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*Via email*

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***Re: Comments on North Carolina Department of Environmental Quality Draft Swine Waste Management System General Permit AWG10000***

Dear Mr. Risgaard and Ms. Lawson,

The Southern Environmental Law Center (“SELC”), Waterkeeper Alliance, Natural Resources Defense Council (“NRDC”), and Center for Biological Diversity (“CBD”) offer these comments on the Department of Environmental Quality’s (“DEQ” or “agency”) draft Swine Waste Management System General Permit (“draft General Permit”) on behalf of the tens of thousands of North Carolina-based members of NRDC and CBD, the undersigned Riverkeeper organizations, and the North Carolina Conservation Network. Thank you for the opportunity to offer these public comments.

The undersigned thank DEQ for proposing changes to the General Permit that pave the way for more transparency, accountability, and equity in the swine industry. The proposed changes to the General Permit will better arm communities suffering disproportional adverse impacts from pollution from these facilities and the public with the information they need to understand and mitigate these harmful impacts. However, there is still significant work to do before the General Permit meets DEQ’s legal obligations and is sufficiently protective of the environment and public health. The undersigned respectfully request that DEQ incorporate the following changes into the final General Permit:

- Increase *accountability* for the hog industry by expanding the requirements for groundwater monitoring and the use of the Phosphorus Loss Assessment Tool (“PLAT”), which measures the risk of nutrient pollution, as well as imposing a co-permitting program that binds industry integrators to the General Permit;

- Ensure *equity* by finalizing and implementing a robust Environmental Justice mapping tool (“EJ tool”), which will identify the communities suffering the most from the impacts from industrial hog operations, using this tool to inform permitting decisions, and requiring permittees to mitigate disparities in cumulative impacts;
- Promote *transparency* by requiring the powerful hog industry to turn over records that tell the public where, when, and how much hog waste is generated at industrial facilities and making crystal clear that covered lagoons and digesters are not eligible for coverage under the General Permit; and
- Require new, cost-effective *technology* that ensures industry compliance with the terms of the General Permit.

A chief failure of the draft General Permit is that it endorses the continuation of the lagoon and sprayfield system, which is a significant source for the harm that this industry has posed to the environment and communities of North Carolina for decades. Over 20 years ago, a Blue Ribbon Commission declared that the extended and exclusive reliance on the lagoon and sprayfield system threatens North Carolina waterways and should be discontinued.<sup>1</sup> It is well past-time for the state to take action and put an end to the permitting of these inherently risky waste management systems.

As detailed below, the harm caused by the lagoon and sprayfield system to communities and natural resources is well-documented and demonstrates the urgent need for change. We understand that DEQ is currently undertaking efforts to better understand and document the cumulative and disparate impacts of its permitting decisions by developing an EJ tool. That tool, if implemented properly, will better enable the agency to incorporate relevant environmental, demographic, and health factors into its decisionmaking by identifying the communities most heavily and disproportionately affected by DEQ’s permitting decisions.

In consideration of the competing priorities of providing the agency with a sufficient amount of time to complete and implement the EJ tool while also ensuring that it will timely respond to the urgent need for systematic change in the permitting of these operations, commenters recommend that the duration of the General Permit’s coverage be reduced from five to two years. To do otherwise and allow the permit to be effective for the full five-year term will evidence agency disregard for its obligation under the Civil Rights Act to ensure that its general permitting program will not disproportionately affect low-wealth communities and communities of color, while also extending the period by which communities continue to be subject to the dangerous effects of pollution from this industry as a result of the lagoon and sprayfield system.

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<sup>1</sup> Blue Ribbon Study Commission on Agricultural Waste, *Report to the 1995 General Assembly of N.C. 1996 Regular Session 29* (May 16, 1996), <https://ncleg.net/Library/studies/1996/st10736.pdf> (emphasis added).

Developments during the most recent five-year permitting term underscore the need for prompt systemic change. First, rapid and escalating changes in the climate have vividly illustrated fundamental insecurities in the lagoon and sprayfield system. In the last three years alone, two 500-year storms have released millions of gallons of hog waste into streams and rivers in eastern North Carolina.<sup>2</sup> Further, researchers have confirmed higher death and disease rates for individuals living near hog operations,<sup>3</sup> multiple federal juries have awarded damages for harm stemming from permitted operations,<sup>4</sup> and the industry has doubled-down on its refusal to implement cleaner, more sustainable technology that would protect our rivers, streams, air quality, and nearby communities.<sup>5</sup> The General Permit that is currently up for renewal is DEQ's most significant opportunity to use its statutory authority to demand change from this industry.

The undersigned incorporate by reference the comments submitted to DEQ by Southern Environmental Law Center and Waterkeeper Alliance on behalf of all North Carolina-based Riverkeeper organizations and comments submitted by Natural Resources Defense Council and Center for Biological Diversity on behalf of their members and supporters in North Carolina on December 21, 2018 in response to the agency's November 2018 stakeholder draft swine general permit ("stakeholder draft"). For your convenience, these comments are attached as Exhibits 1 and 2, respectively.

Commenters urge DEQ to continue to increase attention to the processes it undertakes in soliciting public participation related to its draft General Permit review, especially in light of the history of intimidation of impacted community members who seek to have their voices heard. As we detailed in our comments on the stakeholder draft, from the beginning of the stakeholder engagement there have been some serious process challenges and missteps DEQ must rectify in the future. Commenters recommend that going forward, at a minimum, DEQ use the following strategies *and* consult with impacted communities about the process for providing input *before* finalizing that process.<sup>6</sup> DEQ should livestream public meetings, provide written instructions for participation in public meetings in advance of those meetings, publish notice of public meetings and comment periods more widely, and begin implementing all of these tools during the stakeholder process. DEQ must also adopt language access plans and public participation plans

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<sup>2</sup> Kris Maher & Ben Kesling, *Florence Flooding Hits North Carolina Hog Farms Hard*, WALL ST. J. (Sept. 19, 2019 7:09 PM), <https://www.wsj.com/articles/florence-flooding-hits-north-carolina-hog-farms-hard-1537398585>.

<sup>3</sup> Julia Kravchenko et al., *Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations*, 79 N.C. MED. J. 278 (2018).

<sup>4</sup> *Jury rules again Smithfield Foods hogs nuisance to neighbors*, THE FAYETTEVILLE OBSERVER (Dec. 13, 2018 7:37 AM), <https://www.fayobserver.com/news/20181213/jury-rules-again-smithfield-foods-hogs-nuisance-to-neighbors>.

<sup>5</sup> *See, e.g.,* Travis Fain, *Smithfield rolls out biogas plan, says it will cover most lagoons*, WRAL (last updated Oct. 26, 2018), <https://www.wral.com/smithfield-rolls-out-major-bio-gas-plan-lagoon-covers/17945911/>.

<sup>6</sup> Commenters intend these recommendations to be a starting point and baseline for improving processes in the future, not a complete list.

and then issue notifications, conduct outreach, and conduct meetings in accordance with those plans.<sup>7</sup> Those plans should include provisions for ensuring that all locations are accessible and convenient for affected communities (e.g. scheduling, geographic location, physical accessibility).<sup>8</sup> Finally, DEQ should engage an independent third-party facilitator to coordinate and then evaluate the stakeholder (or other) process.<sup>9</sup>

Ultimately, however, DEQ must phase out its permitting of swine operations that rely on the lagoon and sprayfield system for animal waste management. These rudimentary systems are outdated and cannot adequately manage and dispose of the astronomic amounts of animal waste generated by this industry on the ecologically sensitive coastal plain.

### **Factual Background**

North Carolina is leading the country in a national trend towards larger, more concentrated animal feeding operations.<sup>10</sup> Three decades ago, the swine industry fundamentally restructured, leading to vertical integration of the industry, consolidation of production operations, and concentration of hog production in some of the country's most environmentally, socially, and economically vulnerable areas. From 1997 to 2007 the size of hog operations in the coastal plain grew by over 45 percent.<sup>11</sup> As a result, according to the most recent Census of Agriculture, North Carolina is now home to approximately 9 million swine, 828 thousand head of cattle, 161 million chickens, and 17 million turkeys.<sup>12</sup> Together, these animals produce

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<sup>7</sup> This would bring DEQ into compliance with the Title VI Settlement, Section III.B.5 "DEQ will adhere to Public Participation and LEP policies, as state and federally required, in conducting the stakeholder process." It would also address Section VI.C of that settlement "DEQ will, after public notice and comment, adopt and implement policies to enhance public involvement and language access policies. This will be done with particular attention to marginalized communities due to socio-economic status, race, ethnicity, and language usage, using procedures that provide for early identification and integration of public concerns into permitting decisions. . . ." Settlement Agreement, Section III.B.5 (May 3, 2018), [https://waterkeeper.org/wp-content/uploads/2018/05/Final-Settlement-Agreement\\_attachments-and-sig.pdf](https://waterkeeper.org/wp-content/uploads/2018/05/Final-Settlement-Agreement_attachments-and-sig.pdf) [hereinafter Title VI Settlement].

<sup>8</sup> *Id.* Section III.B.3.

<sup>9</sup> *Id.* at Section III.B.1.

<sup>10</sup> *Agricultural Overview – Commodities*, N.C. DEPT. OF AGRIC. AND CONSUMER SERV., <http://www.ncagr.gov/stats/general/commodities.htm> ("North Carolina leads the country in the shift towards larger size [hog] farms .... This shift is apparent when reviewing the number and size of operations.")

<sup>11</sup> *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality*, EPA, EPA 820-R-13-002, 5 (July 2013).

<sup>12</sup> Pounds of manure, nitrogen and phosphorous per day were calculated taking the total animal inventory for each type of animal from the most recent published Agricultural Census (2012), converting those animal numbers to animal units (AUs) using USDA Economic Research Center (ERS) estimates of the number of animals per AU, then multiplying by USDA Natural Resources Conservation Service (NRCS) estimates for the daily output of manure, nitrogen and phosphorous for each type of AU. Where animal numbers could be attributed to multiple categories, the more conservative factor was used. *See 2012 Census of Agriculture Quick Stats*, Census of Agriculture: National Agricultural Statistics Service, USDA, <https://quickstats.nass.usda.gov/#BBCF08EB-60FA-3108-AEEC-8B4B0D143668>; Noel R.

approximately 147.5 million pounds of manure each day, including over 1.24 million pounds of nitrogen and 434,000 pounds of phosphorous.<sup>13</sup> Swine alone daily produce approximately 62 million pounds of manure, including 411,000 pounds of nitrogen and 157,000 pounds of phosphorous.<sup>14</sup>

Figure 1: EPA, *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality* (2013)

Table 2-5. Top ten states with the highest manure generation in 2007 on a farmland area basis.

National Rank	State	Estimated Tons Manure/Acre Farmland*
1	NORTH CAROLINA	3.85
2	DELAWARE	3.81
3	VERMONT	3.05
4	PENNSYLVANIA	2.99
5	WISCONSIN	2.80
6	CALIFORNIA	2.70
7	NEW YORK	2.66
8	MARYLAND	2.23
9	VIRGINIA	2.22
10	IOWA	2.22

\* Refer to Appendix 1 for further description on livestock manure generation calculations. Reference: USDA 2009a.

To dispose of this enormous amount of waste, as well as additionally-generated process wastewater, hog operations currently rely largely on an uncovered, often times unlined, waste impoundment and field spraying system that is colloquially referred to as the "lagoon and sprayfield" system. These systems are highly susceptible to regular discharges into state and federal waters, including through seepage,<sup>15</sup> leaking, and spills from waste lagoons; runoff from agricultural fields where the waste is sprayed; and seepage into the area's high groundwater table.<sup>16</sup> Further, "[p]athogenic microorganisms including *Campylobacter*, *Staphylococcus*

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Gollehon ET AL., *Confined Animal Production And Manure Nutrients*, Agricultural Information Bulletins 33763 (2001), ECON. RES. SERV., USDA, <https://www.ers.usda.gov/publications/pub-details/?pubid=42412>; *Animal Manure Management, RCA Issue Brief #7* (Dec. 1995), NAT. RES. CONSERVATION SERV., USDA, [https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143\\_014211](https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014211).

<sup>13</sup> 2012 Census, *supra* note 12.

<sup>14</sup> 2012 Census, *supra* note 12.

<sup>15</sup> Seepage is percolation through the soil. See EPA, *supra* note 11, at 24; see also Seepage, OXFORDDICTIONARIES.COM, <https://en.oxforddictionaries.com/definition/seepage> (defining seepage as "the slow escape of a liquid or gas through porous material or small holes.").

<sup>16</sup> See, e.g., Arfken, et al., *Monitoring Swine Fecal Contamination in the Cape Fear River Watershed Based on the Detection and Quantification of Hog-Specific Bacteroides-Prevotella 16s rRNA Genes*, WATER RESOURCES RES. INST. OF THE U. OF N.C., Report No. 436 (Dec. 2013), <http://repository.lib.ncsu.edu/dr/bitstream/1840.4/8276/1/NC-WRRI-436.pdf>; Bajwa, et al., *Modeling*

*aureus*, and *Salmonella* were frequently detected in lagoon surface and sludge samples” at swine facilities in eastern North Carolina.<sup>17</sup> Nitrogenous deposition into waterways from the constant release of ammonia air pollution from these operations also increases water pollution and susceptibility to eutrophic conditions and dead zones.<sup>18</sup>

According to a recent study by the U.S. Geological Survey (“USGS”), conducted in partnership with DEQ, watersheds with swine operations had a statistically significant increase in levels of ammonia, total nitrogen, nitrate and nitrite, specific conductance, major ions (magnesium, sodium, potassium, chloride, sulfate), and pH when compared to watersheds without swine operations.<sup>19</sup> As illustrated in the table below, these results show significant differences in key water quality indicators in the surface water of watersheds with swine operations compared to those without swine operations, and shows further elevated levels of key water quality indicators in watersheds with both swine and chicken facilities.

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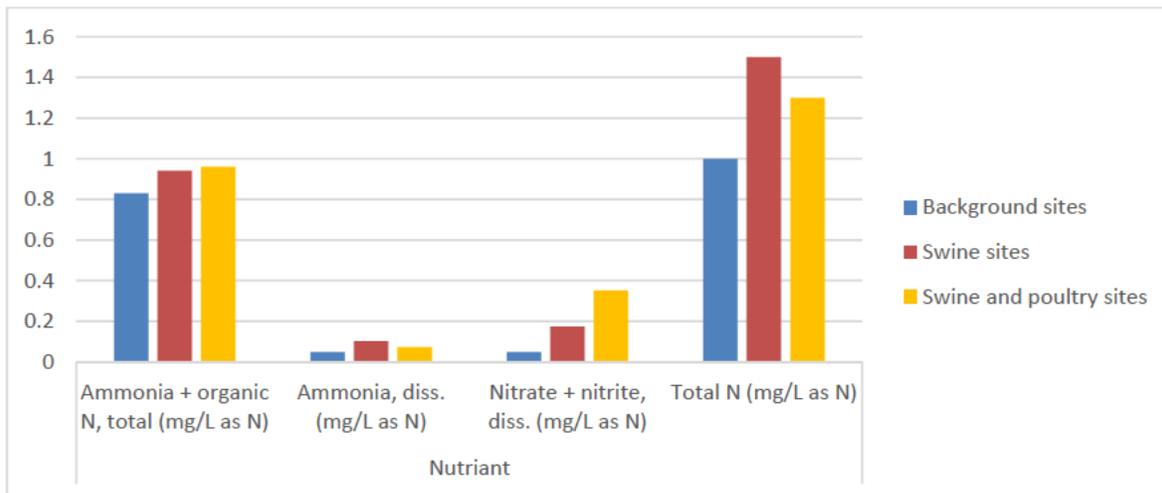
*Studies of Ammonia Dispersion and Dry Deposition at Some Hog Farms in North Carolina*, 58 J. OF AIR & WASTE MGMT. ASS’N 1198 (Sept. 2008); Cole, *et al.*, *Concentrated Swine Feeding Operations and Public Health: A Review of Occupational and Community Health Effects*, 108 ENVTL HEALTH PERSP. 685 (Aug. 2000); Mallin & Cahoon, *Industrialized Animal Production - A Major Source of Nutrient and Microbial Pollution to Aquatic Ecosystems*, 24 POPULATION AND ENV’T 369 (May 2003), [https://www.researchgate.net/publication/263519914\\_Industrialized\\_Animal\\_Production-A\\_Major\\_Source\\_of\\_Nutrient\\_and\\_Microbial\\_Pollution\\_to\\_Aquatic\\_Ecosystems](https://www.researchgate.net/publication/263519914_Industrialized_Animal_Production-A_Major_Source_of_Nutrient_and_Microbial_Pollution_to_Aquatic_Ecosystems); W. Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 ENVTL HEALTH PERSP. A-182 (June 2013), <http://ehp.niehs.nih.gov/121-a182/>; Walker, *et al.*, *Atmospheric Transport and Wet Deposition of Ammonium in North Carolina*, 34 ATMOSPHERIC ENV’T 3407 (2000); Wing & Wolf, *Intensive Livestock Operations, Health, and Quality of Life Among Eastern North Carolina Residents*, 108 ENVTL HEALTH PERSP. 233 (Mar. 2000); Wing, *et al.*, *The Potential Impact of Flooding on Confined Animal Feeding Operations in Eastern North Carolina*, 110 ENVTL HEALTH PERSP. 387 (Apr. 2002).

<sup>17</sup> Expert Report of Shane Rogers at 34, *Gillis v. Murphy-Brown, LLC*, No. 7:14-CV-185-BR, (E.D.N.C. July 20, 2018).

<sup>18</sup> See Bricker, *et al.*, *Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change*, NOAA Coastal Ocean Program Decision Analysis Series No. 26, II-IV, Appx. A at 59 (2007), <http://ian.umces.edu/nea/resources.php> (This report provides an assessment of eutrophic conditions for 141 U.S. estuaries. Results from the assessment show that two-thirds of the estuaries evaluated exhibited moderate to high levels of eutrophication.) [attached as Exhibit 3]; Walker, *et al.*, *Atmospheric Transport and Wet Deposition of Ammonium in North Carolina*, 34 ATMOSPHERIC ENV’T 3407 (2000).

<sup>19</sup> Stephen L. Harden, *Report 2015-5080, Surface-water quality in agricultural watersheds of the North Carolina coastal plain associated with concentrated animal feeding operations* (2015), U.S. Geological Survey, <https://pubs.usgs.gov/sir/2015/5080/pdf/sir2015-5080.pdf>.

Figure 2: Nutrient - Chemical property or constituent median numbers comparison among different land-use type. Source: USGS (2015)



In addition to water pollution from the lagoon and sprayfield waste management systems, there is also the looming threat of pollution from discharges by operators who find themselves overwhelmed by hog waste. Spills and other catastrophic failures of industrial waste management systems resulting from severe weather events, such as hurricanes, are a predictable seasonal threat in eastern North Carolina—where most permitted operations are located.<sup>20</sup>

During Hurricane Floyd in 1999, for example, 26 hog lagoons ruptured and 45 others sustained damage, while at least 30,000 hogs drowned.<sup>21</sup> As a result, approximately 120,000,000 gallons of untreated hog waste flooded into the Cape Fear, Neuse, New, Pamlico, and Tar rivers, contaminating every river basin in the eastern part of the state and leaving a legacy of pathogenic bacteria-contaminated soils.<sup>22</sup> Although the state and industry did make some changes in the

<sup>20</sup> See Wing, et al, *The Potential Impact of Flooding on Confined Animal Feeding Operations in Eastern North Carolina*, 110 ENVTL HEALTH PERSP. 387 (Apr. 2002), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240801/>.

<sup>21</sup> J.D. Bales, *Effects of Hurricane Floyd Inland Flooding, September-October 1999, on Tributaries to the Pamlico Sound, North Carolina*, 26 ESTUARIES No.5, 1324 (Oct. 2004), [https://www.jstor.org/stable/pdf/1353406.pdf?casa\\_token=tpXRm5muLKAAAAAA:-p2CTsBfyAQZp8IEyw6-DbprtkmOQTFRmt75x-RIN-GtLqDLT44DtRy1bNf40hUvTjBju6OHTvoI9MEVvytfYGXJ4FkSOckOkxW4\\_IcLKlasegO6suvj3](https://www.jstor.org/stable/pdf/1353406.pdf?casa_token=tpXRm5muLKAAAAAA:-p2CTsBfyAQZp8IEyw6-DbprtkmOQTFRmt75x-RIN-GtLqDLT44DtRy1bNf40hUvTjBju6OHTvoI9MEVvytfYGXJ4FkSOckOkxW4_IcLKlasegO6suvj3); J.D. Bales et al, *Two Months of Flooding in Eastern North Carolina, September-October 1999*, Water-Resources Investigations Report 00-4093, USGS (2000); Steve Wing, et al., *The potential impact of flooding on confined animal feeding operations in eastern North Carolina*, 110 ENVTL HEALTH PERSP. at 387 (2002), <https://ehp.niehs.nih.gov/doi/10.1289/ehp.02110387>.

<sup>22</sup> Jeff Tietz, *Pork's Dirty Secret: The nation's top hog producer is also one of America's worst polluters*, ROLLING STONE (Dec. 14, 2006), <https://www.globalresearch.ca/pork-s-dirty-secret-the-nation-s-top-hog-producer-is-also-one-of-america-s-worst-polluters/13479?print=1>; MJ Casteel, *Contamination of agricultural soils before and after hurricane-associated flooding in North Carolina*, 41 J. ENV'T. SCI. & HEALTH, PART A, TOXIC/HAZARDOUS SUBSTANCES & ENVTL. ENGINEERING, VOL. 2, 173 (2006).

wake of Floyd, they have not been sufficient to keep up with the increasing frequency and intensity of major storms. Similar stories played out after Hurricane Matthew in 2016, in which millions of confined chickens and thousands of confined pigs drowned in the floodwaters, while untold quantities of animal waste spilled into the state's waterways.<sup>23</sup> Just last year, Hurricane Florence damaged at least six lagoons and caused approximately thirty three to discharge waste into local waterways.<sup>24</sup> Another 57 lagoons were inundated and on the verge of overflowing.<sup>25</sup> Since 1851, 187 tropical cyclones have affected North Carolina, with 83 making direct landfall in the state.<sup>26</sup>

The best available science predicts that the extreme storm trend North Carolina has experienced over the last several years will continue to worsen. A recent report from the United Nations Intergovernmental Panel on Climate Change states that the world is likely to experience dramatic increases in coastal flooding and severe weather events.<sup>27</sup> The most recent National Climate Assessment also reported that the intensity, frequency, and duration of North Atlantic hurricanes, as well as the frequency of the strongest hurricanes, have all increased, and will continue to do so.<sup>28</sup> As these storms intensify and increase in number, so too will the risk of spills from industrial animal operations using the primitive lagoon and sprayfield system and the threats of pollution from spilled hog waste to nearby and downstream communities. Evidence of widespread contamination during major storm events also bolsters the need for comprehensive and reliable water monitoring.

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<sup>23</sup> K. Gee & C. McWhirter, *North Carolina's Poultry, Hog Producers Bail Out from Under Hurricane Matthew: Disposal of millions of carcasses poses challenges and raises public-health concerns*, WALL ST. J. (Oct. 15, 2016), <https://www.wsj.com/articles/north-carolinas-poultry-hog-producers-bail-out-from-under-hurricane-matthew-1476554376>; Nathanael Johnson, *Why the heck are there pig farms in the path of hurricanes?*, GRIST (Oct. 19, 2016), <https://grist.org/food/why-the-heck-are-there-pig-farms-in-the-path-of-hurricanes/>; Tom Philpott, *You Don't Want to Know Where This Pig Poop is Washing up*, MOTHER JONES (Oct. 19, 2016), <https://www.motherjones.com/environment/2016/10/how-much-toxic-poop-leaking-north-carolinas-rivers/>.

<sup>24</sup> DEQ Dashboard: *Animal Operations—Swine Lagoons* (October 9, 2018), DEQ, <https://deq.nc.gov/news/deq-dashboard#animal-operations---swine-lagoon-facilities>. For photographs depicting lagoon breaches during Hurricane Florence, please see Exhibits 4 and 5, depicting breaches at lagoons spilling waste into Tomahawk Creek and Stocking Head Creek, respectively.

<sup>25</sup> *Id.*

<sup>26</sup> *Hurricanes: Statistics: North Carolina Tropical Cyclone Statistics (1851-2017)*, N.C. CLIMATE OFFICE, <http://climate.ncsu.edu/climate/hurricanes/statistics?state=NC&buffer=25>.

<sup>27</sup> *Global Warming of 1.5°C: Summary for Policymakers* (October 6, 2018), INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, <http://www.ipcc.ch/report/sr15/> (an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty) [attached as Exhibit 6].

<sup>28</sup> *Fourth National Climate Assessment Vol. II*, U.S. GLOBAL CHANGE RES. PROGRAM, (Aug. 2018), [https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf).

Exposure to pollution from industrial animal operations can lead to devastating public health effects.<sup>29</sup> For example, according a recent study by Duke Medical School and published in the North Carolina Medical Journal, residents who live near industrial hog operations have higher death rates from causes such as anemia, kidney disease, tuberculosis and low birth weight than those residents who live further away from such operations.<sup>30</sup> The study also found higher rates of low birth weight and infant hospitalization among residents who live nearer to hog operations.<sup>31</sup> The study further determined the impacts to be distinct from any effects caused by other demographic, socioeconomic or behavioral factors, finding that “Southeastern North Carolina communities located in close proximity to hog CAFOs are characterized by poor indicators of health that are not solely due to the impact of converging demographic, socioeconomic, behavioral, and access-to-care factors, but are also due to the additional impact of multiple industrial hog facilities located in this area.”<sup>32</sup>

### **Legal Background**

Under North Carolina law, any facility housing more than 250 swine and using an animal waste management system must obtain a permit.<sup>33</sup> The statute defines animal waste management systems as the “combination of structures and nonstructural practices serving a feedlot that provide for the collection, treatment, storage, [and] land application of animal waste.”<sup>34</sup> Animal waste management systems control waste from the time the waste is produced until it is land-applied or otherwise utilized.<sup>35</sup> Animal waste may not be applied at “greater than agronomic

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<sup>29</sup> See, e.g., Steve Wing & S. Wolf, *Intensive Livestock Operations, Health, and Quality of Life Among Eastern North Carolina Residents*, 108 ENVTL HEALTH PERSP. 233 (Mar. 2000); Steve Wing, *et al.*, *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 92 ENVTL HEALTH PERSP. 92 (2013); Steve Wing, *et al.*, *Environmental Injustice in North Carolina’s Hog Industry*, 108 ENVTL HEALTH PERSP. 225 (2000).

<sup>30</sup> Julia Kravchenko et al., *Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations*, 79 N.C. MED. J. 278 (2018).

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

<sup>33</sup> N.C. Gen. Stat. § 143-215.1(a)(12); N.C. Gen. Stat. § 143-215.10B(1).

<sup>34</sup> N.C. Gen. Stat. § 143-215.10B(3); see also N.C. Gen. Stat. § 143-215.10B(5) (Under North Carolina law, the term feedlot “means a lot or building or combination of lots and buildings intended for the confined feeding, breeding, raising, or holding of animals and either specifically designed as a confinement area in which animal waste may accumulate or where the concentration of animals is such that an established vegetative cover cannot be maintained. A building or lot is not a feedlot unless animals are confined for 45 or more days, which may or may not be consecutive, in a 12-month period. Pastures shall not be considered feedlots for purposes of this Part.”).

<sup>35</sup> *Pt. 651: Agric. Waste Mgmt. Field Handbook* 9-1 (2011), NAT. RES. CONSERVATION SERV., USDA, <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=31493.wba> (defining animal waste management systems as “planned system[s]” designed “to control and use by-products of agricultural production in a manner that sustains or enhances the quality of air, water, soil, plant, animal, and energy resources”).

rates.”<sup>36</sup> The General Permit sets pollution control standards for the over 2,200 industrial swine operations that currently maintain General Permit coverage.

Supporting the terms of this permit, the North Carolina Constitution provides for the conservation of the state’s natural resources:

It shall be the policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivisions to acquire and preserve park, recreational, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this State its forests, wetlands, estuaries, beaches, historical sites, openlands, and places of beauty.<sup>37</sup>

The North Carolina General Assembly has provided three main directives for DEQ to follow in fulfilling its obligations under the Constitution:

1. As a declaration of state environmental policy, the legislature “declare[d] that it shall be the continuing policy of the State of North Carolina to conserve and protect its natural resources and to create and maintain conditions under which man and nature can exist in productive harmony. Further, it shall be the policy of the State to seek, for all of its citizens, safe, healthful, productive and aesthetically pleasing surroundings; [and] to attain the widest range of beneficial uses of the environment without degradation, risk to health or safety.”<sup>38</sup>
2. As a declaration of public policy, the legislature “declared it to be the public policy of the State to provide for consideration of its water and air resources.”<sup>39</sup>
3. The legislature additionally declared that “[i]t is the public policy of the State to maintain, protect, and enhance water quality within North Carolina.”<sup>40</sup>

The North Carolina Legislature further provided with respect to animal feeding operations that:

An animal waste management system that is not required to be permitted under [the federal Clean Water Act National Pollutant Discharge Elimination System permitting program] shall be designed, constructed, and operated so that the animal operation served by the animal waste management system does not cause pollution in the waters of the

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<sup>36</sup> 15A N.C. Admin. Code 02T .0113(b)(3) (requiring animal waste management plans to ensure “[t]he waste shall not be applied at greater than agronomic rates”).

<sup>37</sup> N.C. Const, art. XIV § 5.

<sup>38</sup> N.C. Gen. Stat. § 113A-3.

<sup>39</sup> N.C. Gen. Stat. § 143-211(a).

<sup>40</sup> N.C. Gen. Stat. § 143-211(b).

State except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour storm.<sup>41</sup>

Thus, as the draft General Permit appropriately identifies, waste from a permitted operation must “not reach surface waters or wetlands by runoff, drift, manmade conveyance, direct application, direct discharge or through ditches, terraces, or grassed waterways,” and “[t]he waste collection, treatment, storage and application system operated under this General Permit shall be effectively maintained and operated as a non-discharge system to prevent the discharge of pollutants to surface waters or wetlands.”<sup>42</sup>

Further, in 1997, the legislature enacted a moratorium on the use of the lagoon and sprayfield system by any new or expanded hog operation and directed the North Carolina Department of Agriculture to “develop a plan to phase out the use of anaerobic lagoons and sprayfields as primary methods of disposing of animal waste at swine farms.”<sup>43</sup> That has not yet happened. However, in the meantime, due to the existing moratorium on new and modified hog facilities, the Legislature additionally passed a law for animal waste management systems at *new or modified* hog operations that makes clear that such operations must meet or exceed the following performance standards:

1. Eliminate the discharge of animal waste to surface water and groundwater through direct discharge, seepage, or runoff.
2. Substantially eliminate atmospheric emission of ammonia.
3. Substantially eliminate the emission of odor that is detectable beyond the boundaries of the parcel or tract of land on which the swine farm is located.
4. Substantially eliminate the release of disease-transmitting vectors and airborne pathogens.
5. Substantially eliminate nutrient and heavy metal contamination of soil and groundwater.<sup>44</sup>

However, as Earthjustice articulated in its complaint submitted to the U.S. Environmental Protection Agency (“EPA”) on September 3, 2014:

Title VI of the Civil Rights Act of 1964, and EPA’s regulations, prohibit recipients of federal financial assistance...from taking action that disproportionately burdens persons on the basis of race. [DEQ’s] decision to reissue the General Permit without measures to protect African Americans, Latinos, and Native Americans living and working near the

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<sup>41</sup> N.C. Gen. Stat. § 143-215.10C(b).

<sup>42</sup> Draft General Permit, Condition I.1.

<sup>43</sup> N.C. Sess. Laws 1997-458, § 1.1 (1997); *Id.* at § 12.4.

<sup>44</sup> N.C. Gen. Stat. § 143-215.10I(b).

swine facilities from the staggering amounts of pollution the permitted swine facilities generate violates the basic civil rights protections set forth in Title VI.<sup>45</sup>

Under the federal Clean Water Act, all “point sources” that discharge pollutants into waters of the United States are subject to permitting requirements under the National Pollutant Discharge Elimination System (“NPDES”) permitting program.<sup>46</sup> These permitting requirements set discharge limits that Congress intended to further the goal of eliminating water pollution in waterways by 1985.<sup>47</sup> Explicitly within its plain language, the definition of “point source” in the Act includes “concentrated animal feeding operation[s].”<sup>48</sup>

## **Discussion**

The following comments are organized around four core themes: accountability, equity, transparency, and technology.

### **I. Accountability**

Commenters applaud DEQ for proposing changes that will enable better understanding of the current and potential impacts of permitted animal waste management systems, but DEQ must go further in the final permit in order to meet its legal obligations and protect health and the environment. Through this additional scrutiny, the agency and the public will be better positioned to identify and hold accountable operators whose actions threaten our communities, wildlife, and environment. Commenters support proposed permit terms that would require long overdue assessments of impacts to groundwater resources and the risk of phosphorus loss due to the land application of animal waste.

In addition to retaining the positive aspects of proposals discussed below, commenters recommend that DEQ make the following changes to the final General Permit:

- Require groundwater monitoring when a facility’s construction or the operator’s waste management decisions poses heightened risk to groundwater resources (e.g. when applying waste in the 100-year floodplain);
- Require groundwater monitoring at a facility whenever DEQ receives evidence of groundwater contamination at or near that facility;
- Require all permittees run PLAT;

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<sup>45</sup> Earthjustice, Complaint Under Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d, 40 C.F.R. Part 7 (September 3, 2014), <https://earthjustice.org/sites/default/files/files/North-Carolina-EJ-Network-et-al-Complaint-under-Title-VI.pdf>.

<sup>46</sup> 33 U.S.C. §§ 1311(a), 1342(a), 1362(12).

<sup>47</sup> *Id.* § 1251(a)(1).

<sup>48</sup> *Id.* § 1362(14).

- Establish a co-permitting scheme that puts integrators on the hook for waste management;
- Maintain the requirement to sample waste discharged into surface waters for specific constituents; and
- Make clear that permittees must implement best management practices (“BMPs”) identified in the Odor Control Checklist are comply with the 2D odor rules.

A. Groundwater monitoring (Conditions III.11-III.14)

DEQ proposes a new groundwater monitoring requirement in Condition III.11 that would apply to facilities with lagoons/waste storage structures located in the 100-year floodplain. Commenters appreciate the agency’s willingness to exercise its authority to require groundwater monitoring and reporting to evaluate impacts to water resources.<sup>49</sup> Commenters generally support this proposal, and the subsequent provisions in Conditions III.12-14 addressing the implementation of this monitoring requirement, as a step in the right direction.

Decades-old siting decisions are not, however, the only actions of the swine industry that threaten groundwater resources. And indeed, impacts to groundwater resources cannot be fully determined if samples are not adequately analyzed for additional constituents demonstrating the presence of swine waste. DEQ should, therefore, maintain the requirement for groundwater monitoring in the final General Permit and take the following proposed steps to improve the scope and utility of groundwater monitoring under the General Permit.

- i. *Monitoring should be required whenever facility construction and operation decisions heighten risk to groundwater resources*

It is no secret that groundwater resources are threatened by seepage from hog waste lagoons.<sup>50</sup> Indeed, more than two decades ago the Blue Ribbon Study Commission on Agricultural Waste documented impacts to groundwater resources near such lagoons, opining that “[m]ore data concerning groundwater quality in the area surrounding hog farms is needed.”<sup>51</sup> Yet, DEQ never modified the General Permit to require permittees to collect and report such data.

In Oklahoma, another significant hog-producing state, threats of lagoon seepage are mitigated by requiring either installation of a leak detection system or groundwater monitoring

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<sup>49</sup> 15A N.C. Admin. Code 02T .0108(c).

<sup>50</sup> See Steve Wing et al., *The Potential Impact of Flooding on Confined Animal Feeding Operations in Eastern North Carolina*, 110 ENVTL. HEALTH PERSP. 387(2002), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240801/pdf/ehp0110-000387.pdf>.

<sup>51</sup> Blue Ribbon Study, *supra* note 1, at 30.

up- and down-gradient from lagoons.<sup>52</sup> This is particularly notable since in Oklahoma average depth to water ranges from 15-30 feet in alluvium and terrace deposits to greater than 100 feet.<sup>53</sup> In contrast, most permitted swine operations in North Carolina are located in the coastal plain where “the water table is near the surface,” and “[e]ven without spills, ammonia and nitrates may seep into groundwater.”<sup>54</sup> The threat of groundwater pollution is also elevated in North Carolina because many lagoons were built before liners were required.<sup>55</sup> Commenters encourage DEQ, which has long claimed to have the nation’s most stringent regulatory regime for animal operations, to follow Oklahoma’s lead.

North Carolina decisionmakers have long recognized that storing tremendous volumes of swine waste in close proximity to our rivers, lakes, and streams threatens water quality. Since 1997, it has been illegal to construct a hog waste lagoon in the 100-year floodplain.<sup>56</sup> Since 1999, the state has spent roughly \$19 million to fund a voluntary buyout program resulting in the removal of more than 100 swine waste lagoons from the 100-year floodplain.<sup>57</sup> But many lagoons still exist in the 100-year floodplain, posing a continuing threat to water quality. DEQ should discontinue its practice of permitting hog operations that are located in the 100-year floodplain and rely on a lagoon and sprayfield system for hog waste management. If it does not do so, it is especially appropriate to require permitted facilities to monitor groundwater impacts of lagoons in the floodplain given that groundwater commonly contributes about 50 to 60 percent of the average annual streamflow to streams in the coastal plain.<sup>58</sup> Because swine waste can be transported through groundwater, it is prudent to evaluate the risk of potential surface water

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<sup>52</sup> See Okla. Admin. Code § 35:17-3.

<sup>53</sup> Noël I. Osborn & Ray H. Hardy, *Statewide Groundwater Vulnerability Map of Oklahoma*, OKLAHOMA WATER RESOURCES BOARD: Technical Report 99-1 (1999), <https://www.owrb.ok.gov/studies/reports/gwvulnerability/entire-report.pdf> [attached as Exhibit 7].

<sup>54</sup> Wendee Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 ENVTL. HEALTH PERSP. a182 (2013); see also J.F. Lautier, *Hydrogeologic Framework and Ground Water Conditions in the North Carolina East Central Coastal Plain*, N.C. DEP’T OF ENV’T AND NAT. RES. (2009) (noting that water tables in the coastal plain may be as high as a few inches from the surface), [https://www.researchgate.net/publication/260400573\\_Hydrologic\\_Framework\\_and\\_Ground\\_Water\\_Conditions\\_in\\_the\\_North\\_Carolina\\_East\\_Central\\_Coastal\\_Plain](https://www.researchgate.net/publication/260400573_Hydrologic_Framework_and_Ground_Water_Conditions_in_the_North_Carolina_East_Central_Coastal_Plain).

<sup>55</sup> R.L. Huffman, *Seepage Evaluation of Older Swine Lagoons in North Carolina*, 47 TRANS. AM. SOC’Y AGRIC. ENG’RS 1507, 1507 (2004).

<sup>56</sup> N.C. Sess. Laws 1997-458 (Aug. 27, 1997) (amending G.S. 106-803 to state, in subsection (a2), that “No component of a liquid animal waste management system for which a permit is required under Part 1 or 1A of Article 21 of Chapter 143 of the General Statutes, other than a land application site, shall be constructed on land that is located within the 100-year floodplain.”).

<sup>57</sup> David Williams, *Overview: 100-Year Floodplain Swine Buyout*, N.C. DIV. OF SOIL AND WATER CONSERVATION (Dec. 1, 2016), <https://www.ncleg.gov/documentsites/committees/BCCI-78/2016-2017%20Meeting%20Documents/Dec%201%202016/Swine%20Floodplain%20Buyout%20-%20Overview.pdf>. (In early 2018, approximately \$5M was secured through federal and state funding to continue the buyout program).

<sup>58</sup> See, e.g., McMahon, G., and Lloyd, O.B., Jr., *Water-quality assessment of the Albemarle-Pamlico drainage basin, North Carolina and Virginia—Environmental setting and water quality issues*, U.S. GEOLOGICAL SURVEY, Open-File Report 95-136 (1995), <https://pubs.usgs.gov/of/1995/0136/report.pdf>.

pollution stemming from hydrologically connected groundwater resources.<sup>59</sup> However, constructing a lagoon in the 100-year floodplain is not the only action threatening groundwater resources that should give rise to a monitoring requirement.

First, as DEQ has previously recognized, many “land application fields are in an area of the coastal plain where the groundwater table is high which requires ditching or tile drains in order to allow for crop harvesting and waste application. These are direct conveyances for the highly nutrient laden water to reach surface waters.”<sup>60</sup> Commenters therefore recommend requiring groundwater monitoring when an operation land applies waste in the 100-year flood plain.

Moreover, while the location of lagoons and sprayfields relative to floodplains is important, so too is their location relative to groundwater resources. The coastal plain, where most permitted swine facilities are located, is characterized by shallow depth to groundwater.<sup>61</sup> Lagoons storing waste below the seasonal high water table threaten a direct discharge of untreated manure into groundwater.<sup>62</sup> Commenters therefore recommend requiring groundwater monitoring whenever a permitted animal waste management system includes a lagoon with a bottom elevation that is not at least 2 feet above the seasonal high water table.<sup>63</sup>

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<sup>59</sup> DEQ has an obligation to prevent unpermitted discharges to the waters of the state. See N.C. Gen. Stat. § 143-215.1; see also N.C. Gen. Stat. § 143-212(6) (defining “waters” to include “any body or accumulation of water, whether surface or underground, public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of this State”). However, the agency also has responsibility, under delegated authority, to implement the Clean Water Act, which has been interpreted to prohibit discharge to surface waters through pollution of hydrologically connected groundwater). *Upstate Forever v. Kinder Morgan Energy Partners*, 887 F.3d 637 (4th Cir. 2018) (holding that discharge of a pollutant into groundwater and transported through a direct hydrological connection to surface waters may constitute a violation of the Clean Water Act); *Hawai’i Wildlife Fund v. Cnty. of Maui*, 886 F.3d 737 (9th Cir. 2018) (affirming liability under the Clean Water Act where pollutant was discharged from defendant’s discernible conveyance and traveled through groundwater before reaching navigable water).

<sup>60</sup> *Final Neuse River Basinwide Water Quality Plan*, DIV. OF WATER RES. § 17.1.4 (2009), <https://deq.nc.gov/about/divisions/water-resources/planning/basin-planning/water-resource-plans/neuse-2009>. See also Stephen L. Harden & Timothy B. Spruill, *Ionic Composition and Nitrate in Drainage Water From Fields Fertilized with Different Nitrogen Sources, Middle Swamp Watershed, North Carolina, August 2000 – August 2001*, Scientific Investigations Report 2004–5123, U.S. GEOLOGICAL SURVEY, <http://pubs.usgs.gov/sir/2004/5123/> (last visited Feb. 25, 2019) [attached as Exhibit 8].

<sup>61</sup> J.F. Lautier, *Hydrogeologic Framework and Ground Water Conditions in the North Carolina East Central Coastal Plain*, N.C. DEP’T OF ENV’T AND NAT. RES. (2009).

<sup>62</sup> R. Hermanson et al., *Nitrogen Use by Crops and the Fate of Nitrogen in the Soil and Vadose Zone – A Literature Search*, Pub. No. 00-10-015 at 131 (2000), <https://fortress.wa.gov/ecy/publications/SummaryPages/0010015.html>.

<sup>63</sup> See *Conservation Practice Standard, Waste Storage Facility*, 313-CPS-1, NAT. RES. CONSERVATION SERV., USDA (May 2016) (Requiring lagoon location/construction such that the bottom elevation is “a minimum of 2 feet above the seasonal high water table unless special design features are incorporated that address buoyant forces, impoundment seepage rate and non-encroachment of the water table by contaminants.”) [attached as Exhibit 9].

In addition, groundwater monitoring should be required whenever a permittee selects burial as a means of mass mortality management.<sup>64</sup> DEQ's authority to require such monitoring is contemplated in the current permit.<sup>65</sup> The latest draft explicitly notes that burial "is not recommended for disposal of dead animals" and indicates DEQ may require groundwater monitoring "for mortality burial sites."<sup>66</sup> Commenters appreciate DEQ's discouragement of burial as a means of swine mortality management and believe it important to require monitoring to assess the impacts of decisions that disregard the agency's guidance. Burial is a particularly dangerous means of managing mass mortalities in areas with high water tables, as state law requires burial at "a depth of at least three feet beneath the surface of the ground."<sup>67</sup> Even if DEQ cannot prohibit burial outright, it is critical for the environmental agency to ensure that practices authorized by state statute or the State Veterinarian do not pollute the waters of the state.

Another practice that elevates the risk of groundwater contamination is the installation of a lagoon cover. DEQ must require an individual permit for any facility proposing to cover a lagoon, or install a digester, as provided for under N.C. Gen. Stat. 143-215.10I(b); a facility may not be covered by the General Permit if it installs a cover over a lagoon.<sup>68</sup> DEQ is currently allowing covered lagoons to operate under the General Permit, which is not permitted by statute. In light of this and industry's recent announcement that it plans to cover a large portion of its lagoons, it is imperative that DEQ require groundwater monitoring at any facility with a covered lagoon. Uncovered lagoons can lose 80 percent of the nitrogen in stored waste through ammonia volatilization and other processes; covering the lagoon and reducing gas exchange increases nitrogen concentration.<sup>69</sup> It is therefore critical to require groundwater monitoring to evaluate the consequences of covering a lagoon.

Commenters encourage DEQ to acknowledge that land applying waste in floodplains, burying mass mortalities, constructing a lagoon with inadequate separation from the water table, and covering a lagoon are all practices that heighten the risk of groundwater contamination. If

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<sup>64</sup> For further discussion of mortality management, *see supra* Section II, III.

<sup>65</sup> Permit No. AWG 10000, Condition II.10 (Oct. 1, 2014) ("The Division may require groundwater monitoring when there is massive burial of animals.").

<sup>66</sup> Current Draft, Condition II.10.

<sup>67</sup> N.C. Gen. Stat. § 106-403. According to the training manual for operators of swine animal waste management systems, "The bottom of the hole where dead animals are to be buried should be 3 feet above the seasonal high water table wherever possible and at least 12 inches above the seasonal high water table." *Certification Training for Operators of Animal Waste Management Systems: Type A*, N.C. STATE EXTENSION, (Jan. 27, 2017), [https://files.nc.gov/ncdeq/Water%20Quality/Operator Certification Files/AW Files/Type%20A%20Animal%20Waste%20Training%20Manual%202012 16.pdf](https://files.nc.gov/ncdeq/Water%20Quality/Operator%20Certification%20Files/AW%20Files/Type%20A%20Animal%20Waste%20Training%20Manual%202012%2016.pdf) [attached as Exhibit 10].

<sup>68</sup> For further discussion, *see infra* Section III.

<sup>69</sup> Massey et. al, *Economic Feasibility of Impermeable Lagoon Covers*, Working Paper No. AEWB 2002-03, DEP'T OF AGRIC. ECON. (April 2002). [attached as Exhibit 11] Commenters are pleased that the current draft permit recognizes that it is a "major change" when a permittee retrofits a lagoon or installs a digester, as these actions can alter the animal waste management system in a manner that drastically affects its function.

DEQ will not prohibit these practices, it should *at minimum* require groundwater monitoring to assess the impacts of these practices in the final General Permit.

*ii. DEQ must not ignore evidence of pollution*

While it is important for the permit to universally recognize and scrutinize activities that elevate the risk of groundwater pollution, it is also imperative that DEQ require groundwater monitoring upon receipt of evidence suggesting groundwater pollution at or near a specific facility. In the Stakeholder Draft, DEQ proposed to require groundwater monitoring whenever presented with “evidence that groundwater impacts to public or private water wells are occurring off-site,” “evidence of migration of contaminated groundwater to off-site property or properties,” or “evidence of surface water impacts via groundwater.”<sup>70</sup> DEQ dropped that language from the draft General Permit, and commenters recommend restoring these conditions, as it is important for the agency to exercise its authority to require monitoring in any such instance.<sup>71</sup> And DEQ may, upon receipt or discovery of such evidence, reasonably decide additional monitoring and reporting requirements are necessary.<sup>72</sup>

In response to the Stakeholder Draft, some commenters suggested that authority to require groundwater monitoring should rest solely with the Director of the Division of Water Resources, not Division staff. The Environmental Management Commission clearly vested in the Division of Water Resources the authority to require monitoring and reporting deemed necessary.<sup>73</sup> Commenters urge the agency to exercise that authority and clearly state that permittees will incur monitoring obligations when necessary to investigate and mitigate documented groundwater pollution.

*iii. Proper well construction, sample analysis, and documentation are critical*

While the scope of the groundwater monitoring requirement is important, so too is the means and documentation thereof. DEQ proposes language in Conditions III.12-14 in the draft General Permit that outlines the parameters for required groundwater monitoring. Commenters generally support these provisions and the inclusion of clear, uniform quality assurance standards for all monitoring.

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<sup>70</sup> Stakeholder Draft at Condition III.11

<sup>71</sup> See 15A N.C. Admin. Code 02T .0108(c).

<sup>72</sup> See 15A N.C. Admin. Code 02T .0111(c) (“No provisions in any general permit issued under this Rule shall be interpreted to allow the permittee to violate state surface water standards, groundwater standards outside a Compliance Boundary established in accordance with 15A NCAC 2L .0107, or other applicable environmental Rules.”).

<sup>73</sup> 15A N.C. Admin. Code 02T .0108(c).

For instance, commenters welcome the agency's recognition that a permittee's Certificate of Coverage ("COC") may include enforceable facility-specific requirements.<sup>74</sup> Of particular relevance, commenters support language in the permit and Attachment B indicating that the COC will specify required monitoring frequency and the name and number of required groundwater monitoring wells. Another sign of progress is the transparency surrounding the nature and results of required groundwater monitoring. Requirements to submit, on forms created by DEQ, documentation about well construction,<sup>75</sup> sampling results, and permit compliance will expand the information available to both the agency and the public.<sup>76</sup> However, commenters believe the agency should require a more complete evaluation of the impacts of permitted operations on groundwater quality.

According to Attachment B, facilities required to conduct groundwater monitoring must analyze samples for levels of chloride, fecal coliform, ammonia-N, nitrate-N, total phosphorus, pH, and total dissolved solids. Commenters recommend adding requirements to evaluate levels of Total Kjeldahl Nitrogen and nitrite-N so that sample results enable calculation of the total nitrogen levels. Commenters also recommend including a requirement to monitor for bacteria resistant to medically important antibiotics and residues of medically important antibiotics.<sup>77</sup> One way to accomplish this is to test for *E. coli*, and if it is present test it for susceptibility to antibiotics (resistance). DEQ should require testing for residues of the three most commonly used (in livestock) classes of antibiotics tetracyclines, sulfonamides, macrolides, and lincosamines.

#### B. Phosphorus Loss Assessment Tool (Condition I.9)

Just as commenters encourage DEQ to require an evaluation of groundwater contamination, commenters are pleased that DEQ proposes a requirement for operators to

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<sup>74</sup> Commenters support the proposed inclusion the following statement in the introductory language at the beginning of the permit: "Conditions and Limitation included in the issued COC are incorporated as permit conditions for coverage under the general permit. Violation of conditions or limitation established in the COC are enforceable under the authority of this General Permit."

<sup>75</sup> The Well Construction Record Form (GW-1) was developed by DEQ to document information regarding the location and installation of all well types, including water supply, injection, monitoring, and recovery wells. This documentation is critical because, improperly constructed wells "can adversely affect the public health and the groundwater resources of the State." N.C. Gen. Stat. § 87-84. Completion and submission of this form will help ensure compliance with applicable well construction standards. See 15A N.C. Admin. Code. 02C .0108.

<sup>76</sup> Commenters also support proposed language in Condition III.12 recognizing that compliance monitoring reports are incomplete without appropriate documentation of well construction.

<sup>77</sup> See, e.g. JoAnn M. Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 ENVTL. HEALTH PERSP. 308 (2007), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817674/>; JP Brooks et al., *Microbial ecology, bacterial pathogens, and antibiotic resistant genes in swine manure wastewater as influenced by three swine management systems*, 15;57 WATER RES. 96 (2014).

evaluate the risk of phosphorus loss. DEQ should go further, however. Commenters are concerned that swine waste is being land applied onto fields with little or no assimilative capacity for the resulting phosphorus loading, a practice that increases the likelihood of unpermitted discharge. Historical trends show this concern is well-founded.

Land application rates are typically based on the nitrogen needs of the target crop, but the phosphorus applied in the manure is consequently often two to five times greater than crop requirements.<sup>78</sup> Numerous studies show that, in parts of North Carolina dominated by animal agriculture, there is not enough cropland to assimilate the nutrient load generated from animal manure.<sup>79</sup> For instance, a statewide assessment demonstrated that, in 1993, eighteen counties generated excess phosphorus relative to crop needs.<sup>80</sup> By 1998, an assessment showed “33 counties had enough animal manure to exceed the Phosphorus requirements of all agronomic crops.”<sup>81</sup>

A nationwide study, based on 1982-2012 data, documented a decades-long trend of increasing amounts of recoverable manure, manure nitrogen, and manure phosphorus in the United States coinciding with the proliferation of concentrated animal feeding operations; the authors noted that while “[o]verall, only a few areas of the country have county-level excess manure,” multiple counties in North Carolina generated more manure than necessary to meet local crop needs.<sup>82</sup> In 2013, EPA reported that North Carolina generates more manure per acre of farmland than any state in the country.<sup>83</sup> As such, commenters urge DEQ to require all

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<sup>78</sup> *North Carolina Phosphorus Loss Assessment: I. Model Description and II. Scientific Basis and Supporting Literature*, Technical Bulletin 323, N.C. STATE U., (June 2005), [http://nutrients.soil.ncsu.edu/software/ncanat/plat/PLAT\\_Science\\_behind\\_the\\_tool.pdf](http://nutrients.soil.ncsu.edu/software/ncanat/plat/PLAT_Science_behind_the_tool.pdf). [attached as Exhibit 12].

<sup>79</sup> This is particularly relevant in the context of liquid animal waste management systems, as liquid waste is typically land applied at or near the generating facility due to high costs of transporting liquid waste.

<sup>80</sup> J.C. Barker & J.P. Zublena, *Livestock Manure Nutrient Assessment in North Carolina*, N.C. COOPERATIVE EXTENSION SERV. (June 1996), <http://stormwater.ucf.edu/fileRepository/docs/chemicaltreatment/documents/Barker%20and%20Zublena,%201995.pdf> [attached as Exhibit 13].

<sup>81</sup> *North Carolina Phosphorus Loss Assessment: I. Model Description and II. Scientific Basis and Supporting Literature*, Technical Bulletin 323, N.C. STATE U., (2005), [http://nutrients.soil.ncsu.edu/software/ncanat/plat/PLAT\\_Science\\_behind\\_the\\_tool.pdf](http://nutrients.soil.ncsu.edu/software/ncanat/plat/PLAT_Science_behind_the_tool.pdf).

<sup>82</sup> Noel R. Gollehan et al., *Estimates of Recoverable and Non-Recoverable Manure Nutrients Based on the Census of Agriculture – 2012 Results* (2016), NAT. RES. CONSERVATION SERV., USDA, <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/rca/?cid=nrcseprd1360819>. [attached as Exhibit 14] The same research team tracked this trend in an earlier analysis of data from 1982-1997. R.L. Kellogg et. al, *Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States* (2000), NAT. RES. CONSERVATION SERV., USDA, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs143\\_012133.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012133.pdf). [attached as Exhibit 15].

<sup>83</sup> *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality*, Tbl. 2-5, EPA (2013). In 2017, the NC State Extension noted bluntly, “Many soils in North Carolina have been so well fertilized that they do not need any additional

permittees to run the PLAT in order to effectively protect water quality from nutrient pollution caused by over-application of animal waste.

Instead, in Condition I.9, DEQ proposes to amend the General Permit to state any land application field with a soil analysis P-index above a specified threshold must be evaluated for compliance with NC NRCS Standard 590 “Nutrient Management” as it relates to phosphorus using PLAT. PLAT was developed to quantify the risk of phosphorus export; the tool considers soil P-I levels, soil type, slope, distance to water, land cover, rainfall, soil loss rates and other factors to estimate relative risk of phosphorus export. While commenters support additional evaluation of the risk of phosphorus loss, commenters are concerned by three aspects of the proposed requirement in Condition I.9.

First, commenters recommend that DEQ maintain the statement of the agency’s authority to require the use of PLAT, upon written notice, by “facilities located in watersheds sensitive to nutrient enrichment” in the final General Permit.<sup>84</sup> This appears contrary to the recognition, in multiple rules administered by DEQ, that appropriate nutrient management is critical to the success of strategies designed to overcome impairment of designated uses in nutrient sensitive watersheds.<sup>85</sup> DEQ should be doing more, not less, to evaluate the contributions of animal agriculture operations to in-stream nutrient levels, and commenters are concerned that removing existing language recognizing the agency’s authority to do so signals a retreat from this important duty.

Second, commenters encourage DEQ to acknowledge that running PLAT is not only a means of evaluating compliance with an NRCS standard, but indeed for evaluating compliance with the nondischarge requirement. After all, the General Permit may only be issued for an animal waste management system that does not discharge to surface waters of the state.<sup>86</sup> The permit is issued on the assumption that land application at the agronomic rate will not result in such discharge. But state law defines the agronomic rate as “the amount of waste and other materials applied to soil to meet the nitrogen needs of the crop, *but does not overload the soil with nutrients or other constituents that cause or contribute to a contravention of surface water or groundwater standards, limit crop growth, or adversely impact soil quality.*”<sup>87</sup>

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phosphorus.” Deanna Osmond & Daniel Line, *N.C. State Extension, Best Management Practices for Agricultural Nutrients*, N.C. STATE U. EXTENSION (Aug. 24, 2017), <https://content.ces.ncsu.edu/best-management-practices-for-agricultural-nutrients>. [attached as Exhibit 16].

<sup>84</sup> Permit No. AWG 10000, Condition I.5 (Oct. 1, 2014).

<sup>85</sup> See, e.g., 15A N.C. Admin. Code 02B .0238(8)(b)(x); 15A N.C. Admin. Code 02B .0238(c)(i); 15A N.C. Admin. Code 02B .0239(2)(a), (b).

<sup>86</sup> See 15A N.C. Admin. Code. 02T .0102.

<sup>87</sup> 15A N.C. Admin. Code 02T .0103(1) (emphasis added). Moreover the “agricultural stormwater” exemption from the definition of “point source” under the Clean Water Act only applies where waste is applied in accordance with nutrient management practices that ensure “appropriate agricultural utilization” of the waste. See *Waterkeeper Alliance v. EPA*, 399 F.3d 486, 508-09 (2d Cir. 2005).

Overapplication of phosphorus can cause or contribute to violations of water quality, limit crop growth, and adversely impact soil quality. DEQ may require any monitoring or reporting necessary to determine the effect of waste application on surface waters, groundwaters, or wetlands.<sup>88</sup> The PLAT tool was designed, in part, to evaluate the risk of phosphorus discharge.<sup>89</sup> Stated differently, running PLAT is not merely a way to evaluate compliance with an NRCS standard, but a means of evaluating compliance with state and federal laws.

Third, commenters believe all facilities should evaluate the risk of phosphorus loss by using the tool developed at great taxpayer expense for that purpose. If DEQ insists on using a soil analysis P-index level to trigger the risk evaluation, *the P-index threshold should not exceed 100*, beyond which there is no agronomic benefit of additional fertilization.<sup>90</sup> In the current draft, DEQ appears to contemplate a threshold between 275 and 400. While still too high, if the agency selects a number in that range, it should be 275, so that the maximum number of permitted operations conduct the evaluation necessary to determine if they are breaking the law and contributing to degradation of water quality.

Commenters encourage DEQ to consider evidence that soil-P index levels in areas dominated by animal agriculture are already at levels threatening widespread phosphorus loss. An analysis of public records demonstrates that phosphorus levels in soils onto which waste is land applied under this permit are already so high that little or no crop response to fertilization may be expected. Data were retrieved from the North Carolina Department of Agriculture's Agronomy Division PALS system from soil reports submitted by swine farmers or advisors from 434 operations. A total of 4,313 individual phosphorus soil sampling results reported from July 9, 2015 – February 20, 2019 were reviewed. Of the 4,313 individual phosphorus samples, 430 (9.97%) were above a P-I value of 400; 1,146 were above 275 (26.57%); 3,377 (78.30%) were above 100; and 3,915 (90.77%) were above 50. The maximum P-I was 2,593 and the minimum was 2. Only 527 (12.2%) of samples were in the optimal range for plant utilization. Of the 434 operations represented by the individual samples, 141 (32.49%) were over 400; 257 (59.22%)

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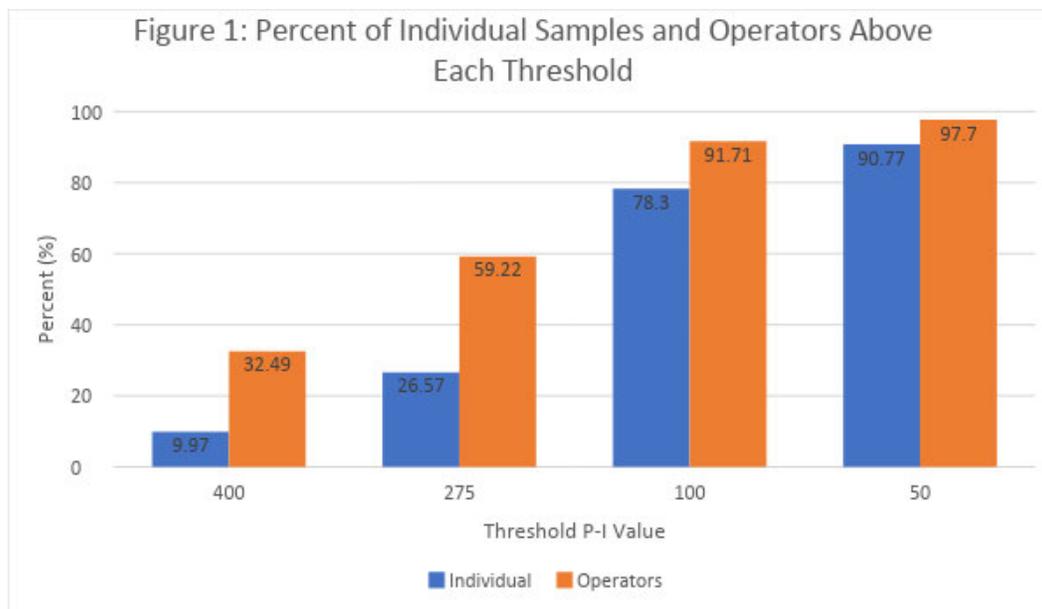
<sup>88</sup> 15A N.C. Admin. Code 02T .0108(c).

<sup>89</sup> "North Carolina agricultural land loses about 10 in. of water each year to surface plus subsurface drainage. If this water contained 1 mg P/L, total P loss through drainage water would be 2.2 lb/ac. The N.C. Neuse River Sensitive Waters Management Strategy Rules adopted by the Environmental Management Commission on December 11, 1997, stipulated that water from wastewater treatment plants should not exceed an average of 2 mg P/L (1 mg P/L for expanded wastewater treatment plants). Applying a 2-mg-P/L concentration limit to drainage water from agricultural land would allow 4.4 lb P loss/ac, thus the Very High rating was set at greater than 4 lb P loss/ac per year." N.C. State U., *supra* note 81.

<sup>90</sup> See 15A N.C. Admin. Code 02T .1304(b)(3) (requiring waste management plans to ensure waste is not applied "at greater than agronomic rates"). According to the North Carolina Department of Agriculture & Consumer Services when soil test phosphorus index is above 50, "crop response to fertilization is not generally expected" and when "soil-test indices are above 100, no fertilization is recommended, except for especially high value crops." Hardy et al., *Understanding the Soil Test Report*, N.C. DEP'T AGRIC. AGRONOMIC DIV. (Oct. 2013), <https://www.ncagr.gov/agronomi/pdf/ustr.pdf>.

were over 275; 398 (91.71%) were over 100; and 424 (97.70%) were over 50. Only ten growers did not have a single sample with a P-I over 50.<sup>91</sup> The relative difference between individual samples and growers represented by those individual samples at each threshold indicates that excessive phosphorus accumulation is not limited to a few growers; instead, it is a widespread phenomenon where individual growers may have multiple samples with a high degree of variability (see Figure 3 below).

Figure 3: *Analysis of Phosphorus Soil Sample Results*



These results are consistent with a study published in 2004, in which soil phosphorus data from the Agronomy Division’s database were analyzed for two-year periods spanning the decades of the 1980s and 1990s for 39 eastern North Carolina counties.<sup>92</sup> By analyzing decadal trends, the authors showed that the rapid increase in land application of wastes by industrial animal operations accounted for increases in soil P-index values in pasturelands in the 1990s, particularly in central eastern North Carolina.<sup>93</sup>

Data collected from 2015-2019 was compared to that presented in the 2004 study. Frequency of excessive (>100) P-index values were compared among time frames. Average P-index values were also compared. The comparison demonstrates both that phosphorus is accumulating in soils receiving swine waste and that the frequency of excessive phosphorus levels is increasing over time. Mean aggregate soil P-index values reported by swine operations

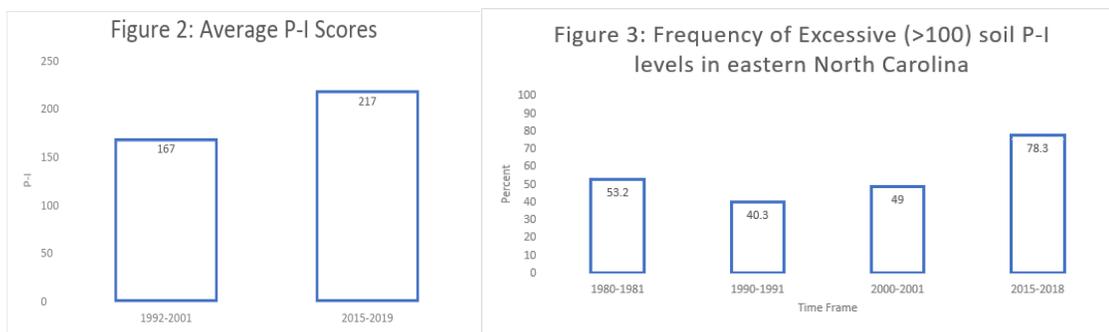
<sup>91</sup> See Exhibit 17 for data supporting these calculations.

<sup>92</sup> L.B. Cahoon et al., *Spatial and temporal variability in excessive soil phosphorus levels in eastern North Carolina*, 69 NUTRIENT CYCLING IN AGROECOSYSTEMS 111 (2004).

<sup>93</sup> *Id.* at 111 (“The potential threat to water quality from export of excessive soil phosphorus is therefore greatest in this region. North Carolina is currently developing a Phosphorus Loss Assessment Tool PLAT in an attempt to manage the challenge posed by excessive soil phosphorus levels.”).

during the three two-year periods evaluated in the 2004 study was 167 (400 kg P ha<sup>-1</sup>) (Figure 4). That increased to 217 for the period from 2015-2019. Excessive soil phosphorus levels occurred in 53.2%, 40.3%, 49% of samples in the 1980s, 1990s, and early 2000s, respectively. That increased to 79.3% from 2015-2019 (Figures 4, 5).

Figures 4, 5: *Average Phosphorus index values and Frequency of Excessive Phosphorus-index levels*



While commenters encourage DEQ to require more permittees to use PLAT to evaluate risks of phosphorus loss, commenters also believe this evaluation is long overdue and should be conducted as soon as possible. Commenters encourage the agency to require PLAT analysis to be *completed within 6 months* of receiving the high P-index soil analysis results, or April 1, 2020 whichever is later. This approach will ensure that facilities with current high P-index soil analysis results will have ample time to run PLAT and those receiving high results during the permit term will promptly assess the risk of phosphorus loss.

Commenters also reject industry claims that there are too few technical specialists capable of running PLAT. As of January 7, 2019, there were 412 technical specialists approved by the Soil and Water Conservation Commission, and 373 (90%) of them were certified in the Waste Utilization Plan/Nutrient Management Category.<sup>94</sup> This category of certification, issued to far more technical specialists than any other, specifically provides for “[d]evelopment of land application plans, including crop acreages available to meet nutrient and hydraulic loading rates, application windows, determination of animal waste nutrient amounts, and other similar determinations such as evaluation of fields for phosphorous [sic] loss and field buffers.”<sup>95</sup>

### C. Co-Permitting (General Condition)

In North Carolina and nationally, integrators such as Smithfield Foods maintain a significant degree of control over where the state’s industrial hog operations are located, how

<sup>94</sup> *SWCC Technical Specialist Designation*, N.C. DEP’T OF AGRIC. & CONSUMER SERV., [https://www.ncagr.gov/SWC/professional\\_development/documents/CurrentTechSpecialist1.7.19.pdf](https://www.ncagr.gov/SWC/professional_development/documents/CurrentTechSpecialist1.7.19.pdf) (last visited Feb. 25, 2019). According to this database, 76 (20%) of the individuals certified in the Waste Utilization Plan/Nutrient Management Category are NRCS employees.

<sup>95</sup> 2 N.C. Admin. Code 59G .0104(2)(A).

they raise animals, and an operation's management of produced waste, wastewater, and animal mortalities.<sup>96</sup> These dramatic increases in processor consolidation and control over industrial hog operations directly impacts water quality by controlling the method by which produced animals are to be managed and the bottom-lines of many producers that are required to comply with the state's permitting scheme.

Because integrators and other corporate entities are a driving force behind so many of the state's industrial hog operations and exercise so much control over them, they should share in the liability that may result from discharges. Placing the entire permitting burden on producers is not only unfair, but also inefficient: if contracted operators are wholly liable for the costs associated with water pollution, the integrators who control their operations and have more resources will have no incentive to minimize the extent of such pollution.<sup>97</sup>

DEQ should, therefore, impose an unambiguous integrator<sup>98</sup> co-permitting program. Under that structure, the agency should definitively find that ownership of the animals being raised in an industrial hog operation establishes an ownership interest in the operation's pollutant-generating activities and that the owner of the animal is to share responsibility for properly treating and disposing of the waste produced. Co-permitting integrators would not only be an equitable step, but it would also create a sensible incentive scheme that is likely to lead to the development of more environmentally friendly and cost-effective waste management systems.

#### D. Other considerations

##### i. *Lagoon sampling after discharge (Condition III.9(f))*

While commenters appreciate incremental progress with regard to monitoring groundwater and evaluating risk of phosphorus loss, commenters are concerned to see decreasing scrutiny of operations elsewhere in the draft General Permit. For instance, commenters object to the decision to remove Section III.9.f, the requirement to sample the source lagoon after a

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<sup>96</sup> See *Factory Farm Nation 2015 Edition*, 10, 11, 15, FOOD & WATER WATCH (2015), <http://www.foodandwaterwatch.org/sites/default/files/factory-farm-nation-report-may-2015.pdf> (finding that by 2012 more than 60% of hogs were raised under contract).

<sup>97</sup> In 2017 and again in 2018, the North Carolina General Assembly passed legislation that would make it harder for individuals living near hog farms to use the private nuisance right of action against integrators, like Smithfield Foods, for harming an individual's right to use and enjoy their property. See Anne Blythe, *Hog farmers win new protections as lawmakers override Roy Cooper's veto*, THE NEWS & OBSERVER (June 27, 2018), <https://www.newsobserver.com/news/politics-government/article213914154.html>.

<sup>98</sup> "Integrator" is defined in N.C. Gen. Stat. § 143-215.10H as "a person, other than a grower, who provides 250 or more animals to a swine farm and who either has an ownership interest in the animals or otherwise establishes management and production standards for the permit holder for the maintenance, care, and raising of the animals." Under the statute, "[a]n ownership interest includes a right or option to purchase the animals." *Id.*

discharge to surface waters or wetlands. Currently, after such a discharge from the waste collection, treatment, storage and application systems (including the land application sites), the permittee must collect a sample from the source waste lagoon within 72 hours and analyze it for fecal coliform bacteria, BOD5, Total suspended solids, Total P, NH3-N, TKN or TN, and NO3-N. In the Stakeholder Draft, the agency proposed to shorten the time period from 72 hours to 48 hours following first knowledge of the discharge. In the draft General Permit, the agency proposes to eliminate the requirement altogether. As such, the only waste analysis submitted with the required discharge notification will be the last waste analysis conducted as required by Condition III.5. But that waste analysis ignores the presence of fecal coliform, BOD5, and total suspended solids. Commenters question the utility of a sample potentially collected months prior to the discharge that is the subject of the notification requirement. When a permittee discovers a discharge, DEQ should require the permittee to collect samples and promptly submit them for analysis so that the agency can effectively evaluate the impacts of the discharge on receiving waters.

*ii. Odor control*

Commenters are concerned by DEQ's removal of two proposals from the Stakeholder Draft that, if included in the final General Permit, could help mitigate odor concerns. Commenters encourage DEQ to re-insert these conditions.

Decades ago, the Blue Ribbon Study Commission on Agricultural Waste concluded that "odor control is a legitimate public policy issue" and that "odor can be minimized by using a variety of recognized best management practices that range from air scrubbing systems to simple housekeeping."<sup>99</sup> However, the report lamented that, at the time, the practices were not required as an element of waste management planning" and were not "eligible for reimbursement under the state's Agriculture Cost Share Program for Nonpoint Source Pollution Control."<sup>100</sup> The legislature responded by correcting both deficiencies in the regulatory regime.

State law now requires every animal waste management plan to include "[a] checklist of potential odor sources and a choice of site-specific, cost-effective remedial best management practices to minimize those sources."<sup>101</sup> And funding is available from the Agricultural Cost Share Program to install these best management practices.<sup>102</sup> Moreover, an animal waste management plan cannot be approved "unless a technical specialist certifies that the system is designed and installed to properly collect, treat, store, or apply animal waste."<sup>103</sup> And when

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<sup>99</sup> Blue Ribbon Study, *supra* note 1, at 16.

<sup>100</sup> *Id.*

<sup>101</sup> N.C. Gen. Stat. § 143-215.10C(e)(1).

<sup>102</sup> N.C. Gen. Stat. § 106-850(b)(5).

<sup>103</sup> 02 N.C. Admin. Code 59E .0103(a); *see also* 15A N.C. Admin. Code 02T .1304(b)(2) ("The technical specialist shall certify that the best management practices that comprise the approved plan meet applicable standards and specifications, pursuant to G.S. 143-215.10C.").

certifying an animal waste management plan, a technical specialist must confirm that the plan includes a “Waste Management Odor Control Checklist” and sources of odors “have been evaluated with respect to this site and Best Management Practices to Minimize Odors . . . have been selected and included in the waste management plan.”<sup>104</sup> However, a waste management plan must be implemented in order to be effective, and DEQ must ensure adequate steps are taken by permittees to control odorous emissions.

In Condition I.3, the Stakeholder Draft stated that “violation of the terms or conditions of the COC or the [certified animal waste management system, which includes the Odor Control Checklist] shall be a violation of this General Permit subject to enforcement action.” However, the draft General Permit strikes the reference to the Odor Control Checklist. Ultimately, since the Odor Checklist will remain part of each certified animal waste management plan, commenters are concerned that DEQ is evincing a reluctance to enforce the requirements of the plan pertaining to odor control measures.

This concern is elevated in light of the deletion of another proposal in the Stakeholder Draft that, in a new Condition V.12, would have obligated permittees to “comply with 15A N.C. Admin. Code 02D .1806 – Control and Prohibition of Odorous Emissions.” Multiple industry stakeholders objected to this proposal, claiming that permittees were exempt from the rule cited. However, by deleting the requirement entirely, DEQ overlooked the indisputable applicability of 15A N.C. Admin. Code 02D .1802, a rule designed to ensure control of odors from animal operations using liquid animal waste management systems, as well as the requirements in subsequent rules pertaining to odor best management plans<sup>105</sup> and reporting requirements applicable when DEQ receives odor complaints.<sup>106</sup>

The permit cannot adequately protect the people living in nearby communities and the environment from the operation of an animal waste management system if it completely overlooks the importance of odor control.

## **II. Equity**

### **A. The General Permit must take cumulative impacts into account**

The General Permit must enable DEQ to take into account the full impact of each facility it covers, including the cumulative impacts of the pollution they produce with that of surrounding facilities, on health and the environment. To accomplish this, commenters request that the agency complete the development of its EJ tool, which should include robust, public data on pollution, siting of facilities, and nearby populations. The agency must implement the EJ tool

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<sup>104</sup> N.C. Soil & Water Commission, *Animal Waste Management Plan Certification*, <http://www.ncagr.gov/SWC/tech/documents/AppenxAnimalWasteMgtCert.pdf> (last visited Feb. 25, 2019).

<sup>105</sup> 15A N.C. Admin. Code 02D .1803.

<sup>106</sup> 15A N.C. Admin. Code 02D .1804.

fully, and if it cannot do so before it issues this General Permit, it should shorten the duration of the General Permit to two years so that it can incorporate the EJ tool into permitting decisions at the first available opportunity.

Commenters recommend that DEQ make the following changes in the final General Permit:

- Take the cumulative burden of pollution on vulnerable communities nearby hog operations into account in permitting decisions;
- Complete and implement a robust EJ tool before issuing this final General Permit; alternatively, if no such tool is available, shorten the duration of this final General Permit to two years;
- Begin the process of moving facilities in the 100-year floodplain out of the General Permit;
- Collect information on antibiotics used at facilities in the application for coverage under the final General Permit;
- Shorten crop removal times; and
- Increase setback distances.

*i. Authority under state law*

The agency is fully authorized by law to take these steps and implement a robust EJ tool. This falls squarely within the legislature’s declaration of state environmental policy, which

[D]eclare[d] that it shall be the continuing policy of the State of North Carolina to conserve and protect its natural resources and to create and maintain conditions under which man and nature can exist in productive harmony. Further, it shall be the policy of the State to seek, for all of its citizens, safe, healthful, productive and aesthetically pleasing surroundings; [and] to attain the widest range of beneficial uses of the environment without degradation, risk to health or safety.<sup>107</sup>

With respect to the General Permit, North Carolina law specifically authorizes DEQ to “conduct any inquiry or investigation it considers necessary before acting on an application.”<sup>108</sup> Moreover, state statute explicitly obligates the agency to consider the cumulative effect of its permitting decisions.<sup>109</sup> In this case, to meet its ethical obligations, fulfill the purpose of its

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<sup>107</sup> N.C. Gen. Stat. § 113A-3; *see also* N.C. Const. art. XIV, sec. 5.

<sup>108</sup> N.C. Gen. Stat. § 143-215.10C(c).

<sup>109</sup> N.C. Gen. Stat. § 143-215.1(b)(2) (“The Commission shall also act on all permits so as to prevent violation of water quality standards due to the cumulative effects of permit decisions. Cumulative effects

authorizing statute, and achieve the minimum required by federal law, DEQ must take the cumulative impacts of all pollution, including and especially both poultry and hog waste, into account in its decision to issue a COC under the General Permit. Creating a robust and meaningful (data-driven) EJ tool and using it in permitting decisions would be a meaningful step towards meeting these legal obligations.

*ii. Obligations under federal civil rights law*

In September 2014, the North Carolina Environmental Justice Network, Waterkeeper Alliance, and Rural Empowerment Association for Community Help filed a complaint with the EPA under Title VI of the Civil Rights Act of 1964.<sup>110</sup> The complaint alleged that DEQ, in issuing an updated General Permit earlier that year, had permitted swine facilities “to operate with grossly inadequate and outdated systems of controlling animal waste and little provision for government oversight, which has an unjustified disproportionate impact on the basis of race and national origin against African Americans, Latinos and Native Americans,” in violation of those communities’ civil rights.<sup>111</sup>

In January 2017, in response to this complaint and EPA’s subsequent investigation, EPA sent DEQ a letter expressing “deep concern about the possibility that African Americans, Latinos, and Native Americans have been subjected to discrimination as the result of NC DEQ’s” swine facility permitting and oversight regime.<sup>112</sup> In support of that finding, EPA identified, in part, that:

Residents, many of whom have lived in these communities for generations, described problems caused by their proximity to the industrial hog operations that have negatively changed their lives and communities . . . . For some residents who live near large numbers of industrial swine operations [there is great geographic concentrations of this industry], they said stench is a weekly event lasting several days. They also stated that they had no warning of when confinement house fans . . . will again bring the stench and actual waste onto their homes, property or themselves. Some described feelings as though they are prisoners in their own homes.

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are impacts attributable to the collective effects of a number of projects and include the effects of additional projects similar to the requested permit in areas available for development in the vicinity. All permit decisions shall require that the practicable waste treatment and disposal alternative with the least adverse impact on the environment be utilized.”).

<sup>110</sup> 42 U.S.C. § 2000d; 40 C.F.R. Part 7.

<sup>111</sup> Earthjustice, *Complaint Under Title VI of the Civil Rights Act of 1964*, 42 U.S.C. § 2000d, 40 C.F.R. Part 7 (Sept. 3, 2014), <https://earthjustice.org/sites/default/files/files/North-Carolina-EJ-Network-et-al-Complaint-under-Title-VI.pdf>.

<sup>112</sup> EPA, Letter from Lilian Dorka, Director of Environmental Civil Rights Compliance with the EPA, to William Ross, Acting Secretary of N.C. DEQ (Jan. 12, 2017), [https://www.epa.gov/sites/production/files/2018-05/documents/letter\\_of\\_concern\\_to\\_william\\_g\\_ross\\_nc\\_deq\\_re\\_admin\\_complaint\\_11r-14-r4.pdf](https://www.epa.gov/sites/production/files/2018-05/documents/letter_of_concern_to_william_g_ross_nc_deq_re_admin_complaint_11r-14-r4.pdf).

Residents described a loss of community that has occurred since the industrial hog farms began operating. They reported that young adults leave and do not return because of the odors, fear of health impacts from the air and drinking water, and other impacts. Prior to the arrival of the industrial hog operations, many of their family, community, and church gatherings has been held outdoors. Now they said those events are rarely held outdoors or if attempted outdoors, they are marred or forced to end early due to odors, flies, and other impacts.

Residents described increases in cases and severity of asthma and other respiratory illnesses, nausea, headaches and other health conditions. They stated that these impacts have been compounded by the increase in industrial poultry operations . . . .

The adverse impacts on nearby residents from the lagoon spray field method of treatment and disposal of waste from industrial swine operations are documented in numerous peer reviewed scientific studies, including more than thirty conducted in North Carolina. At [EPA's External Civil Rights Compliance Office's] request, EPA's Office of Research and Development (ORD) recently reviewed seven reports published by or with federal agencies. ORD stated that the reports provide consistent support for the occurrence of potential health hazards (e.g., eye, nose, and throat irritation; headaches; respiratory effects including asthma exacerbation [all effects associated with exposure to ammonia and hydrogen sulfide]; waterborne disease) at industrial swine operations and in their waste. Even while there is significant uncertainty regarding the levels of exposure in nearby communities to the identified contaminants and the risk of health effects attributable to those exposures, the risk for specific health effects in communities near industrial operations is a concern.<sup>113</sup>

EPA also noted that:

While an industrial swine facility operator may apply for an individual permit or certificate of coverage to operate in a particular location, it is NC DEQ that determines whether that facility will be allowed to operate and under what type of permit and its conditions.<sup>114</sup>

Subsequent negotiations between complainants and DEQ led, in May 2018, to a settlement agreement that, *inter alia*, established a revised General Permit stakeholder process designed to facilitate expanded and balanced stakeholder review of the General Permit and

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<sup>113</sup> *Id.*

<sup>114</sup> *Id.* at 9.

provide for robust and meaningful public participation.<sup>115</sup> This settlement was not a commitment by DEQ to use specific language in the final General Permit; rather this settlement expressed DEQ’s understanding of its obligations under federal law and presented a draft solution. The agency committed to “conduct a meaningful and substantial review of comments made by all stakeholders in the stakeholder and public notice and comment period, but cannot make assurance as to the content of the final General Permit.”<sup>116</sup> Commenters support the draft solutions outlined in that settlement agreement and note that they are well-supported by data and tailored to help the agency meet its legal obligations.

One way through which the agency committed in the settlement to coming into compliance with federal civil rights law was by developing an EJ tool with stakeholder input.<sup>117</sup> This tool was to inform future permitting decisions by “review[ing], as appropriate, and incorporat[ing] available data that are relevant to environmental, demographic, and health factors.”<sup>118</sup> The agency did this with a goal of completing the tool by April 2019.<sup>119</sup> The EJ tool is a way to assess the burden placed on specific communities through a confluence of risk exposure. EPA’s understanding of environmental justice risk assessment and tools, expressed through its own EJSCREEN tool, highlights the centrality of cumulative impacts to any EJ assessment.<sup>120</sup> Other standards for similar assessments underscore the need for a cumulative impacts analysis in order to avoid environmental injustice and running afoul of federal civil rights burdens. The National Research Council has noted, “[I]t is difficult to imagine any risk assessment in which it would not be important to understand the effects of coexposures to agents or stressors . . . or to identify characteristics of the of the affected populations that could contribute to vulnerability to a given exposure.”<sup>121</sup> In the case of eastern North Carolina, there is a robust body of research that points to significant vulnerability and exposure burden from multiple sources. DEQ must use a data-driven approach to meet its obligation to protect these communities, especially as demographic and environmental trends, as well as the aging nature of the infrastructure of the hog facilities, will increase vulnerability absent corrective action.

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<sup>115</sup> See Title VI Settlement Agreement, *supra* note 7 at 4–5; *id.* at 3 (The stakeholder process will be designed to provide “meaningful opportunities for public input... and public participation” in the revision of North Carolina’s General Swine Permit).

<sup>116</sup> *Id.* at 4.

<sup>117</sup> *Id.* at 6.

<sup>118</sup> *Id.*

<sup>119</sup> *Id.*

<sup>120</sup> <sup>120</sup> EJSCREEN identifies places with “combination of environmental and demographic” characteristics that, together, indicate heightened vulnerability.” EPA, *Purposes and Uses of EJSCREEN*, <https://www.epa.gov/ejscreen/purposes-and-usesejscreen> (last updated June 3, 2016) (emphasis added).

<sup>121</sup> NATIONAL RESEARCH COUNCIL, *SCIENCE AND DECISIONS: ADVANCING RISK ASSESSMENT* 219 (2009).

iii. *Cumulative burdens in eastern North Carolina*

The burden that the environment and communities of concern face from the concentration of swine alone warrants a cumulative impacts analysis before DEQ issues permits.

Exposure to pollution from industrial animal operations can lead to devastating effects to public health.<sup>122</sup> As noted above, a recent study conducted by Duke Medical School and published in the North Carolina Journal of Medicine found that residents who live near industrial hog operations have higher death rates from causes such as anemia, kidney disease, tuberculosis and low birth weight than those residents who live further away from such operations.<sup>123</sup> The authors suggest that the extreme concentration of hog operations in the region could be a contributing factor to the dramatic results: “One unique environmental characteristic of southeastern North Carolina is the presence of multiple hog concentrated animal feeding operations.”<sup>124</sup>

Although this study of human premature mortality in populations living in eastern North Carolina sheds new light on the problem hog facilities pose, researchers have long found high mortality and other problems amongst the vulnerable populations disproportionately burdened by hog facilities in eastern North Carolina.<sup>125</sup>

However, communities of concern are facing a burden from much more than swine facilities; specifically, the influx of poultry operations in eastern North Carolina has added a significant environmental burden. According to the Environmental Working Group (“EWG”) and Waterkeeper Alliance, the number of birds in poultry operations in North Carolina rose from 147 million in 1997 to 516 million in 2018.<sup>126</sup> During this time, the number of industrial poultry operations also increased dramatically with larger annual increases in the most recent years.<sup>127</sup> The concentration of poultry operations in the same areas as the most intense concentration of

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<sup>122</sup> See, e.g., Steve Wing & S. Wolf, *Intensive Livestock Operations, Health, and Quality of Life Among Eastern North Carolina Residents*, 108 ENVTL. HEALTH PERSP. 233 (Mar. 2000); Steve Wing, *et al.*, *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 92 ENVTL. HEALTH PERSP. 92 (2013); Steve Wing, *et al.*, *Environmental Injustice in North Carolina’s Hog Industry*, 108 ENVTL. HEALTH PERSP. 225 (2000); Steve Wing, *et al.*, *Air Pollution and Odor in Communities Near Industrial Swine Operations*, 1362 ENVTL. HEALTH PERSP. 1362 (2008).

<sup>123</sup> Julia Kravchenko et al., *Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations*, 79 N.C. MED. J. 278 (2018).

<sup>124</sup> *Id.*

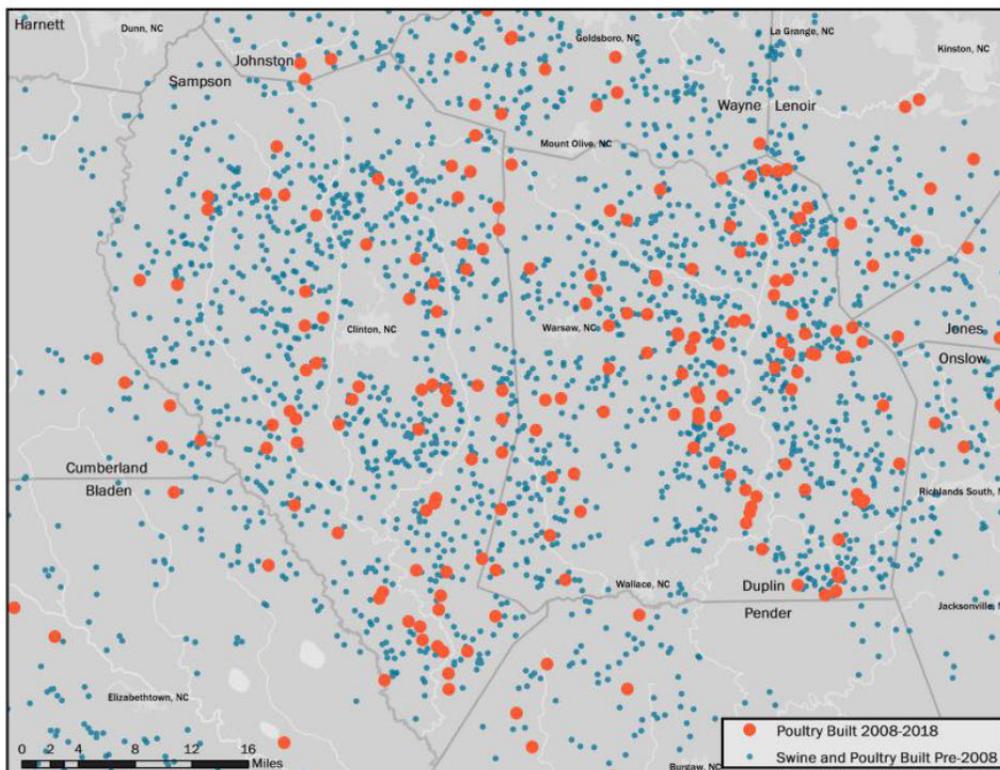
<sup>125</sup> See, e.g. Steve Wing et al., *Environmental Injustice in North Carolina’s Hog Industry*, 108 ENVTL. HEALTH PERSP. 225, 225 (2000); Steve Wing & Jill Johnston, *Industrial Hog Operations in North Carolina Disproportionately Impact African-Americans, Hispanics, and American Indians* at 6 (revised Oct. 19, 2015).

<sup>126</sup> Soren Rundquist & Don Carr, *Under the Radar: new Data Reveals N.C. Regulators Ignored Decade-Long Explosion of Poultry CAFOs* EWG 3 (2019), [https://cdn3.ewg.org/sites/default/files/u352/EWG\\_NC-CAFO\\_Report\\_C05.pdf?\\_ga=2.1334065.1430473716.1551716861-932720297.1551716861](https://cdn3.ewg.org/sites/default/files/u352/EWG_NC-CAFO_Report_C05.pdf?_ga=2.1334065.1430473716.1551716861-932720297.1551716861).

<sup>127</sup> *Id.*

hog operations compounds this problem. Waterkeeper and EWG found that the two counties with the most hog production (Duplin and Sampson Counties) are also the top two counties for poultry production (Figure 6).<sup>128</sup> These facilities are clustered tightly together,<sup>129</sup> placing an intense pollution burden on nearby waters and communities.<sup>130</sup>

Figure 6: *Poultry Operations Packed Into Sampson and Duplin Counties*



The poultry operations produce many of the same pollutants as hog operations, and these pollutants compound the impacts of one another. For example, although there is some variation in exact waste constituents between species, industrial animal facilities generally emit ammonia and nitrogen, hydrogen sulfide, methane, particulate matter, pathogens, volatile organic compounds, and volatile fatty acids.<sup>131</sup> In 2016, DEQ reported that poultry operations are the largest and fastest growing source of nutrients (especially nitrates and phosphorous) from animal

<sup>128</sup> *Id.* The report also noted that 23 percent of all new poultry operations identified were located in these two counties. *Id.*

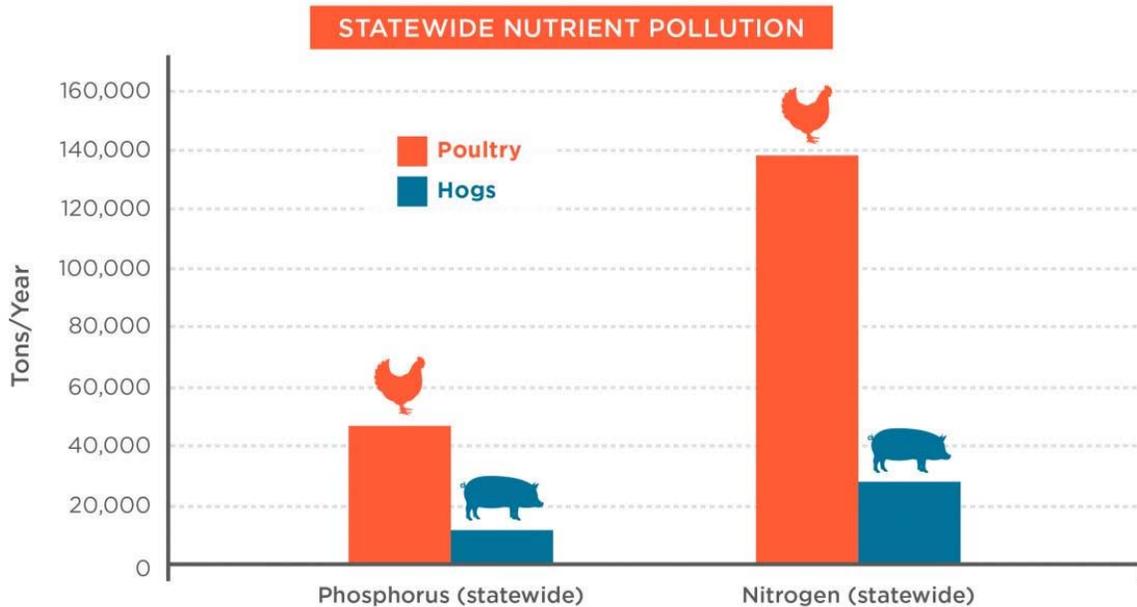
<sup>129</sup> *Id.* at 4–5 (Noting that within Duplin and Sampson counties, an astonishing 93 percent of the poultry operations are within three miles of at least 20 other poultry or swine farms).

<sup>130</sup> *Id.* at 4.

<sup>131</sup> Mich. Dep’t of Env’tl. Quality, *Concentrated Animal Feeding Operations (CAFOs) Chemicals Associated with Air Emissions 2* (2006), [https://www.michigan.gov/documents/CAFOs-Chemicals\\_Associated\\_with\\_Air\\_Emissions\\_5-10-06\\_158862\\_7.pdf](https://www.michigan.gov/documents/CAFOs-Chemicals_Associated_with_Air_Emissions_5-10-06_158862_7.pdf).

waste in the state.<sup>132</sup> There are adverse health consequences of this level of pollution exposure. For example, nitrates can contaminate drinking water and pose a particular threat to fetuses and young babies. Air pollution from CAFOs is also “strongly correlated” with infant mortality.<sup>133</sup>

Figure 7: *Statewide Nutrient Pollution from Swine and Hog Operations*



Source: EWG via 2018 North Carolina Agricultural Chemicals Manual

The people who live near these facilities in North Carolina are especially vulnerable to the effects of cumulative impacts of pollution. Communities of color in the eastern part of North Carolina are disproportionately burdened by pollution in general.<sup>134</sup> Other socioeconomic factors contribute to an acute vulnerability to pollution.<sup>135</sup> For example, poverty compounds the impact of air pollution. One researcher noted:

<sup>132</sup> Heather Patt, DEQ, *A Comparison of PAN and P<sub>2</sub>O<sub>5</sub> Produced from Poultry, Swine, and Cattle Operations in North Carolina* (2017), [https://ncdenr.s3.amazonaws.com/s3fs-public/Environmental%20Management%20Commission/Water Quality Committee Meetings/2017/March/Attachments/Basinwide%20Manure%20Production%20Report%20%20Appendices.pdf](https://ncdenr.s3.amazonaws.com/s3fs-public/Environmental%20Management%20Commission/Water%20Quality%20Committee%20Meetings/2017/March/Attachments/Basinwide%20Manure%20Production%20Report%20%20Appendices.pdf).

<sup>133</sup> Stacy Sneeringer, *Does Animal Feeding Operation Pollution Hurt Public Health? A National Longitudinal Study of Health Externalities Identified by Geographic Shifts in Livestock Production*, 91 AM. J. AGRIC. ECON. 124, 135 (2009).

<sup>134</sup> See UNC Center for Civil Rights, *The State of Exclusion: An Empirical Analysis of the Legacy of Segregated Communities in North Carolina* (2013), <http://www.uncinclusionproject.org/documents/stateofexclusion.pdf>.

<sup>135</sup> See e.g. Steve Wing et al., *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 121 ENVTL. HEALTH PERSP. 96, 96 (2013).

Industrial hog operations in North Carolina are disproportionately located in low income communities of color where there is more potential for exposure to outdoor air pollutants due to older homes that are not airtight and have no air conditioning. Many residents also lack the financial resources to travel and choose activities that could help them avoid high pollution.<sup>136</sup>

The totality of pollution takes a particularly harsh toll on the communities of concern proximate to the hog facilities subject to this General Permit. DEQ must fulfill its obligation to address and mitigate these harms, and it must do so through promptly creating and *deploying* a meaningful EJ tool. If DEQ cannot do so before this permit process is finished, it must shorten the duration of the permit to two years so that it can incorporate the EJ tool into the next iteration of the permit.<sup>137</sup>

## B. Equity and climate

North Carolina must adjust its permitting program to adapt to climatic shifts by reviewing and updating its process for responding to extreme weather events such as hurricanes and tropical storms. In doing so, DEQ should consider what changes are necessary to ensure that facilities can operate without regularly relying on “draw down” practices,<sup>138</sup> mass burial of mortalities in already swollen water tables,<sup>139</sup> or “emergency” waste spraying on already saturated fields after large precipitation events.<sup>140</sup> These types of inherently risky, and now

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<sup>136</sup> Leah Schinasi et al., *Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations*, 22 EPIDEMIOLOGY 208, 214 (2011).

<sup>137</sup> In the event that DEQ shortens the permit duration to 2 years, which Commenters recommend, Commenters also recommend that DEQ and related agencies work with growers and integrators to provide regulatory certainty to farmers. Examples of actions that DEQ and other government entities could take to provide this certainty to growers: working with integrators to ensure that contracts run at least 5 years, in coordination with financing for any upgrades, and requiring integrators post bonds for lagoon closure, as discussed during the Stakeholder process.

<sup>138</sup> The draft General Permit currently allows operators to lower lagoon levels “to provide for additional temporary storage for excessive rainfall during the hurricane season.” Draft General Permit, Condition II.29. Given that the “hurricane season” is a predictable few months every year (June 15 through October 31), continued inclusion of this provision ignores the nutrient planning and agronomic benefit that these applied wastes are supposed to supply and can lead to excess application of wastes onto lands resulting in runoff. While commenters appreciate the disposal candor implied in this term, it is unreasonable for it to continue being included in the Draft General Permit. For further discussion, *see supra* Section IV.

<sup>139</sup> H. Claire Brown, *In the Carolinas, Farmers Face the Painful Task of Livestock Disposal*, *The New Food Economy* (Sept. 20, 2018), available at <https://newfoodeconomy.org/north-south-carolinas-farmers-livestock-chicken-pig-disposal-hog-waste-lagoons-flood/>.

<sup>140</sup> *See, e.g.*, DEQ, *Annual Report on Animal Waste Operations Permitting, Inspection and Compliance Activities July 1, 2016 through June 30, 2017*, tbl. 4 (2017) (stating that inadequate freeboard was among the most common type of violation or deficiency uncovered by inspectors and that the “high number of freeboard violation [sic] is mainly attributed to Hurricane Matthew”),

[https://www.ncleg.net/documentsites/committees/BCCI-6658/Reports/FY\\_percent202017-18/DEQ/DWM\\_Animal\\_Feeding\\_Operations\\_percent20FY\\_2016-17\\_Annual\\_Report-2018-06-13.pdf](https://www.ncleg.net/documentsites/committees/BCCI-6658/Reports/FY_percent202017-18/DEQ/DWM_Animal_Feeding_Operations_percent20FY_2016-17_Annual_Report-2018-06-13.pdf); Charles Bethea, *After Florence, Manure Lagoons Breach, and Residents Brace for the Rising Filth*, *THE*

predictable, “emergency” waste management practices should be the exception, not the rule. Given the special vulnerability of the people who live near the densest concentration hog and poultry operations, as the climate continues to change environmental and weather conditions, the increased burden will fall on communities of concern, deepening environmental injustice.

As discussed, *supra* Section I, commenters appreciate DEQ’s proposal to require groundwater monitoring of facilities in the 100-year floodplain, but given the evidence about increasing storms intensity and frequency and the vulnerability of nearby populations, DEQ should discontinue its practice of permitting hog operations that are located in the 100-year floodplain and rely on a lagoon and sprayfield system for hog waste management.<sup>141</sup> Currently, approximately 62 industrial hog operations house more than 235,000 hogs in the 100-year floodplain in eastern North Carolina.<sup>142</sup> These animals produce more than 201 million gallons of wet waste each year, which is stored in approximately 166 lagoons within the floodplain. These facilities have become extremely vulnerable to flooding and catastrophic failure, and, as a result, will be unable to comply with the terms of the draft General Permit, if granted a renewed COC. Commenters believe the evidence that that these facilities are not viable in the long run is sound, and as a result it is best to begin transition planning as soon as possible, and definitely during the next few years.

C. DEQ should make changes to the information collection, setback, and crop removal sections of the permit to mitigate inequity

i. *Antibiotics (Conditions III.1 et seq)*

DEQ has the authority to collect information it deems necessary, including about antibiotics use at hog facilities, to evaluate the application for coverage. Commenters request the DEQ use this authority to evaluate the risk from antibiotic resistant bacteria to waterways and human health in nearby communities.

It is the policy of the state of North Carolina to conserve natural resources, and in addition the North Carolina General Assembly provided DEQ with the authority to “conduct any inquiry or investigation it considers necessary before acting on an application [of an animal feeding operation for permit coverage].”<sup>143</sup> Because antibiotic resistant bacteria at hog operations poses a significant pollution threat to nearby waterways and local populations, and therefore DEQ must take steps to gather information about antibiotic use at permitted facilities.

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NEW YORKER (Sept. 21, 2018), <https://www.newyorker.com/news/dispatch/after-florence-manure-lagoons-breach-and-residents-brace-for-the-rising-filth> [attached as Exhibit 18].

<sup>141</sup> See N.C. Gen. Stat. § 106-803(a2) (“No component of a liquid animal waste management system for which a permit is required under Part 1 or 1A of Article 21 of Chapter 143 of the General Statutes, other than a land application site, shall be constructed on land that is located within the 100-year floodplain.”).

<sup>142</sup> Soren Rundquist, *Exposing Fields of Filth*, EWG (Nov. 4, 2016), <https://www.ewg.org/research/exposing-fields-filth-hurricane-matthew>.

<sup>143</sup> N.C. Gen. Stat. § 143-215.10C(c).

Antibiotics used routinely at industrial animal feeding operations create a breeding ground for antibiotic-resistant superbugs.<sup>144</sup> “Resistant bacteria can travel via air or water and can wind up in the soil when manure is applied to crops. Even insects and rats can carry resistant bacteria away from [industrial operations].”<sup>145</sup> Researchers have found that workers at hog facilities carry bacteria home to their families and into the community,<sup>146</sup> and also that proximity to swine manure application sites is associated with exposure to antibiotic-resistant pathogens.<sup>147</sup>

DEQ should require submission of veterinary feed directives (VFDs) for antibiotics use on the facility going back two years for each application for coverage under the General Permit considered by the agency. VFDs are prescriptions for antibiotics used in feed, for which records must be maintained for two years under federal regulations.<sup>148</sup> Feed use of antibiotics represents the vast majority of the livestock sales of medically important antibiotics (those important for human medicine).<sup>149</sup> VFDs are thus a good source of data for evaluating the risk of the spread of antibiotic resistant bacteria via waterways (or otherwise) that a particular facility may pose, and that data should be gathered for each application to help the agency evaluate the application. DEQ should make this information available to the public, and should use this information to analyze the risk to human health of these facilities. The World Health Organization has identified routine prevention uses of medically important antibiotics as a problematic use of antibiotics that is a contributing factor to the rise of antibiotic resistant infections in humans,<sup>150</sup> the DEQ should identify operations that use antibiotics for routine prevention uses.

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<sup>144</sup> CDC, *Antibiotic Resistance Threats in the United States, 2013*, 37 (2013), <https://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf>.

<sup>145</sup> Carmen Cordova, *Antibiotic Resistance: From the Farm to You*, Natural Resources Defense Council (March 2015) FS 15-02-A, <https://www.nrdc.org/sites/default/files/antibiotic-resistance-farms-FS.pdf>.

<sup>146</sup> See, e.g., Sarah Hatcher et al., *The Prevalence of Antibiotic-Resistant Staphylococcus aureus Nasal Carriage among Industrial Hog Operation Workers, Community Residents, and Children Living in Their Households: North Carolina, USA*, 125 *Envtl. Health Persp.* 256 (2017); Maya Nadimpali et al., *Livestock-Associated, Antibiotic-Resistant Staphylococcus aureus Nasal Carriage and Recent Skin and Soft Tissue Infection among Industrial Hog Operation Workers*, *PLOS ONE* (2016).

<sup>147</sup> Joan Casey et al., *High-Density Livestock Operations, Crop Field Application of Manure, and Risk of Community-Associated Methicillin-Resistant Staphylococcus aureus Infection in Pennsylvania*, 173 *JAMA INTERNAL MED.* 21 (2013).

<sup>148</sup> 21 C.F.R. § 558.6(c)(3).

<sup>149</sup> FDA, 2017 Summary Report on Antimicrobials Sold or Distributed for Use in Food-Producing Animals (Dec. 2018), tbl. 6a,

<https://www.fda.gov/downloads/ForIndustry/UserFees/AnimalDrugUserFeeActADUFA/UCM628538.pdf>

<sup>150</sup> See WORLD HEALTH ORGANIZATION, *The World is Running Out of Antibiotics, WHO Report Confirms* (Sept. 19, 2017) <https://www.who.int/medicines/news/2017/world-running-out-antibiotics-WHO-report/en/>; see also CDC, *Biggest Threats and Data*, [https://www.cdc.gov/drugresistance/biggest\\_threats.html?CDC\\_AA\\_refVal=https%3A%2F%2F](https://www.cdc.gov/drugresistance/biggest_threats.html?CDC_AA_refVal=https%3A%2F%2F) (last updated Nov. 26, 2018).

*ii. Crop removal (Condition II.28)*

The Draft General Permit allows 24 months for crops to sit and decompose before they must be removed from land. This adds to the burden of the communities near the sites because over the course of the excessively long 24-month period, crops will decompose releasing additional nitrogen and phosphorous into the environment. As discussed above, this burden will fall hardest on those already experiencing a multitude of impacts from this industry. DEQ must implement more stringent requirements and reduce the amount of time Permittees have to remove crops after harvest.

*iii. Setbacks (Condition I.12)*

In the draft General Permit DEQ establishes the minimum setbacks required by law. However, these standards are insufficiently protective of health and the environment; DEQ may meet these standards by establishing more stringent setback requirements in limited circumstances and commenters request that the agency does so.<sup>151</sup> Given the information, *supra*, about the dangers of hog waste to nearby populations, greater setbacks would reduce the inequitable impact of the current lagoon and sprayfield system until it can be phased out. Commenters recommend more stringent setbacks in general, but especially near schools and drinking water wells.

### **III. Transparency in Permitting and Oversight**

DEQ has taken important steps in providing transparency in permitting, operations, and oversight. Commenters thank DEQ for encouraging more transparency in the draft General Permit. DEQ has proposed the following changes, all of which commenters request that DEQ maintain in the final General Permit:

- Requiring permittees submit important records to the agency that, to date, have been maintained only on-site and requiring that records be maintained for a full five years (Condition I.4, II.10, III.15, III.18);
- explaining that new and expanded swine operations may not be covered under the General Permit (Condition I.7);
- clarifying the conditions that trigger the need to transition a facility to an individual permit (preface);
- making clear that the conditions in the COCs are enforceable as part of the General Permit (preface); and
- providing for unannounced inspections (Condition IV.1).

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<sup>151</sup> 15A N.C. Admin. Code 02T .1304(b)(4)-(5).

These proposed changes should be maintained in the final General Permit.

DEQ should make additional changes to the final General Permit to make clear what operations are covered under the General Permit and to ensure that the public is fully informed about where, when, and how much waste is managed and disposed of by permittees during normal operations and in the event of unexpected discharges.

- Make explicit in the final General Permit that covered lagoons and digesters require coverage under an individual permit;
- Reinsert language that requires automated rain gauges be installed “on-site”;
- Clarify that permittees have two years to comply with the updated five-year record maintenance requirement;
- Require additional information be submitted through the annual inspection form; and
- Phase-in electronic submission of records.

A. Clarify permit coverage and triggers

Commenters support DEQ’s proposed statement in Condition I.7 that “[n]ew swine operations and expansion of existing swine operations are not eligible for coverage” under the General Permit. DEQ should maintain this language in the final General Permit.

Commenters also support the language added to the preface of the permit listing the circumstances under which DEQ would require an operator to transition away from coverage under a General Permit and to an individual permit. It is critical that DEQ fully and consistently enforce this language in the General Permit and move non-compliant operations, operations discharging into surface waters, and operations proposing to add lagoons covers, among other operations, to an individual permit.<sup>152</sup> Consistently applying these criteria will support greater compliance with the General Permit and provide the regulated industry with a greater certainty and understanding of when an operation may be required to obtain an individual permit.

B. Increase reporting and monitoring requirements (Conditions II, III)

In Condition II.10, DEQ proposes several changes to the way operators manage mortalities on-site. Commenters are pleased to see that DEQ discourages the use of burial as a means of disposing of dead animals. Commenters recommend that DEQ go further and prohibit burial in the 100-year floodplain under all circumstances. Finally, commenters recommend that

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<sup>152</sup> See 15A N.C. Admin. Code 02T .0120(a) (“The Division shall consider an applicant's compliance history in accordance with G.S. 143-215.1(b)(4)b.2. and with the requirements contained in this Rule for environmental permits and certifications issued pursuant to Article 21.”).

DEQ retain the proposal that operators submit records documenting the location, quantity, and dates for burials included in the draft General Permit.

DEQ also proposes changes to Condition III.3(b), which allows DEQ to require the installation of an automated rain gauge and recorder in certain circumstances. For a complete discussion of the proposed changes to this condition, see Section IV below. DEQ proposes removing language specifying that this technology be installed “on-site.” Commenters recommend that DEQ reinsert the language requiring that such equipment be installed on site to ensure that any rain gauge and recorder installed at the request of DEQ measure rain conditions at the permitted facility.

DEQ proposes that operators maintain records for five years under Condition III.15. Commenters support DEQ’s proposal and request that this change be maintained in the final General Permit. Further, commenters support a two-year implementation period for this requirement.

In Condition III.18, DEQ proposes requiring operators to submit an annual report to the agency detailing information about the facility and waste management practices. Annual reporting of this information is a step toward increased transparency, and commenters support this proposed requirement. DEQ should require more information in the annual reporting form, including but not limited to the number of mortalities and the presence and composition of liners. To make the data easier for the agency to review, store, and provide to the public and to reduce the burden on permittees, commenters suggest requiring electronic submission of these records.<sup>153</sup> Commenters would support notice of this electronic submission requirement and a transition period prior to its effective date. This approach would be similar to that required of National Pollutant Discharge Elimination System permittees in the transition to electronic submission requirements for various records. EPA announced this new requirement in 2015, but allowed time before it went into effect.<sup>154</sup> The transition period would allow permittees to adjust to the new requirement, overcome any technical difficulties, and benefit from ongoing efforts to improve internet connectivity in rural communities.<sup>155</sup> In addition, it would allow permittees to reduce duplication of effort when collecting and compiling records.

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<sup>153</sup> Concentrated animal feeding operations operating under an NPDES permit will be required to submit annual program reports electronically by December 21, 2020. 40 C.F.R. § 127.16(a).

<sup>154</sup> See 80 Fed. Reg. 64,063 (Oct. 22, 2015); 40 C.F.R. § 127.16 (addressing implementation of electronic reporting requirements).

<sup>155</sup> Ongoing efforts include Gov. Cooper’s “Hometown Strong” initiative and its prioritization of extension of broadband access to rural NC. Press Release, Governor, *Governor Cooper Launches “Hometown Strong” to Support North Carolina’s Rural Communities* (Feb. 1, 2018), <https://governor.nc.gov/news/governor-cooper-launches-%E2%80%9Chometown-strong%E2%80%9D-support-north-carolina%E2%80%99s-rural-communities>. Broadband access is also a big priority for the Rural Center. Issue Brief, *Broadband*, <https://www.ncruralcenter.org/wp-content/uploads/2018/05/RC-Broadband-Brief.pdf>.

During the public hearings on the draft General Permit, industry representatives repeatedly claimed that the information contained in the annual reporting form should be collected during annual inspections. Thorough annual inspections require several hours of staff time, but due to consistent budget cuts over the last eight years,<sup>156</sup> DEQ staff are only able to spend a fraction of that time conducting inspections.<sup>157</sup> In addition, requiring permittees to submit annual certifications on a regular schedule will allow for DEQ to review important information from all facilities in the aggregate, rather than reviewing piecemeal information based on inspection schedules.

DEQ should require more stringent notification requirements (twelve hours) when there is a discharge, particularly a large one of at least 1,000 (III.19), 15,000 (III.20) or 1,000,000 (III.21) gallons of manure or other swine facility wastewater. Commenters support the draft General Permit requirements in the event of large discharges, however the notification times are too slow. Community members need and deserve the opportunity to respond to emergency situations (such as the discharge of thousands of gallons of manure) in real time. Commenters request that DEQ implement a shorter notification time (twelve hours). In all cases, DEQ should require that Permittees or operators send the Department all available information relating to the discharge. DEQ should reinsert the language it proposes to delete in Condition III.19. DEQ should also reproduce any reports online.

#### C. Retain “amendments” in the final General Permit (Condition I.4)

Under the current General Permit, DEQ does not require permittees to submit most records to the agency. Specifically, under the existing permit, while “major changes” and “revisions” must be submitted to DWR, and therefore become a public record, “amendments” are not required to be submitted to DEQ.<sup>158</sup> This impedes DEQ’s ability to adequately enforce General Permit requirements, fails to ensure accountability for the industry, and prevents the public from accessing critical information about hog operations in the state. While copies of all records required by the General Permit must be maintained and “readily available” at the facility,

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<sup>156</sup> See, e.g., 2011 N.C. Sess. Laws 145 §§ 13.22A, 13.25 (June 15, 2011) (moving the Forestry Division and the Division of Soil and Water Conservation from the Department of Environment and Natural Resources to the Department of Agriculture and Consumer Services). This agency reorganization deprived the state environmental agency of much of the federal funding provided under the 319 Program to address nonpoint sources pollution.; see also 2017 N.C. Sess. Laws 11 (May 11, 2017) (codified at N.C. Gen. Stat. § 106-701); 2018 N.C. Sess. Laws 113 (June 27, 2018) (codified at N.C. Gen. Stat. § 106-701, 702). This industry favoritism stands in stark contrast to the 1996 recommendation of the Blue Ribbon Study Commission that “differential treatment for agriculture be eliminated where it cannot be justified.” Blue Ribbon Study Commission on Agricultural Waste, *Report to the 1995 General Assembly of N.C. 1996 Regular Session* 23 (May 16, 1996).

<sup>157</sup> Annual Report to the North Carolina General Assembly: Animal Waste Management: July 1, 2017- June 30, 2018, tbl 1, [https://www.ncleg.gov/documentsites/committees/BCCI-6658/Reports/FY%202018-19/DEQ\\_DWR\\_Animal\\_Waste\\_Management\\_Annual\\_Report-2019-01-28.pdf](https://www.ncleg.gov/documentsites/committees/BCCI-6658/Reports/FY%202018-19/DEQ_DWR_Animal_Waste_Management_Annual_Report-2019-01-28.pdf) (listing annual inspection times for Wilmington Regional Office).

<sup>158</sup> Draft General Permit, Condition I.4.

the absence of a record submission requirement in the current General Permit prevents these records from becoming public records.<sup>159</sup> Access to these records would allow for public awareness of on-site operational changes that impact nutrient management and better prepare nearby communities to protect themselves from the risks of pollution from hog waste.

Commenters were pleased to see that the draft General Permit maintains the definition of “amendments” and edits Condition I.4 to require that permittees submit all “amendments” to a facility’s animal waste management system to DEQ within 30 days. DEQ should retain this proposed change in the final General Permit.

D. Make explicit that covered lagoons and digesters are not covered under the General Permit (Condition VII, Condition I.4)

Under Condition VII, DEQ proposed adding the “installation of a digester” to the definition of “major change”; “major changes” require the operator to seek recertification of the CAWMP and approval by DEQ before installing the “major change.”<sup>160</sup> Commenters generally support this change, and request that DEQ make explicit in the final General Permit that the General Permit *does not* allow the installation of anaerobic digesters or covers over lagoons without an individual permit from the agency.<sup>161</sup> State law prohibits issuing or modifying the General Permit to include digesters or covered lagoons.<sup>162</sup>

The North Carolina legislature has shown an interest in restricting the impact of anaerobic lagoons from swine facilities on the environment. “Anaerobic lagoon” is defined by statute as “a lagoon that treats waste by converting it into carbon dioxide, methane, ammonia, and other gaseous compounds; organic acids; and cell tissue through an anaerobic process.” N.C. Gen. Stat. § 143-215.10I(a)(1). This statutory definition includes, *inter alia*, covered lagoons and digesters. North Carolina law prohibits issuing or modifying the General Permit to “authorize the construction, operation, or expansion of an animal waste management system that serves a swine farm that employs an anaerobic lagoon as the primary method of treatment and land application of waste by means of a sprayfield as the primary method of waste disposal.” *Id.* (b). Adding a digester or a lagoon cover to an existing operation can only be permitted if the facility meets the

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<sup>159</sup> Records submitted to DEQ become public records unless they constitute confidential information under the North Carolina Public Records Act. By law, records “made or received pursuant to law or ordinance in connection with the transaction of public business by any agency of North Carolina government or its subdivisions” are public records that must, upon request, be made available by the agency for public inspection or reproduction. Currently, however, DEQ allows permittees to shield critical information from public scrutiny by allowing permittees to keep records on-site, rather than requiring submission to the agency. DEQ typically only reviews facility records during brief annual inspections. Moreover, due to budget cuts, DEQ staff time is limited and therefore only a brief review of on-site records is feasible.

<sup>160</sup> See also Draft General Permit Condition I.4.

<sup>161</sup> See *supra* Section I for a complete discussion of groundwater pollution concerns associated with the installation of digesters or covers over lagoons.

<sup>162</sup> See N.C. Gen. Stat. § 143-215.10I.

performance standards for animal waste management systems established in 1998 and made permanent in 2007.<sup>163</sup> The General Permit and the processes it contemplates for modification of treatment processes cannot authorize system changes which are prohibited by the moratorium. This issue is especially relevant now, as Smithfield Foods recently announced plans to install covered lagoons that would generate more biogas – and more revenue—for the industry.<sup>164</sup>

DEQ has the authority to require an individual permit when an individual permit is “necessary to protect water quality, public health, or the environment.” N.C. Gen. Stat. § 143-215.10C(a). While covering a lagoon may limit the emissions of greenhouse gases, anaerobic digestion actually *increases* ammonia production,<sup>165</sup> which can cause detrimental environmental and public health effects.<sup>166</sup> Because anaerobic digestion can make nutrients more readily available for plants,<sup>167</sup> less digestate effluent will be needed to adequately fertilize crops. Whenever nitrogen is over-applied to soil, nitrate leaching into the water supply can result,<sup>168</sup> contaminating downstream or down-gradient waters and lead to eutrophication. Because the installation of a lagoon cover exacerbates existing pollution from hog operations and poses a threat to public health, and essentially contemplates the construction and operation of a different waste management system, DEQ must require an individual permit if an operator wishes to install a lagoon cover or digester over an existing or new lagoon.

#### IV. Technology

The North Carolina hog industry principally relies upon a primitive operational design to dispose of the tremendous amount of animal waste and gaseous byproduct produced by the more than 2,200 operations currently permitted by the state under the General Permit. Under this design, operations rely on ventilation fans, rather than scrubbers or other capture technology, to jettison noxious air pollution into the surrounding environment. They utilize open, often unlined, pits to store the hundreds of millions of gallons of waste produced on-site each year. They rely on dangerous mortality management practices that allow for burial and other risky practices in an incredibly high water table. And they dispose of waste not by treating it but by spreading it, virtually untreated, onto nearby lands where it is subject to seepage into the groundwater or

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<sup>163</sup> N.C. Gen. Stat. § 143-215.10I(b).

<sup>164</sup> See, e.g., Travis Fain, *Smithfield Rolls Out Biogas Plan, Says it Will Cover Most Lagoons*, WRAL (Oct. 25, 2018), <https://www.wral.com/smithfield-rolls-out-major-bio-gas-plan-lagoon-covers/17945911/>.

<sup>165</sup> L.A. Harper et al., *The Effect of Biofuel Production on Swine Farm Methane and Ammonia Emissions*, 39(6) J. ENV'T QUALITY 1984, 1984 (2010).

<sup>166</sup> See Robbin Marks, *Cesspools of Shame: How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health*, NAT. RES. DEF. COUNCIL 4 (2001), <https://www.nrdc.org/sites/default/files/cesspools.pdf>.

<sup>167</sup> Joe H. Harrison et al., *Transformation and Agronomic Use of Nutrients from Digester Effluent*, EXTENSION.ORG (May 17, 2013), <http://articles.extension.org/pages/67900/transformation-and-agronomic-use-of-nutrients-from-digester-effluent>.

<sup>168</sup> *Id.*

runoff through above-ground ditches and grassed waterways or through the intricate underground tile-drain system that runs like veins underneath of fields.

The regulatory acceptance of these disposal practices relies on a keystone of logic: that the massive amounts of aggregated industrial animal waste produced on the state's geographically-limited coastal plain can and does serve as a valuable fertilizer. To remain intact, numerous flaws in that logic must remain unchallenged. For example, to remain intact it must be ignored that the composition of the animal waste produced by these operations contains more than nutrient rich nitrogen and phosphorus. If challenged, the question becomes why antibiotics and other pharmaceutical residues, heavy metals, pathogens, and pesticides – all of which are commonly found in raw industrial animal waste – are being applied to crops for “fertilization” purposes. In addition, one must not accept that waste is applied at rates exceeding agronomic rates.<sup>169</sup>

Despite the illusion, this archaic system of industrial animal waste management continues to expose itself, time and again, as being incapable of protecting the communities of eastern North Carolina, wildlife health, and natural resources. Recognizing the adverse impacts of this system to environmental health and community welfare, more than twenty years ago the N.C. General Assembly enacted a moratorium on the construction of lagoon and sprayfield systems at any new or expanded hog operation. The legislature further directed the Department of Agriculture to “develop a plan to phase out the use of anaerobic lagoons and sprayfields as primary methods of disposing of animal waste at swine farms.”<sup>170</sup> The lagoon and sprayfield system remains the predominant animal waste management system used in North Carolina.

The need for this industry to move away from the lagoon and sprayfield system is even more essential today than it was in 1997. Since at least 1997, not only has the common understanding that this technology is fundamentally flawed remained unchanged, but the concerns related to it have only grown as the technology itself has aged and become subject to near-catastrophic insecurity and failure. DEQ should, therefore, phase-out the use of the lagoon and sprayfield system as an acceptable animal waste management system under the General Permit.

Until that change takes place, the only reasonable choice is for the General Permit to require permitted operations to install and maintain widely-available automated technologies such as rain breakers, flow meters, rain gauges, lagoon level monitors, and equipment designed to reduce waste potential to help prevent additional pollution from this industry and to protect public health. DWR has authority and, in many cases, the obligation to require such equipment installation. Commenters support the inclusion of automated technologies in the draft General Permit.

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<sup>169</sup> General Permit Condition VII; *see also* 15A N.C. Admin. Code 2T.0103(1).

<sup>170</sup> North Carolina General Assembly, House Bill 515, 1997 Sess. Laws 1997-458.

DEQ must also meaningfully and consistently enforce the requirements of the General Permit. However, to the extent DEQ's oversight and enforcement obligations are hamstrung by staff limitations and agency funding cuts,<sup>171</sup> increasing automated technology requirements should help to relieve staff burden while sustaining discharge prohibitions.

Further, in light of climate change, these facilities are increasingly vulnerable to flooding and waste *mis*management during severe weather events. The General Permit must be amended to account for these increasingly frequent and intense weather events by adjusting how and when operations can spray around storm events and during "hurricane season," and updating the 25-year, 24-hour storm design criteria to reflect the best available science.

As North Carolina's industrial hog operations have grown in size and concentrated in certain communities and watersheds, the risks that they pose to waterways and public health has also increased. The changes and amendments identified in these comments are necessary to ensure that DEQ's final permit is able to meaningfully and accountably stop permitted operations from discharging animal wastes and process wastewater into waterways and communities, be resilient in the face of climate uncertainty, and protect the state's vital natural resources.

Commenters therefore recommend that DEQ make the following changes in the final General Permit:

- Amend the draft General Permit to require operations covered by the permit to adopt a revised lagoon design standard for withstanding now-common extreme rainfall events (Condition I.1);
- Add a provision to the General Permit that requires permittees to seek permission before lowering lagoon levels (Condition II.29);
- Maintain the requirement that Permittees install devices to halt waste spraying around precipitation events (Condition II.24);
- Rescind the proposed expansion of the National Weather Service application window (Condition II.23);
- Expand the use of automatic flow meters (Conditions II.18, II.26);
- Expand the use of other automated technologies and clarify triggers for installation (Conditions II.20, III.2.c, III.3.b);
- Include a stronger limitation on ponding (Conditions II.5, II.7); and
- Meaningfully enforce the requirements of the General Permit.

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<sup>171</sup> See *supra* note 159 discussing cuts to DEQ's budget.

A. Technology, Waste Management Around Weather Events, and Climate Resiliency<sup>172</sup>

Regular extreme rainfall events, increasing frequency and intensity of storms, and widespread, chronic degradation of water quality by industrial animal waste pollution demand more protective General Permit standards and oversight by DEQ.<sup>173</sup> To support resiliency and encourage the adoption of technologies and performance standards that respond to modern climate challenges, at a minimum DEQ should: (1) amend the draft General Permit to require operations covered by the permit to adopt a revised lagoon design standard for withstanding now-common extreme rainfall events (Condition I.1); (2) add a provision to the General Permit that requires Permittees to seek permission before lowering lagoon levels (Condition II.29); (3) maintain the requirement that Permittees install devices to halt waste spraying around precipitation events (Condition II.24); and (4) rescind the proposed expansion of the National Weather Service application window (Condition II.23). These proposed changes are fundamental to protecting the long-term health of the natural environment, species, and communities.

- i. *DEQ should amend the Draft General Permit to require operations covered by the permit to adopt a revised and expanded lagoon design standard (Condition I.1)*

The Draft General Permit's performance standards do not adequately account for the increasingly frequent and intense rain events experienced across eastern North Carolina. To improve the ability of permitted operations to protect water quality and community health, DEQ must revise Condition I.1 to reflect the most recent available data and ensure that design standards accurately reflect anticipated weather events. For example, DEQ could require that facilities be "designed, constructed, operated, and maintained to contain all waste plus the runoff from a 1,000-year, 24-hour rainfall event."<sup>174</sup> This would create additional lagoon capacity and help to prevent the types of lagoon overflows and breaches now regularly being documented around contemporary storm events. In the alternative, commenters recommend updating the 25-year, 24-hour storm design criteria to accurately reflect the best available science. Further, DEQ should remove from this Condition its addition of the term "at the time of construction"; inclusion of that term is counterproductive and will ensure that operations with already

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<sup>172</sup> See *supra* Section II for additional discussion of commenter's suggested climate-related amendments to the General Permit.

<sup>173</sup> According to the IPCC, "[c]limate-resilient development pathways are trajectories that strengthen sustainable development, including mitigating and adapting to climate change and efforts to eradicate poverty while promoting fair and cross-scalar resilience in a changing climate. They take into account dynamic livelihoods, the multiple dimensions of poverty, structural inequalities, and equity between and among poor and non-poor people." Global Warming of 1.5°C, *supra* note 27.

<sup>174</sup> Commenters acknowledge that the North Carolina legislature may need provide DEQ with additional latitude to effectuate the recommendations included in this section. Commenters encourage the agency to advocate for, at a minimum, an updated 25-year, 24-hour storm design criteria that reflects the best available science.

vulnerable lagoon systems remain outdated, increasingly subject to breach or flooding, and in conflict with best available science.

The concept of the “25-year” storm is deceptive, as rainfall of this magnitude can happen far more often than once every 25 years. A 25-year storm has 1 in 25, or 2.5 percent, chance of occurring in a given year, and such a storm in one year does not prevent another from hitting in even a few months. The statistical definition of 100-year storms and flooding in North Carolina has not been updated since 2006 and only includes data through December 2000.<sup>175</sup> This means the large storms seen across the state in the past eighteen years are not factored into today’s rainfall probabilities.<sup>176</sup>

Until an update to North Carolina’s rainfall statistics is conducted, the current probable 25-year storm should not be considered a reliable standard. Rather than grapple in the draft General Permit with the realities of a changing climate, changes in best available science, and outdated waste management systems, DEQ instead proposes to even further insulate operators from making any amendments to the design capacity of their waste management systems by providing that the design standard shall be measured from the time the waste management system is constructed. Inclusion of this term is counterproductive and will ensure that operations with already vulnerable lagoon systems remain outdated, increasingly subject to breach or flooding, and in conflict with best available science.

Adopting a more appropriate storm event reference point for the hog operations design criteria would better prepare these facilities to withstand extreme rainfall, which is becoming more and more common. *This could be achieved by adopting the 1,000-year, 24-hour storm as the waste lagoon design-storm standard.*<sup>177</sup> Adopting the 1,000-year, 24-hour storm as the standard would increase the lagoon capacity requirements from an average of 7.36 inches of

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<sup>175</sup> See *Precipitation-Frequency Atlas of the United States*, NOAA (2006),

[http://www.nws.noaa.gov/oh/hdsc/PF\\_documents/Atlas14\\_Volume2.pdf](http://www.nws.noaa.gov/oh/hdsc/PF_documents/Atlas14_Volume2.pdf) [attached as Exhibit 19].

<sup>176</sup> As an example of why this is important, a 2018 update to Texas’ NOAA Atlas 14 numbers found that Houston’s rainfall probabilities had been underestimated by three inches for the 100-year, 24-hour storm. See *NOAA updates Texas Frequency Values*, NOAA (Sept. 27, 2018) <https://www.noaa.gov/media-release/noaa-updates-texas-rainfall-frequency-values> [attached as Exhibit 20]. Although Texas was previously relying on numbers even more outdated than North Carolina’s, large rain events since 2002 drove the upward shift in their numbers. See Mihir Zaveri, *NOAA study finds Houston’s 100-year floods have been underestimated*, HOUSTON CHRON. (Nov. 27, 2017)

<https://www.houstonchronicle.com/news/politics/houston/article/NOAA-study-could-redefine-100-year-storm-for-12387348.php>. Events previously classified as 100-year storms are now classified as 25-year events under the new Texas analysis.

<sup>177</sup> Hurricane effects can last in an area for hours or days, depending on several factors, including storm speed, so 24 hours covers a substantial amount of probable rainfall risk while remaining consistent with the previous design standard time frame. See Table 2 for probable 1000-year storm rainfall totals in eastern North Carolina.

rainfall to an average 16.2 inches of rainfall, as noted in Table 2 below. This additional capacity could help prevent lagoon overflows and breaches experienced in previous storms.

For comparison, in parts of the state Hurricane Florence greatly exceeded the rainfall expected from a 1,000-year storm event. For example, Elizabethtown in Bladen County received just shy of 36 inches of rain over a 72 hour period during Hurricane Florence.<sup>178</sup> This is almost 10 inches *more* than the highest amount of rainfall expected from a 1,000-year event over the same amount of time in Elizabethtown, according to the current NOAA Atlas 14 storm rainfall probabilities for North Carolina – which is 17.6 inches.<sup>179</sup>

Figure 8: 24-hour rainfall totals (inches) for probable storms in North Carolina coastal plain localities chosen for high density of nearby hog CAFOs.<sup>180</sup>

	<b>25-year</b>	<b>100-year</b>	<b>500-year</b>
<b>Clinton, NC</b>	7.27	9.95	14
<b>Goldsboro, NC</b>	7.24	9.66	14.1
<b>Elizabethtown, NC</b>	7.21	9.85	13.8
<b>Willard, NC</b>	8.1	11.2	16
<b>Greenville, NC</b>	7.23	9.84	13.7
<b>Roper, NC</b>	7.68	10.3	14.1
<b>Lewiston, NC</b>	6.83	9.27	12.9

<sup>178</sup> *Hurricane Florence, 13-18 September 2018: Annual Exceedance Probabilities (AEPs) for the Worst Case 72-hour Rainfall*, NOAA (Sept. 19, 2018), [ftp://hdsc.nws.noaa.gov/pub/hdsc/data/aep/201809\\_Florence/201809\\_Florence\\_72h.pdf](ftp://hdsc.nws.noaa.gov/pub/hdsc/data/aep/201809_Florence/201809_Florence_72h.pdf) [attached as Exhibit 21].

<sup>179</sup> *Id.*

<sup>180</sup> See *NOAA Atlas 14 Point Precipitation Frequency Estimates*, NOAA, [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html](https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html) (last visited Dec. 20, 2018). (last visited Dec. 20, 2018) [attached as Exhibit 22].

Figure 9: *Probable 1,000-year storm rainfall totals (inches) in North Carolina coastal plain localities.*<sup>181</sup>

	<b>1,000-year, 12 hours</b>	<b>1,000 year, 24 hours</b>
<b>Clinton, NC</b>	13.4	16.1
<b>Goldsboro, NC</b>	12.7	16.3
<b>Elizabethtown, NC</b>	13.5	15.9
<b>Willard, NC</b>	15.3	18.6
<b>Greenville, NC</b>	12.7	15.7
<b>Roper, NC</b>	13.5	16.1
<b>Lewiston, NC</b>	11.8	14.7

Notably, immediately before and during a weather-related emergency, DEQ can be pulled in many directions, which can limit the agency’s ability to respond to emergencies. The combination of heightened risk of adverse environmental impact and heightened demands on agency personnel underscores why the current permitting regime is not capable of protecting water quality when severe weather hits North Carolina. Thus, if the agency will not implement a new design standard, it is imperative that DEQ define and implement the current 25-year, 24-hour storm design criteria to accurately reflect the best available science.

- ii. *DEQ should add a provision to the General Permit that requires Permittees to seek permission before lowering lagoon levels (Condition II.29)*

In reviewing and updating its processes for responding to extreme weather events such as hurricanes and tropical storms, North Carolina should consider what changes are necessary to ensure that facilities can operate without regularly depending on “draw down” practices.<sup>182</sup>

Under the draft General Permit, operators have the option to lower lagoon levels in order “to provide irrigation water during drought periods *and* to provide for additional temporary storage for excessive rainfall during the hurricane season *and* in preparation for the following winter months.” Draft General Permit, Condition II.29 (emphasis added). This provision relies on NRCS NC Standard No. 359 as support, but does not include any up-front authorization

<sup>181</sup> See *id.*

<sup>182</sup> See, e.g., DEQ, *Annual Report on Animal Waste Operations Permitting, Inspection and Compliance Activities July 1, 2016 through June 30, 2017* tbl. 4 (2017) (stating that inadequate freeboard was among the most common type of violation or deficiency uncovered by inspectors and that the “high number of freeboard violation [sic] is mainly attributed to Hurricane Matthew”), [https://www.ncleg.net/documentsites/committees/BCCI-6658/Reports/FY percent202017-18/DEQ/DWM\\_Animal\\_Feeding\\_Operations\\_percent20FY\\_2016-17\\_Annual\\_Report-2018-06-13.pdf](https://www.ncleg.net/documentsites/committees/BCCI-6658/Reports/FY%20percent202017-18/DEQ/DWM_Animal_Feeding_Operations_percent20FY_2016-17_Annual_Report-2018-06-13.pdf); Charles Bethea, *After Florence, Manure Lagoons Breach, and Residents Brace for the Rising Filth*, THE NEW YORKER (Sept. 21, 2018), <https://www.newyorker.com/news/dispatch/after-florence-manure-lagoons-breach-and-residents-brace-for-the-rising-filth>.

requirement to ensure that such practices – which are extremely broad in their scope – will not lead to over-application and the discharge of waste that reaches surface waters or wetlands. This is unreasonable, inherently risky, and runs counter to the public’s interest in prohibiting the discharge of pollution from these operations into state and federal waters.<sup>183</sup>

Application of waste, including the lowering of lagoons, around major precipitation events can lead directly to that waste entering surface waters and nearby communities. Any routine lowering of lagoons, spraying on saturated ground, or spraying during precipitation is a sign that an operation’s current waste management system is inadequate. Further, spraying waste during a drought for “irrigation” purposes does not account for the nutrient needs of crops and, similarly, can lead to the over-application of nutrients (not to mention the other constituents in the waste products that crops already don’t utilize, such as antibiotic residues).

The impropriety of Condition II.29 becomes especially apparent when reviewed in the context its “hurricane season” exception. As currently written, a producer is allowed under this condition to “lower lagoon levels . . . to provide additional temporary storage for excessive rainfall *during the hurricane season.*” Draft General Permit, Condition II.29 (emphasis added). Hurricane season is a predictable season that, as applied through the terms of NRCS NC Standard No. 359, spans almost half a year (and a majority of the state’s planting season), running from June 15 to October 31.<sup>184</sup> DEQ’s inclusion of this vague seasonal provision without more direction invites abuse and should be removed from the General Permit.<sup>185</sup>

If DEQ does not remove this condition, it should, at a minimum, require that permittees obtain DEQ permission before lowering lagoon levels. Any decision about whether to endanger water quality and nearby communities as a result of lowering, even to prevent a larger discharge such as overtopping, should rest with DEQ, not individual permittees. In addition, rather than cross-referencing the permittee to NRCS NC Standard No. 359, Condition II.29 should revise and clearly establish at least the following conditions and restrictions:

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<sup>183</sup> 15A N.C. Admin. Code 02T .1304(b)(3), (8).

<sup>184</sup> See NRCS, NC, Conservation Practice Standard No. 359, *Waste Treatment Lagoon 15* (Feb. 2009), <https://efotg.sc.egov.usda.gov/references/public/NC/NC359WTLFeb09.pdf>. The National Oceanic and Atmospheric Administration states that the Atlantic hurricane season runs from June 1 until November 30, which is approximately 45 days longer than the planting listed under the NRCS standard. NATIONAL HURRICANE CENTER, *Tropical Cyclone Climatology*, NOAA, <https://www.nhc.noaa.gov/climo/>.

<sup>185</sup> Other states have much stricter provisions than North Carolina. Oregon, for example, prohibits all lowering of lagoons to avoid overflow. OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, OREGON CONFINED ANIMAL FEEDING OPERATION NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT NUMBER 01-2016, at S2.C.2 (2016), *available at* <https://www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/NPDESGeneralPermit.pdf> [attached as Exhibit 23].

1. All applications must be in conformance with the animal waste management system plan developed for the operation, including adherence to the planned nutrient application rates;
2. This temporary adjustment in operating procedure is only available from June 15 to October 31; and
3. The following information concerning the pump down condition shall be recorded, maintained on site, and provided to DEQ within one week of completion of the pump down<sup>186</sup>:
  - Date the lagoon was first pumped below the stop pump level.
  - Depth of liquid between the stop pump level and the sludge layer prior to pumping below the stop pump mark. Measured from the stop pump level near the pump intake location but off the inside slope of the embankment.
  - Date pump down was completed.
  - Depth of pump down below the stop pump level. Measured weekly until the lagoon returns to the stop pump level.

Finally, commenters are concerned that under its explicit language, the draft General Permit only requires compliance with the terms and conditions of NRCS Standard No. 359 “prior to lowering lagoon levels below designed stop pump levels.”<sup>187</sup> The General Permit should make clear that operators must always comply with animal waste management system plan, monitoring, and recordkeeping requirements in NRCS NC Standard No. 359 if they wish to rely on the protections inherent in this condition.

*iii. DEQ should reject expansion of National Weather Service application window from 4 to 12 hours (Condition II.23)*

Condition II.23 addresses waste management and disposal around major storm events. Commenters support the continued inclusion in this term of the prohibition on spraying during precipitation events.<sup>188</sup> However, with regard to the amended pre-storm land application window, commenters request that DEQ remove the newly proposed changes and revert the draft General Permit language back to its original terms.

Specifically, under the proposed amendments, Permittees will now have 12 rather than 4 hours to cease land application of waste after the National Weather Service first issues a severe

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<sup>186</sup> DEQ and the public deserve a record of these events so that they may use that information to assess the adequacy of the current waste management technologies being utilized by these operations.

<sup>187</sup> See Draft General Permit, Condition II.29.

<sup>188</sup> 15A N.C. Admin. Code 02T.1304(b)(8) (An operations AWMP shall ensure that “[I]and application of waste shall be prohibited during precipitation events”).

storm warning under the theory that storm reporting is more technologically advanced today than it was when the permit language was last approved in 2014. Commenters are concerned about the increased risk to communities and water quality from precipitation-induced runoff and wind drift as a result of this proposed change. Commenters, therefore, strongly believe that expanding the application window to 12-hours will not provide the protections necessary to ensure that waste is not sprayed during the early-onset of precipitation events or that the waste will be fully incorporated in advance of the onset of a precipitation event.

Commenters' concern is compounded by the addition of the following language to the draft General Permit: "This requirement is intended to have all *land application of animal waste end* approximately twenty-four (24) hours in advance of the onset of the storm event."<sup>189</sup> First, the use of the term "approximately" is vague. Second, having land application practices end only 24-hour before the onset of the storm event will not ensure that all sprayed waste is incorporated prior to a precipitation event occurring. If DEQ wishes to maintain the spirit of this term, this sentence should be revised to read: "This requirement is intended to ensure that all land-applied animal waste is incorporated into soil at least twenty-four (24) hours in advance of the onset of the storm event."

- iv. *DEQ should maintain the requirement that Permittees install devices to halt waste spraying around precipitation events (Condition II.24)*

Condition II.24 further addresses waste management and disposal around a major storm event. To ensure compliance with the terms of this permit, DEQ should maintain the requirement that permittees install devices to halt waste spraying around precipitation events. DEQ has authority and obligation to require the installation of such equipment. DEQ should, however, remove section (b) of this condition, which allows an OIC or backup OIC be on site to ensure that land application is halted.

Waterkeeper organizations patrolling the coastal plain—including Sound Rivers, Cape Fear River Watch, Winyah Rivers Alliance, White Oak-New Riverkeeper Alliance, Crystal Coast Waterkeeper, and Coastal Carolina Riverwatch—have observed first-hand violations of the General Permit provisions prohibiting land application during precipitation events and the prohibiting land application more than four hours after the issuance of a relevant warning/watch by the National Weather Service. In advance of Hurricane Florence, but well after the issuance of applicable Flood Warnings/Watches, local Riverkeepers observed twelve hog operations disregarding the permit and land applying waste despite imminent risk of runoff. Similar observations were made when previous storms approached North Carolina.<sup>190</sup> Given this history

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<sup>189</sup> Draft General Permit, Condition II.23 (emphasis added).

<sup>190</sup> See, e.g., e-mail from Christian Breen, Waterkeeper Alliance, to David May & Jim Gregson, DWR (Sept. 2, 2016) (reporting violation of the prohibition of land application triggered in advance of Tropical Storm Hermine).

of observed violations, it is imperative that DEQ rely on automated technology rather than human error to ensure compliance with the General permit.

Requiring this technology will help prevent prohibited practices, such as spraying waste in the rain, and avert additional harm to the environment and communities from improper swine waste disposal practices. Commenters also support DEQ's inclusion of a transition period to give permittees time to install and operate this equipment

#### B. DEQ Should Expand the Use of Automatic Flow Meters (Conditions II.18, II.26)

Flow meters are important tools for measuring and tracking the amount of waste entering and leaving lagoons, and monitoring how much waste is being applied to lands in accordance with the facility's nutrient management plan. Indeed, according to the EPA, "[t]he use of a flow meter is recommended with the systems to ensure that the manure is applied at the proper rate."<sup>191</sup>

Experience has shown that unplanned discharges and spills sometimes occur with pumping activities. Sources of such unplanned discharges include burst or ruptured piping, leaking joints, operation of loading pumps past the full point of hauling equipment, and other factors. Thus, pumping activities should be closely monitored, especially in the startup phase, to ensure that no spills or discharges occur.

Commenters, therefore, support the amendments contained in the draft General Permit (Condition II.18) that expand the circumstances under which DEQ may require a permittee to install and operate an automatic flow meter, and require a permittee to have such equipment in place within 90 days of being notified. Commenters also note that it is proper and resource-appropriate to maintain that DEQ has the authority to make the determination as to whether to flow meter should be required. However, commenters urge DEQ to expand this provision to require that all permittees install and operate flow meters.

Commenters, however, do not support DEQ's vague inclusion of the language "or other flow monitoring equipment approved by the Division." If DEQ intends to maintain this language in the permit, at a minimum it must clearly provide the list of criteria that it intends to apply in selecting and approving "other flow monitoring equipment" under this provision.

Further, to maintain accuracy in waste application equipment, under Condition II.26, calibration should be changed to once per year rather than once every two years, as was originally proposed during the stakeholder process. Under its plain terms, 15A N.C. Admin. Code 02T.1304(b)(9) provides DEQ with the flexibility to make that change because it merely

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<sup>191</sup> EPA, NPDES PERMIT WRITER'S MANUAL FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 5-14 (2012), <https://nepis.epa.gov/Exe/tiff2png.cgi/P100ERZE.PNG?-r+75+g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C11THRU15%5CTIFF%5C00000301%5CP100ERZE.TIF>.

sets a ceiling of “at least every two calendar years,” not a floor of only every two years, in establishing mandatory calibration requirements.

C. DEQ Should Expand the Use of Other Automated Technologies and Clarify Triggers for Installation (Conditions II.20, III.2.c, III.3.b)

DEQ makes several additional amendments to the draft General Permit which may require the installation of automated equipment in order to improve compliance with the Permit, including rain breakers, lagoon monitors and recorders, and technology that reduces drift potential. *See* draft General Permit, Conditions II.20, III.2.c, III.3.b. Commenters support the inclusion of automated technology in the draft General Permit and request that DEQ continue to expand and clarify the conditions under which this technology may be required.

Regarding Condition II.20, commenters support the addition of this condition, which could lead a permittee to “install/utilize application equipment or methods that reduce drift potential.” The draft General Permit is ambiguous, however, about how technology should be used to address drift potential. Commenters, therefore, recommend that DEQ clarify that requisite equipment include wind sensors that automatically prevent application of wastewater at a pre-set wind speed, e.g., 10 mph.<sup>192</sup> Such technology would address the type of noncompliance DWR is ill-suited to detect or correct during annual inspections, but which directly threatens neighboring communities and natural resources.<sup>193</sup> Notably, Smithfield Foods agreed to install such technology on its wholly-owned hog operations more than a decade ago.<sup>194</sup>

Regarding Condition III.2.c, commenters note that rather than clarifying and expanding the circumstances that may lead the agency to exercise its discretion to require the installation of automated lagoon/storage pond waste-level monitors and recorders, the agency instead backtracks by deleting clarifying information. For example, in the Stakeholder Draft, the agency provided that additional waste level monitoring technology may be required if the facility “experiences freeboard violations in any two or more consecutive years or as determined necessary by the Director.” That clarifying language has since been replaced by a vague summary that the “determination shall be made on a case-by-case basis.” Such a change removes transparency from the General Permit and constricts permittees’ incentive to comply with the

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<sup>192</sup> Research discussing the application of agricultural chemicals suggests risk of wind drift is particularly heightened above 10 mph. S Elwynn Taylor, *Spray-Wind-Inversion*, Proceedings of the Integrated Crop Management Conference 7 (1992) (“At 5 mph, small particles can drift significantly. At 10 mph, medium and large particles will also be affected.”). Commenters believe the equipment should prevent land application, at a minimum, when wind speeds exceed 15 mph. This is especially relevant for operators discharging waste water using center pivot end guns, solid set systems, hard-hosed travelers, or center pivots that discharge wastewater above the supply boom.

<sup>193</sup> As such, commenters object to the language that would prevent the requirement unless the “Division determines violations for application of waste outside of the land application area as specified in the facility’s CAWMP due to wind drift.”

<sup>194</sup> *Waterkeeper Alliance v. Smithfield Foods*, Consent Decree Sect. VII (Mar. 22, 2006) (discussing the company’s obligation to install a “wind drift limitation system”).

freeboard requirements of this permit. Commenters recommend that DEQ revert this condition back to the original language proposed during the stakeholder process. That being said, commenters believe that it is proper and resource-appropriate for the DEQ to make the determination as to whether this automated lagoon/storage pond waste-level monitors and recorders should be required.

Regarding Condition III.3.b, commenters appreciate the addition of clarifying details for when an automated rain gauge may be required. To provide flexibility, DEQ should make clear that the list of circumstances provided in the General Permit is not exhaustive. Commenters, therefore, recommend the additional inclusion of “or as determined necessary by the Director” to the relevant sentence that details when the requirement may be triggered.

#### D. DEQ Must Include a Stronger Limitation on Ponding (Conditions II.5, II.7)

The draft General Permit provides that land application of waste should not result in “excessive” ponding or any runoff during any application event. *See* draft General Permit, Conditions II.5, II.7. This is a positive step, but for clarity and to avoid creating a preventable loophole, DEQ should remove the vague term “excessive.” To maintain the permit’s zero discharge obligations, prohibitions on ponding and runoff are reasonable and appropriate.

#### E. DEQ Must Meaningfully Enforce the Requirements of the General Permit

In tandem with improving the terms of the General Permit, DEQ must also commit to meaningfully and consistently enforcing the requirements of the General Permit.<sup>195</sup> Meaningful oversight and enforcement of the General Permit’s requirements can include, for example, increased site visits, compliance and accuracy review of submitted documentation, timely and adequate enforcement actions for violations, follow-up compliance efforts related to enforcement actions, and permit revocation.<sup>196</sup>

If DEQ lacks the staff to carry out its implementation and enforcement duties, it should hire additional staff and inspectors. To the extent DEQ’s oversight and enforcement obligations are hamstrung by staff and agency funding cuts,<sup>197</sup> DEQ can and should supplement its efforts by increasing automated technology requirements. In so doing, the agency should be able to relieve

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<sup>195</sup> The need for DEQ to reassess and increase its enforcement and compliance activities became especially apparent during a recent nuisance trial in which “Christine Lawson, program manager for the Animal Feeding Operations [division of DEQ], acknowledged on the stand [that] a farm could be non-compliant for 364 days of the year and the state would never know.” Lisa Sorg, *The Case Against Murphy-Brown: Inside North Carolina’s Latest Blockbuster Hog Trial*, NC POLICY WATCH (Dec. 13, 2018), <http://www.ncpolicywatch.com/2018/12/13/the-case-against-murphy-brown-inside-north-carolinas-latest-blockbuster-hog-trial/> [attached as Exhibit 24].

<sup>196</sup> *See* N.C. Gen. Stat. § 143-215.6A; 15A N.C. Admin. Code 02T.1001, 02T .0108(b).

<sup>197</sup> Between 2011 and 2016, DEQ suffered an 18 percent reduction in water resources staff overall, amounting to approximately 70 positions. The seven DEQ regional offices, which house inspectors and personnel that respond to citizen complaints, suffered a 41 percent reduction in water quality staff.

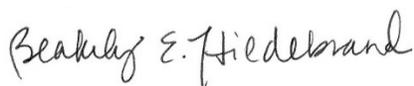
staff burden while maintaining that permitted operations are complying with discharge prohibitions.

In addition to improving permit compliance, meaningful oversight and enforcement of the General Permit requirements will support fairness and consistency in DEQ's permitting program by leveling the playing field among regulated entities and ensuring that those regulated facilities that fail to comply with the law do not have an unfair economic advantage over their law-abiding competitors. Therefore, in the process of reassessing the terms of the General Permit, DEQ should also review its enforcement procedures to ensure that they support meaningful implementation of and compliance with this permitting program.

### **Conclusion**

Thank you for your consideration of these comments. Should you have any questions or wish to discuss these comments further, please do not hesitate to contact us at the email addresses provided below.

Sincerely,



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