List of Amendments to Draft EIS

The following amendments were made to the Rehoboth Beach Wastewater Treatment Plant Final EIS based on comments received at the Public Hearing on April 10, 2012 and during the Public Comment Period from April 10, 2012 to May 10, 2012.

Amendment 1

Section 2.4.2, Paragraph 1 (page 2-9). Replaced sentence 1 with the following:

The RBWWTP is currently meeting and achieving higher levels of treatment than required by the current existing permit limits with effluent concentrations and loadings well below the permitted amounts.

Amendment 2

Section 3.1 (page 3-2). Added the following to the end of Section 3.1:

Individual treatment alternatives, such as incinerating toilets, were not investigated. All residents and other users in the RBWWTP service area would have to agree to have all of their existing toilets replaced with incinerating toilets, which is not considered feasible. Additionally, such toilets do not provide treatment or disposal of other sources of domestic wastewater, such as sink drains, shower drains, dishwashers, or clothing washers.

The use of constructed wetlands to enhance treatment as a component in the overall RBWWTP disposal project was considered. As discussed in Section 2.4.2 of this report, the RBWWTP is currently meeting and achieving higher levels of treatment than required by the State under its current discharge permit, and although minor upgrades are anticipated to be needed to extend the useful life of the plant, major changes to improve performance of the treatment process are not needed, and there are no plans to replace the existing RBWWTP. However, constructed wetlands can bring environmental enhancements to the overall system, which are evaluated for the RBWWTP below.

It should be noted that constructed wetlands are not proposed as a means of eliminating the discharge of treated effluent. The use of constructed wetlands may change the volume of effluent to be disposed of through evapotranspiration, percolation, and precipitation. However, there will still be a significant volume of effluent to dispose of, which is the focus of this EIS.

Wetland plants create an environment that supports a wide range of physical, chemical, and microbial processes. These processes separately and in combination remove total suspended solids, reduce the influent BOD, transform nitrogen species, provide storage for metals, cycle phosphorus, and attenuate organisms of public health significance.

Constructed wetlands are artificial wastewater treatment systems consisting of shallow (usually less than 3 feet deep) ponds or channels which have been planted with aquatic plants, and which rely upon natural microbial, biological, physical, and chemical processes to treat wastewater. The use of constructed wetlands for wastewater treatment in the US dates back to the 1970's, and their use has continued to increase. According to the US Environmental Protection Agency. North American Wetlands for Water Quality Treatment Database (NADB) version 2 produced in 2000, in the US and Canada there are now at least 245 locations that use constructed wetlands for wastewater treatment, and there are likely considerably more today (USEPA 2000).

Constructed wetlands are typically an appropriate technology for areas where inexpensive land is generally available and skilled labor is generally less available, as these systems require a large amount of land, but have low operations and maintenance requirements.

Wetlands are one component of a larger treatment system and are typically used to treat primary or secondary effluent and can also be used as a final enhancement or polishing step. There is no consensus on the optimal design of wetland systems. Data related to wetland design, operation, and performance exists, but is variable with respect to quality. Table 3-1A below presents a comparison of constructed wetland effluent quality data to current RBWWTP effluent quality.

Table 3-1A Comparison of Constructed Wetland Effluent Quality with RBWWTP Effluent Quality

	Quality of Constructed Wetlands Effluent (1)			RBWWTP Existing Effluent Quality
	min	mean	max	
BOD (mg/L)	1.2	15	69	2.8
TSS (mg/L)	1.1	15	40	5.4
TN (mg/L)	0.85	4	9.8	6.2
TP (mg/L)	0.09	2	4.2	0.3

Notes:

1. Reference Table 4.1 Summary of performance data and loadings for TADB (Technology Assessment Database) systems, (USEPA 1999).

As can be seen from Table 3-1A, the current RBWWTP effluent quality exceeds that of the mean effluent quality for constructed wetlands for all but total nitrogen. The ability of constructed wetlands to remove high levels of nitrogen is unproven. Harvesting of wetland plants removes less than 20% of influent nitrogen (Reed, Crites and Middlebrooks 1995). This leaves nitrification and denitrification as the primary removal mechanism. To achieve this, sufficient open water areas would need to be incorporated to allow for aerobic zones in the dominantly anaerobic wetland, which will increase the area needed for the constructed wetland. Based on literature data, with an effective and specifically designed constructed wetland added to the treatment train, total nitrogen levels could be reduced another 50% to 3.1 mg/L (USEPA 1999).

In addition to the comparisons made in Table 3-1A, constructed wetlands are also associated with the removal of heavy metals from wastewater effluent. Metals removed from the effluent are bound to solids and settle from the water column and can be buried in the wetland sediments. If sediments are disturbed, the potential exists for the chemically reduced and sequestered metals to be oxidized and dissolve, thus becoming biologically mobile again. Metals are also incorporated into biomass via primary production processes occurring in wetlands. Metals are taken up via the roots and distributed throughout the plant. The extent of uptake and distribution within the plant depends on the metal species and plant type (USEPA 2000).

For persistent metals, wetland sinks may become sources if not properly constructed and managed. The extent to which wetlands retain contaminants such as metals is an important unknown factor, as are the conditions under which wetlands may release stored contaminants. Bioaccumulation and biotoxicity in treatment wetlands is not clearly documented nor understood (USEPA 1999). Thus, the ability of a constructed wetland to reduce metals on a long-term basis is unknown and should not be relied upon.

Constructed wetlands function in the environment in many of the same ways as a natural wetland. Depending on the system design, constructed wetlands can provide ample habitat for wildlife, including birds and aquatic species. They can also be designed to provide public access including walking and biking trails, public education, and wildlife viewing. Constructed wetlands are generally viewed as favorable by the public in comparison to other forms of wastewater treatment.

The RBWWTP currently produces a high quality effluent. In the discussion of treatment one potential benefit was additional nitrogen removal in the effluent. An estimate of the area needed for a constructed wetland based on additional nitrogen removal was made. The area estimate was based on an areal loading rate of 2 kg/ha-day (USEPA 1999), and includes an additional land for required buffers, set back and site constraints. The estimated area is 110 acres. This is a planning level estimate, and actual acres needed could be much higher. For example, a constructed wetland for the town of Arcata, California was designed to treat an annual average flow of 2.3 MGD (comparative to the 2.5 MGD average design flow of RBWWTP), and included 154 acres of freshwater and saltwater marshes, tidal mudflats and grasslands, on a 307 acre property (Suutari 2007). The current RBWWTP is on less than 10 acres of land, thus additional land would be needed to construct the wetland. The purchase of land contiguous to the ocean is not possible and thus the wetlands discharge would be directed to the Inland Bays (if suitable land in proximity to the wastewater treatment plant could be identified and purchased).

Table 3-1B Summary of Advantages and Disadvantages of Constructed Wetlands for RBWWTP

Advantages	Disadvantages
Can provide habitat for fish, birds, and other wildlife. Can provide recreation opportunities, such as bird watching, photography, and education. Can be built to fit harmoniously into the landscape and provide aesthetic and landscape enhancement. Can potentially reduce nitrogen and metals in the RBWWTP effluent. Typically low operations costs. Are an environmentally-sensitive approach to wastewater treatment that is often viewed with favor by the general public.	Lack of available land (would require 110 acres or more). Existing RBWWTP produces effluent quality better than most constructed wetlands systems. No consensus on the optimal design of wetland systems, thus long-term performance is difficult to rely on. Ability of wetlands to reduce metals in effluent over the long-term uncertain. Addition of constructed wetlands would result in minimal improvement in effluent quality for a significant investment in land and infrastructure. Will result in continued discharge of nitrogen into the inland bays.

Refer to Table 3-1B for a summary of advantages and disadvantages of constructed wetlands for RBWWTP. While constructed wetlands have many benefits to the environment, they would not improve the effluent quality to a point that would change the analysis of the disposal alternatives. Constructed wetlands do not provide the new method of disposal needed by the RBWWTP to address the consent decree, and thus are not a feasible alternative.

Amendment 3

*Section 4.4.1 (page 4-5). Added the following after "*The proposed alignment will predominately follow existing utilities and right of ways."

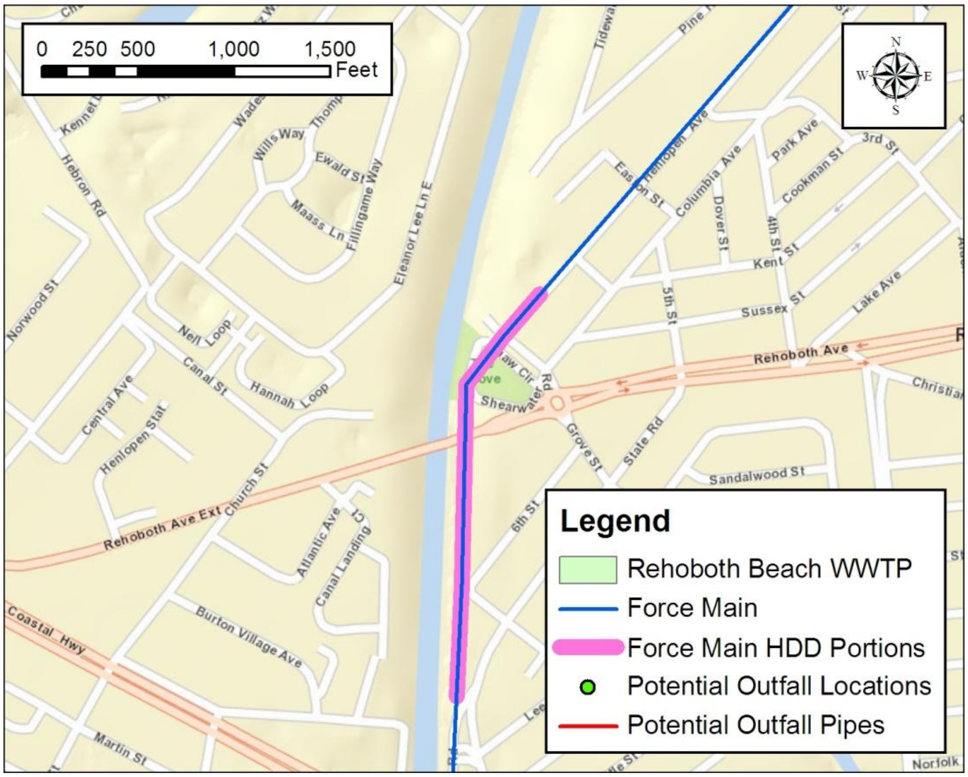
During construction, all efforts will be made to minimize tree impacts along the alignment.

Amendment 4

Section 4.4.2, Paragraph 3 (pages 4-6 to 4-7). Replaced sentences 2 through 4 and Figure 4-3 with the following:

This will allow approximately 9,150 linear feet (2,790 meters) of the 11,400 linear foot (3,470 meter) force main to be constructed utilizing open cut installation. The remaining 2,250 linear feet (680 meters) within Grove Park and in the vicinity of Park Place on the Canal would require HDD in order to minimize impact to this area. The proposed portion of the forcemain to be directionally drilled is presented in Figure 4-3.

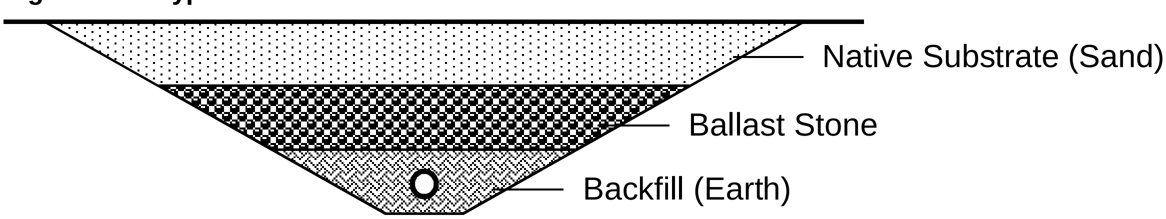
Figure 4-3 HDD Portion of the Proposed Effluent Force Main



Amendment 5

Section 4.5.2 (Page 4-9), Removed armor rock bullet item and replaced Figure 4-7 with the following:

Figure 4-7 Typical Ocean Outfall Cross Section



Amendment 6

Section 4.5.3, Added the following to the end of the sectopm:

The outfall and diffuser structure with be clearly indicated on all nautical charts of the area and fisherman and other water-related businesses will be notified to avoid this area.

Amendment 7

Section 4.5.4, Paragraph 11 (Page 4-19). Replace the first sentence with the following:

The remaining 3,000 feet (910 meters) of the outfall pipe would be constructed using mechanical dredging and backfill techniques. Hydraulic dredging will not be used.

Amendment 8

Section 5.1 (Page 5-1). Added the following bullet to the list of substances of primary concern:

- Salinity

Amendment 9

Section 5.4.3, Paragraph 3 (Page 5-10). Removed "Compliance with Water Quality Criteria" from end of paragraph. Added the following section title before Metals section:

5.4.4 Compliance with Water Quality Criteria

Changed the section number of sections 5.4.3.1 to 5.4.3.5 to the following:

5.4.4.1 Metals

5.4.4.2 Volatile Organic Compounds

5.4.4.3 Semi-Volatile Organic Compounds

5.4.4.4 Phenolics

5.4.4.5 PCB

Amendment 10

Chapter 5. (Page 5-24). Added the following section at the end of chapter 5:

5.6 Salinity

As discussed in Chapter 3 of Appendix J and shown in the Vertical Salinity Profiles shown in Appendix J, ocean salinity near the ocean floor, where the outfall is proposed to be built, typically varies between 30 and 31 practical salinity units (psu). Closer to the surface, salinity was significantly lower, dropping to as low as 20 psu at multiple sample locations multiple times throughout the year.

As discussed in Section 6.6, near field dilution, as modeled by CORMIX, will provide significant mixing of the effluent with ambient seawater in the immediate vicinity of the outfall. Assuming an ocean salinity of 30 psu at the ocean outfall and an effluent salinity of 0 psu, ocean salinity in the vicinity of the proposed outfall will remain above the observed salinity at the ocean surface (20 psu) if at least 1:3 dilution is achieved. As can be seen in Table 6.9 of this report, the dilution achieved during the most common conditions is 1:930 (Case 3) with a minimum worst case dilution of 1:82. Thus, in all cases, mixing at the outfall will not significantly lower seawater salinity.

Amendment 11

Section 7.6 (Page 7-20). Replaced Section 7.6 with the following:

7.6 Prime Agricultural Land

7.6.1 Prime Agricultural Land Definition

Prime agricultural land is defined as land that has “the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses … It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods” (Office of the Federal Register 2010). Prime agricultural land in Sussex County includes land with the soil types listed in Table 7-6 and is shown in Figure 7-11.

Table 7-6 Prime Farmland Soil Types (NRCS 2006)

Map Symbol	Map Unit Name	Farmland Classification
DnA	Downer loamy sand, 0 to 2 percent slopes	All areas are prime farmland
DnB	Downer loamy sand, 2 to 5 percent slopes	All areas are prime farmland
DoA	Downer sandy loam, 0 to 2 percent slopes	All areas are prime farmland
DoB	Downer sandy loam, 2 to 5 percent slopes	All areas are prime farmland
GrA	Greenwich loam, 0 to 2 percent slopes	All areas are prime farmland
GrB	Greenwich loam, 2 to 5 percent slopes	All areas are prime farmland

Map Symbol	Map Unit Name	Farmland Classification
HbA	Hambrook sandy loam, 0 to 2 percent slopes	All areas are prime farmland
HbB	Hambrook sandy loam, 2 to 5 percent slopes	All areas are prime farmland
HmA	Hammonton loamy sand, 0 to 2 percent slopes	All areas are prime farmland
HnA	Hammonton sandy loam, 0 to 2 percent slopes	All areas are prime farmland
IeA	Ingleside loamy sand, 0 to 2 percent slopes	All areas are prime farmland
IeB	Ingleside loamy sand, 2 to 5 percent slopes	All areas are prime farmland
IgA	Ingleside sandy loam, 0 to 2 percent slopes	All areas are prime farmland
IgB	Ingleside sandy loam, 2 to 5 percent slopes	All areas are prime farmland
ImB	Ingleside-Hammonton-Fallsington complex, 0 to 5 percent slopes	All areas are prime farmland
KfA	Keyport fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland
KpA	Keyport silt loam, 0 to 2 percent slopes	All areas are prime farmland
KpB	Keyport silt loam, 2 to 5 percent slopes	All areas are prime farmland
PyA	Pineyneck loam, 0 to 2 percent slopes	All areas are prime farmland
SaA	Sassafras sandy loam, 0 to 2 percent slopes	All areas are prime farmland
SaB	Sassafras sandy loam, 2 to 5 percent slopes	All areas are prime farmland
UlA	Unicorn loam, 0 to 2 percent slopes	All areas are prime farmland
WdA	Woodstown sandy loam, 0 to 2 percent slopes	All areas are prime farmland
WoA	Woodstown loam, 0 to 2 percent slopes	All areas are prime farmland
BhA	Berryland mucky loamy sand, 0 to 2 percent slopes	Prime farmland if drained
MmA	Mullica mucky sandy loam, 0 to 2 percent slopes	Prime farmland if drained
MuA	Mullica-Berryland complex, 0 to 2 percent slopes	Prime farmland if drained
FhB	Fort Mott-Henlopen complex, 2 to 5 percent slopes	Prime farmland if irrigated
FmA	Fort Mott loamy sand, 0 to 2 percent slopes	Prime farmland if irrigated
FmB	Fort Mott loamy sand, 2 to 5 percent slopes	Prime farmland if irrigated
HpA	Henlopen loamy sand, 0 to 2 percent slopes	Prime farmland if irrigated
HpB	Henlopen loamy sand, 2 to 5 percent slopes	Prime farmland if irrigated
HrA	Henlopen-Rosedale complex, 0 to 2 percent slopes	Prime farmland if irrigated

Map Symbol	Map Unit Name	Farmland Classification
HrB	Henlopen-Rosedale complex, 2 to 5 percent slopes	Prime farmland if irrigated
PpA	Pepperbox loamy sand, 0 to 2 percent slopes	Prime farmland if irrigated
PpB	Pepperbox loamy sand, 2 to 5 percent slopes	Prime farmland if irrigated
PrA	Pepperbox-Rockawalkin complex, 0 to 2 percent slopes	Prime farmland if irrigated
PrB	Pepperbox-Rockawalkin complex, 2 to 5 percent slopes	Prime farmland if irrigated
PsA	Pepperbox-Rosedale complex, 0 to 2 percent slopes	Prime farmland if irrigated
PsB	Pepperbox-Rosedale complex, 2 to 5 percent slopes	Prime farmland if irrigated
RkA	Rockawalkin loamy sand, 0 to 2 percent slopes	Prime farmland if irrigated
RkB	Rockawalkin loamy sand, 2 to 5 percent slopes	Prime farmland if irrigated
RoA	Rosedale loamy sand, 0 to 2 percent slopes	Prime farmland if irrigated
RoB	Rosedale loamy sand, 2 to 5 percent slopes	Prime farmland if irrigated

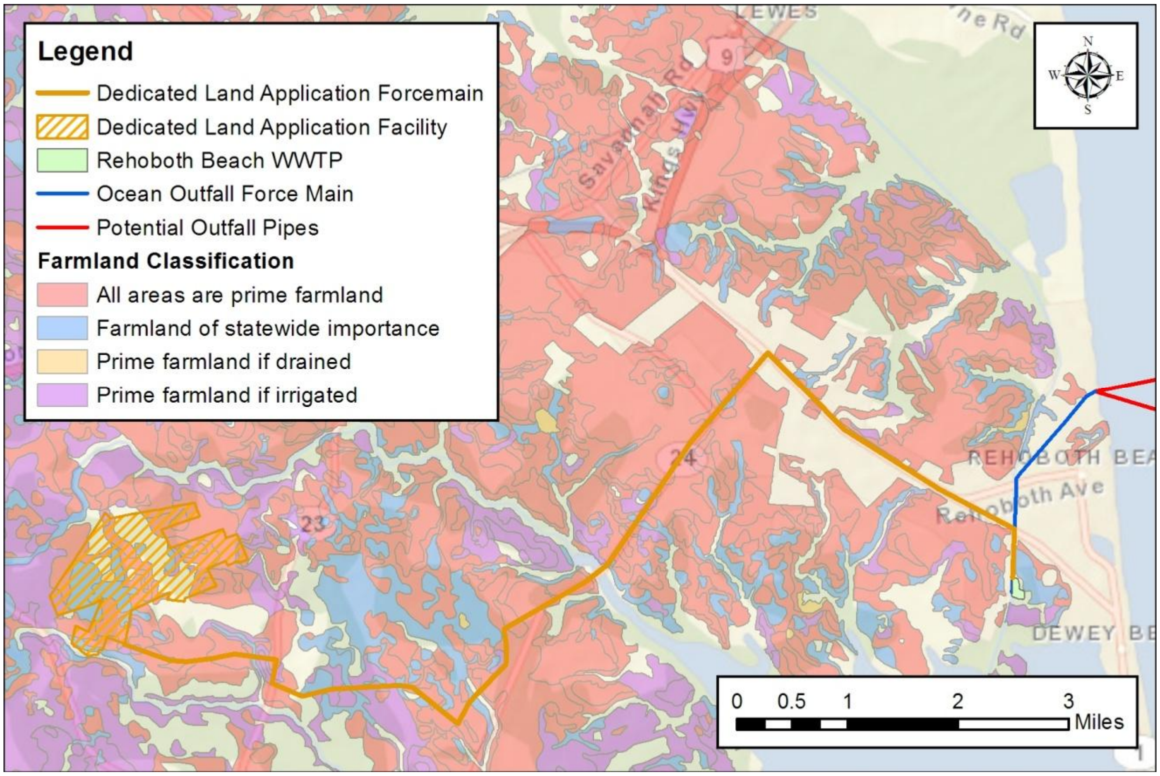
Additional lands of concern are farmlands of statewide importance for the production of "food, feed, fiber, forage, and oil seed crops." (Office of the Federal Register 2010). Typically this includes lands "that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods." (Office of the Federal Register 2010). Statewide Important Farmland in Sussex County includes land with the soil types listed in Table 7-7.

Table 7-7 Statewide Important Farmland Soil Types (NRCS 2006)

Map Symbol	Map Unit Name
CaA	Carmichael loam, 0 to 2 percent slopes
CdB	Cedartown loamy sand, 0 to 5 percent slopes
CoA	Corsica mucky loam, 0 to 2 percent slopes
DnC	Downer loamy sand, 5 to 10 percent slopes
DoC	Downer sandy loam, 5 to 10 percent slopes
FaA	Fallsington sandy loam, 0 to 2 percent slopes
FgA	Fallsington loam, 0 to 2 percent slopes
GaB	Galestown loamy sand, 0 to 5 percent slopes

Map Symbol	Map Unit Name
GoA	Glassboro sandy loam, 0 to 2 percent slopes
HoA	Hammonton-Fallsington-Mullica complex, 0 to 2 percent slopes
HuA	Hurlock loamy sand, 0 to 2 percent slopes
HvA	Hurlock sandy loam, 0 to 2 percent slopes
KgB	Klej-Galloway complex, 0 to 5 percent slopes
KsA	Klej loamy sand, 0 to 2 percent slopes
LfA	Lenni sandy loam, 0 to 2 percent slopes
LhA	Lenni silt loam, 0 to 2 percent slopes
McA	Marshyhope loam, 0 to 2 percent slopes
MdA	Marshyhope sandy loam, 0 to 2 percent slopes
SaC	Sassafras sandy loam, 5 to 10 percent slopes

Figure 7-11 Prime and Statewide Important Farmland (NRCS 2006)



There is public concern that an increase in the treatment capacity of the RBWWTP would encourage farmlands within the RBWWTP service area to be developed into industrial, commercial and/or residential uses. However, no effluent disposal alternative will affect the treatment capacity of the RBWWTP.

7.6.2 Short Term / Temporary Impacts

7.6.2.1 No Action

No construction will occur under the no action alterative, so there will be no short term impacts.

7.6.2.2 Land Application

A significant portion of the land application forcemain will be within soils designated as prime farmland or farmland of statewide importance. However, the forcemain will follow existing roadways and construction will not have a significant impact on the nearby farmland.

7.6.2.3 Ocean Outfall

No construction will occur within prime agricultural land for the ocean outfall alternative, so there will be no short term impacts.

7.6.3 Long Term / Chronic Impacts

7.6.3.1 No Action

The treatment capacity of the RBWWTP will not be impacted by the no action alternative. Thus, this alternative will not encourage any growth or development that could infringe upon agricultural land.

7.6.3.2 Land Application

The treatment capacity of the RBWWTP will not be impacted by the land application alternative. Thus, this alternative will not encourage any growth or development that could infringe upon agricultural land. All land disturbed for the forcemain will be returned to grade. The majority of the dedicated land application facility and much of the surrounding area contain soils designated as prime farmland or farmland of statewide importance as shown in Figure 7-11. If the project uses any federal funds or assistance, including loans, it would fall under the Farmland Protection Policy Act, and a "Farmland Conversion Impact Rating" Form, tracking the evaluation of alternatives and effects on Prime Farmland, would need to be submitted to the National Resource Conservation District (NRCS). The use of federal funds or assistance is not anticipated for this project; therefore, the Farmland Protection Policy Act does not apply.

7.6.3.3 Ocean Outfall

The treatment capacity of the RBWWTP will not be impacted by the Ocean Outfall alternative. Thus, this alternative will not encourage any growth or development that could infringe upon agricultural land.

Amendment 12

Section 8.1.1 (Page 8-1). Changed all references to (Stetzar 2011) to the following:

(Stetzar 2011a)

Amendment 13

Section 8.1.3.2, (Page 8-2). Added the following after Paragraph 1:

If the land application alternative is selected, DNREC Natural Heritage and Endangered Species Program will survey the proposed site, map vegetation communities, and evaluate habitat for the potential to support species of conservation concern (Stetzar 2011).

The coastal plain pond called out in Figure 8-1 is a unique wetland type that can provide breeding habitat for a variety of animals, including amphibians and invertebrates, and support a unique and rare assemblage of plants. Upland buffers will need to be left intact along the forest and wetland areas to protect these areas from excess nutrients, minimize invasion by non-native species, and to provide habitat critical to the life cycle of wetland dependent species (Stetzar 2012).

Section 8.1.3.2, Paragraph 2 (Page 8-3). Added the following to the end of Paragraph 2:

In one study, salamanders confined to irrigated soils for 35 days showed no difference in growth, body water concentration, body sodium, potassium, calcium or magnesium levels. However, laboratory trials performed as part of the same study showed higher body sodium concentrations in salamanders on wastewater effluent soaked substrates than those on deionized water substrates (Laposata and Dunson 2000). Another study showed that there was significantly fewer egg masses, hatching success, and larval survival of wood frogs (*Rana sylvatica* LeConte), Jefferson salamanders (*Ambystoma jeffersonianum* Green), and spotted salamanders (*A. maculatum* Gravenhorst).in wastewater-irrigated ponds compared to natural ponds (Laposata and Dunson 2000a).

Section 8.1.3.2, Paragraph 3 (Page 8-3). Replaced the first sentence with the following:

Plants are more likely to be directly affected by the use of treated effluent than animals, though any impact to plants will also impact any animals that depend on the plants for habitat and/or food.

Amendment 14

Section 8.3.1.1.2, Paragraph 2, Sentence 3 (Page 8-10). Replaced "polychaete works" with the following:

polychaete worms

Amendment 15

Section 8.3.1.3.3, Paragraph 1 (Page 8-13). Replaced sentence 2 with the following:

A five year monitoring program of the effects of waste water discharge from a major ocean outfall in Southern California on benthic communities was performed by Diener et. al. (1995).

Amendment 16

Section 8.3.4 (Page 8-52). Added the following section after section 8.3.4.6.6:

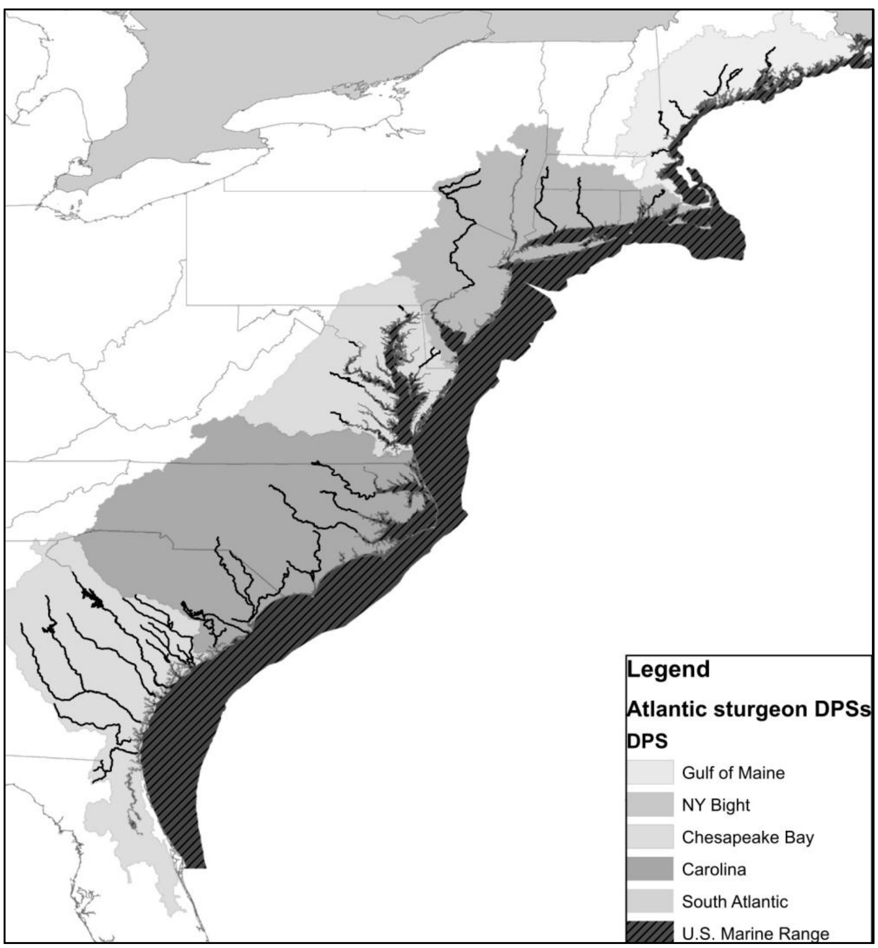
8.3.4.6A Endangered Species

8.3.4.6A.1 Atlantic Sturgeon

The Atlantic sturgeon is an anadromous fish with a habitat spanning most of the eastern coast of the United States (NOAA 2012). Spawning adults migrate upriver in spring, beginning in February-March in the south, April-May in the mid-Atlantic, and May-June in Canadian waters. Spawning occurs in flowing water between the salt front and fall line of large rivers. Juveniles move downstream and inhabit brackish waters for a few months and when they reach a size of about 30 to 36 inches (76-92 cm) they move into nearshore coastal waters. Atlantic sturgeons are benthic feeders and typically forage on crustaceans, worms, and mollusks. The Atlantic sturgeon is divided into five distinct population segments. Under the Endangered Species Act, The Chesapeake Bay, New York Bight, Carolina, and South Atlantic populations of Atlantic sturgeon are listed as endangered, while the Gulf of Maine population is listed as threatened.

The ranges of each distinct population segment of the Atlantic sturgeon are presented in Figure 8-22A.

Figure 8-22A Approximate Ranges of Atlantic sturgeon Distinct Population Segments (NOAA 2012)



Amendment 17

Section 8.3.5.1 (Page 8-54). Replaced the last paragraph with the following:

Mammal species observed in the vicinity of the outfall include harbor, gray, harp, and hooded seals; bottlenose dolphins; harbor porpoises; and humpback, fin, and right whales (Waring, et al. 2009) (Stetzar 2011a) (Thurman 2012).

From 2000 to 2011, 496 marine mammal strandings were recorded by the MERR Institute (Thurman 2012). A breakdown by species and year is presented in Table 8-8A.

Table 8-8A Marine Mammal Strandings (Thurman 2012)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Cetaceans													
Bottlenose dolphin	13	6	13	21	17	9	10	15	26	13	11	13	167
Harbor porpoise	3	4	3	1	1	4	3	3	4	2	3	0	31
Common dolphin	1	1	1	1	2	0	0	0	2	3	0	2	13
Striped dolphin	0	1	0	5	0	0	0	1	0	0	0	0	7
Rough toothed dolphin	0	1	0	0	0	0	0	0	0	0	0	0	1
Rissos Dolphin	0	0	0	0	1	2	0	1	0	0	0	0	4
Unidentified dolphin	0	0	0	0	0	0	1	0	0	0	0	0	1
Humpback whale	0	0	1	1	1	0	0	0	0	0	0	0	3
Minke whale	0	1	0	0	0	0	0	0	0	1	0	1	3
White sided dolphin	0	0	0	0	0	0	1	0	1	1	0	2	5
Pygmy Sperm Whale	0	0	0	0	0	0	2	2	0	0	0	0	4
Short finned Pilot Whale	0	0	0	0	0	0	0	0	0	1	0	0	1
Fin Whale	0	0	0	0	0	0	1	0	0	1	2	0	4
Northern Right Whale	0	0	0	0	0	0	0	2	0	0	1	1	4

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Northern Bottlenose Whale	0	0	0	0	0	0	2	0	0	0	0	0	2
Sei Whale	0	0	0	0	0	0	0	0	0	1	0	0	1
Unidentified Whale	2	0	0	0	0	1	1	0	2	0	1	0	7
Pinnipeds													
Harbor seal	0	40	0	3	1	13	15	5	3	7	4	18	109
Harp seal	0	1	1	2	4	5	6	7	13	1	4	7	51
Hooded seal	0	1	1	0	2	0	3	0	0	0	0	0	7
Gray seal	0	2	0	1	1	5	1	6	6	3	8	8	41
Unidentified Pinniped	0	1	0	0	0	0	2	10	9	2	3	0	27
Sirenia													
Manatee	0	0	0	0	1	0	1	0	0	1	0	0	3
Total	19	59	20	35	31	39	49	52	66	37	37	52	496

Amendment 18

Section 8.3.5.1.1, paragraph 1 (Page 8-55). Replaced last sentence with the following:

The harbor seal (Phoca vitulina) is typically found year-round north of southern New England and New York. Harbor seals typically migrate south to waters off the coast of Delaware from November to May (Waring, et al. 2009), and annual occurrences have been documented in the area since the mid-1980s (Stetzar 2011a).

From 2000 to 2011, 235 seal strandings were reported in Delaware, of which 109 were identified as harbor seals (Thurman 2012). Harbor seals are not listed as threatened or endangered under the Endangered Species Act. The range of harbor seals as identified in the NOAA National Marine Fisheries Service Stock Assessment Report is shown in Figure 8-24. Although the map classifies the area around the outfall as "stranding records only", annual occurrences are well documented and it is assumed that harbor seals are in the vicinity of the project area during winter months (Stetzar 2011a).

Amendment 19

Section 8.3.5.1.2, paragraph 1 (Page 8-55). Replaced last sentence with the following:

From 2000 to 2011, 235 seal strandings were reported in Delaware, of which 41 were identified as gray seals (Thurman 2012). Gray seals are not listed as threatened or endangered under the Endangered Species Act. The range of gray seals as identified in the NOAA National Marine Fisheries Service Stock Assessment Report is shown in Figure 8-25. Although the map classifies the area around the outfall as "stranding records only", annual occurrences are well documented and it is assumed that gray seals are in the vicinity of the project area during winter months (Stetzar 2011a).

Amendment 20

Section 8.3.5.1.3, paragraph 1 (Page 8-56). Replaced last sentence with the following:

From 2000 to 2011, 235 seal strandings were reported in Delaware, of which 51 were identified as harp seals (Thurman 2012). Harp seals are not listed as threatened or endangered under the Endangered Species Act. The range of harp seals as identified in the NOAA National Marine Fisheries Service Stock Assessment Report is shown in Figure 8-26. Although the map does not include the project area, annual occurrences off the coast of Delaware are well documented and it is assumed that harp seals are in the vicinity of the project area during winter months (Stetzar 2011a).

Amendment 21

Section 8.3.5.1.4, paragraph 1 (Page 8-57). Replaced last sentence with the following:

From 2000 to 2011, 235 seal strandings were reported in Delaware, of which 7 were identified as hooded seals (Thurman 2012). Hooded seals are not listed as threatened or endangered under the Endangered Species Act.

Amendment 22

Section 8.3.5.1.5, paragraph 1 (Page 8-58). Replaced last sentence with the following:

Observed bottlenose dolphin sightings during summer NEFSC and Southeast Fisheries Science Center (SEFSC) aerial and shipboard surveys from 1998 to 2006 are presented in Figure 8-27. From 2000 to 2011, 258 cetacean strandings were reported in Delaware, of which 167 were identified as bottlenose dolphins (Thurman 2012).

Amendment 23

Section 8.3.5.1.6, paragraph 1 (Page 8-58). Replaced last sentence with the following:

Observed harbor porpoise sightings during summer NEFSC and SEFSC aerial and shipboard surveys from 1998 to 2007 are presented in Figure 8-28. Harbor porpoises are even more likely to occur in Delaware waters during winter months which are not included in the NOAA survey map. From 2000 to 2011, 258 cetacean strandings were reported in Delaware, of which 31 were identified as harbor porpoises (Thurman 2012).

Amendment 24

Section 8.3.5.1.7, paragraph 1 (Page 8-59). Replaced last sentence with the following:

Observed humpback whale sightings during summer NEFSC and SEFSC aerial and shipboard surveys from 1998 to 2007 are presented in Figure 8-29. Humpback whales are even more likely to occur in Delaware waters during winter months which are not included in the NOAA survey map. From 2000 to 2011, 258 cetacean strandings were reported in Delaware, of which three (3) were identified as humpback whales (Thurman 2012).

Amendment 25

Section 8.3.5.1.8, paragraph 1 (Page 8-60). Replaced last 3 sentences with the following:

Although not well documented, mid-Atlantic waters may be a critical migration route and/or feeding habitat for this species (Stetzar 2011a). The fin whale is listed as an endangered species under the Endangered Species Act.

Observed fin whale sightings during summer NEFSC and SEFSC aerial and shipboard surveys from 1998 to 2007 are presented in Figure 8-30. Fin whales are even more likely to occur in Delaware waters during winter months which are not included in the NOAA survey map. Fin whales have been sighted close to shore in the Delaware region and in the Indian River Inlet (Stetzar 2011a). From 2000 to 2011, 258 cetacean strandings were reported in Delaware, of which four (4) were identified as fin whales (Thurman 2012).

Amendment 26

Section 8.3.5.1 (Page 8-61). Added the following section after section 8.3.5.1.8:

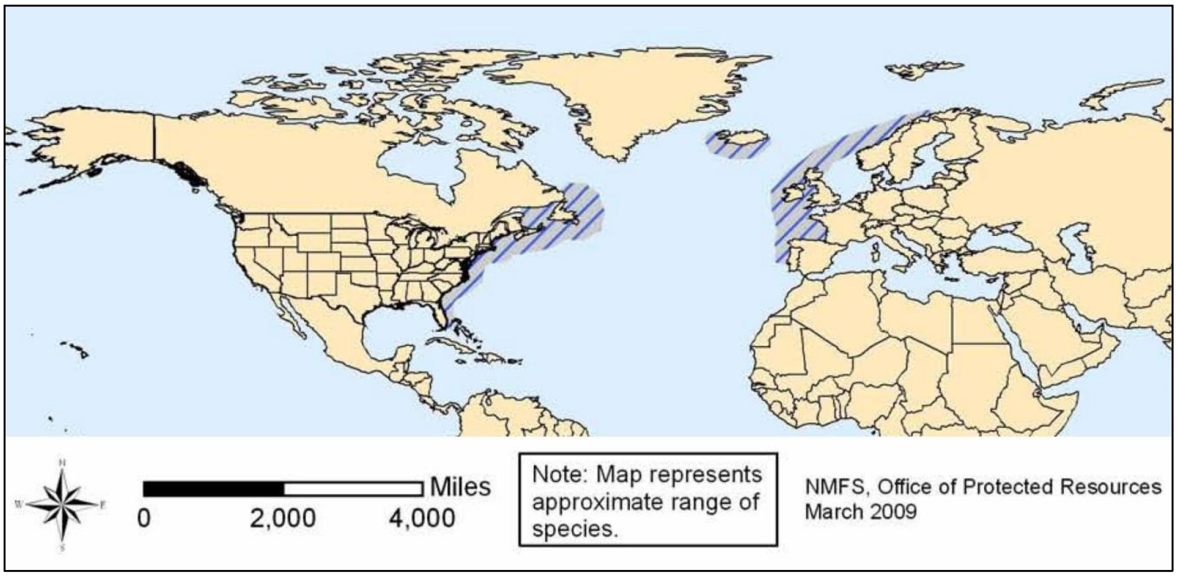
8.3.5.1.9 Right Whale

The North Atlantic right whale (*Eubalaena glacialis*) population ranges from calving grounds in coastal waters of the southeastern United States to feeding grounds in New England waters and the Canadian Bay of Funday, Scotian Shelf, and Gulf of St. Lawrence (Waring, et al. 2009). New England waters are an important feeding ground for right whales because they require dense patches of zooplankton in their spring, summer, and fall habitats (Mayo and Marx 1990). Only one stranding of a right whale occurred in Delaware between 1962 and 1998 (Stetzar 2000). The Delaware Bay has historically served as feeding and weaning grounds for right whales. Mother/calf pairs have been documented in the vicinity of the Indian River Inlet, and sighted north of this area en route to the Delaware Bay (Thurman 2012). The approximate range of the

North Atlantic right whale is presented in Figure 8-30A. From 2000 to 2011, 258 cetacean strandings were reported in Delaware, of which four (4) were identified as North Atlantic right whales (Thurman 2012).

The North Atlantic right whale is listed as endangered under the Endangered Species Act. The minimum population size, as of 2005, is 345 individually recognized whales (Waring, et al. 2009), making it one of the most endangered of all the large whale species (Thurman 2012).

Figure 8-30A Approximate range of North Atlantic Right Whale (NOAA 2012a)



Amendment 27

Section 8.3.5.2.3, Paragraph 1 (Page 8-61). Replaced sentence 3 with the following:

Conversely, harbor and gray seals migrate into the project area between September and May (as shown in Figure 8-24 and Figure 8-25), and harp and hooded seals follow similar migration patterns. Harbor porpoises, humpback whales, and fin whales are also more prevalent in the project area during winter months.

Amendment 28

Section 8.3.5.3.3 (Page 8-63). Added the following to the end of section 8.3.5.3.3:

Dolphin populations from areas with a lower mean salinity have been shown to a higher prevalence and severity of skin lesions in Bottlenose dolphins (Wilson, et al. 1999). As discussed in Section 5.6, salinity equal to that of the ocean surface will be achieved by 1:30 dilution. According to the model presented in Chapter 6, this will be achieved before the end of the near field region in the immediate vicinity of the outfall.

Exposure of dolphins to this area of lower salinity would be transient and unlikely to adversely impact the dolphins.

Amendment 29

Section 8.4.1, Paragraph 1 (Page 8-63). Replace paragraph 1 of Section 8.4.1 with the following:

All endangered species in Delaware are listed in Table 8-9. In addition, the endangered Atlantic Sturgeon and the endangered humpback, fin, and right whales have been observed off the coast of Delaware. Information on the endangered Atlantic Sturgeon is presented in 8.3.4.6A.1, and potential environmental impacts are detailed in sections 8.3.4.7 and 8.3.4.8. Information on humpback, fin, and right whales is presented in sections 8.3.5.1.7, 8.3.5.1.8, and 8.3.5.1.9 of the marine mammals section, and potential environmental impacts are detailed in sections 8.3.5.2 and 8.3.5.3.

Amendment 30

Section 8.4.2.1, Paragraph 1 (Page 8-65). Added the following sentence after sentence 1:

All of these turtles, with the exception of the hawksbill sea turtle, are also listed as endangered species in Deleware as shown in Table 8-9.

Section 8.4.2.1 (Page 8-66). Added the following information to the end of section 8.4.2.1

From 2000 to 2011, 388 sea turtle strandings were recorded in the state of Delaware (Thurman 2012). A breakdown by species and year is presented in Table 8-10A.

Table 8-10A Sea Turtle Strandings in the state of Delaware (Thurman 2012)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Loggerhead	25	14	41	39	23	18	29	24	17	29	13	17	289
Green	0	0	1	0	0	0	0	0	0	2	0	1	4
Leatherback	1	3	1	0	13	5	4	2	1	2	0	0	32
Kemp's Ridley	3	2	3	0	4	1	3	1	0	2	1	6	26
Hybrid	0	0	0	0	1	0	0	0	0	0	0	0	1
Unidentified Sea Turtle	1	2	12	1	7	3	2	3	0	0	4	1	36
Total	30	21	58	40	48	27	38	30	18	35	18	25	388

Amendment 31

Section 8.4.2.1.1, Paragraph 1 (Page 8-66). Replaced last sentence with the following:

Observed green turtle sightings during summer NOAA aerial and shipboard surveys in 1998, 1999, 2002, 2004, and 2006 are presented in Figure 8-32. Winter months are not included in the NOAA survey map. From 2000 to 2011, 388 sea turtle strandings were reported in Delaware, of which four (4) were identified as green sea turtles (Thurman 2012).

Amendment 32

Section 8.4.2.1.2, Paragraph 1 (Page 8-66). Add the following to the end:

From 2000 to 2011, 388 sea turtle strandings were reported in Delaware, of which none were identified as hawksbill sea turtles (Thurman 2012).

Amendment 33

Section 8.4.2.1.3, Paragraph 1 (Page 8-67). Replaced last sentence with the following:

Observed Kemp's ridley sea turtle sightings during summer NOAA aerial and shipboard surveys in 1998, 1999, 2002, 2004, and 2006 are presented in Figure 8-33. Winter months are not included in the NOAA survey map. From 2000 to 2011, 388 sea turtle strandings were reported in Delaware, of which 26 were identified as Kemp's ridley sea turtles (Thurman 2012).

Amendment 34

Section 8.4.2.1.4, Paragraph 1 (Page 8-67). Replaced last sentence with the following:

Observed loggerhead sea turtle sightings during summer NOAA aerial and shipboard surveys in 1998, 1999, 2002, 2004, and 2006 are presented in Figure 8-34. Winter months are not included in the NOAA survey map. From 2000 to 2011, 388 sea turtle strandings were reported in Delaware, of which 289 were identified as loggerhead sea turtles (Thurman 2012).

Amendment 35

Section 8.4.2.1.5, Paragraph 1 (Page 8-68). Replaced last sentence with the following:

Observed leatherback sea turtle sightings during summer NOAA aerial and shipboard surveys in 1998, 1999, 2002, 2004, and 2006 are presented in Figure 8-35. Winter months are not included in the NOAA survey map. From 2000 to 2011, 388 sea turtle strandings were reported in Delaware, of which 32 were identified as leatherback sea turtles (Thurman 2012).

Amendment 36

Section 9.5.2.4 (Page 9-13). Added the following at the end of section 9.5.2.4:

A more recent study by Maruya et al. (2009) concerning emerging contaminants in sediments and fish near ocean outfalls in southern California studied several coastal locations near ocean outfalls, and compared them to a control location far from any ocean outfalls. Samples were collected in the vicinity of outfalls from two secondary wastewater treatment plants, each with a discharge capacity of 320 mgd, a secondary/primary (50/50%) treatment plant with a discharge capacity of 320 mgd, and an advanced primary treatment plant with a discharge capacity of 170 mgd. PCBs, PBDEs, PPCPs, and other contaminants were detected at higher concentrations in both the sediment and fish liver samples at the locations near ocean outfalls as compared to the control; however, no harmful effects were reported.

Another recent study by Yamahara et al. (2012) investigated bacterial pathogens and indicator organisms on beaches along the California coast. The pathogen *Staphylococcus aureus* was detected on 14% of the beaches tested, and methicillin-resistant *Staphylococcus aureus*, commonly known as MRSA, was found on 3% of beaches tested. Based on the spatial distribution of their data, the study concludes that “The presence of a putative source (storm drain, river, or stream) was positively associated with densities of *S. aureus* but not with any other microbes (Yamahara, et al. 2012). Treated effluent discharge was not investigated as a putative sources in this study.

Amendment 37

Section 9.7.2.3.3, Paragraph 1, Sentence 1 (Page 9-26). Replaced “medals” with the following:

metals

Amendment 38

Chapter 12 (Page 12-1). Added the following to References:

Laposata, M, and W. Dunson. "Effects of spray-irrigated wastewater effluent on temporary pond-breeding amphibians." *Ecotoxi coloty and Environmental Safety* 46, no. 2 (2000a): 192-201.

Laposata, Matthew M, and William A. Dunson. "Effects of Treated Wastewater Effluent Irrigation on Terrestrial Salamanders." *Water, Air, & Soil Pollution* 119, no. 1-4 (2000): 45-57.

Maruya, K.A., D.E Vidal-Dorsch, S.M. Bay, J.W. Kwon, K. Xia, and K.L. Armbrust. "Organic contaminants of emerging concern in sediments and flatfish collected near' outfalls discharging treated municipal wastewater effluent to the Southern California Bight." *Environmental Toxicology and Chemistry*, 2009: 365-377.

Mayo, C.A., and M.K. Marx. "Surface foraging behavior of the North Atlantic Right Whale." *Canadian Journal of Zoology* 67 (1990): 1411-20.

NOAA. *Atlantic Sturgeon Recovery Program.* June 26, 2012. http://www.nero.noaa.gov/prot_res/atlsturgeon/ (accessed June 28, 2012).

—. *North Atlantic Right Whales - Office of Protected Resources.* April 20, 2012a. http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_northatlantic.htm (accessed June 28, 2012).

NRCS. *Soil Survey Geographic (SSURGO) Database for Sussex County, Delaware.* October 18, 2006. http://soildatamart.nrcs.usda.gov/ (accessed March 30, 2011).

Stetzar, Edna. *Comments Rehoboth Beach Ocean Outfall Environmental Impact Statement-May 2011 draft.* DNREC Division of Fish and Wildlife, 2011a.

Suutari, Amanda. "USA - California (Arcata) - Constructed Wetland: A Cost-Effective Alternative for Wastewater Treatment." *Earth Island Journal* 22, no. 2 (2007).

Thurman, Suzanne. *Rehoboth Outfall Comments from MERR Institute.* Dover, DE: MERR, 2012.

Wilson, B., et al. "Epidermal diseases in bottlenose dolphins: impacts of natural and anthropogenic factors." *The Royal Society*, 1999: 1077-1083.

Yamahara, Kevan M., Lauren M. Sassoubre, Goodwin Keily D., and Alexandria B. Boehm. "Occurrence and Persistence of Bacterial Pathogens and Indicator Organisms in Beach Sand along the California Coast." *Applied and Environmental Microbiology* 78, no. 6 (2012): 1733-1745.

Amendment 39

Appendix C (Page 31). Removed irrelevant text from Page 31 of Appendix C.

Amendment 40

Chapter 13 (Page 13-1). Added the following to Glossary and Abbreviations:

PSU	Practical Salinity Units
NRCS	National Resource Conservation District