APPENDIX D

Essential Fish Habitat Evaluation

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

REPLY TO
ATTENTION OF

August 2, 2005

Planning Division

Mr. John Nichols
National Marine Fisheries Service
904 S. Morris Street
Oxford, Maryland 21654

Dear Mr. Nichols:

I am writing to request your review of the updated and attached Essential Fish Habitat (EFH) Impacts Assessment for the proposed expansion of the Poplar Island Environmental Restoration Project (PIERP), Talbot County, Maryland. A Final General Reevaluation Report (GRR) for the Poplar Island Expansion Study (PIES) with an integrated Supplemental Environmental Impact Statement (SEIS) is being prepared under the existing PIERP authorization. The public comment period for the Draft GRR/SEIS closes on August 8, 2005. It is anticipated that the Final GRR/SEIS will be sent to Corps Headquarters in September 2005, and therefore your comments on this updated EFH would be appreciated no later than August 17, 2005. The EFH has been updated to reflect changes in the recommended plan of the GRR/SEIS, specifically the addition of an alternative that includes an open water embayment requested by your agency. A review of impacts of the new recommended plan on EFH was conducted in accordance with requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Based on coordination with you, this assessment is focused on EFH for bluefish (*Pomatomus salatrix*), red drum (*Sciaenops ocellatus*), and summer flounder (*Paralichthys dentatus*).

As you know from your history of working with the Baltimore District on the PIERP and PIES, the PIERP is currently under construction, and will ultimately restore/create more than 1,100 acres of wetlands and upland island habitat using clean dredged material from Federal channels in the upper Bay. The District is investigating expanding the PIERP to provide additional capacity for dredged material and increase habitat. Following a recently received proposal from your agency in a letter dated May 19, 2005, a modified lateral expansion was designed by the Corps to incorporate additional protected open water and fish habitat diversity on the project. The proposed expansion would include a 600-acre lateral expansion component (measured from the centerline of the exterior dike outward to the end of the toe dike) with an open water embayment ranging from 90 to 140 acres in size; plus a vertical expansion component consisting of a 5-ft raising of the upland cells of the existing project. For the purposes of the impacts assessment, the size of the open water embayment within the proposed northern lateral expansion is estimated at 130 acres in size and the total impact area of the northern lateral expansion is assumed to be 470 acres. Therefore, the open water embayment will reduce the footprint of the northern lateral expansion originally proposed (600 acres bottom impact) by 130 acres. The new plan conserves both open water and Bay bottom habitat because

no dredged material will be placed in the embayment area and the bottom of the embayment will not be disturbed by construction activities. The lateral expansion with a 130-acre open water embayment would consist of approximately 29 percent wetland habitat, 47 percent upland habitat, and 24 percent open water. The open water embayment would be located on the western side of the northern lateral expansion and directly adjacent to the proposed wetland cells. Approximately 19 acres of sand borrow will be required for construction of the expansion. This sand will be derived from a 230-acre borrow area identified southwest of the existing PIERP. In the borrow area, water depths would be increased by as much as 10 to 12 ft over existing depths.

The District has determined that the proposed project will cause a loss of up to 470 acres of EFH, and increase the water depths over approximately 19 acres of Bay bottom in the southwestern borrow area. However, the project incorporates salt marsh habitat components and is configured to favor development of submerged aquatic vegetation (SAV) in Poplar Harbor. In addition, a direct trophic link between the created wetland cells and the open water embayment is planned which would provide finfish access to the small tributaries and tidal guts, would create a 130-acre quiescent area that could potentially support SAV, would increase the stability and complexity of the existing benthic community, and would provide a more diverse habitat for finfish species. The open water embayment would provide more diverse habitat types that include deep and shallow sub-tidal zones, an open water pelagic zone, mudflat habitat, tidal guts throughout the wetland cells, submerged reef habitat, and rock reef habitat. These positive impacts will partially offset the adverse impacts of open water habitat loss. The project would be constructed in accordance with standard practices that minimize detrimental environmental impacts, and a dredging plan will be developed in coordination with resource agencies. Consequently, the District has determined that the project will not have any substantial adverse effect on federally-managed species populations or their habitats, and complies with the provisions of the Magnuson-Stevens Act, as amended.

The District is requesting your concurrence with this finding. Please provide your agency's concurrence or comments within 15 days of the date of this letter. Your response is important and we are under a constricted schedule to finalize the GRR/SEIS. If you have any questions regarding this matter, please contact Mr. Mark Mendelsohn of this office, at (410) 962-9499.

Sincerely,

Wesley E. Coleman, Jr.
Chief, Civil Project Development Branch

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat Conservation Division
NOAA Bay Program Office
Severn Avenue
Annapolis, Maryland 21401

August 8, 2005

MEMORANDUM FOR: Mark Mendohlsen
Planning Division
Baltimore District, Corps of Engineers

FROM: John Nichols JN

SUBJECT: Revised Poplar Island Expansion EFH Assessment

The National Marine Fisheries Service has reviewed your revised Essential Fish Habitat (EFH) Assessment, dated August 2, 2005, submitted in accordance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, which supplements a second draft of the General Re-Evaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS), dated June 2005, for the proposed expansion of the Poplar Island Restoration Project. We are currently preparing an official response to your revised assessment; this memorandum provides a draft of comments and recommendations that will be contained in that response. We have also attached a copy of our letter, dated May 19, 2005, containing our comments on the February 2005 draft of the GRR and SEIS, to reference EFH Conservation Recommendations contained in that letter.

We strongly support your decision to incorporate our recommended open water embayment into the recommended expansion alternative. Discussion of the embayment in the assessment includes most of the important design features from our previous recommendations. Therefore, we can offer, at this time, **preliminary concurrence** with your EFH determination. However, considering the fact that interagency negotiations are still on-going regarding the design features of the embayment, as well as on other proposed actions associated with this project, such as the need for sand borrow, our concurrence must remain preliminary at this time. The following issues will continue to be of outstanding important during up-coming negotiations.

1. We continue to recommend that the size of the embayment be at least 130 acres, which will result in a minimum 22 percent reduction in EFH impacts associated with the expansion, incorporate a more diverse array of habitat types, and provide preferential habitat for larger predatory species, such as adult bluefish. This issue pertains to our EFH Conservation Recommendation 1(c) from our May 19, 2005 letter.

2. Marsh cells surrounding the embayment must to opened to permit regular tidal exchange between constructed marsh and waters of the embayment to the maximum extent practicable. This issue pertains to our EFH Conservation Recommendation 1(a) from our May 19, 2005 letter.

3. We support your proposed intent to limit the potential for sand borrow from the Southwest Borrow Area to a spatial area of approximately 19 acres. However, we continue to emphasize that avoiding disturbance to this area should be the primary goal, through obtaining the necessary borrow from areas entirely within the expansion footprint, and/or by obtaining sand from other federal navigation projects (EFH Conservation Recommendation 2 from our May 19, 2005 letter).

   We remain concerned about altered bathymetry that may result from borrow actions at the Southwest Borrow Area, and the potential for creating new areas as deep as 25 feet (MLLW), where seasonal hypoxia and/or anoxia may occur as a result of these actions. In consideration of the current trend of spatial expansion of the hypoxia/anoxia zone in the mid-Bay region, the potential for expanding this area as a result of the project is not acceptable. Therefore, we will continue to emphasize the need to avoid borrow at this site, or at minimum, to reduce the depths to which borrow is taken. Potential measures for avoiding this problem, discussed in your EFH Assessment (i.e., 1) connecting borrow areas to ambient depths; and, 2) stipulating a maximum borrow depth relative to the depth of the pycnocline), will be taken under further consideration by our staff during upcoming negotiations.

If you have any questions, contact me at my new phone number, (410) 267-5675; or, by E-Mail, John.Nichols@NOAA.GOV.

ESSENTIAL FISH HABITAT IMPACT ASSESSMENT

GENERAL REEVALUATION REPORT (GRR) AND SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS) FOR THE POPLAR ISLAND ENVIRONMENTAL RESTORATION PROJECT

CHESAPEAKE BAY, TALBOT COUNTY, MARYLAND

August 2005

Prepared By EA Engineering and Baltimore District, U.S. Army Corps of Engineers

Pursuant to Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation & Management Act, the U.S. Army Corps of Engineers (Corps) is required to prepare an Essential Fish Habitat (EFH) Assessment for all proposed actions that occur within coastal waters of the United States. This assessment is being prepared to address impacts of the proposed expansion of the Poplar Island Environmental Restoration Project (PIERP). Based on the prescribed protocol for preparation of an EFH Assessment, this assessment is comprised of the following components:

1. A description of the proposed action;
2. A listing of the life stages of all species with EFH designated in the project area;
3. An analysis of the effects of the proposed action;
4. The Federal agency's opinions regarding the effects of the proposed action; and,
5. Proposed mitigation, if applicable.

1. DESCRIPTION OF THE PROPOSED ACTION

The Corps, the Maryland Department of Transportation (MDOT), and the Maryland Port Administration (MPA), are investigating the potential vertical and lateral expansion of the existing PIERP. The PIERP itself is currently under construction. The PIERP is located in the upper-middle portion of the Chesapeake Bay, approximately 34 nautical miles south-southeast of the Port of Baltimore and one mile northwest of Tilghman Island in Talbot County, MD (Figure 1). The PIERP is restoring over 1,100 acres of island habitat, half uplands and half tidal wetlands, by making beneficial use of dredged material from Federal navigation channels in the upper Chesapeake Bay. The goal of the proposed expansion of Poplar Island is to modify PIERP to provide additional dredged material capacity and increase habitat. Material from Baltimore Harbor within the Patapsco River will not be considered for placement in the proposed expansion in accordance with the original Environmental Impact Statement (EIS) (USACE/MPA, 1996) prepared for the PIERP. Also to be considered with the expansion are environmental enhancements on Poplar Island and within Poplar Harbor, increased recreational and educational opportunities, and potential acceptance of dredged material from additional channels. Dredging for a new access channel, sand borrow for dike construction, and placement of breakwater(s) will

also be considered in the investigation. A General Reevaluation Report (GRR) for the Poplar Island Expansion Study (PIES) was prepared under the existing PIERP authorization, Section 537 of the Water Resources Development Act (WRDA) of 1996, which authorizes using material dredged from the Chesapeake Bay approach channels to the Port of Baltimore to restore Poplar Island to its approximate original 1847 footprint. The GRR is a decision document that will be used to determine the Federal interest in modifying PIERP. A Supplemental EIS (SEIS) was prepared for PIES to ensure compliance with the National Environmental Policy Act (NEPA) of 1969; the draft GRR/SEIS was released in June 2005.

The Draft GRR/SEIS investigated opportunities to expand PIERP within a 1,080-acre study area to the northeast of the PIERP (Figure 2); an access channel and northern sand borrow area are also proposed to be located within this area. Water depths in this general area range from about -4 ft MLLW in the vicinity of Jefferson Island to as deep as –10 to -12 feet MLLW several thousand feet north/northeast of PIERP. Following the receipt of a proposal from the National Marine Fisheries Service (NMFS) in a letter dated 19 May 2005, an open-water embayment was incorporated into the recommended plan to provide additional protected habitats including open water varying in depths from 12 feet to intertidal elevations, mudflats, tidal guts, tributaries, and fish habitat structures with the proposed northern lateral expansion. ***The following EFH assessment was written to address the incorporation of an open-water embayment into the proposed northern lateral expansion of the PIERP, and replaces the draft EFH submitted to NMFS on March 28, 2005.***

The proposed expansion would include a 600-acre lateral expansion component (measured from the centerline of the exterior dike outward to the end of the toe dike) with an open-water embayment ranging from 90 to 140 acres in size, plus a vertical expansion component consisting of a 5-ft raising of the upland cells of the existing project (Figure 3). For the purposes of the impacts assessment for this document, the size of the open-water embayment within the proposed northern lateral expansion was estimated to be 130 acres in size and, therefore, the impact area is assumed to be 470 acres. The open-water embayment will reduce the footprint of the northern lateral expansion originally proposed by 130 acres and conserve both open-water and Bay bottom habitat because no dredged material will be placed in the open-water embayment and the bottom of the embayment will not be disturbed by construction activities. The lateral expansion with the 130-acre open-water embayment would consist of approximately 29 percent wetland habitat, 47 percent upland habitat, and 24 percent open water. The open-water embayment would be located directly adjacent to the proposed wetland cells on the western side within the proposed northern lateral expansion (Figure 3). Eventually, when construction is complete, it is anticipated that the embayment will provide a necessary trophic link between the wetland cells and the open water habitat. A small tidal gut would be incorporated in the southwest portion of the expansion to provide necessary tidal access to existing Cell 1 (Figure 3). The preliminary, proposed tidal gut is approximately 200 to 250 feet wide and would be modeled after the tidal gut separating the southern portion of the existing project and Coaches Island. The open-water embayment would also provide more diverse habitat types within the northern lateral expansion including deep and shallow subtidal zones, an open water pelagic zone, mudflat habitat, tidal guts throughout the wetland cells, submerged reef habitat, and rock reef habitat.

Following the receipt of the 19 May 2005 letter from NMFS, the boundaries of the original wetland areas for the recommended plan were modified slightly to provide wetland habitat around a significant proportion of the shoreline of the 130-acre open-water embayment. The 10,600-foot embayment perimeter consists of approximately 3,400 feet of breakwater, 1,500 feet of upland shoreline, and 5,700 feet of wetland shoreline, consistent with the initial proposal from the NMFS letter dated 19 May 2005 requesting "4,000 to 6,000 linear feet of marsh shoreline". The shoreline of the southern end of the embayment was adjusted to provide a smoother alignment that should simultaneously improve hydraulic performance (by minimizing the potential for areas of poor circulation) and increase the proportion of marsh shoreline.

To create the open-water embayment, segmented breakwaters would replace approximately 3,400 feet of the western leg of the perimeter dike (Figure 3). The breakwater segments are approximately 200 feet long and are separated by about 50 feet of open water except for one or two larger openings of approximately 200 feet to allow access and adequate openings into the open-water embayment to facilitate fish utilization of the area. In addition, three small subtidal artificial reefs were included within the open-water embayment and will provide additional refugia within the embayment.

Internal containment dikes will be constructed with sand from borrow sources within the lateral expansion footprint. The dikes that form the perimeter of the proposed open-water embayment feature would require slope protection to prevent erosion from the exposure along the embayment. The current design assumption is that adequate slope protection can be provided by a double layer of 350-lb stone placed on a bedding layer and a geotextile filter, similar to the protection proposed for the eastern slopes of the expansion dikes. However, dike height and slope protection requirements will be refined as hydrodynamic analyses specific to the open-water embayment are completed. The amount and extent of armor required for the stability of the open-water embayment is not known at this time. Following construction of the internal containment dikes, it is anticipated that a necessary trophic link will be created between the wetland habitat and open water habitat.

To construct the dikes for the northern expansion and raise the existing dikes for the vertical expansion of the existing PIERP, it will be necessary to obtain additional sand beyond that which is available within the footprint of the proposed northern lateral expansion. Impacts associated with converting approximately 470 acres of open water located to the north and northeast of the existing PIERP to island habitat, dredging of sand from a proposed 215-acre southwestern sand borrow area to use in the construction of the lateral and vertical expansion components, and dredging of a northern access channel and turning basin are addressed for this alternative. The final elevation of the upland cells for the lateral expansion component for Alternative 3 will be +20 ft MLLW. As currently planned, it is anticipated that approximately 19 acres of the southwestern borrow area will be impacted during the construction of the proposed lateral expansion and vertical expansion components for Alternative 3. The extent of the southwestern borrow area impacts (total acres impacted) is subject to change based on submittal and approval of a final dredging plan for the project. Water depths in the proposed southwestern borrow area range from about -16 ft MLLW at its western boundary, to about -8 ft MLLW immediately adjacent to the PIERP. The excavation of the southwestern borrow area will permanently

increase the water depth in this area an average of approximately 10 ft across the bottom. The depth of dredging for sand in the southwestern borrow area is proposed to a maximum bottom limit of –25 ft MLLW. The southwestern borrow area would be entered by dredges from the existing access channel that runs south from Cell 6 at the southern end of PIERP, and through the already utilized Borrow Area G that lies immediately to the southeast of the proposed new southwestern borrow area.

Assuming that the open-water embayment within the lateral alignment will be 130 acres, this document assesses impacts of converting 470 acres within the 1,080-acre study area to island habitat, and dredging approximately 19 acres of borrow sand from the proposed 230 acre southwestern borrow area, converting it to open water of greater depth (as described above). It is anticipated that minimal bottom disturbance from construction would occur outside of the 470-acre expansion site within the 1,080-acre study area other than for planned vessel groundings. It is also anticipated that the actual bottom that will be directly impacted by proposed work in the southwestern borrow area will be substantially less once the dredging plan for the proposed work is finalized. However, it is believed that this spatial uncertainty does not compromise the purpose for which this assessment is being conducted or its validity. It should be noted that the reduction of external borrow sources to 19 acres [from the 91 acres stated in the draft EFH (dated March 28, 2005)] is favorable, and significantly reduces the environmental impacts to the southwest borrow area. It is possible that the entire quantity may be obtained from within the expansion dike footprint if the final subsurface exploration indicates that the geologic variability of the borrow deposit within the expansion limits is less than was the case in the southern borrow sources used for the original Poplar Island construction.

2. PROJECT AREA BACKGROUND INFORMATION

Island habitats are being lost in Chesapeake Bay as a consequence of erosion and inundation accompanying rising sea level occurring at a rate more rapidly than new islands are being created (Wray et al., 1995). In contrast, the Chesapeake Bay is growing by up to several hundred acres per year, also as a consequence of the impacts of rising sea level. This is continuously producing new open water habitat, including shallow water habitat. Land losses occur Bay-wide but are concentrated in the low-lying lower Eastern Shore (USACE, 1990).

Estuarine habitat is impacted in the Chesapeake Bay and throughout the mid-Atlantic by anthropogenic nutrient pollution that degrades water quality (USEPA, 1998). Resultant phytoplankton blooms, concomitant with loss of historic oyster populations that formerly filtered algae and suspended sediment from the water column (Ott and Newell, 1999), prevents submerged aquatic vegetation (SAV) from occupying otherwise suitable habitat. These stresses have presumably reduced the carrying capacity of mid-Atlantic estuaries for finfish (USEPA, 1998).

The Maryland Department of Natural Resources (MDNR) Water Quality Monitoring Program has been routinely sampling year-round in the Chesapeake Bay since 1985. They maintain two mid-channel stations in close proximity to Poplar Island that are suitable for characterizing surface water temperatures at Poplar Island: CB4.1C located to the north of Poplar Island southwest of Kent Point, and CB4.2C located to the south of Poplar southwest of Tilghman

Island. Table 1 presents water surface water temperature recorded at these stations for the period 1985-2003 (MDNR, 2005).

The pycnocline, the mixing zone at the boundary between the upper fresher layer of the water column and the lower saltier layer of the water column during times when the water column is stratified, occurs at about 6 to 12 m depth in mid Bay waters (Kemp et al., 1999). Subpycnocline waters are prone to hypoxic and anoxic conditions during warm weather months (Chesapeake Bay Program, 2004).

The surficial substrate surrounding the Poplar Island archipelago is predominantly sand and fine sand (USACE/MPA, 1996), which is consistent with the character of the middle and lower Bay bottom in Maryland along both the Eastern and Western Shore out to depths of about 30 ft depth (Kerhin et al., 1988). Geotechnical investigations conducted for PIES have determined that subsurface geological sand deposits suitable for dike construction extend locally to as deep as about -25 ft MLLW in the proposed southwestern borrow area (Figure 2). Soft (non-compact) clays and silts of 10 ft or more thickness underlie this sand deposit.

No SAV was documented to be present within the proposed northern alignment in Virginia Institute of Marine Science (VIMS) annual surveys conducted from 1992 through 2003. VIMS SAV surveys conducted prior to 1992 were not reviewed for this assessment. SAV was documented to be present in Poplar Harbor (the harbor lies outside of the impact area of the proposed northeast expansion and southwestern borrow areas) by VIMS in 2001, and by the USFWS in 2001 through 2004 (USFWS, 2001, 2003, 2004). The proposed southwestern borrow area is partially included in the Horseshoe Point USGS 7.5 minute quandrangle that has been regularly surveyed by VIMS for SAV since 1984. The southern portion of the proposed southwestern borrow area is not contained within a named 7.5 minute topographic quadrangle because no land occurs there; this region of open water is not regularly surveyed by VIMS for SAV. No SAV was documented to occur within the Horseshoe Point portion of the proposed southwestern borrow area in SAV surveying conducted by VIMS from 1992 through 2003. SAV typically grows to about the Secchi depth. Mean Secchi depth in open water mid-Bay stations in the vicinity of Poplar from 1985 to 2003 ranged from 1.1 to 2.0 m during the year, with Secchi depth during the warm weather months lying at the lower end of that range (MDNR, 2005). Consequently, it is unlikely that SAV could survive in the proposed southwestern borrow area because water depths exceed the Secchi depth for the area. Shallow water habitat less than 2 m deep in the area is considered to be habitat that SAV could potentially reoccupy if water clarity improves. Unvegetated shallows less than 1 m deep are considered to be areas of high potential for SAV recovery, and are included in the Tier II SAV recovery zone of the Chesapeake Bay Program. Unvegetated shallows between 1 and 2 m deep are contained in the Tier III recovery zone.

Finfish monitoring has been conducted at a number of sites around PIERP for PIES, including sites within the proposed northern expansion area and southwestern (SW) borrow area (Figure 4). Table 2 summarizes information on sampling results for 2004 pertinent to this assessment.

3. SPECIES WITH EFH IN THE PROJECT AREA

EFH designations for the Choptank River estuary, which is geographically adjacent to and has a comparable salinity regime to the project area, were utilized to identify species with potential EFH in project waters. NMFS (2004a) identifies the following species and their life stages for the Choptank River: summer flounder (*Paralichthys dentatus*), juvenile and adult life stages; bluefish (*Pomatomus saltatrix*), juvenile and adult life stages; windowpane flounder (*Scopthalmus aquosus*), juvenile and adult life stages; cobia (*Rachycentron canadum*), all life stages; red drum (*Sciaenops ocellatus*), all life stages; king mackerel (*Scomberomorus cavalla*), all life stages; and Spanish mackerel (*Scomberomorus maculatus*).

Based on the initial District coordination with John Nichols, of the NMFS, Oxford, Maryland Habitat Office, we determined that of species with EFH designated in the Choptank, only juvenile and adult summer flounder, and adult and juvenile bluefish likely occur at the proposed expansion site. Juvenile and adult summer flounder and juvenile bluefish were collected in the vicinity of the site during the site-specific investigations in support of the EIS for the original project (USACE, 1996) or the more recent 2004 spring, summer, and fall expansion surveys (EA 2004, summarized in Figure 4 and Table 2). Both species have also been collected during NOAA fisheries monitoring of the project and nearby waters (NOAA, 2001). Windowpane flounder, cobia, and king mackerel are generally restricted to the lower Chesapeake Bay, while red drum and Spanish mackerel are restricted to portions of the Bay south of U.S. 50 bridge (Murdy et al., 1997) but are generally transients north of the Choptank River (Nichols, 2003, pers. comm.). Although Spanish mackerel have not been collected in the vicinity of Poplar Island (USACE, 1996; NOAA, 2001; EA, 2005), juvenile red drum have been collected in Poplar Harbor (NOAA, 2001), and in the tideway between the project and Coaches Island (EA, 2005). Subsequent consultations with John Nichols indicated that an assessment of impacts to red drum EFH should be included, but that juveniles are the main concern in the Poplar area, and should be the focus of effort (Nichols, 2004, pers. comm.).

4. EFFECTS OF THE PROPOSED ACTION

The following provides a brief overview of pertinent natural history information of summer flounder, bluefish, and red drum to serve as a basis for assessing impacts of the proposed action to these species. This natural history information is followed with an analysis of impacts to individuals, habitat, and prey of these species of the proposed action as well as cumulative impacts of other dredging and dredged material placement actions.

Discharge from the existing placement site and newly constructed cells during placement operations must comply with state (Maryland Department of the Environment) water quality standards, and should result in only short term, minor perturbations to local water quality, and minimal impacts to individuals of all three species. Additional discharge locations and quantities would be the only potential effects from vertical expansion.

4.1 Summer flounder (juvenile and adult life stages)

4.1.1 Natural History and Fishing Pressure

Adult and older juvenile summer flounder enter the Chesapeake Bay during spring and early summer and exit the Bay in fall (Murdy et al. 1997). Adult summer flounder overwinter in the ocean and only enter the Bay in late spring. Larvae and young juveniles migrate into the Bay in October and prefer shallower waters; they typically overwinter and grow in the southern portion of the Bay. Older juveniles are generally distributed inshore and in estuarine areas throughout their range during the spring, summer, and fall. During colder months they move into deeper (oceanic) waters and can be found offshore with adults (Murdy et al. 1997, Fahay et al. 1999). Table 3 provides information on general occurrence and habitat preferences of summer flounder in estuaries.

Both adults and juveniles exhibit a marked preference for sandy bottom and/or SAV beds, particularly areas near shorelines (NMFS 2000). SAV has been identified as a Habitat of Particular Concern (HAPC) for both juvenile and adult summer flounder under the tenets of the Magnuson-Stevens Act. Previous consultations with NMFS have indicated that summer flounder are more prevalent in the lower Bay than in the project area (Nichols, pers. comm., 2003).

Summer flounder feed on a variety of small fish, shrimp, and crabs that occur in the Chesapeake Bay. Prey include species such as grass shrimp (*Palaemonetes pugio*), bay opossum shrimp (*Neomysis americana*), Atlantic silversides (*Menidia menidia*), and bay anchovy (*Anchoa mitchilli*). The latter shrimp species prefer sand bottom and/or SAV, similar to summer flounder preferences, while forage finfish are generally widespread in occurrence in shallow waters. Each of these food items occurs in the vicinity of the study area (Table 2).

Summer flounder supports a commercial and recreational fishery (Packer et al., 1999). Overfishing is the principal stressor to the summer flounder population (MAFMC, 1997), and summer flounder stock has frequently been in an overexploited status. As of 2001, summer flounder was being overfished, but the stock was not in an overfished status (NMFS, 2002). By January 2003, summer flounder was not overfished nor was overfishing occurring, presumably due to successful implementation of stock rebuilding measures implemented through limiting fishing take (MAFMC, 2004).

4.1.2 Impacts Assessment

4.1.2.a Impacts to Individuals Direct impacts to summer flounder individuals are unlikely, even if construction occurs during warmer months, because flounder are strong swimmers and would be able to avoid dredging and construction disturbances. During cooler weather months no direct physical impacts to individuals are expected because they are unlikely to be present. MDNR monitoring data for the Poplar Island area indicate that water temperatures are below the optimum temperature for summer flounder (52°F, Table 3) from late November through about mid-April (Table 1). Site filling (i.e. dredged material placement operations) will result in no additional alterations to or displacement of summer flounder habitat (post construction).

4.1.2.b Habitat Impacts Most of the northeast expansion and southwestern borrow areas contain sandy substrates. Construction of the northeast expansion would thus cause the loss of up to 470 acres of preferred habitat for summer flounder when this area is converted to marsh and upland island habitat. The open-water embayment concept would conserve both open water and reduce Bay bottom habitat impacts to summer flounder by 130 acres. Dredging actions in the southwestern borrow area would disturb approximately 19 acres, which may retain a sandy substrate. However, clays may be exposed locally. Sandy substrates are predominant along the shoreline in much of this reach of the Bay, and the proposed northeast expansion acreage is negligible relative to the overall acreages of sand bottom in the Bay. Thus, this loss of preferred habitat is not expected to impact summer flounder populations.

Project construction is not expected to directly impact SAV, since SAV is absent from the northeast expansion project area and southwestern borrow area. Therefore, there should be no direct impact to summer flounder HAPC. The proposed northern expansion is expected to contribute significantly to further protection of beds documented over the last several years as well as Tier II SAV recovery habitat within Poplar Harbor by providing protection from wind-driven waves from the west-northwest. In fact, the current alignment options were designed specifically to protect Poplar Harbor to benefit SAV. In addition, the 130-acre open-water embayment should create quiescent conditions that could potentially support additional SAV beds and HAPC preferred by both adult and juvenile summer flounder. Thus, indirect impacts of the project should benefit SAV, and thus increase summer flounder HAPC. Construction of the northeast expansion project could potentially convert up to approximately 100 acres of shallow water habitat (SWH) less than 6 feet deep (Figure 2) to wetland or upland island habitat. Therefore, the project would cause the permanent loss of up to 100 acres of SAV recovery habitat. However, whether SAV would reoccupy this area in the foreseeable future even if no project were constructed is highly uncertain given trends in the project area since VIMS has been surveying it. Deepening of waters and bottom disturbance from dredging of the southwestern borrow area would not directly impact SAV because of the absence of SAV from this area. Existing water depths preclude consideration of this area as SAV recovery habitat, thus no loss of future SAV habitat would occur.

Parts of the SW Borrow areas that are dredged to –18 feet or greater have the potential to become hypoxic or anoxic in warmer months of years when impaired water quality problems are pervasive below the pycnocline in the Bay. Under these conditions, the bottom in the SW borrow area would be unsuitable as habitat for summer flounder and they would be expected to avoid this area. This temporary loss of habitat would not be expected to impact summer flounder populations because of the abundance of suitable habitat still remaining elsewhere in the Bay.

Summer flounder utilize salt marsh guts (Table 3), which will be created as part of the current project and proposed expansion. It is anticipated that a direct trophic link between the open-water embayment and the proposed wetland cells will be created. The open-water embayment would provide access to the small tributaries and tidal guts that will be created in the wetland cells for juvenile summer flounder, Atlantic silversides (*Menidia menidia*), and juvenile blue crab (*Callinectes sapidus*). This habitat enhancement and the resulting forage access are expected to compensate somewhat for proposed conversion of open water and benthic habitats to island habitat.

Finally, the open-water embayment would also provide more diverse habitat types for summer flounder within the northern lateral expansion including deep and shallow subtidal zones, an open water pelagic zone, mudflat habitat, tidal guts throughout the wetland cells, submerged reef habitat, and rock reef habitat.

4.1.2.c Impacts to Prey Up to 470 acres of open water habitat supporting summer flounder prey would be lost to accommodate the northern expansion, and up to 19 acres of open water habitat would be disturbed in the SW borrow area. Prey individuals will be destroyed or displaced as a result of project expansion and borrow actions in both locations. The reduction of benthic macroinvertebrate communities as a result of island expansion would reduce biomass available for consumption by summer flounder that may use these areas as feeding grounds. However, forage fish and invertebrates consumed by summer flounder occur over a broad area of the Bay. Although the project will cause loss of open water and benthic habitat for summer flounder prey species, population levels of prey species are expected to remain regionally healthy because of the availability of these lost habitats elsewhere in the region. In addition, the habitat in the created wetland cells will export both detritus and micronutrients via the tributaries and tidal guts into the open-water embayment, thus enhancing the existing benthic community within the open-water embayment and providing more forage opportunities and refugia for summer flounder. Because 130 acres of open water will be conserved and not disturbed as part of the northern lateral expansion, it is expected that the existing benthic community (which is currently dominated by a single species of suspension feeder) will eventually become both more stable and more diverse as a result of the detritus inputs from the adjacent wetlands cells, thus providing more forage opportunities for summer flounder.

Natural replacement regionally of open water habitat converted to island would occur within a several year period in association with growth of the Bay. Creation of salt marsh in the northeast expansion and expected development of SAV in Poplar Harbor will support a wide variety of summer flounder forage species and partially compensate for the loss of open water habitat and disturbance to bottom habitats. The SW borrow area will likely recover a benthic community comparable to pre-project conditions within several years following cessation of dredging, as is typical of benthos occurring on sands and fine mobile estuarine deposits (Newell, 1998). However, parts of the SW borrow area left at depths below the pycnocline following dredging have the potential to lose their benthic macroinvertebrate communities in the future if hypoxic or anoxic conditions occur for prolonged periods of time.

4.1.2.d Cumulative Impacts Other dredging and placement actions occur in the immediate vicinity of the project area. Periodic maintenance dredging is conducted in small navigation channels including: Knapps Narrows, the Honga River, and the Chester River. Maintenance dredging of the federal channels in these locations would result in displacement of flounder and forage resources immediately after dredging. Knapps Narrows was last dredged 4-5 years ago, and it is expected that maintenance dredging will occur in either 2005 or 2006, prior to expansion activities at Poplar Island. The Chester River has been maintained within the past 3 years and would not require dredging for several years. The Honga River dredging and channel realignment was conducted and completed earlier in 2004. These projects will cause only temporary bottom disturbance and loss of benthos that could serve as forage for summer flounder. There are also periodic maintenance dredging and placement activities associated with

other portions of the Baltimore Harbor and Channels federal project in the Patapsco River, the Swan Point Channel, Tolchester Channel, and the approach channels to the Chesapeake & Delaware Canal. Activities north of the Bay Bridge, however, should have little additional impact on the species because summer flounder are typically very rare or absent in these regions.

Privately-owned commercial fishing gear, such as hydraulic escalator dredges used to harvest of soft clams (*Mya arenaria*), can also impact bottom habitat used by summer flounder. Escalator dredges produce short-term modifications to bottom topography, which are generally not detrimental to flounder if occurring on non-vegetated bottoms. Operation of escalator dredges in SAV beds has been restricted within Maryland waters so minimal impact to SAV is occurring from these clamming activities.

The State of Maryland and Baltimore District are currently evaluating restoration of two islands south of Poplar Island for a potential Mid-Bay Island Restoration project. If either Mid-Bay project moves forward, up to 2,000 acres of additional EFH may be converted to uplands/wetlands within 16 to 26 nautical miles of Poplar Island in areas that are known to support summer flounder. Although the impacts of these projects when considered cumulatively with the expansion of Poplar Island would be significant, the natural process of Bay growth would likely offset these open water losses regionally within about 10 years.

Proper management of fishing is the most critical measure to ensure stable summer flounder populations, unless other environmental conditions change substantially. Increased oxygenation of bottom waters could increase the depth to which adult summer flounder could occur in warm weather months.

4.2 Bluefish (juvenile and adult life stages)

4.2.1 Natural History and Fishing Pressure

Juvenile and adult bluefish enter the Chesapeake Bay during spring through summer, leaving the Bay in late fall. Adults are uncommon north of Annapolis, and generally do not occur above the U.S. 50 bridge, except during years of greater up-Bay salt wedge encroachment. Juveniles tolerate lower salinities than adults, and are therefore common in the upper Bay above the U.S. 50 Bridge, occurring as far north of Susquehanna Flats and the lower Elk River (Lippson, 1973). MDNR monitoring data for the Poplar Island area (Table 1) indicate that the area reaches the optimum temperature for bluefish immigration (>68°F, Table 3) in early June and falls to the outmigration temperature (<59°F, Table 3) in late November. Both adult and juvenile bluefish were collected in the vicinity of Poplar Island during summer sampling events in 1995 (EA 1995) and continue to support commercial landings in the area (EA 2002). Bluefish do not begin their migration into the mesohaline reaches of the Bay until May in most years. Previous consultations with NMFS have indicated that bluefish are ubiquitous within the Bay and transients to the site (Nichols, pers. comm., 2003) therefore they are not expected to be more prevalent within the project area than elsewhere within the Bay.

Adults are not typically bottom feeders and are strong swimmers that can easily avoid turbid conditions. Juveniles prefer shallower waters but are expected to be able to avoid dredging and

construction activities. Juveniles tend to concentrate in shoal waters, and are opportunistic feeders, foraging on a wide variety of estuarine life in the pelagic zone and over a variety of bottom types (Lippson, 1973). Table 3 provides information on general occurrence and habitat preferences of bluefish in estuaries.

Bluefish supports a commercial and recreational fishery. Large population fluctuations are common (Fahay et al., 1999). Within the Mid-Atlantic Bight, bluefish is one of the most important recreational species and recreational landings historically exceed commercial landings in the region. Its commercial value has increased since the 1960s and 1970s. However, combined landings, which peaked in 1980, declined steadily through the late 1990s (O'Reilly and Austin, 1996 cited in MMS, 2000). As of January 2003, the stock was considered overfished, but overfishing is not currently occurring (MAFMC, 2004).

4.2.2 Impacts Assessment

4.2.2.a Impacts to Individuals Any adults or young that may be in the area during construction would be displaced. However, because of the comparatively small size of the project area in comparison with open waters of the Bay suitable for bluefish, no detrimental impacts to bluefish are expected. Direct impacts to bluefish are unlikely, even if construction occurs during warmer months, because bluefish are good swimmers and can easily avoid construction activities. During cooler weather months no direct physical impacts to individuals are expected because they are unlikely to be present. Bluefish are unlikely to be present around the project from late October through early May due to their temperature preferences (Packer et al. 1999).

4.2.2.b Habitat Impacts The northeast expansion will cause the loss of up to 470 acres of open water habitat. Because of the great abundance of this habitat type in the Bay, no detrimental impacts to bluefish populations are expected. The open-water embayment concept would conserve 130 acres of both open water and Bay bottom habitat that were previously being proposed for filling. Although borrow actions would disturb approximately 19 acres in the SW borrow area, open water habitat would remain. Therefore, no long-term impacts to bluefish habitat are expected.

The marshes and tidal guts created as part of the expansion project, and expected increase of SAV within Poplar Harbor, will support juvenile bluefish (Table 3). These changes would compensate somewhat for loss of open water habitat. In addition, the 130-acre open-water embayment should create quiescent conditions that could potentially support additional SAV beds, which will benefit bluefish. Similarly stated for summer flounder, it is anticipated that a direct trophic link between the open-water embayment and the proposed wetland cells will be created and will be beneficial to bluefish. The open-water embayment would provide access for juvenile bluefish to the small tributaries and tidal guts that will be created in the wetland cells. This habitat enhancement is expected to compensate somewhat for proposed conversion of open water habitat to island habitat.

4.2.2.c Impacts to Prey The permanent reduction of open water and benthic communities as a result of island expansion and temporary loss of benthic communities in the SW borrow area will reduce biomass available for consumption by finfish. However, bluefish are opportunistic

feeders and the prey they consume occur over a broad area of the Bay so impact to any individual prey species is expected to be minimal. The marshes and tidal guts created as part of the expansion project will support a wide variety of forage species consumed by bluefish. Also, the size and depth of the open-water embayment would also provide more diverse habitat types for bluefish within the northern lateral expansion and would provide direct access to prey species utilizing the small tributaries and tidal guts.

This would be expected to compensate somewhat for conversion of open water and benthic habitats and ultimately be a habitat enhancement for this species. In addition, the habitat in the created wetland cells will export both detritus and micronutrients via the tributaries and tidal guts into the open-water embayment, thus enhancing the existing benthic community within the open-water embayment and providing more forage opportunities and refugia for bluefish. Because 130 acres of open-water will be conserved and not disturbed as part of the northern lateral expansion, it is expected that the existing benthic community will eventually become both more stable and more diverse, thus providing more forage opportunities for bluefish.

4.2.2.d Cumulative Impacts Cumulative effects from other projects discussed in the section on summer flounder impacts should not be significant relative to juvenile or adult bluefish because of the ubiquitous distribution and opportunistic feeding habits of this species within the Bay. Proper management of fishing is the most critical measure to ensure stable bluefish populations.

4.3 Red drum (juvenile life stage)

4.3.1 Natural History and Fishing Pressure

Red Drum occur over a wide range of water depths and variety of bottom types, consequently the EFH designation for this species is broad including most benthic habitats less than 50 m ranging from tidal freshwater to high salinity surf zones (Table 3). Juvenile red drum utilize the shallow backwaters of estuaries as nursery areas. Seagrass beds (SAV) have been identified as HAPC for the species within Chesapeake Bay. Within estuaries, juveniles utilize a variety of habitats including: inlet mouths, tidal guts/channels, inter- and subtidal flats, river mouths, oyster reefs and SAV beds over a variety of substrates (Table 3). Of the preferred habitat types, the project area includes intertidal flats and tidal guts/channels. Table 3 provides information on general occurrence and habitat preferences of red drum in estuaries.

Red drum spawn offshore in late summer through early fall and the juveniles enter the Bay in August or September (Murdy et al.1997). Although their temperature preferences are fairly broad (32°F to 86°F, Table 3), they generally occur in the Bay until November moving into deeper areas of estuaries or the ocean in late fall and winter (Murdy 1997). Collections of red drum adjacent to the project occurred in September in Poplar Harbor (NOAA 2001) and November in the tideway between the existing project and Coaches Island (EA, 2005).

Red drum prey varies with life stage. Small individuals consume small crustaceans. Juveniles eat mostly fish, although larger juveniles and adults consume fish, crustaceans, and plant material. Commercial red drum landings have declined along the mid-Atlantic coast, with none being reported north of Chesapeake Bay since 1950 (South Atlantic Fishery Management

Council, 1998). Red drum are not harvested commercially near the project area and are generally not of a size that supports recreational harvesting.

Red drum were previously not expected to occur with any frequency this far north in the Bay (Nichols, pers. comm., 2003, Murdy et al. 1997). The project area is likely the upper range of their distribution and abundances are likely low relative to more saline reaches of the lower Bay. For example, seine collections at James Island (approximately 16 miles south of the project) in Fall of 2002 yielded collections 3 times higher than those at Poplar Island (EA 2003). Red drum juveniles may potentially be in the project area during late summer or fall.

Commercial red drum landings have declined along the mid-Atlantic coast, with none being reported north of Chesapeake Bay since 1950 (South Atlantic Fishery Management Council, 1998). Red drum continues to support a substantial recreational fishery (NMFS, 2005). As of 2001, red drum were overfished and overfishing was occurring (NMFS, 2002).

4.3.2 Impacts Assessment

4.3.2.a Impacts to Individuals Juvenile red drum are strong swimmers and should easily be able to avoid dredging and construction activities. Therefore, direct impacts are not expected. Construction taking place during colder weather months would be unlikely to impact juveniles because they would be absent from the project area.

4.3.2.b Habitat Impacts Construction of the northeast expansion would cause the loss of up to 470 acres of open water habitat for red drum when this area is converted to marsh and upland island habitat. However, the open-water embayment concept would conserve 130 acres of both open water and Bay bottom habitat impacts utilized by red drum. In addition, the 130-acre open-water embayment should create quiescent conditions that could potentially support additional SAV beds and HAPC for juvenile red drum. Because the project and the open-water embayment are expected to create wetlands and tidal guts and enhance SAV habitat, the indirect impacts are expected to be largely beneficial. Red drum (juveniles) observed in the project area during recent surveys were collected from the tideway (gut) between the existing project and Coaches Island. The habitat enhancements that have already been made to that area (wetland and SAV planting) are probably making it a desirable area for red drum. Similar enhancements are planned for the larger restoration efforts and proposed project expansion. It is anticipated that a direct trophic link between the open-water embayment and the proposed wetland cells will be created and will be beneficial to red drum. The open-water embayment would provide access for red drum to the small tributaries and tidal guts that will be created in the wetland cells. This habitat enhancement is expected to compensate somewhat for proposed conversion of open water habitat to island habitat. Loss of open shallow water habitat at the site is in itself expected to have little indirect impact on the red drum population due to the abundance of this habitat within the region. The marshes and tidal guts created as part of the expansion project will support juvenile red drum (Table 3).

4.3.2.c Impacts to Prey The reduction of benthic macroinvertebrate communities as a result of island expansion will reduce biomass available for consumption by finfish, although the open-water embayment should promote a more diverse and stable benthic community. However, red

drum are not obligate bottom feeders and the forage fish and invertebrates they consume occur over a broad area of the Bay so impact is expected to be minimal. The marshes and tidal guts created as part of the expansion project would support a wide variety of forage species consumed by red drum. This would likely compensate for conversion of open water and benthic habitats and ultimately be a habitat enhancement for this species.

4.3.2.d Cumulative Impacts Cumulative effects from other projects discussed in the section on summer flounder impacts would not be significant relative to juvenile red drum because red drum are mobile compared to dredging activities and have opportunistic feeding habits. Red drum are present within the Bay for only a short period of the year, so interactions with any dredging activities would be relatively low. Proper management of fishing is the most critical measure to ensure stable red drum populations.

5. FEDERAL AGENCY'S OPINION ON PROJECT IMPACTS TO EFH

In summary:

1. Adult and juvenile bluefish and summer flounder and juvenile red drum are known to occur near the project area and to utilize the SWH around the existing PIERP. The proposed northeast expansion will convert up to 470 acres of EFH (100 acres maximum of SWH) to tidal wetlands, uplands, and protected open water habitat, which would result in a net loss of EFH for summer flounder, red drum and bluefish. Up to an additional 19 acres of bottom will be disturbed in the proposed SW borrow area to obtain sand for construction. This will result in a temporary loss of benthic habitat for summer flounder until such time as bottom conditions recover.
2. The marshes and tidal guts created as part of the expansion project will support juveniles of summer flounder, bluefish, and red drum as well as a wide variety of their forage species. In addition, a direct trophic link between the open-water embayment and the proposed wetland cells will be created and will be beneficial to EFH species. The open-water embayment would provide access for EFH species to the small tributaries and tidal guts that will be created in the wetland cells. The creation of this habitat is expected to compensate somewhat for loss of open water and benthic habitats.
3. No HAPC will be impacted because SAV is rare adjacent to the project area and the proposed alignments would avoid known SAV beds. The northeast expansion is designed to protect or enhance potential SAV habitat within Poplar Harbor and is likely to induce an increase in SAV bed coverage there. The 130-acre open-water embayment should create quiescent conditions that could potentially support additional SAV beds along the shoreline of the open-water embayment, which is HAPC for summer flounder and red drum. This increase in SAV habitat would benefit all three species.
4. Similar to the existing project, discharges from the new placement cells will be subject to compliance with state water quality standards, resulting in only short term, minor perturbation to water quality. Additional discharge locations and quantities would be the only potential affects from vertical expansion.
5. Although other federal, state and private sponsored projects occur in the project vicinity that cause the disturbance of bottom habitat, these projects are periodic and should not significantly affect summer flounder, bluefish, or red drum, and their preferred habitats.

Proposed large-scale island restoration projects elsewhere would cause a loss of bottom and open water habitat for these species, however natural expansion of the Bay will continue to create open water areas regionally which will ameliorate some of the open water impacts. Therefore, no significant cumulative impacts to habitat or populations of these species are expected to result from this project.

6. Other species with EFH designated in the project area (i.e., cobia, Spanish mackerel, king mackerel, windowpane flounder) are rare and transient to the site (Nichols, pers. comm., 2003 and 2004, Murdy 1997) and have not been documented in the project area in site-specific studies (USACE 1996, NOAA 2001, EA 2004).

In conclusion, the Baltimore District, after reviewing relevant fisheries information, analyzing potential project impacts, and redesigning the proposed northern lateral expansion to include an open-water embayment at the suggestion of NMFS, has determined that the proposed action will not have a substantial adverse affect on EFH, or on species with designated EFH in the project area. Overall, direct, secondary, and cumulative impacts to EFH and associated species will be minimal and, in the long term, the current project and proposed expansion will enhance some habitat features for species managed under the Magnuson-Stevens Act.

6. MITIGATION

Because this proposal will result in minimal impacts to summer flounder, red drum and bluefish and is designed to protect and enhance EFH and HAPC, no mitigation specific to protection of populations of these species or their habitat has been proposed. The northern lateral expansion was redesigned from the original layout to include an open-water embayment at the suggestion of NMFS to benefit EFH species. The improvements to trophic transfer accommodated by the embayment are expected to offset the impacts to adjacent open waters, alleviating the need for mitigation. It should also be noted that the proposed project incorporates numerous mitigation measures designed to maximize the environmental benefits of the project, while minimizing adverse impacts. Dredging activities are currently constrained by spatial and temporal restrictions to protect mapped oyster and SAV beds in the project area. These constraints and others will be discussed at length in the SEIS that is being prepared for the Poplar Island Expansion Project.

A dredging plan is being developed for the proposed borrow and expansion activities. Coordination will be undertaken with resource agencies during development of this plan to determine if additional guidelines or constraints on dredging should be imposed. Two topics being considered currently include potentially conducting dredging such that upon project completion the dredged area would a) connect with waters of equal depth in the Bay to promote water circulation and reduce risk of creating a hypoxic/anoxic basin, and or b) stipulate a maximum depth to be left in relationship to the pycnocline to avoid or minimize production of subpycnocline bottom.

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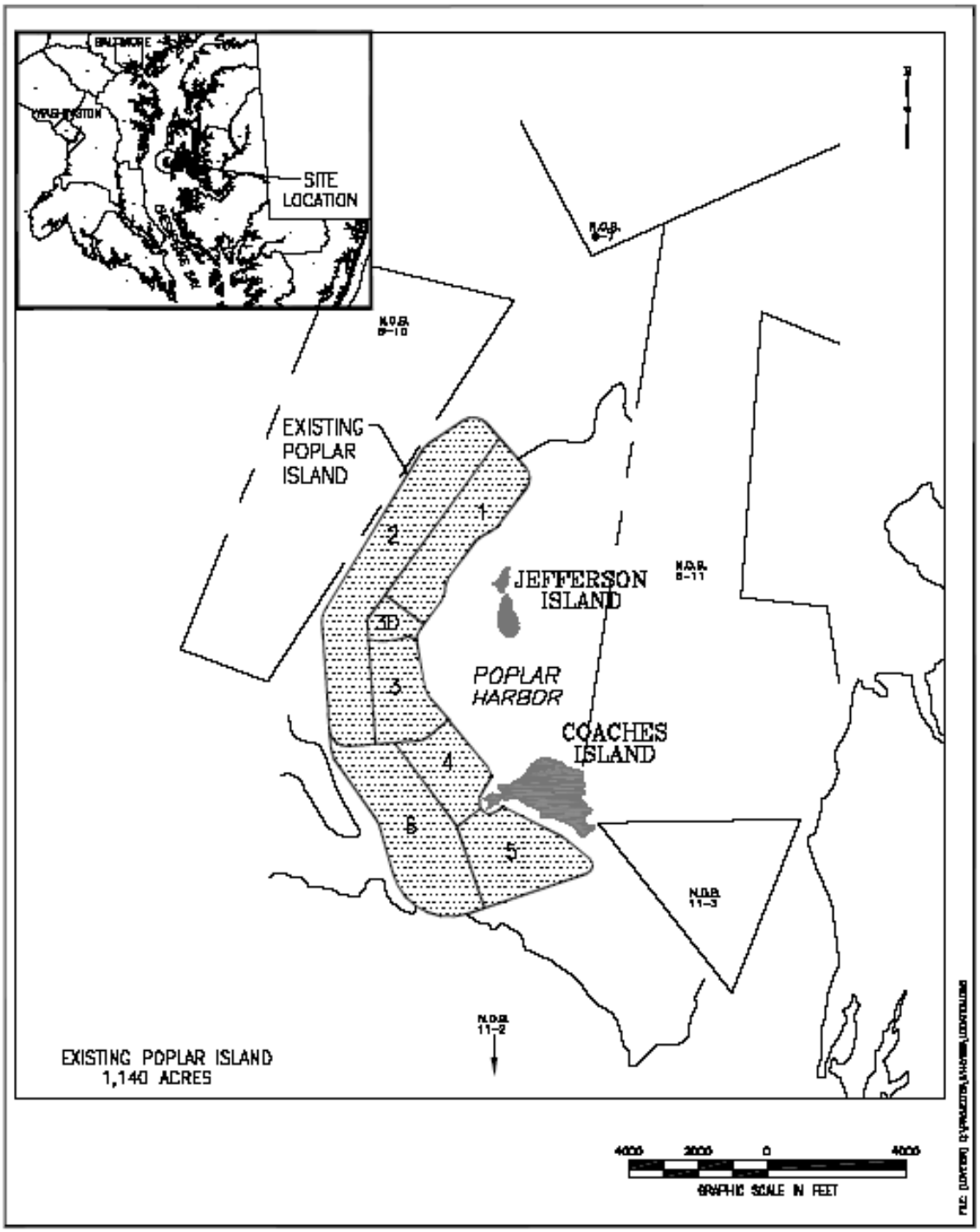

FIGURE 1. EXISTING POPLAR ISLAND CONFIGURATION AND SURROUNDING NATURAL OYSTER BARS (NOB)

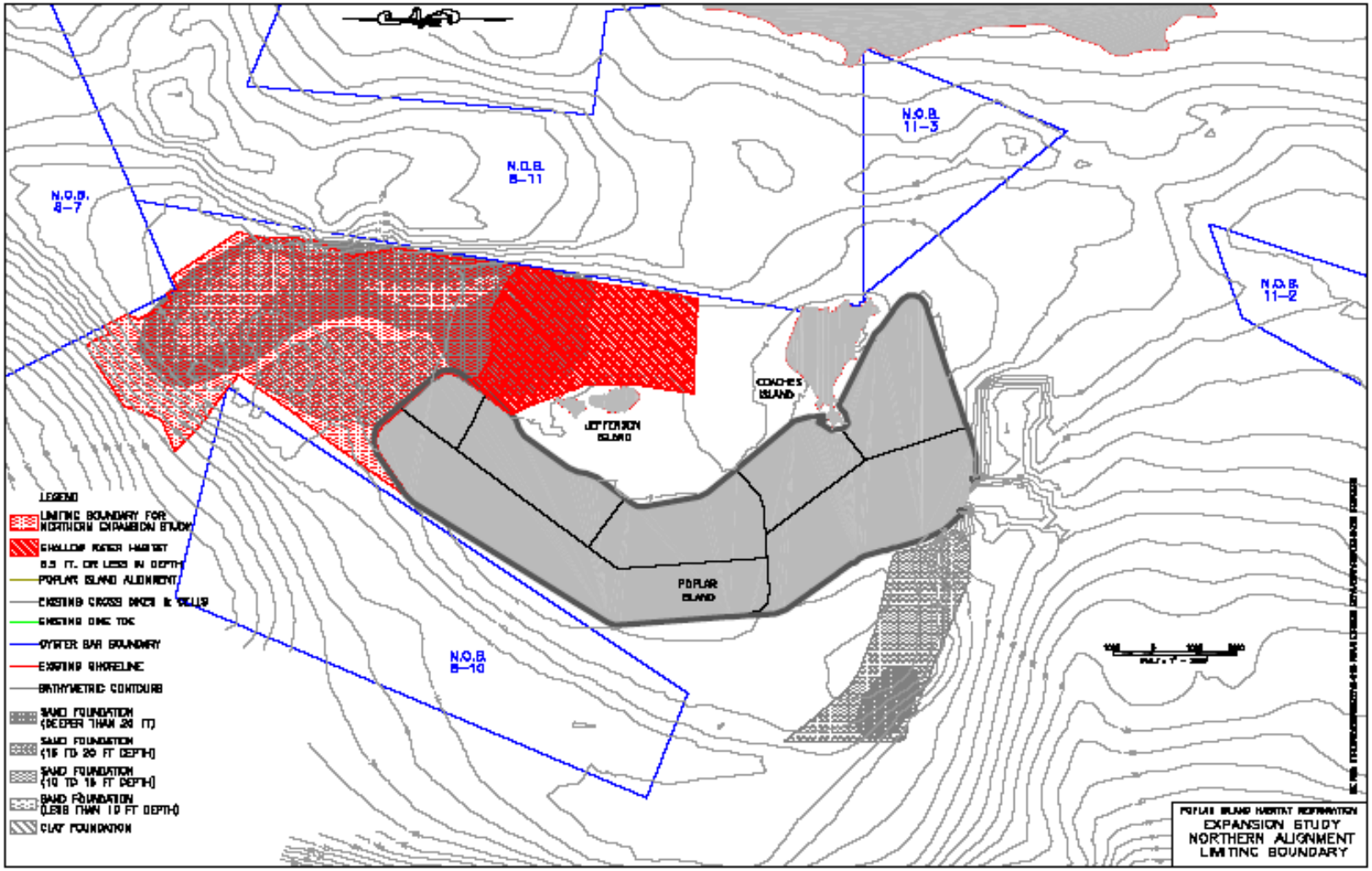

Figure 2. Study Area Boundary and Shallow Water Habitat within Area Evaluated for Poplar Island Expansion Study

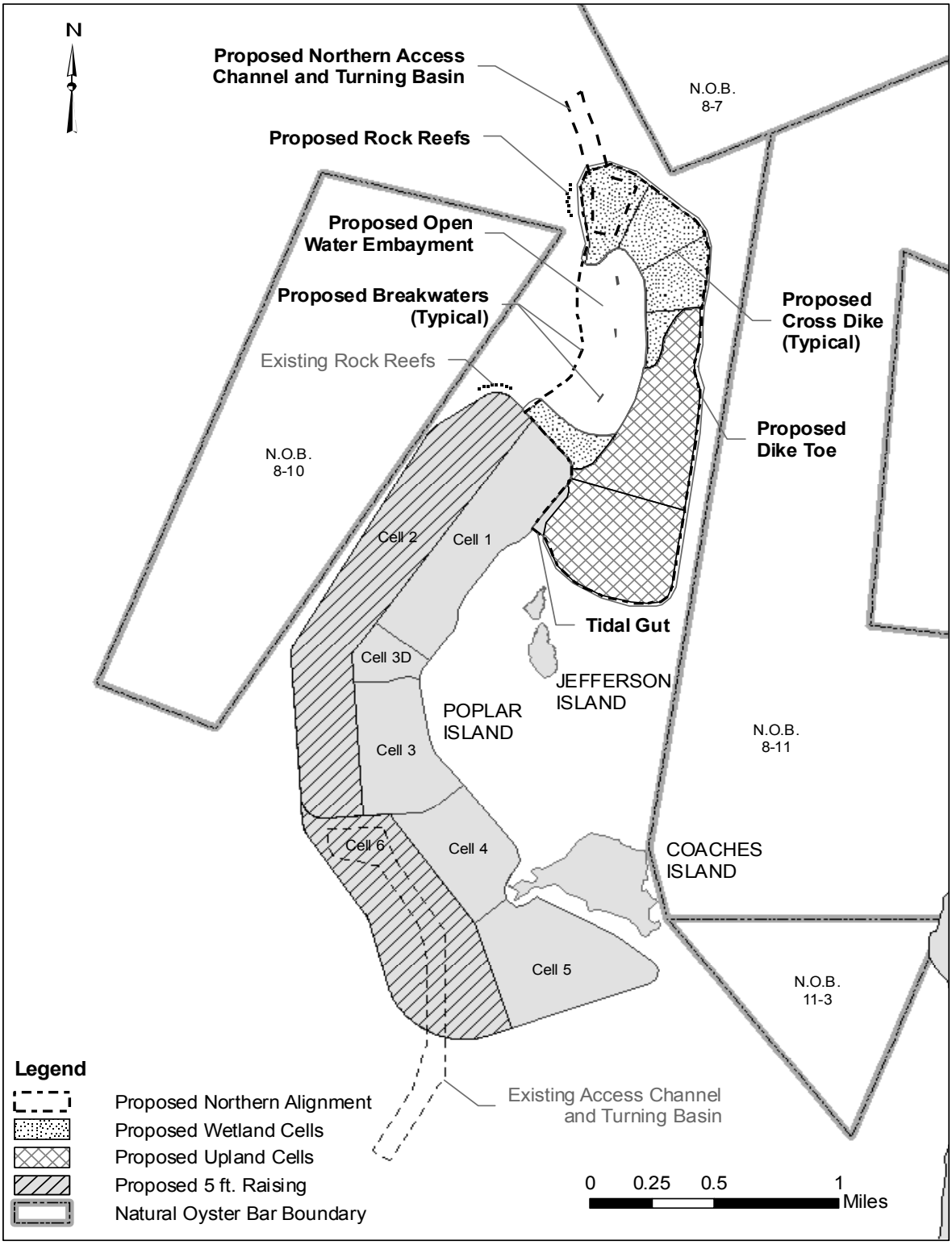

Figure 3. Recommended Plan (29% Wetland, 47% Upland, and 24% Open Water, and 5-ft Raising of Existing PIERP Cells 2 and 6)

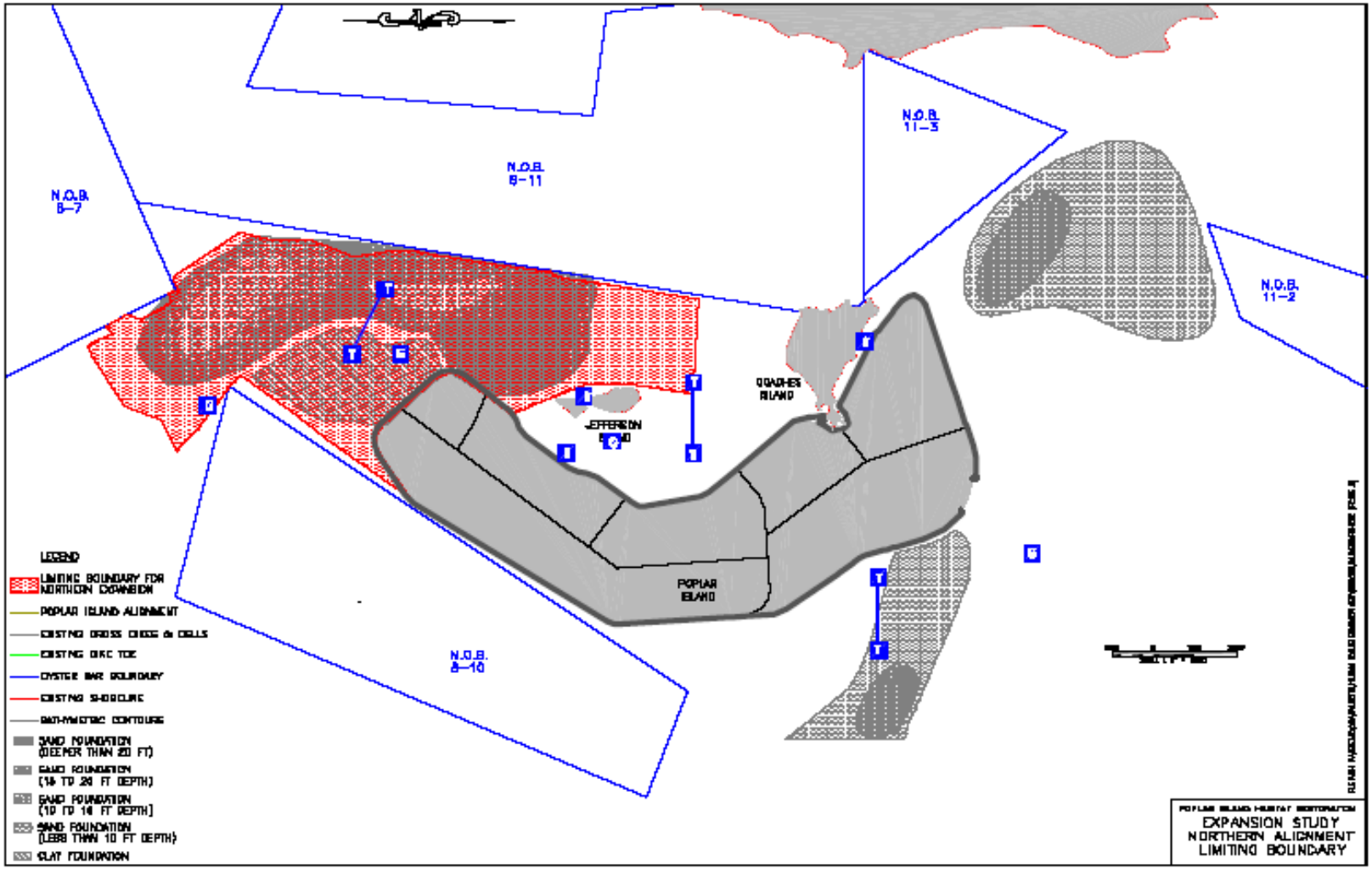

Figure 4. Finfish Sampling Locations for Poplar Island Expansion Study (PIES)

Table 1. Surface Water Temperature (°F) from 1985-2003 at Monitoring Stations in Poplar Island Vicinity.

Month	Chesapeake Bay Mainstem / Kent Point (SW) (CB4.1C)			Chesapeake Bay Mainstem / MD Mid Bay (CB4.2C)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum
January	32	37	42	33	37	42
February	32	35	41	32	35	41
March	36	40	46	36	39	45
April	46	50	57	47	51	56
May	58	60	67	58	60	67
June	67	71	77	65	71	76
July	76	79	82	77	79	82
August	78	80	82	77	80	82
September	72	75	81	72	75	80
October	63	66	70	63	66	69
November	49	54	60	49	54	61
December	39	43	53	39	44	53

Table 2a. Distribution and Abundance of Species of Concern and Prey Species for Poplar Island Expansion Project 2004, Spring Survey

		Discipline														
		Seine			Trawl				Gill Net						Life Stage	
		S1	S2	S3	T1	T2	T3	T4	G1	G2	G3	G4	G5	G6	JUV	ADULT
Species of Concern	Summer flounder	1		3											4	
	Bluefish															
	Windowpane flounder															
	Cobia															
	Red drum															
	King mackerel															
	Spanish mackerel															
Prey Species	Atlantic silverside	23	306	337	1											
	Bay anchovy		1	6828	6	1		1								
	Striped anchovy															
	Striped killifish	39														
	Mummichog			7												
	Atlantic menhaden								40	68	67		47	55		277
	Spot															

Table 2b. Distribution and Abundance of Species of Concern and Prey Species for Poplar Island Expansion Project, 2004 Summer Survey

		Discipline														
		Seine			Trawl				Gill Net						Life Stage	
		S1	S2	S3	T1	T2	T3	T4	G1	G2	G3	G4	G5	G6	JUV	ADULT
Species of Concern	Summer flounder	1		1		1				1					3	1
	Bluefish		1							13		5	7		25	
	Windowpane flounder															
	Cobia															
	Red drum															
	King mackerel															
	Spanish mackerel															
Prey Species	Atlantic silverside	278	1633	531												
	Bay anchovy	5	38	58		1410		79								
	Striped anchovy						1	4								
	Striped killifish	177	1	320												
	Mummichog	2		18												
	Atlantic menhaden	2		12		4				28		8	25	16	49	46
	Spot	10	1	27		60		1		55		37	55	38	223	61

Table 2c. Distribution and Abundance of Species of Concern and Prey Species for Poplar Island Expansion Project, 2004 Fall Survey

		Discipline													
		Seine			Trawl				Gill Net						Life Stage
		S1	S2	S3	T1	T2	T3	T4	G1	G2	G3	G4	G5	G6	JUV	ADULT
Species of Concern	Summer flounder	1								1		1	1			3
	Bluefish									2		6			8	
	Windowpane flounder															
	Cobia															
	Red drum			18											18	
	King mackerel															
	Spanish mackerel															
Prey Species	Atlantic silverside	284	207	294												
	Bay anchovy	6	1	31		46										
	Striped anchovy															
	Striped killifish	1		224												
	Mummichog			15												
	Atlantic menhaden	1		36						24		99	75	35	122	111
	Spot	1								24		30	15	29	87	12

* Blank cells indicate that no individuals of that species were recovered.
** Grey cells indicate that location was not sampled. See EA 2004 for additional details.

Table 3. Occurrence and Habitat Preferences of Bony Fish with EFH Designated for Region by Life-Stage in the Mid-Atlantic, with Focus on Preferences Applicable or Potentially Applicable to Estuaries.

Species Common Name	Regulated EFH Life Stages	Geomorphic Features	Substrate	Depth (m)	Depth (ft)	Water Temperature (C)	Water Temperature (F)	Time of Year	Reference
Bluefish	Juvenile	Day: shorelines, tidal guts; night: open waters, channels	Sand, mud, sea lettuce patches, eelgrass beds, salt marshes	--	--	>20 immigrate into estuaries; 15 emigrate from estuaries	>68 immigrate into estuaries; 59 emigrate from estuaries	May - October	Fahay et al., 1999
	Adult	--	--	--	--	>14 to 16	>57 to 61	--	Fahay et al., 1999
Red drum	Larvae	Inter- and subtidal flats, estuarine wetlands, tidal guts, SAV	Mud, sand, SAV	0 to 10	0 to 30	16 to > 30	61 to >86	--	South Atlantic Fishery Management Council, 1998; NMFS 2000 (Summary Tables)
	Juvenile	Inlet mouth, tidal guts/channels, inter- and subtidal flats, river mouths, oyster reefs	Mud, sand, shell, SAV	0 to 10	0 to 30	0 to > 30	32 to >86	--	South Atlantic Fishery Management Council, 1998; NMFS 2000 (Summary Tables)
	Adult	Inlet mouth, channels, inter-and subtidal flats, oyster reefs	Mud, sand, shell	1 to 100	3 to 330	0 to >30	32 to >86	--	South Atlantic Fishery Management Council, 1998; NMFS 2000 (Summary Tables)
Summer flounder	Juvenile	Lower estuary flats, channels, salt marsh guts, eelgrass beds.	Mud and sand	0.5 to 5	1.5 to 15	>11	>52	--	NMFS 2000 (Summary Tables); Packer et al., 1999
	Adult	--	--	0 to 25	0 to 80	--	--	Warmer months	NMFS 2000 (Summary Tables); Packer et al., 1999