

**Sparrows Point Project
Resource Report 3
January 2007**

**Resource Report 3 – Vegetation and Wildlife
AES Sparrows Point LNG Terminal & Mid-Atlantic Express
Pipeline**

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SUMMARY OF REQUIRED FERC REPORT INFORMATION		
TOPIC	FERC Reference	Report Reference or Not Applicable
<p>1. Classify the fishery type of each surface waterbody that would be crossed, including fisheries of special concern.</p> <ul style="list-style-type: none"> • This includes commercial and sport fisheries as well as coldwater and warmwater fishery designations and associated significant habitat 	§ 380.12(e)(1)	Sections 3.3.1
<p>2. Describe terrestrial and wetland wildlife and habitats that would be affected by the project.</p> <ul style="list-style-type: none"> • Describe typical species with commercial, recreational or aesthetic value. 	§ 380.12(e)(2)	Sections 3.4 and 3.5
<p>3. Describe the major vegetative cover types that would be crossed and provide the acreage of each vegetative cover type that would be affected by construction.</p> <ul style="list-style-type: none"> • Include unique species or individuals and species of special concern • Include nearshore habitats of concern 	§ 380.12(e)(3)	Section 3.4, Table 3.4-1
<p>4. Describe the effects of construction and operation procedure on the fishery resources and proposed mitigation measures.</p> <ul style="list-style-type: none"> • Be sure to include offshore effects, as needed. 	§ 380.12(e)(3)	Section 3.3.3
<p>5. Evaluate the potential for short-term, long-term and permanent impact on the wildlife resources and state-listed endangered or threatened species caused by construction and operation of the project and proposed mitigation measures.</p>	§ 380.12(e)(4)	Sections 3.5.2 and 3.6.2
<p>6. Identify all federally listed or proposed endangered or threatened species that potentially occur in the vicinity of the project and discuss the results of the consultations with other agencies. Include survey reports as specified in 380.12(e)(5).</p> <ul style="list-style-type: none"> • See § 380.13(b) for consultation requirement. Any surveys required through § 380.13(b)(5)(I) must have been conducted and the results included in the application. 	§ 380.12(e)(5)	Sections 3.6.1 and 3.6.2
<p>7. Identify all federally listed essential fish habitat (EFH) that potentially occurs in the vicinity of the project and the results of abbreviated consultations with NMFS, and any resulting EFH assessment.</p>	§ 380.12(e)(6)	Sections 3.3.2 and 3.3.3
<p>8. Describe any significant biological resources that would be affected. Describe impact and any mitigation proposed to avoid or minimize that impact.</p> <ul style="list-style-type: none"> • For offshore species be sure to include effects of sedimentation, changes to substrate, effects or blasting, etc. This information is needed on a mile-by-mile basis and will require completion of geophysical and other surveys before filing. 	§ 380.12(e)(4&7)	Sections 3.3.1, 3.3.2, 3.4, and 3.6

**Sparrows Point Project
Resource Report 3
January 2007**

SUMMARY OF REQUIRED FERC REPORT INFORMATION	
TOPIC	Report Reference or Not Applicable
ADDITIONAL INFORMATION OFTEN MISSING AND RESULTING IN DATA REQUESTS	
Provide copies of correspondence from federal and state fish and wildlife agencies along with responses to their recommendations to avoid or limit impact on wildlife, fisheries, and vegetation.	Appendix 3C
Provide a list of significant wildlife habitats crossed by the project. Specify locations by milepost, and include length and width of crossing at each significant wildlife habitat.	Table 3.5-1

TABLE OF CONTENTS

	Page
3. VEGETATION AND WILDLIFE	1
3.1 Introduction	1
3.2 Objective and Applicability	1
3.3 Fisheries Resources	2
3.3.1 Existing Resources	3
3.3.2 Fisheries of Special Concern	6
3.3.3 Construction and Operation Impacts and Mitigation	10
3.4 Vegetation	14
3.4.1 Existing Resources	14
3.4.2 Vegetative Communities of Special Concern	18
3.4.3 Construction and Operation Impacts and Mitigation	18
3.5 Wildlife Resources	19
3.5.1 Existing Resources	20
3.5.2 Wildlife Resources of Special Concern	22
3.5.3 Construction and Operation Impacts and Mitigation	26
3.6 Endangered and Threatened Species	27
3.6.1 Existing Resources	28
3.6.2 Construction and Operation Impacts and Mitigation	31
3.7 References	38

TABLES

APPENDIX 3A	Finfish/Epibenthic Invertebrate Data Report
APPENDIX 3B	Essential Fish Habitat Assessment
APPENDIX 3C	Agency Correspondence
APPENDIX 3D	FERC Data Request Response Matrix

LIST OF TABLES

Table No.	Title
Table 3.3.1-1	Marine Finfish Species Likely to Occur Within the Proposed Project Area or Along Proposed Marine traffic Routes
Table 3.3.1-2	Diadromous and Freshwater Finfish Species Likely to Occur Along the Proposed Pipeline Route and the Terminal Project Area
Table 3.3.1-3	Benthic Taxa Recorded During MDNR Over Five-Year Survey (FY2001-FY2005) and AES Sampling Efforts Conducted In June and October 2006
Table 3.3.1-4	Waterbodies Crossed by the Sparrows Point Project
Table 3.3.1-5	Location of Aboveground Facilities
Table 3.3.1-6	Location of Staging Areas
Table 3.3.2-1	Trawl Catch Abundance at the Sparrows Point LNG Terminal Site, June/October 2006 Samplings
Table 3.3.2-2	EFH-Designated Species and Life History Stages for the Sparrows Point LNG Terminal Site
Table 3.4-1	Vegetation Cover Types Affected by Construction and Operation of the Sparrows Point Project
Table 3.5-1	Significant Wildlife Habitats Potentially Affected by the Sparrows Point Project
Table 3.6-1	Endangered and Threatened Species Potentially Affected by the Sparrows Point Project

**Sparrows Point Project
Resource Report 3
January 2007**

Term	Description
"	inches
°F	degree Fahrenheit
bbl	barrels
bbl/h	barrels per hour
AMSC	Area Maritime Security Committee
ANSI	American National Standards Institute
AOR	Area of Responsibility
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ATWS	Additional Temporary Workspace
BIA	Bureau of Indian Affairs
BIBI	Benthetic index of biotic integrity
BMP	Best Management Practice
BMS	Burner Management System
BOG	boiloff gas
Bscfd / bscfd	billion standard cubic feet per day
Btu	British thermal unit
Btu/(ft ² hr)	British thermal unit per feet squared per hour
C5 plus	pentane plus
CCTV	closed circuit television
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
COE	U.S. Army Corps of Engineers
COMAR	Code of Maryland Regulations
COTP	Coast Guard Captains of the Port
CROW	Construction right-of-way
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act of 1972
DB&B	double block and bleed
DCS	distributed control system
DMRF	Dredge Material Recycling Facility
Dth/day	Dekatherms per day
EA	Environmental Assessment
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EPC	Engineering, Procurement and Construction
ER	Environmental Report
ERC	emergency release coupling

Term	Description
ESA	Endangered Species Act of 1973
ESD	emergency shutdown
ESD-1	Pier Emergency Shutdown
ESD-1-1	Activation of the unloading arm/vapor return arm ERCs on Berth 1 and Berth 2
ESD-2	Total Terminal Emergency Shutdown
FAA	Federal Aviation Administration
FBE	Fusion-Bonded Epoxy
FEED	Front End Engineering Design
FERC	Federal Energy Regulatory Commission
FERC's Plan	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan
FERC's Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures
FM	Factory Mutual
fps	feet per second
ft	feet
gpm	gallons per minute
h	hour(s)
H&MB	heat and material balance
HAZID	Hazard Identification
HAZOP	Hazard And Operability
HDD	Horizontal Direction Drilling
HDMS	Hazard Detection and Mitigation System
HHV	higher heating value
HID	High Intensity Discharge
HIPPS	High Integrity Pipeline Protection System
Hp / hp	horsepower
HP	high pressure
HTF	heat transfer fluid
IESNA	Illuminating Engineering Society of North America
in	inch
inches H ₂ O	inches of water
inches Hg	inches of mercury
inches Hg/h	inches of mercury per hour
IP	intermediate pressure
ISO	International Organization for Standardization
Kts	knots
kV	kilovolt
kVA	kilovolt Ampere (one thousand Volt Amperes)
LDC	Local Distribution Company
LFL	lower flammability limit

Term	Description
LHV	lower heating value
LNG	Liquefied Natural Gas
LNG Terminal	Sparrows Point LNG Import Terminal
LOI	Letter of Intent
LP	low pressure
LTD	Level, Temperature, Density
M&R	Metering and Regulator
m ³	cubic meters
m ³ /hour	cubic meters per hour
MAOP	Maximum Allowable Operating Pressure
mbar	millibar
mbar/hour	millibar per hour
MCC	Motor Control Center
mcf	million cubic feet
MCMERG	Mid-Chesapeake Marine Emergency Response Group
MCR	Main Control Room
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
Mg/l	Microgram per Liter
MIS	Management Information System
MLLW	mean low low water
MLV	Mainline valve
MMBtu/hr	million British thermal units per hour
MMcf/day	million cubic feet per day
MMscfd	million standard cubic feet per day
MP	Milepost
mph	miles per hour
MW	megawatt
N/A	not applicable
NAS Pax River	Naval Air Station Patuxent River
NAVD	North American Vertical Datum
NDE / NDT	Nondestructive Examination / Nondestructive Testing
NEC	National Electrical Code
NEPA	National Environmental policy Act of 1969
NFPA	National Fire Protection Association
NGA / NGPA	Natural Gas Act / Natural Gas Policy Act
NHPA	National Historic Preservation Act of 1969
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
No. ins	number of inches
NOAA	National Oceanic and Atmospheric Administration

**Sparrows Point Project
Resource Report 3
January 2007**

Term	Description
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NWI	National Wetland Inventory
NVIC	Navigation and vessel Inspection Circular
O&M	Operations And Maintenance
OBE	Operating Basis Earthquake
OD	Outside Diameter
OSHA	Occupational Safety and Health Administration
P&ID	pipng and instrumentation diagram
PAH	Poly Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCMS	Plant Control and Monitoring System
PCR	Platform Control Room
PDEP	Pennsylvania Department of Environmental Protection
PDM	Processed Dredged Material
PIANC	Permanent International Association Navigation Congress
PM	particulate matter
POTW	Publicly-owned Treatment Works
PPB / ppb	parts per billion
PPM / ppm	parts per million
PPT / ppt	Parts per trillion
psf	pounds per square foot
psig	pounds per square inch gauge
PWSA	Preliminary water way suitability assessment
PVC	Poly Vinyl Chloride
QA	Quality Assurance
QC	Quality Control
RGS	Rigid Galvanized Steel (conduit)
ROW	Right-of-Way
RR	Resource Report
RTD	resistance temperature detector
RTU	remote terminal unit
RUSLE	Revised Universal Soil Loss Equation
SAV	Aquatic vegetation
SCADA	Supervisory Control and Data Acquisition
scfh	standard cubic foot (feet) per hour

**Sparrows Point Project
Resource Report 3
January 2007**

Term	Description
scfm	standard cubic foot (feet) per minute
SCUBA	Self-contained Underwater Breathing Apparatus
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SIS	Safety Instrumented System
SPCC	Spill Prevention, Control, and Countermeasure
SSE	Safe Shutdown Earthquake
SSURGO	Soil Survey Geographic
STATSCO	State Soil Geographic
SWPPP	Storm Water Pollution Prevention Plan
Tcf	Trillion Cubic Feet
TCP/IP	Transmission Control Protocol/Internet Protocol,
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
TOC	Total organic carbon
Trap	Pig Launcher Receiver Facility
UL	Underwriters Laboratories
UPS	Uninterruptible Power Supply
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOE	United States Department of Energy
USDOT	United States Department of Transportation
USEPA / EPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
usg	United States gallons
usgpm	United States gallons per minute
V	Voltage
VOC	volatile organic compound
WSA	Water way suitability assessment
WWTP	Waste Water Treatment Plant
§	Section

3. VEGETATION AND WILDLIFE

3.1 Introduction

AES Sparrows Point LNG, LLC (Sparrows Point LNG) proposes to construct, own, and operate a new liquefied natural gas (LNG) import, storage, and regasification terminal (LNG Terminal) at the Sparrows Point Industrial Complex situated on the Sparrows Point peninsula east of the Port of Baltimore in Maryland. LNG will be delivered to the LNG Terminal by LNG marine vessels, offloaded from these vessels to shoreside storage tanks, regasified to natural gas on the LNG Terminal site (Terminal Site), and the regasified natural gas transported to consumers by pipeline. The LNG Terminal will have a regasification capacity of 1.5 billion standard cubic feet of natural gas per day (bscfd), with the potential to expand to 2.25 bscfd. Regasified natural gas will be delivered to markets in the Mid-Atlantic Region and northern portions of the South Atlantic Region through an approximately 88-mile, 30-inch outside diameter interstate natural gas pipeline (Pipeline) to be constructed and operated by Mid-Atlantic Express, L.L.C. (Mid-Atlantic Express). The Pipeline will extend from the LNG Terminal to points of interconnection with existing interstate natural gas pipeline systems near Eagle, Pennsylvania. Together the LNG Terminal and Pipeline projects are referred to as the Sparrows Point Project or Project. Both Sparrows Point LNG and Mid-Atlantic Express (hereinafter collectively referred to as AES) are subsidiaries of The AES Corporation.

The Project footprint is located in the counties of Baltimore, Harford, and Cecil in Maryland and the counties of Lancaster and Chester in Pennsylvania. The Terminal Site, which is located entirely within Baltimore County, is a parcel located within a former shipyard. The route proposed for the Pipeline (Pipeline Route), which crosses all of the listed counties, includes industrial, commercial, agricultural, and residential lands. Together, the Terminal Site and the Pipeline Route comprise the Project Area.

As described in Section 1.10 of Resource Report 1, *General Project Description*, The AES Corporation is considering the possibility of building a combined cycle cogeneration power plant (Power Plant) on the Terminal Site. The Power Plant would be configured with one F-Class combustion gas turbine, one steam turbine, and associated auxiliaries. The Power Plant would operate only on natural gas and would produce approximately 300 megawatts (MW) of clean electric power within an area of high energy demand. The Power Plant would be connected to the local utility electric system by an overhead electric power transmission line.

3.2 Objective and Applicability

This report describes existing fish and wildlife resources, plant communities, sensitive species, and habitats that may be directly or indirectly affected by the Project. It considers potential impacts related to facility construction and operation, along with avoidance, minimization, and mitigation measures designed to address these potential impacts. Section 3.3 describes fisheries resources in the Project Area, along LNG marine traffic transit routes and in waterbodies crossed by the Pipeline. Section 3.4 discusses characteristic vegetation community types in the Project Area and along the LNG marine traffic transit routes. Section 3.5 discusses wildlife resources in the Project Area and along the LNG marine traffic transit routes. Section 3.6 presents information on state and federally listed endangered and threatened species in the Project Area and marine traffic transit route. Finally, Section 3.7 provides a list of references used in the preparation of this report.

Information was derived from three principal sources: project-specific communication with federal and state agencies; published and unpublished natural resources data pertaining to the Project Area; and field surveys of the Project Area from May through October 2006. The field surveys involved concurrent wetland delineation and habitat surveys along the proposed pipeline right-of-way (ROW) and access roads, aboveground facility sites, and staging areas, and aquatic surveys at the location of the Terminal Site. AES's wetland delineation and waterbody identification reports are contained in Resource Report 2, *Water Use and Quality*.

3.3 Fisheries Resources

The regulatory framework of fisheries protection is presented below, followed by sections describing presence and types of fisheries in the Project Area.

Game and non-game fish species are regulated and protected under various federal laws, including the Fish and Wildlife Conservation Act of 1980 (16 U.S.C. §§ 2901-2911) and the Fish and Wildlife Coordination Act of 1958 (16 U.S.C. § 661 *et seq.*). The Project will also be reviewed under both Maryland and Pennsylvania state programs.

The State of Maryland does not have a specific fishery classification system for its streams (MDE 2003). However, the State of Maryland has assigned water quality designations to protect, maintain and improve the quality of Maryland surface waters. Specifically, three components of water quality standards are as follows:

- Designated uses;
- Water quality criteria to protect the designated use; and
- Anti-degradation policy.

From these three components, the State of Maryland has derived eight uses for its surface waters:

- Use I: Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life.
- Use I-P: Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply.
- Use II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting.
 - Shellfish Harvesting Subcategory.
 - Seasonal Migratory Fish Spawning and Nursery Subcategory (Chesapeake Bay Only).
 - Seasonal Shallow-Water Submerged and Nursery Subcategory (Chesapeake Bay Only).
 - Open-Water Fish and Shellfish Subcategory (Chesapeake Bay Only).
 - Seasonal Deep-Water Fish and Shellfish Subcategory (Chesapeake Bay Only); and,
 - Seasonal Deep-Channel Refuge Use (Chesapeake Bay Only).
 - Use II-P: Tidal Fresh Water Estuary – includes applicable Use II and Public Water Supply.
 - Use III: Nontidal Cold Water.
 - Use III-P: Nontidal Cold Water and Public Water Supply.
 - Use IV: Recreational Trout Waters.
 - Use IV-P: Recreational Trout Waters and Public Water Supply.

Pennsylvania classifies surface waters into five “use” categories. These categories include aquatic life, water supply, recreation, special protection, and navigation (Pennsylvania Department of Environmental Protection 2006). Those surface waters classified for fish and other aquatic life are further divided into four subcategories as follows:

- CWF – *Cold Water Fishes*—maintenance and/or propagation of fish species including the family *Salmonidae* and additional flora and fauna that are indigenous to cold water habitat.
- WWF – *Warm Water Fishes*—maintenance and propagation of fish species and additional flora and fauna that are indigenous to a warm water habitat.

- MF – *Migratory Fishes*—Passage, maintenance and propagation of anadromous and catadromous fishes and other fishes that ascend to flowing waters to complete their life cycle.
- TSF – *Trout Stocking Fishes*—Maintenance of stocked trout from February 15 to July 31, and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

Field data and available resource maps were used to classify each waterbody crossing.

3.3.1 Existing Resources

3.3.1.1 Terminal Site and Marine Traffic Transit Route

The tidal Patapsco River bordering the Terminal Site is utilized by a variety of estuarine fish and crustaceans. Tables 3.3.1-1 and 3.3.1-2 list representative marine and diadromous fish species that may occur in the waters adjacent to the Terminal Site and along the proposed marine traffic route. The Patapsco River provides a migratory corridor for anadromous and catadromous fish that annually move to and/or from spawning and nursery grounds in the nontidal Patapsco River mainstem, and tributaries such as Gwynns Falls and Curtis Creek. These species include alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), white perch (*Morone americana*), yellow perch (*Perca flavescens*) and American eel (*Anquilla rostrata*) (O'Dell et al. 1975, National Marine Fisheries Service [NMFS] – Habitat Conservation Division [HCD] 2006). The lower Patapsco River estuary also provides late nursery habitat for the young-of-the-year of species which are ocean-spawned, or spawned in other areas of the Chesapeake Bay. These species include striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatus*), winter flounder (*Pseudopleuronectes americanus*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogon undulatus*) and blue crab (*Callinectes sapidus*) (Lippson 1973, Cronin 1971, United States Army Corps of Engineers [COE] 2006, NMFS HCD 2006).

Additionally, a large volume of data exists regarding potential benthic macroinvertebrate species present within the Chesapeake Bay area, with multiple locations within or adjacent to the proposed Project Terminal Site. Benthic data retrieved from a benthic community database maintained by the Maryland Department of Natural Resources (MDNR) indicated that a total of 32 different species have been collected over a five-year period (September 30, 2000 to September 30, 2005; refer to Table 3.3.1-3). The polychaete, *Streblospio benedicti*, was present in high numbers throughout the five-year period, and studies have shown that this species is associated with high pollution levels and is often used as an indicator of polluted waters (Gray et al 1979, Hartwell et al 2004). AES's samplings conducted on June 28, 2006 and October 18, 2006 produced similar results, as a total of 20 species were collected with *S. benedicti* being one of the dominant species (Appendix 3A, Table 11 and Table 12). Of the 20 species collected, seven species overlapped with those obtained from the MDNR database over the past five years.

As described in Section 2.4.9.2 of Resource Report 2, *Water Use and Quality*, AES plans to install a fire fighting system at the Terminal Site. The primary fire fighting system will contain two on-shore firewater pumps, each capable of providing the entire firewater demand (100 percent redundancy). The firewater system that will be installed at the Terminal Site will be a private, fresh water distributed fire main loop that is fed via fire pumps from a firewater storage tank. The distributed loop will provide firewater to various sprinkler systems, automatic water systems, hydrants, monitors and other systems as needed. The storage tank capacity will be sufficient to provide water to the largest system demand for two hours. The fire water tank will be supplied with water from the city water main.

In addition, there will be an LNG storage tank deluge system to protect storage tanks that may be exposed to high levels of heat in the extremely unlikely event of a fire involving an adjacent tank or sump. The deluge system will be fed from dedicated pumps taking suction from the Patapsco River. The seawater fire pumps will be installed along the water's edge on the western shoreline of the Terminal Site. The pumps will be vertically mounted centrifugal pumps and will take suction from the

Patapsco River. These pumps will supply fire water to the LNG tank deluge system at a design flow of 4,500 gallons per minute (gpm) (and a maximum capacity of 6,750 gpm) per pump. The seawater fire water pump intake structure will be configured with in-take screens designed to prevent ingress of debris, and to maintain inlet velocities below two feet per second (fps), with a velocity cap to minimize the effect of flow on local marine life. While AES does not propose to construct a cooling water intake system, the Maryland regulations governing cooling water intake systems (COMAR 26.08.03) were utilized as the guidance for the conceptual design of the proposed fire water intake structure that would be used to provide water for the LNG tank deluge system at the Terminal Site.

The Power Plant, if constructed, would not require an outside source of cooling water while operating in conjunction with the proposed LNG Terminal. All cooling needs would be supplied via a heat/cold exchange system with the LNG Terminal. Therefore the operation of the Power Plant would not result in impacts to marine life.

The Terminal Site will include construction of new stormwater management systems as described in Section 1.5.1.1.I of Resource Report 1, *General Project Description*. AES will apply for coverage under a "Maryland General Permit for Stormwater Discharge" (Title 26 of the Code of Maryland regulation) associated with Industrial Activity for the LNG Terminal. Power plants are excluded from coverage under the General Permit; AES nevertheless would design the Power Plant with appropriate stormwater controls to minimize stormwater runoff associated with outdoor elements of the Power Plant, and to ensure that such stormwater would be routed to the Baltimore County publicly-owned treatment works (POTW) (or through a different, appropriately permitted discharge). Therefore, stormwater runoff from the operation of the Power Plant would not result in impacts to marine life.

The transit corridor for LNG marine traffic servicing the Project would include open water and estuarine habitats on the Chesapeake Bay. Consideration was given to potential impacts on marine fisheries resources that could result from ballasting operations and engine cooling water intakes.¹ No ballast discharge will occur under routine operations. Direct impacts to marine organisms may be expected in the form of entrapment, entrainment or impingement as a result of ballast uptake and ship cooling operations. Based on available species diversity and abundance data (AES field surveys; see Appendix 3A), any impacts to marine organisms from ballasting and ship cooling operations are expected to be minimal, as limited numbers of species and individuals have been found within the proposed area near the Terminal Site.

There will be an estimated maximum of 200 LNG marine traffic visits per year. The ships will range in size from 217,000 to 125,000 cubic meter (m³) capacity. Per ship, a maximum pump rate of approximately 16,000 gallons per minute (gpm), and an average rate of about 12,000 gpm over a 12- to 16-hour period, is expected as a typical LNG ship can hold up to 80,000 m³ of ballast water during offloading operations. The intake aperture on the ships would be about 25 to 30 feet below the water surface, and would be outfitted with mesh screens to further minimize potential impact to nearby organisms.

In compliance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments enacted by the International Maritime Organization (IMO), the National Invasive Species Act of 1996 (NISA), and the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), all LNG carriers calling at the LNG Terminal will be required to have on board, and implement, a duly approved Ballast Water Management Plan (BWMP). The BWMP will be specific to each ship, and include a detailed description of the actions to be taken to implement the ballast water

¹ The LNG ships will enter the Chesapeake Bay fully loaded with cargo, and unload that cargo at the LNG Terminal. Because no cargo will be loaded, the outbound ships will take on ballast water in order to support marine traffic stability. In all normal operating conditions, ballast water will not be discharged to the Chesapeake Bay. Accordingly, the potential for invasive species introduction and other impacts associated with de-ballasting operations is eliminated.

management requirements. For instance, ballast water loaded in port or taken on board while transiting to inshore waters will be changed with open ocean water during passage between ports of call. The BWMP will determine the specific locations where ballast water exchange may take place, if anywhere, within the territorial waters of the United States.

In addition to water withdrawal for ballast, LNG ships servicing the Project may also withdraw water for cooling the ship's boilers, engines or onboard equipment. Typically, the intakes will be screened to prevent foreign objects or fish being pumped into the ballast tanks. The specific volumes needed for this operation are not available; however, based on the limited annual LNG ship traffic and the small amounts of cooling water needed for each ship's engines, these withdrawals are not anticipated to result in any appreciative impacts beyond those described for ballast water intake, and all cooling water intake use would be limited to non-contact cooling water to limit the potential for impact to thermal change in the discharge water content.

3.3.1.2 Pipeline Facilities

Based on a review of the sources of information summarized above and performance of the May - October 2006 field surveys, it has been determined that the Pipeline will cross 111 perennial streams, 66 intermittent streams and two open water/wetland complexes that provide potential fisheries habitat. Access roads will also cross two perennial streams and one intermittent stream (access roads are shown on USGS maps in Resource Report 1, *General Project Description*). Table 3.3.1-4 lists the waterbodies, including type, crossing width, fisheries classification and proposed crossing method.

The Pipeline will cross 133 waterbodies that support coldwater fisheries, and 42 that support non-coldwater fisheries (see Table 3.3.1-1). Five of the waterbodies support spawning by anadromous fish: White Marsh Run (approximate MP 15.5), Gunpowder Falls (approximate MP 18.28), Deer Creek (approximate MP 35.54), Susquehanna River/Conowingo Pool (approximate MP 44.23), and the Octoraro River (approximate MP 56.31) (NMFS HCD 2006). Coastal rivers that support anadromous species are important aquatic resources from both a freshwater and saltwater perspective because anadromous species reside in both environments at different times of the year or during different life stages. The anadromous species that spawn within or migrate through the above listed waterbodies include alewife, blueback herring, white perch, hickory shad and American shad (NMFS HCD 2006).

3.3.1.3 Aboveground Facilities

Construction of the Pipeline will require installation of nine mainline block valves (MLBVs) and three interconnect metering facilities. Table 3.3.1-5 provides the location of each of these aboveground facilities, summarizes vegetative cover types, and provides the acreages associated with both temporary and permanent impacts to these vegetative cover types. All aboveground facilities will be located outside of waterbodies and fisheries, and their adjacent areas, to minimize potential impacts.

3.3.1.4 Staging Areas

Table 3.3.1-6 provides the location of each of the proposed staging areas, summarizes vegetative cover types, and provides the acreages associated with both temporary and permanent impacts to these vegetative cover types.

With respect to the proposed LNG Terminal, AES is proposing a 10,000 cubic yard per day dredged material recycling facility ("DMRF") that will occupy approximately five acres of the upland portion of the Terminal Site. The DMRF is shown on Figure 1C-2 of Resource Report 1, *General Project Description*. Existing site roadways will be used to transport the processed dredged material ("PDM") from the DMRF to the temporary PDM storage area. The temporary contiguous PDM storage area will consist of an additional 10-acre area (the DMRF and contiguous PDM storage area comprising a total aggregate area of approximately 15 acres), which will be covered by bituminous paving or lined with a 10-mil HDPE (high density polyethylene) liner covered by 6- to 12-inches of existing site soil or imported soil. Additionally, AES is proposing to use an area, approximately 20 acres to the north of

the site, for construction laydown and a marshalling yard for equipment, as well as an additional area for temporary storage of PDM (See Resource Report 1, Figure 1.3-2, Sheet 7).

With respect to the Pipeline Route, there are several types of staging areas proposed, including pipe yards, rail sidings, laydown areas, and contractor yards. These typical staging areas will be areas located outside of waterbodies, their adjacent areas, and fisheries to minimize potential impacts.

3.3.2 Fisheries of Special Concern

Fisheries of special concern include fisheries with exceptional recreational value, waterbodies that provide habitat for federally or state-listed threatened or endangered species and waterbodies that support commercial fisheries that are maintained naturally or by stocking programs. Also included, as fisheries of special concern, is federally listed essential fish habitat (EFH) in the vicinity of a project.

3.3.2.1 Terminal Site and LNG Marine traffic Transit Route

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended in 1996, was established to promote the protection of EFH in the review of projects, conducted under federal permits, licenses or other authorities, that affect or have the potential to affect such habitat. EFH is defined in the MSFCMA as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Federal agencies that authorize, fund, or undertake activities that may adversely impact EFH must consult with the NMFS. Because the Project will potentially impact EFH, consultation with the NMFS on the Project is therefore required. Correspondence with the NMFS confirmed that AES needed to prepare an EFH assessment for the Project (Nichols 2006a). Generally, the EFH consultation process includes agency notification, preparation of an EFH assessment, EFH conservation recommendations submitted to the action agency by the NMFS and a response from the federal action agency. Copies of this correspondence are included in Appendix 3C.

The upper Chesapeake Bay and its tidal tributaries, along with certain areas along the proposed LNG marine traffic transit routes, have been designated as EFH for numerous finfish species, and for management of their life stages under the MSFCMA. AES reviewed the NMFS web site (NMFS 2006) to determine the species and life stages of fish, shellfish, and mollusks for which EFH has been designated in the Project Area. The Web site identifies EFH species in selected 10-minute by 10-minute squares of latitude and longitude, and provides a geographic species list of EFH designations. The Patapsco River is not identified on the Web site, but the NMFS recommended using the Chester River estuary data in preparing an assessment for the Terminal Site, as salinity regimes and ecological conditions are generally similar between the Chester and Patapsco Rivers (NMFS HCD 2006). The NMFS noted that, based on salinity tolerances and the ecology of federally managed species that occur in the Chesapeake Bay, only some of the species with designated EFH for the Chester River estuary are likely to occur in the Patapsco River. Therefore, AES consulted other scientific literature on fishes of the Chesapeake Bay (e.g., Murdy et al. 1997, COE 2006), and conducted in-water surveys during June and October of 2006 to determine which managed species and life stages are present in the vicinity of the proposed LNG Terminal. Table 3.3.2-1 lists the species that were collected during this survey. White perch, a species that tolerates a wide range of salinity conditions, was the most common species collected.

During the finfish surveys, AES also obtained water samples for the waters in the area of the Terminal Site (see attached survey report in Appendix 3A). The water quality data included salinity levels that ranged from approximately six to eight parts per thousand. Dissolved oxygen levels, particularly from locations near the bottom of the water column, were at the low end of the range considered suitable for biological activity (i.e., approximately two milligrams per liter (mg/l)). In sum, dissolved oxygen levels in the area of the Terminal Site are likely to limit the presence and abundance of many finfish species, and low salinity levels will limit the occurrence of many marine finfish species (Tagatz 1961, Miller et al. 2002).

AES prepared a comprehensive assessment of EFH for the species that may be present in the vicinity of the Terminal Site and along the proposed marine traffic transit routes; Table 3.3.2-2 lists the designated species and life stages that are included in the EFH Assessment. The draft EFH assessment is provided in Appendix 3B. A total of 99 bony finfish (this estimate includes 26 species in addition to the snapper-grouper complex that is recognized as such by SAFMC [1998] and is comprised of 73 species), 13 shark/skate species and five invertebrate species, are currently designated as EFH species in the vicinity of the proposed Terminal Site and the area that encompasses proposed LNG marine traffic transit routes within U.S territorial waters. Only two of these species, bluefish (*Pomatomus saltatrix*) and summer flounder (*Paralichthys dentatus*) were collected during the June and October 2006 sampling events (Table 3.3.2-1). A previous EFH assessment performed in part for this area of the Patapsco River also concluded that, of the species listed in Table 3.3.2-1, only juvenile and adult summer flounder, and juvenile and adult bluefish, were likely to occur in the vicinity of the Terminal Site (COE 2006).

The EFH assessment also included an evaluation of potential impacts to non-EFH designated commercially and recreationally important species (e.g., blue crab [*Callinectes sapidus*], striped bass [*Morone saxatilis*], etc.) for the vicinity of the proposed Terminal Site, as this area will be subjected to temporary construction-based impacts. For those EFH-designated species expected to be present within the vicinity of the Terminal Site, the proposed Project and its construction are not expected to have any adverse impacts. For bluefish or any mid-water EFH-designated species, a temporary displacement can be expected. However, this species is highly mobile and would avoid direct impact, as well as continue foraging on prey items such as epifaunal organisms or small fish in nearby, unaffected areas of the Patapsco River Estuary. For summer flounder or any bottom-feeding EFH-designated species, direct impact would also be minimal, as they too are a mobile species and could potentially avoid the construction equipment. The impact of dredging on local forage habitat areas would be temporary, with recruitment and recolonization occurring immediately after construction. For those species expected to occur along the proposed LNG marine traffic transit route, mortality associated with ship movements and operations (such as propeller wash) may be expected for coastal pelagic and highly migratory species, although little or no direct impact is expected given the mobility of these species. No direct or indirect impacts to benthic habitat or bottom-dwelling finfish are expected, as the LNG carrier routes will primarily traverse deep waters.

Finally, Habitats of Particular Concern (areas defined by NMFS [2006b] that are "discreet subsets of EFH that provided extremely important ecological functions or are especially vulnerable to degradation" [e.g., submerged aquatic vegetation]) are known to exist in the immediate vicinity of the Terminal Site but several may occur along potential LNG marine traffic transit routes (although these routes have not been determined as of yet and will most likely depend on fluctuating factors such as weather and market trends). All but one of these areas can be found off the south Atlantic coasts of North and South Carolina, specifically within the areas of The Point, 10 Fathom Ledge, Big Rock, Georgetown Hole, the Charleston Bump Complex and in areas adjacent to the Outer Banks, Cape Hatteras and the Ocracoke Islands. The remaining HAPC has been identified in the lower region of Chesapeake Bay and is thought to be used as nursery and pupping grounds by sandbar sharks (*Charcharinus plumbeus*). AES will continue to consult with the NMFS to minimize potential impacts to EFH and to facilitate development of conservation recommendations by the NMFS.

3.3.2.2 Pipeline Facilities

The MDNR - Wildlife and Heritage Service (WHS) and the Pennsylvania Fish and Boat Commission (PFBC) identified no significant fish habitats or unique natural aquatic communities along the affected area of the Pipeline Route (see Appendix 3C) (MDNR-WHS 2006, PFBC 2006).

Title 25, Chapter 93 of the Pennsylvania Code establishes special protection for High Quality (HQ) waters and Exceptional Value (EV) waters, which are streams or watersheds with excellent water quality and waters that have environmental, recreational, or ecological features of special significance.

Table 3.3.1-4 lists the streams to be crossed by the Pipeline as well as their water quality classification. Pennsylvania Code §93.4b defines HQ and EV waters as the following:

(a) *Qualifying as High Quality Water.* A surface water that meets one or more of the following conditions is a High Quality Water.

(1) Chemistry

(i) The water has long-term water quality, based on at least one year of data that exceeds levels necessary to support the propagation of fish, shellfish and wildlife and recreation in and on the water by being better than the water quality criteria in §93.7, Table 3 (relating to specific water quality criteria) or otherwise authorized by §93.8a(b) (relating to toxic substances), at least 99 percent of the time for the following parameters: dissolved oxygen, aluminum, iron, dissolved nickel, dissolved copper, dissolved cadmium, temperature, pH, dissolved arsenic, ammonia nitrogen, dissolved lead and dissolved zinc.

(ii) The PDEP may consider additional chemical and toxicity information, which characterizes or indicates the quality of water, in making its determination.

(2) Biology. One or more of the following exists:

(i) Biological assessment qualifier

(A) The surface water supports a high-quality aquatic community based on information gathered using peer-reviewed biological assessment procedures that consider physical habitat, benthic macroinvertebrates or fishes, based on the Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols for Use in Streams and Rivers: Periphyton, Benthic Macroinvertebrates and Fish (Barbour et al. 1999), as updated and amended). The surface water is compared to a reference stream or watershed, and an integrated benthic macroinvertebrate score of at least 83 percent shall be attained by the referenced stream or watershed.

(B) The surface water supports a high quality aquatic community based on information gathered using other widely accepted and published peer-reviewed biological assessment procedures that the PDEP may approve to determine the condition of the aquatic community of a surface water.

(C) The PDEP may consider additional biological information that characterizes or indicates the quality of a water in making its determination.

(ii) *Class A wild trout stream qualifier.* The surface water has been designated a Class A wild trout stream by the Fish and Boat Commission following public notice and comment.

(b) *Qualifying as an Exceptional Value Water.* A surface water that meets one or more of the following conditions is an Exceptional Value Water:

(1) The water meets the requirements of subsection (a) above and one or more of the following:

- (i) The water is located in a National wildlife refuge or a State game propagation and protection area.
- (ii) The water is located in a designated State park natural area or State forest natural area, national natural landmark, Federal or State wild river, Federal wilderness area or National recreational area.
- (iii) The water is an outstanding national, State, regional or local resource water.
- (iv) The water is a surface water of exceptional recreational significance.
 - (v) The water achieves a score of at least 92 percent (or its equivalent) using the methods and procedures described in subsection (a)(2)(i)(A) or (B) above.
 - (vi) The water is designated as a "wilderness trout stream" by the Fish and Boat Commission following public notice and comment.

- (2) The water is a surface water of exceptional ecological significance.

In general, special protection waters (HQ and EV waters) must be maintained at their existing quality, and wastewater treatment requirements must comply with §95.1. The Pennsylvania Department of Environmental Protection (PDEP) lists HQ and EV waterbodies by county on the Internet (PDEP 2006). Based on that list, eight of the waterbodies affected by the Pipeline in Lancaster and Chester counties of Pennsylvania are designated as HQ or EV.

3.3.2.3 Aboveground Facilities

Construction of the Pipeline will require installation of nine MLBVs and three interconnect metering facilities. Table 3.3.1-5 provides the location of each of these aboveground facilities, summarizes vegetative cover types, and provides the acreages associated with both temporary and permanent impacts to these vegetative cover types.

All aboveground facilities are located outside of waterbodies and fisheries, and placed outside of adjacent areas to minimize potential impacts.

3.3.3 Construction and Operation Impacts and Mitigation

3.3.3.1 Terminal Site and LNG Marine Traffic Transit Route

AES prepared a comprehensive assessment of EFH-designated species that may occur in the Project area and LNG marine traffic transit route (Appendix 3B). This assessment included an evaluation of potential impacts to important recreational and commercial, non-designated species (Appendix 3B, Table 6). Important non-designated species were captured in the vicinity of the Terminal Site during fish sampling surveys conducted by AES in June and October 2006. A total of 13 species were captured between both sampling events; a complete list is provided in Table 3.3.2-1. Potential direct impacts to non-designated species include displacement from dredging activities during some of the life stages (e.g., juvenile striped bass, blue crab, spot, juvenile and adult Atlantic croaker and white perch), and gill abrasion and suffocation due to increased sedimentation and turbidity. Potential indirect effects include removal of benthic prey organisms for bottom-feeding designated and non-designated species. The impact of dredging on local forage habitat area would be temporary, lasting only until the dredged area is re-colonized by new benthic organisms. Re-colonization would take place shortly after, perhaps within months after dredging, as reported in other studies of dredged areas (Reish 1979, Pagliai 1985, Nichols et al. 1990).

As a result of the construction of the proposed Project, there are several potential direct impacts that could affect the finfish and benthic communities within the entrance channel, turning basin and berthing area of the Terminal Site. These include the potential for direct mortality, the loss of habitat, and increase in turbidity, which could cause gill abrasion and possibly affect sight feeders.

Dredging of the nearshore area would cause direct mortality to the benthic communities within the disturbed aquatic areas (i.e., entrance channel, turning basin and berthing area) of the proposed Terminal Site. Additionally, dredging and construction of the nearshore area would cause a temporary loss of available habitat to the finfish and benthic communities within the disturbed area. However, the footprint of the proposed entrance channel, turning basin and berthing area associated with the Terminal Site is small relative to the entire Patapsco River Estuary, hence the overall impact to the existing benthic communities is expected to be minimal, as recruitment and re-colonization of the disturbed area would be plentiful from nearby, unaffected portions of the estuary. Dredging may also cause direct mortality to finfish species. However, the impact would also be minimal as fish are highly mobile species, and would avoid the area of disturbance and utilize nearby habitat during construction. Should mortality to finfish occur, it would be limited to the slow-moving larval stage.

A temporary increase in sedimentation can be expected as a result of dredging, demolition and construction activities. A significant increase in sedimentation could potentially lead to gill abrasion and cause suffocation to finfish species, as well as hinder predation efficiency of sight feeding fish at or adjacent to the proposed Terminal Site. However, these potential impacts will be offset by use of the dredge techniques described in Section 2.4.8.4 of Resource Report 2, *Water Use and Quality*. Additionally, these potential impacts may be further offset by the fact that the Patapsco River Estuary receives two diurnal tidal fluctuations, thereby increasing sediment dissipation rates and allowing for quicker settlement of sediment of the water column.

The most significant indirect impact throughout the nearshore Terminal Site area would be the loss of available food for bottom feeding finfish species, particularly from the removal of benthic infaunal communities and some epifaunal prey organisms. However, the negative effects of prey removal will be temporary, lasting only as long as it takes for benthic invertebrates to re-colonize. Therefore, while there would be an immediate loss of some prey resources to some bottom feeding finfish, the overall indirect impact from the loss of food sources will be small as re-colonization would begin immediately after construction, and full recovery might be expected within months as reported in other studies of dredged areas (Reish 1979, Pagliai 1985).

Currently, the Patapsco River, including Baltimore Harbor, has been closed indefinitely to shellfish harvest, so the proposed demolition of pier 2 and a portion of the relieving platform near pier 1 will pose no immediate threat to any shell-fisheries within or adjacent to the Terminal Site. Commercial harvest of migratory species such as blue crab and striped bass is minimal in the Patapsco, accounting for only 0.002 percent and 0.003 percent, respectively, of the total harvest for the state of Maryland (MDNR 2005a). Because any resulting impact from the proposed dredging, demolition, or construction will be temporary, and time of year constraints may be imposed (if deemed necessary), it is unlikely that any of the migratory fisheries occurring adjacent to the proposed Terminal Site will be negatively impacted. Additionally, multiple species of herring and shad, yellow perch, white perch, and American eel are of commercial and recreational importance within the Chesapeake Bay system. Similar to striped bass, these species are highly mobile and migratory, and will most likely not suffer any negative impact as a result of the proposed pier demolition.

Potential impacts to fish from sound or pressure waves resulting from demolition/construction noise are possible, but unlikely. Changes in ambient water pressure during pile driving and/or blasting could have negative impacts on finfish species with gas-filled swim bladders that are in near proximity to the proposed Terminal Site during demolition/construction activities. For aquatic species, risk of injury or mortality resulting from noise is generally related to the effects of rapid pressure changes, especially on gas-filled spaces in the animal's body (Carlson et al 2005). The main sensory organ used by fish to detect low-frequency (less than 100 Hz) waterborne signals is the lateral-line. The lateral-line organ is mostly involved in processing acoustic signals when the source is within a few body lengths of the fish. Otoliths located within the skull of the fish are sensitive to vibration rather than sound pressure. In fish species that contain gas-filled swim bladders, pressure waves are converted to vibrations via the swim bladder and are transferred to the otoliths, allowing the fish to detect both sound and vibration. High energy waves that may result from demolition activities may violate these sensory systems; however, finfish species with swim bladders that are reduced or altogether absent (demersal species such as flounder typically do not have swim bladders and tend to be less susceptible to blast impacts) should not be impacted (COE 2004; Popper and Clark 1976). Field tests have shown the weight of the charge and distance from the detonation or pile driving are the most important factors affecting the extent of injury and mortality to local finfish, although water depth, substrate, depth of the fish, and size and species of fish are also important (COE 2004, Keevin and Hempen 1997, Wiley et al. 1981, Teleki and Chamberlain 1978). During previous sampling efforts within the vicinity of the proposed Terminal Site, minimal numbers of finfish were collected within 50 meters of the finger piers. Additionally, a pier inspection involving divers using self-contained underwater breathing apparatus (SCUBA) and underwater video (available upon request) indicated that no finfish were present in or around the finger piers surveyed, therefore decreasing the potential for negative effects of construction related noise and pressure emissions on local fish.

Qualitatively, the pier inspections also revealed that only a minimal number of epibenthic species utilize the concrete slabs, steel piles, and wood piles, as habitat. From field identifications provided by the SCUBA team, barnacles (subclass Cirripedia), fan worms (*Sabella spp.*) and zebra mussels (*Dreissena polymorpha*) were the most abundant and would suffer no negative impacts as recolonization rates for these animals are high. Additionally, positive impacts could be associated with the removal of highly invasive species like the zebra mussel, but it is unlikely that the proposed demolition would provide a permanent solution. Positive impacts to the benthic communities may result from the proposed demolition, as more bottom space will be created and/or restored within the immediate vicinity of the proposed Terminal Site. Although a short term negative impact on local benthic communities within the immediate vicinity of the proposed construction is likely (displacement and potential mortality), rapid recolonization is expected since the majority of species found in the proposed area of the Terminal Site are opportunistic. The Maryland Department of the Environment (MDE) has further substantiated this claim in a previously published federal navigation channel Use Attainability Analysis (MDE 2005) in which the following statement was included:

The existing benthic community in the Outer and Inner Harbor deep-dredged channels can be characterized as unstable due to frequent disturbances, such as the 42-foot dredging project, annual maintenance dredging and prop-washes associated with ship movements, and is thought to consist

primarily of opportunistic species. The community likely to recolonize in the deep dredged channels would be similar in nature to the existing benthic community, since the existing benthic community is unstable and frequently disturbed, and recolonization may occur within a relatively short time.

No negative impacts to marine mammals or reptiles are anticipated to occur within the proposed Terminal Site, as sightings or captures of these animals are rare in that area. Moreover, marine reptiles such as turtles prefer habitat that is primarily composed of submerged aquatic vegetation (SAV), which is notably absent within the vicinity of the Terminal Site, making any long-term occupation improbable. Additionally, both marine mammals and reptiles are extremely mobile and could likely vacate the areas in the vicinity of the Terminal Site under adverse conditions.

AES will comply with the requirements of Federal and state permits for the Project and, in order to prevent unnecessary negative impact, mitigation measures will be taken during the proposed pier demolition/construction phases. The NMFS stated in a May 23, 2006 letter that it supports AES's efforts to reduce dredging in the Patapsco River and to pursue innovative re-use technology for dredge material generated by construction of the LNG Terminal. The NMFS also supports AES's decision to construct a closed-loop heat transfer fluid (HTF) vaporization system for the proposed LNG Terminal, which will avoid resource impacts that would otherwise be associated with an open system requiring water withdrawal from and discharge to the Patapsco River (NMFS HCD 2006). The current LNG Terminal design also uses seawater pumps to provide deluge water to the LNG storage tanks (to cool tanks in the highly unlikely event that an adjacent tank should catch fire). These pumps will take suction from the Chesapeake Bay, and would run only during routine testing and in a large fire scenario. Additionally, as described in Section 2.4.8 of Resource Report 2, *Water Use and Quality*, silt curtains will be used as required to minimize turbidity, and a cofferdam will be installed to minimize in-water construction, thereby reducing the need to conduct underwater sheet-pile-driving operations overall.

AES evaluated the potential for the required dredging to a depth of 45 feet below MLLW to increase the salinity and lower dissolved oxygen (DO) within the vicinity of the Terminal Site, as a result of connecting with the main channel for the Patapsco River estuary. The evaluation assessed the impacts of lower DO and increased salinity to the re-establishment of existing populations of benthic organisms within the offshore areas immediately adjacent to the Terminal Site. The MDNR created an Index of Biotic Integrity for the Patapsco/Back River basin that classifies the health of the Patapsco River as very poor, the lowest rating possible (MDNR 2005b). More specifically, DO averaged 1.2 mg/l and 0.67 mg/l during a seven-month collection period during the 2004 and 2005 sampling seasons, respectively, making it unlikely that the Baltimore Harbor region and the area adjacent to the Terminal Site within the Patapsco River can adequately support most biological life for any long term duration. Given the low levels of DO that currently exist within the area adjacent to the Terminal Site, it is unlikely that any additional decreases in water quality would affect existing biological communities, as those currently found within the vicinity of the Terminal Site are seemingly well adapted to poor conditions.

For those species expected to occur along the proposed LNG marine traffic transit route, mortality associated with ship movements and operations (such as propeller turbulence) may be expected for coastal pelagic and highly migratory species whose egg and larval stages are planktonic (Holland 1986, Nielsen et al. 1986, Pearson et al. 1989); although little or no direct impact is expected for the juvenile and adult stages of these species given their mobility. Additionally, no direct or indirect impacts to benthic habitat or bottom-dwelling finfish are expected as the potential LNG carrier routes will likely traverse deep waters. No significant indirect impacts would likely result from the nominal increase in marine traffic along the potential transit routes. A possible cumulative and/or synergistic impact associated with the proposed nominal increase in marine traffic (and associated transit routes) could result inasmuch that an overall increase in ocean/bay/harbor traffic may increase the mortality rate of planktonic eggs and larvae (Holland 1986, Nielsen et al. 1986, Pearson et al. 1989). It is not yet (and may never be) known if the relationship between traffic and mortality would be linear or exponential with the latter being the least desirable. Impacts associated with increased LNG marine traffic and mitigation measures are discussed in detail within the EFH (Appendix 3B).

3.3.3.2 Pipeline Facilities

Table 3.3.1-4 identifies the proposed crossing methods for all waterbodies that will be crossed by the Pipeline and associated access roads. AES will continue consultation with state and federal environmental agencies to reach consensus on the preferred crossing method for each waterbody along the Pipeline Route. Avoidance and/or minimization of impacts to aquatic resources, including fisheries, is integral to method selection.

Impacts to fisheries resources and other aquatic communities from in-stream trenching can be both direct and indirect. The impacts will depend primarily on the physical characteristics of the streams (e.g., presence of water and flow, substrate, channel configuration) and time of year. Of these characteristics, the presence of water with perceptible flow is of overriding significance and is assumed in the following discussion.

All streams that exhibit flow at the time of construction will be crossed using dry ditch construction methods (e.g., dam and pump, flume, and, for selected streams, horizontal directional drill (HDD)). Proper waterbody construction and restoration procedures will serve to minimize the short-term water quality impacts associated with construction of the waterbody crossings.

The NMFS recommended that the five waterbodies known to support anadromous fish be crossed using HDD techniques (NMFS HCD 2006). Those waterbodies include White Marsh Run (MP 15.45), Gunpowder Falls (MP 18.25), Deer Creek (MP 35.54), Susquehanna River/Conowingo Pool (MP 44.23) and Octoraro River (MP 56.31). Based on preliminary assessments, White Marsh Run, Gunpowder Falls, Deer Creek and Octoraro River are being evaluated to be dry crossed utilizing flumes or dam and pump techniques under low flow conditions to avoid migrations of anadromous fish. The Susquehanna River/Conowingo Pool is being evaluated to be crossed utilizing HDD techniques.

Some in-stream and shoreline vegetative cover may be altered or lost at waterbody crossing locations. Submerging and emergent vegetation, in-stream logs and rocks, and undercut banks provide cover for fish and other aquatic biota. Fish that normally reside in these areas may be displaced. However, this habitat alteration or loss will be insignificant because of the relatively small area affected at each crossing location. In addition, bank restoration techniques are designed to promote re-growth of riparian vegetation.

AES will maintain a minimum separation distance of 100 feet between equipment refueling and service areas associated with Pipeline construction and all intermittent and perennial streams, so as to avoid affecting aquatic biota or their habitat from potential fuel or other petroleum product spills. Any accidental spill or equipment malfunction resulting in a spill will be promptly contained and properly cleaned up, as specified in the Project's Spill Prevention, Control and Countermeasure (SPCC) Plan. Spill kits will be required on all construction equipment as a standard operating procedure. Environmental inspectors will inspect the construction areas to ensure that leaks or spills have not occurred at the stream crossings and to respond to any spills that may occur.

During operation, fisheries resources are unlikely to be impacted by maintenance mowing or manual removal of woody vegetation along the Pipeline Route. Vegetation control will be conducted solely by mechanical means; no herbicides will be used within 100 feet of waterbodies and wetlands, except as allowed by the appropriate land management agency or state agency.

Waterbody Crossing Mitigation

To the greatest extent practicable, the construction method utilized for each waterbody crossing will be compatible with the environmental sensitivity and physical characteristics of each waterbody. AES will consult with and maintain communication with state and federal agencies throughout the planning, permitting, and design process, as warranted, to ensure that the proper construction method is selected and implemented. AES will follow the Federal Energy Regulatory Commission's (FERC) *Plan and Procedures* and the SPCC Plan, and utilize the Construction Best Management Practices (BMPs)

during the construction process. Adoption of procedures, including compliance with seasonal and time constraints for in-stream work, use of appropriate sediment control devices, spoil storage and extra workspace setbacks, and storing and re-fueling equipment at least 100 feet away from waterbodies, will limit downstream sedimentation and other pollutant inflows from adjacent upland areas during and after construction.

Construction and restoration at waterbody crossings will be completed as quickly as practicable and in accordance with the FERC's time limits, where applicable, unless additional time is expressly permitted by federal and state agencies, or unforeseen circumstances (e.g., inclement weather) should dictate otherwise. Short construction time frames will limit the spatial and temporal extent of sedimentation and turbidity impacts on fish, other in-stream biota and aquatic habitat.

3.3.3.3 Aboveground Facilities

Aboveground facilities will be located outside of waterbodies and fisheries, and placed outside of adjacent areas to minimize potential impacts. Impacts to fisheries resources and other aquatic communities from aboveground facilities is not anticipated.

3.4 Vegetation

The following sections describe the major vegetation cover types that will be crossed or otherwise affected by the Project. Project effects on vegetation are summarized in Table 3.4-1. Federally and state-listed endangered and threatened plants are discussed in Section 3.6.

3.4.1 Existing Resources

Descriptions of the Ecoregions of the United States (United States Department of Agriculture [USDA] 1995) provides a hierarchical classification system for ecological units on a national and regional scale. All areas of the country are described as being within a specific Domain, Division and Province. The Project Area is located in the Humid Temperate Domain (USDA 1995). The Humid Temperate Domain is located between 30 to 60 degrees North and is characterized by both tropical and polar air mass pronounced seasons, with strong annual cycles of precipitation and temperate climates (USDA 1995); this Domain includes both broadleaf and evergreen forests. Two Divisions are found within the Project Area including the predominant Hot Continental Division (220) and the upper part of the Subtropical Division (230). The Hot Continental Division defines eastern climate regions that fall within the temperate isotherm boundaries of 72 degrees Fahrenheit (°F) for the warmest month and 32 °F for the coldest month. The distinguishing climate boundary between the Hot Continental Division and Subtropical Division is defined by the warmest temperature during winter months, or 32 °F (USDA 1995). Provinces occurring in the Project Area include the Outer Coastal Plain Mixed Province located within the Subtropical Division (LNG Terminal and south portion of Pipeline Route) and the Eastern Broadleaf Forest (Oceanic) Province located within the Hot Continental Division (mid-to upper Pipeline Route).

The southern portion of the Pipeline Route and the LNG Terminal falls within the extreme upper part of the Subtropical Division / Outer Coastal Plain Mixed Province. Under the USDA description for this province, which includes areas as far south as Georgia, it is characterized by sandy coastal regions that are covered by second-growth forests of longleaf, loblolly and slash pines. Inland areas support deciduous forest. Because of the far northern location of the Pipeline Route and Terminal Site within the Subtropical Division and current land use factors, these vegetative communities do not occur along or within the vicinity of the Project Area.

The northern portion of the Pipeline Route falls within the Hot Continental Division / Eastern Broadleaf Forest (Oceanic) Province. Vegetation in this area is winter deciduous forest, dominated by tall broadleaf trees that provide a continuous dense canopy in summer but shed their leaves completely

in winter (USDA 1995). Land use within the vicinity of the Pipeline Route has converted much of the forest into agricultural fields and other early successional habitats.

The following sections provide brief descriptions of the vegetation cover types and associated plant species composition for each of the Project's proposed facilities. Information for this section was obtained during field surveys and from aerial photograph interpretation for the Project Area (these photos are used as a base layer on the alignment sheets).

3.4.1.1 Terminal Site and LNG Marine traffic Transit Route

The Terminal Site is located in a highly industrialized area that recently operated as a shipbuilding facility. The entire 80-acre parcel consists of developed land occupied by abandoned buildings, roads, docks, relieving platform, and railroad beds with essentially no associated natural vegetation. The 80-acre area includes 45 acres for the Terminal site and an additional 35 acres for two areas associated with the DMRF (discussed further in Section 3.4.1.4 below). The aquatic portion of the Project Area has also been disturbed and is subject to maintenance dredging operations. As illustrated in Table 3.4-1 Vegetation Cover Types Affected by Construction and Operation of the Sparrows Point Project, of the 80-acre parcel, 45 acres will be permanently affected by the construction and operation of the LNG Terminal. In addition, approximately 118 acres of aquatic area will be temporally disturbed during dredging operations for the approach channel, the turning basin and construction of the pier, as shown in Table 2.4-5 of Resource Report 2, *Water Use and Quality*.

SAV was identified by the NMFS as a habitat of particular concern in the Chesapeake Bay (NMFS HCD 2006). Based on preliminary mapping of the 2005 distribution of SAV throughout the Chesapeake Bay (Virginia Institute of Marine Sciences [VIMS] 2006), no SAV beds are present in the proposed workspace areas for the approach channel, turning basin, and docking facilities adjacent to the Terminal Site. An in-water survey conducted by AES in June of 2006 corroborated the VIMS mapping effort, and indicated an absence of SAV in the waters immediately adjacent to the Terminal Site (see attached survey report in Appendix 3A).

No negative impacts to SAV along the proposed LNG marine traffic transit routes are expected, as no SAV beds have been documented along the proposed transit route (Orth et al. 2005). The VIMS, along with the Chesapeake Bay Program, have collected extensive data regarding SAV locations throughout the Bay, and no growth has been documented within the major navigational channels that lead to the Patapsco River. Relatively deep channel depths and frequent environmental disturbances within the bay (vessel traffic, channel maintenance, etc.) typically prevent SAV from successfully establishing and, therefore, it is unlikely that any negative effects will result from the added LNG marine traffic. In regards to inbound LNG marine traffic approaching from territorial waters, no negative impact on SAV is expected because it is not thought that any of the SAV species of concern such as eelgrass (*Zostera marina*) is found seaward of the Chesapeake Bay, and if any SAV does exist in territorial waters it is unlikely that it would be negatively impacted by vessels in transit, due to the fact that the overall depth of the water would offer protection from propeller turbulence and other harmful factors.

3.4.1.2 Pipeline Facilities

Vegetative cover types that will be crossed by the Pipeline consist of wooded areas (traversed for a distance of 114,364 feet, affecting 250.4 acres), open areas (i.e., agricultural land, pasture, and existing overhead transmission and pipeline ROW) (traversed for a distance of 245,716 feet, affecting 569.5 acres), aquatic areas (traversed for a distance of 16,257 feet, affecting 28.6 acres) and developed areas (traversed for a distance of 87,345 feet, affecting 182.7 acres) (see Table 3.4-1).

Wooded areas crossed by the Pipeline consist primarily of small woodlots and hedgerows. Dominant tree species include red maple (*Acer rubrum*), tulip tree (*Liriodendron tulipifera*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), American beech (*Fagus grandifolia*), red oak (*Quercus rubra*)

and white oak (*Quercus alba*). Understory saplings and shrubs include arrowwood viburnum (*Viburnum dentatum*), witch hazel (*Hamamelis virginiana*), bush honeysuckle (*Diervilla lonicera*), multiflora rose (*Rosa multiflora*), highbush blueberry (*Vaccinium corymbosum*) and lowbush blueberry (*Vaccinium angustifolia*). The dominant herbaceous plants include Allegheny blackberry (*Rubus allegheniensis*), field garlic (*Allium vineale*), Japanese honeysuckle (*Lonicera japonica*), Virginia creeper (*Parthenocissus quinquefolia*), bittersweet (*Celastrus orbiculatus*), deer tongue (*Panicum clandestinum*), goldenrods (*Solidago spp.*), Christmas fern (*Polystichum acrostichoides*), marginal wood fern (*Dryopteris marginalis*) and wood aster (*Aster divaricatus*).

Open areas crossed by the Pipeline consist of cultivated fields, hay fields, pastures, successional old fields, and the existing Baltimore Gas & Electric Company (BG&E) overhead transmission and Columbia Gas Transmission Corporation ("Columbia") pipeline ROWs. Although not reflected in the distance traversed, there is an abundance of open land within the construction ROW (CROW) along the proposed Pipeline Route due to the amount of construction workspace that overlaps existing cleared ROWs. Dominant plants in cultivated fields include corn (*Zea mays*), wheat (*Triticum aestivum*), rye (*Secale cereale*), barley (*Hordeum vulgare*) and oat (*Avena sativa*). Dominant plants in pastures and hay fields include orchard grass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*), redtop (*Agrostis sp.*), timothy (*Phleum pretense*), barley (*Hordeum vulgare*), Canada bluegrass (*Poa compressa*), smooth brome grass (*Bromus inermis*), crown vetch (*Vicia sativa*), cow vetch (*Vicia cracca*) and white clover (*Trifolium repens*). Successional old fields and the existing ROWs are dominated by orchard grass, crown vetch (*Vicia sativa*), partridge pea (*Cassia fasciculata*), common milkweed (*Asclepias syriaca*), slender bushclover (*Lespedeza virginica*), panic grass (*Panicum sp.*), deer tongue grass (*Panicum clandestinum*), Canada goldenrod (*Solidago canadense*), hay-scented fern (*Dennstaedtia punctilobula*) and Allegheny blackberry (*Rubus allegheniensis*). An invasive species that occurs along the ROW is common reed (*Phragmites australis*).

Aquatic areas crossed by the Pipeline include stream riparian corridors and wetlands. Stream riparian corridors range from grassy buffers to emergent herbaceous and shrub communities to forested buffers. Dominant tree species in these areas include red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), silver maple (*Acer saccharinum*), American elm (*Ulmus Americana*), sycamore (*Platanus occidentalis*), river birch (*Betula nigra*) and black willow (*Salix nigra*). Dominant shrub species along stream riparian areas include winterberry (*Ilex verticillata*), arrowwood viburnum (*Viburnum dentatum*), highbush blueberry (*Vaccinium corymbosum*), spicebush (*Lindera benzoin*) and multiflora rose (*Rosa multiflora*). Herbaceous vegetation dominating these areas includes spotted jewelweed (*Impatiens capensis*), arrow-leaved tearthumb (*Polygonum sagittatum*), halberd-leaved tearthumb (*Polygonum arifolium*), late goldenrod (*Solidago gigantea*), Canada goldenrod (*Solidago canadense*), deer tongue (*Panicum clandestinum*), common greenbrier (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*), Japanese honeysuckle (*Lonicera japonica*), Virginia creeper (*Parthenocissus quinquefolia*) and bittersweet vine (*Celastrus orbiculatus*).

Palustrine wetland areas crossed by the Pipeline included several types: open aquatic marshes, semi-open emergent marshes, emergent marshes, herbaceous wet meadows, shrub-emergent meadows, wooded swamps and floodplain forests. Open aquatic marshes are dominated by arrowhead (*Sagittaria latifolia*), arrow arum (*Peltandra virginica*), narrow-leaf cattail (*Typha angustifolia*) and broad-leaf cattail (*Typha latifolia*). Semi-open emergent marshes and emergent marshes areas are dominated by awl sedge (*Carex stipata*), tussock sedge (*Carex stricta*), lurid sedge (*Carex lurida*), fringed sedge (*Carex crinata*), rice cutgrass (*Leersia oryzoides*), creeping spike rush (*Eleocharis acicularis*), soft rush (*Juncus effuses*), reed canary grass (*Phalaris arundinacea*), fowl meadow grass (*Poa palustris*), woolgrass (*Scirpus cyperinus*), manna grass (*Glyceria striata*), eastern joe-pye weed (*Eupatoriadelphus dubius*), New England aster (*Aster novae-angliae*), boneset (*Eupatorium perfoliatum*), blueflag iris (*Iris versicolor*), sweetflag (*Acorus calamus*), sensitive fern (*Onoclea sensibilis*) and cinnamon fern (*Osmunda cinnamomea*). Shrub emergent marshes are dominated by similar species found in emergent marsh areas with the addition of a strong woody shrub component. Dominant shrub species within these areas include silky dogwood (*Cornus amomum*), winterberry (*Ilex verticillata*), common elderberry (*Sambucus canadense*), speckled alder (*Alnus rugosa*), swamp rose (*Rosa palustris*) and buttonbush (*Cephalanthus occidentalis*). Wooded swamps encountered are typically forested wetlands

with a strong shrub component. Dominant species include red maple (*Acer rubrum*), American elm (*Ulmus americana*), pin oak (*Quercus palustris*), green ash (*Fraxinus pennsylvanica*), black gum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), arrowwood viburnum (*Viburnum dentatum*), witch hazel (*Hamamelis virginiana*), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*) and silky dogwood (*Cornus amomum*).

Developed areas along the Pipeline Route consist of road and railroad crossings and residential, industrial and other land use categories as defined in Resource Report 8, *Land Use, Recreation and Aesthetics*. These areas generally have no associated natural vegetation with the exception of weedy forbs, grasses and shrubs.

3.4.1.3 Aboveground Facilities

Construction of the Pipeline will require installation of nine mainline block valves and three interconnect metering facilities (Table 3.3.1-5).

The permanent land requirements for these facilities are limited to the footprint of the facility and sufficient area to secure the sites with fencing and provide needed access. A typical layout of meter-regulator and interconnect facilities is provided in Resource Report 1, Figure 1.3-5. Additional land at these locations will be required on a temporary basis during construction to provide sufficient access and adequate space for material laydown, equipment, and worker safety. Following construction, land use in temporary construction workspaces will be restored or allowed to revert naturally to preconstruction land use types and vegetation cover types. Some permanent land use impacts may result but are expected to be minimal and overlap as possible with existing pipeline right-of-way associated with the existing facilities. These areas are necessary for the retention of permanent operational areas resulting from modifications to each aboveground facility following construction.

Table 3.3.1-5 provides the location of each of these aboveground facilities, summarizes vegetative cover types, and provides the acreages associated with both temporary and permanent impacts to these vegetative cover types.

3.4.1.4 Staging Areas

Table 3.3.1-6 provides the location of each of the proposed staging areas, summarizes vegetative cover types, and provides the acreages associated with both temporary and permanent impacts to these vegetative cover types.

With respect to the DMRF that will occupy approximately 5 acres of the upland portion of the Terminal Site, existing site roadways will be used to transport the PDM from the pugmill processing system to the temporary PDM storage area. The temporary PDM storage area will consist of an additional approximately 10 acre area (the DMRF and PDM storage area thus comprising a total aggregate area of approximately 15 acres), which will be covered by bituminous paving or lined with a 10-mil HDPE (high density polyethylene) liner covered by 6- to 12-inches of existing site soil or imported soil. Additionally, AES is proposing to use an area, approximately 20 acres to the north of the Terminal Site, for construction laydown and a marshalling yard for equipment (See Resource Report 1, *General Project Description*, Figure 1.3-2, Sheet 2).

With respect to the Pipeline Route, there are several types of staging areas proposed, including pipe yards, rail sidings, laydown areas, and contractor yards. These staging areas will typically be located outside of waterbodies, their adjacent areas, and other sensitive land uses, to minimize potential impacts.

3.4.2 Vegetative Communities of Special Concern

AES contacted the MDNR Environmental Review Unit (ERU), MDNR WHS, Pennsylvania Department of Conservation and Natural Resources (PDCNR), Pennsylvania Game Commission (PGC) and PFBC requesting information regarding significant natural communities that may occur within the Project Area.

Based on the review of the Project Area in Maryland, the MDNR ERU determined that portions of the Project are located in the Chesapeake Bay Critical Area, and that portions of the Project may be subject to The Forest Conservation Act that protects forests and roadside trees (MDNR ERU 2006). More detailed discussion of the areas identified by MDNR ERU is included in Section 3.5.2 Wildlife Resources of Special Concern. MDNR WHS determined initially that the proposed Pipeline Route crosses through two Nontidal Wetlands of Special State Concern (NTWSSC), which are regulated by the MDE (MDNR WHS 2006). However, based on AES field survey data, the proposed Pipeline Route only crosses one NTWSSC, which occurs at mile post 22.2 to 22.3 on Wild Cat Branch, a stream located within Gunpowder Falls State Park. The second NTWSSC roughly parallels the proposed Pipeline Route from mile post 46.4 to 46.6, with the closest point being approximately 130 feet northwest of the proposed Pipeline Route. AES will consult with MDE regarding delineating NTWSSC boundaries according to its regulations and provide the MDE an opportunity to review the wetland information during the 2007 field season. The MDNR WHS reported that sensitive plant species were known to occur within or close to wetlands in the Gunpowder Falls State Park and the Pilot area.

The PDCNR reported that the Project may impact several State-listed plant species of concern and, if suitable habitat is present, surveys should be conducted at the appropriate time of the year. The PGC and PFBC determined that no significant natural communities will be impacted by Project components within Pennsylvania (see Appendix 3C).

In addition, AES submitted letters to the Maryland and Pennsylvania field offices of the U.S. Fish & Wildlife Service (USFWS) requesting assistance in identifying any significant habitats or other natural landscape features that may be directly or indirectly impacted by the construction and operation of the Project. The USFWS responses did not identify any unique vegetation communities within the Project Area (see Appendix 3C).

3.4.3 Construction and Operation Impacts and Mitigation

Impacts to vegetative resources are not anticipated at the Terminal Site, as the area is highly industrialized. The entire 80-acre parcel consists of developed land occupied by abandoned buildings, roads, docks, relieving platform. Furthermore, no negative impacts to SAV along the proposed LNG marine traffic transit routes are expected as no SAV beds have been documented along the proposed transit route.

Construction of the Pipeline facilities will result in some long-term and short-term impacts to vegetation. Table 3.4-1 presents the acreage of clearing required for each vegetation cover type (open areas, wooded areas, aquatic areas, and developed areas). The area that will be permanently converted (i.e., maintained as herbaceous cover) will include 134.2 acres of upland forest. Clearing of forest will cause long-term impacts to vegetation as it will take many years to reestablish forest vegetation. Clearing will cause minor, short-term impacts to open lands, as these areas will be decompacted, reseeded, and allowed to revegetate naturally to preconstruction conditions. Implementation of Construction BMPs and the Project Environmental Construction Plan ([ECP] based on FERC's Plan and Procedures), included in Resource Report 2, *Water Use and Quality*, Appendix 2A and 2B, respectively, will minimize long- and short-term impacts to vegetation cover types.

Construction of the Pipeline facilities will necessitate the removal of surface vegetation from workspaces. The ground surface will be graded to facilitate installation of the Pipeline and to allow safe operation of equipment. During grading, the root systems of herbs, shrubs and small trees will

likely be disturbed. In areas where it is necessary to remove larger trees, those trees will be cut and their stumps left in place unless stumps are in the trench-line or constitute a hazard for the safe operation of equipment. In all these situations, AES will minimize soil erosion by adherence to its Construction BMPs, including the Project ECP (see Resource Report 2, *Water Use and Quality*, Appendix 2B).

Most impacts to vegetation are expected to be minor and short-term. In open areas with herbaceous cover, re-colonization of disturbed ground by annual and perennial species is characteristically rapid and occurs within one growing season. Where necessary, AES will develop area-specific revegetation and restoration plans in consultation with the COE, county soil and water conservation district offices, and private landowners. These plans will provide specifications for appropriate seed mixes. These plans will also include measures to prevent the introduction of nuisance, exotic, or invasive plant species, and will be in accordance with the revegetation guidelines in AES's Construction BMPs.

Clearing of woody shrubs and trees will have longer-term impacts because shrubs and trees take more time to re-establish than herbaceous vegetation. During re-colonization, a shrub- or tree-dominated community will evolve through several successional stages before assuming its original profile. Tree removal will be minimized to the maximum extent practicable, and replanting will be in accordance with local, state and federal agency requirements. Woody shrubs and trees will be allowed to revegetate in temporary workspace areas, but the permanent corridor will be maintained in an herbaceous state in accordance with the Project ECP (in Appendix 2A, based on FERC's Plan and Procedures) to facilitate access, accommodate underground utilities in a shared ROW, and comply with the safety requirements of 49 CFR Part 192.

In agricultural land, vegetation removal will entail crop harvesting if construction commences when crops are present. If construction takes place when crops are absent, vegetation removal will be limited to post-harvest stubble and/or ruderal weeds. Topsoil will be segregated from underlying subsoil, stored separately along the Pipeline Route during construction, then replaced following installation of the Pipeline. Impacts on agricultural vegetation from soil compaction will be avoided by testing for compaction and mitigating severely compacted soils by plowing with deep tillage equipment.

Aboveground facilities are proposed along the Pipeline Route; therefore, impacts to vegetative cover types will be similar. Additional similar impacts associated with access roads to these facilities are anticipated. AES anticipates that only existing temporary access roads will be used and will be restored to original condition or better following construction. Although there may be some minor widening of tertiary access roads, no new access roads will be created for the project.

Once the Pipeline and aboveground facilities are installed and operational, mechanical methods such as brush-hogging will be used as necessary in upland areas to keep the permanent ROW clear of excessive woody vegetation.

Impacts associated with proposed staging areas to vegetation are expected to be minor and short-term. In open areas with herbaceous cover, re-colonization of disturbed ground by annual and perennial species is characteristically rapid and occurs within one growing season. Where necessary, AES will develop area-specific revegetation and restoration plans in consultation with the county soil and water conservation district offices, and private landowners. These plans will provide specifications for appropriate seed mixes. These plans will also include measures to prevent the introduction of nuisance, exotic, or invasive plant species, and will be in accordance with the revegetation guidelines in AES's Construction BMPs. Table 3.4-1 shows the acreage of clearing required for each vegetation cover type (open areas and developed areas).

3.5 Wildlife Resources

Game and non-game wildlife species are regulated and protected under various federal laws, including the Fish and Wildlife Conservation Act of 1980 (16 U.S.C. §§ 2901-2911), the Fish and Wildlife Coordination Act of 1958 (16 U.S.C. § 661 *et seq.*), and the Endangered Species Act of 1973 (16

U.S.C. § 1531 *et seq.*). These species are also reviewed under state programs administered by the MDNR and the PGC. Maryland statutes that apply to this Project include the Maryland Nongame and Endangered Species Conservation Act (Annotated Code of Maryland 10-2A-01), the Nontidal Wetland Protection Act (Annotated Code of Maryland . § 5-901 *et seq.*), the Critical Area Act, and the Forest Conservation Act (Natural Resources Article 5- 1601-1612, Annotated Code of Maryland). This section identifies and discusses the various wildlife species associated with the vegetative cover types identified in Section 3.4, including upland forest, open land, developed lands and wetlands. It also identifies unique or significant habitats, such as wildlife refuges and wildlife management areas.

3.5.1 Existing Resources

Wildlife species require adequate food, water, cover and living space for the survival of individuals and maintenance of population viability. The various habitats within the Project Area support a variety of mammals, birds, reptiles, amphibians and invertebrates as described below. Based on agency consultation, no significant state game refuges, Wildlife Management Areas, or National Wildlife Refuges will be affected by the Project (PDCNR 2006, MDNR WHS 2006, United States Fish and Wildlife Service (USFWS) 2006).

The proposed Pipeline crosses Gunpowder Falls State Park in two locations (MDNR ERU 2006); potential impacts to sensitive species and habitats found in Gunpowder Falls State Park are discussed in sections 3.4.2, and 3.5.2.

The MDNR WHS identified unique/sensitive areas that may potentially be affected by the Project (Appendix 3C; MDNR WHS 2006). At the Terminal Site, a waterbird colony and a historic waterfowl concentration area were identified (discussed below in Section 3.5.1.1). Along the Pipeline route sensitive areas consist of NTWSSC, Forest Interior Dwelling Bird habitat, a Least Tern colony, and several habitats that support state-listed plant species in the Back River, Susquehanna River, White Marsh, and Gunpowder Falls State Park (discussed in Section 3.5.1.2). The federally listed species, state-listed species, and species of concern associated with these areas were also identified on the MDNR WHS Sensitive Species Project Review Areas (SSPRA), which consist of digital data layers that provide an overview of all state-regulated and designated areas involving sensitive and listed species. The following generally describes the wildlife associated with the habitats found within each component of the Project (MDNR 2006a, PGC 2006).

3.5.1.1 Terminal Site and Marine Traffic Transit Route

Industrial areas, such as the abandoned steel manufacturing and shipbuilding facility at the proposed Terminal Site, typically support commensal species such as the rock pigeon (*Columba livia*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), house mouse (*Mus musculus*) and Norway rat (*Rattus norvegicus*). Several habitat generalists, including the American toad (*Bufo americana*), eastern garter snake (*Thamnophis sirtalis*), American crow (*Corvus brachyrhynchos*) and raccoon (*Procyon lotor*) have adapted well to these altered landscapes and often occur there. There are two waterbird colonies each located approximately 1.5 miles from the terminal site. The first is located at the southern tip of Sparrows Point, and one on Fort Carroll Island. The protection area for both of these locations neither impinges on the Terminal site or the LNG marine traffic routes to the Terminal, so no impacts are anticipated. However, since waterbird colonies are a protected resource in Maryland, therefore protective measures may need to be implemented, as discussed below in section 3.5.2.

Wildlife resources along the LNG marine traffic transit route include marine mammals, sea turtles, seabirds, and fish. Marine mammals include cetaceans (whales, dolphins, porpoises) and pinnipeds (seals, sea lions, walrus). Cetacean species typically found along the LNG marine traffic transit route include northern right whale (*Eubalaena glacialis*), fin whale (*Balaenoptera physalus*), minke whale (*Balaenoptera acutorostrata*), humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), pilot whale (*Globicephala sp.*), Atlantic spotted dolphin (*Stenella frontalis*), common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), and bottlenose dolphin

(*Tursiops truncatus*) (Leatherwood and Reeves 1983, NOAA 2006). The pinniped species typically found along the LNG marine traffic transit route is the harbor seal (*Phoca vitulina*) (Whitaker et al. 1992, NOAA 2006). Sea turtle species likely to be found include green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*), and loggerhead (*Caretta caretta*) (NOAA 2006). Seabirds spend the majority of their life in the open ocean, at the continental shelf break, and closer inshore and come on land only to reproduce. Pelagic seabirds that may be found along the LNG marine traffic transit route include petrels (Family *Procellariidae*) and northern gannets (*Sula bassanus*). Some seabirds that frequent the continental shelf break include shearwaters (Family *Procellariidae*), northern fulmars (*Fulmaris glacialis*), and gulls. Coastal seabirds include sea ducks such as scoter species (*Melanitta sp.*), brown pelicans (*Pelecanus occidentalis*), and terns (*Sterna sp.*) (North American Birds 2000). The marine traffic transit route is discussed in greater detail within Section 3.3, including fish species discussed in Sections 3.3.1.1 and 3.3.2.1.

3.5.1.2 Pipeline Facilities

Wildlife habitats along the Pipeline Route consist primarily of a mix of wooded and open areas, with scattered aquatic habitats and developed areas. Woodland habitats are mostly small woodlots and hedgerows. Mammalian species likely to occur within these woodlands include white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), white-footed mouse (*Peromyscus leucopus*) and several species of shrews and moles. Representative bird species may include the eastern screech-owl (*Otus asio*), eastern wood-pewee (*Contopus virens*), downy woodpecker (*Picoides pubescens*), black-capped chickadee (*Parus atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), red-eyed vireo (*Vireo olivaceus*) and ovenbird (*Seiurus aurocapilla*). Typical reptiles and amphibians may include eastern box turtle (*Terrapene carolina carolina*), common garter snake (*Thamnophis sirtalis*), black rat snake (*Elaphe obsoleta obsoleta*) and American toad (*Bufo americanus*).

Cultivated fields, hay fields, pastures, successional old fields, and the existing utility ROWs provide habitat for wildlife adapted to open environments. Aerial foragers such as the barn swallow (*Hirundo rustica*), eastern kingbird (*Tyrannus tyrannus*), and red bat (*Lasiurus borealis*) are typical insectivores in this habitat. Areas with dense growths of grasses and forbs support songbirds such as the American goldfinch (*Carduelis tristis*), eastern meadowlark (*Sturnella magna*), savannah sparrow (*Passerculus sandwichensis*) and grasshopper sparrow (*Ammodramus savannarum*). Mammals such as the woodchuck (*Marmota monax*) and meadow vole feed on grasses and forbs in these habitats. The presence of high densities of prey species, such as the meadow vole (*Microtus pennsylvanicus*) and short-tailed shrew (*Blarina brevicauda*), often attracts predators to early successional fields. Examples include the eastern garter snake (*Thamnophis sirtalis*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*) and red fox (*Vulpes vulpes*).

Aquatic habitats crossed by the Pipeline include streams and wetlands. Amphibian species that likely occur in these habitats include the spring peeper (*Pseudacris crucifer*), green frog (*Rana clamitans*), northern leopard frog (*Rana pipiens*) and wood frog (*Rana sylvatica*). Reptiles that may be found in wetland and riparian areas include the northern water snake (*Nerodia sipedon*), snapping turtle (*Chelydra serpentina*) and painted turtle (*Chrysemys picta*). Birds that commonly breed in these habitats include the red-winged blackbird (*Agelaius phoeniceus*), swamp sparrow (*Melospiza georgiana*) and common yellowthroat (*Geothlypis trichas*). Representative mammals include semi-aquatic species such as the muskrat (*Ondatra zibethicus*) and beaver (*Castor canadensis*).

Developed areas along the Pipeline Route support wildlife species that have adapted to human environments. Representative species include the rock pigeon, house sparrow, European starling, house mouse, and Norway rat. Several habitat generalists, such as the American toad, eastern garter snake, American crow, American robin (*Turdus migratorius*), raccoon and opossum (*Didelphis virginiana*) may also occur in these habitats.

Habitats along the Pipeline Route support wildlife species of recreational or commercial value for hunting or trapping (MDNR 2006a). Upland game species likely to be in the Project Area include

white-tailed deer, crow and cottontail rabbit (*Sylvilagus floridanus*). Forest game species include wild turkey (*Meleagris gallopavo*) and gray squirrels. Some furbearer species that may occur in the Project Area include muskrat, beaver, raccoon, gray fox, opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*) and coyote (*Canis latrans*). Some migratory game birds of recreational value that may occur along the Pipeline Route include doves, coot, ducks and geese (MDNR 2006a, PGC 2006).

3.5.1.3 Aboveground Facilities

AES has sited aboveground facilities along the Pipeline Route at the locations noted in Table 3.3.1-5. The aboveground facilities are located in wooded and open areas similar to the areas described above in Section 3.5.1.2. Aboveground facilities are located outside of significant wildlife resource areas.

3.5.1.4 Staging Areas

AES has sited staging areas outside of significant wildlife resource areas at the locations noted in Table 3.3.1-6. 3.5.1.3. The staging areas are located in developed and open areas similar to those areas described within Section 3.5.1.2.

3.5.2 Wildlife Resources of Special Concern

Wildlife resources of special concern include significant or sensitive habitats that provide breeding, rearing, nesting or calving areas, migration routes, or overwintering cover or forage areas. The PGC, and Maryland and Pennsylvania field offices of the USFWS identified no designated significant or sensitive wildlife habitats in the Project Area (see Appendix 3C). However, the PGC and MDNR WHS identified several rare or listed wildlife species associated with sensitive habitat that are discussed below and in Section 3.6. The agencies identified no National Wildlife Refuges, Wildlife Management Areas, or game lands within one quarter-mile of the Project Area. The MDNR WHS identified three significant wildlife habitats in the vicinity of the Terminal Site, including waterbird colonies at the southern tip of Sparrows Point and at Fort Carroll Island, and a waterfowl concentration area (MDNR WHS 2006) (Table 3.5-1). The waterbird colonies are located approximately 1.5 miles south and southwest, respectively, from the Terminal Site. The breeding season is generally from 15 March through 15 August. Protection of waterbird colonies (i.e., herons, egrets, terns) is provided through the U.S. Migratory Bird Treaty Act. To protect waterbird nesting colonies from disturbance, a one quarter-mile radius protection area is established and entry is restricted during the breeding season (MDNR WHS 2006). Disturbance activity includes construction that causes abandonment, and subsequent mortality, of chicks by adults. The open waters adjacent to or part of the Terminal Site are known historical waterfowl concentration areas, which is a Chesapeake Bay Critical Area (see discussion below). Any construction of water-dependent facilities must coordinate with the MDNR WHS (MDNR WHS 2006).

The MDNR WHS identified two NTWSSC; one within the Gunpowder Falls State Park and one in the Pilot area along the Pipeline Route (MDNR WHS 2006). The Nontidal Wetland Protection Act is part of Maryland's wetland regulatory program, which strives for no net loss of wetland acreage or function, and for a net resource gain in nontidal wetlands over present conditions. The NTWSSC and the associated 100-foot upland buffer are regulated by the MDE. Several sensitive plant species are known to occur within or in close proximity to the wetlands. As discussed in Section 3.4.2, AES field survey data indicates that the proposed Pipeline crosses only one NTWSSC, which occurs at mile post 22.2 to 22.3 within Gunpowder Falls State Park (Table 3.5-1), while the other NTWSSC identified by MDNR WHS is approximately 130 feet northwest of the proposed Pipeline Route. At the formal filing of the Resource Reports with the FERC, a combined permit application to the COE and MDE will be provided for wetland and waterbody crossings of the project, along with a copy of the wetlands delineation report contained in the Resource Report filing. Application review will afford the opportunity to comment on the Project for any necessary wetland permits that may be associated with NTWSSC.

The waters along the LNG marine traffic transit route provide breeding, forage, and/or migration habitat for listed species. Four species of sea turtles (Loggerhead, Kemp's ridley, green, leatherback), Atlantic sturgeon, shortnose sturgeon, and four species of whales (North Atlantic right, humpback, fin, sperm) potentially occur in this area. Loggerhead, Kemp's ridley, and green sea turtles are present in the Chesapeake Bay and its tidal tributaries from April 1 through November 30. Leatherback sea turtles, though primarily pelagic, are present seasonally in the area. The Bay provides forage habitat for loggerhead, Kemp's ridley, and green sea turtles (Colligan 2006). Leatherbacks would most likely use the area for migration. A small and vulnerable population of sturgeon exists in the Chesapeake Bay area; the area provides breeding and forage habitat. North Atlantic right, humpback, and fin whales are rare visitors to the Chesapeake Bay but outside the Bay is a high use area during migration. Sperm whales may be present further offshore. In particular, the endangered North Atlantic right whale uses the mouth of the Chesapeake Bay area as a seasonal migration corridor (Colligan 2006).

In response to concerns about the quality and productivity of the Chesapeake Bay, the Chesapeake Bay Critical Area Protection Program was established in 1984 with the passage of the Critical Area Act, a comprehensive resource protection program for the Bay and its tributaries. The law identified the "Critical Area" as all land within 1,000 feet of the Mean High Water Line of tidal waters or the landward edge of tidal wetlands, and all waters of and lands under, the Chesapeake Bay and its tributaries. The law mandated the development of regulations (Criteria) by the Critical Area Commission, which oversees the development and implementation of local land use programs. Based on goals set forth by the Critical Area Act, minimum requirements were developed to protect water quality, conserve plant and wildlife habitat, and direct growth and development. The Critical Area Act and its Criteria are implemented at the local level and most jurisdictions work to secure compliance with the law either through the permitting process or through management plans that may include mitigation and restoration; a Project Notification Form is required for this process. The following describes the basic Criteria (MDNR 2006d):

- **Critical Area Land Categorization:** land is categorized by its predominant use and the intensity of its development. There are three categories, which include Intensely Developed Areas (IDAs), Limited Development Areas (LDAs) and Resource Conservation Areas (RCAs). IDAs are areas of twenty or more adjacent acres where residential, commercial, institutional or industrial land uses predominate, and where little natural habitat occurs. Any development or redevelopment within the IDA must reduce water quality impacts associated with stormwater runoff to a level at least 10 percent below the load generated by the same site prior to development (the "10% Rule"). LDAs are areas in which development is of a low or moderate intensity. They contain areas of natural plant and animal habitats, and are not dominated by agriculture, wetland, forest, barren land, surface water or open space. The quality of runoff from these areas has not been substantially altered or impaired. RCAs are characterized by natural environments or by resource-utilization activities such as agriculture, aquaculture, commercial forestry and fisheries activities. The Criteria limit new development in RCAs to one dwelling unit per 20 acres; the "1-in-20" criterion helps to maintain a natural character and avoid fragmentation of areas. New commercial and industrial facilities are not allowed in RCAs.
- **Preserving Natural Resources:** each local jurisdiction must identify and provide for the establishment, preservation, and maintenance of Habitat Protection Areas. These areas include: a naturally vegetated 100-foot buffer (the Buffer); nontidal wetlands; the habitats of threatened and endangered species, and species in need of conservation, and their habitat; significant plant and wildlife habitat; and, anadromous fish-spawning areas.
- **Growth Allocation:** to accommodate future growth, a local jurisdiction is authorized under the Critical Area Act to change a land use designation and allow development at a density or intensity exceeding the limits of a site's original designation.

- Native Trees and Shrubs Recommended for Planting in the Critical Area.

There are a total of 12 Critical Area crossings along the Pipeline Route, with a total of 3.0 miles (15,955 feet) crossed (Table 3.5-1). All Critical Area lands are in the southern portion of the Project Area (shown on Table 8.5.4-1 in Resource Report 8). There are fifteen (15,772 feet) crossings of IDA lands, five (5,183 feet) crossings of LDA lands, and no (0 feet) crossings of RCA lands along the Project Route. There are a total of six access road crossings and three pipe yard crossings of Critical Areas (Table 3.5-1). There are five access road crossings of IDA lands (3840 feet) and one access road crossing of LDA land (1120 feet). There are three pipeyards and the Terminal Site located in IDA lands (Table 3.5-1). The significant wildlife habitats identified by MDNR WHS are Criteria for the Chesapeake Bay Critical Area Protection Program.

One of the requirements of the Critical Area Criteria is the protection and conservation of breeding habitat for forest interior dwelling birds (FIDS). The MDNR WHS identified potential FIDS habitat in the forested areas on or adjacent to the Pipeline Route (MDNR WHS 2006). FIDS species require large (greater than or equal to 100 acres) forest areas to breed and maintain viable populations; many FIDS are declining in Maryland (Jones et al. 2000). Interior forest is defined as forested land cover at least 300 feet from non-forest land cover or from primary, secondary or county roads (i.e., roads considered large enough to break the canopy) (MDNR 2006c). High quality FIDS habitat is defined as a predominantly mature hardwood or mixed hardwood-pine forest tract, at least 100 acres in size, of which forest interior habitat comprises at least 25% of the total forest area. This habitat also must contain one or more of the following (Jones et al. 2000, MDNR 2006c):

- Contiguous forest acreage of greater than 500 acres;
- Riparian forest bordering a perennial stream or river and, on average, at least 600 feet in width;
- At least one highly area-sensitive species or Black-and-white Warbler, as a probable or confirmed breeder;
- Mature river terrace, ravine or cove hardwoods, located at least 300 feet from the nearest forest edge; at least five contiguous acres of old growth forest (as defined in the 1989 MDNR report "Old Growth Forest Ecosystems") located at least 300 feet from the nearest forest edge.

Class I FIDS habitat is high quality forest area of greater than 500 interior acres, class II is high quality habitat of less than 500 interior acres, and class III is low quality FIDS habitat (MDNR 2006c). Low quality forests may present opportunities for habitat restoration or enhancement. Where there is permanent fragmentation and there is no potential FIDS habitat, FIDS conservation is not required. Twenty-five species of FIDS potentially breed in the Critical Area occurring in the Project Area. Most are small songbirds such as warblers, vireos and flycatchers. Thirteen of the 25 species are highly area-sensitive; these species are most vulnerable to forest loss, fragmentation and habitat degradation, and are generally rare or uncommon on the Maryland Coastal Plain. The presence of one highly area-sensitive bird species nesting in a forest is an indicator of high-quality FIDS habitat.

There are a total of 40 potential FIDS habitat crossings along the Pipeline Route. There are a total of approximately 7.0 miles or 36,956 feet crossed by the Pipeline, 1.2 miles or 6,455 feet crossed by nine access roads, and 2.25 acres crossed by two pipe yards (Table 3.5-1). However, because the pipeline is routed almost entirely along existing road and other utility corridors (which have already resulted in fragmentation), there is minimal potential impact to FIDS habitat. If it is determined that new corridor may be required at some point through FIDS habitat, AES will coordinated with MDNR to develop appropriate mitigation measures to minimize impacts to this habitat.

The Maryland Forest Conservation Act (FCA; Natural Resources Article 5- 1601-1612, Annotated Code of Maryland) was passed in 1991 to protect the State's forest resources during development (Galvin et al. 2000, MDNRFS 2006). The FCA establishes standards for local authorities to enforce during development. The objectives are to minimize the loss of forestland from development and to ensure that priority areas for forest retention and forest planting are identified and protected prior to development. Compliance is required for any project for which grading or sediment control is required on a unit of land 40,000 feet (0.42 hectares or greater). Applicants must submit two documents: a Forest Stand Delineation (FSD) and a Forest Conservation Plan (FCP). The FSD and FCP documents must be prepared by a Maryland licensed forester, a Maryland licensed landscape architect or other qualified professional as determined by the MDNR-Forest Service (MDNRFS 2006).

The FSD identifies the existing forest cover and environmental features on the proposed development site. The FSD must identify forest stands, specimen trees, and sensitive areas such as steep slopes, hydric or erodible soils, critical habitat areas, streams, and floodplains. Submittal components include an application form, map, and summary analysis of field data. The map is used to direct the location of impacts away from priority areas onsite. It is submitted at the initial stages of the project plan approval, and the completed FSD is used to prepare the FCP.

The FCP follows a priority sequence, which MAE will comply with, concerning impacts to and retention of priority areas identified in the FSD. The FCP indicates the limits of disturbance for the proposed project, and how existing forested and sensitive areas will be protected during and after development. Thresholds for clearing, afforestation and reforestation are established based on the net tract area, land-use category, existing forest cover and proposed clearing area. The submittal components include an application form, worksheet, tree protection specifications, mitigation planting plan, maintenance agreement and the long-term protection agreement to be placed on the retained forest and mitigation areas. This plan is part of the site plan and construction bid document package. A FCP is submitted with the final project plan, or application for a grading or sediment control permit.

Roadside trees in Maryland are a protected resource identified by MDNR (MDNR ERU 2006). Maryland's Roadside Tree Law and its regulations, which MAE will comply with as applicable, were developed to protect roadside trees by ensuring their proper care and protection, and to ensure their compatibility with an efficient and dependable public utility system (MDNRFS 2006). Any tree that originates within a public road right-of-way is considered a roadside tree under the Roadside Tree Care Law (NRA 5-406) and regulations (COMAR 08.07.02). Any projects that plan to remove, trim, or plant trees within the public right-of-way are required to obtain a permit from the MDNR Forest Service (MDNR ERU 2006).

The proposed Pipeline Route is in the vicinity of Deer Creek and its tributaries (Table 3.3.1-4), which have been designated as a Scenic River by Maryland (MDNR ERU 2006). Designated Scenic and Wild Rivers possess outstanding scenic, geologic, ecologic, historic, recreational, agricultural, fish, wildlife, cultural and other similar resources values. The Scenic and Wild Rivers Act (1968) mandates the preservation and protection of natural values associated with rivers designated as Scenic and/or Wild. Public Lands Policy and Planning prepares a plan for each designated river and each river also has its own Scenic and Wild River Advisory Board. These Boards are responsible for reviewing inventories, plans, studies, and regulations applicable to their jurisdictions and for making recommendations on such matters to the Scenic and Wild Rivers Review Board. AES will coordinate with MDNR's Scenic and Wild Rivers Coordinator to determine potential impacts and mitigation measures for Deer Creek and its tributaries.

Maryland's Rural Legacy Program is designed to preserve large blocks of contiguous open space that are among the State's most valuable because of their agricultural, natural and cultural resources. The proposed Pipeline Route crosses several Rural Legacy Program and Maryland Agricultural Land Preservation easements (MDNR ERU 2006). The proposed activities related to construction of the Pipeline will need to be reviewed for consistency with the terms of the easements held or funded by the State of Maryland; AES will undertake consultation with the Rural Legacy Program director as needed.

3.5.3 Construction and Operation Impacts and Mitigation

The transit corridor for LNG marine traffic servicing the Project would include open water and estuarine habitats on the Chesapeake Bay. Potential LNG marine traffic transit routes outside of the Chesapeake have not been determined as of yet and will most likely depend on fluctuating factors such as weather and market trends. Potential impacts to marine mammals and sea turtles include the risk of ship strikes from marine traffic and noise disturbance from large vessels for marine mammals. Marine mammals are protected under the Marine Mammal Protection Act (1972), and several species are also protected under the Endangered Species Act (1973). Marine mammals and sea turtles are vulnerable to ship traffic at sea, particularly in areas crowded with commercial and recreational vessels. Several hundred animals are wounded or killed by interactions every year (U.S. Commission on Ocean Policy 2004). For example, ship strikes are a leading cause of mortality for endangered North Atlantic right whales (see discussion in Section 3.6.2).

Marine mammal populations may also be disturbed by noise from shipping (U.S. Commission on Ocean Policy 2004). Many marine mammals use sound to communicate, navigate, feed, and sense their surroundings; these natural behaviors can be disrupted when other sounds interfere. Large commercial vessels produce relatively loud and predominately low frequency sounds. The sounds of individual vessels can contribute to overall ambient noise levels; adverse impacts on marine mammals, and their biological significance, are currently unknown. Except for extremely busy shipping lanes or harbors, in which resident species could experience some hearing loss over long periods of exposure to industrial activity, the primary auditory effect of vessel noise on marine animals may be the masking of biologically significant sounds (Southall 2005). Because most of the acoustic energy radiated from large commercial vessels is below 1 kHz, the greatest potential for masking exists for groups of marine animals that produce and receive sounds in this band for critical biological functions. This primarily includes the mysticetes (baleen whales), pinnipeds (particularly the phocids), and fish (Southall 2005).

Protection of seabirds falls under the jurisdiction of the USFWS. Potential risks to seabirds from LNG marine traffic would be minimal as this is not a primary threat (i.e. nesting disturbance, non-native pests, marine debris, pollution, contaminants, and overfishing of prey species) for this group of species.

No significant impacts would likely result from the nominal increase (2 – 3 vessels per week) in marine traffic along the potential transit routes, provided AES adheres to United States Coast Guard navigation rules, the Traffic Separation Scheme that has been implemented for Chesapeake Bay (Pearson et al. 1989), and mitigation measures for listed whales and sea turtles (discussed in Section 3.6.2). A possible cumulative impact associated with the proposed nominal increase in marine traffic could result as an overall increase in ocean/bay/harbor traffic may increase the risk potential for ship strikes for marine mammals and sea turtles. LNG marine traffic should avoid sensitive wildlife habitats such as whale concentration areas.

The total acreage of impacts to wildlife habitats (vegetation cover types) is presented in Table 3.4-1. In general, construction of the Project will have minor, short-term and long-term impacts on habitat, resulting in localized impacts to wildlife populations. During construction, the clearing and grading of the ROW and aboveground facility sites will result in a loss of vegetative cover and could result in limited mortality to less mobile forms of wildlife which are unable to avoid construction equipment/machinery (e.g., small rodents, reptiles and amphibians).

Construction activities will cause the temporary displacement of more mobile wildlife species from the construction workspace and adjacent areas due to increased human activity and noise levels. Following construction, wildlife species are expected to resume their normal habits consistent with the availability of post-construction habitats.

AES will adhere to the construction and mitigation methods identified in the Project ECP (in Appendix 2A, based on FERC's Plan and Procedures). AES will restore vegetative cover, stabilize wetland and stream crossings and utilize site-specific procedures for constructing through sensitive habitats.

Woodland vegetation removed from temporary workspaces will be replaced initially by non-woody vegetation that may provide food and shelter for wildlife adapted to open habitats. Trees will be allowed to grow back on cleared workspace beyond the permanent ROW. After construction, wildlife is expected to return and colonize post-construction habitats.

The Pipeline will parallel and partly or wholly overlap the permanent ROWs of the Baltimore Gas & Electric Company (BG&E) overhead transmission and Columbia pipeline corridors for 90 percent of its length. When combined with other existing ROW corridors (roadway, rail line), the amount increases to almost 100 percent of the Pipeline length. Areas of deviation from these established ROWs were devised primarily to avoid residential or other encroachments upon those ROWs. Because the majority of the impacts to forest lands occurs in the areas where the Pipeline parallels the BG&E or Columbia corridors, impacts to forest habitat will be limited to the areas where widening of the existing open corridor is needed. Because there will be no net loss of edge habitat, however, it is unlikely that the species profiles of the wildlife communities associated with the existing ROW and adjacent woodlands will be altered. AES anticipates that species diversity will remain at or near pre-construction conditions following restoration of the Pipeline ROW.

Stream crossings will be completed as quickly as possible and stream habitats restored upon completion of construction. AES will use construction procedures consistent with the Project ECP (Appendix 2A, based on FERC's Plan and Procedures) to minimize sedimentation, turbidity and other impacts that may temporarily affect stream habitats and wildlife.

Construction and operation procedures will accommodate general and site-specific protective measures for any significant and/or sensitive wildlife habitat identified during the course of constructing and operating the Project. Seasonal timing to account for reproductive and migratory patterns will be coordinated with state and federal agencies, as necessary.

3.6 Endangered and Threatened Species

AES consulted with federal and state agencies regarding the potential occurrence of endangered and threatened species that may be affected by the Project. Copies of all agency correspondence are provided in Appendix 3C. In addition, AES performed concurrent wetland delineation and habitat evaluation surveys of the Project workspaces between May and August 2006. AES's wetland delineation and waterbody identification reports are contained in Resource Report 2, *Water Use and Quality*. Federal and state-listed species that may potentially be affected by the Project are listed in Table 3.6-1 and are discussed in sections 3.6.1 and 3.6.2, respectively.

3.6.1 Existing Resources

3.6.1.1 Federally Listed Species

AES submitted letters to the NMFS and the Maryland and Pennsylvania field offices of the USFWS on April 7, 2006, requesting assistance in identifying any federally-listed endangered, threatened or other species of concern, national wildlife refuges, significant habitats, or other natural landscape features that may be directly or indirectly affected by construction and operation of the Project. AES also consulted with the NMFS and Maryland field office of the USFWS concerning the LNG marine traffic transit route. Both the NMFS and Maryland field office of the USFWS stated they had no further comments regarding the LNG marine traffic transit route, and additional consultation beyond their original correspondence is not required (Koyama 2006, Nichols 2006a, Ray 2006). The following are summaries of the responses received from the NMFS and USFWS.

The NMFS replied to AES's information request in a letter dated May 3, 2006 (NMFS 2006). The letter identified nine federally listed species and one federal species of concern that may potentially occur within the waters of the Chesapeake Bay, including four species of sea turtles, two species of fish and four species of whales (Table 3.6-1). The letter also identified one federally listed species of turtle that may occur in wetland habitats along the Pipeline Route.

Hundreds of juvenile Kemp's ridley turtles have been reported to inhabit the Chesapeake Bay during the summer months (Musick 1988); NMFS reports they are present from April 1 – November 30 each year (NMFS 2006). Kemp's ridley turtles appear to prefer sheltered areas along the coast and frequent bays, estuaries and lagoons for foraging (USFWS 1992). The primary habitat of juvenile Kemp's ridley is submerged aquatic vegetation where abundant food sources are available.

The juvenile loggerhead is the most common sea turtle in the Chesapeake Bay, with up to 10,000 loggerheads inhabiting the Bay in the summer (Musick 1988); NMFS reports they are present from April 1 – November 30 each year (NMFS 2006). Approximately 95 percent of loggerhead sea turtles found in the Bay are juveniles. They are commonly found from the mouth of the Bay to the Potomac River while foraging along channel edges. Loggerheads can be found in a variety of habitats such as coral reefs, rocky bottoms, shellfish beds, and boat wrecks, and are common in waters less than 50 meters deep (Shoop and Kenney 1992). Crustaceans are the primary components of the loggerhead's diet in the Chesapeake (Burke et al. 1990).

Typically, green turtles are found in areas with shallow depths and low wave energies (Mendonca and Erhart 1982). Green turtles have occasionally been seen in nearshore waters from Massachusetts to Virginia from July to November (NMFS 2001), and move southward in late fall as water temperatures decline. Estuarine and coastal waters of the Chesapeake Bay provide summer developmental habitat (NMFS 2006). The green turtle is an herbivore that feeds on sea grasses or algae (Burke et al. 1992).

Leatherback turtles undertake extensive migrations, mostly within the temperate zone. They occupy large, open bays in the northeastern U.S. from June to November; the southern migration to Maryland and Virginia occurs in nearshore waters from August to November (NMFS 2001). Although considered an oceanic species, leatherback turtles are sometimes found in shallow waters (NMFS 1992). Leatherback turtles have been sighted in the Chesapeake Bay, with one instance of nesting reported on the eastern shore of Maryland on Assateague Island (Rabon et al. 2003). The NMFS reports that they are seasonally present in the Bay (NMFS 2006), and are likely present when in pursuit of prey (Musick 1988).

The NMFS commented that data from the MDNR sea turtle tagging program and the Sea Turtle Standing and Salvage Network indicate that sea turtles occur near the mouth of the Patapsco River (i.e., the vicinity of the proposed LNG Terminal). However no sea turtles were seen during the June 2006 and October 2006 marine surveys by AES in the Patapsco River. Further, habitat that would support these species is not likely to occur within the Project Area, thereby limiting their possible

occurrence. While they may be affected by the proposed LNG marine traffic along the main stem of Chesapeake Bay, any such potential impact is unlikely since the proposed traffic will be minimal.

The shortnose sturgeon is anadromous and spends much of its life in slow-moving tidal rivers of the Chesapeake Bay or in nearshore marine waters. It returns upstream to fresh waters to spawn. The shortnose sturgeon matures slowly and spawns selectively, in freshwater, from the end of April to early May (Chesapeake Bay Program 2006). Shortnose sturgeon, though rare, are known to be present in the Chesapeake Bay and its tributaries, including the Patapsco River (NMFS 2006). Since 1996, there have been 74 incidental captures of shortnose sturgeon in the Chesapeake Bay and its tributaries; this includes four captured incidentally in fishing gear in the Patapsco River. Spawning has been reported in the James and York Rivers, but the species has not been reported to spawn near the Patapsco River (MDNR 2006b). No shortnose sturgeon were reported during the June 2006 and October 2006 marine surveys in the Patapsco River.

Atlantic sturgeon are listed as a species of federal concern. Many populations have undergone drastic declines, including those in the Chesapeake Bay. NMFS has initiated a status review for Atlantic sturgeon to determine if listing as threatened or endangered is warranted. There are anadromous fish that may be found in the Chesapeake Bay in April and May on their way to tributaries, which they use as spawning and nursery grounds (Chesapeake Bay Program 2006). Females move downstream within four to six weeks of spawning, while males may remain in the river or lower estuary until autumn when the temperature drops. Most juveniles remain in their natal river for one to six years before migrating into coastal waters. Atlantic sturgeon are rare in the Chesapeake Bay today, but recent evidence suggests limited spawning in the James and York rivers. The Atlantic sturgeon has been documented near the mouth of the Patapsco River (MDNR 2006b) and the mainstem of the Chesapeake (NMFS 2006). Potential habitat exists in the vicinity of the LNG Terminal and the marine traffic transit route. No Atlantic sturgeon were reported during the June 2006 and October 2006 marine surveys in the Patapsco River.

Four species of whales are rare visitors to the Chesapeake Bay, but may occur outside the Bay during seasonal migration within the transit path of marine traffic traveling to and from the LNG Terminal (NMFS 2006). North Atlantic right whales prefer coastlines and sometimes large bays, but are also known at times to be pelagic; they prefer waters within 30 nautical miles (nm) of land (Knowlton et al. 2002). Right whales migrate between winter calving grounds off the coasts of Florida and Georgia, and Canadian feeding areas, during the summer and early fall. They are sighted in the Chesapeake Bay area from February to May and in the fall from October to December (Knowlton et al. 2002). Humpback whales migrate annually between tropical winter calving grounds and polar feeding areas. Like humpback whales, fin whales are found in all oceans of the world and they migrate to subtropical waters for mating and calving during the winter months, and to the colder areas of the Arctic and Antarctic for feeding during the summer months. Recent evidence suggests that during winter, fin whales may be dispersed in deep ocean waters (American Cetacean Society 2006). Sperm whale females and young travel in permanent units, whereas the males travel between breeding and feeding grounds. Females, calves and juveniles remain in the warmer tropical and sub-tropical waters of the Atlantic year-round (American Cetacean Society 2006).

The Chesapeake Bay Field Office (CBFO) of the USFWS responded to AES's information request on August 15, 2006 (USFWS - CBFO 2006). The letter (see Appendix 3C) stated that, except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the Project Area. Therefore, no Biological Assessment or further Section 7 Consultation with the USFWS is required. The letter noted that, should Project plans change or if additional information on the distribution of listed or proposed species becomes available, the determination may be reconsidered.

The Pennsylvania Field Office of the USFWS responded on May 31, 2006 and noted that portions of the Pipeline and associated aboveground facilities are within the known range of the bog turtle (*Clemmys muhlenbergii*), a federally listed threatened species (Densmore 2006 - see Appendix 3C). The bog turtle is a semi-aquatic, omnivorous turtle found in open, marshy wetlands associated with

specific vegetative communities and mucky soils (PFBC 2006). Bog turtles are also known to use forested habitats associated with springs and streams as dispersal corridors (PFBC 2006). Bog turtles migrate short distances between summer breeding and feeding areas, and winter hibernation sites. The turtles emerge from hibernation in late March to April, breed in late April to early June, and lay eggs from June to July. Bog turtle home ranges are less than 0.2 hectare (ha) (Lee and Norden 1998). The USFWS recommended that all wetlands within the portion of the Project Area located in Pennsylvania be evaluated, following USFWS guidelines, regarding potential suitability as bog turtle habitat. AES assessed habitat suitability and filled out official bog turtle survey forms for all wetlands in the said portion of the Project Area; the data are being compiled and review by a certified bog turtle surveyor is anticipated to be completed by mid-March 2007; the results will be submitted in a subsequent filing. Based on preliminary habitat field surveys, several wetlands were identified that present suitable habitat for bog turtles, and such areas will require formal bog turtle surveys during the 2007 survey season, which will be approximately April 15th to June 15th 2007.

Although none of the correspondence from federal and state agencies noted the presence of bald eagle (*Haliaeetus leucocephalus*) nesting or concentration areas in the vicinity of the Project Area, AES's field surveys documented the presence of a bald eagle nest near MP 44.8. The nest was located approximately 500 feet from the centerline of the Pipeline, and was observed to be active during the 2006-breeding season.

3.6.1.2 State Listed Species

AES contacted the Virginia Marine Resources Commission (VAMRC), MDNR WHS, PDCNR, PFBC, and PGC on April 7, 2006, requesting assistance in identifying any state-listed endangered, threatened or other species of concern, state wildlife refuges/management areas, significant habitats and other natural landscape features that may be directly or indirectly impacted by the proposed activity. As part of this consultation, AES completed and submitted a Pennsylvania Natural Diversity Inventory (PNDI) form to the PDCNR. The responses received from each agency are included in Appendix 3C, and are summarized below.

Virginia

On June 14, 2006, AES contacted the VAMRC, Habitat Management Division, which handles a permitting program that encompasses subaqueous habitat preservation, and the protection and preservation of tidal wetlands and coastal primary sand dunes (McGinnis 2006). The VAMRC informed AES that the state is not concerned nor has regulations on vessel traffic, and is not aware of other Virginia state departments with concerns or regulations on vessel traffic. On October 4, 2006, AES submitted written requests to the VAMRC, Virginia Department of Environmental Quality - Office of Environmental Impact Review, and the Virginia Department of Game and Inland Fisheries for formal input on LNG marine traffic transit concerns crossing Virginia state waters for the Project. Comments regarding impacts associated with increased vessel traffic have not been received from the Virginia agencies.

Maryland

The Nongame and Endangered Species Conservation Act is the primary law that governs the listing of endangered species in Maryland, and contains the official State Threatened and Endangered Species list. The MDNR WHS responded to AES's information request on June 23, 2006 (MDNR WHS 2006). The MDNR WHS letter identified 13 plant, one butterfly, one fish, one turtle and one bird species listed as endangered or threatened in Maryland that may potentially occur within the Project Area (Table 3.6-1). In addition, the MDNR WHS identified eight plant species that are classified as rare in Maryland. Two additional bird species with "In Need of Conservation" status were identified by MDNR WHS to occur in the Project Area. Peregrine Falcon (*Falco peregrinus anatum*) nesting is known to occur in the vicinity of the Terminal Site and breeding Least Bitterns (*Ixobrychus exilis*) occur along the Pipeline Route in the Middle River area of Baltimore County. Field surveys will be completed to determine whether any of the state-listed endangered or threatened species occur within

the Project Area. AES will coordinate with MDNR WHS to establish appropriate survey methods and windows to survey during the 2007 survey season. Results of the surveys will be submitted to MDNR WHS and the FERC upon completion.

Pennsylvania

A response was received from the PDCNR on August 7, 2006 (PDCNR 2006). The PDCNR letter identified six plant species that are currently listed or proposed to be listed as endangered or threatened in Pennsylvania that may potentially occur within the Project Area (Table 3.6-1). The PDCNR identified an additional three plant species that are currently classified and are proposed to remain classified as rare or tentatively undetermined (TU) in Pennsylvania. Field surveys will be completed to determine whether any of the state-listed endangered or threatened species occur within the Project Area. AES will coordinate with PDCNR to establish appropriate survey methods and windows to survey during the 2007 survey season. Results of the surveys will be submitted to PDCNR and the FERC upon completion.

The PFBC responded on May 26, 2006 (PFBC 2006). The PFBC stated that the bog turtle, a state-listed endangered species, is known to occur within the vicinity of the Pipeline. However, the letter included no detail regarding known bog turtle locations. The PFBC recommended that all wetlands crossed by the Pipeline be investigated to determine potential suitability as bog turtle habitat. The PFBC also requested that AES submit detailed information (e.g., site plans, habitat descriptions, site photographs, wetland delineation report) for the agency to conduct a thorough assessment of the potential for the Pipeline to adversely impact the bog turtle. As stated previously, bog turtle habitat suitability data have been gathered and will be submitted in a subsequent filing after a specific survey for bog turtles has been performed during the 2007 survey season, which is approximately 15 April to 15 June.

A response was received from the PGC on April 28, 2006 (PGC 2006). The PGC indicated, "the Project will not adversely impact any special concern species of birds or mammals, or state game lands."

3.6.2 Construction and Operation Impacts and Mitigation

The general construction and operational impacts of the Project, as discussed previously in this Resource Report, are applicable to endangered and threatened species. Due to the limited distribution and abundance of endangered and threatened species, any impact may have the potential to impact individual organisms. The primary limiting factor of some endangered or threatened species is believed to be habitat availability. Therefore, the loss or alteration of significant suitable habitat could contribute to the decline of some species' populations.

Dredging, in-water construction, ballast water intakes and discharges, and marine traffic were identified as potential risks to listed species by NMFS (NMFS 2006). Four species of sea turtles (Loggerhead, Kemp's ridley, green, leatherback), Atlantic sturgeon, shortnose sturgeon, and four species of whales (North Atlantic right, humpback, fin, sperm) are potentially at risk. Potential impacts associated with ballast water discharges and in-water pile driving will not be discussed further as AES operations will not entail these activities; ballast water discharges will not occur in the Chesapeake Bay area and piles will be driven along the shoreline only above the water level for support of the sheet pile wall. The potential impacts associated with pile driving and construction of the new sheet pile wall bulkhead are addressed in Section 2.4.8.2 of Resource Report 2, *Water Use and Quality*.

Loggerhead, Kemp's ridley, green, and leatherback sea turtles are at risk of injury and death due to dredging and in-water construction activities, particularly if there are sound waves and sediment plumes. Loggerhead, Kemp's ridley and green sea turtles are present in the Chesapeake Bay and its

tidal tributaries from April 1 – November 30 each year (NMFS 2006). Leatherback sea turtles, though primarily pelagic, are present seasonally in the area. Sea turtles are vulnerable to entrainment in hopper dredges. Construction impacts to sea turtles related to dredging are not anticipated to be significant, as the turtles would likely not be present in the area to be dredged or would avoid the area where dredging would occur. Any sea turtles present in the area adjacent to the Terminal Site or along the LNG marine traffic transit route would likely be transient. To assess the impacts of dredging on sea turtles, NMFS requires that an approved endangered species observer be present on the dredge to monitor for interactions with sea turtles.

The Project Area does not currently contain preferred habitat for sea turtles. To minimize impacts on sea turtles that may be within the Project Area during construction, AES is proposing the use of turbidity curtains during pile driving for the near shore construction of the bulkhead wall, and the use of an environmental (clam shell) dredge bucket during dredging operations, to limit the possibility of entrainment. Also, AES will comply with the following construction guidelines for sea turtles as outlined in NMFS Southeast Regional Office “Sea Turtle and Smalltooth Sawfish Construction Conditions” document (March 2006):

The permittee shall comply with the following protected species construction conditions:

- a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.
- b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.
- c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service’s Protected Resources Division, St. Petersburg, Florida.
- d. All vessels associated with the construction project shall operate at “no wake/idle” speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area on its own volition.
- f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service’s Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.
- g. Any special construction conditions, required of your specific project, outside these general conditions, of applicable, will be addressed in the primary consultation.

Impacts to sea turtles also include the potential for vessel strikes during LNG marine traffic passage along the LNG marine traffic transit route and through the Chesapeake Bay and into the Patapsco River. Such potential is not anticipated to be significant relative to the existing conditions due to the infrequency of ship passage. Also, AES will adhere to the NMFS "Vessel Strike Avoidance Measures and Injured or Dead Protected Species Reporting" guidelines discussed below.

North Atlantic right, humpback and fin whales are rare visitors to the Chesapeake Bay but outside the Bay is a high use area during migration. Sperm whales may be present further offshore. North Atlantic right, humpback, fin and sperm whales are at risk of injury or death due to ship strikes, particularly the endangered North Atlantic right whale that uses the mouth of the Chesapeake Bay area as a seasonal migration corridor (NMFS 2006). North Atlantic right whale stocks are extremely depleted as a result of former fishing pressures and lethal ship strikes (NOAA 2006). Right whales are particularly susceptible to marine traffic collisions since they swim slowly, spend considerable time at the surface, and apparently take little or no evasive action when ships approach (NOAA 2006). Often, entrance channels to commercial ports are the same areas frequented by right whales. However, ships and right whales also co-occur throughout the range of right whales. Right whale deaths attributed to ship strikes have been documented in and near shipping channels as well as in coastal areas that link major aggregation areas such as the waters off the U.S. mid-Atlantic (Knowlton et al.2002). Special consideration has been given to the locations of feeding and calving grounds for Northern right whales. In a port access route study conducted by NMFS and the United States Coast Guard (USCG 2005), it was determined that Northern right whales are not known to aggregate within the Mid-Atlantic region. LNG marine traffic should avoid right whale designated critical habitat areas.

NMFS recommends that AES assess the impacts to whales from increased marine traffic and provide data to them on the expected number of vessel transits, transit speed and approximate transit routes. AES will incorporate NOAA's "Proposed Rule to Implement Speed Restrictions to Reduce the Threat of Ship Collisions with North Atlantic Right Whales and Steps Mariners Can Take To Avoid Collisions with Critically Endangered Right Whales" into the LNG Fuel Supply Agreement as part of AES's efforts to protect marine mammals from marine traffic strikes. These guidelines are appropriate for the protection of all whale species. These guidelines will include reducing marine traffic speed to 10 knots or less and educating marine traffic operators about whale avoidance measures in order to mitigate risks of marine traffic strikes (NMFS 2006). Additional measures to protect whales from marine traffic strikes include obtaining the latest sighting information and avoiding known seasonal aggregation areas (Koyama 2006). Whales are also vulnerable to impacts from in-water construction activities, particularly if there are sound waves or sediment plumes. Significant impacts to whales are not anticipated as a result of Project construction or operation. Similar to sea turtles, impacts are likely to be limited to the potential for marine traffic strikes and are not anticipated to be significant.

The NMFS has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The NMFS Southeast Region vessel strike avoidance guidance outlines standard measures that must be implemented to reduce the risk associated with vessel strikes or disturbance of these protected species to discountable levels. NMFS should be contacted to identify any additional conservation and recovery issues of concern. The "Vessel Strike Avoidance Measures and Injured or Dead Protected Species Reporting" guidelines for whales and sea turtles (May 5, 2006) are listed below:

- Protected Species Identification Training: Vessel crews should use an Atlantic and Gulf of Mexico reference guide that helps identify the species of marine mammals and sea turtles that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean and Gulf of Mexico. Additional training should be provided regarding information and resources available regarding federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.
- Vessel Strike Avoidance: The following measures must be taken in order to avoid causing injury or death to marine mammals and sea turtles:

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.
6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

■ Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).
2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.
3. Mariners should check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners.

■ Injured or Dead Protected Species Reporting: Vessel crews must report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel. Report marine mammals to the Southeast U.S. Stranding Hotline: 305-862-2850. Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312. In addition, if the injury or death was caused by a collision with your vessel, you must notify the Action Agency immediately of the strike by email (email and/or phone number contact information provided by the Action Agency). The report should include the following information:

1. time, date, and location (latitude/longitude) of the incident;
2. name and type of the vessel involved;
3. vessel's speed during the incident;
4. a description of the incident;
5. water depth;
6. environmental conditions (e.g., wind speed and direction, sea state, cloud cover, and visibility);

7. species identification or description of the animal, if possible; and
8. fate of the animal.

If an Action Agency-related industry activity is responsible for the injury or death, the responsible parties should remain available to assist the respective salvage and stranding network as needed.

A small and vulnerable population of shortnose and Atlantic sturgeon exists in the Chesapeake Bay area. Sturgeon are at risk of injury and death due to dredging and in-water construction activities, particularly if there are sound waves and sediment plumes. NMFS notes that sturgeon are vulnerable to entrainment in hopper suction dredges, and impacts may also occur from hydraulic pipeline and mechanical dredge operations (NMFS 2006). To assess the impacts of dredging on sturgeon, NMFS requires that an approved endangered species observer be present on the dredge to monitor for interactions with sturgeon. AES proposes to dredge the entrance channel, turning basin and berthing area primarily by mechanical clamshell dredge or an environmental bucket technology if required, with some limited areas near shore excavated by backhoe dredge, as described in Resource Report 1, *General Project Description*, and Resource Report 2, *Water Use and Quality*. A schedule of the proposed dredging operations is included as Table 1.5-1 of Resource Report 1.

Young life stages of sturgeon are vulnerable to entrainment at intakes for ballast water or tank test water. The intake aperture on the ships would be about 25 to 30 feet below the water surface and would be outfitted with mesh screens to minimize potential impact to nearby organisms.

Shortnose and Atlantic sturgeon are rare species in the Chesapeake Bay, and are not likely to be present in significant numbers in the Patapsco River. Additionally, this species is highly mobile and would avoid direct impact by vacating the proposed dredging area. Therefore, marine traffic transit and dredging-related impacts to both species of sturgeon are not anticipated to be significant.

Potential adverse Project impacts to the bald eagles in connection with the bald eagle nest identified at MP 44.8 along the Pipeline include water quality degradation, which could impact their food source, and disturbance, which could result in nest abandonment. The following discusses potential mitigation measures, which may include seasonal restrictions on Pipeline activity and the establishment of buffer areas around the nest. These are the primary methods discussed in the Bald Eagle Recovery Plan to reduce disturbance (USFWS 1983). The disturbance buffer zones are typical guidelines used in further consultation with USFWS and MDNR in the course of project planning to provide for safe construction while eliminating or minimizing disturbance to protected species. The guidance is as follows:

- Primary Zone: 330 feet from nest; entry may be restricted;
- Secondary Zone: 660 feet from nest; construction and land clearing measures may be restricted; and
- Tertiary Zone: ¼-1/2 mile from nest (dependent on topography and vegetation that acts as a visual barrier); some activities permitted except during most critical breeding period. Specific restrictions are decided upon in consultation with the responsible Agency(s).

AES has initiated consultations with the USFWS Chesapeake Bay field office and the Maryland Wildlife Heritage Program to determine the local requirements for protection of bald eagle nesting grounds and the appropriate buffers required for construction activities. Essential habitat typically includes 640 acres (minimum) around each nest site, roost sites, aquatic and terrestrial foraging areas and prey habitat. Courtship and nest building is the most sensitive period during the breeding season (approximately October to February); construction activities should not occur during this time period. Construction and related activities should be confined to the low critical (chicks one month old to six weeks after fledging; approx. April to August) or non-critical (non-breeding period; approx. August to October) periods of the year. Visibility of the nest is an important factor because topography and trees may provide screening that reduces disturbance. AES is reviewing the Draft National Bald Eagle

Management Guidelines dated February 2006, and coordinating with the USFWS and MDNR to develop a mitigation plan to minimize potential impacts to the bald eagle nest, with specific focus on minimizing disturbance to the nest during the breeding season.

The Regal Fritillary is a butterfly species with Endangered Extirpated Maryland state status. Though considered extirpated, it is possible it may exist in appropriate habitat (MDNR WHS 2006). It inhabits tall-grass prairie and other open sites including damp meadows, marshes and wet fields. This species is rapidly vanishing or declining in much of its range; populations should be monitored and conserved (Butterflies and Moths of North America 2006). Potential Project impacts include loss or disturbance of vegetative habitat that supports larval and adult butterflies. Possible mitigation measures that have been useful for other listed butterfly species include restoration and enhancement of habitat. Restoration may include reseeding with native plants that are food sources for adults (e.g., butterflyweed, thistles, ironweed) and larval stages (e.g., violets) (Lowell and Lounsbury 2002). The MDNR WHS encourages further coordination so that adverse impacts may be avoided if the Regal Fritillary is found to occur in suitable habitats identified in the Project Area.

The logperch is a Maryland state-listed threatened species that may be adversely impacted by sedimentation and erosion. The MDNR WHS recommends that all appropriate best management practices be adhered to during any site disturbance in the area of Glen Cove along the Susquehanna River where logperch have been recorded. Implementation of Construction BMPs (Appendix 2B and the Project ECP (Appendix 2A) will minimize long- and short-term impacts to logperch in this area. Further coordination and consultation with MDNR WHS will also be undertaken to prevent or mitigate potential adverse impacts.

Some potential direct and indirect impacts to listed and rare plants within the Project Area include loss of individuals or communities due to vegetation clearing, and compaction of soils associated with grading and other construction activities. Possible mitigation measures that can protect rare plants include avoidance or re-routing of the Pipeline impact area, narrowing the right-of-way to avoid all or part of the plant community, or salvaging rare plants by transplanting individual plants (e.g., temporary nursery storage during construction with subsequent replanting in their original location following construction; Trettel et al. 2002), seed collection, topsoil segregation/replacement for re-establishment after construction, and use of timber mats to cover and protect populations from heavy equipment traffic (Fryer et al. 2002, Trettel et al. 2002). Salvage methods have been found to be successful but monitoring should be done following site restoration (Fryer et al. 2002, Trettel et al. 2002). Implementation of Construction BMPs (Appendix 2B) and the Project ECP (Appendix 2A) will minimize long- and short-term impacts to vegetation cover types. Further coordination and consultation with MDNR WHS and PDCNR will also be undertaken to prevent or mitigate any potential adverse impacts.

Projects in and adjacent to bog turtle habitat can cause habitat destruction, degradation, and fragmentation. Even if the wetland impacts from an activity are avoided (i.e., the activity does not result in encroachment into the wetland), activities in adjacent upland areas can compromise wetland habitat quality, fragment travel corridors, and alter wetland hydrology, thereby adversely affecting bog turtles. For example, invasive plant encroachment creates a monoculture of unsuitable bog turtle habitat; soil disturbance and degraded water quality associated with development can encourage the spread of invasive plants. Inadequate upland buffers do not protect wetlands. Measures must be taken to avoid impacts to the bog turtles when wetlands in or near the Project Area are known to support bog turtles.

Prior to conducting activities that may directly or indirectly affect wetlands, bog turtle habitat surveys (Phase 1) or bog turtle surveys (Phase 2) should be conducted in accordance with accepted survey guidelines. Bog turtle habitat surveys are conducted if wetlands in or adjacent to the Project Area are not known bog turtle habitat; habitat surveys were conducted during 2006 and the results will be submitted following review by a certified bog turtle surveyor. Based on preliminary survey results, several wetlands provide potential habitat. If a wetland is determined to be potential habitat and the Project will directly or indirectly impact any portion of the wetland, then AES will either:

- Completely avoid all direct and indirect effects to the wetland, in consultation with the USFWS and State wildlife agency, or
- Conduct a bog turtle survey (Phase 2 survey) to determine the presence of bog turtles as specified in the Recovery Plan (USFWS 2001).

Three bog turtle conservation zones have been designated with the intent of protecting and recovering known bog turtle populations, and are meant to guide the evaluation of activities that may affect high-potential bog turtle habitat, potential travel corridors, and adjacent upland habitat that may serve to buffer bog turtles from indirect effects (USFWS 2001). Zone 1 includes the wetland and visible spring seeps occupied by bog turtles. Zone 2 extends at least 300 feet from the edge of Zone 1 and includes upland areas adjacent to Zone 1. Zone 3 includes upland, wetland, and riparian areas extending either to the geomorphic edge of the drainage basin or at least one-half mile beyond the boundary of Zone 2.

Consultations and project reviews are conducted on a case-by-case basis. The MDNR WHS recommends that to reduce the likelihood of adverse impacts, appropriate sediment and erosion control measures be taken to minimize impacts to wetlands near the known bog turtle populations (MDNR WHS 2006). Sediment transport, associated with storm events, can potentially impact wetlands in the Project Area by changing hydrology and/or the vegetative character of the wetland, specifically by establishment of exotic invasive vegetation on deposited sediment. The USFWS (Pennsylvania office) recommends that a Phase 1 habitat survey be conducted in all areas where wetlands will be directly or indirectly affected by Project activities, including impacts associated with roads, water and sewer lines, utility lines, stormwater and sediment basins, buildings, driveways, parking lots, yards/lawns and wells. If potential habitat is found in the Project Area, efforts should be made to avoid any direct or indirect impacts to those wetlands with no disturbance to or encroachment into wetlands. Adverse effects may occur when lot lines include portions of wetlands, when an adequate upland buffer is not designated, or when roads, stormwater/sediment basins, impervious surfaces or wells affect the hydrology of the wetland. If potential habitat is found, an experienced, qualified biologist should conduct a Phase 2 bog turtle survey. Further consultation with the USFWS and MDNR WHS would be necessary if adverse effects cannot be avoided.

A proposed alternate route is within the vicinity of a Least Tern colony that is known to occur on two buildings known as the Hitech Project, near the southwest quadrant of the I-95 and MD Route 43 intersection (MDNR WHS 2006). Significant mortality of chicks or eggs resulting from disturbance of the colony during the breeding season is a violation of the U.S. Migratory Bird Treaty. To protect Least Tern colonies the MDNR WHS recommends the following guidelines:

- Establish a protection area of 660 feet from the colony's outer boundary. Within this area, establish two zones of protection: Zone 1 extends from the outer boundary of the colony to a radius of 330 feet, and Zone 2 extends from 330 feet to 660 feet in radius.
- During the breeding season, 15 April through 31 July, all human entry into Zone 1 should be restricted to only that essential for protection of the Least Tern colony. Human disturbance of colony sites that results in significant mortality of eggs and/or chicks is considered a prohibited taking under various state and federal regulations.
- No land use changes, including development and intensive recreational use, should occur in Zone 1.
- Construction activities, including clearing, grading, building, etc. should not occur within Zone 1.
- No construction, or other disturbing activities, should occur within Zones 1 and 2 during the Least Tern breeding season.

Because AES is not proceeding with construction along the alternate route, no impacts to nesting Least Terns are anticipated; further coordination and consultation with MDNR WHS will be undertaken to prevent or mitigate potential adverse impacts to nesting Least Terns if necessary.

As previously stated, field surveys will be completed to determine whether any federally or state-listed endangered or threatened species occur within the Project Area (Table 3.6-1). Appropriate survey

times for all listed species will be coordinated with the USFWS and appropriate state agencies. If the surveys establish the presence of listed species in areas affected by the Project, avoidance and mitigation measures will be developed. If listed species are encountered during the construction of the Project, AES will halt all work in the immediate vicinity and contact the appropriate state and federal agencies.

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