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NatAgLaw@uark.edu | (479) 575-7646

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In Arkansas Which Comes First, the Chicken or the Environment?

by

John T. Holleman

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IN ARKANSAS WHICH COMES FIRST, THE CHICKEN OR THE ENVIRONMENT?

JOHN T. HOLLEMAN*

I. INTRODUCTION

The successful campaign of the former governor of Arkansas, President Bill Clinton, focused the nation's attention on the small southern state. With a total population no greater than many cities, Arkansas has enjoyed and maintained a rural atmosphere. However, as rural America was transformed in immutable ways by the industrial revolution, Arkansas has recently been changed by an innocuous little bird. That bird is the chicken.

* Associate in the Bryant, Arkansas office of Boswell, Tucker & Brewster. L.L.M., 1992, Environmental Law, Tulane University Law School; J.D., 1990, University of Arkansas Law School; M.B.A., 1985, University of Central Arkansas; B.B.A., 1984, Arkansas Tech. University.

The issue has developed into a classic environmental morality play. On one hand, there exists a thriving industry providing jobs, big salaries, and tax revenues. On the other, there stands a near pristine environment being slowly but surely destroyed. For example, on a daily basis the Arkansas poultry industry dumps 300 pounds of arsenic, and urine/feces equal to the daily waste generated by a population of eight million people, all absent treatment or regulation. Moreover, the pollutants mentioned are just two ingredients of a deadly mix that the Arkansas environment absorbs daily from poultry waste.

This paper examines how this environmental catastrophe has developed, and what can be done to correct the problem. The state has done little to address the problem, but federal remedies are available. Let us hope that they are brought into play soon. The damage caused to Arkansas' environment is likely great but hopefully reversible.

II. THE ARKANSAS POULTRY INDUSTRY

A. An Industry Overview

Arkansas is ranked among the top states in the nation in agricultural production. In 1990, the state produced 38.7 percent of the rice grown in the United States, and Arkansas is also a major producer of soybeans, cotton, wheat, hay, and oats.[1] The total value of these and other crops produced in 1990 totaled $1.6 billion.[2] Yet in 1990 alone, Arkansas generated poultry production valued at $1.84 billion.[3] The entire crop value of Arkansas, one of the top agricultural states in America, was therefore surpassed by poultry production.

Arkansas is the top broiler-producing state with 951.2 million birds.[4] Arkansas ranks sixth nationally in egg production and fourth in turkey production, generating 3.6 billion eggs and 22 million turkeys in 1990.[5] The cash receipts from these sales included $1.38 billion for broilers, $260.6 million for eggs, and $185.8 million for turkeys.[6] And 1990 was a bad year; poultry

1. ARKANSAS AGRICULTURAL STATISTICS SERVICE, ARKANSAS AGRICULTURAL EXPERIMENT STATION, ARKANSAS AGRICULTURAL STATISTICS 1990, 1-2 (July 1991) [hereinafter AASS].
2. *Id.* at 2.
3. *Id.*
4. *Id.*
5. *Id.*
6. *Id.*

receipts were down in 1990 by three percent from the $1.89 billion generated in 1989.[7]

This poultry production machine is making an incredible economic impact upon this poor southern state.[8] Over $1.3 billion was paid in direct salaries to employees of Arkansas poultry companies, and $1.4 billion was paid by these companies to the estimated 25,000 suppliers of the state's poultry industry.[9] Approximately 84,000 Arkansans work in the poultry industry—about one out of twelve members of the entire state's work force.[10] Taking into account the employees of poultry industry suppliers, one out of ten Arkansas jobs depends on the business.[11]

Arkansas ranks near the bottom of the nation in per capita income,[12] yet the average employee of an Arkansas poultry company earns in excess of $17,500 per year, including benefits.[13] More than 4,000 new jobs were created by the industry in the past year.[14]

The capital investment needed to provide the infrastructure for this industry is estimated at $2-3 billion.[15] To support this enterprise, the poultry industry "is [Arkansas'] largest single buyer of virtually every commodity in the state, from paper clips to eighteen wheelers; from south Arkansas pulpwood and timber, to east Arkansas feed grains; from natural gas and electricity to water and telephone service; from typewriters and computers to fenceposts and petroleum products."[16] This com-

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7. *Id.*

8. TYSON FOODS, INC., TYSON FOODS' COMMITMENT TO THE ENVIRONMENT (1992). Tyson Foods, Inc. is headquartered in Springdale, Arkansas and is the largest poultry processor in America. Tyson has 61 major facilities in 12 states and Mexico, and processes 1.3 billion chickens and produces 1 million hogs yearly. The company employs 47,000 people and has 6,000 contract poultry and hog growers.

Tyson produces more than 5,000 different food products, including poultry, beef, and pork. Because of Tyson's Mexican Original line of food products, the company is one of the world's largest manufacturers of corn and flour tortilla products. Founded in 1935, Tyson is a fairly young company that has grown to achieve annual sales of $4 billion in 1991. *Id.*

9. ARKANSAS POULTRY FEDERATION, IN ARKANSAS, THE CHICKEN AND THE EGG BOTH COME FIRST!.

10. *Id.*

11. *Id.*

12. *See, e.g.*, UNITED STATES DEPARTMENT OF COMMERCE STATISTICAL ABSTRACT OF THE UNITED STATES 1991, 461 (111th ed. 1991).

13. ARKANSAS POULTRY FEDERATION, *supra* note 9.

14. *Id.*

15. *Id.*

16. *Id.*

mercial trade has generated a large amount of local, state, and federal tax liability, thus making the poultry industry the state's largest taxpayer.[17]

Moreover, a shift in dietary habits of Americans from red meat to poultry has been a catalyst for this industry.[18] As health-conscious Americans become even more so, and Arkansas poultry producers expand into fertile overseas markets, there seems to be no end to the dramatic growth of this industry.[19] From 1971 to 1990, total farm value of Arkansas poultry and egg production increased 493 percent.[20] Further, poultry has historically been much cheaper than red meat, thus providing an economic incentive for consumption, in addition to the health benefits.[21]

Another factor stimulating dramatic growth in the poultry industry has been depressed prices in other segments of agricul-

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17. *Id.*

18. *Id.*

19. UNIVERSITY OF ARKANSAS COOPERATIVE EXTENSION SERVICE, 1990 ARKANSAS POULTRY PRODUCTION 4. "United States per capita consumption of total poultry in 1990 was 90.1 pounds . . . . 4.2 pounds more than in 1989. This change reflected a 1.1 pound-per-capita increase for broilers. Per capita consumption of turkey increased by 2.2 pounds . . . ." *Id.* Long-term increases in poultry consumption in this country are even more remarkable:

> During the period from 1960 to 1990, per capita consumption of "total poultry" increased from 34.0 pounds to 90.1 pounds; broiler consumption increased from 23.4 pounds to 69.9 pounds; and turkey consumption increased from 6.2 pounds to 18.1 pounds.
>
> Poultry as a percentage of total meat consumed per capita has gradually increased its share from 11 percent in 1940 to 36 percent in 1990 . . . .

Id. By contrast, "per capita consumption of 'total red meats' was 162.5 pounds in 1990, down 4.9 pounds from 1989; 'beef and veal' consumption was down 2.2 pounds in 1990, and pork consumption was down 2.2 pounds . . . ." *Id.* From 1960 to 1990, per capita consumption of total red meats only increased from 161.0 pounds to 162.5 pounds; beef and veal consumption only increased from 91.2 pounds to 97.0 pounds; and pork consumption increased from 64.9 pounds to 68.3 pounds. *Id.*

The only facet of the poultry industry that is not showing a dramatic increase in demand is the consumption of eggs. Per capita consumption of eggs in 1990 was 233.9, down 2.1 from 1989. From 1950 to 1990, per capita consumption of eggs has dropped from 389.0 (1950) to 233.9 (1990). This is a decrease of 155.1 eggs in the 40 year period. *Id.*

20. *Id.* at 2.

21. *Id.* at 4.

> A significant factor in the long-run increase in per capita consumption of poultry has been highly competitive retail prices of poultry as compared with retail prices of red meats. In 1990, the average price of ready-to-cook broilers was 89.9 cents a pound. In comparison, the average price of retail cuts of choice grade beef was $2.81 a pound, over three times the price of broilers; and the average price of retail cuts of pork was $2.13 a pound, over two times the price of broilers.

Id.

ture. The row crop agricultural sector has been adversely effected by low prices caused by overproduction.[22] This has generated interest in poultry production by row crop farmers in Arkansas and other areas of the nation.[23] These farmers have been shifting from row crop farming to poultry production.[24]

B. Poultry Farming Methods

Poultry is produced via a set of business relationships similar to the franchisor-franchisee relationship. The "integrator" is the poultry company which provides chicks, feed, medication, and management supervision.[25] An individual farmer provides the land, housing, equipment, fuel, electricity, litter base, and labor.[26] Under this contractual relationship the integrator retains title to the poultry, then collects and transports the mature birds to the processing plant.[27] The farmer is then paid for his labor, management, and investment. Some farmers also operate egg production and hatching facilities.[28]

The number of birds concentrated on small poultry farms is amazing. An average broiler house will contain 15,000-20,000 chickens.[29] The industry averages 2.3 houses per farmer but many have four or more.[30] These houses are generally within a few feet of each other, and there will be farm after farm after farm with the same operational set-up. Broilers are cycled through the houses every six weeks, as the young chicks mature into fully grown birds.[31] Two weeks pass before the next load of chicks is transported to the farmer.[32] Before the next load of chicks can be delivered to the house by the integrator, the poultry farmer must remove the accumulated litter from the floor of

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22. DR. T. LIONEL BARTON, COOPERATIVE EXTENSION SERVICE, UNIVERSITY OF ARKANSAS, THE INTEGRATED POULTRY INDUSTRY 3 (1987).

23. *Id.*

24. *Id.*

25. *Id.*

26. *Id.*

27. *Id.*

28. UNIVERSITY OF ARKANSAS COOPERATIVE EXTENSION SERVICE, *supra* note 19, at 22. In 1990 Arkansas produced 951.2 million broilers, 22.0 million turkeys, and 18.2 million chickens other than broilers. Broilers comprise the vast majority of poultry production in Arkansas. *Id.*

29. Telephone Interview with Claud Rutherford, Executive Vice-President, Simmons Industries (June 17, 1992).

30. *Id.*

31. *Id.*

32. *Id.*

the house by simply scraping it up.[33] Usually the litter is then land applied to the poultry farmer's pasture land or sold to another farmer who spreads it on his own land.[34]

C. The Geographic Concentration of the Industry

Poultry and egg production in the United States is primarily centered in the South. Arkansas, Georgia, North Carolina, Alabama, and California were the top five states in 1990 cash receipts.[35] Arkansas produced 12.3 percent of total U.S. cash receipts from poultry and eggs.[36] Within Arkansas, poultry production is concentrated in Benton and Washington counties.[37] These counties house 22 percent of the state's total production but represent only 3.44 percent of the state's total land area.[38]

From a geologic standpoint, the center of the poultry industry could not be placed in a worse area. These two counties are located in the Ozark Highlands region of the state. This area is

> noted for its mountainous terrain with steep gradients and fast-flowing, spring-fed streams. A large percentage of the streams from within this region are designated as extraordinary resource waters. The fractured limestone geology of the region allows a direct linkage from surface waters to groundwaters. Numerous incidents involving spills or discharges of contaminants have been traced directly through groundwater channels only to resurface in one of the many springs throughout the region.[39]

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33. D.R. Edwards & T.C. Daniels, *Environmental Impacts of On-Farm Poultry Waste Disposal—A Review*, 7 (unpublished manuscript, University of Arkansas) (on file with the *Tulane Envtl. L.J.*). It is important to note that there is a distinction between the terms poultry "litter" and poultry "manure." Poultry litter is the material used by poultry for bedding during the production cycle. This litter material is typically sawdust, wood shavings, wheat straw, peanut hulls, or rice hulls. Of course, during production, poultry manure is mixed with the litter. To clean out the manure, the bedding materials must also be removed. *Id.* at 4.

Poultry "manure" is the pure excrement from the birds. Poultry manure contains less carbon and iron than poultry litter, but more nitrogen, phosphorous, chlorine, calcium, nitrogen, copper, and zinc. *Id.* at 5.

34. *Id.* at 3.

35. UNIVERSITY OF ARKANSAS COOPERATIVE EXTENSION SERVICE, *supra* note 19, at 1.

36. *Id.*

37. *Id.* at 17-20.

38. Edwards and Daniels, *supra* note 33, at 2.

39. ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY, ARKANSAS NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM 6, Oct. 1991 [hereinafter ADPC&E]. "Extraordinary Resource Waters" are defined as a "combination of the chemical, physical and biological characteristics of a waterbody and its watershed which is

These fast-flowing streams provide some of the finest smallmouth bass fishing and canoeing opportunities in the nation.[40] The region is also known for its breathtaking beauty and its wild turkey, deer and black bear populations. Once-native elk have been reintroduced just west of the region, and plans are underway to restore ruffed grouse populations.[41] The Arkansas Department of Pollution Control and Ecology (PC&E), however, noted that

> within this region are some of the highest animal production rates in the United States, specifically chickens, swine, and cattle. Recent findings indicate that approximately thirty million pounds of animal manure are excreted daily in the Washington/ Benton County area alone. In terms of a human population equivalency based on typical domestic wastewater values, these values would equal a population of over eight million people. The waste generated from this animal production is generally land applied and, therefore, has the potential for contaminating both surface and groundwaters. The nitrate levels measured from this region are very high and few, if any, streams consistently meet the primary contact recreation standard.[42]

An area unsurpassed in natural beauty is now swimming in a sea of animal manure.

III. ENVIRONMENTAL IMPACTS OF POULTRY PRODUCTION

A. General Impacts

The magnitude of the manure problem in Arkansas is almost beyond belief. A table best illustrates the scope of the problem:

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characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential and intangible social values."

40. The environmental degradation spawned by the poultry industry is damaging these opportunities at the same time the public becomes more aware of the problem due to President Bill Clinton's campaign and election. "When national publicity first began to spread a few weeks ago that the tributaries of the White River in northwest Arkansas were polluted with chicken waste and hog waste, Gaston's Resort on the White River at Lakeview had two or three cancellations of reservations from out-of staters." *The Insider: Tourism Trouble*, ARK. TIMES, June 4, 1992, at 3.

41. Interview with Dr. Dave Urbston, Assistant Division Chief, Research, Arkansas Game and Fish Commission (Mar. 23, 1992).

42. ADPC&E, *supra* note 39, at 6.

TABLE 1

Estimated Tons of Manure, Nitrogen (N), Phosphorus (P), and Potassium (K) Generated Daily From Animal Manure[43]

Animals	Animal Units	Manure*	N*	P*	K*
Beef Cattle	1,549,280	48,028	333.0	70.0	178.0
Dairy Cattle	62,000	2,635	11.5	2.1	6.2
Swine	109,480	3,777	24.6	9.3	13.7
Poultry	192,000	5,100	82.8	38.5	33.7

(*Tons per day).

The massive amounts of nitrogen, phosphorous, and potassium generated by this manure can have a serious detrimental impact on the environment. When the wastes are not properly managed, these chemicals are washed away by way of surface runoff.[44] The concentrations of these chemicals can be quite high, resulting in environmental impacts including

> enrichment of lakes and ponds [generating] excessive growth of algae causing taste, odor, and aesthetic problems and decreasing the value for water supply and recreation. Fish can be killed in ponds with serious algae problems. Opportunities for fishing can be reduced. Decaying algae and other plans [sic] deplete dissolved oxygen supplies, thus suffocating fish. High levels of nitrate in groundwater used for water supply can cause methemoglobinemia, a blood disorder in infants, also known as "blue baby disease."[45]

To exacerbate this problem, it is difficult to estimate the concentrations of nitrogen, phosphorus, and potassium that reach ground and surface waters.[46] The concentration of pollutants resulting from improper manure management practices will vary based on the kind and amount of manure, the bedding and feeding practices, the disposal methods, and the location of disposal activity with respect to soils, surface water and rainfall.[47] For example, from 10 to 20 percent of the nitrogen and phosphorus in manure which has been spread on frozen or snow-covered fields can be washed away in runoff from rains and snowmelt.[48]

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43. *Id.* at 45.
44. *Id.*
45. *Id.*
46. *Id.* at 46.
47. ADPC&E, *supra* note 39, at 46.
48. *Id.* Animal manures can be an excellent source of natural fertilizer, however:
> Proper application of manure to the land is conservation in the best sense. Animal manures are applied to agriculture lands to promote plant growth,

In addition to the chemical dangers, fecal coliform bacteria are present in the excrements of all warm-blooded animals.[49] These bacteria present health risks to humans swimming in or consuming the contaminated waters.[50] Further, other harmful organisms often accompany fecals, since "bacteria, viruses, protozoans, and fungi are among the potential pathogens."[51]

Poultry production also generates large amounts of solids, volatile solids, biochemical oxygen demands (BODs), and chemical oxygen demands (CODs).[52] Per 1,000 pounds of live weight, poultry produce the following on a daily basis: 13.9 pounds of total solids; 10.8 pounds of volatile solids; 3.4 pounds of BODs; and 12.5 pounds of CODs.[53] Moreover, poultry manure generates tremendous amounts of heavy metals as the following table illustrates:

TABLE 2

Metals Produced Daily in Poultry Manure[54]

Heavy Metal	Manure mg/kg	Pounds Per Day
Manganese	304	3100
Iron	320	3300
Copper	53	540
Zinc	354	3600
Arsenic	29	300

Converting the metals from mg/kg into pounds per day, based on the 5100 tons of poultry manure produced daily in Arkansas, clearly illustrates the massive amounts of deadly metals that are being disseminated daily into the environment. It would appear logical that these enormous discharges would fall under the hazardous waste provisions of the Resource Conservation and Recovery Act (RCRA). However, agriculture wastes used as

improve soil structure, and to safely dispose of "wastes." Before supplies of synthetic nitrogen fertilizers became readily available, manure was a major source of nitrogen for crop production and animal manure was highly prized. A cropland management program properly using animal manure increases soil organic matter and improves soil structure. Soil with improved structure allows water to infiltrate, thereby reducing runoff, erosion, and loss of nutrients.

Id.

49. *Id.* at 45.
50. *Id.*
51. *Id.*
52. *Id.* at 44.
53. *Id.*
54. Edwards & Daniels, *supra* note 33, at 56.

fertilizers are excluded from Subtitle C of RCRA which identifies hazardous wastes.[55] Yet a toxicologist for the EPA has stated that "arsenic is a known carcinogenic agent that when inhaled can cause cancer in humans, particularly lung cancer."[56]

Dead birds are another enormous source of pollution generated by poultry production.[57] Mortality for broiler production is three to five percent over the production cycle.[58] This equals about 0.1 percent per day.[59] However, in times of extreme weather conditions or health problems, mortality may be as high as 0.25 percent per day.[60] With the 951.2 million broilers produced in Arkansas in 1990, mortality would equal about 28.5 to 47.5 million birds per year.

With all of this pollution, it does not take much of a mental leap to realize the deleterious effects on the environment. Very few streams in northwest Arkansas consistently meet the primary contact recreation standard.[61] Numerous stream segments in the region have been listed as impaired by confined animal operations:[62]

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55. 42 U.S.C. §§ 9601-75 (1990 & Supp. 1992). *See* 40 C.F.R. § 261.4(b)(2) (1989), which lists:

> (b) *Solid wastes which are not hazardous wastes.* The following solid wastes are not hazardous wastes:
>
> (2) Solid wastes generated by any of the following and which are returned to the soils as fertilizers:
>
> (i) The growing and harvesting of agricultural crops.
>
> (ii) The raising of animals, including animal manures.

See also Randolph L. Hill, *An Overview of RCRA: The "Mind-Numbing" Provisions of the Most Complicated Environmental Statute*, 21 ENVTL. L. REP. 10254, 10261 (1991). (Similarly, agricultural wastes used as fertilizers are exempt.). Further, agricultural wastes do not fall under the solid waste provisions of RCRA. *See* 40 C.F.R. § 257.1(c)(1) (1989).

56. Timothy Rogers, *Corning Inc. To Pay $1.83 Million Fine*, CENTRE DAILY TIMES, March 13, 1992, at 1A. Corning, Inc. was forced to pay a $1.83 million fine due to their releases of arsenic in Pennsylvania. The fine was the largest ever paid in the EPAs Mid-Atlantic Region for a violation of the emissions standards for hazardous pollutants. *Id.*

57. Edwards & Daniels, *supra* note 33, at 8.

58. *Id.*

59. *Id.*

60. *Id.*

61. *See* ADPC&E, *supra* note 39, at 6. *See also* REGULATION ESTABLISHING WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF ARKANSAS 7 (1991). "Primary contact recreation" is defined as:

> This beneficial use designates waters where full body contact is involved. Any streams with watersheds of greater than 10 mi^2 are designated for full body contact. All streams with watersheds less than 10 mi^2 may be designated for primary contact recreation after site verification.

Id.

62. *See* ADPC&E, *supra* note 39, at 19-28.

TABLE 3
SELECTED WATERS IMPAIRED BY AGRICULTURE

Nonpoint Source Pollution

Stream	Use Not Supported	Cause	Probable Subcategory
Little Sugar	swimmable	nutrients	confined animal
Flint Creek	swimmable	bacteria	confined animal
Osage Creek	swimmable	bacteria	confined animal
Clear Creek	swimmable	bacteria	confined animal
Illinois River	swimmable	bacteria	confined animal
Baron Fork	swimmable	bacteria	confined animal
Terrapin Creek	swimmable	bacteria	confined animal
Long Creek	swimmable	bacteria	confined animal
Dry Creek	swimmable	bacteria	confined animal
Crooked Creek	swimmable	bacteria	confined animal
Bear Creek	swimmable	bacteri	confined animal
Buffalo River	swimmable	bacteria	confined animal
West Fork	swimmable	bacteria	confined animal
Kings River	swimmable	bacteria	confined animal

This is only a selected listing of streams impaired by confined animal operations. Furthermore, sixty-three percent of Arkansas streams have not been tested for pollutants and are listed as "unknown" in the water quality assessment.[63] No assessment has been done of lakes, groundwater or wetlands.[64] Yet groundwater contamination has occurred and is getting worse. Water wells in Washington County contain ten times the nitrate concentrations found in areas absent poultry production.[65] Many of these wells contain nitrates in concentrations as high as ten parts per million.[66]

B. Impacts on Fish

Fish populations have been dramatically impacted by poultry production according to state wildlife officials.[67] In particu-

63. *Id.* at 3.
64. *Id.* at 4.
65. Author's confidential source.
66. *Id.*
67. Interview with Stuart Woolridge, Biologist, Arkansas Game and Fish Commission (Mar. 23, 1992); *see also* Letter from James E. Johnson, Leader of Arkansas Cooperative Fish and Wildlife Research Unit, to John Holleman (Mar. 19, 1992) (on file with the *Tulane Envtl. L.J.*). Mr Johnson states:

> Our work in Logan Cave National Wildlife Refuge is to look at water quality specifically for threatened Ozark cavefish and a candidate species of troglobitic

lar, the smallmouth bass of northern Arkansas have suffered a great deal. The smallmouth live only in clear waters of the Ozark and Ouachita mountains.[68] These cool, clear and previously clean mountain streams and lakes are the only areas of the state where these fish thrive.[69] Moreover, "Arkansas' smallmouth streams are legendary throughout the country. Its blue-ribbon haunts in the Ozarks include Crooked Creek, Kings River, and the Buffalo River."[70] Each of these streams have segments listed as impaired by confined animal operations.[71]

Arkansas Game and Fish Commission (AG&F) Fisheries Research Biologist Steve Filipek has been studying smallmouth bass populations and streams since 1987.[72] No stream surveying had been conducted since 1950, so virtually nothing was known about current smallmouth populations.[73] It is important to study the population because, as Filipek states:

> Smallmouth bass, better than any other native sportfish, are excellent indicators of water quality and the integrity of a stream system. Many of the streams we looked at first were those that had the possibility of being dammed or were ones with pollution problems. . . . That's when we began to notice that we were having problems with things like gravel operations, channel modification, sewage and other forms of pollution and habitat degradation.[74]

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crayfish; gray bats also inhabit the cave but are probably less affected by water quality changes. We have a good idea of the recharge area for Logan Cave spring, and can calculate the land-use on that relatively small area. However, trying to relate high nutrient levels in Logan Cave spring to chicken rearing and litter spreading will likely be impossible. The reason is because gray bats deposit large amounts of guano in the cave during the maternity season, and the waters of the stream often inundate this extremely rich nutrient source. Because aquatic cave organisms have evolved in this type of habitat . . . any effects of additional nutrient loading will be difficult to isolate and even more difficult to determine the effect on the listed species.

68. Gregg Patterson, *What's Happening to Our Smallmouth Streams?*, ARK. GAME & FISH, Spring 1991, at 2.

69. *Id.*

70. *Id.*

71. ADPC&E, *supra* note 39, at 28.

72. Patterson, *supra* note 68, at 2.

73. *Id.*

74. *Id.* at 2-3. Gravel is prolific in smallmouth streams. Gravel operators simply drive up to the creek with a front end loader and a dump truck. They then dig gravel from the creek bed for a few days. This kills small aquatic organisms that live in the gravel by coating them with mud and silt. The mud and silt travel for several miles downstream, killing additional aquatic organisms besides those in the immediate vicinity of the site. There are no state regulations dealing with sand and gravel operations in-stream.

Another major problem for smallmouth has been the damming of their streams. In

There is also a problem with the direct dumping of poultry waste into nearby streams.[75] Direct dumping of wastes, as well as the common practice of spreading the manure in fields, leads to a heavy load of chemicals leaching into the soil and running off into the water.[76] The effects on smallmouth are dramatic. The fish are found with tumors or heavy parasitic infections.[77] Furthermore, nitrates from the litter reduce dissolved oxygen, causing fish kills.[78] Moreover, the increased nutrients cause blooms of blue-green algae.[79] These heavy loads of nitrogen are too much for the smallmouth to withstand.

The same is true for most of the food chain.[80] Patterson explained that a heavy load of nitrogen "makes the stream unstable . . . because you don't have a broad base of insects doing well. It's not just a minor, once-in-a-while thing. It's continuous. Every time it rains, more and more gets into the stream."[81] To make matters worse, the soil and every other part of the environment has been permeated by chicken manure. Patterson continued by emphasizing that "[the] whole northwest part of the state is so overloaded and has been for so long. If they stopped land applying [poultry waste] we'd probably still see the effects for years to come."[82]

It is a tragedy that one industry, virtually unregulated, has been allowed to destroy some of the nation's most pristine waters. The destruction of water quality leads to the slow eradi-

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the 1950s and 1960s large dams were built on the White River (Bull Shoals), the Little Red River (Greers Ferry), and on the Little Missouri River (Greeson). These streams were once premier smallmouth fisheries, but were wiped out for miles below the dam.

Smallmouth must also suffer from human as well as poultry waste. The Arkansas Department of Pollution Control and Ecology reports that "a high majority of the state's municipalities exceed pollution limits in their water discharge permits during the course of a year due to single event circumstances beyond their control, like flooding . . . . In the last six months of 1990, 21 percent were considered habitual violators."

Dams, gravel operations, municipal waste and poultry waste all diminish smallmouth habitat or pollute the habitat that remains. This intensifies fishing pressure. Streams which once commonly produced three to four pound smallmouth now have few fish greater than twelve inches. *Id.* at 4-6.

75. *Id.* at 6.

76. *Id.*

77. Patterson, *supra* note 68, at 6.

78. Dr. Paul B. Connerly, President of the American Public Health Association, said, "If the fish are dying, the people are not far behind." Bethany Probst, *If Fish Are Dying from Pollution, the People Can't Be Far Behind*, TAMPA TRIB., Apr. 23, 1970.

79. Patterson, *supra* note 68, at 6.

80. *Id.*

81. *Id.*

82. *Id.*

cation of the native fish species, especially sensitive species like smallmouth bass. As some Arkansas biologists have written: "[S]mallmouth are arguably our most esoteric native sportfish. We associate them with our purest, least disturbed mountain streams and greatly value their fighting ability. Conserving and enhancing our smallmouth fisheries should be a high priority."[83]

C. Impacts on Wildlife

Many general effects of poultry production are suffered by wildlife according to Dr. Dave Urbston of the AG&F.[84] These include habitat destruction from the building of poultry houses, increased traffic in rural areas to service the houses, terrible smells that generally degrade the environment, and the unsightly houses in areas of great natural beauty.[85] However, poultry production presents a more subtle and ominous threat to wildlife. This threat is disease.

Disease makes a two pronged attack on wildlife. First, manure spread in fields can carry disease and expose other types of wildlife.[86] Second, in the poultry growing process, large numbers of birds die for various reasons. The bodies are frequently placed in open pits or dumped on National Forest land.[87] Coyotes then eat some of the dead chickens or spread the bodies throughout the surrounding area.[88] This directly exposes native wildlife species to serious diseases that would not normally be present in the environment.

According to Dr. Urbston, wild turkeys and bobwhite quail are the birds most in danger of contracting disease from chickens.[89] Furthermore, AG&F is in the process of restocking ruffed grouse, which were once indigenous to Northwest Arkansas.[90] Poultry diseases could jeopardize this program.[91]

Chickens have been genetically engineered or inoculated to resist disease. However, wild birds may not have the same resistance. Despite the poultry's immunity, the fact that they simply carry the disease is dangerous to wild birds. Wild birds

83. *Id.*
84. Interview with Dr. Dave Urbston, *supra* note 41.
85. *Id.*
86. *Id.*
87. *Id.*
88. *Id.*
89. *Id.*
90. *Id.*
91. *Id.*

may have no such immunities and easily contract certain diseases when they are exposed. One of the worst diseases of this type is histomoniasis, which is commonly known as blackhead disease.[92]

Chickens are readily infected and are asymptomatic carriers of blackhead disease.[93] They infect other birds but rarely become sick or die themselves.[94] Also, earthworms transmit the disease by storing the cecal worm larvae, which carry the disease, in their bodies.[95] This occurs when earthworms feed on soil containing infected chicken droppings.[96] Turkeys, grouse, and quail then eat the worms. Turkeys and ruffed grouse develop severe symptoms and have high mortality rates.[97] Infected turkeys exceed a 75 percent mortality rate.[98] Bobwhite quail have moderate mortality rates.[99] The Field Manual of Wildlife Disease in the Southeastern United States (Field Manual) asserts that: "[b]ecause of the likelihood of losses to histomoniasis, introduction of carrier species into wild turkey habitat should be avoided."[100]

Infectious sinusitis is a respiratory and sinus disease carried by domestic poultry.[101] To date, the disease has been rare in wild turkeys.[102] However, increased contact with domestic poultry by wild turkeys could increase the frequency of the disease.[103] Contact with domestic poultry has been the genesis of

92. WILLIAM R. DAVIDSON & VICTOR F. NETTLES, FIELD MANUAL OF WILDLIFE DISEASE IN THE SOUTHEASTERN UNITED STATES 245 (1988). The disease is caused by a protozoan parasite and attacks the liver. *See also* Letter from Dr. Victor F. Nettles, Director of Southeastern Wildlife Disease Study Cooperative, to John Holleman (Mar. 20, 1992) (on file with the *Tulane Envtl. L. J.*). Dr. Nettles cites a recent study by a graduate student that found "litter from commercial breeder or layer operations would pose a significant risk [for blackhead disease]." *Id.* The study found that 533 out of 900 breeders (24/30 flocks) and 109 out of 900 layers (10/30 flocks) were positive for *Heterakis gallinarum*, the cecal nematode vector of blackhead disease. Washington County houses 1.1 million layers and almost 1 million breeders. Benton County is home to nearly the same amount. *Id.*

93. DAVIDSON & NETTLES, *supra* note 92, at 249.

94. *Id.*

95. *Id.* at 247-49.

96. *Id.* at 249.

97. *Id.* at 246.

98. *Id.* at 249.

99. *Id.* at 246.

100. *Id.* at 249.

101. *Id.* at 238.

102. *Id.* at 238, 240.

103. *Id.* at 240.

the disease each time it has been found in wild turkeys.[104] One wild turkey population crash has been attributed to the disease, and the turkey population has failed to recover.[105] The Field Manual warns that serologic monitoring shows southeastern wild turkeys are not involved in the spread or maintenance of the disease and "[infectious sinusitis] could have a substantial impact should it become established in native wild turkeys."[106]

Avian pox is another serious disease of wild turkeys which can be transmitted by domestic fowl and other birds.[107] The disease manifests itself by skin lesions on unfeathered areas of the head, legs, mouth, and upper respiratory tract.[108] These symptoms then cause vision problems, respiratory distress, emaciation, or weakness.[109] This disease is a major problem for wild turkeys in the Southeast, and localized areas have reported high mortality rates.[110]

A variety of other diseases can be transmitted to wild turkeys, quail and grouse. Avian cholera attacks domestic poultry and wild waterfowl.[111] But "wild turkeys undoubtedly are susceptible to infection and would be expected to develop disease if infected with virulent strains."[112] Coligranuloma diseases produce granulomas in visceral organs of wild turkeys.[113] Severe infections of tracheal worms in turkey poults can produce mortality, and roundworms and tapeworms are a nonfatal problem for wild turkeys as well.[114] External parasites are easily passed from domestic poultry to wild birds.[115]

It is clear that wild bird populations are at risk from poul-

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104. *Id.*
105. *Id.*
106. *Id.*
107. *Id.* at 235.
108. *Id.* at 235-36.
109. *Id.* at 235.
110. *Id.* at 237.
111. *Id.* at 241.
112. *Id.*
113. *Id.* at 243.
114. *Id.* at 251-52.
115. *Id.* at 253.

Wild turkeys commonly harbor a variety of ticks, mites, lice, and louse flies. Most infestations are not a health problem for turkeys, although very heavy tick infestations may cause poultry mortality in certain locales. The scaly leg mite produces lesions on the legs that resemble avian pox lesions, but this parasite is rare. Infestation of lice or their eggs may be readily noticeable when present in large numbers.

Id.

try disease. Manure spreading and carcass disposal must be regulated before a population crash of wild turkey or quail occurs. With some of these poultry diseases producing seventy-five percent mortality rates among wild birds, the potential for severe species damage is present.

IV. REGULATORY STRUCTURE OF THE POULTRY INDUSTRY

A. State & Federal Regulation

1. An Argument for Point Source Regulation

It would seem that an industry which produces, in just two counties, manure equivalent to eight million people daily and generates enormous quantities of chemicals, would be subject to stringent regulation. However, poultry industry wastes are subject to little regulation, and compliance is primarily voluntary. The vast majority of poultry waste is in the form of dry litter and dead birds. Dry litter is not regulated under any permitting program, and the regulations on dead bird disposal are ineffectual, because they do not require permits.[116] The regulations on poul-

116. ADPC&E, *supra* note 39, at 46. The Arkansas Livestock & Poultry Commission does have regulations for poultry carcass disposal. Arkansas Act 20 of 1989 provides:

ACCEPTABLE METHODS ARE AS FOLLOWS:

1. Cremation or incineration
2. Disposal pit
3. Composting of carcasses
4. Extrusion
5. Rendering
6. Cooking for swine feed

CREMATION OR INCINERATION AS A METHOD OF CARCASS DISPOSAL—

a. Controlled burn machine for the purpose of cooking carcass so as not to disseminate disease. This means cooking carcass until meat is rendered to ash.

DISPOSAL PIT AS A METHOD OF CARCASS DISPOSAL—

a. Must be at least 4 feet deep, (not exceeding 6 feet deep) and 3 feet wide.
b. Must be covered with concrete or wood with metal, to seal out H_2O and varmits [sic]. As many drop-holes as needed can be used.
c. Such pit shall not penetrate the water table.
d. Such pit shall be constructed in a manner that will prevent the disposal of "fowl carcasses" on exposed bedrock.
e. Such pit shall be constructed a minimum distance of 100 feet from the nearest water well or surface water.
f. Water and air pollution standards of the state of Arkansas will be followed as stated by the agreed upon memorandum of understanding by the Arkansas Livestock and Poultry Commission and the Arkansas Department of Pollution Control and Ecology. [*See infra* note 121].
g. Covers for drop pipe heavy enough so animals cant remove.

try carcass disposal have recently been amended to provide for on-farm freezing of dead birds.[117] Tyson Foods, Inc. has recently announced the expansion of its River Valley By-Prod-

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h. Flocks under 500 capacity — a post hole pit will be acceptable in lieu of a digestion pit or incineration.
i. In the event of a major die-off, a pit may be used that is 2 to 4 feet deep that will be covered by 2 feet of dirt daily. Lime may be used to control odor if needed.

COMPOSTING AS A METHOD OF CARCASS DISPOSAL—

a. Must be practically odorless.
b. Must be to where pathogenic bacteria are destroyed (150°F).
c. Carcasses must be reduced to nothing, only feathers and bones remaining. This takes about 10-14 days.
d. Operated to where fly larvae are not a problem.

EXTRUSION AS A METHOD OF CARCASS DISPOSAL—

a. Enough heat must be generated to render finished product pathogen free.
b. Carcasses, if moved off the farm, must be moved under "Carcass Moving Guidelines."
c. Permit required from the Arkansas Livestock and Poultry Commission.

RENDERING AS A METHOD OF CARCASS DISPOSAL—

a. Shall be done without odor contamination.
b. Area around rendering unit shall be maintained in a sanitary manner; that is,
   (1) No carcasses of any type being held over 24 hours.
   (2) No pools of contaminated material allowed.
   (3) Carcasses must be ground and temperature must reach 230°F.
   (4) End product stored in a clean area that is varmit [sic]-proof.
c. Carcasses, if moved off the farm, must be moved under "Carcass Moving Guidelines."
d. Permit required from the Arkansas Livestock and Poultry Commission.

COOKING FOR SWINE FEED AS A METHOD OF CARCASS DISPOSAL—

a. Temperature of 212°F must be maintained for 30 minutes.
b. Shall be done without odor contamination.
c. Area around cooking unit shall be maintained in a sanitary manner; that is,
   (1) No carcasses of any type being held over 24 hours.
   (2) No pools of contaminated material allowed.
   (3) End product stored in a clean area that is varmit [sic]-proof.
d. Carcasses, if moved off the farm, must be moved under "Carcass Moving Guidelines."
e. Permit required from the Arkansas Livestock and Poultry Commission.

POULTRY CARCASS MOVING GUIDELINES FROM FARM

1. Anytime poultry carcasses are removed from the farm, they must be moved under the "Poultry Carcass Moving Guidelines."
2. May be canceled in times of LT, AI or anytime state veterinarian deems necessary to stop disease spread.
3. Poultry carcasses must be placed in a leak-proof garbage dumpster that remains on the farm, then dumped into a sealed, leak-proof garbage truck; or can be sealed in leak-proof plastic containers to be placed in a sealed, leak-proof vehicle to be moved to the site of destruction.

1989 Ark. Act 20.

117. Arkansas Act 20 of 1989 provides:

Amendments To Regulations For Acceptable Methods Of Poultry Carcass Disposal

1. On-farm freezing will be added as an acceptable method of holding poultry

ucts facility to accommodate the recycling of dead birds, which are frozen for recycling.[118] The facility also recycles into animal feed the inedible parts of the approximately 600 million chickens annually processed at the twenty-eight Tyson plants in Arkansas, Oklahoma, and Missouri.[119] These plants alone produce twenty-five million pounds of poultry by-products each week, requiring 500,000 cubic feet of landfill space per week to accommodate this waste.[120] These massive amounts of by-products were simply dumped on land prior to the construction of the recycling facility.[121]

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carcasses until they can be disposed of in a proper manner as described in regulations.

2. In the event of a major die-off:
   a. Rendering will be the method of choice for disposal, except when death is caused by a disease entity.
   b. A ditch may be used when dug 2-4 feet deep and covered by at least 2 feet of dirt. Lime may be used to control odor if needed.

1989 Ark. Act 20.

118. Tim Taylor, *Recycling by the River*, ARK. BUS., June 29, 1992, at 25.

119. *Id.*

120. *Id.*

121. *Id.* Moreover, the dead birds were buried or simply dumped on the surface. This presented a massive source of possible water pollution. A memorandum of agreement has been entered into by the Arkansas Livestock and Poultry Commission and the PC&E in an attempt to further address the dead bird issue. The agreement states:

MEMORANDUM OF AGREEMENT

The Arkansas Livestock and Poultry Commission and the Arkansas Department of Pollution Control and Ecology hereby enter into agreement for the purpose of implementation of Act 168 of the 1985 session of the Arkansas General Assembly.

1. The Arkansas Department of Pollution Control and Ecology will continue to have authority to approve and permit all Class I, II, III and IV landfills in the State of Arkansas and for waste stream approval of wastes to be disposed of therein.
2. The Arkansas Livestock and Poultry Commission shall have approval authority for disposal of "fowl carcasses" in an "approved disposal pit" or by an "approved incineration" method as defined in the aforestated act provided that such authority in no way abridges the authority of the Arkansas Department of Pollution Control and Ecology to protect the environment and public health through the enforcement of State environmental laws.
3. The Arkansas Livestock and Poultry Commission shall have authority to approve such disposal pits under the following conditions:
   A. An "approved disposal pit" shall not exceed 6" feet [sic] in depth.
   B. Such pit shall not penetrate the water table.
   C. Such pit shall be constructed in a manner that will prevent the disposal of "fowl carcasses" on exposed bedrock.
   D. Such pit shall be constructed a minimum distance of 100' from the nearest water well or surface water.
4. Open pits for emergency disposal to accommodate a major die-off will require daily soil cover and lime application as necessary to control odor.

The Arkansas Department of Pollution Control and Ecology has a permitting program for animal wastes handled in liquid form.[122] However, none of the manure produced by broilers is managed in liquid form, and only a small percentage of manure from other types of poultry is handled by this method.[123]

With virtually no state regulation in place, it would seem that the federal government would step in and stop the massive and widespread pollution. After all, the objective of the Federal Water Pollution Control Act[124] (Clean Water Act) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[125] The Clean Water Act sets out two national goals to achieve this objective. The first goal is the elimination of the discharge of pollutants into navigable waters by 1985.[126] The second is that water quality be attained at a level to protect fish, shellfish, wildlife, and recreation.[127]

These lofty goals were to be achieved by waging a two-front war. The primary battleground has been point source pollution, which is prohibited absent a permit for the discharge.[128] The secondary fight has centered around non-point pollution, which

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5. The Arkansas Livestock and Poultry Commission shall have authority for approval of incineration in a manner that will produce emissions that do not exceed the "Air Quality Standards" as set forth in the "Arkansas Air Pollution Control Code."
6. The authority of the Arkansas Livestock and Poultry Commission for "approved incineration" shall be limited to approval of small incinerators with less than 200 lbs. per hour capacity.
7. The Arkansas Department of Pollution Control and Ecology will include, in its wastewater permitting requirements under Act 472 of 1949 as amended for poultry operations, the condition that "fowl carcasses" will be disposed of in a manner approved and in an area approved by the Arkansas Livestock and Poultry Commission.

TERMS AND DURATION

This Agreement becomes effective when signed by all parties. It may be terminated or modified by agreement of the parties and may be terminated by either party by giving sixty (60) days notice in writing to the other. Unless terminated by written notice, this memorandum will remain in force indefinitely.

Memorandum between the Arkansas Livestock & Poultry Commission and the Arkansas Department of Pollution Control & Ecology (on file with the *Tulane Envtl. L.J.*).

122. ADPC&E, *supra* note 39, at 46.

123. Telephone Interview with Charles McCool, Staff Engineer, State Permits Branch, Water Division, Arkansas Department of Pollution Control and Ecology (Mar. 24, 1992). Mr. McCool says that no broiler houses use liquid manure management systems and only about 33% of the egg production houses use this system. *Id.*

124. Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1389 (1992).

125. 33 U.S.C. § 1251(a).

126. *Id.* § 1251(a)(1).

127. *Id.* § 1251(a)(2).

128. *Id.* § 1311(a).

will be discussed later in this paper.[129]

The Act defines a point source as "any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, *concentrated animal feeding operation*, or vessel or other floating craft, from which pollutants are or may be discharged."[130] From the plain language of the definition, it would certainly seem that the large scale poultry production that occurs in northwest Arkansas would qualify as a "concentrated animal feeding operation." However, an analytic matrix set forth in the regulations determines whether an operation is concentrated animal feeding under the point source definition.[131] In

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129. *See infra* notes 154-82 and accompanying text.

130. 33 U.S.C. § 1362(14) (emphasis added).

131. 40 C.F.R. App. B (1992) requires that:

An animal feeding operation is a concentrated animal feeding operation for purposes of § 122.23 if either of the following criteria are met.

(a) More than the numbers of animals specified in any of the following categories are confined:
   (1) 1,000 slaughter and feeder cattle,
   (2) 700 mature dairy cattle (whether milked or dry cows),
   (3) 2,500 swine each weighing over 25 kilograms (approximately 55 pounds),
   (4) 500 horses,
   (5) 10,000 sheep or lambs,
   (6) 55,000 turkeys,
   (7) 100,000 laying hens or broilers (if the facility has continuous overflow watering),
   (8) 30,000 laying hens or broilers (if the facility has a liquid manure system),
   (9) 5,000 ducks, or
   (10) 1,000 animal units; or

(b) More than the following number and types of animals are confined:
   (1) 300 slaughter or feeder cattle,
   (2) 200 mature dairy cattle (whether milked or dry cows),
   (3) 750 swine each weighing over 25 kilograms (approximately 55 pounds),
   (4) 150 horses,
   (5) 3,000 sheep or lambs,
   (6) 16,500 turkeys,
   (7) 30,000 laying hens or broilers (if the facility has continuous overflow watering),
   (8) 9,000 laying hens or broilers (if the facility has a liquid manure handling system),
   (9) 1,500 ducks, or
   (10) 300 animal units;

and either one of the following conditions are met: pollutants are discharged into navigable waters through a manmade ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through

order to trigger point source permitting, either one of the two following criteria must first be met: First, more than 55,000 turkeys, more than 100,000 laying hens or broilers (if the facility has continuous overflow watering) or more than 30,000 laying hens or broilers (if the facility has a liquid manure system) must be present; or second, more than 16,500 turkeys, more than 30,000 laying hens or broilers (if the facility has continuous overflow watering) or more than 9,000 laying hens or broilers (if the facility has a liquid manure handling system) must be confined on the property in combination with other specified types and numbers of animals.[132] When it has been determined that the requisite number or combination of livestock are present, then either one of the following two conditions must also be met:

(1) pollutants are discharged into navigable waters through a manmade ditch, flushing system or other similar manmade device; or

(2) pollutants are discharged directly into U.S. waters which originate outside of and pass over, across or through the facility or otherwise come into direct contact with the animals confined in the operation.[133]

However, these two requirements will not be met if the discharges only occur in the event of a 25 year, 24-hour storm event.[134]

Although many Arkansas poultry operations would meet the numerical criteria of the federal regulations, few either discharge waste into navigable waters by a manmade ditch or flushing system, meet the "pass over" requirement, or have

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the facility or otherwise come into direct contact with the animals confined in the operation.

Provided, however, that no animal feeding operation is a concentrated animal feeding operation as defined above if such animal feeding operation discharges only in the event of a 25 year, 24-hour storm event.

The term *animal unit* means a unit of measurement for any animal feeding operation calculated by adding the following numbers: the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 25 kilograms (approximately 55 pounds) multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0.

The term *manmade* means constructed by man and used for the purpose of transporting wastes.

Id.

132. *Id.*

133. *Id.*

134. *Id.*

continuous overflow watering.[135] However, section 122.23 of the regulations allows the Director to designate an operation as a concentrated animal feeding operation on a case-by-case basis.[136] This regulation provides that:

> (1) The Director may designate any animal feeding operation as a concentrated animal feeding operation upon determining that it is a significant contributor of pollution to the waters of the United States. In making this designation the Director shall consider the following factors:
> (i) The size of the animal feeding operation and the amount of wastes reaching waters of the United States;
> (ii) The location of the animal feeding operation relative to waters of the United States;
> (iii) The means of conveyance of animal wastes and process waste waters into waters of the United States;
> (iv) The slope, vegetation, rainfall, and other factors affecting the likelihood or frequency of discharge of animal wastes and process waste waters into waters of the United States; and
> (v) Other relevant factors.
> (2) No animal feeding operation with less than the numbers of animals set forth in appendix B of this part shall be designated as a concentrated animal feeding operation unless:
> (i) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar manmade device; or
> (ii) Pollutants are discharged directly into waters of the United States which originate outside of the facility and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.
> (3) A permit application shall not be required from a concentrated animal feeding operation designated under this paragraph until the Director has conducted an on-site inspection of the operation and determined that the operation should and could be regulated under the permit program.[137]

An analysis of these factors indicates that these poultry operations should be designated as point sources by the Director.[138]

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135. Telephone Interview with Claud Rutherford, *supra* note 29.

136. 40 C.F.R. § 122.23(c) (1992).

137. *Id.*

138. However, poultry operations with less than the number of chickens set forth in

First, considering the size of the Arkansas poultry operation (about one billion birds), the amount of manure produced daily in Benton and Washington Counties alone (over 30 million pounds per day), and the human population equivalency of the manure produced (over 8 million people), it is clear that huge amounts of wastes are reaching the waters of the United States. Moreover, many of the local streams are not meeting the primary contact standard and have been designated as water quality impaired.[139] PC&E specifically lists the cause of the water quality violations as confined animal operations.[140]

An analysis of the second factor—the location of the animal feeding relative to waters of the United States—also mandates designation of these operations as point sources. For example, the Buffalo River is one of the streams threatened by the poultry industry. A segment of this river has already been designated as not meeting water quality standards because of confined animal operations.[141] This is one of the few remaining free flowing rivers in Arkansas, and the river is nationally known for its scenic beauty, fishing and canoeing opportunities.[142] Its first sixteen miles of headwaters lie in the Ozark National Forest and the rest of the river lies within the boundaries of the Buffalo National River.[143] The Buffalo River was established as a national scenic river pursuant to the 1972 National Wilderness Act.[144] The damage occurring to national waters could not be more clear.

The third analytic factor also mandates the designation of these wastes as point source pollution. It focuses on the means of conveyance of animal wastes into waters of the United States.[145] These wastes are deliberately spread over fields in disregard of the capacity of plants and soil to absorb the chemicals:

Appendix B to Part 122 will have to meet at least one of the three additional requirements given in §§ 22.23(c)(v)(2)(i), (ii) and 122.23(c)(3). These poultry farms must discharge pollutants through a manmade ditch, flushing system, or similar manmade device, or meet the "pass over" requirement. Moreover, the Director must conduct an on-site inspection of the operation and determine that the operation should and could be regulated under a permit program. 40 C.F.R. § 122.23(c). These additional requirements will make it nearly impossible to get the smaller poultry farms designated as point sources.

139. ADPC&E, *supra* note 39, at 6, 28.

140. *Id.* at 28.

141. *Id.*

142. *Id.* at 25.

143. *Id.*

144. *Id.*; *see also* Jack Curry, Jr., *Buffalo River Offer Paddlers Sights, Thrills*, THE TIMES-PICAYUNE (New Orleans), Apr. 1, 1992, at D-1.

145. 40 C.F.R. § 122.23(c)(1)(iii).

> Major constituents of animal manure include nitrogen, phosphorus, and potassium compounds. These are present in relatively high concentrations and where animal manure is not properly managed (i.e., properly stockpiled, incorporated into the soil, or spread) the potential for high nutrient concentration in surface runoff is great. Even with proper land spreading based on soil types and soil incorporation methods, concentrations of manure applied per acre must be carefully controlled to prevent excessive leaching of nutrients into groundwater resources.[146]

Until recently, there has been no careful management of this manure. Also "direct dumping of poultry waste into streams"[147] has occurred. Taken together, these two factors mandate that these operations be permitted as point sources.

The fourth factor the Director should consider in determining whether a feeding operation qualifies as a point source is the slope, vegetation, rainfall and other factors affecting the likelihood or frequency of the discharge of animal wastes.[148] Under this factor, it is absolutely clear that most Arkansas poultry operations should be designated as point sources of pollution. The center of the Arkansas poultry industry is in the Ozark Highlands Region, which is known for its mountainous terrain and steep gradients.[149] To make matters worse, the area has fractured limestone geology, which allows a direct linkage from surface waters to groundwaters.[150] Discharges move almost directly into groundwater and resurface in local springs.[151] The geology of the region necessitates strict point source controls. Until these controls are implemented, the environment of this region will be severely jeopardized.

One commentator has pointed out that the common ranching practice of providing cattle with "watering holes" along streams is probably point source pollution.[152] These locations

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146. ADPC&E, *supra* note 39, at 45.

147. Patterson, *supra* note 68, at 6.

148. 40 C.F.R. § 122.23(c)(1)(iv).

149. ADPC&E, *supra* note 39, at 6.

150. *Id.*

151. *Id.*

152. Richard Braun, *Emerging Limits on Federal Land Management Discretion: Livestock, Riparian Ecosystems, and Clean Water Law*, 17 ENVTL. L.J. 43, 71 n. 88 (1986).

> An alternative practice is to provide cattle with direct access to a small length of stream that has otherwise been fenced to keep the cattle out. These areas are known as "water gaps." Both "sacrifice areas" and "water gaps" are analogous to "concentrated animal feeding operations" and probably qualify as point

are known as "sacrifice areas" because of the cattle's continuous trampling, urination and defecation.[153] This creates filthy surroundings, which are comparable to the areas in and around poultry house operations. The poultry houses may not be located directly on the stream, as are watering holes, but the houses may be built quite close to the stream. Also, there may be many poultry houses on one small tract of land. Therefore, many "sacrifice areas" may be present with poultry operations. While in ranching there may be only one "watering hole" for several miles of stream, the poultry industry will generate thousands of "sacrifice areas" all along the stream and its basin.

2. An Argument for Nonpoint Source Regulation

While point source pollution has been reduced in the United States (or at least controlled), nonpoint source pollution[154] has grown out of control.[155] A 1984 report ranked nonpoint source pollution as a major cause of *all* water pollution in a majority of states.[156] Agricultural states like Arkansas have slowly come to terms with the nonpoint source problem and are attempting to take corrective action. However, this action was delayed until the 1987 amendments to the Clean Water Act.[157] Prior to 1987, section 208 of the Clean Water Act controlled nonpoint source pollution by asking states to identify nonpoint sources and attempt to control these sources.[158] This provision created a voluntary program with inadequate federal funding.

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sources subject to Clean Water Act permit requirements. No court has yet addressed this question . . . . If "sacrifice areas" and "water gaps" are point sources, their operation without permits may be enjoined by citizens pursuant to the Clean Water Act. *Id.* (citations omitted); *see also* 33 U.S.C. § 1365 (1982) (providing for citizen suits).

153. Braun, *supra* note 152, at 43, 71 n.88.

154. ADPC&E, *supra* note 39, at 2.

[Nonpoint source pollution] is caused by diffuse sources that are not regulated as point sources and normally is associated with agriculture, silviculture and urban runoff from construction activities, etc. Such pollution results in the human induced alteration of the chemical, physical, biological, radiological integrity of water. In practical terms, nonpoint source pollution does not result from a discharge at a specific single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition, or percolation.

Id.

155. Robert D. Fentress, Comment, *Nonpoint Source Pollution, Groundwater, and the 1987 Water Quality Act: Section 208 Revisited?*, 19 ENVTL. L.J. 807, 808-09 (1989).

156. *Id.* at 808 n.3.

157. Pub. L. No. 100-4, § 316(a), 101 Stat. 52 (1987) (codified as amended at 33 U.S.C. § 1329); *see also* Fentress, *supra* note 155, at 809.

158. 33 U.S.C. § 1288; *see also* Fentress, *supra* note 155, at 808.

This equation equaled failure. The 1987 amendments were spawned by this failure and attempted to directly address the nonpoint nightmare.[159]

Section 319 of the Clean Water Act requires that the states develop plans to control nonpoint sources of pollution.[160] First, the states must identify the problem through an assessment report. The states are required to submit a report which:

> (A) [i]dentifi[es] those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of the Act.
>
> (B) [i]dentifi[es] those categories and subcategories of nonpoint sources, or where appropriate, particular nonpoint sources which add significant pollution to each portion of the navigable waters identified under subparagraph(A) in amounts which contribute to such portion not meeting such water quality standards or such goals and requirements.
>
> (C) [describes] . . . the process, including intergovernmental coordination and public participation, for (1) identifying best management practices and measures to control each category and subcategory of nonpoint sources and, where appropriate, particular nonpoint sources identified under subparagraph (B) and (2) [to reduce], to the maximum extent practicable, the level of pollution resulting from such category, subcategory or source.
>
> (D) [describes] State and local programs for controlling pollution added from nonpoint sources to, and improving the quality of, each such portion of the navigable waters, including but not limited to those programs which are receiving federal assistance under subsection (h) and (i) of this section.[161]

After the assessment report is developed, the state must then design a proposed management program.[162] The state must implement this program within four fiscal years to control nonpoint sources of pollution.[163] Section 319 mandates the program contain at least three major elements: (1) best management practices to reduce pollutant loadings, taking into account the impact of the practice on groundwater quality; (2) pro-

159. Fentress, *supra* note 155, at 808.
160. 33 U.S.C. § 1329(b)(1).
161. ADPC&E, *supra* note 39, at 1.
162. 33 U.S.C. § 1329(a), (b).
163. *Id.* § 1329(b)(1).

grams to achieve these best management practices; and (3) a schedule containing annual milestones for implementation of the programs and the best management practices.[164]

The Arkansas Management Program lists several sources as a basis for the assessment report:[165] "[t]hese include the section 208 water quality management plans, water quality assessment documents (section 305(b) reports), fishery surveys, clean lakes programs (314 reports) . . . , Rural Clean Water Program,"[166] and reports from local health departments, the Soil Conservation Service, and the U.S. Forest Service.[167] The section 305(b) report was developed in Arkansas by focusing on the river reach study format.[168] Any size of water body could be used for study, ranging from an entire river basin down to a river reach.[169] The river reach is the smallest segment for reporting.[170] The next step was to determine if the reach was fully meeting all designated uses by comparing the ambient water quality of the reach to the state water quality standards.[171] If the ambient water quality was below state water quality standards, then the area would be recorded as not meeting the designated use.[172] Not all stream reaches have monitoring stations for the length of the stream, so professional judgement was used to extend the designation either upstream or downstream from the monitoring station.[173] Even with available monitoring stations and the use of best professional judgement designations, sixty-three percent of the state's stream reaches were still recorded as unknown.[174] The management program candidly states that "[t]he main shortcoming of the assessment is that not enough water quality data exists to provide a scientific base to make the decisions required. Without more base data most of the state's waters cannot be evaluated and will remain unknown."[175]

There are 11,507.7 stream miles within Arkansas' river

164. *Id.* § 1329(b)(2).
165. ADPC&E, *supra* note 39, at 2.
166. *Id.*
167. *Id.*
168. *Id.* at 3.
169. *Id.*
170. *Id.* at 2.
171. *Id.* at 3.
172. *Id.*
173. *Id.*
174. *Id.*
175. *Id.* at 4.

reach system.[176] Only thirty-six percent or 4,107 miles have been assessed for use attainment.[177] Of this thirty-six percent, 41.7 percent are meeting all designated uses while 58.3 percent are water quality impaired.[178] Water quality impairments to lakes, groundwater and wetlands were not considered due to the lack of scientific data.[179]

Several factors make it quite clear that Arkansas has severe water quality problems. First, only thirty-six percent of the state's waters have even been assessed for use attainment, and well over half are water quality impaired.[180] Second, lakes, wetlands, and groundwater have not been considered.[181] Third, manure equal to a human population equivalency of over eight million people is being discharged in just a two county area,[182] and this equivalency number does not take into consideration all of the dead chickens that are disposed of in the region. When all of these factors are considered, it is clear that Arkansas' motto—"The Natural State"—will soon be a misnomer.

B. Water Quality Act and the Poultry Industry

As has been discussed already in this paper, section 319 of the Clean Water Act requires each state to assess nonpoint source pollution and prepare a management plan to address the problem.[183] PC&E prepared this assessment and received EPA approval in August of 1989.[184] PC&E then submitted the state management plan for nonpoint source pollution and received EPA approval for the animal holding and management areas of the plan.[185] The Arkansas Soil and Water Conservation Commission (ASWCC) was designated by former Governor Bill Clinton as "the lead agency for NPS management work."[186] Specific study areas, a special task force, and other programs of this nature have been developed in conjunction with the manage-

176. *Id.*
177. *Id.*
178. *Id.*
179. *Id.*
180. *Id.*
181. *Id.*
182. *Id.* at 6.
183. 33 U.S.C. § 1329(a),(b).
184. Arkansas Soil and Water Conservation Commission, *Status of Section 319 Nonpoint Source Program, in* ARKANSAS NONPOINT SOURCE MANAGEMENT STATUS REPORT NO. 2, at 2 (Robert Morgan ed., 1991). [hereinafter *Section 319 Status*].
185. *Id.*
186. *Id.*

ment program.[187] In addressing the task force on animal wastes, former Governor Clinton acknowledged the serious nature of animal waste impacts on the environment.[188] However, the Governor seemed primarily concerned with industry growth, rather than the health of humans, wildlife or the environment. For example, the Governor asked the task force to answer these three questions:

1. Is there a technical fix to the problems that will give the state the water quality that we want?
2. Will the fix allow the continued growth of the industry? [and,]
3. Can the fix be carried out at a cost that will allow growers to stay in business?[189]

The Governor also mentioned in his comments that Arkansas has performed above the national average in the production of new jobs and this was due in large part to the poultry industry.[190] Although he said he was looking for technical and regulatory solutions to the animal waste problem, only solutions which allowed for continued growth of the industry were acceptable.[191]

The ASWCC, while faced with an enormous problem, appears to be responding aggressively to the poultry waste predicament. However, they lack a regulatory structure to back up

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187. *Id.*

188. Arkansas Soil and Water Conservation Commission, *Governor's Task Force on Animal Waste, in* ARKANSAS NONPOINT SOURCE MANAGEMENT STATUS REPORT No. 2, at 3 (Robert Morgan ed., 1991). For example, the Moores Creek/Muddy Fork watershed program was implemented to address an area with severe poultry pollution.

> The [USDA] is expending in excess of $750,000 to address the animal waste problems in these watersheds. ASWCC has contracted with the Arkansas Water Resources Center to sample water quality in Moores Creek during the USDA project. Documentation of the effectiveness of the watershed project and of selected BMPs is the expected result of the monitoring.
>
> The monitoring consists of monitoring edge-of-field runoff from individual BMPs to determine their effectiveness in reducing nutrient concentrations in runoff. BMPs to be monitored are "Nutrient Management, Dead Bird Composting and Critical Area Treatment." In addition, limited in-stream monitoring will determine the combined effectiveness of implementation of BMPs watershed wide. Grab samples will be taken at each site bi-weekly. During storm events, automatic samplers will take composite samples at four edge-of-field sites and at two in-stream sites. The samples will be analyzed for nutrients, organic strength and bacteria.

Id.

189. *Id.* at 3.

190. *Id.*

191. *Id.*

any request or requirement that they may set forth.[192] For example, project engineer Wallace Dellinger sent surveys on the implementation of best management practices on their farms to 8,000 poultry farmers.[193] He received 500 responses. Yet, the responses which he received do indicate some improvement in waste management:[194]

192. *See id.*

193. Interview with Wallace Dellinger, Project Engineer, Arkansas Soil and Water Conservation Commission (Mar. 23, 1992).

194. For example, the ASWCC has recommended that each farm have a waste management plan. Until plans can be prepared for each site, interim Best Management Guidelines have been recommended. These include:

1. Poultry litter should not be stored outside unless proper runoff controls are provided for collection and containment of rainwater that comes in contact with piles of litter.
2. Poultry litter should be evenly distributed over application sites at a rate not to exceed 5 tons per acre per year, or according to a site-specific land management plan, with no more than 2.5 tons/acre in each application. (As a rule of thumb, 30 acres for one 16,000 sq. ft. house per year).
3. Land application of poultry waste should not be undertaken when the soil is saturated, frozen or covered with snow, or during rainy weather, or when precipitation is in the immediate forecast.
4. Poultry waste should not be applied on slopes with a grade of more than 15%, or according to a site-specific land management plan or in any manner that will allow waste to enter the waters of the state.
5. Surface and subsurface application of poultry waste should not be made within 25 feet of rock outcrops; 100 feet of streams, ponds, lakes, springs, sinkholes, wells, water supplies and dwellings, or according to a site-specific land management plan.
6. Records should be kept by the farmer of the dates, quantity, and specific sites where litter is applied; or if the litter is sold, a record should be kept of who buys the litter, the dates, quantities, and farm or sites where the litter is applied or utilized.
7. Vehicles used for transporting poultry litter on state or federally maintained roads or more than 1 mile on any other public road, should be covered or tarped.

COOPERATIVE COMMITTEE FOR POULTRY FARM LITTER AND WASTE DISPOSAL, DRY POULTRY LITTER HANDLING: BEST MANAGEMENT GUIDELINES (on file with the *Tulane Envtl. L.J.*). Furthermore, the ASWCC has recommended buffer zones between litter application areas and water sources. ARKANSAS SOIL AND WATER CONSERVATION COMMISSION & GOVERNOR'S ANIMAL WASTE TASK FORCE, PUBLIC INFORMATION ARTICLE NO. 1 (Dec. 1991), *published in* ARKANSAS NONPOINT SOURCE MANAGEMENT STATUS REPORT NO. 4. These buffer zones will "help to prevent nonpoint source pollution by eliminating direct application of wastes to the water. In addition, pollutant laden sediments carried in runoff from the application site will have a chance to settle out before they reach the stream." *Id.*

TABLE 4

Section 319 Voluntary Assessment[195]

Practice	1989	1990	1991
Dead Bird Disposal			
Composter	1	40	65
Disposal Pit	484	482	464
Extrusion	30	28	24
Rendering	10	10	13
Incineration	68	88	92
Any Other Method	122	108	113
Litter Disposal/Handling			
Nutrient Mgt. Plan	13	16	24
Spread On Pasture	484	475	470
Sold	287	294	300
Any Other Method	15	13	14
Calibrated Spreader	251	267	275
Other Best Management Practices			
Critical Area Planning	16	14	21
Waste Treatment Lagoon	0	0	0
Waste Storage Stacking Shed	8	10	17
Roof Runoff Mgt.	17	22	22
Pasture & Hayland Mgt.	318	342	364
Pasture & Hayland Planting	125	137	145
Structure For Water Control	31	31	35
Sediment Basin	2	2	2
Filter Strip	6	6	7
Field Border	25	29	31
Grassed Waterway	58	67	73
Terrace	60	68	69
Proper Grazing Use	189	201	212
Waste Storage Pond	5	6	5
Best Management Guidelines			
Not Stored w/o Runoff Controls		237	251
Spread Not Exceeding 5 tons/acre/year		125	315
Applied Under Proper Weather Conditions		244	260
No Slopes Greater Than 15 percent		214	232
No Application w/i 100 feet of Water		199	212
Waste Records Kept		100	110
Vehicles Covered When Transported		204	210

195. Arkansas Soil and Water Conservation Commission, *Annual Voluntary Assessment of Best Management Implementation in Poultry Production, in* ARKANSAS NONPOINT SOURCE MANAGEMENT STATUS REPORT NO. 4, at 3 & attachment A (Robert Morgan ed., 1991).

This table shows an increase in composting, the use of calibrated spreaders to spread manure, limits on manure at five tons per year per acre, and other important management guidelines. It is significant that these practices are developing. Composting is vital to alleviate the dead bird disposal problem. The use of calibrated spreaders will help limit the amount of manure discharged, thereby keeping nutrients to a level the soil and vegetation can absorb. This will limit nutrient runoff and surface and groundwater contamination.

Another program being implemented by ASWCC is the Water Quality Technician Program.[196] The Environmental Protection Agency (EPA) has awarded grants for technical assistance to conservation districts in threatened watersheds.[197] These grants will be used to hire and educate water quality technicians to write "Manure Management Plans for Water Quality."[198] These plans will address litter disposal and "[w]ater quality will be improved by matching the nutrient content of litter with the nutrient requirement of the crop being grown by the poultry grower, or finding alternate methods of removing the litter from the farm."[199] These plans will include:

(1) a map designating all fields with buffer zones being delineated;
(2) a soil survey map for the farm with accompanying soil description report;
(3) soil analysis data on each field from the Cooperative Extension Service;
(4) poultry litter worksheet to determine land area and waste storage requirements;
(5) narrative of each recommended best management practice (conservation practice);
(6) specifications for construction of dead bird composters; and
(7) recommended nutrient budget.[200]

As of February 1992, fifty contacts had been made with poultry

196. Mark Bradley, *Training Course for Water Quality Technicians, in* ARKANSAS NONPOINT SOURCE MANAGEMENT STATUS REPORT NO. 5, at 2 (Robert Morgan ed., 1992) (on file with the *Tulane Envtl. L.J.*).

197. *Id.*

198. *Id.*

199. *Id.*

200. *Id.* at 3.

There are four steps to effective waste utilization as fertilizer:

(1) Analyze the nutrient content of the litter.

(2) Analyze the nutrient content of the soil.

producers to develop plans for their farms.[201]

Progress is being made in raising environmental concerns of poultry producers. This has been a direct result of conscientious efforts by ASWCC. However, absent enforcement measures, compliance with ASWCC programs will be limited to voluntary cooperation.

V. REGULATORY ANSWERS

A. Twenty Years of Waiting

To put teeth into the progressive best management practices that have been or are soon to be implemented by ASWCC, the State of Arkansas must set total maximum daily loads (TMDLs) for water quality impaired streams.[202] The process is completed as follows:

[1] State sets water quality standards and determines if its bodies of water meet them;

[2] Bodies of water or segments determined not to be meeting water quality standards (or those which will not meet standards after technology-based controls have been implemented) are identified as "water quality limited." For these segments, a TMDL for the pollutant is established and submitted to EPA. The TMDL takes both point and nonpoint sources of pollution into account.

[3] State develops an implementation plan determining how the TMDL will be apportioned between pollution sources.

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(3) Determine the nutrient requirements of the crop based on realistic yield goals for specific soil types.

(4) Establish litter application rates based on crop needs and the nutrient content of the soil. Bradley, *supra* note 196 at 5.

Id. at 2-3.

201. *Id.* at 3.

202. See 33 U.S.C. § 1313(d)(1) which requires that:

(A) Each State shall identify those waters or parts thereof within its boundaries for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) . . . are not stringent enough to implement any water quality standard applicable to such waters. The State shall establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters.

. . . .

(C) Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under § 1314(a)(2) of this title as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

Point and nonpoint sources can both be considered in making the apportionment.

[4] EPA reviews the designated segments and TMDLs. If, over a long period of time, the state does not set TMDLs, or if EPA does not approve the TMDL the state sets, EPA is to set the TMDLs.

[5] State monitors adherence to the implementation plan. Point sources of pollution are controlled through permits and compliance schedules; nonpoint sources are controlled through use of best management practices . . . .[203]

A TMDL is simply the largest amount of a pollutant that a stream or lake can receive on a daily basis and not violate water quality standards.[204] Furthermore, the TMDLs shall be set at a level to provide for seasonal variations and a margin of safety.[205] Such a strong mandate requires comprehensive and protective TMDLs. Minimal load restrictions, set at a least protective, marginal level, will not fulfill the statutory duty. For example, EPA Region X's Chief of the Office of Water Planning, Thomas Wilson, has stated that a lack of data needed to set an exacting TMDL should not slow the process.[206] He explained that: "[i]n other words, Congress says ignorance is no excuse for inaction. Just add a margin of safety to compensate for the lack of knowl-

203. UNITED STATES GENERAL ACCOUNTING OFFICE, WATER POLLUTION: MORE EPA ACTION NEEDED TO IMPROVE THE QUALITY OF HEAVILY POLLUTED WATERS, GAO/RCED-89-38, Jan. 1989, at 15. [hereinafter GAO REPORT]. *See generally* Lawrence S. Bazel, Comment, *Water-Quality Standards, Maximum Loads, and the Clean Water Act: The Need for Judicial Enforcement*, 34 HASTINGS L.J. 1245 (1983) (discussing, *inter alia*, maximum loads); Fentress, *supra* note 155 (discussing, *inter alia*, TMDLs).

204. Bazel, *supra* note 203, at 1246. A TMDL is developed based on several factors. However, two introductory terms must first be explained to understand the process. A "load" is the "amount of matter . . . that is introduced into a receiving water. . . ." 40 C.F.R. § 130.3(e) (1992). "Loading Capacity" is defined by EPA as the maximum amount of loading that a water can receive without exceeding the applicable water quality standard. 40 C.F.R. § 130.3(f).

Point sources are given "wasteload allocations," which are "[t]he portions of a receiving water's loading capacity that are allocated to one of the water's existing or future point sources." 40 C.F.R. § 130.3. Nonpoint sources are given "load allocations" which are the portions of a receiving water's loading capacity that are allocated to one of the water's existing or future nonpoint or natural sources of pollution. 40 C.F.R. § 130.3(g).

These two elements are then combined to form the "total maximum daily load" which is "[t]he sum of the individual [waste load allocations] for point sources and [load allocations] for nonpoint sources and natural background." 40 C.F.R. § 130.3(h).

See also GAO REPORT, *supra* note 203, at 16 (defining "waste load allocation" and "load allocation" in relation to TMDLs).

205. 33 U.S.C. § 1313(d)(1)(C).

206. EPA NONPOINT SOURCE NEWS-NOTES, Oct. 1990, at 20, *quoted in* Alaska Center for the Env't v. Reilly, 762 F. Supp. 1422, 1429 n.8. (W.D. Wash. 1991).

edge and keep moving. No other program has such a strong statutory endorsement for action in the face of an incomplete database."[207]

Moreover, the state must identify its waters that do not meet water quality standards and prioritize, by way of ranking, the severity of the pollution.[208] Such identification, ranking, and prioritization is clearly indicative of a congressional sense of urgency to clean up badly polluted waters. "[I]t is interesting to note that [Chief Wilson] has included a statement in an October 1990 report that strongly suggests EPA views itself as having a duty to respond to state inaction on TMDLs."[209] The report says

> by statute, EPA is given only 30 days to identify and establish any TMDL needed because of State inaction. This short deadline, along with the margin of safety requirement . . . almost guarantees that any EPA-developed TMDL would be more stringent than a State-developed one.[210]

EPA has regulations on setting a TMDL, which contain two elements: (1) a waste load allocation, which is the point source allotment of the TMDL; and (2) a load allocation, which is the portion allocated to nonpoint sources of pollution.[211] The TMDL allocations should then help bring the stream up to water quality standards:

> Implementation of TMDLs may be accomplished by putting additional controls on nonpoint and/or point sources of pollution. EPA guidance notes that the TMDL process provides for tradeoffs between point and nonpoint pollutant loadings. The guidance states that if best management practices or other nonpoint source pollution controls make more stringent load allocations practicable, wasteload allocations for point source pollution can be made less stringent.[212]

The TMDL process is by no means a new notion. Since 1972, the Clean Water Act has recognized that technology-based controls may not be the "cure-all" of all of our nation's water ailments.[213] Section 303(d) of the Clean Water Act mandates each state to identify water quality impaired waters and then to

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207. 762 F. Supp. 1422, 1429 n.8.
208. 33 U.S.C. § 1313(d)(1)(A).
209. EPA NONPOINT SOURCE NEWS-NOTES, *supra* note 206.
210. *Id.*
211. Bazel, *supra* note 203, at 1246, 1269-70; *see also* 40 C.F.R. § 130.2(f)-(h) (1988).
212. GAO REPORT, *supra* note 203, at 16.
213. *Id.* at 13.

set TMDLs to correct the problem.[214] The administrator of the EPA was to identify pollutants suitable for TMDL calculations, and the TMDL was to be stringent enough to provide a margin of safety.[215] The plan sounded fairly simple and easy to implement. It was not.

First, by October 18, 1973 EPA was to develop and publish a list of pollutants suitable for TMDL measurements.[216] Five years later and pursuant to a court order from *Board of County Commissioners v. Costle*,[217] EPA determined that all pollutants may be considered in TMDL calculations.[218] Second, EPA did not have regulations in place that defined a TMDL until 1985.[219] These regulations were also spawned by litigation.[220] Prior to *Scott v. City of Hammond*, EPA had taken the position that it had no responsibility to set or approve TMDLs until a state had done so.[221] However, the *Scott* court held that EPA did have a duty to develop TMDLs when the states failed to submit them. The court held:

> We believe that, if a state fails over a long period of time to submit proposed TMDLs, this prolonged failure may amount to the "constructive submission" by that state of no TMDLs . . . . The allegation of the complaint that no TMDLs are in place, coupled with the EPA's admission that the states have not made their submissions, raises the possibility that the states have determined that TMDLs for Lake Michigan are unnecessary . . . [t]hen the EPA would be under a duty to either approve or disapprove the "submission."[222]

In the more recent case of *Alaska Center for the Environment v. Reilly*,[223] Judge Rothstein of the United States District Court for the Western District of Washington held that Alaska's ten year delay in submitting TMDLs to EPA was a constructive submission of no limits, and thus triggers a mandatory duty for

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214. 33 U.S.C. § 1313(c), (d)(1)(A).

215. *Id.* § 1313(a)(2), (d)(1)(C).

216. *Id.* § 1314(a)(1).

217. Board of County Comm'rs of Calvert County v. Costle, No. 78-0572 (D.D.C. 1978) (unpublished order), *cited in* Environmental Defense Fund v. Costle, 657 F.2d 275, 295 n.60 (D.C. Cir. 1981).

218. 43 Fed. Reg. 60,662 (Dec. 28, 1978).

219. GAO REPORT, *supra* note 203, at 25.

220. *See* Scott v. City of Hammond, 741 F.2d 992, 994 (7th Cir. 1984).

221. GAO REPORT, *supra* note 203, at 25.

222. *Scott*, 741 F.2d at 996-97 (citations and footnotes omitted).

223. 762 F. Supp. 1422 (W.D. Wash. 1991).

EPA to promulgate the limits.[224] Judge Rothstein said:

> Congress' repeated use of the term "shall" in sec. 303(d) clearly places a mandatory duty upon the EPA to take affirmative action after disapproving a state's unacceptable submission. Read in light of common sense and the fact that Congress set out such short time deadlines in this section, it is strongly arguable that Congress intended that EPA's affirmative duties be triggered upon a state's failure to submit a list, or any TMDL at all.[225]

Alaska was required to identify water quality limited waters by 1979, but at the time of the suit, which was over ten years later, the state had still not made a single TMDL submission to the EPA.[226] To make matters worse, Alaska and the EPA had not even completed the first stage of the TMDL procedure—the identification of water quality limited waters.[227] This was certainly an insult to both the letter and the spirit of the CWA, because "Alaska's 1988 305(b) Report categorized several hundred distinct waterbodies as either 'impaired' or 'threatened' by water pollution."[228] Of the one segment that was identified as water quality limited, "[t]here is no evidence that the EPA ever approved or disapproved that submission within the 30 day deadline."[229]

The third major reason why the TMDL process has been delayed for twenty years is because EPA claims to have focused its resources on "technology-based controls of the act and . . . on other sections of the act or water quality programs that have congressionally mandated time frames."[230] Furthermore, EPA officials have stated that setting TMDLs can be difficult where multiple sources, multiple pollutants or both impair water quality.[231]

However, the true genesis of the difficulty in setting TMDLs stems from the "acutely political judgement as to who's ox will be gored."[232] What state or federal regulatory agency

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224. *Id.* at 1429.

225. *Id.* at 1427.

226. *Id.* at 1425.

227. *Id.* One segment had been identified as water quality limited.

228. *Alaska Ctr. for the Env't*, 762 F. Supp. at 1425 (citations and footnote omitted).

229. *Id.*

230. GAO REPORT, *supra* note 203, at 24.

231. *Id.*

232. Oliver A. Houck, *The Regulation of Toxic Pollutants Under the Clean Water Act*, 21 ENVTL. L. REP. 10528, 10546 (1991).

has the courage to "place its head into the jaws of a public utility, a chemical plant, or local farmers, all of whom may be responsible for a given form of pollution."[233] No regulatory agency or Governor in Arkansas has had that courage.[234]

B. Time for TMDLs

Ironically, the EPA cites section 319 deadlines as one of the reasons they have not been able to give more emphasis to section 305(d) TMDL requirements.[235] Arkansas has completed its section 319 reporting and development of its best management practices.[236] However, absent TMDLs, the best management practices are simply voluntary programs absent any enforcement. Moreover, in a time of limited state and federal resources, TMDLs can be used to save money and time.[237]

Dillon Reservoir, about seventy miles west of Denver, Colorado, has been cited by the EPA "as a good example that demonstrates the potential effectiveness and cost-saving possibilities of comprehensively setting maximum pollution limits."[238] This area has experienced high population growth combined with extensive land use changes.[239] This has greatly increased phosphorus loadings (also a major constituent of chicken manure) and spawned algal blooms.[240] It was discovered that phosphorus could be removed for $119 per pound through nonpoint controls versus $824 to $7,861 per pound by point sources.[241] The area developed an innovative nonpoint control program that "was necessary to avoid a sewer tap moratorium, which would effec-

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233. *Id.*

234. Terry Lemons, *Reality Challenges Some of Clinton's Rhetoric*, ARK. DEMOCRAT-GAZETTE July 27, 1992. The article states,

> Although Clinton said the state's water is cleaner, many state environmentalists claim Clinton has done a poor job of protecting Arkansas waterways.
>
> Critics note many streams are polluted by animal waste from the country's largest poultry industry . . . .
>
> Environmentalists recite a litany of statistics, including a study by the state Department of Pollution Control and Ecology. In almost a fourth of the stream miles studied by PC&E, water was found polluted.
>
> Clinton has admitted putting job growth ahead of environmental protection.

235. *Id.*

236. *Section 319 Status, supra* note 184.

237. *See* GAO REPORT, *supra* note 203, at 35-36.

238. *Id.* at 32.

239. *Id.*

240. *Id.*

241. *Id.* at 33.

tively freeze growth and severely restrict Summit County's strong economy."[242]

It is time for Arkansas to set TMDLs on its water quality impaired waters. Northwest Arkansas in particular has water quality problems related directly to the poultry industry. Therefore, it will be much easier to set TMDLs there than in areas with multiple nonpoint sources of pollution. Furthermore, nonpoint restrictions in northwest Arkansas would be much cheaper to implement than additional point source controls. Simple management practices like composting of dead birds, litter spreading rates at no more than five tons per acre per year, and waste application buffer zones of 100 feet around water bodies would do much to alleviate water quality problems. The TMDL process would move these and other management practices from being merely voluntary.

VI. CONCLUSION

The concentration of poultry production in Arkansas has dramatic repercussions for fish, wildlife, and the environment in general. It will be tragic if poultry wastes are allowed to destroy the environment of Arkansas or the environment of any other poultry producing state. The industry expanded so quickly that regulatory controls were not able to keep pace. In most situations, controls have not even been attempted.

If poultry operations are not regulated as point sources, then TMDLs must be set to control the massive discharges of pollutants. This will force the state to address the problem and to allocate loadings among the polluters. This process will likely lead to the conclusion that best management practices for poultry producers will be the quickest, most cost-effective, and simplest solution to the problem. Moreover, the TMDL would be an enforceable limitation that would force implementation of best management practices.

242. *Id.* at 34.