAQS) criteria pollutants, which include particulate matter (both $PM_{10}$ and $PM_{2.5}$), sulfur dioxide, nitrogen dioxide, carbon monoxide, lead, and ozone. A summary of the pollutant characteristics is provided in Table 3-9.

**Table 3-9. Air Pollutants and Their Characteristics**

| Pollutant | Characteristics |
|---|---|
| Particulates ($PM_{10}$ and $PM_{2.5}$) | • Mixture of solid particles and liquid droplets<br>• Fine particles (less than 10 and 2.5 micrometers) produced by fuel combustion, power plants, and diesel buses and trucks<br>• Can aggravate asthma, produce acute respiratory symptoms, including aggravated coughing and difficult or painful breathing, and chronic bronchitis<br>• Impairs visibility |
| Sulfur Dioxide ($SO_2$) | • Can cause temporary breathing difficulties for people with asthma<br>• Reacts with other chemicals to form sulfate particles that are major cause of reduced visibility in many parts of the country<br>• Main contributor to acid deposition |
| Nitrogen Oxides ($NO_x$) | • High temperature fuel combustion exhaust product<br>• Can be an irritant to humans and participates in the formation of ozone<br>• Reacts with other pollutants to form nitrate particles that are a significant contributor to visibility reduction in many parts of the country<br>• Contributor to acid deposition |
| Carbon Monoxide (CO) | • Odorless, colorless gas produced by fuel combustion, particularly mobile sources<br>• May cause chest pains and aggravate cardiovascular diseases, such as angina<br>• May affect mental alertness and vision in healthy individuals |
| Lead (Pb) | • Can cause damage to the kidneys, liver, brain and nerves, and other organs<br>• Can cause high blood pressure and increases heart disease<br>• Can cause reproductive damage in some aquatic life and cause blood and neurological changes in fish |
| Ozone ($O_3$) | • Not directly emitted by mobile, stationary, or area sources<br>• Formed from complex reactions between $NO_X$ and VOC emissions in the presence of sunlight<br>• Occurs regionally due to multiplicity of sources<br>• Can irritate the respiratory system<br>• Can reduce lung function<br>• Can aggravate asthma and increase susceptibility to respiratory infections<br>• Can inflame and damage the lining of the lungs<br>• Interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather<br>• Damages the leaves of trees and other plants |
| Volatile Organic Compounds (VOCs)[1] | • Product of incomplete fuel combustion<br>• Consists of a wide variety of carbon-based molecules<br>• Participates in the formation of ozone |

[1] *Not an NAAQS criteria pollutant – regulated as ozone precursor*

Although Talbot County is in attainment for all criteria pollutants, the Eastern Shore AQCR is part of the Northeast Ozone Transport Region (OTR), which was established in the 1990 Clean

Air Act Amendments in recognition of the longstanding ozone nonattainment problems in the northeast. The OTR is the area consisting of the Northeast and Mid-Atlantic States that historically has a ground level ozone problem, largely due to pollutant transport from upwind states outside the region. The Ozone Transport Commission (OTC), which is a multi-State organization, provides oversight for the region and is responsible for advising USEPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem.

During normal operations at PIERP, numerous pieces of earthmoving equipment used to place and manage dredged material within the upland and wetland cells. Table 3-10 summarizes the types of equipment currently operating on the island.

**Table 3-10. Equipment Data from the PIERP Earthmoving Equipment Operations**

| Number | Construction Equipment | Average Rated HP | Usage (hrs/yr)[1] |
|---|---|---|---|
| 3 | Dozer | 260 | 2,098 |
| 2 | Trencher | 260 | 20 |
| 4 | Dump Truck | 220 | 2,956 |
| 1 | Fuel & Lube Truck | 260 | 894 |
| 6 | Excavator | 260 | 4,621 |
| 1 | Loader | 260 | 338 |
| 1 | Compactor | 260 | 29 |
| 1 | Grader | 260 | 194 |

[1] Annual usage estimated from extrapolation of equipment operating hours from Jul 2004 – Feb 2005.

Based on the size and activity levels for this heavy equipment shown in Table 3-10, emissions from normal operations were estimated using EPA's National Mobile Inventory Model (NMIM). These emission estimates are summarized in Table 3-11. Emissions are also generated by diesel pickup and utility trucks used at the PIERP. No data on the size and usage level of these trucks are readily available, but as they have smaller engines and are fewer in number than the heavy equipment, their emissions are assumed to be minor relative to the level of emissions generated by the large earthmoving equipment noted in Table 3-10 above. Emissions from normal operations at PIERP, when compared with estimates of annual emissions generated in Talbot County overall from the 1999 National Emission Inventory, are quite small - less that 0.1 percent for CO, VOC, and $PM_{10}$, and less than 1 percent for $NO_X$ emissions, as shown in Table 3-11.

**Table 3-11. Estimated Annual Air Emissions from the PIERP Earthmoving Equipment Operations and Talbot County**

| Area | Emissions (tons/yr) | | | |
|---|---|---|---|---|
| | CO | $NO_X$ | VOC | $PM_{10}$ |
| PIERP Equipment Operations | 1.99 | 6.30 | 0.32 | 0.56 |
| Talbot County | 14,000 | 3,000 | 2,440 | 2,730 |

***Source**:* The above PIERP estimates were calculated using the EPA *National Mobile Inventory Model (NMIM) software.*

### 5.4.9 AIR QUALITY

Although the proposed project would be constructed within a county designated as attainment for all of the National Ambient Air Quality Standards (NAAQS), the county is within the U.S. Environmental Protection Agency (USEPA) designated northeastern Ozone ($O_3$) Transport Region (OTR), a multi-state region where transport of pollutants from upwind states create particular challenges to attainment of the ground-level ozone NAAQS. The ozone precursor pollutants $NO_X$ and VOC, are regulated as nonattainment pollutants within the OTR. The project is thereby potentially subject to the federal General Conformity Rule established at 40 CFR Part 93 Subpart B. A General Conformity applicability analysis was conducted to determine if increases in air pollution from the construction of the PIERP expansion would exceed *de minimis* levels established under the General Conformity Rule, and thereby potentially cause or contribute to new violations of the National Ambient Air Quality Standards (NAAQS).

#### 5.4.9.a Regulatory Background: General Conformity Applicability Analysis

The General Conformity Rule was established to ensure that federal activities do not interfere with efforts to return nonattainment areas to compliance with the NAAQS. In particular, Section 176(c) of the Clean Air Act (CAA) prohibits federal agencies, departments or instrumentalities from engaging in, supporting, licensing, or approving any action, in an area that is in nonattainment of the NAAQS, which does not conform to an EPA approved state implementation plan (SIP). Therefore, it must be determined whether or not the project would interfere with the goals in the affected State Implementation Plans. Pursuant to Clean Air Act (CAA) Section 176(c) requirements, the EPA promulgated Title 40 of the Code of Federal Regulations (CFR) Part 51, Subpart W and Part 93, Subpart B, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans." These regulations, commonly referred to as the General Conformity Rule, apply to all Federal actions except for those Federal actions related to transportation plans, programs, and projects under Title 23 U.S. Code or the Federal Transit Act, which are subject to Transportation Conformity (40 CFR Part 93 Subpart A).

Section 93.153 of the General Conformity Rule sets applicability requirements for projects through establishment of *de minimis* levels for annual criteria pollutant emissions. These *de minimis* levels are set according to criteria pollutant nonattainment area designations. Projects with total emissions below the *de minimis* levels are exempt from the requirements of the Rule. Those at or above the *de minimis* levels are required to perform a Conformity Determination. The *de minimis* levels apply to the largest single-year total of direct and indirect project emissions that can occur during both the construction and operation phases of the project. The *de minimis* threshold for areas in the Ozone Transport Region is 100 tons per year (TPY) for $NO_X$ and 50 TPY for VOC.

The lateral expansion of the PIERP and construction of a vertical dike will generate direct and indirect air emissions from the land-based and marine sources including dump trucks, excavators, bulldozers, other heavy-duty equipment, and tugboats. The pollutants of interest include nitrogen oxides ($NO_X$) and volatile organic compound (VOC) emissions because they

are the precursors to the formation of ozone, as well as carbon monoxide (CO) and particulate matter ($PM_{10}/PM_{2.5}$).

### 5.4.9.b General Conformity Applicability Analysis

This project construction related General Conformity analysis was performed for the Alternative 1. This conformity analysis and air emissions evaluation will follow the criteria specified in 40 CFR Part 51, and 93, Determining Conformity of General Federal Actions to State or Federal Implementation Plans: Final Rule (April 5, 2010). The emissions evaluation will also follow all NEPA-related criteria provided in 40 CFR Part 6.

### 5.4.9.c Non-road Equipment Emissions

The analysis of construction emissions from non-road land-based equipment was based on estimates of the type and quantity of construction equipment likely to be involved in the project. Air emissions have been evaluated using EPA's National Mobile Inventory Model (NMIM), which incorporates the USEPA NONROAD 2008a and MOBILE 6.2.03 programs.

In order to quantify emissions, the NMIM model requires certain input parameters such as fuel type; temporal information; geographic region (state and county); equipment source classification codes (SCC), equipment technology type, equipment population, and monthly activity distribution ratio. The model contains a database of emission factors which is a function equipment SCC, equipment technology type, fuel type and metrological data of the geographical region. In any event where user-defined information is not provided for any project-specific parameter, the model will use the default value available within the software's database for that parameter. The NMIM Model emissions output results are given in tons of pollutant emitted per year for the different types of equipment.

### 5.4.9.d Marine Emissions

The marine operations comprise the following equipment: four (4) tugboats equipped with EPA "Tier 0" engines, and one (1) tugboat equipped with an EPA "Tier 2" engine. Emission rates, reported in tons of pollutant emitted per year of operation (tons/yr) for each tugboat, were calculated for the four criteria air pollutants: PM, $NO_x$, CO, and VOC. The emission rates were derived from the formula:

*Emission Rate (tons/yr) = Power x Activity x LF x EF x FCF x MCF*
Where:
Power = rated power of the engine in kW
Activity = engine activity in hours/year
LF = dimensionless load factor, the ratio of the average power used during normal operations compared to the maximum rated power
EF = emission factor in grams of pollutant per unit of work, g/kW-hr
FCF = dimensionless fuel correction factor to reflect changes in fuel properties that have occurred over time
MCF = mass correction factor that converts grams to tons, 1 ton/907185 grams

CARB (California Air Resource Board) emission estimation methodology report: *Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, Appendix B* was utilized in determining the appropriate load factors, emission factors and other factors used for the marine equipment emissions calculations.

**Alternative 1 (60 Percent Wetlands plus 5-ft Raising)**

**Emissions from Construction Phase**

Lateral Expansion and Vertical Expansion of Existing Uplands Emissions will result from two primary activities – hydraulic dredging during excavation of the sand borrow areas and construction of the lateral expansion. Hydraulic dredging in the sand borrow areas will be a short-term activity, conducted only during construction of the perimeter dikes. Emissions associated with the construction of the lateral expansion were estimated using historical data from Phase I and II construction at the PIERP. During Phase II construction, data on types of equipment and their estimated operating hours were tracked. Using these data as a surrogate for the lateral expansion, emissions were calculated. However, because the lateral expansion is approximately 40 percent larger than the previous Phase II expansion, the operating usage data were scaled accordingly. Estimated emissions are summarized in Table 5-5 for the lateral expansion.

**Table 5-5. Estimated Total Air Emissions from the PIERP Northern Lateral Expansion Construction Equipment**

| Construction Equipment | Average Rated HP | Usage (hrs)[1] | Emissions (tons) | | | |
|---|---|---|---|---|---|---|
| | | | CO | $NO_X$ | VOC | $PM_{10/2.5}$ |
| Dump Trucks | 260 | 22,686 | 10.67 | 36.22 | 3.19 | 1.73 |
| Bulldozers | 260 | 9,487 | | | | |
| Excavators | 260 | 15,448 | | | | |
| Graders | 260 | 568 | | | | |
| Gradall | 200 | 1,149 | | | | |
| Water Truck | 175 | 406 | | | | |
| Cranes | 250 | 13,091 | | | | |

[1] Surrogate data from PIERP Phase II construction equipment hours scaled upward by a factor of 1.2 to account for the larger construction area

[2] Air emissions from dredging of sand in borrow areas adjacent to the Island for vertical dike construction have not been included, but are expected to be minimal. An estimate of these emissions will be included in the Final GRR/SEIS.

The additional air emissions associated with raising the existing upland cells were estimated using historical data from previous vertical dike construction activities. Using these data as a surrogate for the vertical dike raising, emissions were calculated. Estimated emissions are summarized in Table 5-6 for the raising of existing upland cells construction activities.

**Table 5-6. Estimated Total Air Emissions from the PIERP Raising of Existing Upland Cells Construction Equipment**

| Construction Equipment | Average Rated HP | Usage (hrs)[1] | Emissions (tons) | | | |
|---|---|---|---|---|---|---|
| | | | CO | $NO_X$ | VOC | $PM_{10/2.5}$ |
| Dump Trucks | 220 | 18,124 | 8.12 | 25.23 | 2.25 | 1.29 |
| Bulldozers | 260 | 8,840 | | | | |
| Excavators | 260 | 11,151 | | | | |
| Grader | 260 | 1,232 | | | | |
| Front End Loader | 260 | 882 | | | | |
| Water Truck | 175 | 1,081 | | | | |
| Roller | 100 | 1,243 | | | | |

[1] Surrogate data from PIERP Phase II construction equipment hours scaled upward by a factor of 1.2

It should be noted that emissions calculated for the lateral and vertical expansion are related to a one-time event, generated only over the time frame of the lateral and vertical expansion construction.

Marine Operations Air Emissions Air emissions associated with the operations of tugboat assisted barges bringing stones to PIERP site. Emission were estimated based on total 240 trips with 8-hour one-way operation. Tugboats assisting barges over the construction phase will be comprise 4 tugboats with Tier 0 engines and 1 tugboat with a Tier 2 engine. Estimated air emissions for marine operations are summarized in Table 5-7.

**Table 5-7. Estimated Total Air Emissions from the PIERP Marine Operations**

| Marine Operation Equipment | Maximum Rated HP | Usage (hrs) | Emissions (tons) | | | |
|---|---|---|---|---|---|---|
| | | | CO | $NO_X$ | VOC | $PM_{10/2.5}$ |
| Tugboats | 1,600 | 3,840 | 7.54 | 25.88 | 1.55 | 1.05 |

**Emissions from Operations Phase**

Increased Annual Operating Air Emissions In addition to temporary increases in air emissions from the planned construction activities, emissions associated with dredged material placement will increase after completion of construction. At that time, open-water placement of dredged material from maintenance dredging of the southern approaches to the C&D Canal at Pooles Island will cease, and this material will be transported to the PIERP. This will result in a increase in annual dredged material placement volumes at the PIERP from 2 mcy to 3.2 mcy, with an attendant increase in air emissions from these activties. The current estimated annual air emissions from dredged material placement at the PIERP are presented in Table 3-10. Estimated air emissions from the PIERP Earthmoving Equipment Operations. Increasing these emissions proportionally to the increased placement volumes results in the annual air emissions shown in Table 5-8.

**Table 5-8. Estimated Air Emissions from PIERP Earthmoving Equipment Operations – Post Construction**

| Emissions (tons/yr) | | | |
|---|---|---|---|
| **CO** | **$NO_X$** | **VOC** | **$PM_{10/2.5}$** |
| 3.18 | 10.08 | 0.90 | 0.51 |

**Summary of Construction and Operations Emissions**

To put these construction and operation phases emissions into perspective for the applicability analysis, total estimated emissions associated with the construction of the northern lateral expansion, the raising of existing upland cells construction, and additional air emissions from increasing the annual dredged material placement volume from 2 to 3.2 mcy annually, are compared to the *de minimis* threshold in Table 5-9.

Table 5-9 shows that emissions associated with constructing and operating the Alternative 1, when compared to the *de minimis* values for an area that is in attainment inside OTR established in 40 CFR 93.153 (b) for $NO_X$, $PM_{2.5}$, and $SO_2$ for 100 tons per year; and for VOCs of 50 tons per year, fall below the *de minimis* values.

**Table 5-9. Estimated Total Air Emissions from the PIERP Northern Lateral Expansion and Raising Of Existing Upland Cells Construction Equipment**

| | Emissions (tons) | | | |
|---|---|---|---|---|
| | **CO** | **$NO_X$** | **VOC** | **$PM_{10/2.5}$** |
| **Construction Phase** | | | | |
| Northern Lateral Expansion | 10.67 | 36.22 | 3.19 | 1.73 |
| Raising Existing Upland Cells | 8.12 | 25.23 | 2.25 | 1.29 |
| Marine Emissions | 7.54 | 25.88 | 1.55 | 1.05 |
| **Operations Phase** | | | | |
| Increased Annual Placement Volumes | 3.18 | 10.08 | 0.90 | 0.51 |
| **Total from Alternative 1** | 29.51 | 97.41 | 7.89 | 4.58 |
| ***de minimis* threshold** | **100** | **100** | **50** | **100** |

This comparison represents a conservative (worst case) assumption, assuming that all construction is accomplished within one year and that the emissions from increased annual dredged material placement volumes would be concurrent with construction. In reality, the construction would be accomplished over a two-year to three-year period and construction phase and operations phase emissions occur in different years.

The total direct and indirect emissions from non-road land-based and marine sources associated with the proposed alternative in any given year under the worst case scenario presented are less than the *de minimis* levels established under the General Conformity Rule. Hence, a full Conformity Determination is not required to comply with the Rule.

**Alternative 2 (50 Percent Wetlands plus 5-ft Raising)**

Impacts to air quality for Alternative 2 are the same as impacts discussed above for Alternative 1. No additional impacts to air quality are anticipated for Alternative 2.

**Alternative 3 (Open-Water Embayment plus 5-ft Raising)**

Impacts to air quality for Alternative 3 are the same as impacts discussed above for Alternatives 1 and 2, although less perimeter dike construction will be required, resulting in a negligible reduction in construction-related emissions.

**No-Action Alternative**

No additional significant increases in air emissions on the PIERP are expected with the no-action alternative because the operation of heavy-duty diesel equipment are equivalent to the existing conditions at the PIERP. No additional air emissions would be anticipated at PIERP due to the no-action alternative.

## *NMIM Model Input Data*

PIERP Earthmoving Equipment Operations (Existing)

SCC, HPMAX, ModelYear, TechType, Population, Hours/Year
Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
2270002015, 300, 2005, All, 1, 29
DEFAULT
2270002030, 300, 2005, All, 1, 20
DEFAULT
2270002036, 300, 2005, All, 1, 4621
DEFAULT
2270002048, 300, 2005, All, 1, 194
DEFAULT
2270002051, 300, 2005, All, 1, 2956
DEFAULT
2270002051, 300, 2005, All, 1, 894
DEFAULT
2270002060, 300, 2005, All, 1, 338
DEFAULT
2270002069, 300, 2005, All, 1, 2098
DEFAULT

PIERP Northern Lateral Expansion Construction

SCC, HPMAX, ModelYear, TechType, Population, Hours/Year
Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
2270002051, 300, 2005, All, 1, 22686
DEFAULT
2270002069, 300, 2005, All, 1, 9487
DEFAULT
2270002036, 300, 2005, All, 1, 15448
DEFAULT
2270002048, 300, 2005, All, 1, 568
DEFAULT
2270002036, 300, 2005, All, 1, 1149
DEFAULT
2270002081, 175, 2005, All, 1, 406
DEFAULT
2270002045, 300, 2005, All, 1, 13091
DEFAULT

PIERP Raising of Existing Upland Cells Construction

SCC, HPMAX, ModelYear, TechType, Population, Hours/Year
Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
2270002051, 300, 2005, All, 1, 18124
DEFAULT
2270002069, 300, 2005, All, 1, 8840
DEFAULT
2270002036, 300, 2005, All, 1, 11151
DEFAULT
2270002048, 300, 2005, All, 1, 1232
DEFAULT
2270002060, 300, 2005, All, 1, 882
DEFAULT
2270002081, 175, 2005, All, 1, 1081
DEFAULT
2270002015, 100, 2005, All, 1, 1243
DEFAULT

# PIERP Marine Operations
# Emissions from Tugboats

| Source Description | Engine Power | Total Engine Activity | Engine Load Factor | Age of Engine | Life of Engine | Pollutant | Fuel Correction Factor | Engine Deterioration Factor | Zero Hour Emission Factor | Emission Factors | Emission Estimates | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kW | hours | | years | years | | | | g/kW-hr | g/kW-hr | lb/hr | tons/yr |
| 4 Tier 0 Diesel Tugboats (1600 hp) | 1193 | 3072 | 0.31 | 14 | 21 | PM | 0.8 | 0.67 | 0.67 | 0.97 | 0.63 | 0.97 |
| | 1193 | 3072 | 0.31 | 14 | 21 | $NO_x$ | 0.948 | 0.21 | 17.4 | 19.84 | 15.33 | 23.55 |
| | 1193 | 3072 | 0.31 | 14 | 21 | CO | 1 | 0.25 | 4.01 | 4.68 | 3.81 | 5.86 |
| | 1193 | 3072 | 0.31 | 14 | 21 | VOC | 0.72 | 0.44 | 1.13 | 1.46 | 0.86 | 1.32 |
| 1 Tier 2 Diesel Tugboat (1600 hp) | 1193 | 768 | 0.31 | 6 | 21 | PM | 0.8 | 0.67 | 0.27 | 0.32 | 0.21 | 0.08 |
| | 1193 | 768 | 0.31 | 6 | 21 | $NO_x$ | 0.948 | 0.21 | 7.41 | 7.85 | 6.07 | 2.33 |
| | 1193 | 768 | 0.31 | 6 | 21 | CO | 1 | 0.25 | 5 | 5.36 | 4.37 | 1.68 |
| | 1193 | 768 | 0.31 | 6 | 21 | VOC | 0.72 | 0.44 | 0.91 | 1.02 | 0.60 | 0.23 |

**Total Marine Operations Emissions**

| Pollutant | Total Emission Estimates | |
|---|---|---|
| | lb/hr | tons/yr |
| PM | 0.84 | 1.05 |
| $NO_x$ | 21.40 | 25.88 |
| CO | 8.18 | 7.54 |
| VOC | 1.46 | 1.55 |

# D5

# MARYLAND ENVIRONMENTAL SERVICE
## ENVIRONMENTAL SCIENCE AND MONITORING

### PRELIMINARY PHYLOGENETIC LIST OF PIONEERING MACRO FAUNA
### PAUL S. SARBANES ECOSYSTEM RESTORATION PROJECT AT POPLAR ISLAND

Included are fauna identified within the project site while conducting year-round biweekly bird census from dike roads since summer of 2002 plus some additional amphibian, reptile and mammal species observed within cell habitats by various project site personnel. Those observers, their affiliation, first occurrence date and cell locations are credited with the listed species while subsequent occurrences are not cited. Phylogeny here is shortened to Class, Order, Family and Species to provide general organization and simplicity for reference. This inclusive list replaces previous individual Class lists issued bi-annually prior to 2010.

### SPIDERS AND INSECTS

Most Arachnids and Insects cannot be safely identified to Genera or Species without contemporary professional taxonomic keys, expertise, and considerable study. Thus, some species listed here may be best approximations based on information available in popular mid-Atlantic field guides for general reference and identification and may not be professionally acceptable. Taxonomic listing, Genus, Species (spp.) and Common Names are also taken from those field guides. Species listed here are largely macro-insects and only represent a small percent of insect species inhabiting the project site.

Class *Arachnida* – **Spiders, Ticks and Others**
- Order *Araneida*
  - Family *Pholcidae* – **Daddy-long-legs Spiders**
    - Daddy-long-leg Spider *Ochyrocera spp.*
  - Family *Theridiidae* – **Cobweb Weavers**
    - Southern Black Widow *Latrodectus mactans*
    - Theridion Spider *Theridion spp.*
  - Family *Tetragnathidae* – **Long-jawed Orb-weavers**
    - Long-jawed Orb-weaver *Tetragnatha grallator*
  - Family *Linyphiidae* – **Dwarf Spiders**
    - Dwarf Spider *Erigone spp*.
  - Family *Araneidae* – **Orb-weavers**
    - Star-bellied Spider *Acanthepeira stellata*
  - Family *Salticidae* – **Jumping Spiders**
    - Bold Jumping Spider *Phidippus audax*
    - Peppered Jumper *Pelegrina galathea*

Class *Insecta*
- Order *Odonata* – **Dragonflies, Damselflies**
  - Family *Aeshnidae* - **Darners**
    - Common Green Darner *Anax junius*
    - Swamp Darner *Epiaeschna heros*

Family *Libellulidae* - **Skimmers**
Black Saddlebags *Tramea lacerata*
Spot-winged Glider *Pantala hymenaea*
Blue Dasher *Pachydiplax longipennis*
Eastern Pondhawk *Erythemis simplicicollis*
Seaside Dragonlet *Erthrodiplax berenice*

Family *Coenagrionidae* – **Pond Damsels**
Rambur's Forktail *Ischnura ramburii*
Eastern Forktail *Ischnura verticalis*

Order *Orthoptera* – **Grasshoppers, Katydids, Crickets, Mantids, Cockroaches**
Family *Acrididae* – **Grasshoppers**
Northern Green-striped Grasshopper *Chortophaga viridifasciata*
Carolina Grasshopper *Dissosteira carolina*
Seaside Grasshopper *Trimerotropis maritima*
Migratory Grasshopper *Melanoplus sanquinipes*
American Bird Grasshopper *Schistocerca americana*

Family *Tettigonioidae* - **Katydids**
Slender Meadow Katydid *Conocephalus fasciatus*

Family *Grylloidae* - **Crickets**
Southeastern Field Cricket *Gryllus rubens*
Four-spotted Tree Cricket *Oecanthus quadripunctatus*

Family *Mantidae* - **Mantids**
Chinese Mantid *Tenodera aridifolia*

Order *Hemiptera* – **Water Bugs, Leaf Bugs, Assassin Bugs, Lace Bugs, Stink Bugs**
Family *Cicadidae* - **Cicadas**
Swamp Cicada *Tibicen chloromera*

Family *Cicadellidae* – **Leafhoppers**
Pointed Leafhopper *Draeculacephala spp.*
Rounded Leafhopper *Exitianus spp.*

Family *Cercopidae* – **Spittle Bugs**
Meadow Spittlebug *Philaenus spumarius*
Four-spotted Spittlebug *Aphrophora quadrinotata*

Family *Miridae* – **Plant Bugs**
Tarnished Plant Bug *Lygus lineolaris*
Plant Bug *Lygus spp.*
Two-spotted Grass Bug *Stenotus binotatus*

Family *Nabidae* – **Damsel Bugs**
Damsel Bug *Nabis spp.*

Family *Lygaeidae* – **Seed Bugs**
Small Milkweed Bug *Lygaeus kalmii*

Family *Berytidae* – **Stilt Bugs**
Stilt Bug *Neides muticus*

Family *Coreidae* – **Leaf-footed Bugs**
Leaf-footed Bug *Leptoglossus phyllopus*

Family *Alydidae* **- Broad-headed Bugs**
Broad-headed Bug *Alydus spp*.

Family *Pentatomidae* – **Stink Bugs**
Stink Bug *Euschistus* spp.
Rice Stink Bug *Oebalus pugnax*
Harlequin Bug *Murgantia histronica*
Southern Green Stink Bug *Nezara viridula*
Spined Soldier Bug *Podisus maculiventris*
Podis Stink Bug *Podisus spp.*
Two-spotted Stink Bug *Perillus bioculatus*

Order *Coleoptera* – **Beetles**
Family *Cicindelidae* – **Tiger Beetles**
Bronzed Tiger Beetle *Cicindela repanda*.

Family *Carabidae* – **Ground Beetles**
Seed-eating Ground Beetle *Amara spp.*
Ground Beetle *Harpalus pensylvanicus*
Ground Beetle *Harpalus spp*.
Seedcorn Beetle *Stenolophus lecontei*
Colorful Foliage Ground Beetle *Lebia spp*.
False Bombardier Beetle *Galerita* spp.

Family *Staphylinidae* – **Rove Beetles**
Large Rove Beetle *Philonthus spp*.

Family *Coccinellidae* – **Lady Beetles**
Seven-spotted Lady Beetle *Coccinella septempunctata*
Spotted Lady Beetle *Coleomegilla maculata*
Asian Multicolored Lady Beetle *Harmonia axyridis*
Lady Beetle *Hippodamia spp*.

Family *Chrysomelidae* – **Leaf Beetles**
Twelve-spotted Cucumber Beetle *Diabrotica udecimpunctata*

Family *Lampyridae* – **Luminescent Beetles**
Firefly *Photinus spp*.

Family *Cantharidae* – **Soldier Beetles**
Soldier Beetle *Chauliognathus spp.*
Marginated Solider Beetle *Chauliognathus marginatus*

Family Elateridae – **Click Beetles**
Click Beetle *Conoderus spp*.

Family *Curculionidae* – **Snout Beetles**
Weevil *Undetermined spp.*
Pear-shaped Weevil *Apion spp*.

Order *Neuroptera* – **Nerve-winged Insects**
Family *Chrysopidae* - **Lacewings**
Green Lacewing *Chrysopa or Chrysoperla spp.*

Family *Hemerobiidae* – **Brown Lacewings**
Brown Lacewing *Hemerobius spp.*

Family *Myrmeleontidae* - **Antlions**
Long-abdomen Antlion *Brachynemurus abdominalis*

Order *Lepidoptera* – **Butterflies, Moths**
Family *Papilionidae* – **Swallowtails**
Eastern Tiger Swallowtail *Papilio glaucus*
Pipevine Swallowtail *Battus philenor*
Spicebush Swallowtail *Papilio troilus*
Black Swallowtail *Papilio polyxenes*

Family *Pieridae* – **Whites, Sulphurs**
Cabbage White *Pieris rapae*
Checkered White *Pontia protodice*
Clouded Sulphur *Colias philodice*
Orange Sulphur *Colias eurytheme*
Sleepy Orange *Eurema nicippe*
Little Yellow *Eurema lisa*
Cloudless Sulphur *Phoebis sennae*

Family *Lycaenidae* – **Coppers, Hairstreaks, Blues**
Gray Hairstreak *Strymon melinus*
Eastern Tailed-blue *Everes comyntas*

Family *Nymphalidae* – **Brush-footed Butterflies**
Variegated Fritillary *Euptoieta claudia*
Pearl Cresent *Phyciodes tharos*
Question Mark *Polygonia interrogationis*
Mourning Cloak *Nymphalis antiopa*
Red Admiral *Venessa atalanta*
Painted Lady *Vanessa cardui*
Common Buckeye *Junonia coenia*
Red-spotted Purple *Limenitis arthemis*
Viceroy *Limenitis archippus*
American Snout *Libytheana carinenta*
Monarch *Danaus plexippus*
Common Wood Nymph *Cercyonis pegala*

Family *Hesperiidae* – **Skippers**
Silver-spotted Skipper *Epargyreus clarus*
Southern Cloudywing *Thorybes bathyllus*
Common Sootywing *Pholisora catullus*

Sachem *Atalopedes campestris*
Least Skipper *Ancyloxypha numitor*
Saltmarsh Skipper *Panoquina panoquin*

Family *Saturniidae* – **Giant Silkworm Moths**
Luna Moth *Actias luna*

Family *Arctiidae* – **Tiger Moths**
Orange Holomelina *Virbia aurantiaca*
Isabella Tiger Moth *Pyrrharctia isabella*
Virginia Tiger Moth *Spilosoma virginica*
Banded Tiger Moth *Apantesis vittata*
Yellow-collared Scape Moth *Cisseps fulvicollis*

Family *Noctuidae* – **Noctuid Moths**
Smeared Dagger Moth *Acronicta oblinita*
Ipsilon Dart *Agrotis ipsilon*
Armyworm Moth *Pseudodaletia unipuncta*
Small Brown Quaker *Pseudorthodes vecors*
Miranda Moth *Proxenus miranda*
Yellow-striped Armyworm Moth *Spodoptera ornithogalli*
Corn Earworm Moth *Helicoperva zea*
Arcigera Flower Moth *Schinia arcigera*
Common Spragueia *Spragueia leo*
Common Looper Moth *Autographa precationis*
Toothed Somberwing Moth *Euclidia cuspidea*
Forage Looper Moth *Caenurgina erechtea*
Double-lined Doryodes *Doryodes bistrialis*
Green Cloverworm Moth *Plathypena scabra*
Smoky Tetanolita *Tetanolita mynesalis*

Family *Geometridae* – **Inchworm Moths, Geometer Moths**
Blackberry Looper Moth *Chlorochlamys chloroleucaria*
Common Tanwave *Pleuroprucha insulsaria*
Chickweed Geometer *Haematopis grataria*
The Gem *Orthonama obstipata*

Family *Pyralidae* – **Pyralid Moths**
Spotted Peppergrass Moth *Eustixia pupula*
Pale Diacme *Diacme elealis*
Pyralid Moth *Helvibotys helvialis*
Coffee-loving Pyrausta Moth *Pyrausta tyralis*
Celery Leaftier Moth *Udea rubigalis*
Hawaiian Beet Webworm Moth *Spoladea recurvalis*
Snowy Urola Moth *Urola nivalis*

Family Tortricidae – **Leaf-roller Moths**
Reticulated Fruitworm Moth *Sparganothis reticulatana*

Family *Yponomeutidae* – **Ermine Moths**
Ailanthus Webworm Moth *Atteva punctella*
Ermine Moth *Yponomeuta spp.*

Family *Gelechidiidae* – **Gelechid Moths**
Gelechid Moth *Aristotelia pullusella or robusta*

Family *Tineidae* – **Clothes Moths**
Clemen's Grass Tubeworm Moth *Acrolophus popeanella*

Family *Heliozelidae* – **Shield Bearer Moths**
Antispila Moth *Antispila spp*.

Order *Diptera* – **Flies, Midges, Gnats**
Family *Tipulidae* – **Crane Flies**
Crane Fly *Tipula spp*.

Family *Chironomidae* – **Midges, No-see-ums**
Chironomid Midge *Chironomus spp.*

Family *Culicidae* – **Mosquitos**
Woodland Malaria Mosquito *Anopheles punctipennis*
Mosquito *Anopheles crucians/bradleyi*
Golden Saltmarsh Mosquito *Ochlerotatus sollicitans*
Brown Saltmarsh Mosquito *Ochlerotatus cantator*
Black Saltmarsh Mosquito *Ochlerotatus taeniorhynchus*
Inland Floodwater Mosquito *Aedes vexans*
Unbanded Saltmarsh Mosquito *Culex salinarius*

Family *Tabanidae* – **Deer Flies, Horse Flies**
Deer Fly *Chryops vittatus*
Green-headed Fly *Tabanus* spp.
Striped Horsefly *Tabanus lineola*

Family *Stratiomyidae* – **Soldier Flies**
Soldier Fly *Sargus spp*.

Family *Dolichopodidae* – **Long-legged Flies**
Long-legged Fly *Dolichopus* or *Condylostylus spp*.

Family *Phoridae* - **Humpback Flies**
Scuttle Fly *Diplonevra nitidula*

Family *Syrphidae* – **Flower Flies**
Flower Fly *Allograpta spp.*
Flower Fly *Toxomerus geminatus*

Family *Calliphoridae* – **Blow Flies**
Greenbottle Fly *Lucilia sericata*
Bluebottle Fly *Calliphora vicina*

Family *Muscidae* – **Domestic Flies**
House Fly *Musca domestica*

Family *Lonchaeidae* – **Lanchaeid Flies**
Lanchaeid Fly *Lonchaeidae spp.*

Family *Ulidiidae* – **Picture-winged Flies**
Picture-winged Fly *Delphinia spp.*

Family *Drosophilidae* – **Pomace Flies**
Gnat *Drosophila spp.*

Family *Sciomyzidae* – **Marsh Flies, Shore Flies**
Marsh Fly *Tetanocera plebeja*

Order *Hymenoptera* – **Sawflies, Ants, Wasps, Bees**
Family *Tenthredinidae* - **Sawflies**
Sawfly *Tenthredo spp.*

Family *Ichneumonidae* – **Ichneumon Wasps**
Ichneumon Wasp *Eutanyacra spp*.
Ichneumon Wasp *Ophion spp*.

Family *Chrysididae* – **Cuckoo Wasps**
Cuckoo Wasp *Chrysis smaragdula*

Family *Sphecidae* – **Solitary Wasps**
Small Blue Mud Dauber *Chalybion spp.*
Great Golden Digger *Sphex ichnumoneus*
Common Thread-waisted Wasp *Ammophila procera*
Sand Wasp *Bembix spinolae*
Cicada Killer *Sphecius speciosus*

Family *Halictidae* – **Sweat Bees**
Sweat Bee *Agapostemon spp*.

Family *Apidae* – **Bumble Bees, Carpenter Bees, Honey Bees**
American Bumble Bee *Bombus pensylvanicus*
Common Eastern Bumble Bee *Bombus impatiens*
Digger Bee *Triepeolus spp.*

Family *Vespidae* – **Paper Wasps, Yellowjackets, Hornets**
Paper Wasp *Polistes fuscatus*
Paper Wasp *Polistes exclamans*
Potter Wasp *Euodynerus leucomelas*

## AMPHIBIANS

Absence of freshwater habitats and/or intolerance of brackish and saltwater may be responsible for lack of amphibians on historical Poplar Island while pioneers today may have arrived as stowaways in boats, machinery, equipment and materials imported to the island construction site or they may have traversed the narrow tidewater gap from nearby natural Coaches Island where artificial freshwater ponds were created over a decade ago.

Class *Amphibia* – **Amphibians**
Order *Anura* - **Frogs**
Family *Bufonidae* - **True Toads**
Fowler's Toad *Anaxyrus fowleri* – Bill Larrimore MES & Dana Spontak Terrapin Study found on June 2004 near dike road along "Notch" area

Family *Hylidae* – **Tree Frogs**

Green Treefrog *Hyla cinerea* – Peter McGowan USFWS found one in July 2006 in Cell 3C

* Family *Ranidae* – **True Frogs**

* Southern Leopard Frog *Rana sphenocephala utricularia* – Lisa Smith Terrapin Study found one on 4 October 2011 in the "Notch" area

## REPTILES

Diamondback Terrapin and Northern Watersnake represented reptiles on historical Poplar Island while additional species today may have traversed the narrow tidewater gap from nearby natural Coaches Island

Class *Reptilia* – **Reptiles**

Order *Testudines* - **Turtles**

Family *Chelydridae* – **Snapping Turtles**

Eastern Snapping Turtle *Chelydra serpentina serpentina* – Doug Deeter USACE found one in August 2009 near Headquarters and Cell 4DX

Family *Kinosternidae* – **Mud Turtles, Musk Turtles**

Eastern Mud Turtle *Kinosternon subrubrum subrubrum* – Dana Spontak Turtle Study found one in August 2004 at marsh along "Notch" area

Family *Emydidae* – **Pond Turtles, Marsh Turtles, Box Turtles**

Spotted Turtle *Clemmys guttata* - Dan Joyave MES collected one on 13 June 2011 coming out of Cell 3B crossing the east dike road toward tidewater

Northern Diamond-backed Terrapin *Malaclemys terrapin terrapin*

Eastern Box Turtle *Terrapene carolina carolina* - Melanie Heckman Turtle Study found one in July 2007 on exterior beach adjacent to Cell 3B-C and released it on the mainland

Family *Cheloniidae* – **Sea Turtles**

Loggerhead Sea Turtle *Caretta caretta* - Sean Sullivan Turtle Study found one in June 2005 dead on Cell 6 beach plus saw live ones offshore

Order *Squamata* - **Snakes**

Family *Colubridae* – **Snakes**

Common Watersnake *Nerodia sipedon sipedon*

Eastern Gartersnake *Thamnophis sirtalis sirtalis* – Dana Spontak Turtle Study found one in August 2004 in marsh along "Notch" area

Eastern Rat Snake *Elaphe obsoleta obsolete* - Peter McGowan USFWS found one in July 2008 in Cell 4A-B

Eastern Kingsnake *Lampropeltis getula* getula - Eva Matthews Turtle Study found one in June 2006 in marsh along 'Notch" area

Northern Rough Greensnake *Opheodrys aestivus aestivus* - Melanie Heckman Turtle Study found one in July 2007 in marsh along "Notch" area

## BIRDS

Listed species are those identified during biweekly census of the Poplar Island project site, plus "offshore" within half mile of the project site, and heard vocalizing on nearby "Coaches Island." Species occurrence at only the latter sources are denoted with OS or CI

Class *Aves* - **Birds**

Order *Gaviiformes* – **Loons**

Family *Gaviidae* - **Loons**

Red-throated Loon *Gavia stellata* OS

Common Loon *Gavia immer*

Order *Podicipediformes* - **Grebes**
Family *Podicipedidae* – **Grebes**
Pied-billed Grebe *Podilymbus podiceps*
Horned Grebe *Podiceps auritus*
Red-necked Grebe *Podiceps grisegena* OS

Order *Pelecaniformes* – **Boobies, Pelicans, Cormorants**
Family *Sulidae* – **Boobies, Gannets**
Northern Gannet *Morus bassanus* OS

Family *Pelecanidae* – **Pelicans**
American White Pelican *Pelecanus erythrorhynchos*
Brown Pelican *Pelecanus occidentalis*

Family *Phalacrocoracidae* – **Cormorants**
Double-crested Cormorant *Phalacrocorax auritus*

Order *Ciconiiformes* – **Herons, Bitterns, Ibis, Vultures**
Family *Ardeidae* – **Herons and Bitterns**
American Bittern *Botaurus lentiginosus*
Least Bittern *Ixobrychus exilis*
Great Blue Heron *Ardea herodias*
Great Egret *Ardea alba*
Snowy Egret *Egretta thula*
Tricolored Heron *Egretta tricolor*
Cattle Egret *Bubulcus ibis*
Green Heron *Butorides virescens*
Black-crowned Night-Heron *Nycticorax nycticorax*
Yellow-crowned Night Heron *Nycticorax violacea*

Family *Threskiornithidae* – **Ibis**
Glossy Ibis *Plegadis falcinellus*

Family *Cathartidae* – **Vultures**
Turkey Vulture *Cathartes aura*

Order *Anseriformes* – **Swans, Geese, Ducks**
Family *Anatidae* – **Swans, Geese, Ducks**
Snow Goose *Chen caerulescens*
Canada Goose *Branta canadensis*
American Brant *Branta bernicla*
European Mute Swan *Cygnus olor*
Tundra Swan *Cygnus columbianus*
Wood Duck *Aix sponsa*
Gadwall *Anas strepera*
American Wigeon *Anas americana*
American Black Duck *Anas rubripes*
Mallard *Anas platyrhynchos*
Blue-winged Teal *Anas discors*
Northern Shoveler *Anas clypeata*
Northern Pintail *Anas acuta*
Green-winged Teal *Anas crecca*

Canvasback *Aythya valisineria*
Redhead *Aythya americana*
Ring-necked Duck *Aythya collaris*
Greater Scaup *Aythya marila*
Lesser Scaup *Aythya affinis*
King Eider *Somateria spectabilis* OS
Surf Scoter *Melanitta perspicillata*
White-winged Scoter *Melanitta fusca*
Black Scoter *Melanitta nigra*
Long-tailed Duck *Clangula hyemalis*
Bufflehead *Bucephala albeola*
Common Goldeneye *Bucephala clangula*
Hooded Merganser *Lophodytes cucullatus*
Common Merganser *Mergus merganser* OS
Red-breasted Merganser *Mergus serrator*
Ruddy Duck *Oxyura jamaicensis*

Order *Falconiformes* – **Osprey, Eagles, Harrier, Hawks**
Family *Accipitridae* – **Osprey, Eagles, Harrier, Hawks**
Osprey *Pandion haliaetus*
Bald Eagle *Haliaeetus leucocephalus*
Northern Harrier *Circus cyaneus*
Sharp-shinned Hawk *Accipiter striatus*
Cooper's Hawk *Accipiter cooperii*
Red-tailed Hawk *Buteo jamaicensis*

Family *Falcoidae* – **Falcons**
American Kestrel *Falco sparverius*
Merlin *Falco columbarius*
Peregrine Falcon *Falco peregrinus*

Order *Gruiformes* – **Rails, Moorhens, Coots**
Family *Rallidae* – **Rails, Moorhens, Coots**
Clapper Rail *Rallus longirostris*
Virginia Rail *Rallus limicola*
Sora *Porzana carolina*
* Common Moorhen *Gallinula chloropus*
American Coot *Fulica americana*

Order *Charadriiformes* – **Plovers, Sandpipers, Gulls, Terns**
Family *Charadriidae* - **Plovers**
Black-bellied Plover *Pluvialis squatarola*
American Golden Plover *Pluvialis dominica*
Semipalmated Plover *Charadrius semipalmatus*
Piping Plover *Charadrius melodus*
Killdeer *Charadrius vociferus*

Family *Haematopodidea* - **Oystercatchers**
American Oystercatcher *Haematopus palliatus*

Family *Recurvirostridae* – **Stilts, Avocets**
- Black-necked Stilt *Himantopus mexicanus*
- American Avocet *Recurvirostra americana*

Family *Scolopacidae* – **Sandpipers**
- Greater Yellowlegs *Tringa melanoleuca*
- Lesser Yellowlegs *Tringa flavipes*
- Willet *Tringa semipalmata*
- Spotted Sandpiper *Actitis macularia*
- Whimbrel *Numenius phaeopus*
- Hudsonian Godwit *Limosa haemastica*
- Marbled Godwit *Limosa fedoa*
- Ruddy Turnstone *Arenaria interpres*
- Red Knot *Calidris canutus*
- Sanderling *Calidris alba*
- Semipalmated Sandpiper *Calidris pusilla*
- Western Sandpiper *Calidris mauri*
- Least Sandpiper *Calidris minutilla*
- White-rumped Sandpiper *Calidris fuscicollis*
- Baird's Sandpiper *Calidris bairdii*
- Pectoral Sandpiper *Calidris melanotos*
- Purple Sandpiper *Calidris maritima*
- Dunlin *Calidris alpina*
- Stilt Sandpiper *Calidris himantopus*
- Buff-breasted Sandpiper *Tryngites subruficollis*
- Short-billed Dowitcher *Limnodromus griseus*
- Long-billed Dowitcher *Limnodromus scolopaceus*
- Wilson's Snipe *Gallinago delicata*
- Wilson's Phalarope *Phalaropus tricolor*
- Red-necked Phalarope *Phalaropus lobatus*

Family *Laridae* – **Gulls, Terns**
- Laughing Gull *Larus atricilla*
- Bonaparte's Gull *Larus philadelphia*
- Ring-billed Gull *Larus delawarensis*
- Herring Gull *Larus argentatus*
- Iceland Gull *Larus glaucoides*
- Lesser Black-backed Gull *Larus fuscus*
- Great Black-backed Gull *Larus marinus*
- Gull-billed Tern *Gelochelidon nilotica*
- Caspian Tern *Hydroprogne caspia*
- Royal Tern *Thalasseus maxima*
- Sandwich Tern *Thalasseus sandvicensis*
- Common Tern *Sterna hirundo*
- Forster's Tern *Sterna forsteri*
- Least Tern *Sterna antillarum*
- Black Tern *Chlidonias niger*
- Black Skimmer *Rynchops niger*

Order *Columbiformes* – **Doves, Pigeons**

Family *Columbidae* – **Doves, Pigeons**
- Mourning Dove *Zenaida macroura*

Order *Cuculiformes* - **Cuckoos**
Family *Cuculidae* – **Cuckoos**
Yellow-billed Cuckoo *Coccyzus americanus* CI

Order *Strigiformes* – **Owls**
Family *Strigidae* – **Owls**
Barn Owl *Tyto alba*
Great Horned Owl *Bubo virginianus*
Snowy Owl *Bubo scandiacus*
Short-eared Owl *Asio flammeus*

Order *Apodiformes* – **Swifts, Hummingbirds**
Family *Apodidae* – **Swifts**
Chimney Swift *Chaetura pelagica*

Family *Trochilidae* - **Hummingbirds**
Ruby-throated Hummingbird *Archilochus colubris*

Order *Coraciiformes* - **Kingfishers**
Family *Alcedinidae* – **Kingfishers**
Belted Kingfisher *Ceryle alcyon*

Order *Piciformes* – **Woodpeckers**
Family *Picidae* – **Woodpeckers**
Red-bellied Woodpecker *Melanerpes carolinus* CI
Downy Woodpecker *Picoides pubescens* CI
Northern Flicker *Colaptes auratus*

Order *Passeriformes* – **Perching Birds**
Family *Tyrannidae* – **Flycatchers**
Empidonax Flycatcher *Empidonax spp.*
Eastern Phoebe *Sayornis phoebe*
Great Crested Flycatcher *Myiarchus crinitus*
Eastern Kingbird *Tyrannus tyrannus*

Family *Vireonidae* – **Vireos**
Red-eyed Vireo *Vireo olivaceus* CI

Family *Corvidae* – **Jays, Crows**
Blue Jay *Cyanocitta cristata*
American Crow *Corvus brachyrhynchos*
Fish Crow *Corvus ossifragus*

Family *Alaudidae* – **Larks**
Horned Lark *Eremophila alpestris*

Family *Hirundinidae* – **Swallows**
Purple Martin *Progne subis*
Tree Swallow *Tachycineta bicolor*
Northern Rough-winged Swallow *Stelgidopteryx serripennis*
Bank Swallow *Riparia riparia*
Barn Swallow *Hirundo rustica*

Family *Paridae* – **Chickadees, Titmice**
Carolina Chickadee *Poecile carolinensis*

Family *Troglodytidae* – **Wrens**
Carolina Wren *Thryothorus ludovicianus*
House Wren *Troglodytes aedon*

Family *Regulidae* – **Kinglets**
Golden-crowned Kinglet *Regulus satrapa*
Ruby-crowned Kinglet *Regulus calendula*

Family *Sylviidae* - **Gnatcatchers**
Blue-gray Gnatcatcher *Polioptila caerulea*

Family *Turdidae* – **Thrushes**
Eastern Bluebird *Sialia sialis*
Swainson's Thrush *Catharus ustulatus*
Hermit Thrush *Catharus guttatus*
American Robin *Turdus migratorius*

Family *Mimidae* – **Mimics**
Gray Catbird *Dumetella carolinensis*
Northern Mockingbird *Mimus polyglottos*

Family *Sturnidae* – **Starlings**
European Starling *Sturnus vulgaris*

Family *Motacillidae* – **Pipits**
American Pipit *Anthus rubescens*

Family *Parulidae* - **Warblers**
Blue-winged Warbler *Vermivora pinus*
Northern Parula *Setophaga americana*
Yellow Warbler *Setophaga Dendroica petechia*
Chestnut-sided Warbler *Setophaga pensylvanica* CI
Magnolia Warbler *Setophaga magnolia*
Black-throated Blue Warbler *Setophaga caerulescens*
Black-throated Green Warbler *Setophaga virens*
Yellow-rumped Warbler *Setophaga coronata*
Yellow-throated Warbler *Setophaga dominica* CI
Pine Warbler *Setophaga pinus* CI
Palm Warbler *Setophaga palmarum*
Blackpoll Warbler *Setophaga striata*
Black and White Warbler *Mniotilta varia* CI
American Redstart *Setophaga rusticilla* CI
Ovenbird *Seiurus aurocapillus* CI
Common Yellowthroat *Geothlypis trichas*

Family *Emberizidae* – **Sparrows, Buntings**
Eastern Towhee *Pipilo erythrophthalmus*
Chipping Sparrow *Spizella passerina*
Savannah Sparrow *Passerculus sandwichensis*

Seaside Sparrow *Ammodramus maritimus*
Song Sparrow *Melospiza melodia*
Swamp Sparrow *Melospiza georgiana*
White-throated Sparrow *Zonotrichia albicollis*
White-crowned Sparrow *Zonotrichia leucophrys*
Dark-eyed Junco *Junco hyemalis*
Lapland Longspur *Calcarius lapponicus*
Snow Bunting *Plectrophenax nivalis*

Family *Cardinalidae* - **Grosbeaks**
Northern Cardinal *Cardinalis cardinalis*
Blue Grosbeak *Passerina caerulea*

Family *Icteridae* – **Blackbirds**
Bobolink *Dolichonyx oryzivorus*
Red-winged Blackbird *Agelaius phoeniceus*
Eastern Meadowlark *Sturnella magna*
Common Grackle *Quiscalus quiscula*
Boat-tailed Grackle *Quiscalus major*
Brown-headed Cowbird *Molothrus ater*
Orchard Oriole *Icterus spurious* CI
Baltimore Oriole *Icterus galbula* CI

Family *Fringillidae* - **Finches**
House Finch *Carpodacus mexicanus*
American Goldfinch *Carduelis tristis*

## MAMMALS

Class *Mammalia* – **Mammals**
Order Insectivora – **Shrews, Moles**
Family *Soricidae* – **Shrews, Moles**
Kirtland's Short-tailed Shrew *Blarina brevicauda kirtlandi* - Dana Spontak Terrapin Study found one in August 2004 in marsh along "Notch" area
Order Rodentia – **Gnawing Mammals**
Family *Castoridae* – **Beaver**
Beaver *Castor canadensis* - Danny Hayes MES caught one in spring 2002 and released, there is a photo at Headquarters
Family *Cricetidae* – **Deer Mice, Harvest Mice, Voles**
White-footed Mouse *Peromyscus leucopus* - Willem Rosenberg Turtle Study found one dead in vehicle parking area at Headquarters in August 2005
Meadow Vole *Microtus pennsylvanicus* - Peter McGowan USFWS trapped several in June 2007 at west Cell 4C
Muskrat *Ondatra zibethicus* – census first noted in August 2005 in Cells 3C and 4DX

Family *Capromyidae* – **Coypus**
Nutria *Myocastor coypus* - David Meyer NOAA reports netting a drowned one in April 2008 in Cell 3D
Family *Muridae* - **Rats**
Norway Rat *Rattus norvegicus* – census found one dead on road at west Cell 3A in November 2003
House Mouse *Mus musculus* - MES personnel trapped dead at headquarters in 2003

Family *Carnivora* – **Foxes**
Red Fox *Vulpes vulpes* – seen by personnel & trapped after 2003-2007 winter freezes

Family *Mustelidae* – **Weasels, Skunks, Otters**
River Otter *Lutra Canadensis* – census first found one in September 2002 in Cell 1A

Order *Artiodactyla* - **Deer**
Family *Cervidae* – **Deer**
White-tailed Deer *Odocoileus virginianus* – census first found in April 2003 in Cell 1A

Order *Cetacea* – **Whales, Porpoises**
Family *Delphinidae* – **Whales, Porpoises**
Atlantic Bottle-nosed Dolphin *Tursiops truncates* – no definitive sightings since 2004

* Denotes 1 January through 31 July 2012 identified species new to the project site, offshore, or Coaches Island.

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# D6

## Monitoring Background at the Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island:

The Monitoring Framework for the existing project was developed in accordance with EC 1105-2-209 entitled, Implementing Ecosystem Restoration Projects in Connection with Dredging (DA 1995) and is included in the Poplar Island, Maryland Environmental Restoration Project Integrated Feasibility Report and Environmental Impact Statement, February 1996.

The Adaptive Management Plan (AMP) provides the framework for managing the habitat restoration goals of the Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island (Poplar Island Project): restore remote island habitat in the mid-Chesapeake Bay using clean dredged material from the Chesapeake Bay approach channels to the Port of Baltimore. Originally developed in July 2004, annual updates to the AMP began in 2006.

Hypotheses were developed within the Monitoring Framework to support and give a scientific framework to ensure that Poplar Island is performing as projected. The Adaptive Management Plan is being used to quantify, supplement, and refine the objectives as stated in the 1996 monitoring framework document.

As stated in the 1996 Feasibility Report and EIS:

Monitoring of the Poplar Island Restoration Project will be performed to (1) ensure regulatory compliance, (2) document the creation of beneficial habitat, (3) confirm the expected findings of no negative impacts, and (4) provide operational input on the success of habitat creation and potential changes that will increase the habitat value and utilization.

Agencies providing expertise and information on the monitoring elements in the 1996 Framework include the U.S. Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), National Biological Survey (NBS), Maryland Department of Natural Resources including Maryland Geological Service, (MDDNR), Maryland Department of the Environment (MDE) Maryland Environmental Service(MES), Maryland Port Administration( MPA), and the U.S. Army Corps of Engineers (USACE). Monitoring results are regularly presented and discussed at the project's Workgroup, Habitat sub-group and Monitoring Sub-group. Meetings and reported to the Maryland Department of the Environment.

The hypotheses in the monitoring framework are worded so as to capture the presence of impacts or no impacts and benefits or no benefits. For example: The first monitoring element is stated as "The hypothesis being evaluated is that the project conditions will not significantly change the metals concentrations in sediments in Poplar Harbor". The desired outcome is to accept that this hypothesis is true which is the case. For some hypotheses the desired outcome is to reject the hypotheses. For example: "The species and numbers of migratory waterbirds nesting on the islands in the Poplar Island group show no numerical change or site relocation comparing pre- versus post restoration of Poplar Island (an increase is expected). The desired outcome would be to reject this hypothesis which is the case. The number of nesting species has increased from 7 in 2001 to 24 in 2012 (Figure 10).

Examples of the hypotheses being evaluated for the Poplar Island project are listed below in Tables 1, 2, and 3.

| **Table 1: Terrapins Population Hypotheses**<br><br>Hypothesis | Monitoring Year | Determination | Desired Outcome |
|---|---|---|---|
| There will be no change in the number of terrapin nests or the habitat used from year to year | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Monitoring not completed this year<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Confirmed<br>7. Rejected<br>8. Confirmed<br>9. Confirmed | The desired outcome for this hypothesis is that as the project continues and more habitat becomes available for the terrapins to use, there will be an increase number of nests on the island. |
| Nest and hatchling survivorship, and sex ratio will differ between Poplar Island and reference sites | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Monitoring not completed this year<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Confirmed<br>6. Confirmed<br>7. Confirmed<br>8. Confirmed<br>9. Confirmed | The desired outcome for this hypothesis is that there is a difference when it comes to nest and hatchling survivorship between Poplar Island and the reference sites. Since most predators found on the mainland are absent from Poplar Island, nesting success and hatchling survivorship are much higher at Poplar Island. |
| There will be no change in terrapin population size on Poplar Island; particularly within cells, from the time the cells are filled, throughout wetland development, and after completion and breach of the retaining dike | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Monitoring not completed this year<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Cannot be confirmed or rejected ( not enough data to form a conclusion)<br>7. Cannot be confirmed or rejected<br>8. Cannot be confirmed or rejected<br>9. Cannot be confirmed or rejected | The desired outcome for this hypothesis is that the terrapin nesting activity on Poplar Island will increase as more habitat becomes available for them to use, and access to the island becomes easier. |

| **Table 2: Bird Population Hypotheses**<br><br>Hypothesis | Monitoring Year | Determination | Desired Outcome |
|---|---|---|---|
| The species and numbers of migratory water birds nesting on the islands within Poplar Island will show no numerical change, comparing pre- versus post-restoration of Poplar Island | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Rejected<br>7. Rejected<br>8. Rejected<br>9. Rejected | It is expected that more bird species will use the project as more areas of the project are completed. Therefore, a desired outcome would be a rejected for this hypothesis. |
| Densities and species composition of priority migratory water birds breeding in the restored wetlands on Poplar Island do not change with the development and maturation of Poplar Island | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Rejected<br>7. Rejected<br>8. Rejected<br>9. Rejected | It is expected that as the project progress, and more suitable habitat becomes available, more bird species will want to come to the island to nest. Therefore, a desired outcome would be a rejected for this hypothesis. |
| Specific sites (such as the habitat islands) are consistent in their use among years | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Rejected<br>7. Rejected<br>8. Rejected<br>9. Rejected | It is expected that as more habitat becomes available for the birds to use for nesting habitat, the birds will vary where they decide to nest. |
| Reproductive success of each species is consistent among years and is sufficient to sustain a breeding population | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Partially confirmed<br>6. Partially confirmed<br>7. Partially confirmed<br>8. Rejected<br>9. Rejected | The desired outcome for this hypothesis would be a confirmed, as Poplar Island would like to see the reproductive success of the each bird species stay consistent over the life of the project. |
| Methods to enhance reproductive success are successful in increasing productivity | 1. 2002<br>2. 2003<br>3. 2004<br>4. 2005<br>5. 2006<br>6. 2007<br>7. 2008<br>8. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Partially confirmed<br>6. Partially confirmed<br>7. Partially confirmed<br>8. Partially confirmed<br>9. Partially confirmed | The desired outcome for this hypothesis would be a confirmed, as the project would like to verify that the methods used to attract birds to Poplar Island work and that it is providing suitable areas for them to nest. |

| **Table 3: Fish Population Hypotheses:**<br><br>Hypothesis | Monitoring Year | Determination | Desired Outcome |
|---|---|---|---|
| There are no differences between decapod or fish abundance, community species composition or population size class structure among the Poplar Island restored marsh habitats compared to those prior to restoration | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Rejected<br>7. Rejected<br>8. Rejected<br>9. Rejected | Changes are expected as the project is being restored; the desired outcome would be that there would be some difference over time in fish population size and structure in the restored wetlands. It is expected that more fish species will use the project as more wetland cells are completed and opened to tidal flow. Therefore, a desired outcome would be a rejected for this hypothesis. |
| There are no differences between decapod or fish abundance, community species composition or population size class structure among the Poplar Island restored marsh habitats compared to nearby reference marsh habitat | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Rejected<br>7. Partially rejected<br>8. Partially rejected<br>9. Rejected | The desired outcome would that that there are not any difference between the populations found in the restored wetlands to what is found in the nearby reference marshes. The goal is to mimic the reference marsh as much as possible and therefore be able to provide similar habitat for the desired fish species. Therefore, the desired outcome would be a confirmed for this hypothesis. |
| There are no differences in decapod, or fish densities or community species composition associated with age (seral stage) of restored Poplar Island wetlands | 1. 2001<br>2. 2002<br>3. 2003<br>4. 2004<br>5. 2005<br>6. 2006<br>7. 2007<br>8. 2008<br>9. 2009 | 1. Too early to determine<br>2. Too early to determine<br>3. Too early to determine<br>4. Too early to determine<br>5. Rejected<br>6. Rejected<br>7. Rejected<br>8. Rejected<br>9. Rejected | The desired outcome for this hypothesis is confirmed, thereby showing that the restored marsh habitats at Poplar Island over time all support similar abundance, composition, or population size class structure. |

# D7

Table 4- Fish utilization at Poplar Island in the restored wetland cells

| Latin Name | Common Name | 2002 | 2003 (Cell 4D Completed) | 2004 | 2005 (Cell 3D Completed) | 2006 | 2007 | 2008 | 2009 (Cell 1A Completed) | 2010 | 2011 (Cell 1C Completed) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fish** | | | | | | | | | | | |
| *Alosa aestivalis* | Blueback herring | | | | | | | Cell 4D | | | |
| *Alosa pseudoharangus* | Alewife | | | Cell 4D | | Cell 4D | | | | | |
| *Anchoa mitchilli* | Bay anchovy | | | | | Cells 4D, 3D | Cell 3D | | | | |
| *Anguilla rostrata* | American eel | | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cell 3D | Cell 3D | Cell 3D | |
| *Bairdiella chrysoura* | Silver perch | | | | | | Cells 4D, 3D | | | | |
| *Brevoortia tyrannus* | Atlantic menhaden | | | | | Cell 3D | Cell 3D | Cell 3D | Cell 3D | Cells 3D, 1A | |
| *Cynoscion nebulosis* | Spotted seatrout | | | | | | | | | Cell 3D | |
| *Cynoscion regalis* | Weakfish | | | Cell 4D | | Cell 3D | Cell 4D | Cell 4D | | Cell 1A | |
| *Cyprinodon variegatus* | Sheepshead minnow | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Dorosoma cepedianum* | Gizzard shad | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cell 3D | Cells 4D, 3D | Cell 3D | Cell 1A | |
| *Fundulus diaphenous* | Banded killifish | | | | | Cell 3D | Cell 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Fundulus heteroclitus* | Mummichog | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |

| Latin Name | Common Name | 2002 | 2003 (Cell 4D Completed) | 2004 | 2005 (Cell 3D Completed) | 2006 | 2007 | 2008 | 2009 (Cell 1A Completed) | 2010 | 2011 (Cell 1C Completed) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Fundulus majalis* | Striped killifish | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Gobiosoma bosc* | Naked goby | | | | | Cell 3D | Cell 3D | Cell 3D | Cell 3D | | |
| *Gambusia affinis* | Mosquito fish | | | | | | | | Cell 3D | Cells 3D, 1A | |
| *Leiostomus xanthurus* | Spot | | | | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Lepomis gibbosus* | Pumpkinseed | | | | | Cell 3D | | | | Cells 3D, 1A | |
| *Lepomis machrochius* | Bluegill sunfish | | | Cell 4D | | | | | Cell 3D | Cells 3D, 1A | |
| *Lucania parva* | Rainwater killifish | | | | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cell 4D | Cell 3D | Cells 3D, 1A | |
| *Menidia beryllina* | Inland silverside | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Menidia menidia* | Atlantic silverside | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Micropogon undulatus* | Atlantic croaker | | | | | | | Cell 4D | | | |
| *Morone americana* | White perch | | | Cell 4D | Cell 4D | Cell 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Morone saxatilis* | Striped bass | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Notemigonus crysoleucas* | Golden shiner | | | | | | | | | Cell 3D | |
| *Pogonias cromis* | Black drum | | | | | | Cell 3D | | Cell 3D | | |
| *Pomatomus saltatrix* | Bluefish | | | Cell 4D | | Cells 4D, 3D | | Cells 4D, 3D | Cell 3D | | |
| *Tinectes maculates* | Hogchoker | | | Cell 4D | | | | | | | |

| Latin Name | Common Name | 2002 | 2003 (Cell 4D Completed) | 2004 | 2005 (Cell 3D Completed) | 2006 | 2007 | 2008 | 2009 (Cell 1A Completed) | 2010 | 2011 (Cell 1C Completed) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Macroinvertebrates/Decapods** | | | | | | | | | | | |
| *Callinectes sapidus* | Blue crab | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |
| *Crangon septemspinosa* | Sand shrimp | | | | | | | | Cell 3D | | |
| *Littorina littorea* | Periwinkle snail | | | | | | | | | Cell 4D | Cell 4D |
| *Melampus bidentatus* | Coffee bean snail | | | | | | | | | | Cell 4D |
| *Palaemonetes pugio* | Grass shrimp | | | Cell 4D | Cell 4D | Cells 4D, 3D | Cells 4D, 3D | Cells 4D, 3D | Cell 3D | Cells 3D, 1A | |

# D8

Table 5- Birds species nesting on Poplar Island

| Year | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|---|
| # Nesting Pairs and Fledglings or Presence of Nests | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings |
| *American black duck | | | | | | | Presence | | ~3 | |
| American oystercatcher | | | | | | | | | | |
| Bank swallow | | | | | | | | | Presence | |
| Barn swallow | | | | | | | Presence | | Presence | |
| Black-crowned night heron | | | | | | | | | | |
| Black-necked stilt | | | | | | | | | | |
| Canada goose | Presence | | >20 | | 1 | 5 | 5-6 | 1+ | Controlled | |
| Cattle egret | | | 1 | | | | | | 5 | |
| Common grackle | | | | | Presence | | Presence | | | |
| *Common tern | 398 | | 340-400 | | 827 | | 810-825/0 | | ~477 | >75 |
| Crow spp. | | | | | | | | | | |
| Double-crested cormorant | | | 80-90 | | 405 | | 435 | | 740 | >1,000 |
| European mute swan | 2 | | 3 | | Controlled | | 2 | | Controlled | |
| European starling | | | | | Presence | | Presence | | Presence | |
| Glossy ibis | | | | | | | | | | |
| Great black-backed gull | Presence | | >25 | | 5+ | | 50-75 | >20 | 61 | >80 |
| Herring gull | Presence | | | | Presence | | | | | |
| Horned lark | | | >300 | | 190 | | | | | |
| Killdeer | | | | | Presence | | Presence | | Presence | |
| *Least tern | 35-40 | 0 | 40 | | 62 | | 50-60 | 0 | 12 | 1 |
| Mallard | | | | | Presence | | Presence | | Presence | |
| Northern rough-winged swallow | | | | | | | Presence | | Presence | |
| Osprey | Presence | | 5 | | 6 | | 7 | 7 | 6 | 8 |
| Purple martin | | | | | | | | | | |
| Red-winged blackbird | | | | | Presence | | Presence | | Presence | |
| Seaside sparrow | | | | | | | | | | |
| *Snowy egret | | | >40 | | 0 | | 40-50 | ~100 | 42-45 | ~80 |
| Tree swallow | | | | | Presence | | Presence | | Presence | |
| Tri-colored heron | | | | | | | | | | |
| Virginia rail | | | | | | | | | | |
| Willet | | | | | Presence | | Presence | | Presence | |
| Annual total | 7 | | 10 | | 17 | | 17 | | 19 | |
| * indicate target species for Poplar Island | | | | | | | | | | |

| Year | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # Nesting Pairs and Fledglings or Presence of Nests | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings | Nesting Pairs | Fledglings |
| *American black duck | ~3-4 | | 3-4 | >10 | 3-4 | >10 | 3-4 | >10 | >5 | >10 | 4+ | |
| American oystercatcher | 1 | 1 | 1/1 | | 1 | 0 | 1 | 2 | ~2 | 0 | 1-2 | 0 |
| Bank swallow | Presence | | Presence | | Presence | | Presence | | Presence | | Presence | |
| Barn swallow | Presence | | Presence | | Presence | | | | Presence | | Presence | |
| Black-crowned night heron | | | | | | | | | | | Probable | |
| Black-necked stilt | | | | | 1 | 1+ | ~4 | | 2-5 | 6+ | 4-6 | |
| Canada goose | Controlled | | Controlled | | Controlled | | Controlled | | Controlled | | Controlled | |
| Cattle egret | 4 | | 2-3 | | 1 | 2 | 1 | ~1-2 | 2-4 | 3-6 | 3+ | |
| Common grackle | | | Presence | | Presence | | Presence | | Presence | | | |
| *Common tern | 494 | 50-65 | 260 | 0 | 406 | 21+ | 244 | ~113 | 512 | 55 | 216 | |
| Crow spp. | | | 1 | 3 eggs | | | | | | | | |
| Double-crested cormorant | 650 | ~1,300 | 1,000 | 1,000-1,300 | 1,217 | 1,300 | 1,181 | 1,500+ | 1,572 | >2,000 | 1,816 | |
| European mute swan | Presence | | Controlled | | | | | | | | | |
| European starling | Presence | | | | Presence | | Presence | | Presence | | | |
| Glossy ibis | | | | | | | | | | | 1 | 1+ |
| Great black-backed gull | Controlled | | Controlled | | Controlled | | Controlled | | Controlled | | Controlled | |
| Herring gull | Controlled | | Controlled | | Controlled | | Controlled | | Controlled | | Controlled | |
| Horned lark | | | | | Presence | | | | | | | |
| Killdeer | Presence | | Presence | | Presence | | Presence | | Presence | | Presence | |
| *Least tern | 35-40 | 1 or 2 | 76 | 15+ | 112 | 35+ | 63 | 80-100 | 175 | 50-70 | 120 | |
| Mallard | Presence | | Presence | | Presence | | 150+ | | Presence | | Presence | |
| Northern rough-winged swallow | | | | | | | | | | | | |
| Osprey | 5 | 3 | 9 | 10 | 11 | 5 | 10 | 10 | 9 | 12 | 10 | 22 |
| Purple martin | | | | | Presence | | Presence | | Presence | | Presence | |
| Red-winged blackbird | Presence | | Presence | | Presence | | | | Presence | | Presence | |
| Seaside sparrow | | | | | Presence | | Presence | | Presence | | Presence | |
| *Snowy egret | 50-60 | 65-85 | 65 | >50 | 55 | 82 | 68 | 80-100 | 7 | ~164 | 74+ | |
| Tree swallow | Presence | | Presence | | Presence | | Presence | | Presence | | Presence | |
| Tri-colored heron | | | | | | | | | 1 | 4 | | |
| Virginia rail | | | | | | | | | | | 1 | 1+ |
| Willet | Presence | | Presence | | Presence | | Presence | | Presence | | Presence | |
| Annual total | 20 | | 21 | | 24 | | 21 | | 24 | | 24 | |
| * indicate target species for Poplar Island | | | | | | | | | | | | |