PUBLIC JUSTICE
IMPACT. CHANGE.

January 19, 2018

Hon. John Shimkus
Chair, Subcommittee on Environment
Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, DC 20515

Chairman Shimkus,

Thank you for the opportunity to testify at the hearing entitled "H.R.____. Farm Regulatory Certainty Act" on Thursday, November 9, 2017. Per your request, please find attached my response to your questions for the record.

Sincerely,

[redacted]

Jessica Culpepper
Food Project Attorney
Public Justice

Enclosures

QUESTIONS FOR THE RECORD

JESSICA CULPEPPER
PUBLIC JUSTICE

Responses to questions from the Honorable John Shimkus:

1. **Question: Does the Resource Conservation and Recovery Act (RCRA) contain a fee-shifting provision?**

The Resource Conservation and Recovery Act contains a discretionary provision in the law that allows a court to recompense attorneys for reasonable costs and fees incurred during litigation. RCRA is no different in this regard than any other bedrock environmental statute. Congress has long recognized the importance of allowing the public to bring legal action against bad actors for violations of environmental laws to protect their property rights and their community from contamination when the government falls down on the job.[1] Indeed, the very purpose of enacting citizen suit provisions is to ensure that individuals are not reliant on the Government alone to enforce the statute. "The plaintiff is the chosen instrument of Congress to vindicate a policy that Congress considered of the highest priority." *Christiansburg Garment Co. v. Equal Employment Opportunity Commission*, 434 U.S. 412, 418 (1978). This provision is a mechanism to effectuate this policy.

There are limits on these provisions. A party is only able to recover fees and costs if they prevail in these extremely difficult cases, so a plaintiff could never recover costs for a frivolous lawsuit. Even then, because recovery is discretionary, it is up to the judge to review the request for recovery and will only award "reasonably" incurred costs and time.

As the only relief available under RCRA is injunctive relief to stop the cause of the contamination (meaning that a plaintiff cannot recover money from the polluter), without these provisions that cover litigation costs and time, many rural Americans, including the neighbors in the *Cow Palace* lawsuit, could not otherwise protect their drinking water. There are two reasons for this. First, contingency fees, meaning a sum of money that a lawyer receives if a case is won, are not possible in injunctive relief-only cases. Second, bringing a private action to protect the public health and environment from violations of these laws require experts to gather and analyze complex scientific data. The costs associated with experts and data-gathering and compensating a lawyer for the time to bring such complex litigation under these laws – often years of work – would exceed the financial capability of most private citizens.

[1] When considering amendments to the Clean Air Act nearly fifty years ago, Congress found that government enforcement of the nation's environmental laws was "restrained," and thus urged Courts to "recognize that in bringing legitimate actions under this section citizens would be performing a public service." S. Rep. No. 91-1196, at 36.

RCRA's provisions for the award of costs and fees for prevailing in a citizen suit are found in section 42 U.S.C. § 6972(e). It states as follows:

> (e) Costs
> The court, in issuing any final order in any action brought pursuant to this section or section 6976 of this title, *may* award costs of litigation (including *reasonable* attorney and expert witness fees) to the prevailing or substantially prevailing party, whenever the court determines such an award is appropriate. (emphasis added)

2. Question: For the case *Community Association for the Restoration of the Environment, Inc. v. Cow Palace, LLC* how much was awarded to Plaintiffs in (a) attorneys' fees, (b) expert witness fees, and (c) costs?

Community Association for the Restoration of the Environment v. Cow Palace LLC was one of three interrelated cases that were litigated simultaneously against the four dairy Concentrated Animal Feeding Operations responsible for contaminating the surrounding community's drinking water. After the court granted the plaintiffs' motion for summary judgment in the *Cow Palace* case, all three cases settled in a global settlement. As part of that settlement, the defendants from the other two cases stipulated "that they will be jointly and severally liable for any award of fees and costs ordered by the Court." *See* Case No. 2:13-CV-3019, ECF No. 251. Because of this stipulation, the court did not separate the fees and costs award by case, but rather jointly addressed the fees and costs incurred on all three cases. Submitting detailed time records, the plaintiffs requested $3,587,615.50 in attorneys' and experts' fees and $542,088.60 in costs incurred during the course of the three-year litigation against all four dairies, but the court awarded $2,683,193.80 in attorneys' and experts' fees and $444,374.86 in costs. In its Order on Fees, the court "strongly encourage[d] the parties to come to a stipulated resolution" about the remaining expenses and fees that had arisen since the close of the case, and the parties did so without further litigation. *Cmty. Ass'n for Restoration of the Env't, Inc. v. Cow Palace, LLC*, No. 13-CV-3016-TOR, *57, 2016 WL 3582754 (E.D. Wash. Jan. 12, 2016).

The court's order on fees came after two years of intensive investigative work and thousands of pages of briefing resulting in the Court "grant[ing] Plaintiffs' motion on the core RCRA liability issues," *i.e.*, concluding the dairies were responsible for the drinking water contamination. *Cmty. Ass'n for Restoration of the Env't, Inc. v. Cow Palace, LLC*, No. 13-CV-3016-TOR, 2016 WL 3582754, at *1 (E.D. Wash. Jan. 12, 2016) ("As was their right, Defendants fought Plaintiffs at every turn"). In a 58-page opinion explaining why it had chosen to award fees and costs, the Court reviewed the hours spent by the attorneys in *Cow Palace* in great detail, finding that Plaintiffs' counsel were reasonable in their time spent, and that the plaintiffs – who bore the burden of proving the case and therefore would be expected to have spent more hours than the defendants – had actually worked 1,000 fewer hours than defense counsel.

In response to the Court's direction to resolve all remaining fees and costs outside of what was done in the Court's Order, the parties to the case came to an agreement about fees and costs in total, reducing the amount awarded by the court and allowing the different dairies to pay as they were able. In the parties' agreement on fees and costs filed with the court, they did not separate out attorneys' fees, expert witness fees, and costs in their agreement. In the stipulation filed in court by all parties, Cow Palace agreed to pay $800,000 to plaintiffs, which covered all categories listed; that is, attorneys' fees, expert witness fees, and costs.

3. **Question: How much did your organization, Public Justice, receive in attorneys' fees?**

In the combined Yakima dairies litigation, Public Justice devoted almost 1500 hours and spent considerable resources exposing violations of the law against the four dairy Concentrated Animal Feeding Operations, including the *Cow Palace* case. In the course of investigation, development, litigation, and resolution of the three cases, Public Justice incurred over $530,000 in billed attorney time and more than $25,000 in litigation expenses. Public Justice sought to recover $453,319.50 in fees and $10,927.80 in costs in total, which includes *Cow Palace*. *See Cmty. Ass'n for Restoration of the Env't, Inc. v. Cow Palace, LLC*, No. 13-CV-3016-TOR, ECF 411 at 23. The Court found that Public Justice's hours were "adequately documented" and costs were "adequately detailed" and "fully compensable as reasonable." ECF 453 at 34, 54. After the parties' fees and costs settlement, Public Justice received $404,419.02 in fees and recovered the $10,927.80 in costs, which was paid jointly by all four dairies as part of the settlement. This realized the goal of the fees and costs provision because a community that would not otherwise be able to bring a citizen suit was able to obtain clean drinking water and stop the contamination of their wells.

4. **Question: Did any of the Plaintiffs' attorneys initiate any other RCRA citizen suits (against other defendants) after the conclusion of *Community Association for the Restoration of the Environment, Inc. v. Cow Palace, LLC?***
    a. **Please identify all cases initiated by any of Plaintiffs' attorneys subsequent to the decision in *Community Association for the Restoration of the Environment, Inc. v. Cow Palace, LLC.***

To my best knowledge and after contacting each firm that represented the plaintiffs in the *Cow Palace* case, only one RCRA citizen suit was initiated against an agricultural entity subsequent to the *Cow Palace* case. This response is limited to RCRA citizen suits against agricultural entities:

> *Blackwood et al. v. N&M Dairy et al.*, No. 5:14-cv-00395-JGB-SP (E.D. Cal.), which settled outside of court.

Community Association for the Restoration of the Environment v. Cow Palace LLC remains the only case where a court determined that the mismanagement of animal manure violated RCRA. The fact that so few RCRA cases have been brought against agricultural entities

is not surprising, given that proving a violation of RCRA's imminent and substantial endangerment provision takes considerable time, cost, and effort, and is therefore reserved for only for the rare times that massive contamination causing critical health threats has not been solved by local, state, and federal government actions. The difficult jurisdictional requirements to bring a RCRA suit also reduce the likelihood of citizen suits.

First, no small or medium-sized farm could meet RCRA's jurisdictional requirement, and would never be subject to RCRA's citizen suit provisions. In order for a citizen to bring a lawsuit for RCRA violations, the entity responsible for the pollution must be discarding their waste. RCRA already exempts any manure used as fertilizer for crops because a recycled waste (i.e., manure used as fertilizer) is not considered to be a "solid waste" subject to RCRA's jurisdiction. So RCRA will never stop a farmer from using their manure to grow crops and make healthy soil. And even if there is a solid waste (meaning the manure was not used as fertilizer and was instead dumped out), it must be in such a great quantity that it causes or contributes to a substantial and imminent endangerment off the bounds of their property. This means that only the largest operations that have mismanaged manure for so long that it has endangered people or the environment surrounding them are subject to these lawsuits.

Second, RCRA's jurisdictional requirements provide several ways to stop these lawsuits early and prevent costly litigation. For example, RCRA's citizen-suit provision, like those in other environmental statutes, requires a 90-day notice period before filing a lawsuit. This notice period is designed to give the polluter notice and time to fix the problem before they are subject to a lawsuit, and is also designed to give the government the chance to file its own action and supplant the citizen suit. And because RCRA only allows for injunctive relief to stop the endangerment, if the polluter simply fixes the problem, it stops the lawsuit immediately under the judicial doctrine of "mootness" because it solves the controversy at issue. As most farmers and industrial agriculture operators are good neighbors, they respond to problems they have caused by fixing them, thus negating a potential citizen's ability to bring the citizen suit. These lawsuits are limited to bad actors that refuse to address serious problems caused by their operations.

It is worth briefly documenting some of the behavior of the Yakima dairies at issue in *Cow Palace* to show the Committee why the lawsuits were necessary – these dairies refused not only during the notice period, but over a span of decades – to comply with the law. They were extreme examples of bad actors, and a state agency that refused to force them to meaningfully change their behavior. This is not the norm, and is exactly when citizen suits are needed.

- Records gathered from the local agency showed letters from the agency to one of the dairies stating "Your lack of response to our previous attempts to contact you by visit, letter, phone, and finally delivery of a cease-and-desist order by the sheriff has resulted in our recommendation of an additional penalty…. We would much rather have seen you spend that money on wastewater control facilities than to have to recommend a penalty." But even this did not fix the problem, and three years later, the dairy was caught digging

a ditch that unlawfully allowed "a discharge of black manure solids-laden water" to run off the property. The dairy was described by the agency as "uncooperative." All the while, the agency would, on occasion send fines that were only occasionally paid, without any meaningful enforcement action.

- In the 1990s, the dairies were reported by the community for unlawful behavior, involving dumping raw animal sewage through a drainage pipe into irrigation ditches that dumped into the local streams, spraying manure on frozen ground, overapplying manure on sprayfields, allowing lagoons to overflow, and deliberately dumping manure into canals.
- In 1993, numerous illegal manure discharges were observed by the community members and the local agency that did not result in enforcement action.
- In response to their reports, between 1995 and 1997, the state agency fined two of the dairies that were the subject of the RCRA litigation for "substantial water quality violations," but did not stop the continuing unlawful behavior.

These actions, and the dairies' refusal to change their waste management practices over the course of decades, led to the drinking water contamination and RCRA violations.

5. **Question: The Administrative Order on Consent between the Environmental Protection Agency (EPA) and the dairies that were defendants in Cow Palace was signed in March 2013. The complaint in the RCRA citizen suit was filed February 4, 2013. EPA was working with the defendant dairies to help them come into compliance with the applicable statutes and regulations. Why did Plaintiffs not allow the process between EPA and the dairies to play out before initiating a citizen suit?**

Without this suit, the primary objective of the plaintiffs – to secure clean, safe drinking water for over 100 families, and to ensure modifications to eliminate future contamination – would not have been realized. CARE, the plaintiff, attempted to work with the EPA during the Administrative Order on Consent ("AOC") process. Before the final Order was signed, for example, it was distributed to the public for comment. When CARE approached the EPA to discuss grave concerns with the draft AOC, namely that it did not cover the full radius in which impacted homes could receive replacement drinking water, the agency brushed aside CARE's complaints. Additionally, CARE expressed that the AOC failed to require double-lined lagoons and a nutrient management budget that would result in lower levels of soil contamination – both of which were established as major causes to the aquifer contamination. CARE also pointed out that the AOC did not address contamination from cow pens and compost areas or require any changes to those practices to reduce leaching into the aquifer, the community's sole source of drinking water. In the face of such deficiencies, and EPA's refusal to address them in the AOC, CARE had no choice but to use the citizen suit provisions of RCRA – provisions that Congress specifically intended to be used in such situations.

Importantly, CARE filed suit before the final Administrative Order on Consent was signed in hopes that the lawsuit would spur the parties to the AOC, the EPA and the dairies, to reconsider and correct the deficiencies in the Order so that it would address the serious public health risk to the community. If they had, the court would have automatically dismissed the plaintiffs' lawsuits against the dairies under the doctrine of "mootness" (that is, that there would have been no relief the plaintiffs could have gotten under a RCRA suit that was not already addressed by the Administrative Order on Consent). The Defendants actually claimed that the lawsuit should be dismissed because of the AOC. The only reason Plaintiffs' lawsuit was allowed to go forward was because the Court noted that there were very real differences between what was sought by the community members and what was required under the signed final Order. The outcome in the case was instrumental for the community because it accomplished ends the AOC did not achieve— over 100 families have so far been provided clean, safe drinking water, and major operational and structural modifications are being made at the facilities to ensure future contamination is eliminated.

Finally, it is worth correcting the record that it was in response to the EPA's Order, not the RCRA citizen suits, that one of the mega-dairies in the Valley went out of business. At the hearing, Mr. Wood falsely stated that one of the CAFOs went out of business because of the citizen enforcement action. Hearing at 21:56-22:09. Mr. Gordon, Mr. Wood's colleague at the Washington State Dairy Federation, stated otherwise in the Yakima Herald.[2] Mr. Gordon stated the facility went out of business because they did not want to comply with the EPA requirements under the Safe Drinking Water Act AOC.

6. **Question: Your testimony is that a citizen suit under RCRA is "last resort" - what other proceedings (under any other state or federal law) did your organization or any of the other Plaintiffs, initiate or conduct regarding the dairies at issue in *Community Association for the Restoration of the Environment, Inc. v. Cow Palace, LLC?***

There are two important clarifications to the phrase "last resort" as it refers to RCRA citizen suits. First, I was not limiting that phrase to "proceedings" initiated by the community. Rather importantly, I include community attempts to work with the polluter to try and get them to change the offending practice, and community attempts to get the local, state, or federal government to act on their behalf to stop the bad actors from continuing to harm the community. Second, to the extent that we *are* discussing "proceedings," the phrase "last resort" refers to the fact that there were (and remain) no other reasonably viable legal causes of action the Plaintiffs and their affected members could take at the time the *Cow Palace* lawsuit was initiated.

[2] Courtney, R. Yakima Herald. *Opposing sides argue positions in groundwater pollution case* (Jun. 13, 2013), available at http://www.yakimaherald.com/news/local/opposing-sides-argue-positions-in-groundwater-pollutioncase/article_5030c644-9938-52fd-b51c-17f0da7f0810.html

In case of *Cow Palace*, the community of farmers, orchardists, farmworkers, and multi-generation residents had been trying for two decades to protect their well water from the dairies who were acting far outside acceptable norms. CARE, specifically, worked for decades to address CAFO pollution in Washington State, prior to bringing the Yakima groundwater litigation. In the 1990s, members of the community in the Yakima Valley began to document and report when the dairies violated the law, but while the local agencies would occasionally fine the dairies, they took no enforcement action to force the facilities to change their practices. Instead, CARE's work led to anonymous threats, CARE's members being driven off the road, and other aggressive behavior.

It was not just the community residents who were frustrated with the state agency's failure to fix the problem. Public records show that the manager of the Sunnyside Valley Irrigation District sent a letter to the state agency about the dairies allowing waste from their lagoons to run into the canal. "The impact has been enormous," he wrote. "We have complaints from water users…These are not isolated complaints. The above situation is frustrating because it is typical of the experience the District has had with dairy waste problems for the last several years." He added "We have a number of water users who would be most willing to testify in court, contact area legislators, or do whatever else is necessary to assist you with your enforcement responsibilities."

In 1998, after years of the state regulatory failing to fix the problems in Yakima Valley, the community organized into CARE and threatened litigation to a number of the dairies in the Lower Valley. In response to the letters noticing a potential lawsuit, some of the dairies made significant improvements to their manure management systems and fixed the problems. For the dairies that refused to make changes to comply with the law, the community filed their first of several Clean Water Act lawsuits against the dairies for violations of their Clean Water Act and Washington state dairy permits. A court would later rule in the community and CARE's favor, establishing that the dairies in the Yakima Valley had violated the Clean Water Act. While these actions slowed pollution of the local rivers, the groundwater contamination problem persisted because the Clean Water Act does not address groundwater pollution. In the early 2000's, some of the civil penalties from the CWA lawsuits helped fund two studies of groundwater quality in the Lower Yakima Valley, the results of which showed nitrate contamination in residential water wells.

Armed with that information, multiple Washington state public interest groups, including CARE, have tried to persuade state regulators for decades to impose meaningful pollution control regulations on Concentrated Animal Feeding Operations ("CAFOs") under the CWA and the State's Water Pollution Control Act, R.C.W. 90.48.[3] In 2006, CARE was the lead petitioner in a challenge to the State's CAFO National Pollution Discharge Elimination System ("NPDES")

[3] The November 7, 2017 letter from Washington State public interest groups discusses how the State has been aware of groundwater contamination issues for years, but has failed to take actions to correct that contamination or address its sources.

permit under the Federal Water Pollution Control Act, otherwise known as the Clean Water Act. Among other problems, that NPDES permit failed to require lagoon lining or groundwater monitoring in and around permitted facilities – despite the fact that the State's own scientist testified that such monitoring was the only effective means to evaluate whether a facility was causing groundwater pollution. Nonetheless, the State approved the permit to the detriment of public health. Presently, CARE and others are involved in a challenge to Washington State's newest NPDES permit, which this time around includes a state groundwater discharge component. Unfortunately, the new permit again fails to require lagoon lining, groundwater monitoring, or adequate pollution control measures for livestock confinement pens, composting areas, and land application fields. Indeed, it allows for permittees to discharge manure and other pollutants into groundwater without *ever* having to monitor those discharges.

As it pertains to the *Cow Palace* defendants, CARE tried to work with EPA to obtain documents about the groundwater contamination surrounding those dairies before the EPA finalized its "Consent Order" so that the order could be amended to address residents' health concerns. Unfortunately, EPA administrators informed CARE that it would not provide any documents out of fear that such a move would "enflame" the dairies and throw off the Agency's settlement negotiations. CARE was forced to file suit against EPA to obtain the documents, which were provided after months of litigation in federal court. EPA also brushed aside CARE's complaints that the "Consent Order" was inadequate to protect human health and the environment, namely that it did not cover the full radius in which impacted homes could receive free drinking water. Additionally, the Consent Order failed to require double-lined lagoons nor a nutrient management budget that would result in lower levels of soil contamination – both of which were established major causes to the aquifer contamination. CARE also pointed out that the Consent Order did not address contamination from cow pens and compost areas or require any changes to those practices to reduce leaching into the community's sole source of drinking water. In the face of such deficiencies, CARE had no choice but to use the citizen suit provisions of RCRA – provisions that Congress specifically intended to be used in such situations.

In sum, it was only after decades of regulatory failure, and finally, when the EPA made clear that they would not fully fix the problem and shut the door on hundreds of community members who had lost access to their own wells, that this litigation was brought. No community should be forced to watch their common resources be degraded and their property values diminished with no recourse, which would have been the case for the people in the lower Yakima Valley were the Farm Regulatory Certainty Act law.

Responses to questions from the Honorable Frank Pallone

1. **Question: What are some of the health and environmental impacts you have seen in the communities you have worked with?**

Health and environmental impacts from CAFOs on fenceline communities have been well-documented for decades, and are only getting worse.[4] Some of those communities shared their compelling stories with you in letters filed in the record before the hearing. Their stories tell the truth about what industrial animal agriculture harms when allowed to mismanage their waste with impunity. They show that when waste from an industry is mismanaged, those who suffer most are the fenceline communities. Outside of what is illustrated by these community letters, health and environmental impacts from industrial animal agriculture range from very local bacterial outbreaks to the global impact of being one of the major contributors to climate change.

It is helpful to briefly outline the source of the impacts about which Mr. Pallone inquires. In 2010, the Centers for Disease Control worked with the National Association of Local Boards of Health in creating a report called Understanding Concentrated Animal Feeding Operations and Their Impact on Communities ("CDC Report").[5] My findings in my work with these communities matches exactly the findings in the CDC Report. The report's findings are best summarized in its own words:

> All of the environmental problems with CAFOs have direct impact on human health and welfare for communities that contain large industrial farms. As the following sections demonstrate, human health can suffer because of contaminated air and degraded water quality, or from diseases spread from farms. Quality of life can suffer because of odors or insect vectors surrounding farms, and property values can drop, affecting the financial stability of a community. CDC Report at 3.

The report defines the source of the environmental and public health problems caused by industrial agriculture as the enormous amount of waste the industry produces (in the form of raw animal sewage). *Id*. at 2. The report, along with many others, notes that large CAFOs produce more waste than some U.S. cities, but without any waste treatment, as occurs with human waste. *Id*. Instead, the facilities store the vast quantities of raw sewage in football field-sized lagoons, or in train-sized piles, before spreading the raw sewage onto land. The problems arise when there is more manure than can be used by the land or their crops, or when the manure is disposed of inappropriately so that it comes off the property and into the neighboring community or nearby waterways, where it degrades water quality. The CDC report also notes that the emissions from degrading waste harms air quality and is a source of greenhouse gases that contribute to climate change.

[4]Casey, J.A., Kim, B.F., Larsen, J. Nachman, K., et al., I*ndustrial Food Animal Production and Community Health*. Curr Envir Health Rpt (2015) 2: 259. https://doi.org/10.1007/s40572-015-0061-0
[5] Available at https://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf

Poor manure handling practices frequently result in clear and acute environmental problems. Just looking at fish kills in August-October of 2017, for example:

- In October of 2017, raw animal sewage from the Wild Rose Dairy in Wisconsin spilled into the Otter Creek, killing 1,300 fish.[6]
- In October of 2017, manure allowed to runoff an Iowa dairy facility killed 60,000 fish in eastern Iowa.[7]
- In October of 2017, a facility dumped manure into a creek in Lancaster County, Pennsylvania, which turned the creek water black and killed the fish in the tributary to the Conestoga River.[8]
- In August of 2017, bad manure management at an Iowa dairy caused a fish kill in a 5-mile portion of Dry Run Creek.[9]
- In August of 2017, bad manure management caused about 66,000 fish deaths in Lake Erie tributaries, where the creek water smelled of manure.[10]

The same waste that causes fish kills in surface water endangers entire communities reliant on contaminated groundwater or living near industrial facilities. Groundwater has long been recognized as an essential national resource, accounting for 40% and 36% of the nation's drinking water and irrigation water, respectively. The urine and manure stored and disposed of at industrial animal facilities contain pathogens, hormones, antibiotic resistant bacteria, pharmaceuticals, chemicals used at the facility, and nutrients like nitrate and phosphorus that can endanger public health and the environment. Many of the pathogens present in the fecal matter are zoonotic, meaning that people can get sick when they ingest them, and include *E. coli*, *Salmonella*, *Cryptosporidium*, *Listeria*, rotavirus, and hepatitis. Several studies have documented the transfer of these pathogens onto sprayfields and disposal sites, and subsequently, into surface and groundwater.[11] The CDC Report confirms that through misapplication of manure, these pathogens and excess nutrients end up in groundwater – often rural American's sole source of

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[6] McBride, J. *Manure kills 1,300 fish in Otter Creek near La Farge*, available at http://lacrossetribune.com/vernonbroadcaster/news/local/manure-kills-fish-in-otter-creek-near-la-farge/article_bc76f48c-47e1-51f9-8839-43d80a1fdfbc.html

[7] *Manure from Iowa dairy farm blamed for deaths of 60K fish*, available at http://fox6now.com/2017/10/31/manure-from-iowa-dairy-farm-blamed-for-deaths-of-60k-fish/

[8] *Crews cleaning up manure spill; Fish kill reported in nearby creek*, available at http://www.wgal.com/article/traveler-says-he-couldnt-board-flight-after-he-put-all-his-clothes-on/15335324

[9] *Manure runoff causes fish kill in stream near Decorah*, available at http://northiowatoday.com/2017/08/28/manure-runoff-causes-fish-kill-in-stream-near-decorah/

[10] Henry, T. *Poor manure practices culprit in thousands of fish deaths*, http://www.toledoblade.com/State/2017/08/24/Poor-manure-practices-culprit-in.html

[11] *See, e.g.*, Hutchison, M.L., et al. 2005. *Fate of Pathogens Present in Livestock Wastes Spread onto Fescue Plots*. Appl Environ Microbiol. 2005 Feb; 71(2): 691–696. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC546755/; Jones, D. L. Potential health risks associated with the persistence of *Escherichia coli* O157 in agricultural environments. 1999 Soil Use Manag. 15**:**76-83; Pell, A.N., *Manure and microbes: public and animal health problem?* J Dairy Sci. 1997 Oct; 80(10):2673-81.

drinking water, where it poses grave risk. Just some of the documented health impacts of living near a CAFO are that:

- You have almost three times the risk of carrying the antibiotic resistant bacteria MRSA from living within one mile of a hog facility that confines 2,500 or more hogs.
- Children attending schools within one-half mile from a CAFO have a "significantly increased prevalence of physician-diagnosed asthma."[12]
- For children with allergies, the prevalence of wheezing is 5% higher for those attending schools located within 3 miles of a CAFO and was 24% higher for those students at schools where farm animal odor was reported to be noticeable indoors twice per month.
- Residents living within the vicinity of a CAFO had elevated rates of mucous membrane irritation and respiratory and gastrointestinal problems, as well as higher reporting of headaches, runny noses, sore throats, excessive coughing, diarrhea, and burning eyes.[13]
- Doubling animal production at a facility increases infant mortality, driven by elevated levels of respiratory diseases, by 7.4%.

In the communities I have worked with, I have seen levels of nitrate, a substance that cannot be seen, smelled, tasted, nor boiled out, seven times the EPA's Maximum Contaminant Level ("MCL"). The EPA set the MCL for nitrate at 10 because above that level, nitrate can cause "blue baby syndrome" – a potentially fatal condition for infants who drink bottles made with contaminated water. In the Yakima Valley where the litigation took place, about 20% of the sampled drinking water wells, and about 35% in the immediate vicinity of the dairies, tested above the EPA limit. High levels of nitrates have also been linked to fatal birth defects, including anencephaly, in which the fetus never fully develops parts of the brain and skull. In the Yakima area, anencephaly occurs more than four and a half times the national average, and more pregnant women are affected by anencephaly there than anywhere else in the country. In North Carolina, the CDC linked water contamination from pig waste to miscarriages in the mid-1990s.

In Kewaunee County, Wisconsin, **60%** of the wells tested positive for fecal bacteria linked predominantly to cow manure. Cryptosporidium, a parasite which causes severe and acute digestive symptoms including diarrhea and vomiting, and can be deadly for young children, pregnant women, the elderly, and people undergoing chemotherapy, has also been documented in private wells. Kewaunee County has an estimated 140 cases of cryptosporidiosis

[12] Sigurdarson ST, *School proximity to concentrated animal feeding operations and prevalence of asthma in students*, Chest. 2006 Jun;129(6):1486-91.
[13] Wing S, Wolf S. *Intensive livestock operations, health, and quality of life among eastern North Carolina residents. Environmental Health Perspectives*. 2000;108(3):233–238.

per year from private wells, one of the highest rates per capita in the country.[14] There have been documented cases of wells showing *E. Coli* levels at 9,800 colony forming units per milliliter the EPA considers *any* amount of *E. coli* in drinking water to be dangerous. Simply bathing in their own well water in areas of Wisconsin have landed children in the hospital due to dehydration from vomiting, severe ear infections from *E. coli*, and exposure to antibiotic resistant bacteria.

In the communities in which I have worked, those impacts extend also to an infringement on community and family life– the loss of neighborhood cookouts, of outdoor birthday parties, of gardens and porches, and of evening walks and children's bicycle rides. The smell and flies I have personally experienced have been overwhelming. In places like Eastern North Carolina, the California's Central Valley, Maryland, and all over the Midwest I have walked in fenceline communities where the smell made my own eyes water and throat burn, causing uncontrollable coughing fits and gagging, and left my clothes and anything they touched reeking for days. One reporter that visited a poultry CAFO in California's San Joaquin Valley claimed that his suit continued to carry a putrid odor back at the studio. That is daily life for these communities all over rural America.

I have heard the people who are not aware of these conditions attempt to argue that these impacts should be expected from agriculture. It is critical to note for the record that these facilities are not agricultural, but industrial, and their impacts are simply not experienced in traditional pasture-based systems. As the grandchild of farmers, an attendee of a farm college, and having worked with farmers and ranchers, I am familiar with the smell of a farm. But living near these facilities is more like living by an industrial plant than a red barn. The industrial approach to animal agriculture discharges toxic chemicals far above what would be ever be created at a traditional small family farm. Indeed, in Public Justice's work, we represent and work with farmers and farming communities who view what is going on in their neighborhoods and grieve the change from agricultural to industrial.

2. Question: Are these impacts isolated to Washington State, or do we see them nationwide?

Over 15 million U.S. households rely on private well water for drinking water, and EPA regulations that protect public drinking water systems do not apply to privately owned wells. All private wells rely on groundwater. Health and environmental impacts from industrial animal agriculture will occur anywhere that the industry concentrates its animal confinements beyond what the ground can bear and dumps its waste rather than processing it or disposing it in a safe way. These impacts are unfortunately not isolated to Washington State, as described above, but can be found in rural communities nationwide. Counties in Iowa, Nebraska, Michigan, Ohio, Minnesota, Illinois, Indiana, and Wisconsin at the central part of the United States; Georgia,

[14] Murray, P., NPR, *Researchers Want To Know If Cows Are To Blame For Contaminated Wells In Northeastern Wisconsin*, available at https://www.wpr.org/researchers-want-know-if-cows-are-blame-contaminated-wells-northeastern-wisconsin; *see also* Painter, J.E., Cryptosporidiosis Surveillance — United States, 2011–2012 https://www.cdc.gov/mmwr/preview/mmwrhtml/ss6403a1.htm.

Arkansas, North Carolina, Mississippi, and Alabama in the southern part of the United States; Delaware, Maryland, and Pennsylvania in the eastern part of the United States; and Arizona, California, Idaho, New Mexico, and Texas in the western part of USA contain "hotspots" of CAFOs. In these regions, if large facilities refuse to properly dispose of their waste, then the communities and environment are endangered.

While farmers face serious pressures with regulation, it has been well documented that environmental enforcement for unlawful behavior is lacking in this industry. Without enforcement, bad actors are allowed to produce cheaper product by externalizing their waste and costs onto others, giving them an unfair competitive advantage to farmers who are following the rules. Either because the regulators do not have the resources to properly inspect and respond to dirty facilities, or the agencies lack the political will, bad actors in this industry frequently act with impunity for decades. Here are just a few of the documented impacts nationally that were not mentioned above:

- In 2001, nationally, agriculture accounted for 59% of all sources of impairment for rivers.
- Detailed mapping of CAFOs in North Carolina documenting industrial animal agriculture pollution demonstrate 60% of the watersheds where CAFOs are located have "distinct differences in water quality reflecting swine and/or poultry manure effects" including high levels of nitrate and ammonia.[15]
- Detailed tracking of the manure load in the Western Lake Erie Basin established industrial animal agriculture as a major contributor to the growth of algae blooms in Lake Erie.[16]
- Four decades of studies of the Delmarva Peninsula, which includes most of Delaware, the Eastern Shore of Maryland, and the Eastern Shore of Virginia, have shown that excess nutrients from the land application of poultry waste is a major contributing factor in drinking water aquifers and the pollution in the Chesapeake Bay.
- An EPA-funded, decade-long study detailing seven CAFOs located in contaminated groundwater aquifers in south central United States found that the contamination "most likely resulted directly from the operation, either through leaking infrastructure piping, leaking lagoons, or land application of CAFO waste."[17]
- A report released by the California State Water Resources Control Board identified animal agriculture as a serious contributor to the contamination of the groundwater serving 21 million Californians, particularly in the Central Valley.

[15] Environmental Working Group, *Exposing Fields of Filth*, https://www.ewg.org/research/exposing-fields-filth#.Wl-oCqhKuUk
[16] Sierra Club, *Follow the Manure: Factory Farms and the Lake Erie Algal Crisis* https://www.sierraclub.org/michigan/follow-manure-factory-farms-and-lake-erie-algal-crisis
[17] Hutchins, S.R., *Case Studies on the Impact of Concentrated Animal Feeding Operations (CAFOs) on Ground Water Quality*, EPA 600/R-12/052 (Sept. 2012) at 23.

It is also important to correct the record on the matter of environmental impacts in fenceline communities. Washington State Dairy Federation (WSDF) Director Dan Wood, in addition being loose with many supposed facts, testified falsely to the Committee that "[g]roundwater nitrates there [in lower Yakima Valley] have been high for more than 100 years, predating the dairies and much of agriculture that's in the area." Hearing at 21:00-21:10. This argument was made and discredited in the Yakima groundwater litigation. There are no facts that credibly support historic source of nitrate contamination in the area. Nitrate history was a central issue in the *Cow Palace* litigation and the dairy industry failed to put any evidence forward of historic nitrate contamination. In fact, it is just the opposite – the uncontroverted testimony is that over 99% of the potential loadings of nitrate in the area came from the four large dairy CAFOs, most of which had been operating since the 1970s.

3. Question: Environmental justice is a real and serious concern. We should be doing everything we can on this Committee to increase environmental justice by helping low income communities and communities of color that bear the brunt of pollution. Who lives in these impacted communities?

The issue of pollution from industrial animal agriculture is one of the most critical environmental justice issues of our time. Industrial animal agriculture facilities are overwhelmingly located in communities of color and in low-income communities.

A study of 48 states and Hawaii of CAFO siting and communities of color and low-income communities found "that the EJ issue is found to be valid for all the categories of industrial farms." [18] The study concluded that, in taking a national view, the percentage of African-American population, percentage of population below poverty, and the percentage of African-American population below poverty were significantly higher in areas with industrial chicken facilities. The percentage of white population below poverty level were found significantly higher in areas with cattle and hog farms at a national level, though there was recognition that concentration of siting varied on state-by-state bases.

In North Carolina, for example, 95% of hog CAFOs are located in low-income communities of color. The intensive hog confinement facilities are located squarely in the so-called Black Belt, a crescent-shaped band throughout the South where slaves worked on plantations. A century after slavery, black residents of this region still experience high rates of poverty, poor health care, low educational attainment, unemployment, and substandard housing. They also live alongside the highest concentration of CAFOs in the state. In response to years of inaction from North Carolina agencies, the affected communities filed an Administrative Complaint with the EPA against the state for violations of Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d, 40 C.F.R. Part 7. The Complaint is based on the state's issuing permits to more than 2,000 swine operations in communities of color; those permits fail to

[18] Rafael Harun, S.M. and Ogneva-Himmelberger, Y. *Distribution of Industrial Farms in the United States and Socioeconomic, Health, and Environmental Characteristics of Counties*, Geography Journal (2013), Article ID 385893.

control pollution, leading to a disparate impact on African-Americans, Latinos, and Native Americans.[19] The proportions of African-Americans, Latinos, and Native Americans are 1.54, 1.39, and 2.18 times higher, respectively, than the proportion of non-Hispanic Whites in North Carolina living within 3 miles of an industrial swine facility. In a 25-page response to the complaint, the EPA said that the N.C. Department of Environmental Quality has not done enough to reduce asthma, stench, flies, truck traffic, and other problems caused by the facilities. The federal agency also says it has "grave concerns" about reports from minority neighbors of threats and intimidation against those who have complained, and documented where many neighbors gave up, feeling that state regulators would not help them.

A case study in Ohio found higher proportions of children and Hispanic populations in regions with high densities of dairy and swine CAFOs, and concluded that there was environmental discrimination with respect to the concentration of CAFOs in the state.[20] The study also found that Hispanic populations were disproportionately exposed to the environmental dangers of toxic emissions and airborne illnesses from concentrated animal facilities, as well as reduced quality of life. The study argued that the disproportionate impact of pollution on communities of color must be considered in future siting and construction of CAFOs.

In California, 90% of California's dairy cows and 30% of the state's disadvantaged communities are located in the San Joaquin Valley, where the communities are disproportionately non-white and low income relative to the rest of the state of California. While the average poverty rate in California is 14.2%, the average rate in the eight counties of the San Joaquin Valley is 20.49%.[21] The dairy industry in this region has disproportionate impacts on these communities. Though only about 9% of the state's population lives in the San Joaquin Valley (SJV), the region accounts for approximately 15% of the pollutants listed by the EPA as most concerning.[22] Despite being significantly more likely of drinking water contaminated with nitrates, the disadvantaged communities in the San Joaquin Valley are less likely to be able to afford to treat the contamination.[23] In fact, the majority of water systems that reported contamination in 2015 were in the Valley.

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[19] Complaint Under Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d, 40 C.F.R. Part 7 https://earthjustice.org/sites/default/files/files/North-Carolina-EJ-Network-et-al-Complaint-under-Title-VI.pdf

[20] Lenhardt, J. and Ogneva-Himmelberger, Y. *Environmental Injustice in the Spacial Distribution of Concentrated Animal Feeding Operations: A case study from Ohio, USA.* Environmental Justice. August 2013, 6(4): 133-139.

[21] Perez, Miguel, and Kathleen Curtis. *Healthy People 2010: A 2003 profile of health status in the Central San Joaquin Valley*. 2003. California State University, Fresno. p. 2.

[22] *Id*. at 8.

[23] STATE WATER RESOURCES CONTROL BOARD REPORT TO THE LEGISLATURE, *COMMUNITIES THAT RELY ON A CONTAMINATED GROUNDWATER SOURCE FOR DRINKING WATER* (Jan. 2013) https://www.waterboards.ca.gov/gama/ab2222/docs/ab2222.pdf

4. Question: Under current law, citizen suits are blocked when EPA or the State is pursuing an enforcement action to address the dangerous condition the citizen suit seeks to address. How is the language in the discussion draft different from the approach in current law?

The difference between the current law and the discussion draft is that the draft bill would block citizen suits for *any* civil, criminal, or Federal or State administrative action of *any* kind, including any "consent agreements" that seek compliance with *any* "applicable permit, standard, regulation, condition, requirement, prohibition, or order." Discussion Draft Subsection (E)(i)(I)-(II).

In plain language, that means that no citizen can enforce RCRA even if there is imminent and substantial endangerment to public health if a regulatory authority is asking the facility to comply with *any* requirement, whether or not that requirement has anything to do improving the health and safety of the community. This includes paper filing requirements or paying dues and taxes on permits. It encompasses any kind of compliance activity that one could possibly conceive of at these facilities. It would be like preventing the State from prosecuting someone for a hit and run if they were already fighting a parking ticket.

The current law, on the other hand, prohibits citizen suits where a state or federal agency is taking action to fix the very RCRA violations that may result in an endangerment to public health or the environment. Currently, that is limited to actions taken under relevant sections of RCRA or the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA").

Additional limitations include judicial doctrines designed to stop any lawsuit that seeks relief from an injury that is already being addressed. One such doctrine is "mootness," which is a judicial principle where a court will not decide a case where there is no true controversy, including if a solution is already underway thanks to a State or Federal agency. For example, in the *Cow Palace* case, the defendants raised that argument – saying that the Administrative Order on Consent already provided the relief that the plaintiffs sought. The Court explicitly rejected that argument, saying that the plaintiffs sought relief that would not be provided by the Order so they could secure clean water to a larger area of impacted homes, and require waste management practices that were serious sources of drinking water contamination.

5. Question: We received testimony from EPA in advance of this hearing, and they noted that "Unlike the current statutory bars, the EPA or state actions that would bar a citizen suit under this bill are not limited to RCRA or CERCLA actions." Do you agree with this assessment? Do you think this is appropriate?

The EPA's assessment is correct. The statutory bar in this bill is virtually limitless. This is inappropriate for two reasons.

First, the discussion draft turns the intent of RCRA on its head. When Congress enacted RCRA in 1976, it sought to close "the last remaining loophole in environmental law, that of

unregulated land disposal of discarded materials and hazardous wastes." H.R.Rep No. 1491, 94th Cong., 2d Sess. 4, reprinted in 1976 U.S.C.C.A.N. 6238, 6241. RCRA is designed to be protective of public health and the environment from solid and hazardous waste. Agricultural waste was major Congressional focus when RCRA was passed, which is highlighted by Congress specifically naming it in the statutory definition of solid waste. Given that RCRA's citizen suits are designed as a residual power to protect the public from endangerment, then any time there is a solid or hazardous waste that causes an endangerment, Congress gave citizens the power to act. The drafters were careful not to limit that power simply because an agency is already working with the polluter. In fact, it is almost the reverse! If there is an endangerment, the statute presumes citizens can act unless a limited subset of actions that cover the same issues are present. This discussion draft completely inverts those intentions by being utterly *un*protective of public health, through limiting citizens who are facing an imminent and substantial endangerment from being able to protect themselves if *any* action is being taken, whether or not it stops the endangerment. It leaves citizens defenseless if their drinking water is contaminated by solid waste, which cannot be what Congress intended when it passed this law.

Second, the discussion draft is dangerous because it removes the only safeguard rural Americans have to protect their own private wells from industrial agriculture facilities that mismanage their waste. If this draft is passed into law, private citizens are completely reliant on regulatory agencies to provide them with adequate clean replacement water for drinking and domestic uses, and to stop any further contamination that may endanger them or their families. This unfairly passes the cost of pollution from the wrongdoer onto the taxpayer, and unfairly puts rural Americans at the mercy of an already overburdened and under-resourced regulatory agency or an agency with no political will or ability to fix the problem, as was seen in the Yakima Valley. The people in Kewaunee County Wisconsin, in Eastern North Carolina, and in Iowa are *still* waiting for their respective State and Federal governments to act on their behalf, as they have been for more than two decades.

6. Question: If this bill had been in effect, would the lawsuit brought by Community Association for Restoration of the Environment against Cow Palace have been blocked?

Yes, CARE would not have been able to bring a citizen suit to get clean drinking water for the hundreds of community members who had been left out of the EPA's settlement with the dairies under the Safe Drinking Water Act. This is because the EPA's Order would have fallen under the statutory bar if there are any "consent agreements" with the EPA seeking "compliance with an applicable… requirement." Had this discussion draft been law, then there would currently be hundreds of community members reliant on contaminated drinking water with no way to get relief. Moreover, groundwater contamination would continue because the EPA's Order failed to seek compulsory changes to the waste management practices at the dairies for several of the sources of contamination.

7. Question: What actions, required under the settlement in the CARES v. Cow Palace case, would not have been required under the Safe Drinking Water Act consent order?

The following actions were not required under the Safe Drinking Water Act consent order:

- An expanded radius of the community eligible for replacement water, meaning hundreds of community members would be going without clean drinking water.

- The provision of drinking water to wider area by a neutral third-party, Nuestra Casa, an organization that provides educational and health services to immigrant women and leads community outreach efforts for cities and schools, rather than the dairies, which brought fear to the community and was limited in scope.
- Modern, synthetic liners with leak-detection systems for the waste storage lagoons to stop leaking of wastewater into the aquifer. EPA had no such requirements to stop discharges.
- Groundwater monitoring devices to detect new leaks of manure placed according to scientific measurements for where leaks were most likely to occur.
- A nutrient management budget that would result in lower levels of soil concentration of nitrate, an established major cause to the aquifer contamination.
- Contamination prevention requirements from cow pens and compost areas, such as building concrete aprons around water troughs and directing feed sileage leachate into the waste storage lagoons to reduce leaching into the aquifer.
- Limitations on amounts of nitrogen and phosphorus to fields that were causing a significant amount of the contamination.
- Mandatory recordkeeping for compliance.
- Updating each facility's state-required Dairy Nutrient Management Plan to reflect these requirements so that their operations reflected a waste management system that was protective of public health.

8. Question: It has been suggested that the requirements of RCRA are duplicative with the requirements of the Safe Drinking Water Act or the Clean Water Act. Do you agree with that suggestion?

While there are similarities in language, the requirements of RCRA are quite different from that of the Safe Drinking Water Act ("SDWA") and the Clean Water Act ("CWA"). The main difference is that neither the SDWA or RCRA impose any regulatory burdens or requirements on agricultural facilities at all, while the Clean Water Act creates a regulatory permitting system to prevent and control discharges of pollution from "point sources" to surface waters of the United States. Notably, the Clean Water Act does not regulate groundwater or "non-point sources" and importantly the statute exempts from regulation the runoff from land application of animal manure to fields or manure storage on a facility.

Both RCRA and the SDWA provide emergency powers to the EPA to take to stop persons from causing or contributing to imminent and substantial endangerments to public health, but the SDWA limits such actions to public water systems or underground sources of drinking water, 42 U.S.C. § 300i, while RCRA limits such actions to the disposal of solid or hazardous waste. 42 U.S.C. § 6973. However, neither of those statutes impose requirements that must be complied with, outside of prohibiting a person from seriously endangering the public health.

In terms of citizen enforcement, the Safe Drinking Water Act limits citizen suits to public water systems that are failing to meet primary drinking water standards or against the government for failing to discharge their duties under the law. 42 USC § 300j-8; 40 CFR Part 141. Those suits cannot be used to protect private wells, or against private actors who are the source of the contamination.

The primary statute invoked by citizen-plaintiffs generally is the Federal Water Pollution Control Act, otherwise known as the Clean Water Act, 33 U.S.C. §1251 *et seq.* ("CWA"). Like RCRA, citizen-plaintiffs suing under the CWA's "citizen suit" provision must provide statutory pre-suit notice and are barred from litigation if a state or federal regulatory entity is "diligently prosecuting" a civil or criminal action against the defendant. *See* 33 U.S.C. § 1365(b). The Yakima citizens did bring actions against the big dairy CAFO's in the late 1990's. While these successful actions slowed pollution of the local rivers, the groundwater contamination problem persisted because the Clean Water Act does not regulate pollution to groundwater.

Unfortunately, CWA citizen suits against CAFOs are limited by three important factors. First, jurisdiction under the CWA is confined to surface waters, *not* groundwater, which becomes drinking water.[24] In the context of *Cow Palace*, there were no active, ongoing surface water discharges that would have given rise to a cause of action under the CWA. Instead, manure pollutants were being released from soil to groundwater, causing widespread nitrate contamination of the underlying aquifer. Second, the remedy for CWA violations is typically a court-ordered cessation of discharges coupled with civil penalties. Injunctive relief of the type achieved by the Plaintiffs in *Cow Palace* to clean up the contamination would not have been available had the case been litigated under the CWA. Third, the Second Circuit's decision in *Waterkeeper Alliance et al. v. EPA*, 399 F.3d 486 (2005), reversed EPA policy and held that only facilities with "actual discharges" are obligated to obtain a NPDES permit. In Washington State, virtually all CAFOs dropped their NPDES permit coverage after the decision, claiming no actual discharges of pollutants originated from their facilities. As such, there were no NPDES permits to enforce against CAFOs, making CWA litigation even more difficult.

[24] Some courts have recognized that discharges to surface water that first enter "hydrologically connected" groundwater are actionable under the CWA. Discharges directly to groundwater, however, are outside the purview of the statute.

In sum,

- RCRA and the SDWA do not impose any regulatory or statutory burdens or requirements, apart from prohibiting a person from gravely endangering the public health.
- Citizens cannot bring enforcement actions for pollution to private well water under the Safe Drinking Water Act as it only pertains to community and public water systems; only RCRA covers pollution of private wells.
- Citizens cannot bring enforcement actions for pollution to drinking water aquifers under the Clean Water Act as it only pertains to discharges of
- pollution to *surface* water; only RCRA covers groundwater pollution impacting private wells.

9. Question: It has also been suggested that communities have extensive alternatives to citizen suits. What alternatives would have been available to the Community Association for Restoration of the Environment if their citizen suit had been blocked?

It is worth providing a background to this issue for the record, but the short answer is none. Private well water is completely unregulated in America. If your well water is contaminated by a third party, and the government has refused to step in and fix the problem, RCRA is your only option.

As a primer, there are typically two avenues of litigation against a polluting CAFO facility: common law tort claims or causes of action arising under federal environmental statutes. As discussed below, each of these avenues has substantial constraints, leaving cases brought under the Resource Conservation and Recovery Act ("RCRA") as the only meaningful way to remedy CAFO pollution.

First, under Washington State law, impacted citizens face major legal and financial barriers when bringing trespass, nuisance, or negligence claims against agricultural operations for contaminating their drinking water. In particular, Washington's "Right to Farm Act," codified in R.C.W. 7.48.300 *et seq*., insulates agricultural activities like dairy CAFOs from such lawsuits. RCW 7.48.305(1).

In the context of *Cow Palace*, the Washington State Department of Agriculture had deemed the facility to be "in compliance" with its Dairy Nutrient Management Plan, the only state-mandated operational document required of the CAFO. *See* R.C.W. 90.64.026 (requiring dairy CAFOs to obtain and have certified a "dairy nutrient management plan" pursuant to Washington's "Dairy Nutrient Management Act").[25] In a nuisance-type case, statements about such "compliance" would likely have been used offensively to seek dismissal of the state tort

[25] There are no citizen enforcement mechanisms contained within the Dairy Nutrient Management Act.

action, with a counterclaim under the Right to Farm Act that would have put the individuals who brought action at risk of serious, personal financial jeopardy. Under RCRA, however, the Yakima Plaintiffs defeated a motion to dismiss and, in discovery, uncovered that the Washington Department of Agriculture and its inspectors had *completely* failed in their role to protect human health and the environment. Inspectors, either deliberatively or through incompetence, had inputted incorrect data on their inspection reports. They had also failed to review critical documents evidencing Cow Palace's *non*-compliance with its Nutrient Management Plan.

Even more problematic, an unsuccessful plaintiff facing a Right to Farm Act counterclaim is liable for a prevailing farmer's actual damages, exemplary damages, attorneys' fees, and costs. RCW 7.48.315(1). Indeed, the law even authorizes a state or local agency that merely *investigates* a complaint against an agricultural activity to recover its "full investigative costs and expenses" against an unsuccessful complainant. RCW 7.48.320. This creates a great disincentive to bringing tort actions because losing could be financially devastating.

Finally, and perhaps most importantly, the remedy in state tort cases is almost universally money-damages, which do not abate the past and ongoing environmental harms caused by polluting CAFOs.

The high evidentiary burden accompanying state tort claims, coupled with the potentially devastating financial implications for an unsuccessful citizen under the Right to Farm Act, make state tort claims against operations like *Cow Palace* exceptionally risky and non-advisable endeavors.

The second avenue of litigation for citizens impacted by CAFOs lies with federal law. As discussed above, the Clean Water Act is limited to surface water discharges and does not cover the drinking water aquifer contamination that causes the public health risks addressed by RCRA. Similarly, the Safe Drinking Water Act does not cover private wells, leaving rural Americans without a federal safeguard except for RCRA.

Against this backdrop, RCRA citizen suits are, indeed, the "last resort" to abate and remedy groundwater pollution from CAFOs. Make no mistake, citizen litigation under RCRA is an expensive, time-consuming, and complex endeavor. It is not entered into lightly. Plaintiffs in the *Cow Palace* lawsuit expended hundreds of thousands of dollars proving that the facility was causing or contributing to an imminent and substantial endangerment to human health by inundating the aquifer with dangerous levels of nitrate contamination. The outcome in the case was significant for the community— over 100 families have so far been provided clean, safe drinking water, and major operational and structural modifications are being made at the facilities to ensure future contamination is eliminated.

September 3, 2014

By email and Federal Express

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Dear Ms. McCarthy and Ms. Golightly-Howell:

Re: Complaint Under Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d, 40 C.F.R. Part 7

The North Carolina Environmental Justice Network, Rural Empowerment Association for Community Help ("REACH"), and Waterkeeper Alliance, Inc. ("Complainants") submit this complaint against the North Carolina Department of Environment and Natural Resources ("DENR") for issuing a general permit that allows industrial swine facilities in North Carolina 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 Title VI of the Civil Rights Act of 1964, 42 U.S.C. §§ 2000d to 2000d-7, and the United States Environmental Protection Agency's ("EPA") implementing regulations, 40 C.F.R. Part 7.

DENR currently allows more than 2,000 swine operations—with the collective capacity to raise more than 9.5 million swine in confinement—to operate within the state and,

particularly, in the coastal plain in the eastern portion of the state.[1] The permitted swine facilities generate a staggering amount of waste that wreaks havoc on the health and well-being of neighboring communities and the environment. Under the permit, these facilities can continue to store urine and feces in open-air cesspools, called lagoons, before spraying the waste on fields with high volume spreaders. At all steps of this so-called waste management system, waste from the facilities can pollute the air and water and injure human health.

For years, Complainants and other community members in eastern North Carolina have complained to DENR about the adverse effects of the swine industry on their health and environment and have implored the agency to provide greater protection. The eastern portion of the state contains counties that have more industrial swine facilities, and are more densely populated by swine, than anywhere else in the country.[2] Study after study has documented that the swine industry pollutes the air and water, interferes with the enjoyment of property, causes property values to plummet, and takes a toll on human health. Despite the research, and repeated requests that the agency revise the permit program to protect communities, in March of this year, DENR failed to conduct an analysis of the potential disproportionate impact of the permit and issued a permit with essentially the same conditions as previous permits, conditions that proved woefully inadequate to protect the health and environment of the affected communities. DENR did not require facilities to do away with the polluting lagoon and sprayfield system, or to make modifications that would prevent waste from escaping from the confinement houses, the high volume sprayers, the lagoons, the waste application fields, or any other of the many conduits for pollution. DENR also failed to impose rigorous government inspection and oversight to ensure that the swine facilities meet the meager protections in the permit, and to monitor the ways in which the facilities affect the environment and human health.

The effects of the swine industry on the health and environment of communities in eastern North Carolina are all the worse given the growth of the poultry industry in this region, and the cumulative impact of swine and poultry waste. More must be done to protect these communities, yet at the same time, the state has cut the number of inspectors at DENR, limiting the agency's ability to enforce even existing permit terms.

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[1] The current general permit expires on September 30, 2014. At the time this complaint was written, DENR had not published notice of the facilities that are covered under the revised permit, but, as described in footnote 26, *infra*, the number of permitted facilities is not expected to change. Complainants will supplement this complaint when DENR makes available a new list of covered facilities.

[2] *See* Feedstuffs, Hog Density by County (May 24, 2010), *available at* http://fdsmagissues.feedstuffs.com/fds/PastIssues/FDS8221/fds14_8221.pdf and http://fdsmagissues.feedstuffs.com/fds/PastIssues/FDS8221/fds15_8221.pdf (showing that ten counties in eastern North Carolina have the highest density of swine of all counties in the country).

Complainants believe that but for the race and national origin of the impacted population, which is disproportionately African American, Latino, and Native American, DENR would be more responsive to the crying need for stronger permit conditions. Given the high burden required to prove claims of intentional discrimination, however, Complainants do not at this time allege that DENR intentionally discriminated against communities of color in issuing the general permit. Nonetheless, this complaint should be understood in the context of a dynamic where race and ethnicity continue to play a role in governance and DENR's failure to be responsive to the need for improvement in waste management at industrial swine facilities. North Carolina is the birthplace of the environmental justice movement. It is in North Carolina that, in the early 1980s, DENR designated a predominantly African American community to receive soil contaminated with polychlorinated biphenyls ("PCBs"), leading to the formation of the Warren County Citizens Concerned about PCBs. This group turned to acts of civil disobedience to have their voices heard.

Since the early 1990s, African American, Latino, and Native American community members have sought greater protection from the adverse impacts of industrial swine production, but time and again their requests have been unanswered. Complainants hope that in the year 2014, the Office of Civil Rights will enforce Title VI of the Civil Rights Act of 1964 and EPA's implementing regulations, and will respond with the full force of law—withdrawing DENR's funding, if need be—to protect communities of color from the injustice of being forced to live and work near inadequately regulated industrial pollution sources. Complainants request that EPA investigate the complaint and, upon finding discrimination, require that DENR conduct a disproportionate impact analysis and come into compliance with the law by overhauling the general permit to protect African Americans, Latinos, and Native Americans from the adverse disproportionate impacts of industrial swine facilities.

I. NATURE OF THE ACTION

1. This is a complaint for relief under Title VI of the Civil Rights Act of 1964, 42 U.S.C. §§ 2000d to 2000d-7, and the United States Environmental Protection Agency's ("EPA") implementing regulations, 40 C.F.R. Part 7, arising from DENR's decision to issue a permit that allows industrial swine facilities in North Carolina to operate with inadequate and outdated systems of controlling animal waste and little oversight to the detriment of neighboring African American, Latino, and Native American communities.

2. On March 7, 2014, DENR finalized a renewal of the Swine Waste Management System General Permit, AWG100000 (the "General Permit"). The General Permit should protect communities that live and work near the permitted swine facilities from the staggering amounts of waste that the facilities generate; it sets forth the standards that more than 2,000 industrial swine facilities in North Carolina must meet to operate legally within North Carolina. However, the General Permit falls far short of what is needed to protect human health and the environment. Permitted industrial swine facilities are allowed to store animal waste in open-air

pits, called lagoons, that can spill waste into surface waters and leach harmful pollutants into groundwater that feeds drinking water sources, and to spray that waste on fields with high volume spreaders that spew pollutants not only onto the fields, but also into nearby communities. Wastewater from the sprayfields can seep into groundwater or run off into nearby surface waters. The General Permit does not require rigorous government oversight, monitoring, and reporting that would allow the state and the public to understand the full extent to which pollutants from the facilities are getting into the air and water and making people sick.

3. Surface waters in North Carolina are polluted with waste from permitted swine facilities. Communities have lost streams and ponds that they had relied on for fishing and swimming to the runoff and water pollution that comes with the industrial swine industry. After catching fish with open sores and infections, people have had to abandon favorite fishing holes, losing not only a source of recreation but also a way of feeding their families.

4. Pollutants, including nitrates, phosphorus, bacteria, viruses, and parasites can leach from the earthen lagoons that are authorized under the permit into the groundwater. Polluted groundwater, in turn, can feed drinking water sources, including wells. Fearing that their well water is contaminated, people living near permitted industrial swine facilities have been forced to connect to municipal water supplies at personal expense.

5. Air pollution from the permitted swine facilities is a significant problem for human health and welfare. Gases, including ammonia, hydrogen sulfide, volatile organic compounds ("VOCs"), particles from feces, dander, feed, and dead microorganisms, and live bacteria and viruses are emitted from the confinement houses through mechanical ventilation or massive industrial fans. The lagoons and the sprayers that distribute the waste on to the fields also emit gasses into the air. Because of the terrible smell and harmful pollutants, people living near permitted industrial swine facilities experience difficulty breathing when the facilities are spraying. They suffer from asthma attacks, runny noses and eyes, and bronchitis. They have trouble sleeping. They avoid going outside and keep windows closed lest they be inundated with the overpowering smell of the waste and the flies that the waste attracts. Many community members no longer hang their clothes on the line to dry for fear that the clothes will be coated with manure.

6. The permitted swine facilities are located disproportionately in African American, Latino, and Native American communities, and African Americans, Latinos and Native Americans disproportionately bear the burden of the General Permit's failure to control the waste at the permitted swine facilities.

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

the swine facilities from the staggering amounts of pollution the permitted swine facilities generate violates the basic civil rights protections set forth in Title VI.[3]

II. PARTIES

8. Complainant North Carolina Environmental Justice Network ("Environmental Justice Network") is a statewide, grassroots-led organization made up of community members and other organizations that are working to fight environmental injustice. The Environmental Justice Network seeks to promote health and environmental equality for all people in North Carolina through organizing, advocacy, research, and education based on principles of economic equity and democracy for all. The Environmental Justice Network supports the communities that are most impacted by environmental injustice and has worked for over a decade to change the fact that industrial swine facilities in North Carolina are allowed to pollute low-income and African American communities. Declaration of Naeema Muhammad ¶¶ 4-5, 13-48, attached as Exhibit 30 [Muhammad Decl.].

9. Complainant Rural Empowerment Association for Community Help ("REACH") is an organization that seeks to address social, economic, and environmental inequities in Duplin, Sampson, and Bladen Counties. Through research and advocacy, REACH has worked to change the system that allows industrial swine facilities to pollute the environment and to destroy the health and welfare of the affected communities. Declaration of Devon Hall ¶¶ 4-13, attached as Exhibit 16 [Hall Decl.].

10. Complainant Waterkeeper Alliance, Inc. is a nonprofit organization that unites the more than 200 Waterkeeper organizations that patrol and protect the waterways in North Carolina, across the United States, and around the world. Waterkeeper Alliance's Pure Farms, Pure Waters Campaign recognizes that concentrated animal feeding operations, including swine facilities, and the rise of corporate controlled meat production have nearly destroyed the family farm and severely poisoned the nation's waters. As part of the Pure Farms, Pure Waters Campaign, Waterkeeper Alliance has worked with communities in eastern North Carolina to stop industrial swine facilities from destroying the waters and human health. Declaration of Larry Baldwin, ¶¶ 12-14, attached as Exhibit 6 [Baldwin Decl.].

11. DENR is an agency of the State of North Carolina. N.C. Gen. Stat. § 143B-279.1. DENR is charged with protecting North Carolina's environment and public health, *id.* § 143B-279.2, and has the power to issue permits to carry out this mission. *Id.* § 143-215.1(a)-(b). The Environmental Management Commission ("EMC") of DENR, *id.* § 143B-282(a)(1)(a), has the authority to regulate animal waste management systems at swine facilities. *Id.* § 143-

[3] This is not a siting case. Stated simply, DENR's decision to issue a permit that fails to control pollution from the permitted swine facilities has an unjustified disproportionate impact on African American, Latino, and Native Americans in violation of Title VI and its regulations.

215.1(a)(12) (requiring animal waste management systems to obtain a permit from the EMC of DENR); *id.* § 143-212(2).

III. JURISDICTION

A. DENR Is Subject to Title VI

12. Title VI of the Civil Rights Act of 1964 prohibits recipients of federal funds from discriminating against individuals on the basis of race, color, or national origin.

13. Title VI provides that "[n]o person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." 42 U.S.C. § 2000d.

14. Acceptance of federal funds, including EPA assistance, creates an obligation on the recipient to comply with Title VI and EPA's implementing regulations.

15. EPA's Title VI regulations provide that "[n]o person shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving EPA assistance on the basis of race, color [or] national origin." 40 C.F.R. § 7.30.

16. EPA's regulations provide the following specific prohibitions, at 40 C.F.R. § 7.35:

> (a) As to any program or activity receiving EPA assistance, a recipient shall not directly or through contractual, licensing, or other arrangements on the basis of race, color, [or] national origin . . . :
>
> > (1) Deny a person any service, aid or other benefit of the program or activity;
> >
> > (2) Provide a person any service, aid or other benefit that is different, or is provided differently from that provided to others under the program or activity;
> >
> > . . .
>
> (b) A recipient shall not use criteria or methods of administering its program or activity which have the effect of subjecting individuals to discrimination because of their race, color, [or] national origin, . . . or have the effect of defeating or substantially impairing accomplishment of the objectives of the program or activity with respect to individuals of a particular race, color, [or] national origin . . . .
>
> . . .

(d) This list of the specific prohibitions of discrimination do not limit the general prohibition of § 7.30.

i. DENR is a Program or Activity Covered by Title VI

17. DENR is a program or activity covered by Title VI. Title VI defines program or activity as "all of the operations of . . . a department, agency, special purpose district, or other instrumentality of a State or of a local government . . . ***any part of which*** is extended Federal financial assistance." 42 U.S.C. § 2000d-4a (emphasis added).

18. Under Title VI, if any part of a listed entity receives federal funds, the whole entity is covered by Title VI. *Ass'n of Mex.-Am. Educ. v. California*, 195 F.3d 465, 474-75 (9th Cir. 1999, *rev'd in part on other grounds*, 231 F.3d 572 (9th Cir. 2000) (en banc).

19. DENR is an agency of the state of North Carolina that, as shown in paragraphs 20 to 26 below, receives federal financial assistance from EPA. DENR, thus meets the definition of program or activity under Title VI and must comply with Title VI in implementing all of its programs, whether or not the particular portion of the program or activity itself specifically received EPA funding.

ii. DENR is a Recipient of EPA Assistance

20. EPA's Title VI regulations define a "[r]ecipient" as "any state or its political subdivision, any instrumentality of a state or its political subdivision, any public or private agency, institution, organization, or other entity, or any person to which Federal financial assistance is extended directly or through another recipient . . . ." 40 C.F.R. § 7.25.

21. EPA's regulations define "EPA assistance" to mean "any grant or corporative agreement, loan, contract . . . , or any other arrangement by which EPA provides or otherwise makes available assistance in the form of funds," among other means. 40 C.F.R. § 7.25.

22. DENR was a recipient of EPA assistance as of March 7, 2014, the time of the alleged discriminatory action, as shown in Exhibit 1.A (EPA award of federal funds to DENR in fiscal year 2014) and Exhibit 1.B (EPA awards of federal funds to DENR extending into fiscal year 2014 and thereafter).

23. USASpending.gov is a searchable website operated by the Office of Management and Budget, which provides the public with information about federal awards, including the name of the entity receiving the award and the amount of the award.

24. According to USASpending.gov, as of August 27, 2014, EPA had awarded DENR at least $19,282,355 in federal funds for fiscal year 2014.[4] Of this amount, $14,899,454 was given as continuations of awards given in previous fiscal years, and $4,382,901 was given to fund new projects. For example, $4,340,904 was earmarked for "Water Pollution Control State, Interstate, and Tribal Program Support," a program that received more than $7 million across five of the disbursements in fiscal year 2014. In fiscal year 2014, EPA also earmarked $3.1 million for "State Public Water System Supervision," $2.2 million for "Hazardous Waste Management State Program Support," and $2.2 million for "Leaking Underground Storage Tank Trust Fund Corrective Action Program."[5] *See* Exhibit 1.A (EPA award of federal funds to DENR in fiscal year 2014) (compiling awards for fiscal year 2014).

25. As of August 27, 2014, 22 of DENR's programs had received or were receiving EPA assistance for programs that extended into 2014 and beyond.[6] *See* Exhibit 1.B (EPA awards of federal funds to DENR extending into fiscal year 2014 and thereafter).

26. Because DENR is a department of the State of North Carolina that receives EPA grants and funding, DENR is subject to Title VI.

B. **The Complaint is Timely**

27. DENR issued the General Permit on March 7, 2014. This complaint is timely as it is filed within 180 days of the discriminatory action, DENR's approval of the General Permit. 40 C.F.R. § 7.120(b)(2).[7]

C. **The Complaint Meets Other Jurisdictional Criteria**

28. This complaint meets all other jurisdictional criteria: it is in writing; it identifies DENR as the entity that allegedly performed the discriminatory act and describes the acts that violate EPA's Title VI regulations; and, should EPA so require, it is also filed by groups that are

[4] Fiscal year 2014 began on October 1, 2013 and ends on September 30, 2014.
[5] USA Spending, http://www.usaspending.gov (enter "809785280" then select "Environmental Protection Agency" under "By Agency" and "2014" under "By Fiscal Year").
[6] This data reflects only that which is available on usaspending.gov. It is possible that data from some awards made by EPA to DENR were omitted from the data on usaspending.gov, and thus are not included in Exhibits 1.A and 1.B.
[7] In addition, OCR has authority to waive the time limit for good cause, 40 C.F.R. § 7.120(b)(2), and has affirmative authority to conduct post-award compliance reviews when it has "reason to believe that discrimination may be occurring." *Id.* § 7.115(a).

authorized to represent people who were discriminated against in violation of EPA's Title VI regulations.[8]

IV. FACTUAL BACKGROUND

A. The Industrial Swine Industry and the Development of the State Permitting Program

29. The North Carolina swine industry has "changed dramatically since the 1980's from the small farm raising a few hogs to large confinement type operations."[9] In 1982, more than 11,000 swine farms raised approximately 2 million animals.[10] By 1997, the number of farms had dropped to fewer than 3,000, while the swine population had ballooned to nearly 10 million.[11]

30. In 1995, a disaster at a swine lagoon brought the growing industry into the public eye. In the summer of 1995, a lagoon at a swine facility in Jacksonville, North Carolina burst, spilling 28.5 million gallons of swine waste into a tributary to the New River.[12]

31. The spill focused attention on the swine industry, and its significant potential to threaten human health and welfare. Following the spill, in 1995, the North Carolina General Assembly created the Blue Ribbon Study Commission on Agricultural Waste to study "[t]he

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[8] *See* EPA, Draft Revised Guidance for Investigating Title VI Administrative Complaints Challenging Permits (Draft Revised Investigations Guidance), 65 Fed. Reg. 39,667, 39,672 (June 27, 2000) (listing jurisdictional criteria applicable to Title VI complaints).

[9] N.C. Dep't of Agric. & Consumer Servs., Agricultural Overview – Commodities, http://www.ncagr.gov/stats/general/commodities.htm (last visited Aug. 28, 2014); *see also* Chris Hurt & Kelly Zering, *Hog Production Booms in North Carolina: Why There? Why Now?, in* Dep't of Agric. Econ., Purdue Univ., Purdue Agric. Econ. Report 11 (1993), *available at* http://www.agecon.purdue.edu/extension/pubs/paer/pre_98/paer0893.pdf; Pew Commission on Industrial Farm Animal Production, Putting Meat on the Table: Industrial Farm Animal Production in America (2008), *available at* http://www.ncifap.org/_images/PCIFAPSmry.pdf, attached as Exhibit 46 [hereinafter, Pew, Putting Meat on the Table] (describing the rise of industrial animal production in America and the effects on public health and the environment); Pew Commission on Industrial Farm Animal Production, Environmental Impact of Industrial Farm Animal Production 1-2 (2008), *available at* http://www.ncifap.org/_images/212-4_EnvImpact_tc_Final.pdf, attached as Exhibit 45 [hereinafter, Pew, Environmental Impact] (same).

[10] U.S. Dep't of Agric., Census of Agriculture 30 tbl. 32 (1987), *available at* http://usda.mannlib.cornell.edu/usda/AgCensusImages/1987/01/33/3/Table-32.pdf.

[11] U.S. Dep't of Agric. 1997 Census of Agriculture – Highlights of Agriculture: 1997 and 1992 North Carolina, http://www.agcensus.usda.gov/Publications/1997/Census_Highlights/North_Carolina/ncst.txt (last visited Aug. 28, 2014).

[12] JoAnn M. Burkholder et al., *Impacts to a Coastal River and Estuary from Rupture of a Large Swine Waste Holding Lagoon*, 26 J. Envtl. Qual. 1451, 1452-53 (1997), attached as Exhibit 2 to Exhibit 14, Declaration of Dr. JoAnn Burkholder [hereinafter, Burkholder, *Lagoon Rupture*].

effect of agriculture waste on groundwater, drinking water, and air quality and any other environmental impacts of agriculture" and "[m]ethods of disposing of and managing agriculture waste that have fewer adverse impacts than those methods currently in use in this State, including positive commercial and noncommercial uses of agriculture waste," among other things.[13]

32. The Blue Ribbon Commission proposed a number of recommendations to reduce the impact that swine facilities have on water, air quality, and human health. The Commission recommended that the State replace the then-existing regulatory system, which deemed swine facilities permitted under the law if they met certain conditions, with a requirement that facilities apply for and obtain a permit to control waste. The general permit was intended to ensure more direct oversight and control.[14]

33. The Blue Ribbon Commission also recommended that the State do more to protect communities against odors from swine facilities,[15] enact programs to monitor swine facilities to prevent heavy metal and phosphorus pollution,[16] work to develop alternatives to the system of storing waste in open air lagoons,[17] and study the impacts that lagoons have on groundwater quality.[18]

34. In 1996, the North Carolina legislature required that the State develop a general permit program to prevent the discharge of waste from animal operations, including swine operations with 250 or more swine.[19]

35. DENR began issuing general permits for controlling swine waste management systems on January 1, 1997.[20] In 2003, the General Assembly extended the expiration date of all general permits until October 1, 2004.[21]

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[13] N.C. Sess. Law 1995-542, sec. 4.1(1), (3) (eff. July 29, 1995), *available at* http://www.ncga.state.nc.us/EnactedLegislation/SessionLaws/HTML/1995-1996/SL1995-542.html; *see also* Blue Ribbon Study Commission on Agricultural Waste, Report to the 1995 General Assembly of North Carolina, 1996 Regular Session 1 (1996), *available at* http://ncleg.net/Library/studies/1996/st10736.pdf, attached as Exhibit 38 [Blue Ribbon Study Commission].

[14] *Id.* at 24-25.

[15] *Id.* at 16.

[16] *Id.* at 19.

[17] *Id.* at 29.

[18] *Id.* at 29-30.

[19] N.C. Sess. Law 1996-626, sec. 1 (codified as amended at N.C. Gen. Stat. §§ 143-215.10A through .10*I*) (eff. as provided at sec. 19), *available at* http://www.ncga.state.nc.us/EnactedLegislation/SessionLaws/HTML/1995-1996/SL1995-626.html.

[20] Senate Bill 1217 Interagency Group, Ninth Senate Bill (SB) 1217 Interagency Group Guidance Document 7-1 (Sep. 25, 2009), *available at* http://www.ncagr.gov/SWC/tech/documents/9th_Guidance_Doc_100109.pdf.

36. DENR has since issued revised general permits, first on June 4, 2004, and again on February 20, 2009. These permits were effective from October 1, 2004 until September 30, 2009 and from October 1, 2009 until September 30, 2014, respectively.

B. Finalization of the General Permit and DENR's Failure to Conduct a Disparate Impact Analysis

37. In 2013, DENR published draft state permits to control animal waste, including AWG100000, the Swine Waste Management System General Permit.

38. Since at least the mid 1990s, when North Carolina charged the Blue Ribbon Commission with studying the effects of swine facilities, the State has been on notice that these operations generate massive amounts of waste that threaten the health and environment of communities that are forced to live nearby.

39. Myriad scientific articles describe the ways in which the swine facilities pollute the environment and wreak havoc on human health.[22]

40. Citizens have told DENR, through meetings with the agency and formal complaints, that swine facilities are polluting their waters and air, causing them to feel sick, and preventing them from sitting outside and enjoying their property. Baldwin Decl. ¶¶ 43-46; Hall Decl. ¶ 12; Declaration of Elsie Herring ¶ 16, attached as Exhibit 17 [Herring Decl.]; Muhammad Decl. ¶¶ 46-48, 50.

41. Citizens, and nonprofits working with them, have demanded stronger controls to protect them from the water and air pollution these facilities generate. *See* Baldwin Decl. ¶¶ 43-46; Muhammad Decl. ¶¶ 48, 50.

42. DENR has been invited to attend the Environmental Justice Network's annual summit, where representatives from DENR have sat on a "Community Speak Out and Government Listening" panel that allows the citizens to voice concerns about industries that affect their health and welfare, including the industrial swine industry. Muhammad Decl. ¶¶ 46, 48, 50.

43. Despite repeated protests about the failures in the general permit program, DENR proposed permit terms that were largely the same as the permit that came before it. The draft offered nothing to correct the failures and protect neighboring communities from harmful pollution from permitted swine facilities.

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[21] *See* N.C. Sess. Law 2003-28, sec. 1.

[22] *See* paragraphs 74 to 128, *infra*; *see generally* Pew, Putting Meat on the Table, *supra* note 9, at 96-105 (references); Pew, Environmental Impact, *supra* note 9, at 38-44 (references).

44. On December 6, 2013, Steve Wing, Ginger T. Guidry, Sarah Hatcher, and Jessica Rinsky, from the University of North Carolina – Chapel Hill School of Public Health, submitted comments to DENR, raising the "large body of evidence documenting the negative health impacts of industrial swine operations," and calling on DENR "to reduce off-site pollution and increase transparency about animal production activities." Exhibit 2 at 1. This letter called upon DENR to modify the state general permit to prohibit "1) the management of swine waste using lagoons and spray fields, 2) the non-therapeutic use of antibiotics in livestock production, and 3) the location of animal confinements and animal waste storage in flood plains" as "the minimum required to preserve the health and well-being of rural residents near swine operations." *Id.* at 5.

45. Complainants Environmental Justice Network and Waterkeeper Alliance, along with others, also submitted comments to DENR on December 6, 2013, asking DENR to modify the proposed general permit to come into compliance with Title VI. The Comments are attached as Exhibit 3. The Comments made clear that "DENR's failure to require robust waste management technologies as a condition of the permit disproportionately impacts communities of color" and indicated that "the program must be redrawn to avoid this result." *Id.* at 2.

46. These Comments called on DENR "to assess the racial and ethnic impact of the permitting program" before finalizing the general permit and to "adopt measures that protect communities from pollution from the swine facilities." *Id.* at 6. The Comments pointed out that although swine facilities have historically had a disproportionate impact on the basis of race, "there is no evidence that DENR took steps to analyze the disparity its permitting program creates or attempted to address the disparity in any way." *Id*. at 15.

47. On March 7, 2014, DENR finalized the most recent renewal of the general permit. North Carolina, Environmental Management Commission, Department of Environment and Natural Resources, Swine Waste Management System General Permit, Permit No. AWG100000 [General Permit].

48. DENR issued the General Permit with inadequate provisions to protect human health and the environment, after nearly two decades of concern and complaints about the inadequate regulation of swine facilities.

49. On information and belief, DENR finalized the permit without analyzing the potential for disproportionate health or environmental impacts on African Americans, Latinos,

and Native Americans, as required by Title VI and EPA implementing regulations. DENR should have conducted a disproportionate impact analysis but failed to do so.[23]

C. **The Swine Waste Management System General Permit**

50. The General Permit is effective from October 1, 2014 until September 30, 2019. General Permit at 1.

51. The General Permit regulates animal waste management systems at swine facilities in North Carolina that meet the definition of animal operations, which involves 250 or more swine. 15A N.C. Admin. Code § 2T.1304; N.C. Gen. Stat. § 143-215.10B(1). Under North Carolina law, a person must have a permit to construct or operate an animal waste management system. N.C. Gen. Stat. § 143-215.1(a)(12); 15A N.C. Admin. Code § 2T.1304.

52. Animal waste management systems are defined by statute as the "combination of structures and nonstructural practices serving a feedlot[24] that provide for the collection, treatment, storage, [and] land application of animal waste." N.C. Gen. Stat. § 143-215.10B(3).

53. Animal waste management systems refer to the complete system for controlling waste the animal facility generates, from the time the waste is produced until it is utilized.[25]

54. Swine facilities obtain a certificates of coverage to operate under the General Permit.

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[23] 40 C.F.R. § 7.80(a)(1) provides, "Applicants for EPA assistance shall submit an assurance … stating that, with respect to their programs or activities, they will comply with the requirements of this part," Nondiscrimination in Programs or Activities Receiving Federal Assistance from EPA. If assurances are to be at all meaningful, this obligation requires recipients to analyze whether they are complying with Title VI and EPA's implementing regulations and, particularly, whether their programs and activities have an unjustified disproportionate impact. *See* Draft Title VI Recipient Guidance, 65 Fed. Reg. at 39,657.

[24] 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." N.C. Gen. Stat. § 143-215.10B(5).

[25] Natural Res. Conservation Serv., USDA, Pt. 651: Agric. Waste Mgmt. Field Handbook 9-1 (2011), *available at* 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").

55. Currently, more than 2,000 swine facilities hold certificates of coverage to operate under the existing general permit, which expires on September 20, 2014. The number of facilities holding a permit is not expected to change significantly under the renewal.[26]

56. The General Permit will not prevent degradation of North Carolina's ground and surface water or air, and will not protect the health of people living, working, and attending school in proximity to permitted swine facilities. Baldwin Decl. ¶ 51; Declaration of Dr. JoAnn Burkholder ¶¶ 41-51, attached as Exhibit 14 [Burkholder Decl.].

57. Moreover, inadequate enforcement measures all but ensure the meager protections—such as the prohibition against spraying waste in the rain or on oversaturated fields—can go unheeded. Baldwin Decl. ¶¶ 42, 48. The dwindling number of state inspectors, and lack of overtime staffing, exacerbate enforcement issues. *Id.* ¶ 47.

D. The General Permit Does Not Require Robust Waste Management Technologies or Other Provisions to Control Pollution from Permitted Swine Facilities

58. Chief among the failures in the current General Permit is that it continues to allow permitted swine facilities to use a lagoon and sprayfield system to control disposal of

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[26] At the time this complaint was written, DENR had not published notice of the facilities that are covered under the General Permit, however the number of permitted facilities is not expected to change significantly. In 1997, North Carolina enacted moratorium against the construction and operation of new and expanded swine facilities. *See* N.C. Sess. Law 1997-458, sec. 1.2 *available at* http://www.ncga.state.nc.us/EnactedLegislation/SessionLaws/HTML/1997-1998/SL1997-458.html. The moratorium was extended and changed over the years. *See, e.g.*, N.C. Sess. Law 1998-188, sec. 3 (amending N.C. Sess. Law 1997-458 § 1.2) (eff. Oct. 12, 1998), *available at* http://www.ncga.state.nc.us/EnactedLegislation/SessionLaws/HTML/1997-1998/SL1998-188.html; N.C. Sess. Law 1999-329, sec. 2.1 (amending N.C. Sess. Law 1997-458 § 1.2) (eff. July 20, 1999), *available at* http://www.ncga.state.nc.us/EnactedLegislation/SessionLaws/HTML/1999-2000/SL1999-329.html. Under the current law, DENR "shall not issue or modify a 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." N.C. Gen. Stat. § 143-215.10I(b). Thus, new lagoons and sprayfield systems, which would otherwise be controlled under the General Permit, are prohibited. DENR may issue a permit for the construction, operation, or expansion of an animal waste management system serving a swine facility if it meets certain performance standards designed to protect the environment, *id.*, however the standards in essence prohibit lagoons and sprayfields. Moreover, any new or expanded facility would be required to meet these standards under an individual permit. Thus, the facilities operating under the current general permit represent the upper bound of facilities that will be permitted under the renewal. The number of permitted facilities will decline if an operation closes. Complainants will supplement this complaint when DENR makes available a new list of facilities covered by the General Permit.

animal waste. The lagoon and sprayfield system is a blunt instrument for controlling the staggering amount of waste generated each year at the permitted facilities. Lagoons can spill, threatening surface and groundwater, and leach pollutants into groundwater. The high volume sprayers generate a mist of manure that drifts off the fields, inundating homes, streams, and anything in its path with harmful gases and pathogens and an overwhelming smell.

59. The General Permit also does not ensure that all permitted swine facilities are meeting standards to control phosphorus pollution, focusing instead on those facilities that are "sensitive to nutrient enrichment," General Permit at 2 (Condition I.5). This condition fails to recognize that, in large part because of the swine industry, many of North Carolina's waters are oversaturated with nutrients and are sensitive to nutrient enrichment. Baldwin Decl. 39 & Exs. 12-17.

60. The General Permit allows permitted swine facilities to land apply waste as close as 100 feet from a well, General Permit at 3 (Condition 1.8). Far greater setbacks are required to protect drinking water sources from the waste that drifts off the sprayfields. Nitrate from swine facilities, for example, has been found to travel up to 100 meters from swine facilities, and nitrate in water can cause methemoglobinemia, or blue baby syndrome. Burkholder Decl. ¶¶ 45, 25.

61. The General Permit provides permitted swine facilities with up to two days to incorporate manure and sludges into bare soil, unless rainfall events are predicted, General Permit at 3 (Condition II.7). For two days, then, manure and sludges are allowed to sit on the ground, where they could run into nearby waters, all the while giving off a terrible smell.

62. The General Permit allows permitted swine facilities to "temporarily lower lagoon levels" in times of drought or wet weather without first obtaining approval and oversight from DENR, General Permit at 6 (Condition II.27). Facilities, thus, can spray additional manure from the lagoon without ensuring that the land can incorporate the additional waste. Without oversight and control, this provision all but ensures that waste will run off the sprayfields and into any nearby streams and leach into groundwater. The additional spraying generates additional manure mist that blankets the community with harmful gasses and pathogens whose presence is known with the putrid smell. *See, e.g.*, Baldwin Decl. ¶¶ 16, 23, 24, 36, 42.

E. The General Permit Does Not Require Sufficient Oversight and Control of Permitted Swine Facilities

63. The General Permit does not require rigorous oversight and reporting to ensure that permitted swine facilities are not polluting the surface and groundwater, as well as air, to the detriment of human health and welfare.

64. The General Permit does not specify the practices, beyond mere visual inspection, that must be used to ensure that the waste collection, treatment, and storage structures and the runoff control measures in place at permitted swine facilities are in proper working order and are not leaking or otherwise discharging pollutants, General Permit at 6 (Condition III.1).

65. The General Permit does not uniformly require best practices to monitor the lagoons, such as automated lagoon or storage pond waste level monitors and recorders, General Permit at 6-7 (Condition III.2(b)). Only those facilities that have been found to violate requirements to maintain proper lagoon levels for two consecutive years are subject to this heightened requirement. All facilities should rigorously monitor lagoon levels to prevent catastrophic outcomes, like spills in the event of North Carolina's frequent heavy rainfall events.

66. The General Permit does not require permitted swine facilities to submit an amendment to the Certified Animal Waste Management Plan to DENR for approval, and does not publish other major changes and revisions for public review, General Permit at 2 (Condition I.3). DENR, thus, is not carefully monitoring the waste management plans to ensure that swine facilities are subject to best practice.

67. The General Permit does not require rigorous microbial analysis of swine waste that is applied to the fields to provide the state, the scientific community, and the public with sufficient information to understand the scope of impacts in the event of a discharge event, or to assess problems arising from normal operation. Burkholder Decl. ¶ 43. Within 60 days of land applying waste, the facility must analyze "a representative sample of animal waste" for nitrogen, phosphorus, zinc, and copper. General Permit at 8 (Condition III.5). The lag time between land application and testing does not ensure that DENR, the scientific community, or the public will have accurate information about the content of animal waste in the event of a discharge. The limited microbial analysis also will not provide enough information to evaluate and respond to citizen complaints and monitor and predict potential problems.

68. The General Permit does not require groundwater monitoring in the event of a "massive burial of animals," but rather makes such monitoring discretionary, General Permit at 4 (Condition I.10). Animal burial is a significant threat to surface and groundwater quality, especially in recent years, as the emergence of the porcine epidemic virus ("PED") threatens to wipe out herds of animals. Baldwin Decl. ¶¶ 24, 27, 32.

69. The General Permit does not require public notice of a number of events that threaten human health—including failure of the waste management system causing a discharge to ditches, surface waters, and wetlands; failure of the waste management system that prohibits the system from receiving, storing, or treating additional waste; spills of waste or sludge; deterioration or leaks in the lagoon; failure to maintain storage capacity in the lagoon or below designated freeboard levels; waste application in violation of the animal waste management

plan or that results in runoff to a ditch, surface water, or wetlands; and discharge to ditches, surface waters, or wetlands, General Permit at 9-10 (Condition III.13).

70. The General Permit does not require sufficient public notice in the event of a discharge of more than 1,000 gallons of waste, and even up to 1 million gallons, and does not require rigorous testing of the waste source, the receiving water body, and the soil sediment to determine the potential impact on human health, General Permit at 10-11 (Conditions III.15-17). The permit does not ensure that the waste will be sampled close enough to the discharge event to enable the agency and the public to assess the severity of the threat and the potential impacts to human health. Burkholder Decl. ¶¶ 43, 46-48.

71. The General Permit establishes a system of self-monitoring, where the permitted swine facilities create, but do not submit to DENR for review nor make available to the public, the following records:

- Records of inspection of the land application site, General Permit at 5 (Condition II.17)
- Records of testing and calibration of the land application equipment, General Permit at 6 (Condition II.24)
- Records of the waste level in each lagoon, General Permit at 6 (Condition III.2);
- Records of precipitation events, General Permit at 7 (Condition III.3(a));
- Records concerning irrigation and land application events, General Permit at 8 (Condition III.6);
- Records of transfers of waste between waste structures on the same site not typically operated in series, General Permit at 8 (Condition III.7); and
- Monthly stocking records, General Permit at 8 (Condition III.8).

DENR and the public need access to these records to understand and evaluate the extent to which the swine facilities are impacting human health and the environment. Burkholder Decl. ¶¶ 43-44.

72. DENR does not have sufficient inspectors to visit the permitted swine facilities and ensure compliance with the minimum standards to protect the environment and human

health. On information and belief, North Carolina has cut approximately 131 employees from DENR, including inspectors and other regulators, since January 2013.[27]

73. DENR's decision to issue the General Permit without adequate measures to control, dispose of, and monitor the significant amounts of animal waste and pollutants that these facilities generate threatens to pollute the state's water and air. This pollution, in turn, contributes to serious health problems among those in neighboring communities, prevents people from enjoying their land and property, and contributes to declining property values.

V. ADVERSE IMPACTS

A. Swine Facilities Permitted by DENR Contribute to Surface Water Pollution that Adversely Affects Human Health and Welfare

74. The General Permit allows permitted swine facilities to use a lagoon and sprayfield system to dispose of waste.

75. Lagoons are prone to acute pollution problems, including ruptures and spills, which impair surface water quality.[28] Such contamination is also capable of harming human health. Burkholder Decl. ¶¶ 6-14.

76. Hurricanes in eastern North Carolina have led to severe flooding of industrial swine facilities, the rupture of lagoons, and the overflow of waste into North Carolina's creeks, rivers, and streams.[29]

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[27] Andrew Kenney & Craig Jarvis, *Cuts to DENR Regulators Jarring in Wake of Dan River Spill, News & Observer*, Mar. 7, 2014, http://www.newsobserver.com/2014/03/07/3683762/cuts-to-denr-regulators-jarring.html.

[28] *See* Michael A. Mallin & Lawrence B. Cahoon, *Industrialized Animal Production—A Major Source of Nutrient and Microbial Pollution to Aquatic Ecosystems*, 24 Population & Env't 369, 371 (2003), attached as Exhibit 41; Burkholder, *Lagoon Rupture*, *supra* note 12, at 1463 (rupture of lagoon at a facility in Jacksonville, North Carolina in 1995, releasing more than 28.5 million gallons of untreated swine waste in the New River, to the detriment of water quality); Mallin & Cahoon at 371 (in 1995, a poultry lagoon breach and a large swine lagoon leak were suspected of causing algal blooms, fish kills, and microbial contamination in North Carolina's Cape Fear River Basin).

[29] *See* Burkholder, *Lagoon Rupture*, *supra* note 12, at 1463 (in 1996, "Hurricane Fran led to severe flooding of [confined animal operations] located in coastal river floodplains, and to rupture of various lagoons in several major watersheds"); Steve Wing, et al., *The Potential Impact of Flooding on Confined Animal Feeding Operations in Eastern North Carolina*, 110 Envtl. Health Perspectives 387, 387 (2002), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240801/pdf/ehp0110-000387.pdf (describing how the 15-20 inches of rain dropped by Hurricane Floyd turned eastern North Carolina into a fecal flood zone). The flooding following Hurricane Floyd was not an isolated incident. *Id.* ("In 1996, 22 fecal waste pits were reported to have been ruptured or inundated following flooding from Hurricane Fran, and one major spill was reported following Hurricane Bonnie in 1998.").

77. Waste spilled from overflowing lagoons and runoff from application of the waste to fields has been linked to outbreaks of harmful pathogens, such as salmonella and *E. coli* in the environment[30] has led to major freshwater fish kills, and has contributed to toxic algae outbreaks.[31] *See, e.g.*, Burkholder Decl. ¶¶ 6-14.

78. The General Permit allows permitted swine facilities to use sprayfields to disperse the waste stored in their lagoons. Sprayfields also contribute to water quality impacts by introducing various pollutants, including those described in the preceding paragraph, to the water column. For example, waste can run off fields when over-applied, or when it is applied to ground that is already saturated or frozen and cannot absorb the waste.[32] Baldwin Decl. ¶ 16, 23, 36, 42; Burkholder Decl. ¶ 30; *see also* Declaration of Ogden D. Batts ¶ 17, attached as Exhibit 7 [Batts Decl.] (reporting improper spraying); Declaration of Alvin Miller ¶ 13, attached as Exhibit 28 [Alvin Miller Decl.]. Contaminants from swine waste also reach receiving waters through runoff and leach through permeable soils to vulnerable aquifers even when the waste is applied at recommended application rates. Burkholder Decl. ¶ 29. Permitted swine facilities have been reported to apply waste to ditches that lead to surface waters. Baldwin Decl. ¶ 16, 23, 35, 42. Finally, waste from the sprayers can blow directly into the surface waters. Baldwin Decl. ¶ 23.

79. Over-applying the waste or applying the waste to saturated or frozen ground would violate the General Permit and the associated animal waste management plans, however, many facilities are reported to engage in such practices. Without provisions requiring frequent DENR inspections of the permitted facilities in the General Permit and rigorous self-monitoring and reporting to DENR and the public, combined with increases in DENR staff to handle the additional responsibility, DENR and the public are not in a position to find and prohibit the unlawful waste application practices that threaten water quality. Baldwin Decl. ¶¶ 45-51.

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[30] Michael Greger & Gowri Koneswaran, *The Public Health Impacts of Concentrated Animal Feeding Operations on Local Communities*, 33 Farm Cmty. Health 11, 13 (2010); Carrie Hribar, Nat'l Ass'n of Local Bds. of Health, Understanding Concentrated Animal Feeding Operations and Their Impact on Communities, Environmental Health 4 (2010), *available at* http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf, attached as Exhibit 40.

[31] JoAnn M. Burkholder et al., *Impacts of Waste from CAFOs on Water Quality*, 115 Envtl. Health Perspectives 308, 309 (2007), *available at* http://dx.doi.org/10.1289/ehp.8839, attached as Exhibit 3 to Burkholder Decl. [hereinafter, Burkholder, *Impacts of CAFO Waste*]; *see also* Michael A. Mallin et al., Ctr. for Marine Science Research, Univ. of N.C. at Wilmington, Effect of Organic and Inorganic Nutrient Loading on Photosynthetic and Heterotrophic Plankton Communities in Blackwater Rivers (1998), *available at* http://repository.lib.ncsu.edu/dr/bitstream/1840.4/1880/1/NC-WRRI-315.pdf; Michael A. Mallin et al., *Factors Contributing to Hypoxia in Rivers, Lakes, and Streams*, 51 Limnology & Oceanography 690, 699-700 (2006).

[32] Hribar, *supra* note 30, at 4.

80. Ammonia that is volatilized from the sprayers or the confinement houses at permitted swine facilities also degrades water quality. The airborne ammonia returns to the surface near permitted facilities, where it can land in surface waters or wash into the waters via ditches.[33] Burkholder Decl. ¶¶ 32-33. For example, researchers found that industrial swine facilities contributed to ammonia pollution in the lower Neuse estuary. *Id.* ¶ 19, 34.

81. High ammonia concentrations can lead to algal blooms that are harmful to aquatic life. Burkholder Decl. ¶ 34, 19. The algae themselves produce toxins that degrade water quality and impact human health. *Id.* ¶¶ 19, 40. For example, cyanobacteria make toxins that cause liver hemorrhaging as well as neurological and psychological impacts. *Id.* ¶ 40. Cyanotoxins can cause burning eyes and skin irritation, and can even promote tumor growth. *Id.* The Cape Fear River, which is impacted by many swine facilities, has experienced highly toxic cyanobacteria blooms. *Id.* ¶ 41. Scientists at the University of North Carolina, Wilmington recorded levels as high as 390 micrograms of the toxin per liter in Cape Fear, a level that far exceeds the 1 microgram per liter standard for safe drinking water put forward by the World Health Organization. *Id.*

82. Waste from permitted swine facilities has polluted waterways, forcing people to abandon favorite swimming holes and fishing ponds. In some instances, the low dissolved oxygen seen in waters oversaturated with swine waste causes the fish to suffocate, ruining a water body as a potential fishing source. Burkholder Decl. ¶ 38; *see also* Alvin Miller Decl. ¶ 9. People have reported catching fish with skin infections, visible sores, and abrasions that may have been caused by water pollution from the industrial swine facilities.[34] Declaration of Luby C. Waters ¶¶ 14-15, attached as Exhibit 36 [Waters Decl.]; Hall Decl. ¶ 19; Declaration of Daniel Mejia ¶¶ 18-20, attached as Exhibit 26 [D. Mejia Decl.].

83. Parasites, bacteria, viruses, nitrates, and other components of liquid waste from permitted swine facilities pose threats to human health.[35] Steve Wing & Jill Johnston, Industrial

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[33] *Id.*; *see also* Marion Deerhake et al., *Atmospheric Dispersion and Deposition of Ammonia Gas*, *in* RTI Int'l, Benefits of Adopting Environmentally Superior Swine Waste Management Technologies in North Carolina: An Environmental and Economic Assessment, at 2-32 to 2-34 (2003), *available at* http://www.cals.ncsu.edu/waste_mgt/smithfield_projects/phase1report04/appendix%20c-RTI.pdf, attached as Exhibit 47 (modeling rates of ammonia deposition by county). "The greatest deposition occurs in Sampson and Duplin counties." *Id.* at 2-33.

[34] *See* JoAnn M. Burkholder & Howard B. Glasgow, *History of Toxic Pfiesteria in North Carolina Estuaries from 1991 to the Present*, 51 Biosci. 827, 833 (2001) ("During acute [Pfiesteria] exposure, fish commonly hemorrhage or develop skin lesions that are diffuse or nonfocal, as well as deep, localized or focal, bleeding sores or ulcerations.").

[35] Burkholder, *Impacts of CAFO Waste*, *supra* note 31; *see also* Dana Cole et al., *Concentrated Swine Feeding Operations and Public Health: A Review of Occupational and Community Health Effects*, 108 Envtl. Health Perspectives 685 (2000), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1638284/pdf/envhper00309-0041.pdf, attached as Exhibit 39.

Hog Operations in North Carolina Disproportionately Impact African-Americans, Hispanics and American Indians 2 (Aug. 2014), attached as Exhibit 4 [Wing & Johnston Report].

B. Swine Facilities Permitted by DENR Contribute to Groundwater Pollution that Adversely Affects Human Health and Welfare

84. The lagoon and sprayfield system contributes to groundwater pollution that adversely affects human health and welfare.

85. Many of the lagoons in North Carolina were built in the 1990s, before standards requiring that lagoons be lined with plastic and compacted clay were in place.[36] Baldwin Decl. ¶ 34; Burkholder Decl. ¶ 29. Lagoons have been shown to leach wastewater into the soil where

[36] When the swine industry in North Carolina expanded, lagoons were not required to have synthetic liners, allegedly because of the largely unproven assumption that the lagoons would develop a seal. R.L. Huffman, *Seepage Evaluation of Older Swine Lagoons in North Carolina*, 47 Trans. Am. Soc'y Agric. Eng'rs 1507, 1507 (2004) ("[L]agoons were expected to develop a seal at the liquid-soil interface that would impede seepage."); *see also* Danny McCook, Discussion of Background Considerations in the Development of Appendix 10D to the Agricultural Waste Management Field Handbook 1 (2001), *available at* https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_024282.pdf ("Prior to about 1990, NRCS engineers commonly assumed that the accumulation of manure solids and the bacterial action resulting from a sludge interface would effectively reduce seepage . . . to an acceptable level."). Assumptions about the effectiveness of natural sealing were inaccurate or overstated. *See* McCook, *supra* at 1 ("[R]esearch . . . demonstrated that . . . manure sealing . . . was not as complete as formerly believed."); *see also* Natural Res. Conservation Serv., USDA, Part 651: Agricultural Waste Management Field Handbook 10D-1 (2009), *available at* ftp.wcc.nrcs.usda.gov/wntsc/AWM/handbook/ch10.pdf ("A rule of thumb supported by research is that manure sealing is not effective unless soils have at least 15 percent clay content for monogastric animal generated waste . . . ."). The General Assembly has prohibited the construction, operation, or expansion of new anaerobic lagoons, stating that DENR is prohibited from "issu[ing] or modify[ing] a 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. *See* N.C. Gen. Stat. § 143-215.10*I*(b). Furthermore, the performance standards that apply to new or expanded animal waste management systems at swine facilities specify that the system "be designed and constructed with synthetic liners to eliminate seepage." 15A N.C. Admin. Code § 2T.1307(b)(1)(A).

it can reach groundwater.[37] Baldwin Dec. ¶ 34; Burkholder Decl. ¶ 24. Studies from eastern North Carolina have shown that lagoons at swine facilities can and do contaminate shallow groundwater with antibiotic-resistant *E. coli*[38] and nitrate,[39] and ammonia.[40]

86. Liquid waste that is applied to the fields can also percolate through the sandy soils in North Carolina and into shallow groundwater. Burkholder Decl. ¶ 23.

87. Permitted facilities are allowed to operate without proper liners unless and until DENR requires their replacement.[41]

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[37] *See, e.g.*, J.P. Murphy & J.P. Harner, *Lagoon Seepage Through Soil Liners*, *in* Swine Day 1997, at 1, 3 (Kans. State Univ. Agric. Experiment Station & Coop've Ext. Serv.), *available at* http://www.asi.k-state.edu/doc/swine-day-1997/srp795.pdf; *see also* Carol J. Hodne, Iowa Policy Project, Concentrating on Clean Water: The Challenge of Concentrated Animal Feeding Operations 8 (2005), *available at* http://www.iowapolicyproject.org/2005docs/050406-cafo-fullx.pdf. 2005docs/050406-cafo-fullx.pdf (identifying "seepage from earthen manure storage structures" as typical pathway for nitrates entering groundwater); Jerry L. Hatfield et al., Chapter 4: Swine Manure Management, *in* Agric. Research Serv., USDA, Agricultural Uses of Municipal, Animal, and Industrial Byproducts 78, 82 (1998), *available at* http://infohouse.p2ric.org/ref/43/42647.pdf (describing "leakage" as a "major environmental concern").

[38] *See* M.E. Anderson & M.D. Sobsey, *Detection and Occurrence of Antimicrobially Resistant* E. coli *in Groundwater on or near Swine Farms in Eastern North Carolina*, 54 Water Sci. & Tech. 211, 217 (2006), attached as Exhibit 37 ("Overall, the results of this study demonstrated that antibiotic-resistant E. coli were present in groundwaters associated with commercial swine farms that have anaerobic lagoons and land application systems for swine waste management.").

[39] *See* Melva Okun, Envtl. Res. Program, UNC School of Public Health, Human Health Issues Associated with the Hog Industry (1999), *available at* http://www.bape.gouv.qc.ca/sections/mandats/prod-porcine/documents/SANTE5.pdf (discussing 1996 NC DHHS well testing program, which found exceedances of 10 ppm nitrate standard in 9.9% and 22.5% of wells in Duplin and Sampson Counties, respectively); Wendee Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 Envtl. Health Perspectives A182, A186 (2013), attached as Exhibit 44 ("Even without spills, ammonia and nitrates may seep into groundwater, especially in the coastal plain where the water table is near the surface.").

[40] R.L. Huffman & Phillip W. Westerman, *Estimated Seepage Losses from Established Swine Waste Lagoons in the Lower Coastal Plain of North Carolina*, 38 Trans. Am. Soc'y Agric. Eng'rs 449-453 (1995); Phillip W. Westerman et al., *Swine-Lagoon Seepage in Sandy Soil*, 38 Trans. Am. Soc'y Agric. Eng'rs 1749-1760 (1995); J.M. Ham & T.M. DeSutter, *Toward Site-Specific Design Standards for Animal-Waste Lagoons: Protecting Groundwater Quality*, 29 J. Envtl. Qual. 1721, 1721-32 (2000). Even lagoons that feature liners built to NRCS standards leach some amount of waste into nearby soils. *See* NC-NRCS, Conservation Practice Standard: Waste Treatment Lagoon (Code 359), at 5 (2009) (allowing seepage of up to "1.25×10^{-6} cm/sec (0.003 ft/day)"); McCook, *supra* note 36, at 4 (observing that "clay liners obviously allow some seepage").

88. Burial methods allowed under the General Permit also threaten groundwater. Permitted facilities often bury dead animals in pits on-site. Groups monitoring North Carolina's waters have reported seeing facilities burying animals close to waters of the state and in deep ditches containing groundwater, practices that threaten to contaminate groundwater sources. Baldwin Decl. ¶ 32 & Exs. 10 & 11. The recent spread of PED threatens to increase the mortality rate at permitted swine facilities. Greater animal deaths create a need for additional burial sites, each of which could leach pollutants and disease from the decomposing animals into groundwater. Baldwin Decl. ¶¶ 27-28, 32.

89. Groundwater pollution threatens human health in communities that rely on groundwater wells for drinking water.[42] Burkholder Decl. ¶¶ 28-29, 26. A study of the North Carolina swine industry completed in 2000 found that "[a]lmost half of all hog CAFOs are located in block groups where > 85% of households have well water."[43] High nitrate levels found in contaminated groundwater, for example, are hazardous to human health, as they contribute to methemoglobinemia, or blue baby syndrome. *See, e.g.*, Burkholder Decl. ¶¶ 25-27 (noting studies that have shown that the area near lagoons can be contaminated with levels of high nitrate and high ammonia, and discussing the impact on human health and the environment).

90. The threat of contaminated groundwater also injures human welfare. Many people have switched from well water to municipal water sources for fear that their wells were polluted by industrial swine facilities.[44] Where municipal water is not yet available or

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[41] A lagoon for which a permit was issued prior to 2007 "may continue to operate under . . . that permit, including any renewal [thereof]." *See* N.C. Sess. Law 2007-523, sec. 1(b) (eff. Sep. 1, 2007), *available at* http://www.ncga.state.nc.us/EnactedLegislation/SessionLaws/HTML/2007-2008/SL2007-523.html. Grandfathering is also accomplished via DENR regulations. *See* 15A N.C. Admin. Code § 2T.1304(a)(1) (requiring animal waste management systems to meet "all applicable state statutes and rules *at the time of development or design*") (emphasis added). Where DENR is willing to acknowledge that these lagoons threaten water quality and the environment, it may require facilities to obtain an individual permit, which must remedy that threat. *Id.* § 2T.0111(h)(7) (indicating that DENR can require a facility whose lagoon "has been allowed to deteriorate or leak such that it poses an immediate threat to the environment" to obtain an individual permit).

[42] Hribar, *supra* note 30, at 3-4 (discussing the risk of well water contamination for facilities near industrial animal operations, and explaining that high nitrate levels could harm infants, who are susceptible to blue baby syndrome).

[43] Steve Wing et al., *Environmental Injustice in North Carolina's Hog Industry*, 108 Envtl. Health Perspectives 225, 228 (2000), attached as Exhibit 52 [Wing, *Environmental Injustice*].

[44] Declaration of Anonymous 1 ¶ 12, attached as Exhibit 5 [Anonymous 1 Decl.]; Batts Decl. ¶ 6; Declaration of Tony Bennett ¶ 8, attached as Exhibit 8 [Bennett Decl.]; Declaration of Eddie Dean Brinson ¶¶ 10-11, attached as Exhibit 11 [E. Brinson Decl.]; Declaration of Jessie Mae Brinson ¶ 13, attached as Exhibit 12 [J.M. Brinson Decl.]; Hall Decl. ¶ 21; Herring Decl. ¶ 29; Declaration of Jessie Ladson ¶ 13, attached as Exhibit 23 [J. Ladson Decl.]; Declaration of Joan Malloy ¶ 15, attached as Exhibit 25 [Malloy Decl.]; Waters Decl. ¶ 12.

affordable, people are forced to purchase bottled water.[45] Others, however, have stayed on well water and, despite attempts at filtering the water, are forced to deal with water that smells of eggs, a hallmark of sulfur pollution that could be caused by industrial swine facilities.[46]

C. Swine Facilities Permitted by DENR Contribute to Air Pollution that Adversely Affects Human Health and Welfare

91. Permitted swine facilities contribute to air pollution that adversely affects human health and welfare. The confinement houses at swine facilities are equipped with industrial fans that draw in air from outside and vent out air containing hundreds of pollutants, including harmful gases, aerosols, and "particles consisting of swine skin cells, feces, feed, bacteria, and fungi."[47]

92. Decomposing waste in lagoons contributes to air pollution. As the waste sits in the lagoon, it gives off malodorous or toxic gases, including ammonia,[48] nitrous oxide, and other VOCs.[49] Studies have estimated that over time, approximately 70% of the nitrogen in the lagoon will escape to the atmosphere.[50]

93. The range of air pollutants emitted from industrial swine facilities includes hydrogen sulfide, ammonia, a wide array of other VOCs, and bioaerosols including endotoxins

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[45] Declaration of Violet Branch ¶ 14, attached as Exhibit 9 [Branch Decl.]; Declaration of Robert Houston ¶ 10, attached as Exhibit 20 [R. Houston Decl.]; Declaration of Norma Mejia ¶ 10, attached as Exhibit 27 [N. Mejia Decl.]; Declaration of Bennie Wallace ¶ 7, attached as Exhibit 34 [B. Wallace Decl.].

[46] Declaration of Brittany Johnson ¶¶ 5-7, attached as Exhibit 21 [Johnson Decl.]; Declaration of Stella Louise Smith ¶ 12, attached as Exhibit 32 [Smith Decl.]; *see also* Declaration of Cynthia Brinson ¶ 9, attached as Exhibit 10 [C. Brinson Decl.] (reporting a general concern with well water); Declaration of Hannah Louise Fullwood ¶ 9, attached as Exhibit 15 [Fullwood Decl.] (concern over well water); Declaration of Levone Houston ¶ 11, attached as Exhibit 19 [L. Houston Decl.].

[47] Cole et al., *supra* note 35, at 685; *see also* Hribar, *supra* note 30, at 5-6.

[48] *See, e.g.*, John T. Walker et al., *Atmospheric Transport and Wet Deposition of Ammonium in North Carolina*, 34 Atmospheric Env't 3,407 (2000); Jennifer K. Costanza et al., *Potential Geographic Distribution of Atmospheric Nitrogen Deposition from Intensive Livestock Production in North Carolina, USA*, 398 Sci. Total Env't 76, 77 (2008); Matias B. Vanotti & Patrick G. Hunt, Ammonia Removal from Swine Wastewater Using Immobilized Nitrifiers, *in* Proceedings of the 8th Int'l. Conf. of the FAO ESCORENA Network on Recycling of Agricultural, Municipal and Industrial Residues in Agriculture, Rennes, France 427, 428 (1998), *available at* http://www.ramiran.net/doc98/FIN-ORAL/VANOTTI.pdf.

[49] *See* James A. Zahn et al., *Air Pollution from Swine Production Facilities Differing in Waste Management Practice* 3, Proceedings of the Odors and Emission 2000 Conference (2000) (listing all types of "emissions released from stored swine manure" mentioned above).

[50] C.A. Rotz, *Management to Reduce Nitrogen Losses in Animal Production*, 82 J. Animal Sci. E119, E129 (2004).

and other respiratory irritants.[51] *See* Wing & Johnston Report at 2; Burkholder Decl. ¶ 31 (discussing ammonia and hydrogen sulfide pollution). These emissions create "zones of exposure . . . for human populations who live near industrial hog operations in Eastern [North Carolina]."[52]

94. High levels of ammonia are a public health concern, as ammonia readily forms fine particulate matter,[53] which "strong epidemiological evidence . . . link[s] . . . with cardiovascular-related and lung cancer mortality."[54]

95. One recent study of the impact of industrial swine operations on adults living in eastern North Carolina found that the odor and chemicals emitted from the operations, including hydrogen sulfide and endotoxins, lead to acute eye, nose, and throat irritation, increased incidents of difficulty breathing, increased wheezing, chest tightness, and nausea.[55]

96. Studies have shown that people living near an industrial swine facility in North Carolina suffered elevated rates of respiratory and gastrointestinal problems, mucous membrane irritation, headaches, runny nose, sore throat, excessive coughing, diarrhea, and

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[51] Cole et al., *supra* note 35, at 686-88; Susan S. Schiffman et al., *Quantification of Odors and Odorants from Swine Operations in North Carolina*, 108 Agric. & Forest Meteorology 213 (2001); Ana M. Rule et al., *Assessment of an Aerosol Treatment To Improve Air Quality in a Swine Concentrated Animal Feeding Operation,* 39 Envtl. Sci. & Tech., 9649, 9649 (2005).

[52] Sacoby M. Wilson & Marc L. Serre, *Examination of Atmospheric Ammonia Levels Near Hog CAFOs, Homes, and Schools in Eastern North Carolina*, 41 Atmospheric Env't 4977, 4985 (2007), attached as Exhibit 49; *see also* Sacoby M. Wilson & Marc L. Serre, *Use of Passive Samplers to Measure Atmospheric Ammonia Levels in a High-density Industrial Hog Farm Area of Eastern North Carolina*, 41 Atmospheric Env't 6,074 (2007).

[53] *See* Marion Deerhake et al., *Generation of Ammonium (NH_4^+) Salt Fine Particulate Matter*, *in* RTI Int'l, *supra* note 33, at 3-2 to 3-3.

[54] EPA, National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. 3,086, 3,103 (Jan. 15, 2013).

[55] Leah Schinasi et al., *Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations*, 22 Epidemiology 208, 208 (2011), attached as Exhibit 48 (measuring pollutants levels and effect on 101 adults living near hog CAFOs in 16 eastern North Carolina communities); *see also* K.M. Thu, *Public Health Concerns for Neighbors of Large-Scale Swine Production Operations*, 8 J. Agric. Safety & Health 175 (2002) (synthesizing research regarding public health concerns for neighbors of industrial swine facilities, including respiratory issues associated with air pollution).

burning eyes as compared to residents in the control group that did not live near industrial livestock operations.[56]

97. Children going to school near swine facilities report more doctor-diagnosed asthma and more symptoms of wheezing than populations that are not exposed to swine facilities.[57] Adults living near swine facilities also have reported increased incidence of asthma.[58]

98. Children who attend schools where livestock odor is reported at least two times per month experience more wheezing symptoms than children who attended schools where no livestock odor was reported.[59]

99. Living near livestock production facilities has been linked to increased infant mortality due to respiratory disease.[60]

100. People living and working near permitted swine facilities have confirmed the scientific findings above. They have complained about frequent sinus problems, and bronchitis. They have trouble breathing and have suffered through frequent raw throats, runny noses, persistent, hacking coughs, burning or water eyes, and allergy attacks, issues that often

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[56] Steve Wing & Susanne Wolf, *Intensive Livestock Operations, Health, and Quality of Life Among Eastern North Carolina Residents*, 108 Envtl. Health Perspectives 233, 233 (2000), attached as Exhibit 53; *see also* Cole et al., *supra* note 35 (reviewing literature on health effects associated with swine industrial agriculture); Susan S. Schiffman et al., *Symptomatic Effects of Exposure to Diluted Air Sampled from a Swine Confinement Atmosphere on Healthy Human Subjects*, 113 Envtl. Health Perspectives 567 (2005) (finding that those exposed to diluted swine air for two 1-hour sessions were more likely to report headaches, eye irritation, and nausea than the control group that was exposed to clean air); *see also* Hribar, *supra* note 30, at 6-7 & Table 1.

[57] Maria C. Mirabelli et al., *Asthma Symptoms Among Adolescents Who Attend Public Schools That Are Located Near Confined Swine Feeding Operations*, 118 Pediatrics e66 (2006), attached as Exhibit 42 (finding students aged 12 to 14 who attended North Carolina public schools within 3 miles of industrial swine facilities reported increased asthma-related symptoms, more doctor-diagnosed asthma, and more asthma-related medical visits compared to peers at other schools); James A. Merchant et al., *Asthma and Farm Exposures in a Cohort of Rural Iowa Children*, 113 Envtl. Health Perspectives 350 (2005) (finding children living on swine farms, including large facilities with more than 500 head, experienced increased rates of asthma compared to non-exposed children; results more pronounced where swine facilities added antibiotics to feed); *see also* Wing & Johnston Report at 2; *see also* Batts Decl. ¶ 11; Branch Decl. ¶ 13; D. Mejia Decl. ¶ 27; Declaration of Sandra Wallace ¶ 7, attached as Exhibit 35 [S. Wallace Decl.].

[58] Bennett Decl. ¶ 17; Fullwood Decl. ¶ 11; Declaration of Anthony Hicks ¶ 12, attached as Exhibit 18 [Hicks Decl.]; Johnson Decl. ¶ 12; Declaration of Beaford Lee Outlaw ¶ 6, attached as Exhibit 31 [Outlaw Decl.].

[59] Mirabelli, *supra* note 57.

[60] 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, 130 (2009).

worsened when they are near swine facilities. Colds seem to last longer for those exposed to air pollution from swine facilities. The smell of the waste is nauseating.[61]

D. **Swine Facilities Permitted by DENR Depress Quality of Life**

101. The overpowering smell associated with swine facilities greatly degrades the quality of life for people living and working in the shadow of these facilities.

102. The smell from the permitted swine facilities is often unbearable. Individuals who live near swine facilities frequently are not able to open their windows, sit outside their homes on their porches or in their yards, have cookouts, or otherwise engage in routine activities because of the intense and putrid odor from the swine facilities.[62] They hold their breaths and cover their mouths if they have to go outside when the facilities are spraying. They plan walks and recreation to avoid the raw, stinking smell. They avoid cooking when the facilities are spraying, because the thought of eating when smelling takes away their appetite. They no longer hang the laundry out to dry for fear that the smell will sink into their clothes. The smell even wakes them up at night.[63]

103. There's no telling when a facility will choose to spray its waste, and neighbors receive no advance notice. Some people who live near permitted swine facilities have resigned themselves to the fact that the spraying might interrupt an outdoor gathering with friends and family, while others have given up on the idea of planning events outside entirely. Without certainty about when a facility will spray, people living near permitted facilities explain that

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[61] Anonymous 1 Decl. ¶ 10; Baldwin Decl. ¶ 22; Batts Decl. ¶ 11; Bennett Decl. ¶¶ 7, 15; Branch Decl. ¶ 12; C. Brinson Decl. ¶ 8; E. Brinson Decl. ¶ 9, 12; J.M. Brinson Decl. ¶ 7; Fullwood Decl. ¶¶ 6, 11; Hicks Decl. ¶ 9; L. Houston Decl. ¶ 6; J. Ladson Decl. ¶¶ 17-18; Declaration of Joyce Lamb ¶¶ 7, 11, attached as Exhibit 24 [Lamb Decl.]; Malloy Decl. ¶ 16; N. Mejia Decl. ¶¶ 5, 11; Declaration of Audrey Miller ¶ 12, attached as Exhibit 29 [Audrey Miller Decl.]; Outlaw Decl. ¶ 6; Smith Decl. ¶ 13; Declaration of Latongia Tyrance ¶ 6, attached as Exhibit 33 [Tyrance Decl.]; Waters Decl. ¶¶ 17, 19.

[62] *See, e.g.*, Steve Wing et al., *Air Pollution and Odor in Communities Near Industrial Swine Operations*, 116 Envtl. Health Perspectives 1362 (2008), attached as Exhibit 50 (study participants living within 1.5 miles of swine factory farm reported altering or ceasing normal daily activities when hydrogen sulfide concentrations, and associated hog odor, were the highest) [Wing, *Air Pollution and Odor*]; Wing & Wolf, *supra* note 56; Hribar, *supra* note 30, at 7-8.

[63] Anonymous 1 Decl. ¶¶ 5-7, 9, 13; Baldwin Decl. ¶¶ 21, 37; Batts Decl. ¶¶ 7-8; Bennett Decl. ¶¶ 7, 10, 13; Declaration of Tara Nicole Brinson ¶¶ 4-6, 8, attached as Exhibit 13 [T.N. Brinson Decl.]; Branch Decl. ¶¶ 10-11; C. Brinson Decl. ¶¶ 6, 11; E. Brinson Decl. ¶¶ 13, 21; J.M. Brinson Decl. ¶¶ 7, 11; Fullwood Decl. ¶ 7; Hall Decl. ¶ 20; Herring Decl. ¶¶ 24-27; Hicks Decl. ¶¶ 6-7, 12; L. Houston Decl. ¶¶ 5, 10; R. Houston Decl. ¶ 8; J. Ladson Decl. ¶¶ 14-15; Lamb Decl. ¶¶ 9-12; Malloy Decl. ¶¶ 9, 12; N. Mejia Decl. ¶ 12; Audrey Miller Decl. ¶ 7; Alvin Miller Decl. ¶ 10; Outlaw Decl. ¶ 9; Smith Decl. ¶¶ 11, 14; Tyrance Decl. ¶¶ 6-7, 12; B. Wallace Decl. ¶¶ 8-9; S. Wallace Decl. ¶¶ 8-9; Waters Decl. ¶¶ 8, 10.

they have to leave the windows up, or else face the possibility of returning home to a house that stinks of swine waste.[64]

104. People who are elderly, have disabilities, are sick or recovering from illness, and children are among the most affected of those who are forced to live and work near permitted swine facilities. People who are elderly or recovering from illness have been forced to stay inside, even on hot days, either because they are bedridden or because their doctors have recommended that they avoid breathing in the swine waste. People using crutches have difficulty covering their nose and mouth and thus find it difficult to go outside, even just to get the mail, when the facility is spraying and the smell is overpowering.[65] Families keep their children inside because do not want them exposed to the smell and pollution from industrial swine facilities.[66] Children complain that they would like to be outside, playing in their yards, but they simply can't bear the smell.[67] Children who live near permitted swine facilities, or whose parents work in permitted swine facilities, have been forced to suffer the embarrassment and humiliation of attending school reeking of swine waste.[68] The stench of swine waste can sink into a person's clothes and stay there for days.[69]

105. The smell from the facilities is embarrassing for those forced to live near a permitted swine facility. People who live near permitted swine facilities complain that friends and family who live farther away from the facilities refuse to come and visit because of the smell. If friends and family happen to visit on a day when the smell is particularly bad, their complaints or visible discomfort is humiliating, and the visits are short-lived.[70]

106. The waste from the permitted swine facilities not only smells, it also interferes with the quality of life. Droplets of waste from the automated sprayers form a fine mist that coats everything in its path, from clothes lines, cars parked near the sprayfield or driving by, bedroom windows and sides of homes, playing fields, and even the people themselves. Student athletes have been forced to practice sports near the sprayfields, and breathe in the terrible odor.[71]

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[64] Batts Decl. ¶ 7; Bennett Decl. ¶ 7; E. Brinson Decl. ¶ 15; J.M. Brinson Decl. ¶ 9; Hall Decl. ¶ 20; Lamb Decl. ¶ 10; Malloy Decl. ¶¶ 9-10; Audrey Miller Decl. ¶ 11; Smith Decl. ¶ 18; Tyrance Decl. ¶ 15; Waters Decl. ¶¶ 5, 9.
[65] Batts Decl. ¶ 10; J.M. Brinson Decl. ¶¶ 12, 18; Herring Decl. ¶ 28; Audrey Miller Decl. ¶¶ 7-9.
[66] Bennett Decl. ¶ 12; C. Brinson Decl. ¶ 8; D. Mejia Decl. ¶¶ 26, 28; S. Wallace Decl. ¶¶ 7, 10.
[67] T.N. Brinson Decl. ¶¶ 4-6; *see also* J.M. Brinson Decl. ¶ 10; Smith Decl. ¶ 10; Tyrance Decl. ¶ 12.
[68] D. Mejia Decl. ¶ 11.
[69] *Id.* ¶ 14; Muhammad Decl. ¶ 61.
[70] Branch Decl. ¶ 10; C. Brinson Decl. ¶ 10; J.M. Brinson Decl. ¶ 7; Hall Decl. ¶ 20; L. Houston Decl. ¶ 8; D. Mejia Decl. ¶ 26; Johnson Decl. ¶ 9.
[71] Anonymous 1 Decl. ¶ 14; Baldwin Decl. ¶ 36; C. Brinson Decl. ¶ 7; E. Brinson Decl. ¶ 15; J.M. Brinson Decl. ¶ 14; Herring Decl. ¶¶ 12-14, 21-22; R. Houston Decl. ¶ 7; D. Mejia Decl. ¶¶ 8-10; Alvin Miller Decl. ¶ 4; Audrey Miller Decl. ¶ 10; S. Wallace Decl. ¶ 11.

107. People living near permitted swine facilities have abandoned their favorite pastimes, like hunting or fishing, because the smell near the swine facilities is simply too much to bear, or the waters are clogged with algae. Others have are concerned that the animals they catch might not be safe to eat because they, too, might be suffering from the pollution.[72]

108. Swine facilities attract bugs and other pests, from flies to buzzards, which swarm to the waste piles and boxes of decomposing animals at swine facilities. The flies make it make it unpleasant to have gatherings outside.[73]

109. For communities impacted by swine facilities, there is little escape. People living and working near permitted swine facilities have complained that they can smell the odor in their cars as they approach a sprayfield, even if their windows are tightly rolled up. In hot summer months, they race to turn off their air conditioning, in an often futile attempt to prevent the putrid air from getting into the car and making it hard to breathe.[74]

110. People attending church or community meetings, too, experience the overpowering smell. Just as at home, people must work to avoid the smell from nearby swine facilities, keeping doors and windows closed, and gathering inside for community celebrations and meetings.[75]

111. The trucks that transport animals between different confinement houses and ultimately to slaughter also interfere with quality of life. Industrial swine operations "grow" their animals in stages until they reach slaughter weight. Some operators grow swine in three stages, "farrow to wean," "wean to feeder," "feeder to finish," while others progress the animals from "farrow to feeder" and "feeder to finish," each with a new confinement house.[76] Often the animals are moved via tractor-trailers that are open to the air in places to prevent suffocation. The open air design, however, allows dust, dander, and other waste to escape, and people living nearby breathe it in. Like the odor from the waste pits and sprayers, the smell of

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[72] E. Brinson Decl. ¶ 18; Herring Decl. ¶ 30; L. Houston Decl. ¶ 9; R. Houston Decl. ¶ 11; Lamb Decl. ¶ 13; Alvin Miller Decl. ¶¶ 5-6; Smith Decl. ¶ 17; Waters Decl. ¶ 16.

[73] Batts Decl. ¶ 7; Bennett Decl. ¶ 7; Branch Decl. ¶ 10; C. Brinson Decl. ¶ 12; E. Brinson Decl. ¶ 17; Fullwood Decl. ¶ 6; Hall Decl. ¶¶ 20, 29; Johnson Decl. ¶ 10; Lamb Decl. ¶ 10; Outlaw Decl. ¶ 7; Smith Decl. ¶ 18; Tyrance Decl. ¶ 15; *see also* Hribar, *supra* note 30, at 8.

[74] Baldwin Decl. ¶ 21; J.M. Brinson Decl. ¶ 18; Hall Decl. ¶ 24; Hicks Decl. ¶ 8; Lamb Decl. ¶ 11; Audrey Miller Decl. ¶ 5; Outlaw Decl. ¶ 5; Smith Decl. ¶ 14.

[75] Bennett Decl. ¶ 14; Branch Decl. ¶ 9; E. Brinson Decl. ¶¶ 22-23; Hall Decl. ¶ 18; Hicks Decl. ¶¶ 10-11; Declaration of Cleveland Ladson ¶ 8, attached as Exhibit 22 [C. Ladson Decl.]; Lamb Decl. ¶ 14; Malloy Decl. ¶ 12; Smith Decl. ¶ 16; B. Wallace Decl. ¶ 9.

[76] *See, e.g.*, NCDENR, Animal Feeding Operations, List of Permitted Animal Facilities (showing facilities permitted to manage waste from swine facilities at the different stages of operation); Baldwin Decl. ¶ 38.

the trucks is overpowering. The trucks rumble through communities at all times of day, disturbing people as they try to sleep and enjoy their lives.[77] .

112. Dead boxes, a descriptive term for the dumpsters that permitted swine facilities use to collect mortalities before their ultimate disposal, are another nuisance. Many facilities leave their dead boxes open or ajar, inviting buzzards, other scavengers, and flies, and giving off a powerfully bad smell. Even closed dead boxes smell terrible and invite pests. Many dead boxes are not well sealed and leak a smelly, potentially harmful liquid containing fluids from the decomposing animals and moisture from the environment.[78] The smell from trucks carrying dead animals is another assault on the community's senses.[79]

113. The swine industry divides communities, often pitting those employed by the swine industry who are afraid or unwilling to speak out against friends and family who want better.[80] The swine industry is a constant weight on the community, a frequent topic of conversation among those who wonder why they are forced to fight for basic rights.[81]

114. It should come as little surprise, then, given the many problems described above, that scientists have found that those living near swine facilities report more tension, more depression, more anger, less vigor, more fatigue, and more confusion than control subjects who were not exposed to industrial animal production.[82]

115. Hydrogen sulfide concentrations near swine facilities also have been associated with increased stress and anxiety,[83] as well as acute elevation of systolic blood pressure.[84]

E. **Proximity to Swine Facilities Permitted by DENR Depresses Property Values**

116. Studies across the country, including from North Carolina, have demonstrated a statistically significant relationship between proximity to a swine facility and declining property

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[77] Baldwin Decl. ¶ 38; C. Ladson Decl. ¶¶ 4-5; J. Ladson Decl. ¶¶ 11-12; Alvin Miller Decl. ¶ 8
[78] Baldwin Decl. ¶¶ 29-30 & Exs. 8-9; E. Brinson Decl. ¶ 17; Alvin Miller Decl. ¶ 11.
[79] Hall Decl. ¶ 23; Smith Decl. ¶ 9.
[80] Baldwin Decl. ¶ 37.
[81] Anonymous 1 Decl. ¶16; Batts Decl. ¶ 18; C. Brinson Decl. ¶ 13; J.M. Brinson Decl. ¶ 17; T.N. Brinson Decl. ¶ 7; Herring Decl. ¶ 25; Muhammad Decl. ¶ 65; Tyrance Decl. ¶ 7; B. Wallace Decl. ¶ 5.
[82] Susan S. Schiffman et al., *The Effect of Environmental Odors Emanating from Commercial Swine Operations on the Mood of Nearby Residents,* 37 Brain Research Bull. 369 (1995); *see also* Wing, *Air Pollution and Odor*, *supra* note 62 (finding that when hog odor was the strongest, study participants more frequently reported feeling stressed, gloomy, angry and unable to concentrate).
[83] Rachel Avery Horton et al., *Malodor as a Trigger of Stress and Negative Mood in Neighbors of Industrial Hog Operations*, 99 Am. J. Pub. Health Suppl., S610 (2009).
[84] Steve Wing et al., *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 121 Envtl. Health Perspectives 92 (2013), attached as Exhibit 51.

values.[85] Research suggests that property values decline with increasing proximity to a swine facility, and with the increasing number of swine at a facility.[86]

117. Individuals in North Carolina fear that the value of their property has declined and that they will not be able to sell their property and move away because of neighboring industrial swine facilities.[87]

F. Swine Facilities Permitted by DENR Can Spread Antibiotic Resistant Bacteria, which Threatens Human Health

118. Many swine facilities use antibiotics to promote growth and to preemptively ward off the threat of disease.[88] The overuse of antibiotics in livestock production is linked to emergence of antibiotic-resistant bacteria that make infections in humans more difficult to treat. *See* Wing & Johnston Report at 2.[89]

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[85] *See* Raymond Palmquist et al., *Hog Operations, Environmental Effects, and Residential Property Values*, 73 Land Econ. 114 (1997) (studying relationship between swine factory farms and property values in nine southeastern North Carolina counties and finding that effect on price depended on number and distance of nearby factory farms); Katherine Milla et al., *Evaluating the Effect of Proximity to Hog Farms on Residential Property Values: A GIS-Based Hedonic Model Approach*, 17 URISA J. 27 (2005) (finding that values of Craven County, North Carolina homes decreased with increasing local hog populations and decreasing distances from homes to factory farms); Jungik Kim & Peter Goldsmith, *A Spatial Hedonic Approach to Assess the Impact of Swine Production on Residential Property Values*, 42 Envtl & Res. Econ. 509 (2009) (estimating decline in Craven County home property values on per hog basis); Joseph Herriges et al., *Living with Hogs in Iowa: The Impact of Livestock Facilities on Rural Residential Property Values*, 81 Land Econ. 530 (2005).

[86] *See* Palmquist et al., *supra* note 85; Milla et al., *supra* note 85.

[87] Anonymous Decl. ¶ 15; Batts Decl. ¶ 12; E. Brinson Decl. ¶ 19; Fullwood Decl. ¶ 10; L. Houston Decl. ¶ 5; C. Ladson Decl. ¶ 7; Tyrance Decl. ¶ 9

[88] James M. MacDonald & William D. McBride, USDA, The Transformation of U.S. Livestock Agriculture: Scale, Efficiency, and Risks 32-35 (2009), *available at* http://www.ers.usda.gov/media/184977/eib43.pdf.

[89] *See* EK Silbergeld & LB Price LB, *Industrial Food Animal Production, Antimicrobial Resistance, and Human Health*, 29 Ann. Rev. of Pub. Health 151 (2008).

119. Antibiotic-resistant bacteria capable of causing human disease have been found in air emissions from industrial swine facilities.[90]

120. Antibiotic-resistant bacteria associated with industrial livestock production also can be transmitted through water. A recent water quality study found that samples taken near industrial animal facilities were more likely to contain multi-drug resistant bacteria than water sampled elsewhere.[91]

121. Studies have found a specific strain of methicillin-resistant *Staphylococcus aureus* ("MRSA") in both swine and people who work in the swine industry.[92] In addition, a recent study of medical records in Pennsylvania showed that people living near industrial swine

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[90] Amy Chapin et al., *Airborne Multidrug-Resistant Bacteria Isolated from a Concentrated Swine Feeding Operation*, 113 Envtl. Health Perspectives 137 (2005) (finding multidrug-resistant *Enterococcus*, coagulase-negative staphylococci, and viridans group streptococci in the air of an industrial swine operation at levels dangerous to human health); Shawn G. Gibbs et al., *Airborne Antibiotic Resistant and Nonresistant Bacteria and Fungi Recovered from Two Swine Herd Confined Animal Feeding Operations*, 1 J. Occupational & Envtl. Hygiene 699 (2004) (finding multidrug-resistant bacteria inside and downwind of industrial swine operations at levels previously determined to pose a human health hazard); Julia R. Barrett, *Airborne Bacteria in CAFOs: Transfer of Resistance from Animals to Humans*, 113 Envtl. Health Perspectives A116 (2005) (reviewing literature on cross-species transfer of antibiotic-resistant bacteria); Jochen Schulz et al., *Longitudinal Study of the Contamination of Air and of Soil Surfaces in the Vicinity of Pig Barns by Livestock-Associated Methicillin-Resistant* Staphylococcus aureus, 78 Applied Envtl. Microbiol. 5666 (2012) (detecting MRSA 300 feet from a barn in which animals, air, and workers' plastic boots tested positive for MRSA); Shawn G. Gibbs et al., *Isolation of Antibiotic-Resistant Bacteria from the Air Plume Downwind of a Swine Confined or Concentrated Animal Feeding Operation*, 114 Envtl. Health Perspectives 1032 (2006).

[91] Bridgett M. West et al., *Antibiotic Resistance, Gene Transfer, and Water Quality Patterns Observed in Waterways Near CAFO Farms and Wastewater Treatment Facilities*, 217 Water Air Soil Pollution 473 (2011).

[92] Tara C. Smith et al., *Methicillin-Resistant* Staphylococcus auereus *(MRSA) Strain ST398 Is Present in Midwestern U.S. Swine and Swine Workers*, 4 PLoS One e4258 (2009); Tara C. Smith et al., *Methicillin-Resistant* Staphylococcus aureus *in Pigs and Farm Workers on Conventional and Antibiotic-Free Swine Farms in the USA*, 8 PLoS One e63704 (2013); Jessica L. Rinsky et al., *Livestock-Associated Methicillin and Multidrug Resistant* Staphylococcus aureus *Is Present Among Industrial, Not Antibiotic-Free Livestock Operation Workers in North Carolina*, 8 PLoS One e67641 (2013); Xander W. Huijsdens et al., *Community-Acquired MRSA and Pig-Farming*, 5 Annals Clinical Microbiol. & Antimicrobials 26 (2006) (Netherlands); Ingrid V.F. Van den Broek et al., *Methicillin-Resistant* Staphylococcus aureus *in People Living and Working in Pig Farms*, 137 J. Epidem. & Infection 700 (2009) (Netherlands); Oliver Denis et al., *Methicillin-Resistant* Staphylococcus aureus *ST398 in Swine Farm Personnel, Belgium*, 15 Emerging Infectious Diseases 1098 (2009) (Belgium); T. Khanna et al., *Methicillin Resistant* Staphylococcus aureus *Colonization in Pigs and Pig Farmers*, 128 J. Veterinary Microbiol. 298 (2008) (Canada).

facility liquid waste application sites received treatment for more skin and soft tissue infections and infections caused by MRSA than people who lived further away from application sites.[93]

122. The emergence and proliferation of new strains of antibiotic-resistant bacteria is a significant threat to human health. Each year more than 2 million people in the United States acquire a serious infection that is resistant to antibiotics, and at least 23,000 people die each year as a result of those infections.[94] Among those infections, "MRSA infections can be very serious and the number of infections is among the highest of all antibiotic-resistant threats."[95]

G. Pollution from Swine Facilities Permitted by DENR Adversely Affects Sensitive Populations That Are Exposed to Other Waste Sources

123. Swine facilities are often located in communities that are overburdened with other polluting livestock operations, including poultry operations.[96]

124. Poultry operations are of significant concern for the community. Many poultry operations use a dry waste management system, as opposed to the wet lagoon system favored by the swine industry. The confinement houses are lined with bedding that absorbs the waste. The bedding is stored in piles before it is land-applied as fertilizer. Poultry confinement houses emit significant amounts ammonia and fine particles consisting of bits of manure-laden bedding, animal dander, dust, and feathers.[97] These emissions contribute to the health and welfare problems described above.

125. These same poultry facilities also attract houseflies, which may contribute to the dispersion of drug resistant bacteria.[98]

126. For people living near these facilities, the way the poultry facilities store and apply the waste is a particular concern. Often, facilities store the dry litter waste outside and uncovered, where it can drift or leach pollutants into the soil. In one study, researchers found chemicals from an uncovered litter pile at a turkey facility in the soil up to two feet below the

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[93] Joan A. Casey, *High-Density Livestock Operations, Crop Field Application of Manure, and Risk of Community-Associated Methicillin-Resistant* Staphylococcus aureus *Infection in Pennsylvania*, 173 J. Am. Med Ass'n: Internal Med. 1980 (2013).

[94] Ctrs. for Disease Control, U.S. Dep't of Health and Human Servs., Antibiotic Resistance Threats in the United States, 2013, at 6 (2013), *available at* http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf.

[95] *Id.* at 20.

[96] Baldwin Decl. ¶ 25; Fullwood Decl. ¶ 3; N. Mejia Decl. ¶ 4; Smith Decl. ¶ 8; Tyrance Decl. ¶ 10.

[97] Baldwin Decl. ¶ 25-26, 41.

[98] National Association of Local Boards of Health, Understanding Concentrated Animal Feeding Operations, at 8 (2010), *available at* http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf.

surface.[99] Ammonium concentrations in the soil were 62 times higher beneath the litter pile than in the soil outside of the litter pile footprint. Arsenic concentrations were also elevated.[100] Soils near industrial swine facilities also can be polluted with metals,[101] thus the comingling of the operations increases the burden on the environment.

127. The facilities land apply the waste, but, because the waste is dry, it can drift off the fields, and over to neighboring houses.[102] The proximity of poultry and swine facilities to one another also raises the risk that land will be oversaturated with applications of swine manure and dry litter.

128. Processing and packaging plants, rendering plants, and slaughterhouses add to the burdens borne by communities near permitted swine facilities. The smell from these facilities is another injury foisted on communities living in near industrial swine facilities.[103]

VI. DISPROPORTIONALITY

A. Permitted Swine Facilities Disproportionately Affect African Americans, Latinos, and Native Americans

129. In North Carolina, permitted swine facilities adversely affect a disproportionate number of African Americans, Latinos, and Native Americans as compared to the general population.[104]

130. More than 2000 swine facilities hold a certificate of coverage allowing them to operate their waste management systems. These certificates were issued under the current swine waste management system general permit, which expires on September 30, 2014. The number and location of swine facilities is not expected to change significantly with this new permitting cycle.

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[99] N.C. Coop. Ext., Poultry Waste Stockpiling Methods: Environmental Impacts and Their Mitigation 4 (2013), *available at* https://www.bae.ncsu.edu/extension/ext-publications/air_quality/ag-788w-waste-stockpiling-shah.pdf.

[100] *Id.*

[101] Burkholder Decl. ¶ 31.

[102] Tyrance Decl. ¶ 10.

[103] Batts Decl. ¶ 13; E. Brinson Decl. ¶¶ 28-29; R. Houston Decl. ¶ 14; D. Mejia Decl. ¶ 21.

[104] *See* Wing & Johnston Report; *see also* Maria C. Mirabelli et al., *Race, Poverty, and Potential Exposure of Middle-School Students to Air Emissions from Confined Swine Feeding Operations*, 114 Envtl. Health Perspectives 591, 595 (2006), attached as Exhibit 43 (finding that North Carolina's swine facilities are located closer to schools enrolling higher percentages of non-white and economically disadvantaged students); Wing, *Environmental Injustice, supra* note 43 (finding that North Carolina's intensive hog confinement operations are located disproportionately in communities with higher levels of poverty, higher proportions of non-white persons, and higher dependence on wells for household water supply).

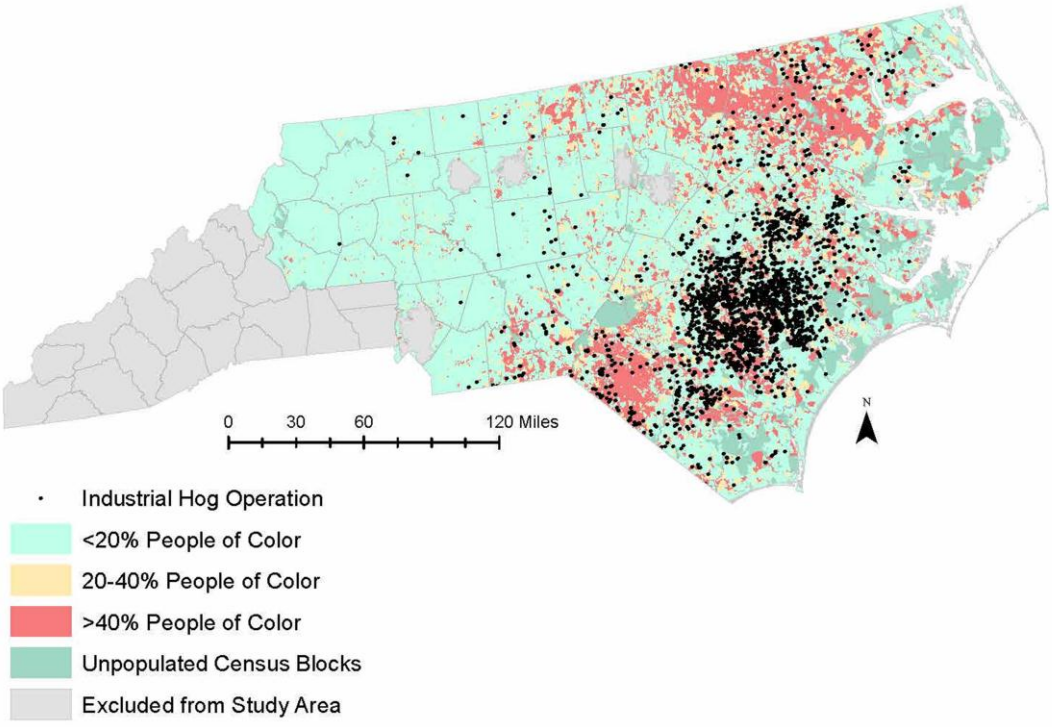
131. Analyses based on a study area that excludes the state's five major cities and western counties that have no presence of this industry show that the proportion of people of color[105] living within 3 miles of an industrial swine facility is 1.52 times higher than the proportion of non-Hispanic Whites. *See* Wing & Johnston Report at 5, 14 (Table 3). The proportions of African Americans,[106] Latinos,[107] and Native Americans[108] living within 3 miles of an industrial swine facility are 1.54, 1.39, and 2.18 times higher, respectively, than the proportion of non-Hispanic Whites. *Id*. These disparities are statistically significant. *Id*.

132. Analysis of the population statewide yields consistent results. The proportions of African Americans, Latinos, and Native Americans statewide living within 3 miles of an industrial swine facility are 1.4, 1.26, and 2.39 times higher than the percentage of non-Hispanic Whites, respectively. Wing & Johnston Report at 6, 13 (Table 2). These disparities are also statistically significant. *Id.*

133. As shown in the following figure, which depicts the relationship of industrial swine facilities to the racial and ethnic composition of North Carolina, swine facilities are clustered in communities of color. *See* Wing & Johnston Report at 7, 12 (Figure 3).

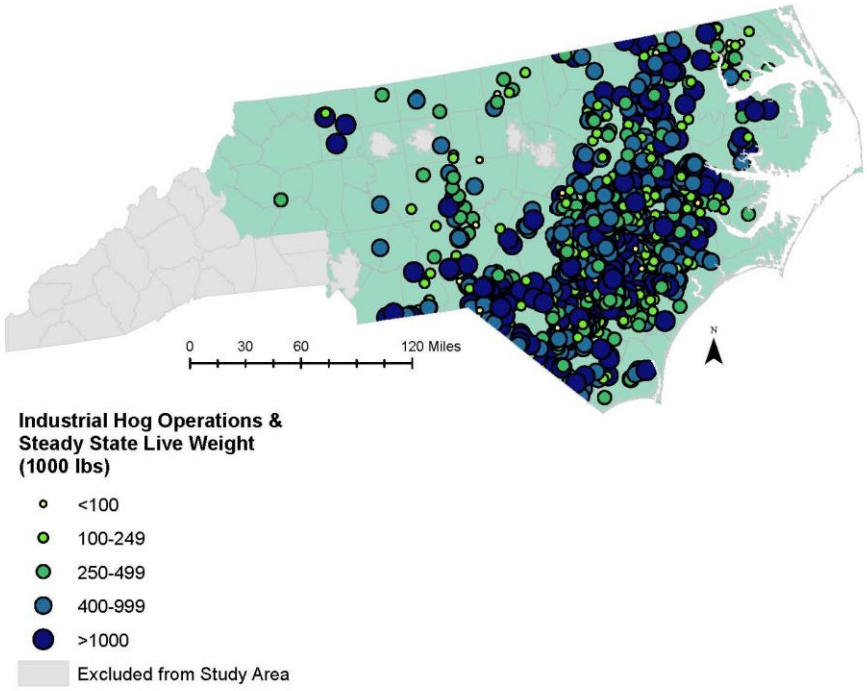
[105] In the Wing and Johnston Report, the term people of color referred to all people who identified as other than non-Hispanic white in the 2010 census data. Wing & Johnston Report at 4.
[106] The term African American used herein corresponds to the term Black as used in the Wing and Johnston Report. In the Report, the Black racial category referred to those who identified as African American or black without any other race in the 2010 census data. Wing & Johnston Report at 4.
[107] The term Latino used herein corresponds to the term Hispanic as used in the Wing and Johnston Report.
[108] The term Native American used herein corresponds to the term American Indian as used in the Wing and Johnston Report. In the Report, the term American Indian referred to those who identified themselves as American Indian without any other race in the 2010 census data. Wing & Johnston Report at 4.

Racial Composition of Census Blocks and the Locations of NC Industrial Swine Facilities Operating Under the General Permit, 2014



134. Moreover, the amount of swine waste is also greater in communities of color. Wing & Johnston Report at 6-7, 16 (Table 7). Each permitted facility is allowed to house a certain number and type of swine, and based on these factors, some facilities can be expected to produce more feces and urine than others. Steady state live weight is an indicator of the amount of waste a facility is likely to produce. The following figure depicts the distribution of steady state live weight across the state.

Industrial Swine Facilities by Steady State Live Weight



135. The swine industry's disproportionate impact on communities of color has long been known and documented. A study examining the relationship between race and the spatial concentration of swine waste in eastern North Carolina between 1982 and 1997 found evidence that "minority communities and localities lacking the political capacity to resist are shouldering

the bulk of the adverse economic, social, and environmental impacts of the pork industry restructuring."[109]

136. A later study found that there were more than seven times more industrial swine facilities in areas where there was more poverty and high percentages of non-white people.[110]

137. Research on school distribution in North Carolina also has shown that swine facilities overburden communities of color. The research has found that schools in lower income areas with a larger non-white population are more likely to be sited near an industrial livestock operation than other schools in the state.[111]

B. **African Americans**

138. African Americans in North Carolina are disproportionately adversely impacted by permitted swine facilities compared to non-Hispanic Whites and the total population.

139. The proportion of African Americans living within 3 miles of an industrial swine facility is 1.54 times higher than the proportion of non-Hispanic Whites in a study area that excludes the state's five major cities and western counties that have no presence of this industry. Wing & Johnston Report at 5, 14 (Table 3).

140. Statewide, the proportion of African Americans living within 3 miles of an industrial swine facility is 1.40 times higher than the proportion of non-Hispanic Whites. Wing & Johnston Report at 6, 13 (Table 2).

141. The ratios of African Americans living within 3 miles of an industrial swine facility as compared to non-Hispanic Whites in the study area and statewide area are statistically significant. Wing & Johnston Report at 5-6.

142. African Americans make up a larger proportion of the population living in proximity to industrial swine facilities than the proportion of the population living more than 3

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[109] Bob Edwards & Anthony E. Ladd, *Race, Class, Political Capacity and the Spatial Distribution of Swine Waste in North Carolina*, 1982-1997, 9 N.C. Geographer 51, 51 (2001).
[110] Wing, *Environmental Injustice, supra* note 43, at 225.
[111] Maria C. Mirabelli et al., *Race, Poverty, and Potential Exposure of Middle-School Students to Air Emissions from Confined Swine Feeding Operations*, 114 Envtl. Health Perspectives 591 (2006) (finding schools in North Carolina with white student population less than 63% and subsidized-lunch eligible population greater than 47% were more likely to be located within 3 miles of a factory farm than were schools with high-white or high-socioeconomic status populations); Paul B. Stretesky et al., *Environmental Inequity: An Analysis of Large-Scale Hog Operations in 17 States, 1982-1997*, 68 Rural Soc. 231 (2003) (finding that between 1982 and 1997 large-scale hog operations in North Carolina were more likely to be sited in areas with a disproportionate number of black residents).

miles away from any facility. The disparities are statistically significant. Wing & Johnston Report at 13 (Table 2).

143. In addition, as more African Americans are represented in a community, it is more likely that all members of the community will be exposed to swine facilities permitted by DENR. For every ten percent increase in the population of African Americans in a community, the proportion of people living within 3 miles of an industrial swine facility increases on average by 9.4%. This relationship between race and living near a facility is statistically significant. Wing & Johnston Report at 6, 15 (Table 6).

144. Adjusted for population density takes into account the fact that African Americans live in less rural areas than non-Hispanic Whites and are therefore less exposed to agricultural operations than they would be if they were more rural. With this adjustment, areas that are more than 80% African American, the proportion of people living within three miles of an industrial swine facility is more than three times the proportion in areas that have no African Americans. This disparity is statistically significant. Wing & Johnston Report at 6, 15 (Table 5).

145. The amount of hog waste in a community also increases as the percent of African Americans in the community increases. Adjusted for population density, areas with more than 40% African American residents have an excess steady state live weight compared to areas with no African American residents—they have between 493,000 and 620,000 more pounds of swine within 3 miles than areas with no African American residents. Wing & Johnston Report at 7, 16 (Table 8). The disparity is statistically significant. *Id.* Adjusted for population density, the steady state live weight of swine within 3 miles of a community increases, on average, over sixty four thousand pounds for every ten percent increase in the percentage of African Americans in a community. Wing & Johnston Report at 7, 16 (Table 9). The larger or more numerous the swine, the more waste they generate. Thus, African American communities are exposed to more detrimental operations than other communities.

C. **Latinos**

146. Latinos in North Carolina are disproportionately adversely impacted by permitted swine facilities compared to non-Hispanic Whites and the total population.

147. Latinos, on average, are more likely to live within three miles of a permitted swine facility than non-Hispanic Whites. Analyses based on a study area that excludes the state's five major cities and western counties that have no presence of this industry show that the proportion of Latinos living within 3 miles of a permitted swine facility is 1.39 times higher than the proportion of non-Hispanic Whites within the same distance of a permitted swine facility. Wing & Johnston Report at 5, 14 (Table 3).

148. Statewide, the proportion of Latinos living within 3 miles of an industrial swine facility is 1.26 times higher than the proportion of non-Hispanic Whites. Wing & Johnston Report at 6, 13 (Table 2).

149. The ratios of Latinos living within 3 miles of an industrial swine facility as compared to non-Hispanic Whites in the study area and statewide area are statistically significant. Wing & Johnston Report at 5-6.

150. Latinos make up a larger proportion of the population living in proximity to industrial swine facilities than the proportion of the population living more than 3 miles away from any facility. The disparities are statistically significant. Wing & Johnston Report at 13 (Table 2).

151. In addition, as more Latinos are represented in a community, it is more likely that all members of the community will be exposed to swine facilities permitted by DENR. For every ten percent increase in the population of Latinos in a community, the proportion of people living within 3 miles of an industrial swine facility increases on average by 8.5%. This relationship between race and living near a facility is statistically significant. Wing & Johnston Report at 6, 15 (Table 6).

152. The amount of swine waste in a community also increases as the percent of Latinos increases. Adjusted for population density, the steady state live weight of swine within 3 miles of a community increases, on average, over two hundred and forty two thousand pounds for every ten percent increase in the percentage of Latinos in a community. Wing & Johnston Report at 7, 16 (Table 9). This relationship is statistically significant. The larger or more numerous the swine, the more waste they generate. Thus, Latinos communities are exposed to more detrimental operations than other communities.

D. **Native Americans**

153. Native Americans in North Carolina are disproportionately adversely impacted by permitted swine facilities compared to non-Hispanic Whites and the total population.

154. Native Americans, on average, are more likely to live within three miles of a permitted swine facility than non-Hispanic Whites. Analyses based on a study area that excludes the state's five major cities and western counties that have no presence of this industry show that the proportion of Native Americans living within 3 miles of a permitted swine facility is 2.18 times higher than the proportion of non-Hispanic Whites within the same distance of a permitted swine facility. Wing & Johnston Report at 5, 14 (Table 3).

155. Statewide, the proportion of Native Americans living within 3 miles of an industrial swine facility is 2.39 times higher than the proportion of non-Hispanic Whites. Wing & Johnston Report at 6, 13 (Table 2).

156. The ratios of Native Americans living within 3 miles of an industrial swine facility as compared to non-Hispanic Whites in the study area and statewide area are statistically significant. Wing & Johnston Report at 5-6.

157. Native Americans make up a larger proportion of the population living in proximity to industrial swine operations than the proportion of the population living more than 3 miles away from any facility. The disparities are statistically significant. Wing & Johnston Report 13 (Table 2).

158. In addition, as more Native Americans are represented in a community, it is more likely that all members of the community will be exposed to swine facilities permitted by DENR. For every ten percent increase in the population of Native Americans in a community, the proportion of people living within 3 miles of an industrial swine facility increases on average by 16.2%. This relationship between race and living near a facility is statistically significant. Wing & Johnston Report at 6, 15 (Table 6).

159. The amount of swine waste in a community also increases as the percent of Native Americans increases. Adjusted for population density, the steady state live weight of swine within 3 miles of a community increases, on average, over ninety two thousand pounds for every ten percent increase in the percentage of Native Americans in a community. Wing & Johnston Report at 7, 16 (Table 9). The larger or more numerous the swine, the more waste they generate, and there are greater quantities of this waste in communities with more Native Americans.

VII. LESS DISCRIMINATORY ALTERNATIVES

160. DENR should exercise its authority to require permitted swine facilities to install and operate waste management systems that protect communities from pollution and include sufficient monitoring and public reporting to ensure that the goals of protecting public health and the environment are met.[112]

161. DENR is charged by state law to protect the environment and human health from pollution from the swine industry. N.C. Gen. Stat. § 143-215(a)(12) (requiring animal waste management systems to obtain a permit from the EMC of DENR for construction and

[112] *See generally* Doug Gurian-Sherman, Union of Concerned Scientists, CAFOs Uncovered: The Untold Costs of Confined Animal Feeding Operations (2008), *available at* http://www.ucsusa.org/assets/documents/food_and_agriculture/cafos-uncovered.pdf (discussing the substantial cost of confined animal feeding operations and discussing alternatives).

operation).[113] In particular, the North Carolina legislature intended to "establish a permitting program for animal waste management systems that will protect water quality and promote innovative systems and practices." *Id.* § 143-215.10A.

162. DENR has authority to condition the permitting program to achieve the broad purposes of the air and water conservation laws, including "conserv[ing] … [the state's] air and water resources," "maintain[ing] for the citizens of the State a total environment of superior quality," "protect[ing] human health," "prevent[ing] damage to public and private property," and "secur[ing] for the people of North Carolina, now and in the future, the beneficial uses of [the State's] great natural resources." N.C. Gen. Stat. § 143-215.1(b)(4)(a) (authority to condition permits to achieve the goals of Article 21, water and air resources); *id.* § 143-21(a)-(c) (declaring the goals of Article 21); *see also* 15A N.C. Admin. Code § 02T.0108(b)(1) (same).

163. Among its powers, DENR has the authority to "require any monitoring and reporting (including but not limited to groundwater, surface water or wetland, waste sludge, soil, lagoon/storage pond levels and plant tissue) necessary to determine the source, quantity, quality, and effect of animal waste upon the surface waters, groundwaters, or wetlands." 15A N.C. Admin. Code § 02T.0108(c).

164. DENR should condition the operation of swine facilities on practices that are consistent with the protection of public health and the environment.[114] For example, DENR has the authority to require facilities to install controls on the confinement houses that filter the air, which is laden with dust particles consisting of swine skin cells, feces, feed, fungi, gases, and (often antibiotic-resistant[115]) bacteria, before it is emitted to the ambient air.[116] Air pollution is a large byproduct of these animal systems that should be addressed under a comprehensive program to address animal waste.[117]

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[113] The statute requires animal waste management systems to obtain a DENR-issued permit. *See* N.C. Gen. Stat. § 143-212(2); *id.* § 143B-282(a)(1)(a) (creating the EMC of DENR). DENR's regulations further require all animal waste management systems that meet the definition of animal operations, including swine facilities with more than 250 swine, to obtain a state-issued permit. *See* 15A N.C. Admin. Code § 2T.1304; N.C. Gen. Stat. § 143-215.10B(1) (defining animal operation).

[114] *See* Exhibit 3 (list of less discriminatory alternatives to the proposed general permit offered by Complainants Environmental Justice Network and Waterkeeper Alliance, Inc., as well as Southern Environmental Law Center, in December 6, 2013 Comments to DENR).

[115] *See generally* paragraphs 118 to 122, *supra*.

[116] *See* Natural Res. Conservation Serv., USDA Conservation Practice Standard: Air Filtration and Scrubbing (Code 371), at 3 (2010) (describing various "device[s] or system[s] for reducing [air] emissions . . . from a structure via interception and/or collection").

[117] DENR has the authority to control pollutants that are emitted first into the air that later are washed into waters under laws designed to protect water quality. *Rose Acre Farms, Inc. v. NC Dep't of Env't & Natural Res.*, 12-CVS-10, slip op. at 8-9 (Hyde Cnty. Sup. Ct. Jan. 7, 2013).

165. DENR also has the authority to require facilities to improve their waste collection systems by avoiding consolidation of solid and liquid swine waste, which creates harmful ammonia gas.[118] Manure conveyor belts or other systems that drain the urine from the feces have proven effective as retrofits to existing barns.[119]

166. In addition, DENR has the authority to require improvements to waste storage systems. At a minimum, DENR could require facilities to cover existing lagoons to prevent gases from volatilizing.

167. DENR has the authority to require facilities to use alternative treatment methods more appropriate than open-air lagoons.[120]

168. DENR has the authority to prohibit the use of high pressure spray guns, which create fine droplets and aerosols that can drift and cause odor problems, in favor of drip irrigators, or other irrigation mechanisms that do not rely on sprayers.[121] Baldwin Decl. ¶ 51.

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[118] A.L. Elliott et al., *Best Management Practices (BMPs) for Ammonia Emissions Reductions from Animal Feeding Operations: A Colorado Case Study*, 7 W. Nutrient Mgmt. Conf. 124, 124 (2007) ("[U]rea nitrogen in urine combines with the urease enzyme in feces and rapidly hydrolyzes to form ammonia gas. The reaction is quick, taking anywhere from 2 to 10 hours for ammonia volatilization to peak after mixing of urine and feces."); Pius M. Ndegwa et al., *A Review of Ammonia Emission Mitigation Techniques For Concentrated Animal Feeding Operations*, 100 Biosys. Eng'g 453, 465 (2008) (assessing several urine-feces segregation methods, all of which "reduced [ammonia] emissions from livestock barns by about 50% compared to the conventional manure handling system").

[119] Ndegwa, *supra* note 118, at 455-56.

[120] *See, e.g.*, Kelsi Bracmort, Cong. Research Serv., Anaerobic Digestion: Greenhouse Gas Emission Reduction and Energy Generation (2010), *available at* http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R40667.pdf (describing digester types and basic operating parameters); Wendy J. Powers & Robert T. Burns, Energy and Nutrient Recovery from Swine Manures 1-3 (2007), *available at* http://www.pork.org/filelibrary/Energy%20and%20Nutrient%20Recovery%20from%20Swine%20Manures.PDF (listing superior efficiency and environmental benefits of digester technologies, compared to lagoons); Philip W. Westerman et al., *Struvite Crystallizer for Recovering Phosphorus from Lagoon and Digester Liquid* (2009), *available at* https://www.bae.ncsu.edu/extension/ext-publications/waste/animal/ag-724w-struvite-westerman.pdf (discussing successful application of "continuous-flow cone-shaped struvite crystallizer" to capture slow-release mineral fertilizer from swine lagoon effluent); Nathan O. Nelson et al., *Struvite Precipitation in Anaerobic Swine Lagoon Liquid: Effect of pH and Mg:P ratio and Determination of Rate Constant*, 89 Biores. Tech. 229, 230 (2003) (reporting success of laboratory batch experiments precipitating struvite from "[a]naerobic swine lagoon liquid . . . collected from two active farms in North Carolina").

[121] *See, e.g.*, Karl A. Shaffer & Sanjay Shah, NCSU Coop. Ext., SoilFacts: Reducing Drift and Odor with Wastewater Application 2 (2008), *available at* http://www.soil.ncsu.edu/publications/Soilfacts/AG439-69W.pdf; Ndegwa, *supra* note 118, at 455-56.

169. DENR has the authority to require improved monitoring, including groundwater monitoring, and reporting, which is critical in light of recent cutbacks in DENR personnel, to ensure that facilities are meeting standards.

VIII. RELIEF

As established above, DENR issued a General Permit that fundamentally fails to protect the health and environment of residents living in proximity to permitted swine facilities, disproportionately affecting African Americans, Latinos, and Native Americans. Despite years of documentation demonstrating how these facilities—and particularly the dense concentration of swine facilities in communities in the eastern portion of the state—have polluted the water and air and affected the daily life of area residents, DENR issued a permit that contains essentially the same conditions as the last permit. This is entirely unacceptable and contrary to federal law.

First, to obtain funds, DENR must offer EPA the assurance that it will not undertake any action that violates Title VI, but DENR issued the General Permit without conducting an analysis of the potential for disproportionate health and environmental impacts on the basis of race and national origin. Complainants request that OCR investigate DENR's failure to satisfy the prerequisites for obtaining EPA funding and require DENR to complete a disproportionality analysis of its permitting program. Complainants further request that EPA require that DENR, in any future consideration of a permit program for industrial animal production in the state, conduct a robust analysis of disproportionate impact on the basis of race and ethnicity, including cumulative impacts from other nearby facilities, to ensure compliance with Title VI and its regulations.

Second, Complainants request that OCR conduct an investigation to determine whether DENR also violated Title VI and EPA's implementing regulations by issuing the revised general permit for swine waste management system in light of its grossly inadequate protections for the health and environment of people living in proximity to swine facilities, a permit that will have a statistically significant disproportionate impact on African Americans, Latinos and Native Americans. The General Permit simply fails to include conditions to prevent these facilities from continuing to injure human health and pollute the water and air. Study after study has shown that permitted swine facilities using the lagoon and sprayfield system in ways that are allowed by the General Permit spew pollution on surrounding communities, degrading air and water quality, injuring human health, and impacting quality of life. People living in proximity to industrial swine facilities, and particularly to multiple operations, have switched from using well water for fear that their water is contaminated with swine waste. They have given up fishing and hunting because they worry about the effect of pollution on the environment and surface water quality. They have complained that the pollution and overwhelming odor from these facilities makes it difficult to breathe, aggravates their allergies, and contributes to respiratory problems. People living in the shadow of permitted swine facilities are careful to

avoid spending time outside when the smell from the facilities is at its worse. They fear that their property values have declined because of proximity to the odors and other effects of swine facilities. Moreover, these long documented adverse effects of DENR's permitting program disproportionately affect African Americans, Latinos, and Native Americans, and they cannot be justified. DENR has alternatives, but has refused to exercise its authority to protect communities who for years have been struggling with the adverse effects of industrial swine facilities.

Community members have long asked why their way of life has been assaulted day in and day out by feces and urine from this industry, why so many industrial swine facilities were allowed to locate, densely packed, on the low lying coastal plain of the state, where soils are sandy and shallow and cannot absorb the massive amounts of waste that the industry creates. As journalist Wendy Nicole wrote in an article appearing in 2013 in Environmental Health Perspectives:

> The clustering of North Carolina's hog CAFOs in low-income, minority communities – and the health impacts that accompany them – has raised concerns of environmental injustice and environmental racism. As one pair of investigators explained, "[P]eople of color and the poor living in rural communities lacking the political capacity to resist are said to shoulder the adverse socio-economic, environmental, or health related effects of swine waste externalities without sharing in the economic benefits brought by industrial pork production."[122]

Today, however, Complainants are focusing on what DENR can do – indeed, has the legal obligation to do -- to protect them, and ask EPA to require, at a minimum, that DENR revise the General Permit to condition the operation of facilities on protections, including the installation and operation of waste management systems to prevent pollution, improved monitoring, and public reporting, among other things, to bring DENR into compliance with Title VI and EPA's regulations. Should DENR fail to come into compliance voluntarily, Complainants request that EPA initiate proceedings to suspend or terminate EPA funding to DENR in accordance with Title VI and 40 C.F.R. §§ 7.115(e), 7.110(c), 7.130(b).

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[122] Nicole, *supra* note 39 (quoting B. Edwards B & AE Ladd, *Race, Poverty, Political Capacity and the Spatial Distribution of Swine Waste in North Carolina*, 1982–1997, 9 North Carolina Geogr 55–77 (2001)).

Sincerely,

Dated: September 3, 2014

EARTHJUSTICE

By: _____

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

EXTERNAL CIVIL RIGHT COMPLIANCE OFFICE
OFFICE OF GENERAL COUNSEL

January 12, 2017

Return Receipt Requested
Certified Mail# 7015 3010 0001 1267 5140

In Reply Refer to:
EPA File No. 11R-14-R4

Marianne Engelman Lado
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Elizabeth Haddix
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UNC Center for Civil Rights
323 West Barbee Chapel Rd.
Chapel Hill, NC 27517

Re: Copy of Letter of Concern

Dear Ms. Lado, Mr. Smith, and Ms. Haddix:

Consistent with United States Environmental Protection Agency's External Civil Rights Compliance Office's (ECRCO) goal to promote appropriate involvement by complainants and recipients in the external complaint process, we are writing to provide you a copy of the enclosed Letter of Concern to the North Carolina Department of Environmental Quality, related to administrative complaint No. 11R-14-R4.

Please note that ECRCO considers this letter part of its ongoing investigation. So, while we are providing the enclosed letter to the Complainants, ECRCO does not consider this letter a public document.

If you have any questions, please feel free to contact me at (202) 564-9649, by e-mail at dorka.lilian@epa.gov, or U.S. mail at U.S. EPA, Office of General Counsel, External Civil Rights Compliance Office (Mail Code 2310A), 1200 Pennsylvania Avenue, N.W., Washington, D.C., 20460.

Sincerely,

Lilian S. Dorka
Director
External Civil Rights Compliance Office
Office of General Counsel

Cc:

Elise B. Packard
Associate General Counsel for Civil Rights and Finance
U.S. EPA Office of General Counsel

Kenneth Lapierrre
Assistant Regional Administrator
U.S. EPA Region 4

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

EXTERNAL CIVIL RIGHT COMPLIANCE OFFICE
OFFICE OF GENERAL COUNSEL

January 12, 2017

Return Receipt Requested
Certified Mail# 7015 3010 0001 1267 5133

In Reply Refer to:
EPA File No. 11R-14-R4

William G. Ross, Jr.
Acting Secretary
North Carolina Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1611

Re: Letter of Concern

Dear Acting Secretary Ross:

We are writing to you to provide the North Carolina Department of Environmental Quality (NC DEQ) preliminary information related to the United States Environmental Protection Agency's (EPA) External Civil Rights Compliance Office's[1] (ECRCO) investigation into alleged discriminatory impacts from NC DEQ's operation of the Swine Waste Management System General Permit (Swine Waste General Permit). ECRCO has not concluded its investigation of EPA File No. 11R-14-R4 (Complaint) or reached final conclusions of fact or law. However, in light of the preliminary information gathered, ECRCO has deep concern about the possibility that African Americans, Latinos, and Native Americans have been subjected to discrimination as the result of NC DEQ's operation of the Swine Waste General Permit program, including the 2014 renewal of the Swine Waste General Permit.

EPA recognizes that there is new leadership at NC DEQ who were not involved in the events and correspondence described below relating to this Complaint and who will understandably need to come up to speed. ECRCO looks forward to sitting down with NC DEQ's new leadership in the next few weeks to provide any necessary background on NC DEQ's obligations under the federal nondiscrimination statutes and to discuss issues raised by ECRCO's investigation to date; any additional information NC DEQ may have relevant to the issues under investigation; the recommendations ECRCO has made below; and how to move forward on a constructive path to informally resolve the Complaint in the near future and ensure NC DEQ is in compliance with the applicable nondiscrimination statutes and regulations.

[1] Formerly the Office of Civil Rights. To eliminate confusion, except where quoting another document, this letter will use the Office's current name, rather than its name at the time of any particular action or correspondence.

Procedural Background of Complaint

On September 3, 2014, Earthjustice filed a complaint under Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. §§ 2000d et seq., and the EPA's nondiscrimination regulations found at 40 C.F.R. Part 7, on behalf of the North Carolina Environmental Justice Network, Rural Empowerment Association for Community Help (REACH), and the Waterkeeper Alliance, Inc. alleging discrimination based on race and national origin by NC DEQ. The complaint alleged that NC DEQ's 2014 renewal of the Swine Waste General Permit without adequate measures to control, dispose of, and monitor animal waste from industrial swine feeding operations subjects African Americans, Latinos, and Native Americans to discriminatory impacts (*e.g.*, health issues, noxious odors, nuisances, increased expenses, social and psychological harms, declining property values).

On February 20, 2015, EPA opened an investigation into:

> Whether the North Carolina Department of Environmental Quality's (NC DEQ) regulation of swine feeding operations discriminates against African Americans, Latinos, and Native Americans on the basis of race and national origin in neighboring communities and violates Title VI of the Civil Rights Act of 1964 and the Environmental Protection Agency's implementing regulation.

On March 6, 2015, the Complainants and NC DEQ entered into an Alternative Dispute Resolution (ADR) process funded by EPA. ECRCO placed the investigation on hold pending the outcome of the ADR process. On March 7, 2016, the Complainants informed ECRCO that they were withdrawing from the ADR process.

On May 5, 2016, ECRCO informed NC DEQ that the ADR process between NC DEQ and the Complainants concluded without resolution; therefore, consistent with ECRCO procedures, ECRCO's investigation was reinitiated. On July 11, 2016, the Complainants filed an additional complaint alleging NC DEQ violated EPA's regulation prohibiting retaliation, intimidation, and harassment of Complainants (40 C.F.R. § 7.100). Among other events, Complainants point to events involving the Pork Councils' attempt to intervene at the January 2016 ADR session.

On August 1, 2016, NC DEQ submitted a response to the retaliation allegations. On August 2, 2016, ECRCO informed NC DEQ that it will also investigate:

> Whether NCDEQ's actions or inactions, including those associated with the presence and activities of the Pork Councils related to the January 2016 mediation session, violated 40 C.F.R § 7.100 which prohibits intimidating, threatening, coercing, or engaging in other discriminatory conduct against any individual or group because of actions taken and/or participation in an action to secure rights protected by the non-discrimination statutes OCR enforces.

On September 2, 2016, NC DEQ requested that ECRCO dismiss the original complaint. After reviewing the information provided by NC DEQ, ECRCO notified NC DEQ that the Complaint

would not be dismissed. On December 5, 2016, NC DEQ submitted a response to the Complaint.

ECRCO's investigation is being conducted under the authority of Title VI of the Civil Act of 1964, and EPA's nondiscrimination regulations (40 C.F.R. Part 7), and consistent with ECRCO's Interim Case Resolution Manual (https://www.epa.gov/ocr/case-resolution-manual) Title VI provides that "[n]o person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." 42 U.S.C. § 2000d. As implemented by EPA's regulation, these prohibitions include intentional discrimination as well as practices that have a discriminatory effect on the bases of race, color, or national origin. See 40 C.F.R. §§7.35(a), 7.35(b). The EPA regulation at §7.35 (b) prohibits a recipient from using criteria or methods of administering its program or activity which have the effect of subjecting individuals to discrimination. The EPA regulation also prohibits intimidation and retaliation against any individual or group for the purpose of interfering with a right protected by Title VI or because the individual has "filed a complaint, or has testified, assisted or participated in any way in an investigation, proceeding, or hearing" under EPA's regulation or has opposed any practice prohibited by the regulation. See 40 C.F.R. § 7.100.

ECRCO's investigation thus far has included an on-site visit to interview residents; reviewing information submitted by the Complainants including declarations prepared by residents and other witnesses; reviewing scientific and other literature and interviewing the authors when appropriate, and, a review of NC DEQ's responses to the Complaint dated August 1, 2016, September 2, 2016, and December 5, 2016. NC DEQ's December 5, 2016, letter requested that ECRCO "...provide any relevant information in its possession on the issue of discrimination by the State's regulation of Swine feeding operations." Below is a summary of information gathered thus far through ECRCO's investigation.

Adverse Impacts from Industrial Swine Operations on Communities of Color

On-Site Interviews and Declarations

ECRCO conducted an on-site visit to North Carolina (November 13-15, 2016) and interviewed over 60 residents living near industrial swine operations permitted under the Swine Waste General Permit. ECRCO's interviews were conducted mostly in Duplin and Sampson counties which have the highest concentration of industrial swine operations. To investigate the effects of the permitting program more broadly throughout the state, ECRCO also conducted interviews in other counties including Northampton County on the Virginia border and Pender County near the South Carolina border.

Some of the people interviewed had previously submitted declarations to ECRCO as exhibits to the Title VI complaint, some had not. The issues raised in the declarations and the impacts they discussed are similar or identical to those heard during the interviews. Many of those interviewed who had previously provided declarations provided updates to their declarations. ECRCO found credible all those interviewed thus far in the investigation. So far, ECRCO has heard in writing and/or orally from 85 witnesses in North Carolina who live near and described problems caused by their proximity to the industrial hog operations.

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, including those impacts described in studies referenced or discussed below. The residents described an overpowering stench, pests -- including a constant large number of flies, and the truck traffic all associated with the hog operations have forced residents to keep doors and windows closed and significantly limit any outdoor activity. Residents said the stench permeates homes, cars, and clothing. Some residents said the strength of the odor can be so strong it causes gagging, nausea and/or vomiting. For some residents who live near large numbers of industrial swine operations, they said stench is a weekly event lasting several days. They also stated they have no warning of when confinement house fans, spraying of the hog waste, or trucks transporting live or dead hogs will again bring the stench and actual waste onto their homes, property or themselves. Some described feeling as though they are prisoners in their own homes.

Residents described the 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 had 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 these impacts have been compounded by the increase in industrial poultry operations, as well as the operation of landfills and waste disposal sites for hog sludge and carcasses. Those who had hunted and fished for both food and enjoyment, said they no longer do so because of the odors and fear of the contamination of wild sources of food such as fish. Residents stated they no longer keep gardens or grow their own vegetables for fear of contamination. Some residents are still on well water and are concerned about the safety of their drinking water. Some residents would prefer to use their private wells rather than public drinking water, but said they have either been told not to drink it or are afraid that it is contaminated. Residents also discussed increased expenses from buying and using public water, bottled water, clothes dryers, air fresheners, pesticides, air conditioning units, and food.

When asked whether they had filed complaints with NC DEQ or local governments about the odors, pests, and waste sprayed on them or their property, some residents said they did not know how or where to file complaints. ECRCO was told the filing of complaints with NC DEQ would be pointless and has resulted in retaliation, threats, intimidation, and harassment by swine facility operators and pork industry representatives. Several residents said that for more than 15 years, the government has been well aware of the conditions they have to live with, but has done nothing to help, so complaining to NC DEQ would be futile.

ECRCO also interviewed residents who live near an industrial swine operation that began operation using the lagoon and spray field method under a Certificate of Coverage under the Swine Waste General Permit. When discussing the impacts that occurred while the facility operated under the General Permit, the residents described the same impacts as those currently

living near facilities operating under the General Permit, including nausea; headaches; odors that permeated their homes and prevented them from enjoying their yards and the outdoors; concerns about impacts to groundwater and surface water; and increased numbers of flies and other pests.

After several years of operation, the operator installed innovative technologies and practices to reduce the odor and other impacts from his operation including covering the waste lagoons; not spraying in the evenings and on weekends; and not using dead boxes. When asked to describe the current impacts from that industrial swine operation, for the most part the residents who live nearby said they rarely notice intense odors and that the number of flies has been greatly reduced. The exception was that one bordering neighbor said that the smell was unbearable during spraying. Other neighbors pointed out that the smell could also be from other industrial swine operations near that resident's property that still employ open lagoons and spray fields. ECRCO and other EPA staff who toured the operation including the confinement houses and the edge of the lagoons were surprised at how little odor there was given the number of swine housed there at that time and the presence of more than one waste lagoon.

Other Information on Adverse Impacts of Industrial Swine Operations on Nearby Residents

EPA recognizes that industrial hog operations have a negative impact on nearby residents, particularly with respect to objectionable odors and other nuisance problems that can affect their quality of life. (EPA, *Animal Feeding Operations Consent Agreement and Final Order*, 70 FR 4957, 4959 (Jan. 31, 2005)). The adverse impacts of offensive odors from North Carolina's industrial hog operations have been a known issue for more than 20 years. In 1994, the North Carolina legislature established a Blue Ribbon Panel, the Swine Odors Task Force, to study "the problem of swine odors and how to reduce them."[2] The report of the Swine Odors Task Force stated protests had been "numerous and well publicized."[3]

In part to protect North Carolina's travel and tourism industry and allow time for the completion of the studies of odor and other problems associated with swine operations, the state legislature implemented a moratorium effective March 1, 1997, on the construction or expansion of swine operations[4] that use "an anaerobic lagoon as the primary method of treatment and land application of waste by means of a spray field as the primary method of waste disposal."[5] Any new or expanding swine operations were required to eliminate or reduce a number of impacts from the lagoon and spray field methods including substantially eliminating ammonia emissions and odors detectable beyond the boundaries of the swine operation.[6] The moratorium was made permanent in 2007. However, the industrial hog operations using the lagoon spray field configuration already operating at the time of the moratorium were allowed to continue to operate under the Swine Waste General Permit without the requirements to substantially eliminate ammonia emissions and odors. Today, in a handful of counties mostly in eastern North

[2] Dr. Johnny C. Wynne, et al., *Options for Managing Odor... a report from the Swine Odor Task Force (March 1, 1995)*, NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE, N.C. STATE UNIV., *available at* http://www.mtcnet.net/~jdhogg/ozone/odor/swineodr.html#notsimple

[3] *Id.*

[4] S.L. 1997-458, H.B. 515, § 1.1(a).

[5] G.S. § 143-215.10I.

[6] G.S. § 143-215.10I (b)(2)-(3).

Carolina there is a total of more than 9 million hogs allowed in the more than 2000 industrial hog facilities operating under the Swine Waste General Permit.

North Carolina established a rule specifically to control objectionable odors from industrial swine operations.[7] "Objectionable odor" means any odor present in the ambient air that by itself, or in combination with other odors, is or may be harmful or injurious to human health or welfare, or may unreasonably interfere with the comfortable use and enjoyment of life or property. Odors are harmful or injurious to human health if they tend to lessen human food and water intake, interfere with sleep, upset appetite, produce irritation of the upper respiratory tract, or cause symptoms of nausea, or if their chemical or physical nature is, or may be, detrimental or dangerous to human health."[8] North Carolina's definition of "objectionable odor" encompasses the panoply of negative effects experienced by North Carolina residents, as told to ECRCO and discussed above.

Review of Reports and Studies

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.[9] At ECRCO's request, EPA's Office of Research and Development (ORD) recently reviewed seven reports published by or with federal agencies.[10] 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; 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 swine operations is a concern.

North Carolina's 1994 Swine Odors Task Force stated "it is not surprising to learn that living near a swine operation can affect mental health" when discussing a Duke University study of "the moods of people exposed to odors from commercial swine operations in North Carolina. Forty-four neighbors of hog operations . . . had less vigor and were significantly more tense, depressed, angry, fatigued, and confused."[11]

Additionally, ECRCO considered the findings of the analysis prepared by Drs. Steve Wing and Jill Johnston, *Industrial Hog Operations in North Carolina Disproportionately Impact African-Americans, Hispanics and American Indians*, (revised October 19, 2015) (*Complainants' Disproportionate Impact Analysis*). While the *Complainants' Disproportionate Impact Analysis* has not undergone peer review, it uses a study protocol and methodology that are substantially similar to peer reviewed studies by Wing et al. and Johnston et al.[12] The

[7] 15A NCAC 02D.1802(a).
[8] 15A NCAC 02D.1801(9).
[9] *See* Attachment A. Additional studies can be made available.
[10] *See* Attachment B.
[11] *See* Wynne, et al., *supra* note 3.
[12] *See* Steve Wing, et al., *Environmental Injustice in North Carolina's Hog Industry* (Mar. 2000), ENVIRONMENTAL HEALTH PERSPECTIVES, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637958/; Jill E. Johnston, et al.,

Complainants' Disproportionate Impact Analysis concludes that the impacts from the manner in which waste is disposed of, and other impacts tied to industrial swine facilities operating under the Swine Waste General Permit, detrimentally affect those who live in neighboring properties and communities.

The *Complainants' Disproportionate Impact Analysis* also concluded, when examining those neighboring properties that African-Americans, Hispanics, and Native Americans are more likely than Whites to live near industrial swine operations granted COCs. Specifically, the *Complainants' Disproportionate Impact Analysis* concluded that, both state-wide, and in only-rural areas, African-Americans, Hispanics, and Native Americans living in North Carolina are more likely than Whites to live within 3 miles of an industrial swine operations granted COCs, and therefore suffer those detrimental effects. The *Complainants' Disproportionate Impact Analysis* looked at the steady state live weight (SSLW) of hogs within 3 miles of the center of census blocks. The SSLW was used as an indicator of density of hogs/the amount of swine feces and urine produced by the hogs in that 3-mile area. The *Complainants' Disproportionate Impact Analysis* found that for each 10 percent increase in the combined African-American, Hispanic, and Native American population and for each 10 percent increase in population for each of those census categories individually, the SSLW of hogs within 3 miles increases by anywhere from 47,000 to 165,000 pounds. This analysis concludes that there is a linear relationship between race/ethnicity and the SSLW or density of hogs.

Intimidation/Retaliation

The Complainants raised allegations of intimidation and harassment in their written submissions to ECRCO and during interviews related to the appearance of and actions by national and local representatives of the pork industry at what was to be a confidential ECRCO-sponsored alternative dispute resolution mediation session between NC DEQ and the Complainants. Complainants claim that, although NC DEQ representatives knew that complainants did not want representatives from the National Pork Producers Council and North Carolina Pork Council (Pork Councils) at this confidential meeting, NC DEQ representatives appeared to encourage their attendance and participation.

NC DEQ's responses in its letters dated August 1, 2016, and December 5, 2016, in part question whether complainants felt intimated by the Pork Council representatives' presence at the January 2016 mediation session. NC DEQ stated in both letters that "it strains credulity that these individuals were intimidated by the fact that they would be identified by representatives of organizations whom these individuals routinely criticized at public forums."[13] The following information provided to ECRCO may assist NC DEQ to better understand in part the context within which the Complainants have raised concerns about harassment, retaliation, and intimidation.

Wastewater Disposal Wells, Fracking, and Environmental Injustice in Southern Texas (Mar. 2016), AMERICAN JOURNAL OF PUBLIC HEALTH (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4816143/.

[13] Letter to Lilian S. Dorka, Acting Director, EPA Office of Civil Rights from Sam M. Hayes, General Counsel, North Carolina Department of Environmental Quality (Dec. 5, 2016), at 8-9.

During interviews, residents including REACH members, and current and former Riverkeepers working in the eastern North Carolina rivers recounted first hand incidents of harassment, intimidation, and retaliatory behavior, including physical and verbal threats, by swine facility owners and/or operators and their employees. The accounts ranged from sustained tailgating; driving back and forth in front of the houses of residents who have complained; filming or photographing residents who are taking photos or videos of spraying; being yelled at; confronted in parking lots and at intersections; and threatened with guns and other physical violence.

Those interviewed stated that these are regular events, rather than an exception, creating a climate where residents believe that if they file an environmental complaint with NC DEQ, they will likely be retaliated against by neighboring swine facility operators or employees. The Riverkeepers stated that they are subjected to this type of harassment and intimidation two or three times every couple of weeks. Particularly egregious instances brought to ECRCO's attention include a local industrial swine facility operator entering the home of an elderly African American woman and shaking the chair she sat in while threatening her and her family with physical violence if they continued to complain about the odors and spray; the firing of a gun in the air when an African American REACH member tried to speak to a person sitting on their porch; and a truck that sped up and swerved toward a Riverkeeper who was standing on the side of a public road teaching a group of volunteers how to sample water from public ditches. Those interviewed believe that the NC DEQ's lack of response to their complaints lends to the hostile environment and emboldens local facility owners and operators to act in a threatening and intimidating manner.

ECRCO has grave concerns about these reports indicating a potential hostile and intimidating environment for anyone seeking to provide relevant information to NC DEQ or EPA. Also, ECRCO is concerned about the circumstances surrounding the attendance by pork industry representatives during the mediation session.

Under certain circumstances, Title VI's prohibition on retaliation extends to third parties, which may include lower-level recipient employees, program beneficiaries or participants, organizations with a relationship to the recipient such as contractors, and others. EPA Title VI regulations provide that "[n]o recipient or *other* person" may retaliate. 7 C.F.R. § 7.100. Recipients themselves have two key obligations related to third party retaliation: first, to protect individuals from potential retaliation, recipients are obligated to keep the identity of complainants confidential except to the extent necessary to carry out the purposes of the Title VI regulations, including conducting investigations, hearings, or judicial proceedings; and second, recipients must investigate and respond when a third party engages in retaliatory conduct that Title VI prohibits. As with other types of third party conduct, such as harassment, the extent of the recipient's obligation is tied to the level of control it has over the bad actor and the environment in which the bad acts occurred. *See Davis v. Monroe Cty. Bd. of Educ.*, 526 U.S. 629, 644 (1999). EPA makes these determinations on a case-by-case basis in light of the facts and totality of circumstances in a particular case.

NC DEQ's Response to the Complaint[14]

In part, NC DEQ's December 5, 2016 letter responding to the Complaint reiterated arguments in favor of dismissal previously submitted to ECRCO by letter dated September 2, 2016. ECRCO has considered the information in both letters concerning the alleged reduction of adverse impacts by the permit renewal. As ECRCO pointed out previously, NC DEQ itself explained that the majority of the changes from the 2009 permit to the "current permit are structural and grammatical in nature"[15] and "do not make the Permit more stringent, costly or burdensome."[16] NC DEQ's responses did not state or explain how the 2014 Permit will reduce adverse impact from the source, significantly or otherwise; therefore, as stated in ECRCO's letter dated October 5, 2016, ECRCO does not believe that the argument constitutes a proper basis for dismissal of the complaint.

Similarly, NC DEQ's December 5, 2016 letter raised again a concern that the Complainants did not pursue an administrative appeal of the Swine Waste General Permit. NC DEQ explained that the permit appeal process under state law is an appropriate forum for "those who believe that the terms of the General Permit failed to comply with state law, or if a more effective means of pollution control should have been incorporated into the General Permit."[17] The allegation raised to EPA by the Complainants is that the Swine Waste General Permit fails to comply with federal law, namely Title VI of the Civil Rights Act of 1964. For almost 30 years, recipients of EPA financial assistance have been required under EPA's Title VI implementing regulation to have in place a grievance process. 40 C.F. R. § 7.90. The NC DEQ administrative forum to investigate and resolve exactly the issues of discrimination alleged in the Complaint that should have been available to Complainants did not exist when they filed their Complaint with EPA. Regardless, as NC DEQ previously acknowledged in its October 5, 2016 letter, there is no requirement under Title VI that Complainants exhaust administrative remedies before filing a discrimination complaint with EPA.

NC DEQ's response did not deny or refute the allegation that the industrial hog facilities operating under the Swine Waste General Permit were creating discriminatory impacts, rather, NC DEQ points to siting decisions by operators and changing demographics as reasons why certain communities may be more impacted than others. The impacts of concern in this investigation flow from the operation of the facilities. 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.

NC DEQ also pointed out that the population has grown and the demographics have changed in areas of high concentration of industrial swine facilities since the first Swine Waste General

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[14] ECRCO is not specifically addressing all of the points NC DEQ raised in its December 5, 2016 letter, but this should not be interpreted as ECRCO accepting those arguments.

[15] State of North Carolina, Department of Environmental and Natural Resources, *Report of the Proceedings on the Proposed Renewal of the State General Permits for Animal Feeding Operations, Public Meeting, November 12, 2013, Statesville, North Carolina, Public Meeting, November 14, 2013, Kenansville, North Carolina,*" p. 4.

[16] *Id.*, at pp. 5 and 8.

[17] Letter to Lilian S. Dorka, Acting Director, EPA Office of Civil Rights from Sam M. Hayes, General Counsel, North Carolina Department of Environmental Quality (Dec. 5, 2016), at 2.

Permit was issued. NC DEQ discussed the population growth in Duplin and Sampson Counties, highlighting in particular the rapid growth of the Latino population, and speculated that the population growth may have been due to jobs created by the industrial hog industry. The reasons for an increase in the minority population in the past 20 plus years in Duplin and Sampson Counties does not change NC DEQ's obligation to ensure that its current programs and activities do not have the effect of subjecting individuals to discrimination based on race, color or national origin.

NC DEQ requested information ECRCO has on anecdotal as well as systemic concerns relative to the Swine Waste General Permit Program. With regard to concerns about individual facilities, based on interviews of Riverkeepers working in eastern North Carolina, it is our understanding that for more than a decade they have provided NC DEQ documentation of hundreds of instances of waste spray or drift entering play areas; landing on people in their gardens, on their cars, and on their houses; runoff of hog waste entering streams and ditches; and improper spraying of waste after issuance of a National Weather Service Flood Watch. Riverkeepers stated they have provided NC DEQ the information through eyewitness accounts, photographs with time, date, and GPS coordinates embedded in the metadata, and/or video. Some of this information has been shared with ECRCO as well. Witnesses have stated that, to their knowledge, very few of these reports have received any mitigating action or resulted in enforcement action by NC DEQ. The temporal and geographic breadth of the anecdotal instances documented by Riverkeepers, points to systemic issues about which NC DEQ is aware.

Nondiscrimination Procedural Safeguards

At the time the Complaint was filed, NC DEQ was not in compliance with EPA's longstanding requirements under 40 C.F.R. Part 7, Subpart D which form the foundational elements of a recipient's program to implement the federal non-discrimination statutes.[18] These regulatory requirements include a continuing notice of non-discrimination under 40 C.F.R. § 7.95, grievance procedures available to the public, and the designation of at least one person to coordinate its efforts to comply with its non-discrimination obligations under 40 C.F.R. § 7.85(g).

At some point during the summer of 2016, NC DEQ appears to have begun the process of establishing its non-discrimination program. However, it is unclear whether NC DEQ has put in place the foundational elements of a properly functioning nondiscrimination program. ECRCO has attached a Procedural Safeguards Checklist (Attachment C) to assist NC DEQ in evaluating whether it has in place the appropriate foundational elements to ensure that it will meet its obligations under the federal nondiscrimination statutes.

Mitigation

As NC DEQ's December 5, 2016 letter noted, the study of the feasibility of environmentally superior swine waste technologies to the lagoon and spray field method began back in 2000.

[18] Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, Section 13 of Federal Water Pollution Control Act of 1972, and Title IX of the Education Amendments of 1972 (hereinafter referred to collectively as the federal non-discrimination statutes).

Some reviews of particular technologies were concluded more than a decade ago. According to the designee who made the decisions regarding the economic and environmental feasibility of the technologies, "[S]ubsequent research has focused on improving the economics of targeted technologies while maintaining the environmental performance."[19] EPA's ORD found in its review of reports discussed above that a number of risk management options are available to reduce potential health risks to nearby communities. EPA, USDA, and academia have continued to work on new processes, methods, and technologies to reduce impacts from industrial swine operations and waste since the review of available technology mentioned in NC DEQ's letter was completed.

Recommendations

ECRCO has not concluded its investigation and this letter does not contain ultimate findings of facts or law. Rather, ECRCO has summarized some of the information gathered to date to explain why ECRCO continues to be concerned about possible discriminatory impacts.

The totality of the information ECRCO has collected to date in its investigation, including NC DEQ's response to the complaint, indicates that the types of adverse impacts described above are being felt by large segments of the communities of color and are potential evidence of systemic concerns, not purely anecdotal claims. The information raises a concern that Swine Waste General Permit Program may run afoul of Title VI and EPA's Title VI regulations. NC DEQ's responses thus far have not provided a reason to dismiss the complaint or halt the investigation, nor has the information or arguments provided served to diminish ECRCO's level of concern.

On this basis, EPA makes a series of preliminary recommendations and requests a meeting to explore informal resolution. The recommendations are designed to focus an inquiry that will help them determine whether the problems are being caused by: (1) structural problems with the General Permit Program; (2) a lack of enforcement of the requirements of the permit (for example, no odors, no discharges, no spray beyond borders); or, (3) both.

ECRCO recommends that NC DEQ:

- Conduct an assessment of current Swine Waste General Permit to determine what changes to the Permit should be made in order to substantially mitigate adverse impacts to nearby residents. Determine which changes are currently within NC DEQ's authority to make and develop a timetable for adopting them. For Permit changes necessary to substantially mitigate the adverse impacts that NC DEQ cannot adopt, determine the source of the impediment to their adoption.
- Conduct an assessment of current regulations applicable to facilities operating under the Swine Waste General Permit to determine what if any changes to the regulations would be required to substantially mitigate adverse impacts to nearby residents. Determine which changes are currently within NC DEQ's authority to make and develop a timetable

[19] Williams, C.M. Williams, "*C.M. "Mike" Williams: Waste economics.*" The News & Observer, 8 June 2015. http://www.newsobserver.com/opinion/letters-to-the-editor/article23534074.html.

to adopt them. For regulatory changes necessary to substantially mitigate the adverse impacts that NC DEQ cannot adopt, determine the source of the impediment to their adoption.

- Evaluate the feasibility of risk management options available to reduce adverse impacts to nearby communities, including covering the waste lagoons; not spraying in the evenings and on weekends; not using dead boxes; and others described in this letter.
- Conduct an assessment of current mitigation technologies that would satisfy NC DEQ's performance criteria for new or expanding industrial swine operations and what if any impediments exist to adopting those technologies.
- Conduct a self-evaluation of the sufficiency of NC DEQ's enforcement and compliance efforts for existing rules governing the operation of its Swine Waste Management Program, including its response to odor and adverse health effects complaints, to determine whether implementation of any corrective measures are necessary including those to ensure a prompt and appropriate response to odor and other complaints. Determine which corrective measures are currently within NC DEQ's authority to make and develop a timetable for adopting them.
- Conduct an evaluation of NC DEQ's current policies and adjust them as appropriate to ensure the protection of confidentiality and identities of residents who provide information to NC DEQ about either environmental or civil rights complaints.
- Conduct a self-evaluation of its new non-discrimination program using the attached Procedural Safeguards Checklist to determine whether it has in place all the foundational elements listed to ensure that NC DEQ will meet its obligations under the federal nondiscrimination statutes. If any of the elements are not in place, NC DEQ should correct those deficiencies.

ECRCO looks forward to working with NC DEQ and would like to discuss with NC DEQ as soon as possible: the concerns previously outlined regarding the impacts on residents and communities; any additional information NC DEQ believes is relevant to the issue of whether Title VI has been violated; ECRCO's preliminary recommendations; NC DEQ's non-discrimination program; and the potential for informal resolution of this Complaint.

I will be contacting you in the next day or so to schedule a meeting to occur in the next two weeks. It is our goal to be able to reach informal resolution as soon as possible. We believe that through productive conversations over the next 60 days, we can negotiate an Informal Resolution Agreement that would address the concerns discussed in this letter and that would include a plan for moving forward on the above recommendations. If after discussion with NC DEQ, ECRCO does not believe informal resolution is possible, ECRCO will move forward to conclude its

investigation and issue formal findings. If you have any questions, please feel free to contact me at (202) 564-9649, by e-mail at dorka.lilian@epa.gov, or U.S. mail at U.S. EPA, Office of General Counsel, External Civil Rights Compliance Office (Mail Code 2310A), 1200 Pennsylvania Avenue, N.W., Washington, D.C., 20460.

Sincerely,

Lilian S. Dorka
Director
External Civil Rights Compliance Office
Office of General Counsel

Cc:

Elise B. Packard
Associate General Counsel for Civil Rights and Finance
U.S. EPA Office of General Counsel

Kenneth Lapierrre
Assistant Regional Administrator
U.S. EPA Region 4

Attachments

ATTACHMENT A

1. Wing, Steve, et al., *Environmental Injustice in North Carolina's Hog Industry*, 108 Envtl. Health Perspectives 225 (2000)
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ATTACHMENT B

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7. NRC, 2003. *Air Emissions from Animal Feeding Operations: Current Knowledge, Future Needs.* National Academies Press, Washington, D.C.

ATTACHMENT C

CHECK LIST FOR PROCEDURAL SAFEGUARDS FOR RECIPIENTS FEDERAL NON-DISCRIMINATION OBLIGATIONS

Federal Non-Discrimination Statutes: Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, Section 13 of Federal Water Pollution Control Act of 1972, and Title IX of the Education Amendments of 1972.[20]

Item	Yes & Supporting Documentation	Not Yet	Checking
Notice of Non-Discrimination under the Federal Non-Discrimination Statutes[21]			
See attachment for recommended text of notice			
The non-discrimination notice is posted:			
• in a prominent location in your offices and facilities			
• prominently on your website			
• in any publications			
Grievance Procedures for Complaints filed under the Federal Non-Discrimination Statutes[22]			
A grievance procedure that:			
• Clearly identifies the Non-Discrimination Coordinator, including contact information			
• Explains the role of the Non-Discrimination Coordinator relative to the coordination and oversight of the grievance procedures			
• States who may file a complaint under the procedures			
• Describes which formal and informal processes are available, and the options for complainants in pursuing either			

[20] 40 C.F.R. § 7.85(g)
[21] 40 C.F.R. § 7.95(a).
[22] 40 C.F.R. § 7.90.

Item	Yes & Supporting Documentation	Not Yet	Checking
• Explains that an appropriate, prompt and impartial investigation of any allegations filed under federal non-discrimination statutes will be conducted			
• States that the preponderance of the evidence standards will be applied during the analysis of the complaint			
• Contains assurances that retaliation is prohibited[23] and that claims of retaliation will be handled promptly if it occurs			
• States that written notice will be promptly provided about the outcome of the investigation, including whether discrimination is found and the description of the investigation process[24]			
• Is published in print in general publications distributed to the public			
Non-Discrimination Coordinator[25]			
At least one Non-Discrimination Coordinator to ensure compliance with the federal non-discrimination statutes			
Non-Discrimination Coordinator or other individual responsible for:			
• Providing information internally and externally regarding rights to services, aids, benefits, and participation without regard to race, national origin, color, sex, disability, age or prior opposition to discrimination			
• Providing notice of your Agency's formal and informal grievance processes and the ability to file a discrimination complaint			
• Establishing grievance policies and procedures or mechanisms (e.g., an investigation manual)			
• Tracking all complaints filed with your Agency under federal non-discrimination statutes including any patterns or systemic problems			

[23] 40 C.F.R. § 7.100.

[24] Whether OCR considers complaint investigations and resolutions to be "prompt" will vary depending on the complexity of the investigation and the severity and extent of the alleged discrimination. For example, the investigation and resolution of a complaint involving multiple allegations and multiple complainants likely would take longer than one involving a single allegation of discrimination and a single complainant.

[25] 40 C.F.R. § 7.85(g).

Item	Yes & Supporting Documentation	Not Yet	Checking
• Semiannual reviews of all complaints filed with your Agency under federal non-discrimination statutes in order to identify and address any patterns or systemic problems			
• Appropriate training for your Agency's employees on your Agency's non-discrimination policies and procedures and obligations to comply with federal non-discrimination statutes			
• Updating complainants on the progress of their complaints filed with your Agency under federal non-discrimination statutes and any determinations made			
• Periodic evaluations of the efficacy of your Agency's efforts to provide services, aids, benefits, and participation in any of your Agency's programs or activities without regard to race, national origin, color, sex, disability, age or prior opposition to discrimination			
Public Participation			
Written and published public participation process/procedures that provide that when your Agency prepares a public participation plan for a specific action, it will include:			
• A description of the community (including demographics, history, and background)			
• A contact list of Agency officials with phone numbers and email addresses to allow the public to communicate via phone or internet			
• A list of past and present community concerns (including any complaints filed under the federal non-discrimination statutes)			
• A detailed plan of action (outreach activities) your Agency will take to address concerns			
• A contingency plan for unexpected events			
• Location(s) where public meetings will be held (consider the availability and schedules of public transportation			

Item	Yes & Supporting Documentation	Not Yet	Checking
• Contact names for obtaining language assistance services for limited-English proficient persons, including, translation of documents and/or interpreters for meetings			
• Appropriate local media contacts (based on the culture and linguistic needs of the community			
• Location of the information repository			
Access To Programs And Activities by Persons with Limited English Proficiency			
Has your Agency conducted an appropriate analysis described in OCR's LEP Guidance found at 69 FR 35602 (June 25, 2004) and http://www.lep.gov to determine what language services it may need to provide to ensure that individuals with limited-English proficiency can meaningfully participate in the process?			
Has your Agency developed a language access plan consistent with the details found in OCR's training module for LEP. http://www.epa.gov/civilrights/lepaccess.htm?			
Does your Agency have written and published procedures that:			
• Ensure meaningful access to all of your Agency's programs and activities to persons with limited-English proficiency and individuals with disabilities			
• Make communities you serve aware that foreign language services are available			
• Translate standardized documents			
• Provide for simultaneous oral interpretation of live proceedings such as town hall meetings or public hearings			
Access To Programs And Activities by Persons with Disabilities			
Does your Agency have written and published procedures to ensure to provide access to your programs, services, and activities for individuals with disabilities that:			
• Provides at no cost appropriate auxiliary aids and services including, for example, qualified interpreters to individuals who are deaf or			

Item	Yes & Supporting Documentation	Not Yet	Checking
hard of hearing, and to other individuals as necessary to ensure effective communication or an equal opportunity to participate fully in the benefits, activities, programs and services provided by your Agency in a timely manner and in such a way as to protect the privacy and independence of the individual			
• Ensures that your Agency's facilities and non-Agency facilities utilized by your Agency (*e.g.*, if your Agency holds a public hearing at a school) are physically accessible for individuals with disabilities			
• Makes communities you serve aware that services for individuals with disabilities are available			

NOTICE OF NON-DISCRIMINATION RECOMMENDED TEXT

[Agency Name] does not discriminate on the basis of race, color, national origin, disability, age, or sex in the administration of its programs or activities, as required by applicable laws and regulations.

[Insert name and title of Non-Discrimination Coordinator] is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7 (Non-discrimination in Programs or Activities Receiving Federal Assistance from the Environmental Protection Agency), including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972.

If you have any questions about this notice or any of [Agency Name]'s non-discrimination programs, policies or procedures, you may contact:

[Insert name and title of Non-Discrimination Coordinator]
[Insert Agency Name and Address]
[Insert phone number of Non-Discrimination Coordinator]
[Insert email address of Non-Discrimination Coordinator]

If you believe that you have been discriminated against with respect to a [Agency Name] program or activity, you may contact the [insert title of Non-Discrimination Coordinator] identified above or visit our website at [insert] to learn how and where to file a complaint of discrimination.

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GLOBAL ENVIRONMENTAL HEALTH AND SUSTAINABILITY (JM SAMET, SECTION EDITOR)

Industrial Food Animal Production and Community Health

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Abstract Industrial food animal production (IFAP) is a source of environmental microbial and chemical hazards. A growing body of literature suggests that populations living near these operations and manure-applied crop fields are at elevated risk for several health outcomes. We reviewed the literature published since 2000 and identified four health outcomes consistently and positively associated with living near IFAP: respiratory outcomes, methicillin-resistant *Staphylococcus aureus* (MRSA), Q fever, and stress/mood. We found moderate evidence of an association of IFAP with quality of life and limited evidence of an association with cognitive impairment, *Clostridium difficile*, *Enterococcus*, birth outcomes, and hypertension. Distance-based exposure metrics were used by 17/33 studies reviewed. Future work should investigate exposure through drinking water and must improve exposure assessment with direct environmental sampling, modeling, and high-resolution DNA typing methods. Investigators should not limit study to high-profile pathogens like MRSA but include a broader range of pathogens, as well as other disease outcomes.

Keywords IFAP · CAFOs · Air pollution · Asthma · Zoonotic disease · Odor

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Introduction

The 20th century saw unprecedented transformation in the scale and practices associated with food animal agriculture. The resulting industrial model first emerged in US poultry production over the 1930s–1950s [1], with parallel developments in Europe [2]. Industrial food animal production (IFAP) today [2] is characterized by large-scale, highly specialized, densely stocked operations designed to maximize output at minimal cost to producers. In the USA, for example, the majority of swine and laying hens are confined to operations with inventories of over 5000 swine or 100,000 birds [3]. Production relies heavily on inputs, including specially formulated feeds, pharmaceuticals, and synthetic hormones (in cattle), the use of which has been implicated in the presence of environmental, occupational, and/or food-borne hazards [4, 5]. This model has become increasingly globalized, with multinational

corporations expanding operations in Southeast Asia, Mexico, Eastern Europe, and other parts of the world [1, 6].

Figure 1 illustrates how IFAP can lead to adverse health effects in nearby communities via the generation and spread of microbial and chemical hazards. Studies have identified bacterial pathogens, such as antibiotic-resistant strains of *Staphylococcus* and *Enterococcus*, in and around IFAP operations, including colonizing animals and surfaces [7–10], in manure [11–16], and carried by flies [17, 18] and rats [19] near operations. IFAP is also a source of airborne pathogens [8, 20–22], endotoxins [23], particulate matter (PM) [24], hydrogen sulfide (H_2S), ammonia, odorous chemicals, and other contaminants [23, 25–28], which may be spread from operations to the downwind environment, e.g., via ventilation fans and emissions from decomposing manure [7, 8, 26, 27, 29–32]. IFAP workers are subject to heightened exposures to these hazards and have been shown to exhibit elevated rates of respiratory illness [33, 34], psychological distress [35, 36], and colonization/infection with resistant pathogens [5, 37, 38], the latter potentially transmissible to workers' communities. Spreading IFAP waste on agricultural fields—a common method of disposal—presents further opportunities for microbial [13, 39–43] and chemical [44] contaminants (e.g., nitrates, antibiotic residues, heavy metals, and excreted hormones) to be transported through environmental media, including ground and surface waters. Failed containment and extreme weather events may also lead to the discharge of stored waste into nearby water sources [45]. Taken together, these and other exposure pathways have been implicated in adverse health outcomes among nearby residents.

The breadth of research on the community health effects associated with IFAP has not been the subject of a recent review [46–49]. A 2010 systematic review [49] examined evidence of respiratory, gastrointestinal, and mental health outcomes; however, this review reflects a limited subset of the broader body of research. Furthermore, the review was funded by two major industry groups and may have been subject to bias from competing interests.

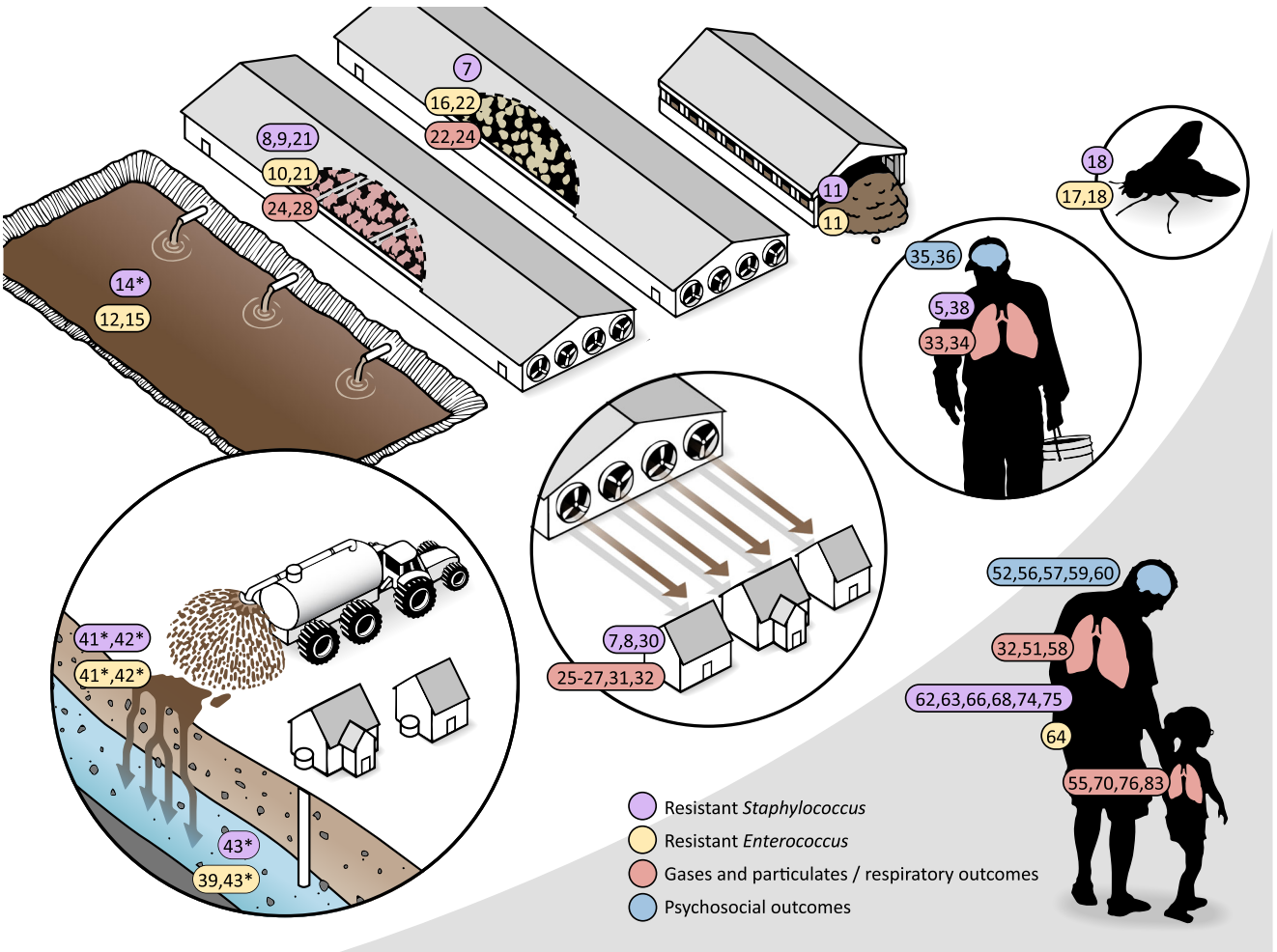

Fig. 1 Studies that document selected hazards associated with IFAP, illustrating potential pathways through the environment, and adverse health outcomes in nearby populations. *Numbers* indicate study citations. *Study investigated the presence of resistance genes, which could be acquired by *S. aureus*, *Enterococcus*, or other pathogens

For this review, we identified studies published after the year 2000 by searching PubMed and Google Scholar using key words related to animal production including IFAP, concentrated animal feeding operation (CAFO), livestock operation, and agriculture and key words related to health outcomes, including health, infection, asthma, stress, and aquatic health. We scanned the reference lists of the identified studies for additional papers missed by our search strategy. We included all studies that addressed health outcomes, either clinical or subclinical, either in humans or in animals. Several related areas of research were excluded or mentioned only briefly because they were beyond the scope of this review: studies of people living or working on a farm, measurement of environmental hazards without an associated health outcome, exposures related to meat consumption, issues of environmental justice, and climate change implications. In this article, we review 33 studies completed since 2000, identified from our search of the scientific literature, that characterize health effects in communities near IFAP. We also discuss methodological challenges, policy implications, and future research directions.

Exposure Assessment

Both infectious and noninfectious disease can occur as a result of a single exposure via a single pathway, but more commonly, diseases are multifactorial and several pathways may act simultaneously (e.g., odor, air pollution, weather, community characteristics, and socioeconomic status) to influence the relationship between IFAP and health outcomes. This systemic causation partially explains why few studies have linked direct environmental measurements to human health outcomes [50•, 51, 52]. Studies have used a variety of tools to assign exposure to study populations: self-report, aggregation to a specified geographical area, distance-based methods, interpolation from sampled points to estimate those not sampled, direct environmental sampling, and microbiologic methods [53] (Fig. 2a).

Self-Report

To evaluate exposures, many studies asked participants to report presence, severity, and/or duration of livestock odor [27, 50•, 51, 52, 54–56]. Four studies, two in Germany [57, 58] and two in the Netherlands [59, 60], asked participants about annoyance due to livestock odor. Few studies used self-reported livestock odor as the only exposure variable [56, 57]; many also incorporated direct measurements or used dispersion modeling to estimate individual-level exposure [27, 50•, 51, 52, 59, 60]. Self-reported odor has the potential to bias estimates away from the null if those experiencing health outcomes are more aware of and report more exposure, a particular issue with retrospective data collection (i.e., recall bias) [61]. Study design can reduce risk of bias. For example, Deiters et al. and Larsen et al. [62, 63•] supplemented self-reported livestock contact with microbiologic analysis of methicillin-resistant *Staphylococcus aureus* (MRSA) strains.

Geographical Aggregation

Five studies aggregated IFAP exposure to the zip code [64, 65], municipality [63•, 66], or county [67] level. Two included population density to account for differences in characteristics of the aggregated units that might influence the outcome [66, 67]. Feingold et al. also assessed spatial variation in risk and clustering of livestock-associated MRSA cases.

Distance-Based Exposure and Interpolation

Likely due to simplicity, interpretability, and data availability, distance-based measures were the most common way to estimate exposure (17/33 studies reviewed). Three types of distance metrics were used: (1) buffers around IFAP with radii varying from 800 to 3200 m [54, 56, 57, 64, 68–71], (2) proximity measures [55, 58, 72, 73], and (3) gravity models (i.e., inverse distance-squared model) [74–77]. Pavilonis et al. [76] also incorporated wind direction in their gravity model [76].

In regions where some air pollution monitors are available, but not at the study subject's exact residence, researchers have estimated exposure using validated [78] local and long-range models [59, 60].

Direct Environmental Sampling

Direct sampling most closely captures human exposure. Researchers in North Carolina set up a central monitoring trailer for 2 weeks in study participants' neighborhoods and continuously measured H_2S, semivolatile PM_{10}, and PM_{10} [27, 50•, 51, 52]. In 2008, Wing et al. reported a significant positive association between H_2S concentration and self-reported odor, adding credence to studies using self-reported odor as an exposure measure [27]. In a comprehensive investigation of a Q fever outbreak that originated at a goat dairy in the Netherlands, Hackert et al. took environmental samples from the barn; blood samples from veterinarians, farmers, and their close contacts; and aerosamples 1000 m from the barn to characterize many phases of exposure [79•].

Microbiologic

Microorganisms sampled from IFAP and the community must be characterized with high-resolution DNA typing methods to determine whether isolates found in people with no livestock exposure are linked to the livestock reservoir. Over the years, several typing methods have been used, including phenotypic

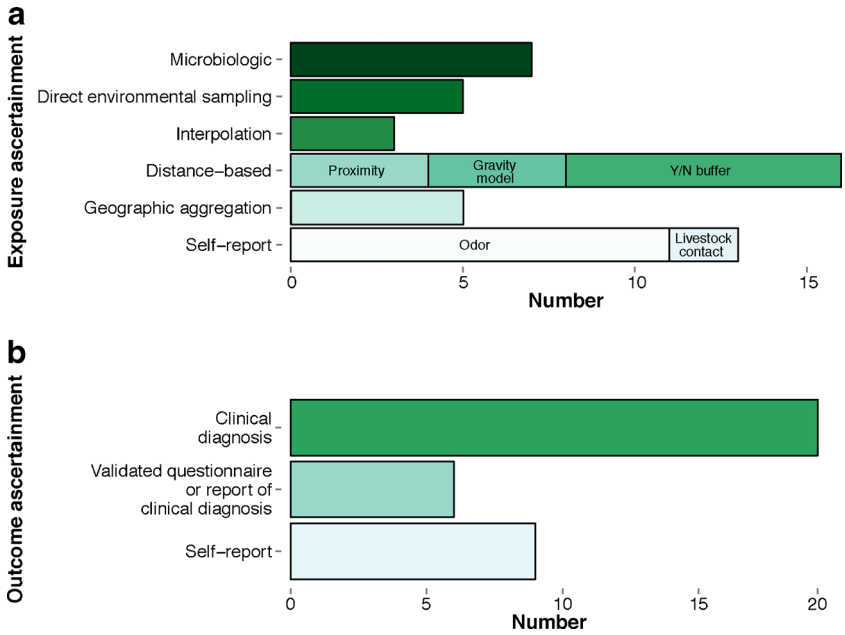

Fig. 2 Methods of exposure assessment and outcome ascertainment in reviewed health outcome research since 2000. **a** Main method of exposure assessment (n=33 studies); all are mutually exclusive except for self-report, which complemented other methods in many studies. **b** Main method of outcome ascertainment (n=33 studies); all are mutually exclusive

characterization, DNA fingerprinting, single-locus and multilocus sequence typing, DNA microarrays, optical mapping, and whole-genome sequence typing (WGST) [80]. The increased use of WGST is bound to improve our understanding of the relationship of microorganisms at the animal-human interface in the coming years. Its discriminatory power has already been shown in a number of retrospective outbreak investigations, but the technology still has to be translated from a research tool into one that is useful in routine surveillance programs and early warning systems.

Outcome Ascertainment

In studies reviewed, outcome ascertainment methods were less variable than exposure assessment. Researchers used just three types: self-reported outcome, self-report of clinical outcome or a validated questionnaire, or a medically documented clinical diagnosis (Fig. 2b). Clinical diagnoses were most common (18/33 reviewed studies) and the only method used for zoonotic pathogen research.

Empirical Work on IFAP and Health Outcomes

Respiratory Outcomes

A small number of studies in a few locations (Iowa [70, 76] and North Carolina [50•, 51, 55] in the USA, as well as northwestern Germany [32, 58] and the Netherlands [77]) have examined relationships between IFAP and the occurrence of respiratory outcomes in nearby residents or schoolchildren. All studies included swine operations, though some also included other animal species (chickens, cows, goats, sheep, and mink).

Assessed respiratory outcomes varied across studies. Most studies used self-reported wheeze/whistle, medication use or prescription, or asthma diagnosis, collected through questionnaires [32, 51, 55, 58, 70, 76]. Fewer studies also used objective clinical measurements of lung function, including forced expiratory volume in one second (FEV_1) and peak expiratory flow (PEF) or clinical diagnosis codes [32, 51, 58, 77]. A study of children attending schools near IFAP examined functional limitations (in the form of missed school or activity limitations) stemming from asthma symptoms [55].

With some exceptions, the limited available evidence suggests a relationship between exposures to air pollutants from IFAP and respiratory morbidity (Table 1). One strength of this small database includes the notion that using multiple variations of exposure assessment (proximity- or density/gravity-based, objective pollutant measurement, and subjective odor monitoring) yields generally consistent relationships between exposures and outcomes related to asthma (diagnosis, wheeze, and medication use). Another strength is that many of the observed effects (asthma, wheezing, and COPD) are consistent with those seen in hog confinement workers who are more highly exposed [81]. Despite these strengths, some limitations exist, especially in regard to study design; the majority of the studies available are cross sectional. Only one prospective cohort study of respiratory outcomes was identified [51], and while its findings were consistent with other findings, the overall confidence in the relationships would be bolstered with additional prospective studies. In addition, the literature has focused on swine, making it difficult to draw conclusions

Table 1 Summary of health outcomes and proportion of studies reporting an association between living near industrial food animal production and poor health outcomes

Health outcome	Study design	Proportion with greater than or equal to one significant association with IFAP	Weight of evidence	References
Respiratory				
Asthma	Observational/Cross sectional	3/4		[51, 58, 70, 76, 77]
	Longitudinal	1/1		
Wheeze	Observational/Cross sectional	2/4	Mostly consistent evidence of an association, stronger for asthma and lung function	[32, 51, 55, 58, 70]
	Longitudinal	1/1		
Lung function (FEV_1, PEF, and COPD)	Observational/Cross sectional	2/3		[32, 51, 58, 77]
	Longitudinal	1/1		
Allergic rhinitis	Observational/Cross sectional	1/3		[32, 58, 77]
Cognitive impairment	Experimental	0/1	Weak evidence of an association	[69, 87]
	Observational/Cross sectional	1/1		
Stress/Mood	Experimental	0/1	Sufficient evidence of an association	[52, 54, 59, 60, 69, 87, 88]
	Cross sectional	4/4		
	Longitudinal	2/2		
Quality of life and activities of daily living	Ethnography	1/1	Moderate evidence of an association	[27, 56, 57, 59, 71]
	Observational/Cross sectional	4/4		
Zoonotic disease				
MRSA	Observational	6/6	Sufficient evidence of an association	[62, 63•, 66, 68, 74, 75]
C. difficile	Observational/Longitudinal (humans) and Observational (swine)	1/1	Insufficient evidence of an association	[85]
Enterococcus	Observational	1/1	Insufficient evidence of an association	[64]
Q fever	Observational/Cross sectional	1/1	Sufficient evidence of an association	[72, 73, 79•]
	Longitudinal	2/2		
Birth outcomes	Ecologic	1/6	Insufficient evidence of an association	[65, 67]
Blood pressure	Observational/Longitudinal, short term	1/1	Weak evidence of an association	[50•]

about broiler, egg layer, cattle, and dairy operations with regard to respiratory health. Of the few studies that relied upon objective pollutant measurements to characterize exposure, H_2S and fine PM were found to be predictors of reporting chest tightness and wheeze, respectively [51]; a different study relying on interpolated estimates of measured ammonia concentrations did not find significant associations with wheeze [32].

Two other studies painted a blurrier picture of the relationship between IFAP and respiratory outcomes. One study which built upon an earlier investigation that did find significant relationships relied upon interpolated ammonia exposures from area monitors to assign exposure and did not find associations with wheeze or allergic rhinitis but did show a significant increase in allergen sensitization and a significant decrease in FEV_1 [32]. Another study in the Netherlands used electronic health records and multiple methods of farm pollution exposure assessment and found significant inverse relationships with asthma, allergic rhinitis, and COPD [77].

The European GABRIEL Advanced Studies have shown a protective effect against asthma and atopic sensitization for children who grew up on a farm that both raised cows and cultivated feed crops, though associations were less clear for atopy [82]. In contrast, research in Iowa found higher prevalence of asthma among children growing up on a farm raising swine (with an elevated effect for swine farms that use antibiotics), even among those with lower rates of atopy and personal histories of allergies [83]. Many studies of respiratory outcomes in our database did not account for farm contact/residence in assessment of relationships between respiratory outcomes and animal operations.

Zoonotic Diseases in Humans Living in Close Proximity to IFAP

IFAP is an enormous reservoir of zoonotic bacteria (including those resistant to important antimicrobials for human use) such as *Salmonella* spp., *Campylobacter* spp., *Escherichia coli*, and *Enterococcus* spp., *Coxiella burnetii*, *S. aureus* (including MRSA), and *Clostridium difficile*. Although food animals are the primary hosts of these microorganisms, they may also be present in IFAP workers and in the surrounding

environment, which could put people living in close proximity at risk for acquisition and infection.

In particular, *C. burnetii*, the cause of Q fever in humans, and MRSA have been increasingly recognized as important pathogens in people living near IFAP. Sheep, goats, and cattle are considered the most common reservoirs of *C. burnetii*, which is excreted in milk, urine, feces, and birth material from infected animals [84]. In the Netherlands, Smit et al. demonstrated a strong association between human Q fever and the number of goats within a 5-km radius of the residential address [73]. In another study of a large single-point source outbreak of Q fever in the Netherlands, Hackert et al. showed that most community cases were scattered downwind from the index farm and that the risk of *C. burnetii* exposure and development of Q fever increased with residential proximity to the index farm [79•]. Most recently, Hermans et al. demonstrated a strong spatiotemporal relationship between residential proximity to goat-manure-applied crop fields and human Q fever in the Netherlands [72]. Taken together, these studies support the conclusion that exposure to a contaminated environment is a primary source of Q fever in community settings.

Several studies from Europe have shown that the distribution of human cases of MRSA strains belonging to clonal complex 398 (MRSA CC398) is concentrated in rural areas where food animals are raised [62, 63•, 66]. Worryingly, a substantial proportion of these people have no direct animal contact, suggesting that MRSA CC398 is spreading from IFAP into surrounding communities [62, 63•, 66]. In Denmark, living in the same municipality as an IFAP worker with MRSA CC398 infection was associated with a 2.5-fold higher risk of developing an MRSA CC398 infection in the general population [63•]. It remains unclear how spread into the community occurs. While MRSA usually spreads through human-to-human contact, it is possible that other modes of transmission play a role, including spread via contaminated environmental media, pests, and fomites. A study from Germany found low numbers of MRSA CC398 in air samples (<15 bacteria/m^3) and on soil surfaces downwind of IFAP operations [8]. It is unknown, however, whether these concentrations are high enough to represent a risk for human acquisition and development of infection. In the USA, living in close proximity to IFAP operations and manure fields has been associated with an increased overall risk of MRSA infection and carriage [68, 74]. Nearby IFAP operations and manure fields were not sampled and MRSA isolates from the patient populations were not available for typing due to the retrospective study designs, thereby hindering molecular tracking of the source. In a prospective study, some MRSA types seemed to predominate in people living in close proximity to IFAP [75], but again, there was no sampling of local IFAP operations. US studies were unable to directly control for livestock contact and therefore did not exclude IFAP workers from the analysis. However, Casey et al. showed that adjusting for the prevalence of livestock workers at the community level did not change the results [74].

Only a few studies have investigated whether other microorganisms can spread from IFAP into the surrounding communities. In the Netherlands, Goorhuis et al. found that the human infections with *C. difficile* ribotype 078 were concentrated in more rural areas where pigs are raised and that isolates from pigs and humans were closely genetically related [85]. Kelesidis and Chow showed that daptomycin-nonsusceptible enterococci cases lived in close proximity to animal and crop operations in Los Angeles County, but this study did not attempt to track the source of these microorganisms [64]. Conversely, Odoi et al. found no link between cattle density or intensity of manure application IFAP and human *Giardia lamblia* infection in Ontario [86].

Few studies have directly measured the transmission of antibiotic-resistant zoonotic pathogens into communities proximal to livestock production. The most robust studies have been conducted on livestock-associated MRSA, and these show strong evidence for transmission to communities near IFAP. Additional studies are needed to assess the risk due to other pathogens resistant to clinically important antibiotics.

Cognitive Impairment, Stress, and Mood

Only two studies evaluated cognitive impairment from exposure to IFAP, providing weak evidence [69, 87]. In an experimental design, Schiffman et al. found no effect of acute (1 h) exposure to swine IFAP air (i.e., air containing elevated levels of H_2S, NH_3, PM, and endotoxin) compared to exposure to 1 h of clean air on attention, memory, or mood [87]. During short-term exposure, volunteers did experience increased headaches, eye irritation, or nausea. Kilburn et al. compared people living <3 km from a hog manure lagoon (n=25) to those living >3 km (n=22), to evaluate chronic exposure to IFAP, and found significantly more neurobehavioral abnormalities in those living <3 km [69]. They also reported worse moods (as measured by the Profile of Mood States, e.g., tension, depression, anger, vigor, fatigue, and confusion) among those living <3 km from manure lagoons. When restricting analysis to those <3 km from a lagoon, shorter distances to a lagoon were not associated with stronger effects, perhaps due to low power, unobserved confounding, or selection bias.

Several studies in the USA have evaluated the effect of exposures to swine IFAP on stress or mood, using cross-sectional [69], experimental [87], and longitudinal designs [52, 54]. Horton et al. used a community-based, longitudinal design among 101 participants living near swine IFAP operations and found self-reported odor, and directly sampled H_2S, and semivolatile PM_{10} were each associated with feelings of stress or annoyance and nervousness or anxiety [52]. In an earlier community-based study, Avery et al. had 15 participants living <1.5 mi from a swine operation take twice-daily

salivary samples after rating livestock odor and found evidence that exposure to odor reduced the function of the mucosal immune system (as measured by secretory immunoglobulin A) [54]. Although not directly measured, they hypothesized that this association was mediated by stress caused by odor exposure.

European studies have focused on odor annoyance due to exposure to livestock (i.e., swine, poultry, and cattle) and cross-sectional studies have consistently reported odor annoyance among participants living in areas with high livestock density [58–60, 88], with attenuated affects for those living or working on a farm [57, 59, 60]. Hooiveld et al. also noted that while self-reported symptoms (e.g., respiratory, gastrointestinal, and stress) were associated with higher self-reported odor annoyance, few participants sought health care services to resolve their concerns [88]. This finding highlights the importance of measuring symptoms directly or carefully selecting health outcomes for research that are available in the health care record.

Despite differences in exposure assessment, outcome ascertainment, and study design, six out of seven studies reported at least one significant association between IFAP exposure and cognition, mood, or stress, providing sufficient evidence of an association. Schiffman et al. did not observe any effects of an acute laboratory exposure, suggesting that chronic, unpredictable exposures are more salient [87].

Quality of Life

Three studies in the USA [27, 56, 71] and two in Europe [57, 59] have considered the relationship between odors from IFAP and quality of life. Four of the five studies assessed exposure by proximity to livestock operations and self-reported odor; one used modeled annual ammonia concentration at the household [59]. All studies used self-reported outcomes.

Wing et al. provided early evidence by interviewing 100 individuals in North Carolina who lived near swine or cattle operations and 55 who did not (N=155) [71]. Of all symptoms recorded, the greatest differences between communities were seen on quality of life questions; for example, those living within 2 mi of a swine operation reported being unable to go outside 15.4 times (on average) in the prior 6 months, compared to 2.1 times for those not living near an operation. Radon et al. assessed quality of life with the Short-Form 12 Health Survey (SF-12), a reliable and valid measure of physical and mental health in a variety of contexts. In analyses adjusted for factors like age, sex, schooling, and smoking, they reported a strong association between odor annoyance and reductions in physical and emotional SF-12 scores [57].

Blanes-Vidal et al. found evidence supporting a coping hypothesis: Odor leads to behavioral interference (e.g., disruption of lifestyle or unwanted changes in social behavior), mediated by annoyance perception [59]. In a Danish sample, they reported that modeled ammonia exposure was associated with increased odds of behavioral interference and health risk perception and that odor annoyance mediated 81 and 44 % of the relationships, respectively. Two community-based participatory research projects also found support for this hypothesis where residents living near swine operations commonly changed their activities, including social interactions, physical activities, and sleep, due to odor [27, 56]. Tajik et al. reported that even in the absence of odor, participants felt stress and anxiety regarding the potential impact to daily routines or embarrassment if guests were present when odor occurred [56]. Taken together, these studies provide moderate evidence that exposure to IFAP impacts activities of daily living or quality of life.

Other Studies

Two ecologic studies evaluated the effect of geographically aggregated livestock exposure on indices of infant health and mortality [65, 67]. Sneeringer conducted a time-series analysis using two decades of US, nationwide, county-level data on livestock numbers (i.e., beef, dairy, swine, and poultry) and infant births and deaths [67]. While accounting for county-level confounding variables, she found that a 100,000 head increase in livestock was associated with a 7.3 % increase in county infant mortality rate. No association was seen between livestock count and four birth outcomes: continuous birth weight, low birth weight, 5-min Apgar score, or preterm birth. The author proposed an underlying air pollution mechanism based on several secondary analyses. Similarly, Blake did not find an association between zip code-level counts of dairy cows in the San Joaquin Valley in California and birth weight but found cow density to be associated with higher nitrate levels in well water [65].

We also identified a single study of the relationship between air pollution from animal operations and blood pressure [50•]. Using a case-crossover design, Wing et al. found that, after adjusting for stress, increases in community H_2S measurements, but not PM, were significantly associated with rising systolic blood pressure. This finding provides support for a psychophysiological mechanism where stress from odor triggers physiological response.

Susceptibility/Vulnerability Factors

Certain populations, including the young and old, the immune-compromised, the uninsured, racial and ethnic minorities, and the poor and those living in deprived communities, are at particular risk of health effects from IFAP exposure. These susceptible or vulnerable populations may lack neighborhood resources necessary to buffer or avoid IFAP exposures [89]. Indeed, several studies have suggested that

livestock operations are more likely to be sited in communities of color or low socioeconomic status [55, 90–92]. This environmental injustice contributes to health disparities [93].

Aquatic Toxicology Studies

Animals living near IFAP experience similar exposures as humans. Aquatic toxicology studies, which describe effects in high-exposure animals, can inform us about IFAP-associated health risks in both human and animal populations. Several studies have evaluated the effect of steroidal hormones from beef cattle feedlot runoff on aquatic life [94–99]. The body of evidence suggests that androgens, specifically trenbolone acetate used to promote muscle growth in cattle and its metabolites 17α-trenbolone and 17 β-trenbolone, which appear relatively stable in manure [100], bind readily to fish androgen receptors [101] and have been detected in waterways near feedlots [95, 97, 99] and can cause problems in fish.

Leet et al. found that fathead minnows exposed to an IFAP effluent mixture for 45 days were significantly heavier and longer than the controls and further analysis revealed ovaries in the testes of 84 % of exposed males, compared to 0 % of controls [96]. In IFAP ditchwater-exposed wild fish, Leet et al. also observed lower species richness, faster growth, and worse reproductive conditions compared to reference site fish [95]. The authors reported a male-skewed sex ratio in fathead minnows exposed to IFAP ditchwater for their first 6 weeks of life (60.4± 3.3 % males in the IFAP-exposed group vs. 48.7±3.9 % males in control group). They did not detect an estrogenic effect (measured by vitelloeginin activity) in fathead minnows during a 7-day in situ exposure, suggesting that androgens might have a greater impact on aquatic life [95]. These ecotoxicological studies could have implications in humans reliant on impacted groundwater.

Methodological Issues in Community Health IFAP Studies

Access to Populations and Health Outcomes

IFAP is usually sited in rural areas, which have lower population densities, more diffuse health care, and a population that may have medical skepticism [102] or indirect involvement in IFAP [103], all of which present potential barriers to their involvement in research. Wing and colleagues in North Carolina have effectively used community-based participatory research [104] to engage community members in academic health research [27, 50•, 51, 52, 54, 56, 71]. In the USA, state and national agencies do not require reporting of most diseases associated with IFAP (with the exception of Q fever), so data acquisition on diseases of interest is challenging. Despite this barrier, most studies utilized a clinically diagnosed outcome (Fig. 2b). Casey et al. used data from the Geisinger Health System, which provides medical care in an area covering 69,000 km^2 to study associations of IFAP and MRSA infection [74, 75]. Databases available in several European countries also enabled studies on individuals dispersed across large geographies.

Exposure Characterization

In comparison to outcome assessment, access to information about IFAP is extremely limited. In the USA, swine and poultry operations are generally vertically integrated, privately owned, and inaccessible to researchers. Unlike in some European countries, almost no information exists about antibiotic type, quantity, or duration of use in US IFAP [105]. Most studies reviewed relied on self-report or distance-based exposure estimates, sometimes paired contemporaneously with self-reported outcomes, potentially biasing results of either or both measurements.

In addition, in the few studies that were able to measure environmental media, samples were restricted to indicator pollutants (e.g., H_2S, PM, or ammonia) or bacteria (e.g., MRSA) [27, 50•, 51, 52]. IFAP exposures are multifactorial, including not only air pollution but also water pollution, odor, and potential impacts on housing values [106] that might have additive, multiplicative, or nonlinear effects on health outcomes.

Establishing Causality

Randomized experiments allow causal inference by allowing us to assume that exposed individuals represent what would have happened to the unexposed if they had been exposed. However, in environmental health, randomizing people to a harmful exposure is not an option. In IFAP research, as in many observational studies [107], it might not be possible to fully account for individual-level characteristics, like income or education, that are also related to health and to living near IFAP (i.e., confounding bias). Additionally, sicker individuals or people with certain health behaviors might be more likely to live near to IFAP (i.e., selection bias).

To investigate how IFAP impacts health, researchers should take advantage of available data, natural experiments [108], and creative sensitivity analyses. Government agencies often collect wind data, which future studies should consider incorporating in distance-based models, since bacteria, antibiotics, and antibiotic-resistant genes are more common downwind from farms [8, 30, 31] and wind can affect the spread of air pollution and odor [25, 31, 109]. In a sensitivity analysis, Casey et al. assessed the odds of an MRSA infection in those living near a manure-applied crop field compared to those living near any crop field and found that risk was only associated with manure-applied crop fields [74]. For acute outcomes, researchers have used cases as their own controls in a short-term longitudinal design to reduce the number of necessary participants and to handle unmeasured confounders [27, 50•, 51, 52, 54, 87]. Long-term longitudinal designs to

establish temporality and reduce selection bias are another important step toward causal inference.

Discussion and Future Directions

Some important strides have been made in characterizing the public health burdens placed on communities by IFAP. We found sufficient evidence of an association between living near IFAP and respiratory outcomes, MRSA, Q fever, and stress/mood. To date, much of the existing epidemiologic literature describes investigations that follow on observational, cross-sectional design. While these studies are useful, more prospective studies, especially those that involve primary data collection for both exposures and outcomes, are needed to generate additional, stronger evidence.

In addition, characterization of chemical exposures typically involves measurement of a narrow set of indicator pollutants, while it is well understood that emissions from IFAP operations tend to be complex multipollutant mixtures [81, 110, 111]. More sophisticated approaches that examine the spatiotemporal patterns of mixtures and that may not track well with traditionally used indicator chemicals are needed [112]. Building on improvements in exposure characterization, novel approaches aimed at disentangling the contributions of individual contaminants and multicontaminant synergies within mixtures [113] should be applied in the context of IFAP. These techniques have increasingly been used in the urban context for air pollution research but may also be useful in evaluating exposures to rural mixtures.

Future studies should explicitly investigate community exposure through water pollution. Given the potential for land-applied animal waste to impact groundwater [65, 114–116], and the reliance of rural communities on these sources for drinking water [117], it is prudent to directly consider their potential contributions to morbidity and mortality.

One strength of the existing body of literature is that it includes community-driven studies [50•, 51, 55, 118]; these studies build upon established trust between researchers and communities by meaningfully involving community members to design, conduct, contextualize, and disseminate research [119]. Continued use of this approach holds promise for answering questions relevant to community-identified needs.

In the case of microorganisms, future investigations should not be limited to high-profile antibiotic-resistant pathogens like MRSA but should also include a broader range of potentially infectious microorganisms to quantify the total infectious disease burden borne by people living near IFAP. New studies should include samples from IFAP operations, environmental media, and people with and without direct livestock contact and use high-resolution DNA typing methods to identify the transmission pathways into the community and risk factors for human colonization and infection. In addition, emphasis should be placed upon clinically relevant health outcomes such as infection, rather than colonization, especially for microorganisms where the risk of infection given colonization is not well understood. This knowledge would inform evidence-based intervention strategies to control the spread of these microorganisms into the community.

Conclusions

We reviewed 33 studies of community exposure to IFAP and human health outcomes, 17 published since the last review was conducted in 2010. Residence near IFAP has consistent positive associations with respiratory outcomes, MRSA infection and colonization, Q fever, and stress/mood outcomes. Future research should improve exposure assessment through direct environmental sampling, taking into account pollutant mixtures, and continued efforts at community-based participatory research.

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Compliance with Ethics Guidelines

Conflict of Interest Joan A. Casey, Brent F. Kim, Jesper Larsen, Lance B. Price, and Keeve E. Nachman declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This review contains studies by Joan A. Casey and Keeve E. Nachman that used electronic health record data on patients for which IRB approval was received. The review also contains a study by Jesper Larsen and Lance B. Price that used electronic records on humans which was approved by the Danish Data Protection Agency.

This article does not contain any studies with animal subjects performed by any of the authors.

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