Economics 051 The Economics of North Carolina

Hog Farming and Lagoon Management in North Carolina: Economic and Environmental Effects on the North Carolina Fishing Industry

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Fishing in North Carolina is an extremely profitable industry. In a survey by the Enfo-online survey group, it is currently worth over \$1 billion dollars and recreational fishing activities bring in hundreds of millions of tourists to the state per year (Enfo). There are several outside threats to the fishing economy however, and a prominent one of these threats is pollution, specifically pollution originating from hog farms.

On the North Carolina coast, there are approximately 10 million hogs that produce 19 million tons of waste each year (Enfo). This creates a difficult situation for hog farmers because they have to decide how to use existing technology to rid their pens and pastures of a large amount of excrement that grows about 40% per year (Enfo).

Currently, the majority of hog farmers use lagoon (an open air cesspool) and/or spray-field (spray fertilizer) technology (Environmental Defense.org). This is problematic because these forms of technology have become outdated compared to the recent Environmentally Superior Technology. The old forms of lagoon and spray-field waste containment are environmentally dangerous because so many unpredictable occurrences are possible. The equipment could malfunction, a dam in the lagoon could break, and flooding could cause an overflow. In situations like these, externalities will be created and will specifically affect the fishing, both recreational and commercial.

In a perfect world, the hog farmers would simply update their technology to ensure that the least amount of pollution harms the environment; however, in actuality fishing and hog farming are both markets of perfect competition, and worry little about their responsibility to their surroundings. Due to a high level of competition, hog farmers concern themselves more with efficiency than cleanliness. Using the older, cheaper technology, hog farming is more profitable to that farm owner, and as long as he does not become a nuisance and practices ?due diligence? then hog farms can continue to pollute the environment.

The pollution impacts the surroundings by adding to amounts of nitrogen in the air, contaminating wells and fresh water streams, lakes, and rivers, and causing horrible odors that drift into the nostrils of downstream neighbors (Environmental Defense). Such externalities are harmful to the fishing industry because "fish, especially salmonid [game] fish, are very sensitive to water pollutants, and they will react increasingly unfavorably as the dissolved oxygen content of the water is lowered through pollution increase" (Enfo). Deoxygenation is when the water in a lake, river, etc. has become completely absent of free oxygen and water must have an adequate level of dissolved oxygen if fish are to thrive - without it they will die (Enfo). Nitrogen, ammonia, and hydrogen sulfide from hog waste contribute to the deoxygenating capacity of these wastes to the devastating effect on fish stocks in pollution incidents (Enfo). In order for commercial fishing to be possible, there has to be a surplus of fish, and as for recreational fishing, the water would have to be extremely healthy because game fish can only survive in the best aquatic conditions (Enfo). In other words, with the dissolution of oxygen in water and the presence of pollution, the fishing economy in North Carolina will profitably decline.

There are also health-defects that result from polluted streams and lakes. Drinking water becomes contaminated by the high concentrations of ammonia, nitrates, and methane emissions from lagoons and a large amount of these chemicals can cause cancer (Jacob, 13). Also, the fish that are contaminated by the pathogens in the excrement are especially harmful to the health of fishermen and fish-eaters because those pathogens can be passed from the body of the fish into the body of the human consuming it (Environmental Defense). Also, bacteria have been associated with skin problems and memory loss in humans (NCPIRG). Finally, another externality, the hog waste odors, also pollutes the air and decrease the quality of life for downstream fishermen.

If the North Carolina coast is highly polluted and odorous why would tourists spend their scarce resources, i.e., time and money, vacationing in the Carolinas when they could fly south to Florida and enjoy a cleaner environment? This example of opportunity costs is what will ail the fishing industry. The induced expenditures will drop and therefore not add any direct revenue to the circular flow within North Carolina. As mentioned before, tourism on the coast brings in huge numbers of people per year who will fish recreationally and spend money in sea food restaurants. If it is publicized that pollution due to hog feces is affecting the cleanliness of bodies of water they could potentially swim in and sea food they could potentially eat, tourists will sacrifice visiting NC instead and move to another vacation spot that has less environmental and health threats for their families.

In the event of lagoon flooding, dam break, or other malfunctions of that nature that would cause the waste to overflow into rivers and streams, fishing would be affected in a negative manner. However, an important aspect to consider as to the extremity of negative impact is the time of year. Tourism on the coast and fishing in general is more profitable during the summer months due to climate and recreational opportunities, therefore, the impact would be greater during warm months and less during cold months when fewer people from outside the state come anyway. If there was a flood during the summer, fisherman would simply move their activities away from the spill site, and tourists would move with the recreation. When a specific area is polluted, the tourists are more likely to pick an alternate location rather than canceling their vacation altogether, so for example, waste leakage near Kitty Hawk would most likely result in a higher amount of induced expenditures spent in Wilmington on recreation such as fishing (MMS).

For example, in 1999, Hurricane Floyd ravaged the east coast and temporarily turned the waters into a breeding ground for bacteria and a resting pool for animal corpses. Forty factory hog farms had lagoon breaches causing hog waste to flow into nearby rivers and streams (NCPIRG). According to Marlise Moody Taylor, the Director of Research at the North Carolina Department of Commerce Division of Tourism, visitation decreased slightly in similar situations in the past, but there has been no direct research to isolate the specific effects in the 1999 situation. But it is logical to assume that with the increased pollution and destruction, the recreational fishing expenditures dropped and that branch of the economy declined.

The impacts to the commercial fishing sector may be important for two reasons. First, the northeast flowing Gulf Stream currents and the distance from shore make it very likely that a waste overflow would not reach the shore before being contained. In this case, the tourism impacts would be minimal while the commercial fishing impacts could still be substantial. Second, the multiplier effects of a dollar loss in fishing sales are higher than those in the tourism sector. The larger multipliers are because most fishing sales are retained as personal income, and relatively few inputs are imported from outside the region? (MMS).

Clearly, the economic impact of tourism directly affects the fishing industry and when pollution drives down tourism, all revenue from out of state, the induced expenditures, is driven down. So in order for the fishermen to retain a profitable business, they should attempt to reach a satisfactory situation with the hog farmers.

In the year 2000, Mike Easley negotiated a deal between Smithfield Foods and Premium Standard Farms where they would donate almost \$20 million dollars to research environmentally superior technology to replace the lagoons and spray fields. However, this agreement only impacted a few factory style hog farms because it was a decision based on good will and the individual farmer's discretion (NCPIRG).

But what better way to force a business out of hesitation than negative publicity? By publicizing the negative effects of the pollution on the North Carolina economy, the fishing industry puts pressure on the hog farmers to act more responsibly. The negative publicity could convince NC legislators to implement legislation that would require hog farmers to use the Environmentally Superior Technology.

Another option would be to grant a tax cut to those farms that updated in order to provide initiative for the switch. Lagoon and spray field technology is cheaper than the EST, so according to the concept of the free rider problem, the individual, in this instance the hog farmer, bears all the costs and only some of the benefits, and therefore, he isn?t legally required to act when the alternative to what he is currently practicing is beneficial to society. With the free-rider problem considered, the fishing industry should attempt to negotiate with the hog farming market in order to equalize the marginal benefits and costs using the basis of the Coase Theorem. Without negotiation, the hog farmers may continue to use property rights in order to exploit their resources to remain efficient. So although the economics of tourism and fishing have little to do with the success of hog farms, with negotiation the results will be beneficial to both farmers and fishermen because social costs are also private costs, and with the cleanup, the negative externalities such as the resulting odors and unhealthy environment can be significantly decreased with the new technology.

This process of negotiation is increasingly important to the NC fishing industry because although the number of factory hog farms is staying the same due to moratorium and legislation, hog farms are becoming more profitable and expanding their business (MMS), and there is currently a 60% collapse within the fishing industry (Environmental Defense). With negotiation and possibly a switch to the EST, tourism would be consistent throughout the state of North Carolina and the 185,000 jobs that are created due to tourism (and the sections that are confined within commercial and recreational fishing) would increase (E.E.E.D.).

In conclusion, substantial research has proven that the 19 million tons of hog waste produced per year frequently seeps into the North Carolina environment impacting the freshwater streams, lakes, and rivers by dissolving oxygen and thus killing aquatic life. With the decline in fish population, commercial fishing profits subsequently drop due to a decrease in the previous surplus. Additionally, with the decline in all species of fish, game fish are especially prone to extermination because salmonid require extremely clean living conditions. When there is a plentiful amount of game fish, more recreational fishing will occur. This produces greater direct expenditures for the state and creates additional jobs for residents within North Carolina. Without negotiation between the hog farming industry and the fishing industry in the immediate future, negative externalities on the environment will result in a decline of induced spending by tourists and an overall decline in state revenue.

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