

## 1. Summary

Table 1.1 shows the levels to which the assessed portions, or assessment units, of the non-tidal Delaware River supported their designated uses during the 2000 through 2002 monitoring seasons. Segments of the River that were assessed as not supporting the aquatic life designated use were 1A1, 1A2, 1B1 and 1E4 due to pH, 1B2 due to Turbidity, 1D2-1D4 and 1D6 due to Total Dissolved Solids. Additionally, the recreation designated use was considered not supported in 1D6, 1E2 and 1E5 due to fecal coliform and the drinking water designated use was considered not supported in 1B2 due to turbidity. The Fish consumption use was the most widely not supported use, with the entire non-tidal Delaware River falling under one or more state fish consumption advisories.

Table 1.2 provides a summary of the extent of use support for the designated uses, in the different assessment units of the Delaware Estuary. The aquatic life designated use was considered not supported in 3 due to temperature and pH, 4 due to temperature and toxic parameters, 5B due to toxic parameters and 5C due to dissolved oxygen. The drinking water designated use was considered not supported in Zones 2 and 3 due to DRBC's combined human health criteria (for PCBs) for drinking water and fish consumption. The fish consumption designated use was considered to be not supported in any part of the Estuary, due to state fish consumption advisories that are in place.

Table 1.3 provides a summary of the extent of use support for the designated uses, in different assessment units of the Delaware Bay. The aquatic life designated use was considered not supported in 6br2b, 5brA, 6de1, 6de5 and 6nj9 due to dissolved oxygen, in 6nj1 due to temperature and dissolved oxygen and in 6brB due to temperature. Fish consumption was not supported in any portion of the Bay due to the presence of state fish consumption advisories. The shellfish designated use was considered not supported in all areas closed to shellfish harvesting.

Tables 1.4 and 1.5 provide a summary of use support by region (Non-Tidal and Estuary/Bay), expressed in miles or square miles and percent of total miles or total square miles.

Tables 1.6 - 1.8 provide an overview of causes and sources of pollutants or conditions that created the non-support of uses as described in this report. The causes of the non-support are the chemical constituents,

pollutants or conditions that created the criteria violations. The source is the activity that creates the condition or pollutant, or causes the pollutant to enter the stream. In many circumstances, professional judgment was utilized in surmising the most likely sources Table 1.1: Use Support in Non-Tidal River Assessment Units from 2004 Integrated Assessment

**Table 1.1: Use Support in Non-Tidal River Assessment Units from 2004 Integrated Assessment**

AU	River Miles*	DO	pH	Fecal	Turbidity	TDS Aquatic Life	TDS Drinking Water	Alkalinity	Aquatic Life Assessment	Recreation Assessment	Drinking Water Assessment	Fish Consumption Assessment	Final Assessment
1A1	335.54-308.01	+	-	+	+	+	+	NA	Not Supported	Supported	Supported	Not Supported	5
1A2	308.01-299.38	+	-	+	+	ID	ID	NA	Not Supported	Supported	ID	Not Supported	5
1A3	299.38-293.62	ID	ID	ID	ID	ID	ID	NA	Probably Not Supported	Probably Supported	ID	Not Supported	3A
1B1	293.62-281.11	+	-	+	+	ID	ID	NA	Not Supported	Supported	ID	Not Supported	5
1B2	281.11-264.88	+	+	+	-	ID	ID	NA	Not Supported	Supported	Not Supported	Not Supported	5
1B3	264.88-257.67	+	+	+	+	+	+	NA	Supported	Supported	Supported	Not Supported	2
1C1	257.67-256.53	ID	ID	ID	ID	ID	ID	NA	ID	Probably Supported	ID	Not Supported	3B
1C2	256.53-229.85	+	+	+	+	ID	ID	NA	Probably Supported	Supported	ID	Not Supported	5
1C3	229.85-228.13	ID	ID	ID	ID	ID	ID	NA	ID	Probably Supported	ID	Not Supported	5
1C4	228.13-219.35	+	+	+	+	ID	ID	NA	ID	Supported	ID	Not Supported	5
1D1	219.35-214.70	+	+	+	+	ID	ID	NA	ID	Supported	ID	Not Supported	5
1D2	214.70-210.20	+	+	+	+	-	+	NA	Not Supported	Supported	Supported	Not Supported	5
1D3	210.20-200.89	+	+	+	+	-	+	NA	Not Supported	Supported	Supported	Not Supported	5
1D4	200.09-192.71	+	+	ID	ID	-	+	NA	Not Supported	Probably Supported	ID	Not Supported	5
1D5	192.71-185.83	ID	ID	ID	ID	ID	ID	NA	Probably Not Supported	ID	ID	Not Supported	5
1D6	185.83-185.41	+	+	-	+	-	+	NA	Not Supported	Not Supported	Supported	Not Supported	5
1E1	185.41-179.02	ID	ID	ID	ID	ID	ID	ID	ID	Probably Not Supported	Probably Supported	Not Supported	5
1E2	179.02-176.16	+	+	-	+	+	+	+	Supported	Not Supported	Supported	Not Supported	5
1E3	176.16-173.88	ID	ID	ID	ID	ID	ID	ID	ID	ID	Probably Supported	Not Supported	5
1E4	173.88-156.22	+	-	+	+	+	+	+	Not Supported	Supported	Supported	Not Supported	5
1E5	156.22-133.4	+	+	-	+	+	+	+	Supported	Not Supported	Supported	Not Supported	5

Notes:

\* River miles reflect National Hydrographic Dataset mileage system, which differs slightly from DRBC river mileage system.

ID: Insufficient data to compare this parameter to current water quality criterion

Aquatic Life Use Support Assessed by: DO, pH, TDS, Alkalinity, Turbidity

Recreation Use Support Assessed by: Fecal Coliform

Drinking Water Use Assessed by: TDS, Turbidity

Fish Consumption Use Assessed by: Presence of Advisories

**Table 1.2: Use Support in Estuary Assessment Units from 2004 Integrated Assessment**

Parameter	Assessment Unit					
	2	3	4	5A	5B	5C
Dissolved Oxygen	+	-	+	ID	ID	-
Temperature	+	-	-	NA	NA	NA
pH	+	+	+	+	+	+
Fecal Coliform	+	+	+	+	+	+
Enterococcus	+	+	+	+	+	+
Turbidity	+	+	+	+	+	+
Alkalinity	+	+	+	+	+	+
Sodium	NA	+	NA	NA	NA	NA
Chloride	+	+	NA	NA	NA	NA
TDS	+	+	NA	NA	NA	NA
Toxicity	+	+	+	ID	ID	+
Toxic Parameters	+	+	-	+	-	+
Designated Use	Use Support Level					
Aquatic Life	Supported	Not Supported	Not Supported	ID	Not Supported	Not Supported
Recreation	Supported	Supported	Supported	Supported	Supported	Supported
Drinking Water	Not Supported	Not Supported	NA	NA	NA	NA
Fish Consumption	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Final Assessment Category	5	5	5	5	5	5

Notes:

NA: Ambient criteria not applied in these zones

+(-): This parameter meets (does not meet) current water quality criterion

ID: Insufficient Data

Aquatic Life Use Support Assessed by: DO, Temperature, pH, TDS, Alkalinity, Turbidity, Toxicity, Toxic Parameters

Recreation Use Support Assessed by: Fecal Coliform

Drinking Water Use Assessed by: TDS, Turbidity, Chloride in Zones 2 and 3, Sodium in Zone 3, Toxic Parameters

Fish Consumption Use Assessed by: Presence of Advisories

**Table 1.3: Use Support in Delaware Bay Assessment Units from 2004 Integrated Assessment**

Assessment Unit	Miles <sup>2</sup>	DO	pH	Temp.	Fecal	Entero.	Alkalinity	Turbidity	Aquatic Life	Recreation	Fish	Shellfish	Final
6br1a	2.66	ID	ID	ID	ID	ID	ID	ID	ID	ID	Not Supported	Not Supported	5
6br1b	20.61	+	+	+	+	+	+	+	Supported	Supported	Not Supported	Supported	5
6br2a	1.09	ID	ID	ID	ID	ID	ID	ID	ID	ID	Not Supported	Not Supported	5
6br2b	25.88	-	ID	ID	+	ID	ID	ID	Not Supported	Supported	Not Supported	Supported	5
6br2c	0.31	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6br2d	1.52	ID	ID	ID	ID	ID	ID	ID	ID	ID	Not Supported	Not Supported	5
6br3a	16.45	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Not Supported	5
6br3b	12.63	+	+	+	+	+	+	+	Supported	Supported	Not Supported	Supported	5
6br3c	8.53	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6brA	47.10	-	+	+	+	+	+	+	Not Supported	Supported	Not Supported	Supported	5
6brB	40.82	+	+	-	+	+	+	+	Not Supported	Supported	Not Supported	Supported	5
6brC	22.39	+	+	+	+	+	+	+	Supported	Supported	Not Supported	Supported	5
6de1	187.24	-	+	+	+	+	+	ID	Not Supported	Supported	Not Supported	Supported	5
6de2	0.72	ID	ID	ID	ID	ID	ID	ID	ID	ID	Not Supported	Not Supported	5
6de3	5.31	+	+	+	+	+	+	ID	ID	Supported	Not Supported	Not Supported	5
6de4	5.39	ID	ID	ID	ID	ID	ID	ID	ID	ID	Not Supported	Not Supported	5
6de5	5.81	-	+	+	+	+	+	+	Not Supported	Supported	Not Supported	Not Supported	5
6nj1	268.96	-	ID	-	+	ID	ID	ID	Not Supported	ID	Not Supported	Supported	5
6nj2	1.65	+	ID	+	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj3	2.96	+	ID	+	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj4	0.65	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj5	0.82	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj6	0.69	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj7	7.17	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj8	3.23	+	ID	+	+	ID	ID	ID	ID	ID	Not Supported	Supported	5
6nj9	1.32	-	ID	+	ID	ID	ID	ID	Not Supported	ID	Not Supported	Not Supported	5
6nj10	1.00	ID	ID	ID	+	ID	ID	ID	ID	ID	Not Supported	Not Supported	5

Aquatic Life Use Support Assessed by: DO, pH, TDS, Alkalinity, Turbidity

Recreation Use Support Assessed by: Fecal Coliform

Drinking Water Use Assessed by: TDS, Turbidity

Fish Consumption Use Assessed by: Presence of Advisories

**Table 1.4: Extent of Use Support of Designated Uses (Non-Tidal River)**

Use	Total Miles	Miles Supporting	Miles with Insufficient Data	Miles Not Supporting
Aquatic Life	202	33	64	105
Fish Consumption	202	0	0	202
Primary Contact Recreation	202	144	32	26
Drinking Water	202	93	93	16

**Table 1.5: Extent of Use Support of Designated Uses (Estuary and Bay)**

Use	Total Area (mi <sup>2</sup> )	Area Supporting (mi <sup>2</sup> )	Area with Insufficient Data (mi <sup>2</sup> )	Area Not Supporting (mi <sup>2</sup> )
Aquatic Life	790	64	73	653
Fish Consumption	790	0	0	790
Shellfishing	693	652	0	41
Primary Contact Recreation	769	444	325	0
Secondary Contact Recreation	21	21	0	0
Drinking Water	15	0	0	15

Note: Zone 2 = 8 square miles, Zone 3 = 7 square miles, Zone 4 = 17 square miles, Zone 5 = 65 square miles, Zone 6 = 693 square miles (total area is 790 square miles)

**Table 1.6: Overview of Causes and Sources of Impairments in Non-Tidal Delaware River**

<b>Assessment Unit</b>	<b>Use Not Supported</b>	<b>Causes</b>	<b>Possible Sources</b>
1A1	Aquatic Life	pH	Excessive Plant Growth*
1A1	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1A2	Aquatic Life	pH	Excessive Plant Growth*
1A2	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1A3	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1B1	Aquatic Life	pH	Excessive Plant Growth*
1B1	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1B2	Aquatic Life	Turbidity	Unknown Sources
1B2	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1B2	Drinking Water	Turbidity	Unknown Sources
1B3	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1C1	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1C2	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1C3	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1C4	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D1	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D2	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D2	Aquatic Life	Total Dissolved Solids	Natural Sources, Unknown Sources
1D3	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D3	Aquatic Life	Total Dissolved Solids	Natural Sources, Unknown Sources
1D4	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D4	Aquatic Life	Total Dissolved Solids	Natural Sources, Unknown Sources
1D5	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D6	Aquatic Life	Total Dissolved Solids	Natural Sources, Unknown Sources
1D6	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1D6	Primary Contact Recreation	Fecal Coliform	Residential Districts, Wet Weather Discharges (Non-Point Source)
1E1	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1E2	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1E2	Primary Contact Recreation	Fecal Coliform	Residential Districts, Wet Weather Discharges (Non-Point Source)
1E3	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1E4	Fish Consumption	Mercury	Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1E4	Aquatic Life	pH	Excessive Plant Growth*
1E5	Fish Consumption	Dioxins, Mercury, PCBs	Brownfield Sites, Contaminated Sediments, Some Industrial Point Sources, Nonpoint Sources, Air Deposition
1E5	Primary Contact Recreation	Fecal Coliform	Residential Districts, Wet Weather Discharges (Non-Point Source)

\* Excessive plant growth, if a source of pH criterion exceedence, may be caused by nutrient enrichment

**Table 1.7: Overview of Causes and Sources of Impairments in Delaware Estuary**

<b>Assessment Unit</b>	<b>Use Not Supported</b>	<b>Causes</b>	<b>Possible Sources</b>
2	Drinking Water	PCBs	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources
2	Fish Consumption	PCBs, Dioxins, Mercury	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources, Air Deposition
3	Drinking Water	PCBs	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources
3	Fish Consumption	PCBs, Dioxins, Mercury	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources, Air Deposition
3	Drinking Water	PCBs	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources
3	Aquatic Life	Temperature	Drought-Related Impacts, Urbanized High Density Areas
3	Aquatic Life	Dissolved Oxygen	Municipal Point Source Discharges, Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Residential Districts
4	Fish Consumption	PCBs, Dioxins, Mercury	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources, Air Deposition
4	Aquatic Life	Temperature	Drought-Related Impacts, Urbanized High Density Areas
4	Aquatic Life	Copper	Unknown Sources
5a	Fish Consumption	PCBs, Dioxins, Mercury, Arsenic, Chlorinated Pesticides	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Air Deposition, Unknown Sources
5b	Aquatic Life	Copper	Unknown Sources
5b	Fish Consumption	PCBs, Dioxins, Mercury, Arsenic, Chlorinated Pesticides	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Air Deposition, Unknown Sources
5c	Aquatic Life	Dissolved Oxygen	Municipal Point Source Discharges, Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Residential Districts
5c	Fish Consumption	PCBs, Dioxins, Mercury	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources, Air Deposition

**Table 1.8: Overview of Causes and Sources of Impairments in Delaware Bay**

<b>Assessment Unit</b>	<b>Use Not Supported</b>	<b>Causes</b>	<b>Possible Sources</b>
All Units	Fish Consumption	PCBs, Dioxins, Mercury	Brownfield Sites, Contaminated Sediments, Wet Weather Discharges, Unknown Sources, Air Deposition
6br1a	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts
6br2a	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts
6br2b	Aquatic Life	Dissolved Oxygen	Municipal Point Source Discharges, Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Agriculture
6br2d	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts
6br3a	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts
6brA	Aquatic Life	Dissolved Oxygen	Municipal Point Source Discharges, Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Agriculture
6brB	Aquatic Life	Temperature	Drought-Related Impacts, Urbanized High Density Areas, Natural Sources
6de1	Aquatic Life	Dissolved Oxygen	Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Agriculture, Natural Sources
6de2	Shellfishing	Pathogens	Wet Weather Discharges
6de3	Shellfishing	Pathogens	Wet Weather Discharges
6de4	Shellfishing	Pathogens	Wet Weather Discharges
6de5	Aquatic Life	Dissolved Oxygen	Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Agriculture, Natural Sources
6de5	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts
6nj1	Aquatic Life	Dissolved Oxygen	Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Agriculture, Natural Sources
6nj9	Aquatic Life	Dissolved Oxygen	Wet Weather Discharges, Non-Point Sources, Small Flow Discharges, Agriculture, Natural Sources
6nj9	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts
6nj10	Shellfishing	Pathogens	Wet Weather Discharges, Residential Districts