

Findings & Recommendations of the Mountaire Pollution Committee

Chris Bason, Executive Director, November 2, 2018

Introduction

This report was produced with input from the Center for the Inland Bays Board of Directors' ad hoc Committee on Mountaire Pollution, formed at its meeting on December 15, 2017. The Committee met twice during January 2018, once during March 2018, once during June 2018, and again in October 2018 to help develop these findings and recommendations. Committee participation included Board Members Vickie York (Board-Elected Director), Jonathan Forte (Board-Elected Director), Rob Robinson (Appointee of the Senate *Pro Tem*), Scott Andres (Chair of the Scientific & Technical Advisory Committee), Mike Dunmyer (Board Elected Director), and Hans Medlarz (Sussex County); Citizens Advisory Committee Members John Austin and Richard Watson, and CIB staff members Chris Bason (Executive Director) and Michelle Schmidt (Watershed Coordinator). Publicly available information was used to prepare the report, some of which was obtained through Freedom of Information Act requests to government agencies. The Delaware Department of Natural Resources and Environmental Control (DNREC) was unable to provide much of the information requested due to an ongoing investigation of the violations at the Mountaire facility.

The findings section of this report was originally released in April of 2018 during a press event. At that time, the recommendations section was withheld to allow for DNREC to best complete its ongoing investigation into the permit violations at the Mountaire facility. After a consent decree between Mountaire and DNREC was released in June 2018, the Committee met again to request additional information from DNREC. After not receiving the information, the Committee recommended to the Center Board in October to release the recommendations to the public which was done as a press release including this full report.

Findings

Condition of the Site and River

In the year 2000, Mountaire Farms assumed ownership of the Millsboro-area poultry processing facility previously owned by Townsends Inc. located adjacent to Swan Creek and the Indian River. The facility has been used for poultry operations for decades; and it currently includes a feed mill, a hatchery, a resource recovery facility, a wastewater treatment plant, and approximately 1,000 acres of farm fields. DNREC permits Mountaire to dispose of 2.6 million gallons of treated wastewater per day and no more than 320 lbs of nitrogen per acre per year

on the fields. The facility previously disposed of its wastewater directly to Swan Creek under a permit that expired in 2001.

The groundwater and surfacewater of the area is highly polluted by the excess nutrients nitrogen and phosphorus that originate primarily from fertilizers and wastewater applied to croplands. Nitrate, a form of nitrogen that dissolves in water, seeps quickly through sandy soils to contaminate unconfined drinking water aquifers and eventually creeks and bays. Nitrate levels over 10 milligrams per liter (mg/L) in drinking water poses a health threat to the population in general and an acute health threat to children under 6 months. Ingestion of high nitrates in drinking water has been associated with blue baby syndrome, birth defects, and gastric problems. In creeks and bays, total nitrogen levels over 1 mg/L of water causes algae blooms, low-dissolved oxygen, and loss of fish and shellfish habitat.



Figure 1. 2008 aerial image of facility and Swan Creek looking south.

The level of nitrate in groundwater unaffected by human activities is believed to be 0.4 mg/Lⁱ. The median nitrate concentration of groundwater of unconfined aquifers statewide is 4.7 mg/Lⁱⁱ, and is higher for the Indian River Bay watershed at 6.4 mg/Lⁱⁱⁱ. Average nitrate levels from 1988 to 2016 in 34 monitoring wells on the Mountaire facility ranged from 6 to 49 mg/L with an overall average of 20 mg/L. Overall, average levels dropped from 1988 to 2005 and then increased to 2016. Nitrate levels near the facility's soil surface (measured with lysimeters) averaged 36.3 mg/L from 2011 to 2016.

SITE MAP – Labeling of *WHBJ-5* superimposed by the GWDS

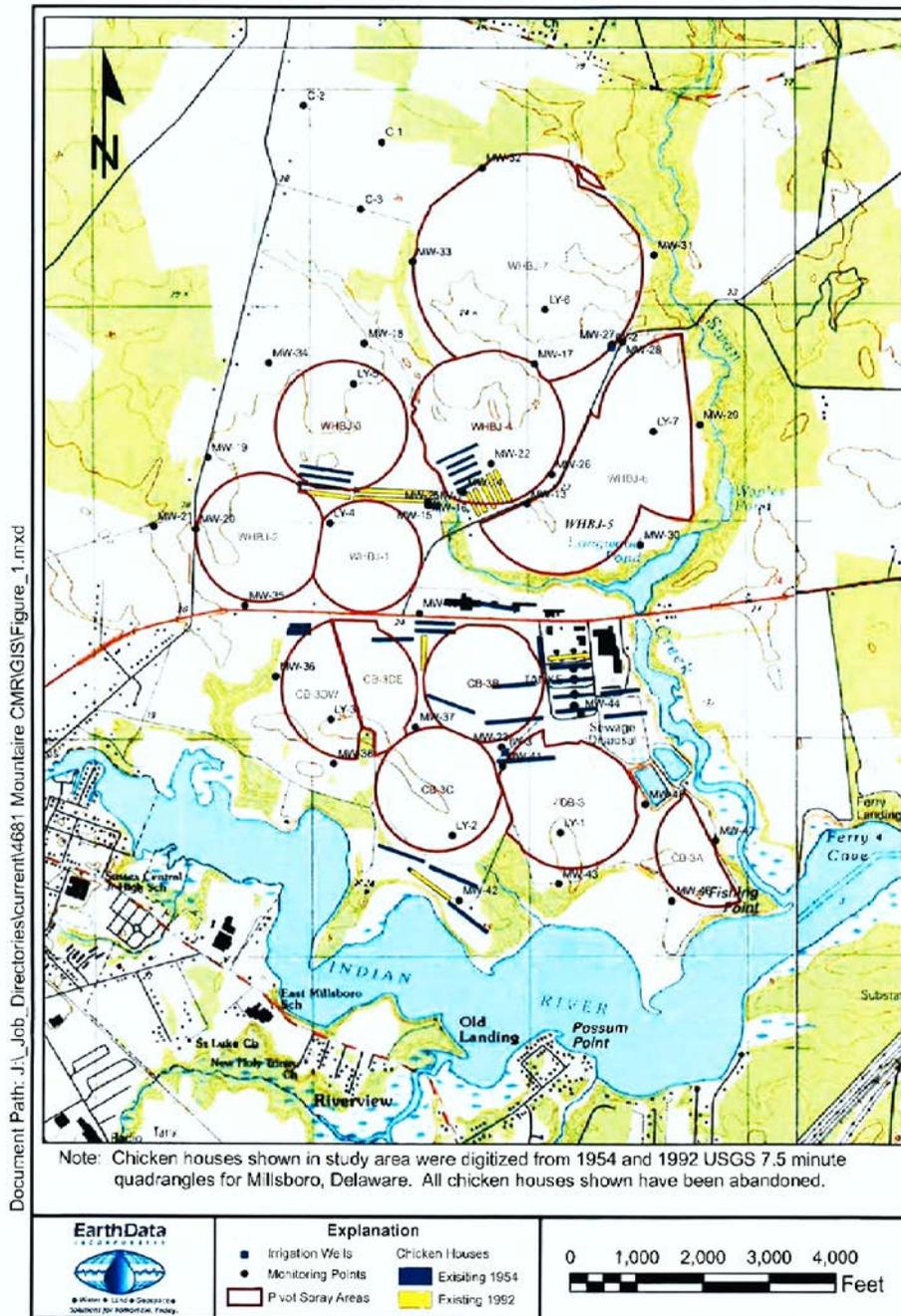
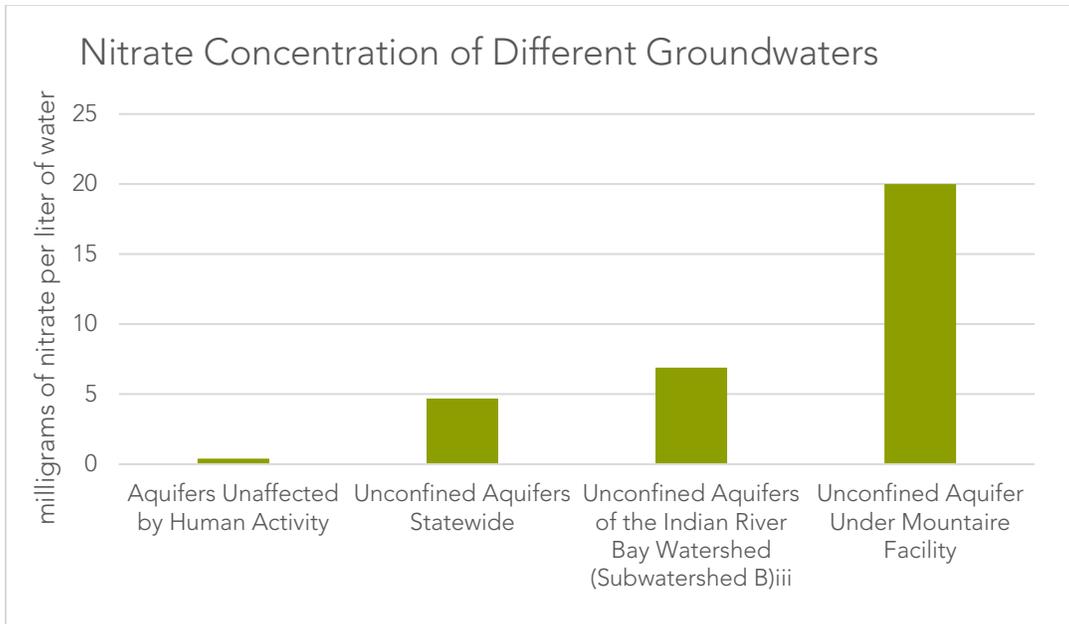
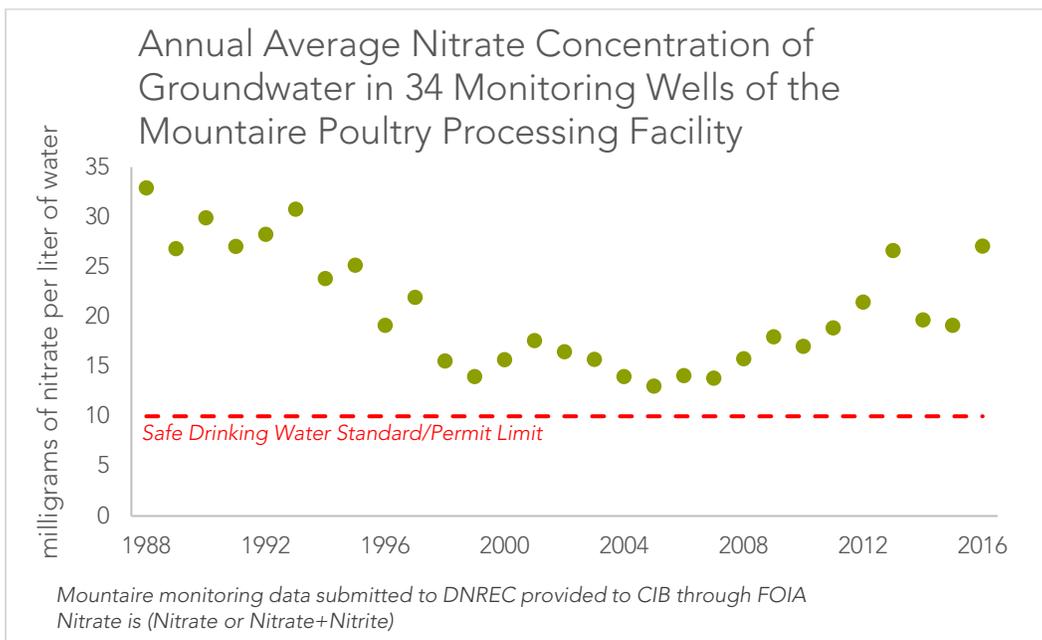


Figure 2. USGS topographic quadrangle with wastewater spray areas.



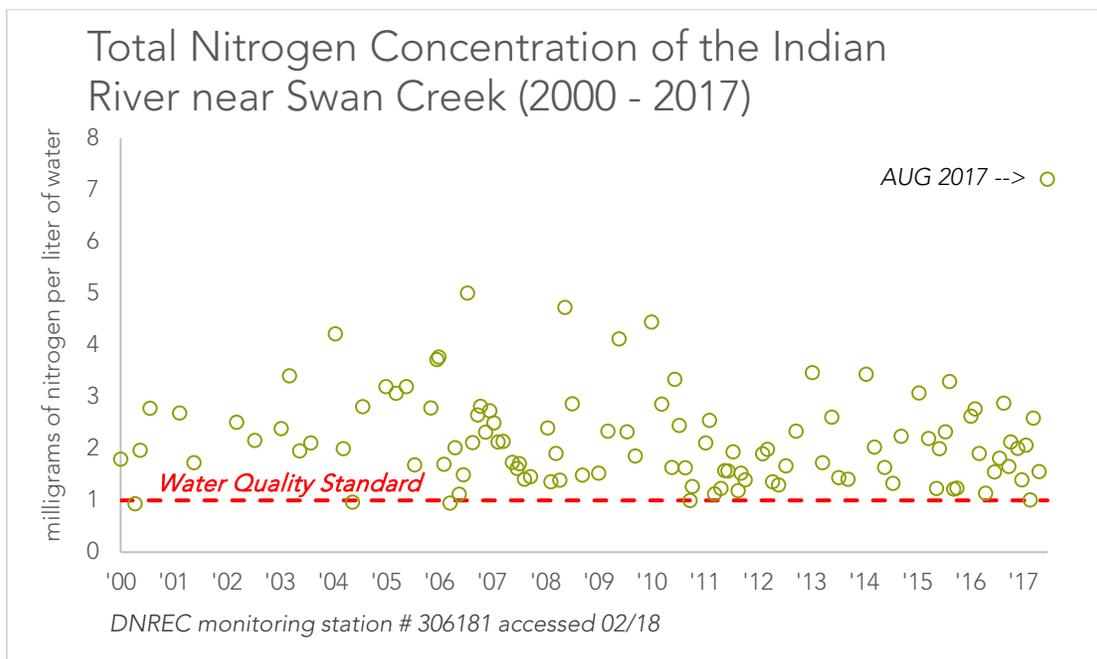
Groundwater under the facility generally flows toward Swan Creek and the Indian River. Groundwater moves quickly through such sandy soils: between 4 and 39 inches per day in a vertical and/or horizontal direction^{iv}. Near the facility, it likely moves faster and in a great variety of directions because of the wastewater sprayed on the fields. It can take days to decades for groundwater to flow into creeks and the Bays. Generally, the closer to surface waters that lands receiving wastewater are, the shorter the amount of time it takes that groundwater to flow into the surface water.



The upper Indian River and Bay are highly-polluted by nutrients. Of all the water bodies in the state, they need the greatest reductions of nutrient loads to realize healthy water quality.

DNREC has monitored water quality of the Indian River near the facility (buoy station #306181) since at least 2000. The average total nitrogen concentration here is over twice the healthy limit for the river, phosphorus is 40% higher than the healthy limit, and floating algae (measured as chlorophyll) is more than 5 times greater than the healthy limit. Despite 20-year old DNREC regulations designed to reduce pollution in the river, the pollution levels here are not decreasing. Pollution from the facility is a significant contributor to the degradation of the River and Swan Creek.

In August of 2017, DNREC’s monitoring station in the river had its highest recorded nitrogen value at 7.21 mg/L, its second highest phosphorus value, and fourth highest value for algae. The nitrogen value in August 2017 was 43% higher than the next highest value. These extreme values are likely related to highly-contaminated wastewater applied to the facility that travelled quickly through the aquifer to enter the river. DNREC’s November 2017 Notice of Violation of the facility’s wastewater permits indicated that a groundwater monitoring well #MW-47 on the facility near the river had extremely high nitrate concentrations of 92.5 mg/L in March of 2016 and 65.8 mg/L in March 2017. It is also possible that the extremely poor water quality of the river was related to an unpermitted surface water discharge that summer.



The Inland Bays, including Indian River and Swan Creek, are an estuary of national significance through their inclusion in the National Estuary Program. Since 1995, the Bays have been managed under a Comprehensive Conservation and Management Plan that outlines the actions necessary to restore their water quality and natural habitats. DNREC, as a signatory of the Plan, has resolved to work diligently, to the extent practicable, to implement it.

The Inland Bays are also designated under the State’s Water Quality Standards as Waters of Exceptional Ecological and Recreational Significance (ERES). According to the Standards: “ERES waters shall be accorded a level of protection and monitoring in excess of that provided

most other waters of the State. These waters are recognized as special natural assets of the State, and must be protected and enhanced for the benefit of present and future generations of Delawareans. ERES waters shall be restored, to the maximum extent practicable, to their natural condition. To this end, the Department [DNREC] shall, through adoption of a pollution control strategy for each ERES stream basin, take appropriate action to cause the systematic control, reduction, or removal of existing pollution sources, and the diversion of new pollution sources, away from ERES waters. Discharges to ERES waters shall be avoided to the maximum extent practicable. In order to be permitted, a discharge must be the least environmentally damaging practicable alternative.”

Permitting Operations and Enforcement at the Facility

A number of permits and a consent order for the facility have been in place for years. The enforcement of permit and consent order terms and conditions has been apparently lax.

EPA Administrative Order

In 2003, the USEPA found that facility operations caused or contributed to nitrate contamination of the drinking water aquifer. They ordered Mountaire, who consented, to 1) provide emergency drinking water to affected residences, 2) then provide EPA a plan to provide permanent alternate water supply acceptable to the residences such as a new well or point of entry point of use treatment device, 3) provide maintenance of any point of entry or treatment device until pre-treated water is in compliance, and **4) a) implement a groundwater/remediation program consisting of treating and disposing of wastewater such that annual average nitrate levels [of groundwater] are below 10 mg/L, b) continue operation of irrigation wells to reduce nitrate levels, and c) monitor wells quarterly and report for two years.**

Mountaire, after providing emergency and permanent alternate water supply to residents, requested the closure of the order in 2005. EPA denied the request until pre-treated water is in compliance for nitrate and ordered Mountaire to continue to report to the EPA. The order remains open.

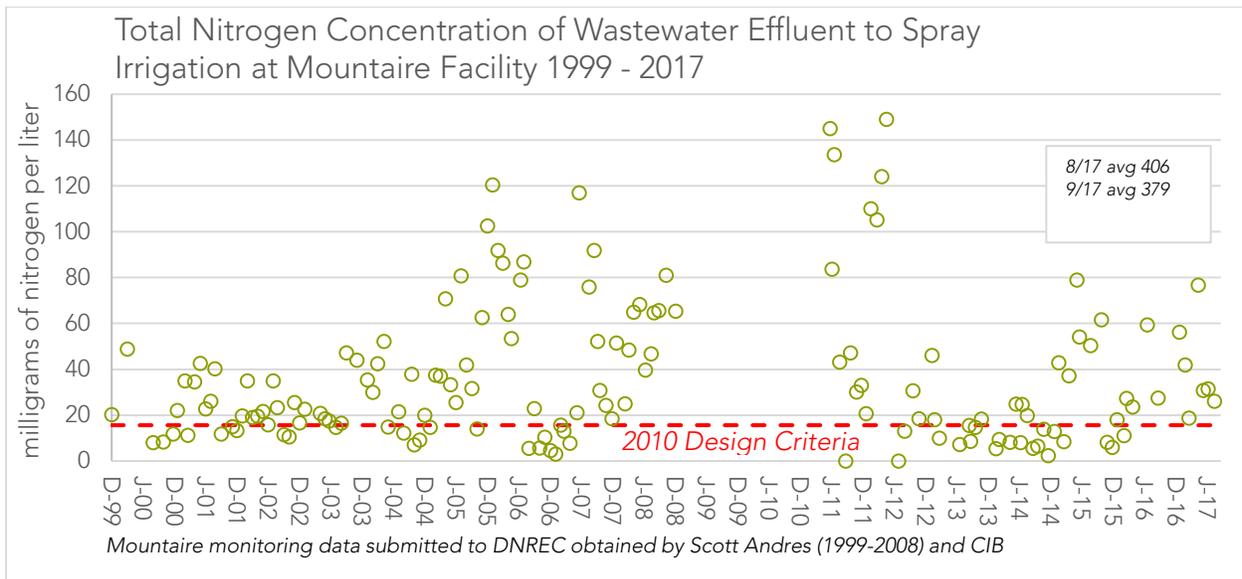
The status of enforcement of the 2003 EPA-Mountaire consent order remains unclear. When asked how the groundwater remediation program was to be enforced during a January 2018 phone call, the EPA contact for the order replied that it was DNREC’s purview through permitting; although this was not stated in the order. DNREC’s reply to this was that they had no authority under the EPA’s order and were not aware of EPA’s position on the matter. There had been little if any communication between the agencies since the order was written.

DNREC Wastewater and Coastal Zone Act Permits

Most information about wastewater permits and compliance was not available on DNREC’s online environmental information system. Freedom of Information Act requests to DNREC for the information were denied due to an ongoing investigation of the facility. What information was obtained by CIB indicated that enforcement of permit conditions has been lax. The facility operates under a DNREC permit to dispose of treated wastewater on its fields using spray irrigation. The earliest permit obtained by CIB was issued in 2009 but the permit may extend

back to 1987 when the spray field may have been put into operation. The 2009 permit allows 320 pounds of nitrogen per acre per year to be applied including any supplemental fertilizers for growing crops. The permit requires that the spray irrigation system not cause the ground water quality to be in violation of federal or state drinking water standards on an average annual basis.

Permit compliance monitoring data from 2000-2003 show that average nitrogen concentration of the wastewater was approximately 20 mg/L followed by periods of highly-variable concentrations that average nearly 80 mg/L during the 2005-2006 time frame. Data from 2009 and 2010 were unavailable.



For the year 2009, DNREC found that annual nitrogen application to the fields exceeded the permit limit by 78,465 pounds or an average of 215 pounds per day. For perspective, the Total Maximum Daily Load of nitrogen that could enter Swan Creek from its entire watershed while still allowing healthy conditions in the creek is 65 pounds. That means the over application of nitrogen from the facility alone was three times the healthy limit of the Creek. The Total Maximum Daily Load of nitrogen that could enter the upper Indian River from its entire watershed while still allowing healthy conditions is 425 pounds per day. That means the over application of nitrogen from the facility alone was nearly half the healthy limit of the River.

Cover crop establishment is a popular pollution control practice subsidized by the state that costs roughly 3 to 5 dollars per pound of nitrogen prevented from entering ground or surface waters. The cost to mitigate the nitrogen over applied during 2009 using cover crops could thus range from \$235,395 to \$392,324. In response to the over application of nitrogen, DNREC found the facility in violation of its permit but no of a penalty or other mitigation was found.

In 2010, DNREC issued a Coastal Zone Act (CZA) permit for the facility to add a resource recovery operation and upgrade its wastewater treatment plant. The facility is within Delaware's Coastal Zone where heavy industry and manufacturing is regulated to protect the coastal

environment for the primary use of recreation and tourism. The CZA permit was dependent upon an engineering report from the company demonstrating a decrease in wastewater nitrogen concentrations from 48.5 mg/L to a 15.6 mg/L design criteria.

Construction permit and schedule information for the wastewater treatment plant upgrades was not available. During construction, the wastewater effluent sometimes had nitrogen concentrations exceeding 100 mg/L. After construction, the 15.6 mg/L design criteria was not consistently met and in 2015, the design criteria began to be greatly exceeded.

During 2015 and 2016, DNREC reviewed the facility's 5-year wastewater compliance monitoring report for the period (2009-2013) and found numerous administrative and technical violations of permit conditions. DNREC reviewers found that a) only three of three of the five annual reports required during the monitoring period were available, b) the facility was not including crop fertilizer applications by the farmer of 60 to 128 lbs of nitrogen per acre in calculations of total nitrogen applications to fields, c) incorrect nitrogen removal rates for the crops were reported, d) overestimation of nitrogen removal from the fields through ammonia volatilization was reported and e) the wastewater treatment plant operator logs did not include information from the spray irrigation operators, f) three of 7 required lysimeters (devices to measure quality of shallow soil porewater) produced few or no samples, and g) groundwater nitrate concentrations were increasing and continued to exceed permitted limits. DNREC also found that nitrogen applications to 11 of 13 fields exceeded permitted limits in 2015. Despite abundant failures to meet wastewater or Coastal Zone Act permit requirements, no violations or penalties were issued. A wastewater permit that increased the amount of effluent that could be applied to the fields was re-issued by DNREC in July of 2017.

In May of 2017, Mountaire applied to DNREC for another Coastal Zone Act permit to add a third kill line meant to increase production by 18%. The application also included a wastewater treatment plant upgrade designed to reduce the nitrogen concentration of wastewater to 9.8 mg/L.

During the summer of 2017, the wastewater facility was failing. On August 31, 2017, the fecal coliform concentration of the wastewater was 1,100,000 colonies per 100 milliliters of water (col/100 ml); over 5,500 times the permitted limit. On September 26, 2017, wastewater effluent concentrations reached 641 mg/L nitrogen, over 40 times the permitted limit. On November 2, 2017, DNREC issued an extensive notice of violations of Mountaire's wastewater and agricultural utilization of biosolids permits.

The Notice of Violation included that the facility:

1. Exceeded permit limits for total nitrogen in wastewater effluent since 2015,
2. Exceeded the permitted amount of nitrogen applied to its fields in 2015 and 2017,
3. Exceeded permitted limits for Biological Oxygen Demand, Total Suspended Solids, Fecal Coliforms, and Total Chlorine Residuals,
4. Continued to cause groundwater to exceed safe drinking water standards,
5. Failed to submit a plan of corrective action for effluent nitrogen concentrations,

6. Failed to properly maintain and operate its wastewater treatment facility,
7. Failed to provide DNREC non-compliance notifications,
8. Caused wastewater flows to by-pass part of its treatment process,
9. Failed to monitor and/or report complete representative data,
10. Failed to provide DNREC plans for cropping and crop nutrient use
11. Failed to plant an appropriate crop after wastewater sludge application to fields
12. Failed to mark buffer zones prior to sludge application
13. Failed to notify DNREC that it was applying sludge

As of December 2017, Mountaire had returned their effluent coliform levels to within permitted limits and was continuing to work with DNREC to achieve compliance with the notice of violation.

Compliance & Enforcement Capacity and Other Violations

Violations of wastewater discharge permits in southern Delaware are not uncommon and DNREC has a history of inadequate enforcement. The CIB requested information on DNREC staffing levels relative to need for adequate compliance and enforcement, but the information was not available at the time of writing.

In September of 2015, the USEPA completed a review of DNREC's enforcement of multiple Clean Water Act programs in 2013. The review included the National Pollutant Discharge Elimination System (NPDES). NPDES covers activities regulated by the DNREC Division of Water including stormwater discharges, concentrated animal feeding operations (CAFOs), and surface water discharges of wastewater; but does not cover groundwater discharges. The review found that DNREC did not adequately address NPDES noncompliance in a timely and appropriate manner, nor did they appropriately escalate enforcement responses to address significant violations and long-term, ongoing noncompliance. Two previous reviews conducted by EPA in 2004 and 2008 included similar findings. The review also found a permit issuance backlog of CAFO and traditional NPDES permits. Fifty-seven percent (57%) of major NPDES permits were expired and 40% of minor NPDES permits were expired.

A review of other wastewater violations in southern Delaware within the past few years revealed 1) a minor violation at the Wolfe Neck Wastewater Treatment and Disposal Facility issued in 2016 with no fine, 2) an extensive list of violations issued to the Allen Harim Poultry Processing Facility near Harbeson dating back to 2012 with no fines to date, 3) and NPDES permit violation at the Mountaire Selbyville Poultry Processing Facility issued with a \$48,000 civil penalty, 4) a major NPDES permit violation issued to the Town of Millsboro in 2011 for pollution of Indian River with a \$376,303 administrative penalty, 5) an extensive list of NPDES violations issued to the Kent County Regional Wastewater Treatment Facility with a \$99,023 administrative penalty, and 6) an NPDES permit violation issued to Perdue Farms near Georgetown for pollution of a tributary of the Broadkill River with nitrogen and bacteria including \$84,901 in fines and administrative penalties.

Summary of Findings

The Mountaire facility has a history of chronic permit violations that has resulted in significant pollution of ground and surface waters afforded the state's highest level of protection. DNREC's permit compliance reviews indicated that Mountaire did not accurately calculate the amount of nutrients applied to its fields and thus the amount of nutrients entering groundwater. Given this, combined with the record of wastewater effluent nitrogen concentrations, it is possible that the facility may not have been in compliance with its permit limits since 2005. Nitrogen concentrations of wastewater effluent, ground water in monitoring wells, and shallow groundwater indicate significant and increasing pollution. To date, neither EPA nor DNREC have enforced compliance with conditions of the facility's multiple permits and orders, and this contributed to the ultimate failure of the wastewater treatment system in 2017. This appears related to an ongoing issue with DNREC's enforcement of some Clean Water Act programs and the understanding of responsibility for enforcement between EPA and DNREC.

Recommendations

Remediation and Mitigation

A full accounting of, and 2:1 mitigation of, pollutant loads discharged in excess of permitted limits extending back to at least 2009 should be required over an expedient timeline through clearly-demonstrable pollution reduction practices within the Swan Creek or upper Indian River Watershed. The practices should be verified as complete and additional (otherwise would clearly not have occurred) by a third party.

Mitigation should include all costs incurred by DNREC and be in addition to plans by Mountaire for upgrades to the wastewater treatment plant. DNREC should prioritize, if feasible, the purchase and permanent protection and reforestation of the property to the east of the facility (parcel 234-33.00-8.00) as a mitigation practice. Installation of wide forested buffers on the Mountaire facility along Indian River and Swan Creek should also be prioritized for mitigation.

Proposed upgrades to the facility's wastewater treatment plant should be required to meet the highest level of treatment required by regulation for new large systems by achieving 1) an average annual concentration of 5 mg/L total nitrogen in effluent or an average annual concentration of 5 mg/L beneath the system as verified by in-field monitoring provided that the design percolate concentration does not exceed 5 mg/L on an average annual basis and 2) an average annual concentration of 4 mg/L (ppm) total phosphorus in effluent or an average annual concentration of 4 mg/L beneath the system as verified by in-field monitoring provided that the design percolate concentration does not exceed 4 mg/L on an annual average basis.

The facility should locate groundwater withdrawal for facility operations to intercept groundwater with the highest nutrient levels before it enters surface waters.

Inspection and Enforcement

CIB should host a public presentation by EPA and DNREC regarding the responsibility for inspection and enforcement of wastewater facilities to achieve ground and surface water quality standards. EPA and DNREC should consider a new or enhanced memorandum in regards.

An independent organization in cooperation with DNREC should publish a report on 1) the causes of the failure of DNREC to prevent mismanagement of the facility (if that was the case), prevent permit violations, and achieve permit compliance; and 2) the actions that DNREC can take to prevent this in the future and the resources necessary to carry out these actions.

DNREC should address violations of the facility's Coastal Zone Act permit in any forthcoming enforcement actions.

Regulation & Permitting

Potential sellers of homes with private drinking water wells should be required to disclose the level of nitrate in the water prior to sale.

Revision of Onsite Wastewater Treatment and Disposal Regulations to redefine requirements for new large systems and addition of nitrogen effluent concentration limit of 20 mg/L total nitrogen to existing systems.

Public Outreach

The CIB should produce a fact sheet about the inter-related quality of the river and the local groundwater and hold a press event followed by a public forum on its findings and recommendations. CIB should take care to reference Mountaire's status as a long-standing community stakeholder and the importance of environmental stewardship for the company.

DNREC should provide monthly reports on the parameters of the wastewater treatment plant effluent to the public.

Environmental Monitoring

Mountaire should begin monitoring Swan Creek upstream and downstream of the facility including operating or funding the operation of a continuous multi sonde water quality monitoring probe to measure dissolved oxygen, chlorophyll, nitrogen and phosphorus. The facility should also fund the operation of such a monitoring probe in Indian River off Swan Creek.

Per the current regulations governing the design, installation, and operation of on-site wastewater treatment and disposal systems, surface water bodies adjacent to wastewater spray irrigation sites must be monitored by the wastewater treatment facility. DNREC may deem necessary the monitoring of other surface water bodies in close proximity to the spray irrigation site. Monitoring must be performed upgradient and downgradient of the irrigation site. It appears that the facility is not conducting this monitoring as required. Currently, DNREC maintains no water quality monitoring in Swan Creek.

Furthermore, Mountaire should fund the production of a watershed nutrient loading and estuarine hydrodynamic and water quality model for the area.

Availability of Public Information

DNREC should maintain complete and up to date records for wastewater facilities on its environmental navigator online information system.

Per Title 7 Chapter 60 of Delaware Code relating to Environmental Control, DNREC must develop an environmental information system to house information about facilities and sites under the Department's regulatory jurisdiction. The information must include permitting requirements, emissions and discharge monitoring and reporting data, compliance inspections, violations and enforcement actions. The System shall provide the public with information that indicates when a facility has been inspected, what violations are detected, when the facility comes into compliance, and any enforcement action that results from violations at the facility.

The exiting Delaware Environmental Navigator appears to be that system. According to the DNREC website, the Navigator allows the public to view facility information, violations, enforcement actions and monitoring results pertaining to Air Quality, Waste Water, Water Supply, Hazardous Waste, Hazardous Waste Annual Reports, Solid Waste, Contaminated Site Cleanup, Underground Tanks and Vapor Recovery, Above Ground Tanks, Septic Permits, Wetlands, Ambient Water Monitoring Data and Corrective Action Sites. The environmental navigator currently houses documents such as inspection reports and permits on the Mountaire facility pertaining to air quality and underground storage tanks but not water permits. Sussex County's Inland Bays wastewater facility also did not have such reports and permits.

ⁱⁱ Hamilton, P. A., Denver, J. M., Phillips, P. J., and Shedlock, R. J., 1993, Water-quality assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia – effects of agricultural activities on, and distribution of, nitrate and other inorganic constituents in the surficial aquifer: U.S. Geological Survey Open-File Report 93-90, 87 p.

ⁱⁱ Delaware Department of Natural Resources and Environmental Control. 2017. The State of Delaware 2016 Combined Watershed Assessment Report (305(b)) and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs.

ⁱⁱⁱ Kasper, J. W. and Strohmeier, S. A. 2007. Ground-water-quality survey of the Indian River Bay watershed, Sussex County, Delaware: Results of sampling, 2001-03: Delaware Department of Natural Resources and Environmental Control Document No. 40-08-05/07/03/01, 57 p.

^{iv} Andres, A.S. 1995. Nitrate Loss Via Ground Water Flow, Coastal Sussex County, Delaware, in K. Steele, ed., Animal Waste and the Land-Water Interface: Boca Raton, FL, CRC Press, Inc., p. 69-75