

POINT SOURCE LOADS

ISSUE

In 1998, the State adopted pollution limits or Total Maximum Daily Load (TMDL) regulations for the Nanticoke River and Broad Creek. At that time, 1691 lbs. of total nitrogen (TN) and 75.2 lbs. of total phosphorous (TP) were discharged daily into the River from seven points sources of pollution. Those points sources were Dupont Seaford, Seaford Sewage Treatment Plant, S. C. Johnson and Son, Inc., Bridgeville Sewage Treatment Plant, Laurel Sewage Treatment Plant, Delagra Corp. and Mobile Gardens Trailer Park. Their load accounted for 25 % of TN and 39% of TP loads to the River. From the three sewage plants (Seaford, Laurel and Bridgeville), 439 lbs. of TN and 73 lbs. of TP were discharged daily. Of these plants, the City of Seaford discharged the most with 176 lbs TN and 23.8 lbs of TP. The remaining 4-point sources (Dupont Seaford, Mobile Gardens Trailer Park, Delagra Corp. and S. C. Johnson and Son, Inc.) contributed 1252 lbs. of TN and 2.2 lbs. of TP daily to the River.

By far the Seaford Dupont plant discharges the most TN (640 lbs) and least TP (0 lbs) of the point sources. However, it must be noted that Seaford Dupont uses only surface and groundwater as a coolant in their manufacturing process and adds a small amount of treated wastewater to the 65 million gallons/day permitted discharge into the Nanticoke. So most of the nutrients in the wastewater are from the Nanticoke and groundwater itself, not added by the plant.

TMDL LOAD ALLOCATIONS

The TMDL Regulations for the Nanticoke River requires the three sewage treatment plants to employ biological nutrient reduction (BNR) or equivalent process to reduce their TN load by 50% and their TP load by 25 %. The remaining point sources are capped at their present loads. These actions lower the point source pollution contributions by 13% for TN (218 lbs/day) and 24% for TP (8 lbs/day).

However, the point sources are actually discharging far less than is allowed in their NPDES permits (Table 1). Point sources discharge from 0 to 75% less nitrogen and from 0 to 88% less phosphorous. In order to ensure compliance with the TMDL, each facility's operating permit is reviewed in accordance with the adopted regulations (Table 2). Seaford's permit was re-issued in August 2000 and for 2 million gallons per day with reductions in both nitrogen and phosphorous loading through the use of BNR. The other point sources will be brought into compliance when their new NPDES permits are issued.

INNOVATIONS

The Seaford sewage treatment plant composts their sludge and sells the by-product. The nutrient analysis of the compost shows that there is about an even percentage of organic nitrogen and phosphorous at

about 1%. The potassium content is negligible at ~0.1%. This high quality sludge compost is sold to homeowners, landscapers, turf farmers and nursery growers in the region. Only about 1/3 of the material is sold locally (within the watershed). The bulk of the 80 tons of compost produced annually is transported to other watersheds in the State (and some out-of-state). As a service, the City provides directions for yard use to all customers in an effort to suppress over-application. The bulk of the product is used for lawn and ornamental garden incorporation. Land application of liquid wastewater sludge is non-existent in the Nanticoke Watershed.

There is spray irrigation facility at the Cool Branch Mobile Home Park. The facility is designed to accommodate 604 units with a designed wastewater flow of 125,000 gallons per day. The plant started to operate in September of 1998. In May 2001, DNREC re-issued Cool Branch's spray irrigation permit for a five-year period. Wastewater flow rates are averaging 20,000 gallons per day (gpd). The wastewater from the Cool Branch Mobile Home Park receives biological treatment in a series of four treatment lagoons. The first lagoon is an aerated lagoon with a 14-day detention time at the design flow of 125,000 gpd. The remaining three lagoons provide facultative treatment and storage capacity. At design flows, the facility has 138 days of storage capacity. Following disinfection with a hypochlorite solution, the effluent from the treatment lagoons is discharged onto a 30-acre spray irrigation field using solid set sprinklers. Irrigation occurs on both a wooded portion of the site, and on a field planted in orchard grass. Nutrient loading rates to the spray fields are carefully monitored to match the nutrient needs of the crops that are being grown.

NUTRIENT TRADING

Non-point source contributions of nutrients (runoff) make up the majority of the nutrient loading into the bays. Controlling or regulating these non-point sources may be more effective at reducing nutrient levels in the River and may be much less expensive than controlling point sources. A nutrient-trading program may achieve the needed reduction in nitrogen and phosphorus. Nutrient trading is a way of allocating the assimilative capacity of the system—regardless of activity. These trades can take place among point sources between point and nonpoint sources or, among nonpoint point sources. Wastewater treatment plants would not be able to trade nutrient reductions achieved through upgrades partially funded with state or federal grants. Any plant selling credits would have to meet all their normal permit requirements.

Table I. Point Source Permitted and Actual Nitrogen and Phosphorous Loads

Point Sources	Flow (millions gallons per day)			Total Nitrogen (lbs per day)			Total Phosphorous (lbs per day)		
	Permitted	Monitored (1992)	Reduction from Permitted as Loads	Permitted	Monitored (1992)	Reduction from Permitted as Load	Permitted	Monitored (1992)	Reduction from Permitted as Loads
Dupont Seaford	64.65	37.8	41%	243	132.3	19%	0	0	0%
Seaford STP	2	0.95	52%	27.7	36.6	31%	6.9	4.9	12%
S. C. Johnson and Son, Inc	0.8	0.23	71%	9.1	2.7	6.9%	0.09	0.04	36%
Bridgeville STP	0.8	0.17	79%	52.7	11.4	62%	5.8	1.2	63%
Curtice-Burns (DelAgra)	0.715	0.12	88%	9.1	1.4	75%	0.14	0	88%
Laurel STP	0.5	0.19	62%	6.8	3.6	10%	2.4	0.95	37%
Mobile Gardens Trailer Park	0.028	0.028	0%	1.4	1.4	0%	0.18	0.18	0%

Table II. Points Source permitting Schedule.

Point Source	Permit Issued	Permit Expires
Bridgeville STP	04/25/01	05/31/06
DuPont Seaford	12/30/88	<u>12/29/93</u>
Laurel STP	03/01/02	02/28/07
Mobile Gardens Trailer Park	01/04/01	01/31/06
Seaford STP	08/01/00	08/31/05
S. C. Johnson and Son, Inc.	12/07/99	12/31/04

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NANTICOKE WATERSHED

This fact sheet was prepared by the Delaware Department of Natural Resources and Environmental Control's Whole Basin Team for citizens and stakeholders interested in one of Delaware's most environmentally and economically attractive areas—the Nanticoke River and its surrounding lands, surface and ground waters.

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