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ILLINOIS AGRICULTURE

This report highlights the importance of Agriculture in Illinois and contains information that was published as of March 10, 2011. In 2010, there were 76,000 farms utilizing almost 27 million acres or 75 percent of the total land area in the state. Approximately 89 percent of Illinois agricultural land could be used to grow crops.

About 1.5 million Illinois workers are employed in the food and fiber system, ranking it as one of the top states in dependency on agriculture. In addition to farming, Illinois is a leading state in agricultural related industries, such as soybean processing, meat packing, dairy manufacturing, feed milling, vegetable processing, machinery manufacturing, foreign exports, and service industries.

Crop and livestock statistics date back to the beginning of this country with the issue of the first official monthly crop report over 130 years ago. From the beginning, statistics on crops, livestock, prices, and other subjects have informed both buyers and sellers, helping to keep agricultural markets efficient and helping to maintain a "level playing field" for all. Illinois farm operators and agricultural service firms form the backbone of this system by voluntarily reporting the data needed to compile the many reports.

THE FARMER

The 2007 Census of Agriculture showed the average Illinois farm operator was 56.2 years of age. The average value of land and buildings on each farm was more than 1.3 million dollars. Machinery and equipment were valued at \$136,609 per farm. The average farm sold products valued at \$173,421 and had production expenses of \$117,683. Forty-eight percent of principal farm operators considered farming to be their principal occupation.

PRODUCTIVITY

Illinois farm families are industrious and their work shows it. On a peak spring day, they may plant nearly 800,000 acres of corn or 500,000 acres of soybeans. With fewer than 4 percent of the farms in the U.S., they produce about 14 percent of the soybeans, 16 percent of the corn, 7 percent of the pigs, and account for nearly 6 percent of the agricultural exports.



ILLINOIS FARMS AND FARMLAND

Year	Number of farms	Land in farms	Average size of farms
		1,000 acres	Acres
1960	159,000	30,700	193
1970	128,000	29,500	230
1980	107,000	28,800	269
1990	83,000	28,400	342
2000	77,000	27,500	357
2002	73,000	27,500	377
2003	73,000	27,400	375
2004	72,800	27,200	374
2005	72,500	27,000	372
2006	72,400	26,900	372
2007	76,900	26,800	349
2008	75,900	26,700	352
2009	75,800	26,700	352
2010	76,000	26,700	351

STATE RANKING

Illinois usually ranks second in both corn and soybean production and fourth in hog production. Generally it is one of the top five states in cash income, crop cash receipts, and total value of farm real estate.

THE CLIMATE

Illinois lies midway between the Continental Divide and the Atlantic Ocean and some 500 miles north of the Gulf of Mexico. The climate is typically continental with cold winters, warm summers, and frequent short-period fluctuations of temperature, humidity, cloudiness, and wind direction. The excellent soil and well-distributed annual precipitation of 32 to 48 inches favors a very high standard of agricultural production.

WORKERS ON FARMS AND WAGE RATES: Regional averages, 2000-2010

Year	Number of hired workers Thousands	Wage rates by type of worker		
		All hired workers	Field	Field & livestock
Region 1/				
2000	52.8	8.55	8.02	8.09
2002	42.2	9.21	8.44	8.65
2003	42.7	9.61	8.88	9.00
2004	41.0	9.89	9.16	9.20
2005	43.3	9.79	9.35	9.22
2006	46.8	10.59	10.18	9.88
2007	46.5	10.55	10.08	9.90
2008	38.3	11.10	10.36	10.45
2009	40.3	11.09	10.63	10.51
2010	45.8	11.44	11.03	10.84

1/ Region consists of Illinois, Indiana, and Ohio.

ILLINOIS FARM REAL ESTATE VALUES, JANUARY 1

Year	Value per acre farmland and buildings	Cropland rent per acre
---Dollars---		
1960	316	NA
1970	490	36.40
1980	2,041	107.00
1990	1,405	99.40
2000	2,260	119.00
2003	2,430	123.00
2004	2,560	126.00
2005	3,210	129.00
2006	3,590	132.00
2007	4,020	141.00
2008	4,550	163.00
2009	4,530	163.00
2010	4,650	169.00

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CROPS

Corn, soybeans, and wheat are the major field crops grown in Illinois, accounting for over 90 percent of the cultivated acres. An abundance of other crops is also grown, including hay, grain sorghum, oats, apples, peaches, sweet corn, pumpkins, melons, popcorn, horseradish, asparagus, green beans, peas, potatoes, nursery crops, and numerous other items.

Farm marketings of crops accounted for 87 percent of the total farm marketings in 2009. Corn accounted for 52 percent of the total crop marketings and soybeans 29 percent. Cash receipts from marketing of all crops totaled \$12.7 billion in 2009.

ILLINOIS CROP PRODUCTION, 2010

Commodity	Acres harv.	Yield per acre	Produc- tion	Illinois ^a rank among states
	1,000 acres	Bushels	1,000 bushels	
Corn	12,400	157	1,946,800	2
Soybeans	9,050	51.5	466,075	2
Winter Wheat	295	56	16,520	15
Grain Sorghum	33	96	3,168	8
Oats	30	65	1,950	12
Apples (million pounds)			43.0	12
Peaches (tons)			7,580	9
		Tons	1,000 tons	
Alfalfa Hay	340	3.8	1,292	19
Other Hay	260	2.4	624	34
Snap Beans, Processing	11.1	3.73	41.4	9
		Cwt.	1,000 cwt.	
Sweet Corn, Fresh Mkt.	7.5	81	608	13
Potatoes, Summer	5.6	350	1,960	3

CROPS: RECORD HIGHS FOR ILLINOIS THROUGH 2009

Crops	Year of record	Record high
Corn:		
Yield Per Acre	2004	180 bu.
Production (thous.)	2007	2,283,750 bu.
Soybeans:		
Yield Per Acre	2010	51.5 bu.
Production (thous.)	2004	495,000 bu.
Wheat:		
Yield Per Acre	2006	67 bu.
Production (thous.)	1989	105,020 bu.
Grain Sorghum:		
Yield Per Acre	2004	109 bu.
Production (thous.)	1985	36,190 bu.
Oats:		
Yield Per Acre	2003	89 bu.
Production (thous.)	1917	207,000 bu.
All Hay:		
Yield Per Acre	1990	3.7 tons
Production (thous.)	1956	5,065 tons

ILLINOIS CROP PRODUCTION

Year	Acres planted for all purposes	Acres harvested	Yield per harv. acre	Production
	---Thous.---		Bushels	Thous. bu.
CORN				
1960	10,425	9,985	68	678,980
1970	10,310	9,940	74	735,560
1980	11,700	11,440	93	1,063,920
1990	10,600	10,400	127	1,320,800
2000	11,200	11,050	151	1,668,550
2008	12,100	11,900	179	2,130,100
2009	12,000	11,800	174	2,053,200
2010	12,600	12,400	157	1,946,800
SOYBEANS				
1960	5,013	4,973	26.0	129,298
1970	6,848	6,800	31.0	210,800
1980	9,400	9,350	33.5	313,225
1990	9,200	9,100	39.0	354,900
2000	10,500	10,450	44.0	459,800
2008	9,200	9,120	47.0	428,640
2009	9,400	9,350	46.0	430,100
2010	9,100	9,050	51.5	466,075
WINTER WHEAT				
1960	1,617	1,577	29.0	45,733
1970	1,075	1,030	37.0	38,110
1980	1,600	1,570	49.0	76,930
1990	2,050	1,850	48.0	88,800
2000	950	920	57.0	52,440
2008	1,200	1,150	64.0	73,600
2009	850	820	56.0	45,920
2010	330	295	56.0	16,520
GRAIN SORGHUM				
1960	19	14	50	700
1970	30	20	56	1,120
1980	100	83	59	4,897
1990	210	195	75	14,625
2000	90	85	95	8,075
2008	80	76	103	7,828
2009	40	36	82	2,952
2010	35	33	96	3,168
OATS				
1960	1,912	1,867	51	95,217
1970	935	612	56	34,272
1980	280	230	61	14,030
1990	600	170	68	11,560
2000	75	55	73	4,015
2008	45	30	70	2,100
2009	40	25	65	1,625
2010	45	30	65	1,950
ALL HAY				
			Tons	Thous. tons
1960		2,171	2.16	4,682
1970		1,230	2.69	3,303
1980		1,160	3.07	3,558
1990		900	3.72	3,348
2000		830	3.13	2,594
2008		620	3.03	1,878
2009		610	3.28	2,001
2010		600	3.19	1,916

LIVESTOCK, DAIRY, AND POULTRY

Cash receipts from livestock and products marketings account for 12.7 percent of total farm marketings and totaled \$1.8 billion in 2009.

ILLINOIS LIVESTOCK, DAIRY, AND POULTRY PRODUCTION, 2010

Item	Unit	Number	Illinois ^a rank among states
Inventory:			
Hogs & Pigs 1/	Thou. Head	4,300	4
Cattle & Calves 2/	Thou. Head	1,100	27
Beef Cows 2/	Thou. Head	352	26
Milk Cows 2/	Thou. Head	98	20
Sheep & Lambs 2/	Thou. Head	56	26
Production:			
Pig Crop	Thou. Head	9,535	4
Calf Crop	Thou. Head	410	29
Lamb Crop	Thou. Head	51	23
Milk Production	Mil. Lbs.	1,894	20
Egg Production	Mil. Eggs	1,453	18
Wool Production	Thou. Lbs.	320	22

1/ As of 12/1/09 2/ As of 1/1/10 3/ Milk production statistics are for 2008.



NUMBER OF ILLINOIS FARMS WITH LIVESTOCK AND DAIRY

Year	Cattle	Milk Cows	Hogs	Sheep
----- Number -----				
1960	115,000	52,000	92,000	26,000
1970	68,000	18,000	50,000	13,000
1980	50,000	6,500	30,000	7,000
1990	33,000	3,700	15,300	4,500
2000	25,000	2,100	5,100	2,400
2004	20,000	1,500	3,400	1,900
2005	19,800	1,400	3,100	2,000
2006	19,700	1,300	2,900	2,000
2007	18,500	1,200	2,900	1,900



ILLINOIS LIVESTOCK, DAIRY, AND POULTRY INVENTORY NUMBERS, JANUARY 1

Year	Hogs & Pigs 1/	Cattle & Calves	Beef Cows	Milk Cows	Sheep & Lambs
----- 1,000 head -----					
1960	7,469	3,981	668	648	722
1970	6,842	3,325	785	347	386
1980	6,950	2,700	699	235	173
1990	5,700	1,750	493	177	159
2000	4,050	1,510	480	120	74
2008	4,350	1,230	427	103	60
2009	4,350	1,200	408	102	58
2010	4,250	1,170	389	101	64
2011	4,300	1,100	352	98	56

1/ December 1, preceding year for 1970-2009.



LIVESTOCK, DAIRY, AND POULTRY: RECORD HIGHS FOR ILLINOIS THROUGH JANUARY 2010

Item	Year of record	Record high
Hogs & Pigs Inventory	1963/1964	7,748,000
Cattle & Calves Inventory	1957	4,149,000
Milk Cow Inventory	1935	1,231,000
Sheep & Lambs Inventory	1931	975,000
Chicken Inventory	1927	28,236,000
Milk Production	1945	5.8 billion lbs.
Egg Production	1955	3.0 billion eggs
Turkeys Raised	1990	4,460,000
Wool Production	1942	6.6 million lbs.

ILLINOIS PRODUCTION OF SELECTED COMMODITIES

Year	Milk	Eggs	Turkeys raised	Wool

	<u>Mil. lbs.</u>	<u>Million</u>	<u>Thousand</u>	<u>Thou. Lbs.</u>
1960	4,229	2,397	1,034	4,787
1970	2,850	1,820	832	2,232
1980	2,540	1,266	474	1,327
1990	2,559	793	4,460	925
2000	2,094	944	2,900	520
2005	1,958	1,210	2,900	385
2006	1,983	1,307	2,700	370
2007	1,917	1,357	2,700	410
2008	1,894	1,453	2,700	360
2009	1,925	N/A	N/A	395
2010	1,917	N/A	N/A	320

N/A - Not available.

ECONOMICS

PRICES RECEIVED BY ILLINOIS FARMERS 1/

Commodity	1960	1970	1980	1990	2000	2010 2/
---Dollars---						
Com, bu.	1.00	1.37	3.14	2.36	1.91	5.50
Soybeans, bu.	2.23	2.90	7.62	5.85	4.62	12.40
Wheat, all, bu.	1.74	1.30	3.93	2.75	2.09	5.60
Oats, bu.	.61	.66	1.82	1.09	1.33	3.20
Hay	19.50	24.50	55.50	70.00	83.00	117.00
Sorghum, bu.	.82	1.12	2.94	2.09	1.93	5.88
Beef Cattle, cwt.	22.10	27.50	62.30	75.70	67.70	94.00
Calves, cwt.	23.90	33.70	72.20	119.0	115.00	112.00
Hogs, cwt.	15.40	23.20	38.50	53.90	40.40	53.60
Lambs, cwt.	18.10	27.00	58.80	53.10	72.00	123.00
Milk Cows, head	207	303	1,200	1,150	1,290	1,370.00
Milk, cwt.	3.76	5.49	12.90	12.90	12.30	16.30
Table Eggs,	.29	.35	.53	.65	.47	N/A
Wool, lb.	.44	.33	.69	.35	.08	.39

1/ Marketing year average prices. 2/ Crop prices are preliminary for 2010. Livestock prices are final for 2009.

FARM VALUE SHARE OF RETAIL FOOD PRICES, U.S., 2000

Product	Percent	Product	Percent
Beef, choice	49	Apples, red delicious	21
Pork	31	Potatoes	17
Chicken, broiler	48	Corn, canned	22
Milk	34	Tomatoes, canned	7
Eggs	53	Flour, wheat	19
Cheese, Natural cheddar	29	Bread	5

Source: Economic Research Service, USDA

ILLINOIS CASH RECEIPTS FROM FARM MARKETINGS

Commodity	1970	1980	1990	2000	2009
---Million dollars---					
All Commodities:	2,809	7,951	7,779	7,019	14,546
Crops	1,499	5,627	5,336	5,346	12,698
Livestock					
Dairy & Poultry	1,310	2,324	2,443	1,672	1,849
Selected Commodities:					
Corn	774	2,712	2,691	2,649	7,534
Soybeans	574	2,438	2,023	2,081	4,233
Hogs	592	1,036	1,206	788	952
Cattle	491	884	800	532	487
Dairy Products	153	324	326	255	255
Wheat	44	268	230	135	221
Other	143	215	416	483	864

Source: Economic Research Service, USDA

ILLINOIS AG SECTOR OUTPUT AND INCOME

Year	Ag Sector output 1/	Net value added 2/	Net farm income 3/
---Million dollars---			
1950	1,927	1,017	734
1960	2,129	836	534
1970	2,908	1,104	630
1980	7,347	1,916	112
1990	8,462	3,811	1,508
2000	7,993	4,011	1,561
2004	11,635	6,296	4,022

1/ Gross value of the commodities and services produced.

2/ Contribution of the agricultural sector to the National economy.

3/ Farm operators' share of income from the sector's production.

Source: Economic Research Service, USDA

AGRICULTURAL PRODUCTS

PER CAPITA CONSUMPTION, U.S.

Food Group	1970	1980	1990	2000
Beef 1/	79.6	72.1	63.9	64.5
Pork 1/	48.0	52.1	46.4	47.8
Chicken 1/	27.4	32.7	42.4	53.2
Turkey 1/	6.4	8.1	13.8	13.7
Eggs 2/	39.5	34.8	30.2	32.4
Cheese 2/	11.4	17.5	24.6	30.0
Fresh Fruits 2/	101.2	104.8	116.3	127.2
Fresh Vegetables 2/	152.9	149.3	167.2	200.4

1/ Pounds of boneless, trimmed meat. 2/ Pounds.

Source: Economic Research Service, USDA

VALUE OF ILLINOIS FARM EXPORTS

Commodity Group	1980	1990	2000	2009
---Million dollars---				
Wheat & Products	165.8	235.3	122.9	190
Feed grains	1,862.9	1,435.7	935.9	1,717
Soybeans & Products	1,437.9	979.5	1,110.0	2,268
Live Animals & Meat	50.2	129.5	264.0	525
Other	128.0	326.4	252.9	832
TOTAL	3,644.8	3,106.4	2,842.5	5,532

Source: Economic Research Service, USDA

FOR IMMEDIATE RELEASE

April 23, 2004

Illinois EPA Issues General Permit for Concentrated Animal Feeding Operations
Permit will assist livestock operations in complying with federal Clean Water Act requirements

SPRINGFIELD, ILL. — A new permit to assist an estimated 3,200 livestock operations in Illinois to comply with federal Clean Water Act requirements to protect the state's waterways from manure and wastewater discharges has been finalized, Illinois EPA Director Renee Cipriano announced today.

“This permit meets federal requirements to protect our natural resources while making it as convenient as possible for livestock operators to meet their environmental obligations,” said Director Cipriano. “The Agency held numerous meetings with livestock producers, environmental groups and others before finalizing this permit which we believe is protective of our water resources while also making the permit process as efficient as possible.”

The “general permit” will require Concentrated Animal Feeding Operations (CAFOs) to apply for and comply with the National Pollutant Discharge Elimination System, or NPDES, permit. The federal Clean Water Act established the NPDES permit system to reduce pollutants entering waterways.

“Illinois EPA staff will provide the technical assistance to help livestock producers meet these new federal requirements and maintain their traditional commitment to environmental stewardship,” Director Cipriano said.

In addition, she noted medium-size CAFOs can “opt out” of the permit if they do not have a man-made ditch or pipe carrying manure or wastewater to surface waters or have animals in contact with surface water. Producers with medium-size CAFOs should contact the Illinois EPA for technical assistance to see if their operations qualify to “opt out.”

Under the new permit, CAFO facilities will work with IEPA technical staff and submit annual reports, and develop and implement manure and wastewater handling plans. These plans may be based on federal guidelines or on criteria developed under Illinois' Livestock Management Facilities Act. Once the plans are written by the CAFO operators, they are reviewed by the IEPA to determine whether the facility may be covered under the general permit.

Adoption of this general NPDES permit will allow for timely issuance of permits for most Illinois' livestock operations. The alternative of issuing individual NPDES permits for each CAFO is not a practical or efficient means of addressing thousands of facilities statewide.

In February 2003, the U.S. Environmental Protection Agency issued permit regulations for CAFOs in response to growing national concern about the potential for water quality problems from accidental release or improper handling of animal wastes.

Illinois follows such states as Michigan, South Dakota and Nebraska in issuing a general NPDES permit covering the livestock facilities.

“Livestock production methods are changing and it is important that environmental management practices keep pace so we can continue to protect our valuable land and water resources for future generations,” said Cipriano.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 28 2010

REPLY TO THE ATTENTION OF

Douglas Scott, Director
Illinois Environmental Protection Agency
1021 North Grand Avenue
P.O. Box 19276
Springfield, Illinois 62794-9276

Subject: Petition to Withdraw the Illinois NPDES Program

Dear Mr. Scott:

The U.S. Environmental Protection Agency, Region 5, recently completed an initial investigation of the program that the Illinois Environmental Protection Agency (Illinois EPA) administers for concentrated animal feeding operations (CAFOs). The investigation was carried out in response to a petition submitted by the Illinois Citizens for Clean Air & Water and the Environmental Integrity Project. The petitioners allege that Illinois EPA is not properly implementing the program for CAFOs.

Based on our initial investigation, it appears that Illinois EPA's CAFO program fails to comply with Section 402(c)(2) of the Clean Water Act. Section VI of the enclosed report describes the findings in detail. That Section also identifies required and recommended actions to improve the quality of the program.

Within 30 days of receipt of this letter, please reply in writing and submit a description of the actions Illinois EPA has taken or will take to ensure that its NPDES permitting, compliance and enforcement program for CAFOs complies with the Clean Water Act. After we receive your reply, U.S. EPA will provide an opportunity for public comment on the adequacy of the Illinois CAFO program.

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Thank you for your personal attention to this serious matter. I look forward to receiving your reply.

Sincerely,

A handwritten signature in black ink, appearing to read 'S Hedman', with a long horizontal flourish extending to the right.

Susan Hedman
Regional Administrator

Enclosure

cc: Ms. Marcia Willhite, Illinois EPA
Ms. Danielle Diamond, ICCAW

Initial Results of an Informal Investigation of the
**National Pollutant Discharge Elimination System Program
for Concentrated Animal Feeding Operations
in the State of Illinois**

Region 5
United States Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

September 2010

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Attachments

- Attachment A: Illinois EPA List of Facilities that previously had NPDES Permits, through 2009
- Attachment B: Illinois EPA List of CAFOs Required to Obtain NPDES Permit
- Attachment C: Case Studies of Illinois EPA NPDES CAFO Permitting, Compliance Monitoring, and Enforcement
- Attachment D: Illinois EPA List: No Permit Required
- Attachment E: September 29, 2007, letter from Illinois EPA

I. Executive Summary

In March 2008, the Illinois Citizens for Clean Air & Water (Illinois Citizens) submitted a petition for withdrawal of Illinois' authorized National Pollutant Discharge Elimination System (NPDES) program. In February 2009, Illinois Citizens, joined by the Environmental Integrity Project (EIP), supplemented its petition to provide the U.S. Environmental Protection Agency with additional information. The Illinois Citizens claim that the Illinois Environmental Protection Agency (Illinois EPA) has failed to fully implement the program for concentrated animal feeding operations (CAFOs). The Illinois Citizens' claim Illinois EPA has failed to:

- identify CAFOs subject to regulation;
- issue permits to CAFOs;
- inspect to determine whether or not facilities are CAFOs subject to NPDES requirements and are in compliance with those requirements;
- exercise its enforcement authorities to ensure compliance by CAFOs with NPDES requirements;
- provide for public participation in the permitting and enforcement process; and
- meet its commitments to EPA under the terms of the original program authorization in 1977 and ongoing work planning agreements.

The petitioners also expressed concern that Illinois EPA needs to revise its permitting process to comply with EPA's revised NPDES regulations and effluent limitations guidelines for CAFOs. While the petition and EPA's review focuses on Illinois' alleged failure to fully implement the CAFO portion of its program, any action to withdraw the State's program would affect the entire program.

EPA conducted an informal investigation of the petitioners' allegations¹. The investigation consisted of visits at Illinois EPA's Headquarters and Field Offices, and a meeting with citizens to hear their concerns regarding specific CAFOs. The reviewers also met with a representative of the Illinois Attorney General's Office. EPA conducted these activities from December 2008 to September 2009.

Based on its investigation, EPA Region 5 finds that the Illinois EPA NPDES program for CAFOs does not meet minimum thresholds for an adequate program. This report discusses EPA's initial findings for the various program areas, and the actions Illinois EPA must take to comply with Clean Water Act requirements for authorized state NPDES programs. In particular, Illinois EPA must:

- issue NPDES permits to CAFOs that are required to be permitted under NPDES regulations,
- develop and maintain a comprehensive inventory of CAFOs and evaluate their regulatory status,

¹ Where this report references "results" or "our review", those terms refer to the initial results of the informal investigation conducted under 40 CFR 123.64(b)(1).

- revise its inspection process for livestock and poultry facilities to enable the Agency to determine and track whether inspected facilities are CAFOs required to have NPDES permits, and whether they are in compliance with NPDES requirements,
- develop standard operating procedures and properly investigate, track, and respond to citizen complaints reporting potential violations of NPDES requirements,
- take timely and appropriate enforcement to address noncompliance by CAFOs,
- require that, where a facility has discharged or is designed, constructed, operated or maintained such that it will discharge, Illinois EPA's enforcement response must also address the CAFO's failure to apply for an NPDES permit,
- ensure that sufficient resources are maintained to issue or deny permits, as well as for inspections and enforcement of NPDES requirements for CAFOs, and
- establish technical standards for nutrient management by Large CAFOs and finalize revisions to 35 Illinois Administrative Code, Subtitle E, as necessary to be consistent with the federal CAFO rules as soon as possible, but not later than December 2010.

II. Introduction

This report describes the results of an informal investigation of the NPDES program that the Illinois EPA administers to protect or restore water quality from pollutants generated by CAFOs. The EPA, Region 5, conducted the investigation in response to a petition filed by Illinois Citizens for Clean Air and Water (Illinois Citizens) on March 27, 2008. The Illinois Citizens claim that Illinois EPA has failed to fully implement the NPDES program for CAFOs. On February 20, 2009, Illinois Citizens, joined by the Environmental Integrity Project (EIP), submitted a supplement to the petition to provide EPA with additional information obtained subsequent to the filing of the original petition. EPA approved the Illinois EPA to administer the NPDES program in the State of Illinois on October 23, 1977. The purpose of this review is to develop the record on which to either deny the petition, or recommend that the EPA Administrator review the Illinois EPA's NPDES program and consider commencing proceedings to withdraw the program.

Section 301 of the Federal Water Pollution Control Act (Clean Water Act) prohibits the discharge of pollutants from point sources into waters of the United States unless the discharge is in compliance with an NPDES permit. Section 502 of the Act defines the term "discharge" to mean, among other things, any addition of any pollutant or combination of pollutants from a point source to waters of the United States. It defines "point source" to include CAFOs from which pollutants are or may be discharged. It defines the term "pollutant" to include agricultural waste. Under federal regulations, an owner or operator of a CAFO must seek coverage under an NPDES permit if the CAFO discharges or proposes to discharge. A CAFO proposes to discharge if it is designed, constructed, operated or maintained such that a discharge will occur (40 CFR §122.23(d)(1) (see 73 Federal Register 70480, November 20, 2008)). Once an application is complete, the federal regulation at 40 CFR §124.6 requires the Agency or approved state, as the case may be, to tentatively decide whether to prepare a draft permit.

The Clean Water Act, § 402(c)(2), requires states with approved NPDES programs, including Illinois EPA, to administer their programs in accordance with § 402 of the Act and the regulations EPA established under § 304(i)(2) of the Act at all times. These regulations appear

at 40 CFR Part 123. They require approved states to prohibit the discharge of pollutants from point sources unless the discharge is in compliance with an NPDES permit. They also establish requirements regarding: (1) the submission of NPDES permit applications to, and processing of NPDES permit applications by, approved states (see 40 CFR §123.25), (2) state programs for evaluating compliance by point sources (see 40 CFR §123.26), and (3) state enforcement authority (see 40 CFR §123.27).

The Clean Water Act, § 402(c)(3), requires the EPA Administrator to withdraw an approved state NPDES program if, after public hearing, she determines that the state is not administering the program in accordance with applicable requirements, and the state fails to take corrective action. Criteria for withdrawal appear at 40 CFR § 123.63. They include, but are not limited to, the following:

- (1) Where the state's legal authority no longer meets the requirements of Part 123, including:
 - (i) Failure of the state to promulgate or enact new authorities when necessary; or
 - (ii) Action by a state legislature or court striking down or limiting state authorities.
- (2) Where the operation of the state program fails to comply with the requirements of 40 CFR Part 123, including:
 - (i) Failure to exercise control over activities required to be regulated under Part 123, including failure to issue permits;
 - (ii) Repeated issuance of permits which do not conform to the requirements of Part 123; or
 - (iii) Failure to comply with the public participation requirements of Part 123.
- (3) Where the state's enforcement program fails to comply with the requirements of Part 123, including:
 - (i) Failure to act on violations of permits or other program requirements;
 - (ii) Failure to seek adequate enforcement penalties or to collect administrative fines when imposed; or
 - (iii) Failure to inspect and monitor activities subject to regulation.
- (4) Where the state program fails to comply with the terms of the Memorandum of Agreement required under §123.24.

While the petition and EPA's review were focused on Illinois EPA's implementation of the NPDES program for CAFOs, any action to withdraw Illinois' program would affect the entire program, not just the element pertaining to CAFOs. For point sources other than CAFOs, Illinois EPA has issued 1713 individual NPDES permits, and many more authorizations to discharge under general NPDES permits.

III. Petitioners' Allegations

Following is an overview of the allegations provided in Illinois Citizens' March 27, 2008, petition, and the February 20, 2009 supplement, submitted by Illinois Citizens and EIP.

- Illinois EPA has failed to issue permits to facilities that require them.
- Illinois EPA has failed to make a comprehensive survey of livestock facilities in Illinois to determine which ones are subject to CWA NPDES requirements.
- Illinois EPA does not have a standard in place for review of the siting and design of new and expanding facilities to determine if they require NPDES permits.
- Illinois fails to inspect and monitor activities subject to regulation.
- Illinois EPA has not conducted comprehensive inspections to determine which CAFOs need NPDES permits.
- Illinois EPA is not requiring regular inspections at Large CAFOs to determine compliance with NPDES program requirements.
- Illinois EPA fails to adequately respond to citizen complaints regarding CAFOs with proposed or actual discharges.
- Illinois CAFOs are not being assessed adequate penalties for violations.
- Illinois EPA fails to comply with public participation requirements.
- Illinois EPA has failed to comply with the terms of the Memorandum of Agreement required under 40 CFR §123.24, and Environmental Performance Partnership Agreements between Illinois EPA and EPA.
- Illinois EPA failed to make available to the public a copy of each NPDES permit application in response to citizen requests, as required under Section 402(j) of the CWA.
- Illinois will need to revise its permitting process to comply with the NPDES regulations and effluent limitations guidelines for CAFOs, consistent with the Second Circuit Court of Appeals decision in *Waterkeeper Alliance et al v. EPA*.

IV. Methods

EPA Region 5 developed a protocol (Appendix C) to guide the review of the allegations. The protocol consisted of:

Interviews

- Illinois EPA staff and managers at Field Offices and Headquarters
- Illinois Attorney General's Office staffperson

Illinois CAFO File Reviews

- Permit applications
- Compliance inspection reports
- Complaint investigations
- Enforcement actions

Document Reviews

- National Pollutant Discharge Elimination System, Memorandum of Agreement between the Illinois EPA and the EPA Region 5, October 23, 1977
- Illinois Performance Partnership Agreements, 2000-2009
- Illinois EPA 2004 Enforcement Management System

Meetings

- Members of Illinois Citizens regarding Illinois EPA's response to complaints

Permit Application Review: The review team reviewed 16 permit application files at two field offices, the Rockford Field Office and the Peoria Field Office. Reviews focused on the circumstances leading up to applications for permit coverage, and Illinois EPA's review and processing of applications.

Compliance Monitoring and Enforcement Review: EPA adapted templates from EPA's State Review Framework (SRF) to evaluate the compliance and enforcement aspects of Illinois EPA's NPDES program for CAFOs. The SRF is a tool that EPA uses to evaluate state performance in the NPDES compliance and enforcement program in a nationally consistent manner. The Framework provides a means to evaluate elements essential to the operation of an effective state program. These elements include: data completeness, timeliness, and quality; inspection coverage and quality; identification of violations; enforcement actions (appropriateness and timeliness); and the calculation, assessment, and collection of penalties.

EPA Region 5 randomly selected files that represent a stratified sample of facility sizes, and a variety of animal types. The random file selection was supplemented by the selection of additional files representing those facilities most likely to require permits: Large CAFOs and Medium CAFOs that have discharged in the past. Documents within the files could be classified into four major categories: complaints, inspections, pre-enforcement actions, and enforcement actions. Fourteen to twenty-three case files were reviewed at each of four Field Offices (Rockford, Peoria, Champaign and Marion/Collinsville).

V. Results

The results of EPA Region 5's investigation consist of:

- A summary of the Illinois NPDES program for CAFOs, as it is contemplated in state law, administrative rules, and written policies and procedures.
- Our findings as to the manner in which the Illinois NPDES program for CAFOs is actually being implemented. The discussion addresses whether Illinois EPA meets the minimum requirements for state programs set forth in 40 CFR Part 123, and addresses each major program area.

A. State law, administrative rules, and written policies and procedures.

Permit process: Illinois EPA's general authority to enforce environmental laws and administer a permitting program is provided by the Illinois Environmental Protection Act, 415 ILCS 5/1 (the Act), at Title III and X. The State of Illinois implements its regulatory scheme by way of the Illinois Pollution Control Board, which establishes NPDES permitting requirements for various classes of sources, and adopts substantive effluent limits and water quality standards under 35 Illinois Administrative Code (IAC) Subtitle C (Water Pollution) and Subtitle E (Agriculture Related Pollution). See 35 IAC Sections 304 and 502.

In particular, the Act authorizes the Board to issue regulations that "assure that no contaminants are discharged into the waters ... without being given the degree of treatment or control necessary to prevent pollution," including, among other requirements, water quality standards, effluent standards, standards for the issuance of permits, and inspection and monitoring requirements. Illinois Environmental Protection Act 415 ILCS 5/1, Sections 11 and 13. The Act directs the Board to adopt requirements, standards, and procedures which will enable the State to implement and participate in the NPDES program.

Regulations adopted by the Board prohibit the discharge of pollutants to waters of the State without an NPDES permit, and require compliance by permittees with effluent limitations and standards as established in permits. 35 IAC Sections 304 and 309. Section 309 establishes permit application requirements, including for animal waste facilities. Existing discharges are required to apply as of the effective date of the regulations, and new livestock facilities that are required to obtain a permit must apply no later than 180 days in advance of the date on which the facility is to commence operation minus the number of days of available storage time for installed manure storage structures. 35 IAC 309.103 and 502.205.

35 IAC Section 501 establishes specific requirements for livestock management facilities and livestock waste-handling facilities. Such facilities are required to comply with provisions of the Act and Board regulations, and with the CWA application requirements and feedlot effluent guidelines. The section requires specified persons operating livestock management facilities or livestock waste-handling facilities to apply for NPDES permits, although the threshold numbers

and types of animals that meet the State's criteria for operations required to apply for permit coverage are not fully consistent with current federal requirements. This section also continues to include the exemption from permitting for operations that only discharge in the event of a 25-year, 24-hour storm event. 35 IAC Section 502.102. EPA removed this exclusion from the federal regulations in 2003.

The Memorandum of Agreement (MOA) between Illinois EPA and EPA regarding Illinois EPA's administration of the NPDES program commits Illinois EPA to expeditious processing and issuance of all required NPDES permits, and to provide ongoing, timely and adequate review of permits. The MOA also commits Illinois EPA to comprehensively evaluate and assess compliance with effluent limitations and other permit conditions, and to maintain a vigorous enforcement program to take timely and appropriate enforcement action in every case where in the State's opinion such action is warranted².

As of the time of this report, the Pollution Control Board had not revised the State's NPDES regulations to incorporate either the 2003 or 2008 revisions to the federal CAFO rule. Federal regulations require approved states to revise their programs within one year after EPA revises the relevant federal regulations. The regulations provide two years if a state statutory change is required.

On October 20, 2009, Illinois EPA reissued a general permit for CAFOs. CAFO owners and operators required to have a permit under 35 Illinois Administrative Code 502, Subpart A or 40 CFR §122.23 are eligible for coverage under the permit.

Compliance/Enforcement: The Bureau of Water and its associated Field Offices evaluate compliance by point sources; work with Illinois EPA's Division of Legal Counsel to issue informal enforcement actions; and prepare referrals to the Illinois Attorney General's Office for enforcement in state court or before the Illinois Pollution Control Board.

Illinois EPA has defined the processes it will use to enforce the Act and regulations in its 2004 Enforcement Management System (EMS) document³. Illinois EPA's Bureau of Water- Field Operations Section (FOS) evaluates compliance and engages in enforcement activities. This work is done by personnel at both the Headquarters and Field Offices. The Headquarters Office is largely responsible for policy decisions, guidelines, regulatory interpretations, and formal enforcement actions, while the field offices conduct compliance assurance activities, informal enforcement actions, and provide support for some formal enforcement actions.

Compliance Monitoring and Evaluation: Compliance with the Act and the environmental regulations implemented by the Illinois EPA is primarily monitored through either field investigations or record reviews. FOS identify violations at CAFOs through inspections.

² As discussed in section V.B.5, annual commitments are further detailed in a two-year environmental Performance Partnership Agreement, or EnPPA. The EnPPA sets forth the joint environmental priorities and mutual interests, the desirable environmental outcomes, the performance expectations for the participating programs, and the oversight arrangements between the parties.

³ During the 2009 SRF review, EPA reviewers were told that the EMS was no longer operable as guidance for compliance and enforcement staff at Illinois EPA.

Inspections may be performed as a part of a program to routinely monitor compliance or in response to complaints received. In addition, follow-up compliance monitoring of enforcement orders or Compliance Commitment Agreements (CCAs) may involve both field investigations and record reviews.

Once violations have been identified, decisions are made by the Bureau of Water, Springfield, as to whether or not to take compliance/enforcement follow-up actions. The types of actions that may be taken are described in the “Enforcement Response Guidance” provided in the 2004 EMS document.

The EMS does not contemplate specific procedures for the conduct of compliance assurance activities. Illinois EPA does not provide inspectors any standard operating procedures for the inspection of CAFO facilities, or any checklists by which to evaluate facility compliance.

Enforcement Procedures: The 2004 Illinois EMS provides media-specific guidance on enforcement responses for wastewater violations. Table 2 of the EMS, labeled *Wastewater Compliance Enforcement Response Guidance*, provides specific recommendations for addressing various noncompliance issues. Based on the circumstances of the noncompliance, a range of response is provided. The first wastewater noncompliance type described in Table 2 is “Permit violations” including “Discharge without NPDES permit.” The Permit Violation section differentiates two circumstances: 1) Unintentional; first violation without documented environmental impact; and 2) Intentional; one or more times with or without documented environmental impact. In the latter case, the suggested range of response includes a Violation Notice, or formal enforcement such as civil or criminal referrals. A range of responses for Livestock Waste Management Violations are also described in the EMS document.

The following is a description of enforcement procedures contemplated within the State’s EMS:

Informal Warning Letters – Section 31 of the Act, as described below, requires that certain actions be taken when violations of the Act are found. However, an informal warning letter called the Noncompliance Advisory can be used, if appropriate, in lieu of the procedures under Section 31 of the Act. It is available for violations of lesser significance. If the Noncompliance Advisory results in a return to compliance in a set amount of time, the compliance is documented and no further action is taken. If compliance does not occur in a timely manner, the procedures under Section 31 are then followed.

- *Pre-Enforcement Procedures* – Section 31(a)(1) of the Act requires that Illinois EPA issue a Violation Notice within 180 days of becoming aware of a violation. Section 31(a)(2) provides that the alleged violator must respond within 45 days of receipt of the Violation Notice with rebuttal information, a proposed Compliance Commitment Agreement, and a meeting request if desired. If the alleged violator does not respond, Illinois EPA does not have further procedural obligations under Section 31. For instances where the alleged violator responds, the Illinois EPA can accept, modify or reject the Compliance Commitment Agreement depending on its contents, but a return to

compliance must happen in a timely manner⁴. For alleged violations that remain unresolved after following the procedures set out in Section 31(a), or where the alleged violator does not respond, the Illinois EPA may refer the matter to the Attorney General for further enforcement pursuant to Section 31(b) and Section 42 (Penalties). If the decision is to reject the Compliance Commitment Agreement, or if a failure to comply with the Compliance Commitment Agreement is discovered, a decision will be made to refer or defer formal enforcement, or take no enforcement action at all.

- *Section 43 Immediate Enforcement Referral Procedures* – In cases of substantial danger to the environment or to public health, Illinois EPA can immediately refer cases to the Attorney General under Section 43 of the Act without first completing the Section 31(a) procedures. In these circumstances, the Attorney General can institute a civil action for an immediate injunction to halt the dangerous activity. The State court may issue a temporary injunction and schedule a hearing on the matter within three days of that order. The usual eventual outcome in these instances is a final judicial order for compliance. According to the Illinois Attorney General's Office, section 43 immediate enforcement cases comprise approximately 75% of CAFO enforcement cases sent to the Attorney General.
- *Section 31(b) and 42(b) Traditional Enforcement Referral Procedures* – If formal enforcement is chosen to resolve a violation, Illinois EPA may refer the matter to the Illinois Attorney General's Office with a recommendation for resolution. When this decision is made, Illinois EPA's Division of Legal Counsel must send a Notice of Intent to Pursue Legal Action letter to the alleged violator under Section 31(b). The Notice of Intent to Pursue Legal Action affords the party another opportunity to confer. If the matter is referred, the Attorney General's Office sends a separate notice letter to the respondent. The case is then pursued by the Attorney General's Office through one of two routes: 1) before the Illinois circuit court, which can issue an order (for penalties and/or injunctive relief) that is independently enforceable if violated, or 2) before the Illinois Pollution Control Board, which can issue an order (including penalties, but not injunctive relief, except for a requirement to seek permit coverage) that is not independently enforceable if violated. The Attorney General's Office must represent Illinois EPA in all matters before either legal tribunal. If a Pollution Control Board order is violated, the Attorney General's Office may litigate the matter before the state circuit court. Illinois citizens have no known statutory right of intervention in these enforcement actions. Illinois EPA does not have authority to issue administrative orders, to assess penalties, or to require submittal of information.
- *Criminal Referrals* – Cases that are believed to involve criminal activity will be processed by criminal staff within Illinois EPA. Illinois EPA may refer a criminal case to

⁴ Accepted CCAs will result in a return to compliance (or promise to cease and desist when a return to compliance is not possible for a past violation) within one year of the date of the CCA. CCAs with longer compliance plans shall only be accepted with the approval of the applicable bureau chief and the Chief Legal Counsel and shall include the following elements: compliance plan with enough specificity to show that the plan is achievable; specific completion date; interim milestone dates for significant steps.

the Attorney General, the Illinois State Police, or to the State's Attorney in the county where the violation occurred.

Public Access to Information: Federal regulations under the CWA provide that information provided in state NPDES application forms may not be claimed confidential. 40 CFR §122.7 (b) and (c).

The Illinois Freedom of Information Act (IFOIA) provides that "Each public body shall make available to any person for inspection or copying all public records, except as provided in Section 7." Section 7 lists the exemptions to requests for information. There is no exemption for NPDES permit applications. §§ 3 (a) and 7 of the IFOIA, 5 ILCS 140/3 and 7.

The Illinois Environmental Protection Act provides that all records of Illinois EPA shall be open to reasonable public inspection and copying with limited exceptions. §7 of the Illinois Environmental Protection Act, 415 ILCS 5/7. Under 35 IAC 309.185, Illinois EPA is required to assure public access to information pursuant to section 7(b) of the Illinois Environmental Protection Act.

B. The Illinois NPDES program for CAFOs as implemented

1. Permitting Program

Allegation: Illinois EPA has failed to Issue Permits to CAFOs that Require Them.

Program Requirements: Under 40 CFR 123.25, state NPDES programs must (1) have a law or administrative rule that requires all CAFOs that discharge or propose to discharge to apply for an NPDES permit and (2) must administer their programs in accordance with the permit application requirement. Under 40 CFR 123.63(a)(2)(i), the failure to issue permits is a criterion for withdrawal of a state NPDES program.

Illinois EPA provided a list of CAFO individual and general permits as of the time of the review (Attachment A). The list includes 12 facilities that have been covered by NPDES permits. Of the 12 CAFOs that have had permit coverage at one time or another, only two, Mulberry Pork Producers and Heller Brothers, were listed as being covered by a permit at the time of EPA's review (the April 2004 general permit, which expired in April 2009). Neither of these operations had submitted a renewal application at the time of EPA's review; Illinois EPA informed Heller Brothers in January 2009 that it was not required to have an NPDES permit.

Illinois EPA also provided the Review Team a spreadsheet of CAFOs which it believes are required to obtain an NPDES permit (Attachment B). The spreadsheet indicates when applications were submitted, and their current status. As of April 2009, Illinois EPA was tracking 76 facilities which it believes are required to obtain an NPDES permit. Sixty-four of those have submitted permit applications. All of the applications were originally submitted to the Agency's headquarters in Springfield. They have subsequently been sent to personnel in the appropriate Field Office for review and processing. Many of the

applications remained in the Headquarters office for years (as far back as 1997 in some cases) before being forwarded to the appropriate Field Office in mid 2008. All applications submitted to the Agency since mid 2008 were forwarded to the appropriate regional office upon receipt.

Files reviewed in the Field Offices indicated that applications had been submitted to Illinois EPA between four and ten years prior to EPA's review. These timeframes were evident even in cases where the need for a permit was mandated by a court order or originated with a discharge event documented by Illinois EPA⁵.

As of August 2009, FieldOffice staff had determined that eight of the facilities which Illinois EPA had identified as needing permits were ready to be permitted. Illinois EPA reissued its general permit for CAFOs in October 2009⁶.

In some facility files reviewed, Illinois EPA had issued three to four notices of incomplete applications. In some cases, Illinois EPA provided its initial notice regarding an incomplete application shortly after submittal of the original application. Where Illinois EPA has sent multiple notices, the language used to specify the consequences of failing to submit the required information varies, and the letters do not compel submittal of a complete application. Nor did the review team find any enforcement actions to compel complete applications.

Illinois EPA provided a list of 45 facilities that applied for NPDES permits, some as long as 10 years ago (Attachment D). The list indicates that these facilities do not need NPDES permits, many because of "no discharges." Seven of the facilities were either out of business, or were never built. For one of the files reviewed from this list, the facility had a documented discharge from a lagoon subsequent to Illinois EPA's determination that it did not need a permit⁷. In general, where a facility applies for an NPDES permit, that action indicates the need for a permit, and Illinois EPA is obligated to either issue or deny a permit after reviewing the application and providing for public comment.

During the 2004-2008 period, between 36 and 59 percent of the facilities evaluated in Illinois EPA's Livestock Facility Investigation Annual Reports had at least one regulatory violation, many related to discharges of manure, litter or process wastewater. However, only a small percentage of Illinois' estimated 500 Large CAFOs have applied for permits on their own volition. Other states in EPA Region 5 have addressed potential gaps between permitted CAFOs and those lacking the regulatory control afforded by

⁵ See Attachment C for a case study showing that a permit had not been issued ten years after application submittal, even where the CAFO was mandated by court order to apply for an NPDES permit following a discharge event documented by Illinois EPA.

⁶ Any Illinois CAFO required to apply for an NPDES permit may seek coverage under this general permit. CAFOs may alternatively seek coverage or be required by Illinois EPA to seek coverage under an alternative general permit (if issued), or an individual permit.

⁷ See Attachment C for a case study showing a CAFO with a discharge from its lagoon subsequent to Illinois EPA's determination that it did not discharge, and therefore did not need an NPDES permit.

permit coverage by establishing unambiguous requirements for CAFOs to apply for permits.

Based on the above, EPA Region 5 finds the following:

- a) With limited exceptions, Illinois EPA has not issued NPDES permits to CAFOs that have applied for them.**
- b) In some cases, Illinois EPA has sent applicants multiple notices of incomplete applications. The notices do not compel submittal of a complete application. Consequences for failing to submit the required information were not found by the Review Team.**
- c) Illinois EPA has determined that another group of 45 facilities that applied for NPDES permits, some as long as 10 years ago, do not need permits. Where a facility applies for a permit, Illinois EPA is obligated to either issue or deny a permit after reviewing the application and providing for public comment.**
- d) A significant percentage of the facilities evaluated in Illinois EPA's Livestock Facility Investigation Annual Reports had at least one regulatory violation, many related to discharges of manure, litter or process wastewater. Only a small percentage of Illinois' estimated 500 Large CAFOs have applied for permits on their own volition.**

2) Compliance Evaluation/Inspection Program

a) Surveys to Identify Facilities Subject to NPDES Regulation

Allegations:

- Illinois EPA has failed to make a comprehensive survey of livestock facilities to identify which ones are subject to CWA requirements.***
- Illinois EPA does not have a standard in place for review of siting and design of new and expanding facilities to determine if they require NPDES permits.***

Program Requirements: Under 40 CFR 123.26(b)(1), a state must have a program which is capable of making comprehensive surveys of all facilities and activities subject to the Director's authority to identify persons subject to regulation who have failed to comply with permit application or other program requirements.

Past discussions between EPA and Illinois EPA addressed the need for Illinois EPA, with assistance as appropriate from EPA, to develop a comprehensive inventory of CAFOs in Illinois. Such an inventory would provide a basis for Illinois EPA to define the universe of CAFOs potentially needing to obtain NPDES permit coverage.

As part of its NPDES program oversight process, EPA annually conducts a "Joint Evaluation" with NPDES-authorized states to assess program performance. In its

response to EPA comments on the 2008 Joint Evaluation, and in discussions with Illinois EPA managers as part of this review, Illinois EPA cited numerous problems with establishing a statewide inventory. Barriers to creating an inventory include the time and resource demands of aggregating data from Agency and other sources, and the State's perception that such data is of limited utility.

While Illinois EPA has not developed a statewide inventory, all of the Field Offices maintain and provided lists of known or possible CAFOs. Data in field offices are expressed as animal units, not animal numbers as provided in the federal regulations. The lists vary in the level of detail. For example, the list from the Rockford Field Office consisted of only the facilities names and addresses. Rockford staff expressed a lack of confidence that the list was comprehensive enough to identify those facilities needing permits. In contrast, the Peoria and Collinsville/Marion Field Offices actively maintain their lists, which include information regarding the type of animal, animal units onsite, and the type of waste storage systems. These regions use the lists for inspection scheduling and tracking, and add facilities as they become known.

Through informal means, most Illinois EPA regional offices have been able to obtain information from the Illinois Department of Agriculture (IDA) regarding registrations of new sites, including the implementation of setback provisions, and/or manure management plan (MMP) registrations, from their counterparts at IDA regional offices. The Livestock Management Facilities Act (LMFA) (510 ILCS 77/1 et seq.) and associated rules (8 Illinois Administrative Code Part 900) give the IDA primary authority over the design, construction, and operation of livestock management and livestock waste-handling facilities in the State. The Act also establishes procedures and criteria for the siting of facilities. Compliance with the LMFA requires operators to submit a Notice of Intent to Construct for new facilities and to register livestock waste lagoons. The LMFA also states that facilities with 300 or more animal units must be supervised by a certified livestock manager; facilities with over 1000 animal units must certify their livestock waste management plans.

Illinois EPA does not have formal agreements in place allowing the Agency to receive facility information from IDA. A Notice of Intent to Construct (NOITC) application must be filed with IDA for new and/or expansions of livestock facilities. Though the NOITCs are posted on IDA's website, the NOITC filing is only the initial step in the LMFA approval process. According to IDA's LMFA website, once a facility is deemed compliant with all applicable provisions of the Act, including but not limited to the NOITC filing requirements, construction plan provisions, public informational meeting requirements (if applicable), various construction-related certifications, and any specific manure management planning requirements, the overall project is approved and the facility may begin operation. No mention is made in public information regarding the LMFA of the potential need for the facility to apply for an NPDES permit.

In part because Illinois EPA does not have a formal mechanism by which it can regularly receive information regarding new or proposed CAFOs from IDA, it does not have a comprehensive list of facilities with NOITCs approved by IDA. Illinois EPA staff indicated that it can be difficult to know whether a proposed facility has been constructed and when the facility may go into operation.

EPA provided Illinois EPA with a list of CAFOs that have received IDA approval of NOITCs from IDA since 2003. Illinois Citizens had obtained the list from IDA as a result of a FOIA request. Staff from the Field Offices were interested in comparing the list with their lists of CAFOs, and indicated that regular updates of that list would be useful.

Field Office staff also indicated that they may learn of facilities from the Illinois Emergency Management Agency (IEMA) as a result of a manure spill. Inspectors frequently respond to spill incidents occurring within their region, and will respond to incidents outside their boundaries as needed to maintain coverage.

While Illinois EPA does not have a formal inventory of CAFOs, the Agency does have data sources that may serve as a foundation for inventory development. Currently, the Agency has four databases that serve differing needs: 1) the CAFO tracker is maintained to track permit issuance status; 2) the complaints and inspection database is managed and populated by field office inspectors; 3) the Violation Notice, or “VN” tracking system follows the issuance of informal enforcement actions; and 4) the Division of Legal Counsel (DLC) maintains a list of enforcement actions. The complaints and inspection database is the most comprehensive of these lists, as it reflects most facilities for which the Field Operations Section has had contact. Five of the Illinois EPA’s seven field offices maintain current data in this database⁸. This database could serve as the Agency’s primary data source for the development of a comprehensive inventory. The complaints and inspection database is also appropriate as the foundation for Illinois EPA’s CAFO inventory since it is maintained by Illinois EPA inspectors as they inspect/survey facilities over time.

Based on the above, EPA Region 5 finds that Illinois EPA does not currently have a statewide comprehensive survey of CAFOs which may be subject to NPDES permit requirements. However, all of the field offices maintain lists of known or possible CAFOs. These lists vary in the level of detail and specificity provided with respect to NPDES requirements.

Illinois EPA does not have a formal agreement with IDA to provide plans for new and expanded livestock facilities submitted to IDA. Lacking complete access to these plans, Illinois EPA is unable to review plans for new and expanded facilities to identify livestock operations as CAFOs that are subject to permit application requirements.

⁸ As of the time of the review, Field Offices 1 and 2 had not entered any data into the central database since 2007.

b) Inspection coverage

Allegations:

- ***Illinois EPA has not conducted comprehensive inspections to determine which CAFOs need NPDES permits.***
- ***Illinois fails to inspect and monitor activities subject to regulation.***
- ***Illinois EPA is not requiring regular inspections to determine compliance with NPDES program requirements at Large CAFOs.***

Program Requirements: Under 40 CFR 123.26(b), state programs shall have inspection and surveillance procedures to determine, independent of information supplied by regulated persons, compliance or noncompliance with applicable program requirements. 40 CFR 123.26(b)(2) states that programs shall have a program for periodic inspections of the facilities and activities subject to regulation.

Under 40 CFR 123.63(a)(3)(iii), failure to inspect and monitor activities subject to regulation is a criterion for withdrawal of a state NPDES program.

To assess whether Illinois EPA is meeting its program requirements with respect to inspections, EPA evaluated 1) the adequacy of the procedures employed by inspectors in determining whether or not CAFO facilities were in compliance with NPDES requirements, and 2) whether or not the Illinois EPA has met its obligations for periodic inspection of facilities potentially subject to regulation.

As specified in EPA's NPDES Compliance Inspection Manual (July 2004), the primary role of a CAFO inspector is to gather information to evaluate compliance with NPDES CAFO permit conditions. Inspectors also identify facilities subject to regulation through compliance monitoring of unpermitted animal feeding operations (AFOs). Facilities should be inspected to determine whether they meet the definition of a CAFO and whether the facility discharges or proposes to discharge and should have an NPDES permit. The CAFO inspector plays an important role in enforcement case development and support, as well as permit development.

In order to provide an objective assessment of Illinois EPA's inspection of livestock facilities, EPA Region 5 randomly selected files that represent a stratified sample of facility sizes, and a variety of animal types. The random file selection was supplemented by the selection of additional files representing those facilities most likely to require permits: Large CAFOs and Medium CAFOs who have discharged in the past. A checklist was used to determine the degree to which inspection reports properly document observations, and whether reports provide sufficient information to lead to an accurate compliance determination (see Appendix D: Inspection and Enforcement Review Protocol).

EPA Region 5 reviewers' observations regarding inspection program performance are detailed below. Where Illinois EPA lacks written guidance, such as a policy

regarding the timeliness of inspection report completion, EPA policy was used as the standard for comparison. The quantitative metrics developed from the file reviews are indicators of performance based on available information.

Table 1: Evaluation of Illinois EPA Inspection Program Implementation

File Review Parameter	Value	Initial Findings and Conclusions	Assessment
# of inspection case files reviewed.	72	A ten-year time period, from 1999-2009, was reviewed to assess the history of inspections and facility compliance with NPDES requirements. In many cases, more than one inspection report was reviewed in a case file; nonetheless, the count was 1 (file) for purposes of the inspection metrics.	
% of inspection reports reviewed that are complete.	48%	Major deficiencies observed in the completion of inspection reports included a substantive lack of detail about the facility, including the number and type of livestock; incomplete descriptions of the areas of the facility examined; and little narrative explanation in the inspection report.	Significant area of concern. Complete inspection reports are critical to making accurate NPDES compliance determinations.
% of case files reviewed that provide sufficient documentation to lead to an accurate compliance determination.	68%	49 out of 72 inspection case files reviewed had one or more inspection reports that provided sufficient information to lead to an accurate compliance determination. Illinois EPA also performs a large number of informal inspections that would be classified as reconnaissance inspections, usually conducted in response to complaints. Very few of these inspections are as comprehensive as needed to determine compliance with NPDES requirements.	Significant area of concern. The 23 case files with insufficient documentation frequently lacked evidence such as lab reports and photographs needed to make a compliance determination.
% of inspection reports reviewed that are timely.	68%	Among Illinois EPA staff interviewed during the review, there was a general consensus that reports should be produced within 30 days of the inspection. Reports from four of the five Field Offices reviewed did not distinguish between the inspection date and the report date, making determination of timeliness difficult. Reviewers frequently determined timeliness based on other documents within the case files. 67.6% of the case files reviewed contained timely inspection reports. 25% of the files contained insufficient documentation to determine how timely inspection reports were.	Area of concern. Due in part to a lack of Standard Operating Procedures for CAFO inspections and inspection reports, it was difficult to determine how timely inspection reports were. Inspection reports need to differentiate between inspection date and report date.

The deficiencies noted in the collection and documentation of inspection data by Illinois EPA's inspectors significantly impair Illinois EPA's ability to make accurate NPDES compliance determinations. Basic information is often missing from inspection reports, such as the location of the facility, the number and type of livestock maintained onsite, the areas of the facility inspected, and whether or not the facility had permit coverage or had applied for a permit. The absence of such data renders the report incomplete, and does not enable the reader to determine whether or not a facility is an AFO or a CAFO.

Thirty-two percent of inspection reports were also found to be lacking sufficient detail to allow an accurate determination of compliance. As recommended in Chapter 16 of the NPDES Compliance Inspection Manual, an inspection report should include an inspection checklist, any documentation copied during the inspection, an explanation of findings, and supporting documentation such as photographs. Many of Illinois EPA's inspection reports were lacking any narrative communicating the inspector's observations, or any photographs and/or sampling data documenting the findings of the inspection. Narrative findings should include observations regarding whether or not the facilities had a release or discharge of manure and/or wastewater. These deficiencies limit Illinois EPA's ability to accurately make compliance determinations.

Illinois EPA is also limiting its ability to identify facilities needing NPDES permits, and to monitor the return to compliance by facilities subject to pre-enforcement or enforcement actions, because it is not consistently monitoring CAFO facilities on a routine, planned basis. Illinois EPA staff indicated that planned inspections, including follow-up at facilities known to have been in noncompliance, may not be completed due to the demands of responding to large numbers of complaints. The primary reason for inspections of CAFOs, as stated by Illinois EPA inspectors, was complaints received and follow-up after such complaints. Although Illinois' goal is to inspect each CAFO at least once every five years, Field Office staff estimated that inspections in response to complaints make up about 75 percent of livestock inspections conducted. For the 2004-2008 period, the Peoria Office received well over 200 complaints of all types each year. On average, thirty-seven percent (91 facilities) of these complaints were livestock-related, requiring further investigation by field personnel. Facilities subject to complaint may also be AFOs not subject to permitting requirements, as indicated by staff at the Springfield Office, which inspected approximately 50 non-CAFO livestock facilities in 2007 and 2008.

Review of case files showed that some facilities under informal enforcement through a Violation Notice with a Compliance Commitment Agreement were not monitored for time periods as long as five to ten years. As a result, many of these facilities were in ongoing noncompliance. The Review Team observed that the lack of permit coverage for these CAFOs likely contributes to ongoing noncompliance, as well as to the number of complaints to which inspectors must respond. Regulatory conditions are not in place that could prevent some problems from developing and/or continuing. As a result, the nature of most completed inspections is not to determine compliance or noncompliance with NPDES program requirements but to respond to citizen complaints.

Prior to 2009, there appears to have been no central coordination in the planning of CAFO inspections despite ongoing commitments to perform inspections. In 2008, Illinois EPA committed in its EnPPA to implement the National Compliance Monitoring Strategy (CMS) in Fiscal Year 2009. This national strategy calls for states to inspect all Large CAFOs within five years, and regularly thereafter, to determine whether the facility discharges or proposes to discharge. The CMS also

calls upon states to inspect medium AFOs one time to determine whether they are Medium CAFOs, and are therefore required to apply for an NPDES permit. After the initial assessment, for facilities that are not medium CAFOs, states should inspect and designate those facilities as needed based on citizen complaints or other information that indicates whether they are significant contributors of pollutants. The CMS calls for similar efforts regarding small facilities. Several of the Field Offices have been attempting to inspect CAFO facilities on a routine five-year basis, with limited success. Routine inspection efforts by all Field Offices are frequently limited by workload issues, including the review of NPDES permit applications. In 2009, the first year Illinois EPA was to adopt the CMS, the Illinois EPA Field Operations Section issued a spreadsheet to the Regional Field Offices listing a limited number of CAFOs requiring inspection and monitoring. For Fiscal Year 2009, Illinois EPA did not meet the CMS goals set forth in the EnPPA.

Based on the above, EPA finds that Illinois EPA has serious deficiencies in its program for determining compliance or noncompliance with applicable program requirements. Illinois EPA does not have inspection and surveillance procedures sufficient to determine compliance or noncompliance with applicable program requirements.

EPA also finds that Illinois EPA has not been conducting periodic inspections of CAFOs that may be subject to NPDES regulation. Illinois EPA has not met its EnPPA commitments to implement the National Compliance Monitoring Strategy, including the goal to inspect CAFOs on a routine five-year basis.

c) Response to Citizen Complaints

Allegation: Illinois EPA fails to adequately respond to citizen complaints regarding CAFOs with proposed or actual discharges.

Program Requirements: Under 40 CFR 123.26, state programs shall have procedures for receiving and ensuring proper consideration of information submitted by the public about violations. Public effort in reporting violations shall be encouraged, and the State Director shall make available information on reporting procedures.

Under 123.27(d), authorized states shall provide for public participation in the enforcement process by providing either authority which allows intervention as of right in any civil or administrative action by any citizen having an interest which is or may be adversely affected, or assure that the state agency or enforcement authority will, among other requirements, investigate and provide written responses to all citizens complaints submitted pursuant to the procedures in 123.26(b)(4).

Illinois EPA field office inspectors respond to numerous citizen complaints regarding a range of issues, including spills, unauthorized discharges, and odor. Though the inspectors will try to meet the needs of the complainant through a telephone call, a site visit is frequently required. A considerable amount of time is spent by Field

Operations Section inspectors responding to and investigating odor complaints. The investigations are to determine whether violations of air pollution-related nuisance provisions have occurred under the Illinois Environmental Protection Act. These complaints are recorded on a "Livestock Odor Complaint and Log Form" to facilitate the gathering of data from complainants. Odor complaint investigations are a specific subset of inspections. While the implementation of statutes other than the Clean Water Act is beyond the purview of this review, this observation is of significance due to its impact on the workload of the Bureau of Water field inspectors.

Tracking complaints received, and the response to these complaints, has proven challenging for the Illinois EPA. Illinois EPA has a statewide database of livestock and/or CAFO complaints, which usually includes the follow up actions taken. This database is not consistently maintained by all Regional Field Offices, however. Data compiled includes the nature and source of the complaint, and the resulting action by the field office, but does not indicate if follow-up is conducted with the complainant.

While Illinois EPA inspectors respond to numerous citizen complaints regarding a variety of issues at livestock facilities, it is not clear whether Illinois EPA consistently provides a written response to the complainant. Illinois EPA does not have procedures developed to ensure proper consideration of information submitted by the public regarding such potential violations. Such procedures, accompanied by appropriate staffing, would allow Illinois EPA to provide appropriate responses to citizens' complaints.

3) Enforcement Programs

Allegation: Illinois CAFOs are not being assessed adequate penalties for violations.

Program Requirements: Under 40 CFR 123.27, "Requirements for enforcement authority," states administering NPDES programs must have available remedies for violations of State program requirements. These remedies must include a mechanism to stop any unauthorized activity which is endangering or causing damage to public health or the environment, and the ability to seek or assess specified civil or criminal penalties for violation of state program requirements.

Further, 40 CFR 123.63(a)(3) states the following are criteria for withdrawal of a state program: Where the State's enforcement program fails to comply with the requirements of this part, including: (i) Failure to act on violations of permits or other program requirements; (ii) Failure to seek adequate enforcement penalties or to collect administrative fines when imposed.

a) Enforcement Activities

Addressing the Petitioners' allegations regarding the assessment of penalties first requires evaluation of whether or not Illinois properly exercises enforcement authority to stop activities that may be in violation of NPDES program requirements. Where noncompliance has been discovered, enforcement action is needed. The goal of enforcement is to provide a rapid resolution to environmental hazards, and to achieve a return to compliance by noncompliant facilities.

Section 31 of the Illinois Environmental Protection Act describes the procedures, timelines, and management controls associated with pre-enforcement and enforcement referral activities in response to findings of noncompliance. As discussed in EPA's 1989 National Enforcement Management System (EPA EMS) policy, guidance on the appropriate enforcement action for specific types of violations should be defined in an Enforcement Management System (EMS) document. Although Illinois EPA indicated during the 2009 State Review that it is not currently employing the 2004 Illinois EMS, the practices described in the document are reflective of current practice with respect to CAFOs.

Determination of the levels of follow-up action for specific violations is made by personnel at the Bureau of Water, with legal consultation as needed. EPA allows that informal pre-enforcement activities may be appropriate in response to inspection findings of noncompliance where violations are minor in nature. Informal pre-enforcement actions such as Noncompliance Advisory letters should only be used where conditions permit a prompt return to compliance with all applicable statutory provisions and regulations. Where pre-enforcement actions have not succeeded in achieving compliance, and/or the nature of the violation is more serious, formal enforcement is generally more appropriate. Formal enforcement, as defined in the EPA EMS, requires specific actions to achieve compliance to be completed on a finite schedule. Formal enforcement actions should also contain consequences for noncompliance that are enforceable independent of the original violation, and subject the facility to adverse legal consequences for noncompliance. Formal enforcement may include the assessment of civil and/or criminal penalties.

Illinois EPA's informal enforcement process begins with the issuance of a Noncompliance Advisory or a Violation Notice. The Illinois EMS allows up to 60 days to issue a Noncompliance Advisory from the date a violation is identified and 165 days to issue a Violation Notice. The enforcement referral process allows 90 days from the date an enforcement decision is made to the date a referral package is due to management.

CAFO enforcement program elements examined included appropriateness and timeliness of enforcement actions, and calculation, assessment and collection of penalties. Fourteen to twenty-three complete case files were reviewed at each Field Office visited. Overall, 90 pre-enforcement and enforcement action files were reviewed.

Pre-Enforcement/ Enforcement Actions

The pre-enforcement/enforcement action category includes five types of actions: Noncompliance Advisories; Violation Notices with Compliance Commitment Agreement approvals; Notices of Intent to Pursue Legal Action; Section 43 Immediate Enforcement Referrals; and Consent Decrees. Actions taken by the Illinois Attorney General's Office, or the Illinois Pollution Control Board, were reviewed solely in the context of their relationship to the effectiveness of Illinois EPA enforcement.

EPA reviewers examined whether or not Illinois EPA's enforcement responses returned, or were likely to return, facilities to compliance with the CAFO regulations applicable at the time of the enforcement response⁹. Determining whether or not a given enforcement action returned, or will return, a facility to compliance often involved looking beyond actual discharges to evaluate other factors such as substantial failure to implement best management practices; failure to meet major milestones required in a permit or a judicial or administrative order, or failure to submit timely reports as required. Whether or not an action by Illinois EPA would return the facility to compliance in the future was, in part, also determined by whether or not the pre-enforcement/enforcement action included an enforceable schedule for implementation of appropriate injunctive relief, and whether or not a facility that required a permit was ordered to apply for one.

The reviewers also examined whether or not the enforcement response was appropriate to the violation, and whether or not the responses were taken in a timely manner. The EPA EMS encourages all CWA violations be reviewed and considered for appropriate follow-up enforcement action. Important considerations include the type, duration, frequency, and outcome of any violation or deficiency. If violations persist without resolution, the NPDES authority should initiate formal enforcement action with an appropriate penalty, particularly if the facility has failed to correct violations that were noted during the compliance evaluation or fails to comply with conditions related to an informal action.

⁹ e.g., per the 2000-2004 EnPPAs, Illinois EPA committed to the following: "for CAFOs with 1000 or more animal units, the Agency will enforce the duty to apply for an NPDES permit...For CAFOs with more than 300 but less than 1,000 animal units that are subject to enforcement...the Agency's enforcement will result in either (1) a change in the design or operation of the facility, or both, such that the facility no longer is a CAFO point source or (2) the submission of an application for a NPDES permit".

Table 2: Evaluation of Illinois EPA Enforcement Program Implementation

File Review Parameter	Value	Initial Findings and Conclusions	Assessment
# of enforcement case files reviewed ¹⁰	56	A total of 90 pre-enforcement/enforcement actions in 56 case files were reviewed.	The majority of the enforcement responses were informal. The number and type of action issued is detailed below. NCA: 36 VN with CCA: 32 NIPLA: 13 Section 43 Referral: 2 Consent Order: 7
% of enforcement responses that have returned or will return a source in noncompliance to compliance.	46%	26 of the 56 case files had enforcement responses that, in the past ten years, have returned or will return a facility in noncompliance to compliance with basic provisions of the CWA. A determination of whether or not a facility has returned, or is likely to return, to compliance could not be made for 4 facilities (7%). <ul style="list-style-type: none"> • 17 of 36 NCAs (47%) did not/will not return the subject facilities to compliance. • 20 of 32 VNs (62.5%) did not/will not return the subject facilities to compliance 	Significant area of concern. Over fifty percent of the actions were NCAs or VNs which have failed or were likely to fail to bring the subject facility into compliance.
% of enforcement responses reviewed that are appropriate to the violations.	54%	The majority of the enforcement responses reviewed were appropriate to the violation when reviewed against the procedures required by Section 31 of IL's environmental law. However, only 27 of 50 (54%) of these responses would be considered appropriate, according to national policy for addressing the violations apparent in the case histories.	Significant area of concern. Based on factors such as the severity of the discharge, the recalcitrance of the facility, and the environmental damage caused, many cases should have been elevated to a Violation Notice or formal enforcement earlier.
% of enforcement responses reviewed that are taken in a timely manner.	34%	17 of 50 enforcement responses were taken in a timely manner. 16 of 53 were not taken in a timely manner. For an additional 17 files, the timeliness of the enforcement actions could not be determined.	Significant area of concern. The timeliness of enforcement response to violations can be improved by establishing and following further guidance on appropriate and effective enforcement through an Enforcement Management System

¹⁰ As described on p. 18, Illinois EPA has not routinely gathered information on the size and type of livestock maintained on CAFO/AFO facilities inspected. A similar deficiency was noted when reviewing enforcement actions taken; the review team could not adequately differentiate whether actions taken were against AFOs or CAFOs.

When it identifies violations, the Illinois EPA will often issue an informal enforcement action in the form of a Noncompliance Advisory. Per the Illinois EMS, if a Noncompliance Advisory is issued, the return to compliance must be achieved within 150 days of the violation date. These advisory letters, however, appear to be of varying effectiveness for returning a facility to compliance. As indicated in Table 2, 47% of the facilities reviewed returned to compliance after receipt of a Noncompliance Advisory¹¹.

Illinois EPA may employ a Violation Notice for an escalation of enforcement. A Violation Notice with Compliance Commitment Agreement must be recommended by the Field Office to a management decision-making group at the Bureau of Water in Springfield. Facilities receiving a Violation Notice must respond within 45 days identifying facility-specific activities and timeframes by which they will resolve violations. The informal enforcement process is concluded with a Compliance Commitment Agreement acceptance or rejection letter. If the Compliance Commitment Agreement is accepted by the facility and Illinois EPA, the facility is determined to be in compliance during the duration of the Agreement. Rejected Compliance Commitment Agreements are one basis upon which the Agency may seek a formal action in the form of a referral to the Office of the Attorney General, the State's Attorney, or EPA.

In over 50% of the cases reviewed, the original response by Illinois EPA was insufficient to resolve the violations and bring the facility back into compliance. Attachment C provides examples where Illinois EPA enforcement responses did not return facilities to compliance. Some, but not all, of these cases of continuing noncompliance, including rejected Compliance Commitment Agreements, were referred for formal action. As stated in EPA guidance documents, when one or more noncompliance conditions occur at a single site, the enforcement response should be weighted toward the strongest response option, in light of previous responses taken at the facility. Larger or more sophisticated facilities may warrant stronger enforcement responses.

The authority to enforce against violations is maintained by a management group in the Bureau of Water. This group will consider action – either a Violation Notice or a “no action” decision – in the event that the Noncompliance Advisory is not successful in obtaining compliance, or when the violations are serious enough to warrant a stronger response. If this management group makes a “no action” decision despite continuing noncompliance, the Illinois EMS specifies this decision must be adequately documented to the file. Clear documentation of these decisions was not readily apparent in all case files. It is also unclear to what extent “no action” recommendations by this group are communicated to Field Offices and inspectors.

¹¹ The Illinois EMS states that if a facility returns to compliance, “it can be documented (*e.g.*, reinspection or report from violator) to the appropriate file and no further enforcement taken.” As stated in Section V. B. 2. b. above, follow-up inspections may not be conducted. In such cases, a determination of return to compliance cannot be made.

When a Violation Notice with Compliance Commitment Agreement is authorized by the management group, a Compliance Commitment Agreement received from the facility is one determinant of the response by Illinois EPA. If the decision is to reject the Compliance Commitment Agreement, or if a failure to comply with an accepted Compliance Commitment Agreement is discovered, it is Illinois EPA's policy that a recommendation on the matter be presented to the "Enforcement Decision Group", a higher level management group authorized to make enforcement decisions for the Bureau of Water. This group may decide to: 1) to refer the case for formal enforcement; 2) defer enforcement; or 3) not pursue enforcement. Anecdotal evidence from Illinois EPA managers and staff has indicated that resource issues frequently have a large influence on the decision whether or not to escalate enforcement, independent of proof of noncompliance.

In Table 2 of the Illinois EMS, labeled *Wastewater Compliance Enforcement Response Guidance*, the recommended responses for CAFO facilities are inconsistent with those recommended for permit violations and wastewater noncompliance issues regarding other point source dischargers. For wastewater compliance issues in general, a Violation Notice or a referral for formal enforcement is the suggested response for "Discharge without NPDES permit," where the discharge is intentional and/or has occurred one or more times without a documented environmental impact. For livestock facilities, however, a Violation Notice or formal enforcement is only suggested where a livestock waste discharge has a documented environmental impact, or there is evidence of negligence or intent. Although Illinois EPA has indicated it is not currently employing the 2004 EMS, the practices described in the document are reflective of current practice with respect to CAFOs. By applying a standard of documented environmental harm, Illinois has not consistently escalated enforcement against CAFOs with chronic problems consistent with the general EMS responses for "discharge without a permit."

While Illinois strives to meet the timeframes in its EMS for enforcement action, a Violation Notice with a Compliance Commitment Agreement may not return facilities to compliance within a reasonable timeframe. EPA policy requires that a facility that has been found to be in serious or chronic noncompliance be corrected or that a formal enforcement action be initiated within a specified period of time. Illinois EPA's EMS should provide the criteria by which staff can make this determination, either generally or with respect to livestock facilities, and the case files should contain the documentation of that decision. Illinois EPA should also track the timeframes in which facilities achieve compliance¹².

EPA recognizes that Illinois EPA's lack of independent formal administrative enforcement authority, such that the Agency must pursue formal action from the

¹² During the 10-year period examined, only 20 of the 32 facilities reviewed that were under Violation Notices with Compliance Commitment Agreements were determined by reviewers to have returned to compliance. Reviewers were unable to determine the time these facilities took to return to compliance based on information provided in case files.

Illinois Pollution Control Board through referral to the Attorney General's Office, lessens the number of options available.

Based on the above, EPA finds that Illinois EPA frequently fails to act in a timely and/or appropriate way in response to violations of NPDES program requirements applicable to CAFOs. Half of the pre-enforcement/enforcement actions examined for livestock operations did not result in the facility returning to compliance, or did not appear likely to return a facility to compliance in the future.

According to its EMS, Illinois EPA's escalation of enforcement for CAFO violations is not consistent with responses Illinois EPA would pursue regarding noncompliance by other types of point source dischargers. In addition, the EMS does not include a requirement for a CAFO to apply for an NPDES permit where it has discharged or is designed, constructed, operated or maintained such that it will discharge.

b) Assessment of penalties for violations

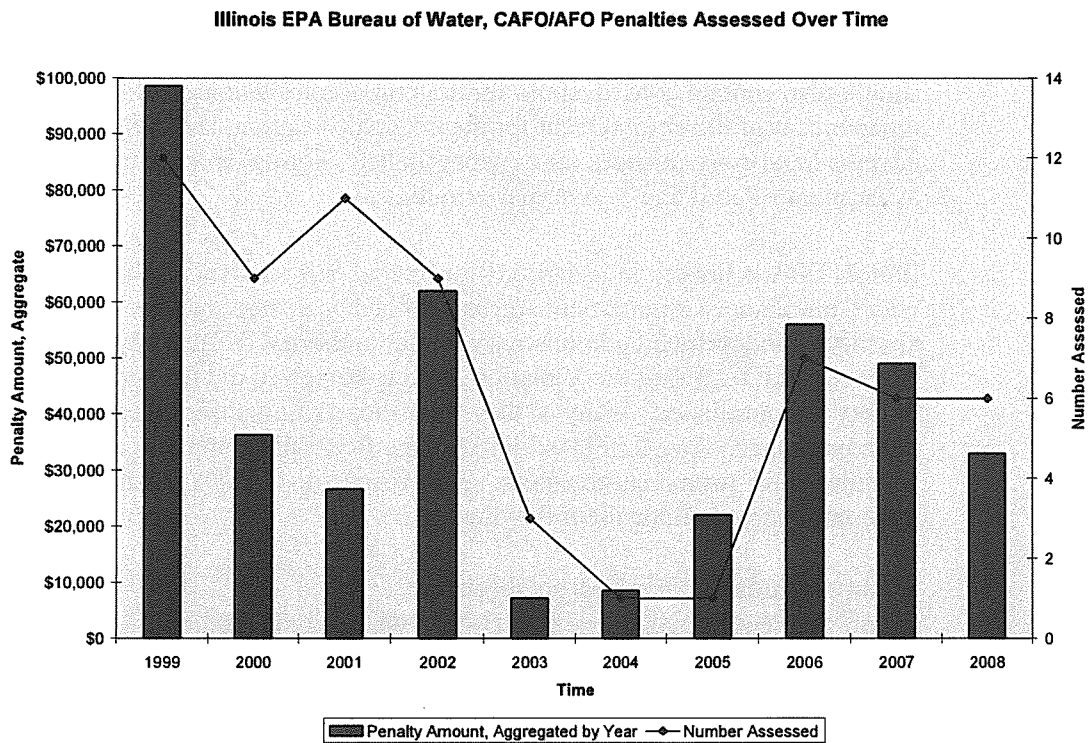
As discussed in the previous section, effective formal enforcement requires specific actions to achieve compliance to be completed on a finite schedule. These actions should also contain consequences for noncompliance that are enforceable independent of the enforcement for the original violation, and subject the facility to adverse legal consequences for noncompliance. Formal enforcement may include the assessment of civil and/or criminal penalties.

Illinois EPA is limited in its options for formal enforcement. The Violation Notice with Compliance Commitment Agreement has been employed by Illinois EPA in the absence of independent administrative order authority. EPA analysis has shown, however, that 62.5% of the Violation Notices reviewed did not, or will not, return the facility to compliance. Many of these facilities exhibited serious or chronic noncompliance. Any CAFO exhibiting significant noncompliance should be considered for formal enforcement. With respect to CAFOs, examples of serious noncompliance include the following:

- any significant unauthorized discharge
- no Nutrient Management Plan (NMP) when one is required
- multiple discharges without an NPDES permit (and the failure to apply for an NPDES permit, when one is required)
- multiple violations of permit requirements
- multiple deficiencies in complying with the permit and the NMP, such as failure to maintain adequate storage capacity and containment
- failure to meet the major milestones required in an administrative or judicial order or in a permit by 90 days or more
- failure to submit an annual report or other required report

Of the files EPA reviewed, fourteen large facilities with unauthorized discharges and/or fish kills were issued Noncompliance Advisories and/or Violation Notices during the review period, 1999-2009. In EPA's assessment, these pre-enforcement/enforcement actions did not, or will not, return the facilities to compliance. The Noncompliance Advisories or Violation Notices issued to nine of these 14 large facilities included language recommending the facility apply for NPDES permits¹³. Five of these facilities subsequently submitted applications. These five facilities submitted permit applications between 2001 and 2007. In the intervening time period between submittal of an application for an NPDES permit and the current time, these facilities continued to violate the CWA act, as determined by further inspections by Illinois EPA or EPA. None of the fourteen large facilities had received a permit by the end of calendar year 2009, nor had they been determined to be in compliance via inspection. Nevertheless, the enforcement files on these cases were often considered closed by the Bureau of Water¹⁴. The majority of these cases were not referred to the Illinois Attorney General or other authority for formal enforcement seeking penalties, despite persistent serious or chronic noncompliance.

Figure 1. CAFO/AFO Penalties Assessed Over Time



¹³ See Attachment C for case studies showing examples where Illinois EPA enforcement activities did not return the facility to compliance, and where CAFOs were not required to apply for an NPDES permit as part of an enforcement action for long-standing water quality issues.

¹⁴ Information on the closure of case files was not consistently available in the files provided to the review team.

National policies on the assessment of civil penalties state several goals; the primary goal is to promote a swift resolution of environmental problems. Review of a ten-year history of 56 Illinois EPA case files has revealed numerous facilities with chronic significant noncompliance issues. The number of penalties assessed by the Illinois Attorney General on behalf of the Illinois EPA has varied over time. The dollar amount assessed has also varied. EPA cannot quantify the number of penalties that should have been assessed. However, based on the failure of many facilities to come into compliance, more facilities should have been assessed penalties than were.

National policies also state that a penalty should, at a minimum, recover the economic benefit to the facility of noncompliance; that penalties should be large enough to deter noncompliance; and that there should be a logical basis for the calculation of penalties for all types of violations.

Of the 90 formal enforcement actions found in a random sampling of Illinois EPA case files of livestock facilities, 14 actions included penalties. Documentation of penalty calculations, penalty demands, and penalties received is maintained by the Illinois EPA's Division of Legal Counsel in Springfield. In order to effectively assess penalties, Illinois EPA needs an EMS that clearly delineates policies and procedures for the calculation of penalties in accordance with recommended guidelines.

Based on this review, EPA finds that Illinois EPA did not refer a sufficient number of CAFO cases for formal enforcement to the Illinois Attorney General or other authorities, in light of the number of CAFOs in chronic or serious noncompliance.

Due to the lack of a current Illinois EPA EMS that establishes policies and procedures for the documentation and calculation of penalties, EPA was unable to evaluate whether the penalties assessed were adequate.

4) Responses to information requests.

Allegation: Citizens have been denied reasonable access to permitting documents.

Program Requirements: The information in NPDES permit applications may not be claimed confidential (40 CFR §§122.7(b) and (c) and 123.25).

According to Illinois Citizens, citizens submitted under the Illinois Freedom of Information Act (FOIA) a request for information to Illinois EPA on September 12, 2007, seeking, among other documents, all pending CAFO NPDES permit applications. On September 24, 2007, Illinois EPA's FOIA Coordinator for the Bureau of Water responded by sending the requestor, among other items, a list of NPDES permit applications received for CAFOs, and stated that "Since this request has many records to review and screen" the above referenced documents/files will be made available after they have been screened for your inspection at the Illinois EPA." (Attachment F) The letter went on to say that only five files will be made available

per visit for inspection and copying ... at the Illinois EPA headquarters” in Springfield, Illinois. The letter also said that another request for information must be sent. An appointment was made by the requestor for October 12, 2007, with Illinois EPA in Springfield to review Illinois EPA files.

The petition states that at the October 12, 2007 appointment, an Illinois EPA FOIA Officer verbally denied the requestor access to the pending NPDES permit applications. According to the petition, the Officer stated that because the applications had not been approved by the Agency, they were not subject to the FOIA. The Petitioner alleges that since Illinois EPA did not provide access to pending NPDES permit applications, the Agency violated Section 1342(j) of the CWA.

EPA discussed with Illinois EPA the allegation that Illinois EPA did not provide copies of NPDES permit applications in response to a FOIA request. Also discussed was the specific allegation that when the requestors arrived at Illinois EPA Headquarters, the requestors were denied the right to look at the applications, since the applications had not been approved by Illinois EPA, and the alleged requirement that requestors needed to come to the Agency’s headquarters office to review the documents.

According to Illinois EPA, it is Agency policy to provide pending NPDES permit applications to requestors. Due to the large number of files requested in the September 12, 2007 request, Illinois EPA asked the requestor to pick five files to come in and see, and then make a subsequent visit to see more files. According to Illinois EPA, the requestor came to Illinois EPA Headquarters office on October 12, 2007, and was given the five files that the requestor had identified, including five Division files. Illinois EPA believes that there is no reason they would not have provided pending NPDES permit applications that were in the five files identified by the requestor. Illinois EPA indicated it has provided pending NPDES permit applications to other requestors, and the requested applications did not fall under the confidential business information exemption.

According to Illinois EPA, the only time requestors are asked to come in and see documents is if the volume of the requested materials is over 400 pages. If a response to a request is over 400 pages, a requestor is required to come in or reduce the request.

Illinois EPA’s representative stated that the agency does not have a written FOIA policy, but follows the Illinois FOIA. Illinois EPA also needs to screen the files before releasing them. For example, if the NPDES permit application is not issued and the application file contains Illinois EPA review notes, the Illinois EPA considers the documents in the file draft documents, and would not release them until the notes are separated from the applications.

In 2008, the Bureau of Water received 4767 requests and Illinois EPA received 26,908 requests for information. The Illinois EPA Bureau of Water has two people assigned to processing FOIA requests.

Based on the above, EPA Region 5 finds that it is currently Illinois EPA's unwritten policy to provide copies of pending NPDES permit applications to FOIA requestors. According to the information provided, Illinois EPA's practices for responding to information requests are consistent with the expectations for the authorized state program.

5) Compliance with the Memorandum of Agreement and Performance Partnership Agreements.

Allegation: Illinois EPA has failed to comply with the terms of the Memorandum of Agreement required under 40 CFR 123.24, and Environmental Performance Partnership agreements between Illinois EPA and U.S. EPA.

Program Requirements: 40 CFR 123.63(a)(4) states that a state's failure to comply with the terms of the Memorandum of Agreement required under 40 CFR 123.24 is a criterion for withdrawal of a state program."

As pointed out in Illinois Citizen's petition, the 1977 Memorandum of Agreement between EPA and Illinois EPA regarding Illinois' NPDES program commits the State to expeditiously process and issue all required NPDES permits and provide ongoing, timely and adequate review of permits. The MOA also commits Illinois EPA to comprehensively evaluate and assess compliance with effluent limitations and other permit conditions, and to maintain a vigorous enforcement program to take timely and appropriate enforcement action in every case where in the state's opinion such action is warranted.

The MOA commits Illinois EPA to delineate an annual State Program Plan, which is enacted through a Performance Partnership Agreement (PPA, or "the agreement"). The agreement between EPA Region 5 and Illinois EPA sets forth the mutual understandings reached regarding the state/federal relationship, the desirable environmental outcomes, the performance expectations for the participating programs, and the oversight arrangements between the parties.

The agreements entered into between the agencies since 2005 required Illinois EPA to review all CAFO permit applications and act upon those applications. In its latest Performance Partnership Agreement with EPA, Illinois EPA committed to NPDES permit coverage for at least 10 CAFOs by June 30, 2009. Illinois EPA did not meet this commitment.

Previous Performance Partnership Agreements between EPA and Illinois EPA have also addressed the need for Illinois EPA, with assistance as appropriate from EPA, to develop a comprehensive inventory of CAFOs in Illinois. As discussed in section

V.B.2, Illinois EPA has not developed a statewide inventory, although Field Offices have developed lists which vary in the degree of completeness and detail.

For the period subject to review, the agreements have memorialized commitments by Illinois EPA to inspect and enforce against CAFOs. For the time period from 2000-2004, the agreement includes an ongoing commitment from Illinois EPA to review and update, if necessary, the State's EMS, assuring that all components are consistent with EPA policy and regulations. The current EMS was completed by Illinois EPA in 2004. The following year, the agreement contained modified language regarding EMS documents: "Take appropriate compliance and enforcement actions in accordance with the Illinois EPA's Enforcement Management System and Section 31 of the Illinois Environmental Protection Act for violations of NPDES, Stormwater, SSO/CSO, CAFO and other violations of environmental regulations." Subsequent agreements contained the same language. Statements by Illinois EPA personnel during the 2009 State Review Framework indicated that the Illinois EMS was not currently being employed. The absence of an effective EMS is inconsistent with the agreement Illinois EPA has with EPA.

The 2000 PPA committed Illinois EPA to submit to EPA an inspection strategy at the start of the fiscal year identifying overall goals and priorities, including an approach for targeting CAFOs. The inspection plan was also to identify facilities to be inspected. In FY2002, the PPA stated that Illinois EPA will "continue to develop the AFO inventory. In developing the inventory, the IEPA will compile data from existing sources based on field inspections, enforcement activities and permitting." At that time, Illinois EPA also committed to provide the results of this initial phase of the inventory process to EPA for review. Following EPA review, additional data and a schedule for any outstanding activities necessary to complete the inventory of CAFOs was to be arranged by mutual agreement between Illinois EPA and EPA. Illinois EPA also committed to performing "targeted inspections ... to identify facilities larger than 1000 animal units or otherwise subject to NPDES requirements. Consistent with available resources, the Agency will work toward a goal of inspecting all CAFOs before October 2003." These commitments were not met. Starting in 2003, subsequent PPA commitments cited resource constraints as a factor in whether or not the Illinois EPA would meet its commitments. In FY 2004, for example, the PPA included the statement that Illinois EPA..." will continue to initiate inspections consistent with available resources, working toward a goal of inspecting 20 percent of the known universe....." Illinois has not met the most basic requirements of the PPA with respect to inspection of CAFOs; EPA has not received an inspection plan identifying priorities and targeted facilities since 2006.

In 2008, Illinois EPA committed to implement the National Compliance Monitoring Strategy (CMS) requiring inspection of all Large CAFOs within five years, and regularly thereafter, to determine whether the facility discharges or proposes to discharge. The CMS also set goals for inspection of medium and small facilities to determine whether they are subject to regulation. Illinois EPA has not developed and implemented an inspection plan that meets the requirements of the CMS Strategy.

Based on the above, and as discussed in previous sections of this report, Illinois EPA has not met its Memorandum of Agreement or Performance Partnership Agreement requirements with respect to CAFOs.

Illinois EPA needs to fulfill its long-standing PPA commitment to compile an inventory of CAFO facilities, as well as its commitments to issue permits to facilities that discharge or propose to discharge, to provide an annual inspection strategy to EPA for approval, and to maintain an EMS consistent with current regulatory policy. Although Illinois EPA committed to implement the National CMS for CAFO inspections, the Agency is unable to quantify its performance under the CMS goals until it has identified Illinois' universe of CAFO/AFOs.

6) Illinois EPA Organization and Resources.

Illinois EPA has indicated that the Bureau of Water has seven FTEs working on CAFO permitting and inspections. These FTEs are primarily field staff that inspect CAFOs as part of their duties. As indicated above, Illinois EPA forwarded all permit applications it had previously received (19) to the Field Offices for review beginning in mid-2008. At the time of EPA's review, regional office staff knowledgeable about CAFOs had reviewed some of these applications, including review of nutrient management plans and identification of deficiencies in applications. Through these means, eight applications had been identified by regional office staff as being complete and ready to be permitted.

The review of CAFO permit applications is a collateral duty for Illinois EPA inspectors, and has meant an increase in desk work, decreasing the amount of time they can spend on inspecting CAFOs and responding to complaints. Many of these inspectors also have additional, non-CAFO-related inspection duties; as such, Illinois EPA does not appear to have seven full FTEs devoted to NPDES CAFO activities. In several regions, regional managers have taken on inspector duties in other areas of the NPDES program in an attempt to allow the CAFO inspectors to address this increased workload. No increase in resources for the regional offices is planned, despite their expanded role. Regional office managers and staff indicated they would be unable to maintain both the current level of inspection coverage and the increased permit-related responsibilities.

In order for CAFO inspectors to meet their responsibilities, they are required to know and abide by applicable regulations, policies, and procedures; legal requirements concerning inspections; procedures for effective inspection and evidence collection; accepted health and safety practices; and quality assurance standards. They must also be familiar with the permit requirements for the facilities they are inspecting. While this review did not examine the full scope of general job-related training requirements, CAFO-specific training was discussed with inspectors and managers. Technical training on NPDES CAFO requirements appears to consist primarily of on-the-job training. No written standard operating procedures for CAFO inspections are in use at Illinois EPA.

Based on the above, EPA finds that Illinois EPA field office inspectors are being relied upon for both permitting and inspection activities, along with their other duties. Illinois needs to take measures to ensure that adequate resources are maintained for review of permit applications, as well as for compliance monitoring and enforcement at CAFOs.

7) Legal authority

EPA did not assess Illinois EPA's legal authority as part of its review of ICCAW's petition. However, in a December 22, 2008, letter from Tinka Hyde, Director, Water Division, EPA Region 5 to Marcia Willhite, Chief, Bureau of Water, Illinois EPA, EPA asked that Illinois EPA take steps necessary to establish technical standards for nutrient management, and to ensure that the CAFO rules were amended in 2009 as necessary to be consistent with the federal CAFO rules. Illinois EPA indicated that the Illinois Pollution Control Board is responsible for adopting administrative rules for the Illinois NPDES program, and that final state livestock rules are expected to be completed by December 2010.

Under the State Review Framework, EPA reviewed Illinois EPA's general compliance monitoring and enforcement processes, including the Illinois Environmental Protection Act and the relationship between Illinois EPA, the Illinois Attorney General's Office, and the Illinois Pollution Control Board for purposes of implementing the NPDES program. The EPA State Review Framework team and the Petition review team both observed that Illinois EPA's lack of administrative order authority impacts the timeliness and effectiveness of enforcement against violations (see section V.B.3.a., Enforcement Activities).

Illinois EPA has not updated its NPDES program for CAFOs to be consistent with the federal CAFO regulations as revised. In particular its rules and technical standards for nutrient management need revision.

EPA's review indicates that Illinois' enforcement efforts were not timely and appropriate. EPA believes that timeliness and effectiveness of enforcement efforts could be improved if Illinois EPA had independent administrative enforcement authority.

VI. Initial Findings and Required Actions

As stated above, EPA Region 5 finds that the Illinois EPA NPDES program for CAFOs does not meet minimum thresholds for an adequate program. Following is a summary of the findings in response to the petitioners' allegations, and the required actions Illinois EPA must take to comply with the requirements for state programs set forth in 40 CFR Part 123. This section also includes several recommendations for Illinois EPA to improve the effectiveness of its CAFO program.

1. Permitting Program

Findings:

Illinois EPA has not issued NPDES permits to CAFOs that have applied for them. While the Agency has identified 76 facilities as needing NPDES permits, and 64 have submitted applications, only five are currently covered by permits. Many of the applications were submitted several years ago. Permits have not been issued even in cases where the need for a permit application was triggered by a court order or discharge event documented by Illinois EPA. As of October 2009, there were eight facilities identified by Field Office staff as having complete permit applications. On October 20, 2009, Illinois EPA reissued its CAFO general permit.

In some cases, Illinois EPA sent applicants multiple notices of incomplete applications. The notices do not compel submittal of a complete application. Consequences for failing to submit the required information were not found by the Review Team.

Illinois EPA has determined that another group of 45 facilities that applied for NPDES permits, some as long as 10 years ago, do not need permits. Where a facility applies for a permit, Illinois EPA is obligated to either issue or deny a permit after conducting its review of the application and providing for public comment.

Only a small percentage of Illinois' estimated 500 Large CAFOs have applied for permits on their own volition.

Required actions:

Illinois EPA must issue NPDES permits to CAFOs that discharge or are designed, constructed, operated, or maintained such that a discharge will occur. Permits must be issued within a timeframe to be negotiated with EPA.

- Permit issuance may be phased in, beginning with the 76 facilities the State has identified as needing permits. Permits for additional CAFOs identified through the survey that Illinois EPA has committed to conduct, and other means may be issued in subsequent phases.
- The State must either issue or deny permits to the 45 facilities that had submitted applications, but which Illinois EPA subsequently determined did not need permits. Where a facility applied for a permit and is no longer in operation or did not commence operation, Illinois EPA should confirm the status with the applicant and close the application file.
- Illinois EPA needs to establish a consistent, escalating process for responding to submittal of incomplete permit applications. Escalated responses should include inspections and enforcement as appropriate.

Recommendation:

In order to establish and convey clear water quality expectations for CAFO operations, the State should consider establishing an unambiguous requirement for CAFOs to apply for a permit.

To enable Illinois EPA to obtain complete permit applications, and to obtain information whether CAFOs that have not begun operations propose to discharge, the State should consider providing Illinois EPA either information collection and/or enforcement authority to compel submittal of complete information.

2. Compliance Evaluation/Inspection Program

Finding:

A. Illinois EPA does not maintain a program capable of making a comprehensive survey of CAFOs subject to NPDES permit requirements. Several of the Agency's Field Offices maintain a list that, with modifications to align data to NPDES requirements, could serve as a baseline for such a survey.

Illinois EPA does not have a formal agreement with IDA to review plans for new and expanded livestock facilities submitted to IDA. Illinois EPA review of plans for new and expanded facilities would facilitate Illinois EPA's ability to identify livestock operations as CAFOs that need permits.

Required actions:

To determine which facilities are CAFOs requiring NPDES permits, Illinois EPA must conduct and maintain a comprehensive survey of livestock facilities. The inventory developed should be entered and maintained in EPA's Integrated Compliance Information System.

Recommendation:

To identify new or expanded livestock operations as CAFOs that are subject to permit application requirements, Illinois EPA should establish procedures, in coordination with IDA and other state agencies as appropriate, to review plans for new and expanded livestock facilities.

Finding:

B. Illinois EPA has not conducted comprehensive inspections to determine whether unpermitted CAFOs need NPDES permits, or whether permitted CAFOs are in compliance with NPDES requirements. Illinois EPA has serious deficiencies in its ability to inspect and monitor activities subject to regulation. A majority of inspections conducted at livestock facilities are not comprehensive, and do not document whether or not a facility is in compliance with NPDES requirements or needs an NPDES permit. Illinois EPA does not have inspection and surveillance procedures sufficient to determine compliance or noncompliance with applicable program requirements.

Illinois EPA has failed to conduct routine, periodic inspections of CAFOs that may be subject to NPDES regulation. Illinois EPA has not met the commitments described in its Environmental Performance Partnership Agreement to implement the National Compliance Monitoring Strategy of 2008, including the goal to inspect CAFOs on a routine five-year basis.

Required actions:

Illinois EPA must revise its inspection process for livestock facilities so that it can determine and track whether inspected facilities are CAFOs required to have NPDES permits, and whether they are in compliance with NPDES requirements. In particular, Illinois EPA needs to develop and implement:

- A standard operating procedure (SOP) for CAFO inspections to aid in assessing whether or not a facility is a CAFO, is discharging, and whether it is subject to NPDES permit application requirements.
- A standard operating procedure for inspection reports.
- An inspection checklist that aligns to the requirements of Illinois EPA's CAFO general permit, to ensure that data necessary for a compliance determination is gathered.

Illinois EPA must track the routine inspection and monitoring of facilities that may be subject to regulation using a comprehensive inventory of facilities. In accordance with its EnPPA, and the requirements of the National Compliance Monitoring Strategy (CMS) incorporated therein, Illinois EPA must develop and execute an inspection plan to accomplish the inspection goals stated in the CMS.

Recommendation:

Illinois EPA should enter all CAFO inspections into EPA's Integrated Compliance Information System, and work with EPA to ensure that inspections and evaluations for CAFOs are classified and recorded consistent with national definitions.

Finding:

C. It is unclear whether Illinois EPA consistently responds adequately to complaints. While Illinois EPA inspectors do respond to numerous citizen complaints regarding a variety of issues about livestock facilities, it is not clear that they consistently provide a timely response to the complainant. Illinois EPA needs to develop procedures to ensure proper consideration of information submitted by the public regarding potential violations of NPDES program requirements. Such procedures, accompanied by appropriate staff resources, would allow the Illinois EPA to appropriately respond to citizens' complaints.

Required action:

Illinois EPA shall investigate and provide written responses to citizen complaints reporting potential violations of NPDES requirements, including for CAFOs. To ensure that Illinois EPA responds to complaints as appropriate, the Agency should establish written procedures for responding to complaints regarding livestock facilities, including procedures for responding to complainants as appropriate and establish a procedure for conducting compliance inspections during investigation of citizens' complaints.

3. Enforcement Program**Findings:**

A. Illinois EPA is not taking timely and appropriate enforcement in response to NPDES violations by CAFOs. Illinois EPA's use of its two primary informal pre-enforcement tools, Noncompliance Advisories and Violation Notices with Compliance Commitment Agreements, do not consistently return facilities to compliance. The Agency's EMS as it applies to CAFOs is inadequate, as it does not result in escalated enforcement action consistent with actions that would be taken for other facilities, including the assessment of penalties. Illinois does not follow existing national compliance and enforcement policy and guidance. The State's application of a standard of environmental harm to CAFOs for the determination of whether or not to proceed with formal enforcement is inconsistent with CWA policy. In addition, enforcement actions do not consistently include requirements for CAFOs that have discharged to apply for NPDES permit coverage.

Required actions:

Illinois EPA must take timely and effective enforcement to address noncompliance by CAFOs. To do so, Illinois EPA should revise its Enforcement Management System guidance for CAFOs, including a timeframe for making enforcement decisions, and must fully implement the EMS upon approval by EPA. The guidance should specify that, where a facility has discharged or is designed, constructed, operated or maintained such that it will discharge, the enforcement action must also address the CAFO's failure to apply for an NPDES permit. Illinois EPA's escalation of enforcement for CAFO violations, as implemented through its EMS, needs to be consistent with the responses Illinois EPA would pursue regarding noncompliance by other types of point source dischargers. Where a facility is in significant noncompliance, enforcement should take the form of a referral to the Illinois Attorney General's Office for enforcement in circuit court or by the Illinois Pollution Control Board.

Recommended action:

Illinois EPA should seek the authority to issue administrative orders, including the authority to seek administrative penalties, without having to pursue administrative action from the Illinois Pollution Control Board through referral to the Attorney General's Office. Until such time as this authority is obtained, Illinois EPA needs to seek ways to increase the likelihood that Compliance Commitment Agreements will bring facilities into compliance with NPDES

requirements in a timely manner. Illinois EPA should bring formal enforcement against facilities that fail to comply with informal enforcement responses.

Findings:

B. *Illinois EPA is not assessing adequate penalties against CAFOs.* Based on this review, EPA finds that Illinois EPA has referred an insufficient number of CAFO cases for formal enforcement to the Illinois Attorney General or other authorities, in light of the number of CAFOs in chronic or serious noncompliance. The number of cases referred for which penalties were assessed does not appear to be sufficient to serve as deterrence to noncompliance.

Required actions:

Illinois EPA must revise its Enforcement Management System guidance for CAFOs to ensure escalation of enforcement occurs in a manner consistent with the violations identified, and in accordance with the EPA EMS guidelines.

Recommendation:

Illinois EPA should update its EMS to include additional instructions on calculation and documentation of penalties, as well as a commitment to assess penalties using those calculations. This recommendation was included in the 2007 Illinois SRF report, which was to have been completed by December 31, 2007.

4. Response to citizen requests for information

Finding:

Illinois EPA's unwritten policy is to provide copies of pending NPDES permit applications for CAFOs to citizens that request them. The Agency's practices for responding to information requests are consistent with the expectations for the authorized state program.

Required action:

None.

Recommendation:

Illinois EPA should develop a written policy describing how it will address citizen requests for NPDES permit applications, including for CAFOs.

5. Compliance with the Memorandum of Agreement and Performance Partnership Agreements between Illinois EPA and EPA

Finding:

Illinois EPA has not met its Memorandum of Agreement or Performance Partnership Agreement requirements with respect to CAFOs. In addition to not meeting numerous requirements stated in the MOA and the PPAs, Illinois EPA has not met the requirements of the National Compliance Monitoring Strategy, as adopted in FY2009.

Required action:

As discussed above, Illinois EPA must fulfill its long-standing PPA commitment to compile an inventory of CAFO facilities, as well as its commitments to issue permits to facilities that need them, to provide an annual inspection plan to EPA, and to maintain an EMS consistent with current regulatory policy. Illinois EPA must develop a comprehensive plan, including timeframes, for completing these tasks. Illinois EPA must also meet its targets under the National CMS for CAFO inspections, or adopt a state-specific strategy with realistic performance goals satisfactory to EPA Region 5.

6. Organization and resources.

Finding:

Illinois EPA field office inspectors are being relied upon for both permitting and inspection activities, along with their other duties.

Required action:

Illinois EPA must prepare a workload assessment to determine the number of full-time equivalents (FTEs) needed to effectively implement the NPDES program for CAFOs. The assessment must include, but should not necessarily be limited to, FTEs needed for characterizing which livestock operations are CAFOs needing NPDES permits, permit issuance, compliance and enforcement activities, responding to citizen complaints, and information management. Plans for addressing any shortfalls between needed and available FTEs must also be addressed in the assessment including existing or potential worksharing arrangements with other state agencies, utilization of contract or temporary employees, and permanent or temporary reassignment of existing Illinois EPA employees. Illinois EPA must also develop a long-term plan for obtaining and training future CAFO inspectors. Illinois EPA must allocate staff to CAFO permitting, compliance evaluation, and enforcement as required to implement an effective program.

7. Legal Authority

Finding:

A. Illinois has not updated its NPDES program for CAFOs, in particular its rules and technical standards for nutrient management, consistent with the federal CAFO regulations as revised.

Required action:

Illinois must revise its rules and nutrient management standards as necessary to be consistent with the federal CAFO rules as soon as possible, but not later than December 2010.

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Bureau of Water
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Information for this report is gathered from the following Sections within the Bureau of Water - Compliance Assurance Section, Water Pollution Control/Field Operations Section, and Water Pollution Control/ Permits Section.

Information is also gathered from the Agency's Division of Legal Counsel.

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Section I: General Information

1. Total number of facilities surveyed during 2011 189
2. Number of facilities contacted for the first time during 2011 63
3. Total number of on-site visits conducted during 2011 297
4. Number of on-site follow-up surveys conducted in 2011 108
5. Number of facilities contacted/visited raising or boarding the following types of livestock:
 - Beef 52
 - Dairy 41
 - Swine 87
 - Poultry 7
 - Sheep 1
 - Equine 14
 - Other 6
6. Number of operations contacted in 2011 where more than one type of livestock were raised or boarded - 15
7. Number of facilities contacted/visited falling within each of the following categories in terms of animal units:
 - <50 25
 - 50-100 6
 - 100-300 29
 - 300-1000 45
 - 1000-5000 81
 - >5000 3
8. Number of facilities observed in 2011 using one or more of the following waste handling components:
 - Lagoons 35
 - Covered Lagoons 1
 - Holding Ponds 26
 - Pit (beneath slats) 102
 - In ground tank 25
 - Above ground tank 18
 - Settling Basins 17
 - Manure Stack 65
 - Vegetative Filter 7
 - Other 13
 - None 12
9. Total number facilities utilizing lagoons and holding ponds observed during on-site surveys of livestock facilities in 2011 – 3.

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10. Number of facilities observed in 2011 using one or more of the following livestock waste storage structures tabulated by facility type:

Structures	Beef	Dairy	Swine	Poultry	Sheep	Equine	Other	Total	Combined
Lagoons	2	6	26	1	0	1	0	36	1
Covered Lagoon	0	1	0	0	0	0	0	1	0
Holding Ponds	6	17	7	0	0	0	0	30	4
Pits (beneath slats)	16	9	80	2	1	2	1	111	9
In ground tank	3	12	11	0	0	0	0	26	1
Above ground tank	4	4	9	2	0	0	0	19	1
Settling Basin	7	10	1	0	0	1	0	19	2
Manure Stack	31	20	9	4	1	13	4	82	17
Vegetative Filter	6	2	0	0	0	1	0	9	2
Other	5	5	3	2	1	2	0	18	5
None	8	2	1	0	0	0	1	12	0

11. Number of facilities observed in 2011 using one or more of the following livestock waste storage structures tabulated by facility size:

Structure	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Lagoons	0	0	2	10	22	1	35
Covered Lagoon	0	0	0	1	0	0	1
Holding Ponds	1	0	3	12	10	0	26
Pit (beneath slats)	0	1	6	24	70	1	102
In ground tank	0	0	5	6	13	1	25
Above ground tank	0	0	1	3	14	0	18
Settling Basin	0	2	3	8	4	0	17
Manure Stack	22	4	15	12	11	1	65
Vegetative Filter	0	1	2	2	2	0	7
Other	0	0	4	1	7	1	13
None	2	0	6	4	0	0	12

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12. Number of facilities observed using one or more of the following livestock operations during on-site surveys in 2011:

Total confinement building	118
Open front confinement units	52
Open concrete feedlot.....	67
Open earthen feedlot.....	55
Vegetated pasture.....	39
Other.....	7
Total	338

13. Facilities using open front confinement units and/or open concrete or earthen feedlots observed during 2011 without a livestock waste storage structure where even a concrete settling basin was not in place - 11

14. Number and percent of livestock facilities surveyed during 2011 where clean surface water needs to be diverted away from the facility - 81 (43%)

Section II: Regulatory Violations

15. Number of facilities characterized as having the following regulatory violations during 2011:

Water Quality Standards (Subtitle C)	21
Effluent Standards (Subtitle C)	14
Air Emissions.....	0
New Facility Location (501.402).....	0
Runoff Control Requirements (501.403)	76
Handling/Storage Requirements (501.404).....	79
Field Application Criteria (560).....	10
NPDES Permit Provision.....	2
No NPDES Permit (See note).....	25
No Violation Occurred	80
Other.....	17

16. Number and percent of the livestock facilities contacted/visited having one or more regulatory violations in 2011 - 109 (58%)

17. Number and percent of livestock facilities contacted/visited having no regulatory violations in 2011 - 80 (42%)

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18. Tabulation of the number and percent of each type of facility contacted/visited having one or more regulatory violations in 2011:

Type	No. Contacted	No. With Violations	Percent With Violations
Beef	52	37	71%
Dairy	41	29	70%
Swine	87	39	45%
Poultry	7	2	29%
Sheep	1	1	100%
Equine	14	9	64%
Other	6	4	67%
Combined	19	12	63%

19. Tabulation of the number and percent of each type of facility contacted/visited that caused no pollution problem or regulatory violations in 2011:

Type	No. Contacted	No. With No Problems	Percent With No Problems
Beef	52	15	29%
Dairy	41	12	30%
Swine	87	48	55%
Poultry	7	5	71%
Sheep	1	0	0%
Equine	14	5	36%
Other	6	2	33%
Combined	19	7	37%

Section III: Water Pollution

20. Total number of livestock facilities generating water pollution complaints during 2011 - 56*

21. Percent of unsubstantiated water pollution complaints - 14%

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22. Tabulation of the number of livestock facilities by size and animal type generating water pollution complaints during 2011:

Type	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	9	2	15	13	13	0	52
Dairy	5	4	11	14	7	0	41
Swine	1	1	5	17	62	1	87
Poultry	1	0	0	1	3	2	7
Sheep	0	0	1	0	0	0	1
Equine	10	0	2	0	2	0	14
Other	4	0	0	1	1	0	6
Total	30	7	34	46	88	3	208
Combined	5	1	5	1	7	0	19

23. Sources of water pollution problems observed in 2011 tabulated by animal type:

Sources	Beef	Dairy	Swine	Poultry	Sheep	Equine	Other	Total	Combined
Feedlot runoff	32	22	5	1	0	1	2	63	7
Pit discharge	1	1	8	0	1	1	0	12	9
Lagoon/HP overflow	1	3	2	0	0	0	0	6	2
Intentional discharge/dumping	2	2	1	0	0	1	1	7	2
Tile connection	1	1	4	0	0	0	0	6	0
Manure stack	7	3	2	0	0	6	2	20	3
Field application	0	2	9	0	0	1	0	12	1
Irrigation equipment failure	0	0	0	0	0	0	0	0	0
Milk House Waste	0	3	0	0	0	0	0	3	0
Other	11	6	24	1	0	0	1	43	1
No Problem Existed	16	12	49	5	0	5	2	89	7

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24. Sources of water pollution observed in 2011 tabulated by facility size:

Sources	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Feedlot	9	4	21	17	5	0	56
Pit discharge	0	1	2	1	5	0	9
Lagoon/HP overflow	0	0	1	1	2	0	4
Intentional discharge/dumping	3	0	1	1	0	0	5
Tile connection	0	0	1	2	3	0	6
Manure stack	11	1	3	2	0	0	17
Field application	1	0	0	6	4	0	11
Irrigation equipment failure	0	0	0	0	0	0	0
Milk House Waste	1	1	1	0	0	0	3
Other	0	0	2	20	20	0	42
No Problem Existed	7	1	7	11	53	3	82

Section IV: Odor/Air Pollution

25. Total number of livestock facilities generating odor complaints during 2011 - 20 *

26. Percent of unsubstantiated odor complaints - 50%

27. Tabulation of the number of livestock facilities by size and animal type generating odor complaints during 2011:

Type	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	2	0	1	1	0	0	4
Dairy	0	0	1	0	1	0	2
Swine	0	0	2	5	7	0	14
Poultry	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0
Equine	1	0	0	0	0	0	1
Other	0	0	0	0	0	0	0
Total	3	0	4	6	8	0	21
Combined	0	0	0	0	1	0	1

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28. Sources of odor pollution problems observed in 2011 tabulated by animal types:

Sources	Beef	Dairy	Swine	Poultry	Sheep	Equine	Other	Total	Combined
Field application	0	0	4	0	0	0	0	4	0
Manure stack	1	0	0	0	0	0	0	1	0
Lagoon/holding pond	0	0	1	0	0	0	0	1	0
Feedlot	1	2	0	0	0	0	0	3	0
Agitation/manure handling	0	0	1	0	0	0	0	1	0
Confinement building/pit	0	0	0	0	0	0	0	0	0
Other	2	0	3	0	0	0	0	5	0

29. Sources of odor pollution problems observed in 2011 tabulated by facility size:

Sources	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Field application	0	0	0	4	0	0	4
Manure stack	1	0	0	0	0	0	1
Lagoon/holding pond	0	0	0	0	1	0	1
Feedlot	1	0	2	0	0	0	3
Agitation/manure handling	0	0	0	0	1	0	1
Confinement building/pit	0	0	0	0	0	0	0
Other	0	0	2	1	2	0	5

Section V: Facilities Referred to Illinois Department of Agriculture

30. Number and percent of facilities referred to the Illinois Department of Agriculture regarding either dead animal disposal or potential LMFA violations in 2011 - 8 (4%)

Section VI: Enforcement Activities

31. Number and percent of facilities sent a Noncompliance Advisory Letter (NCA) by the Illinois EPA in 2011 - 47** (25%)

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32. Tabulation of the number of facilities by size and animal type receiving NCA letters in 2011:

Type	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	5	0	4	3	3	0	15
Dairy	3	2	5	2	0	0	12
Swine	0	0	2	3	8	0	13
Poultry	0	0	0	0	1	0	1
Sheep	0	0	0	0	0	0	0
Equine	6	0	0	0	0	0	6
Other	2	0	0	0	0	0	2
Total	16	2	11	8	12	0	49
Combined	2	0	0	0	0	0	2

33. Number and percent of facilities sent a Violation Notice Letter (VN) by the Illinois EPA in 2011 - 21** (11%)

34. Tabulation of the number of facilities by size and animal type receiving Violation Notice letters in 2011:

Type	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	0	0	1	5	1	0	7
Dairy	1	0	2	4	2	0	9
Swine	0	0	1	4	5	0	10
Poultry	0	0	0	0	0	0	0
Sheep	0	0	1	0	0	0	1
Equine	0	0	1	0	0	0	1
Other	0	0	0	0	0	0	0
Total	1	0	6	13	8	0	28
Combined	0	0	3	1	3	0	7

35. Number and percent of facilities sent a Notice of Intent to Refer Letter (NOIR) by the Illinois EPA in 2011 - 2** (1%)

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36. Tabulation of the number of facilities by size and animal type receiving Notice of Intent to Refer letters in 2011:

Type	<u>NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	0	0	1	0	0	0	1
Dairy	0	0	1	0	0	0	1
Swine	0	0	0	0	1	0	1
Poultry	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0
Equine	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	0	0	2	0	1	0	3
Combined	0	0	1	0	0	0	1

37. Number and percent of facilities where a case was referred to the Attorney General's Office in 2011 - 11** (6%)

38. Tabulation of the number of facilities by size and animal type where a case was referred to the Attorney General's Office.

Type	<u>NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	0	0	2	0	2	0	4
Dairy	0	0	1	0	0	0	1
Swine	0	0	0	3	4	0	7
Poultry	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0
Equine	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	0	0	3	3	6	0	12
Combined	0	0	1	0	0	0	1

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Section VII: Measures Taken in 2011 to Correct Pollution Problems

39. Frequency of implementing various management techniques in 2011:

New settling basin	2
New lagoon/holding pond	3
New pit	2
New manure storage structure	3
New or improved irrigation system	0
Storm water diversions or terraces	10
Vegetative filter	2
Guttering	3
Raised berms or modified lagoons	3
Written plans and specs	13
Cleaned feedlots more frequently	2
Hired a commercial hauler	3
Repaired field tile/closed inlets	4
Moved fences	4
Relocated feedlot	6
New application equipment	2
Changed application site	4
Incorporation or injection	0
Reduced herd size	6
Went out of business	5
Revegetated Pasture/rotate grazing	3
Other practice implemented	36
No effort made to correct problem	6
No Problem existed	68
Unknown	47

* Actual number of complaints fielded may be higher. This total does not reflect a single facility that may generate multiple complaints or cause more than one pollution incident. The total is facilities generating at least one complaint.

** Number of facilities receiving letters or referred only. Actual number of referrals or letters may be higher due to single facilities receiving multiple letters or referrals.

**Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report**

Section VIII: List of Attachments

- Attachment 1 - 2011 livestock related fish kill data
- Attachment 2 - 2011 livestock facilities receiving enforcement letters and facilities referred to the Attorney General tabulated by county
- Attachment 3 - List of livestock facilities for which NPDES Permits were issued in 2011 (Information from DWPC Permit Section)
- Attachment 4 - List of livestock facilities for which Tax Certifications were issued in 2011 (Information from DWPC Permit Section)
- Attachment 5 - Summary of select 2011 data tabulated by county

ATTACHMENT 1
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Livestock Related Fishkill Data

County	Discharge ID	Assessed Value (\$)
Effingham	CSA/049/BC/1	\$ 2,861.02

ATTACHMENT 2
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Adams	0	2	0	0
Alexander	No Visits			
Bond	No Visits			
Boone	4	0	0	0
Brown	No Visits			
Bureau	0	0	0	0
Calhoun	No Visits			
Carroll	0	0	0	1
Cass	0	1	0	0
Champaign	0	0	0	0
Christian	No Visits			
Clark	No Visits			
Clay	0	0	0	0
Clinton	4	0	0	0
Coles	No Visits			
Cook	No Visits			
Crawford	No Visits			
Cumberland	0	1	1	1
DeKalb	4	0	0	0
DeWitt	No Visits			
Douglas	0	0	0	1
DuPage	No Visits			
Edgar	0	0	0	0
Edwards	No Visits			
Effingham	0	1	0	0
Fayette	0	1	0	0

ATTACHMENT 2
Illinois EPA Livestock Program
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Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Ford	No Visits			
Franklin	0	0	0	0
Fulton	0	2	0	0
Gallatin	No Visits			
Greene	No Visits			
Grundy	No Visits			
Hamilton	0	0	0	0
Hancock	3	0	0	0
Hardin	No Visits			
Henderson	No Visits			
Henry	5	0	0	0
Iroquois	0	0	0	0
Jackson	0	0	0	0
Jasper	No Visits			
Jefferson	No Visits			
Jersey	0	0	0	0
JoDaviess	1	3	0	0
Johnson	No Visits			
Kane	0	0	0	0
Kankakee	No Visits			
Kendall	No Visits			
Knox	1	0	0	1
Lake	No Visits			
LaSalle	1	0	0	0
Lawrence	0	0	0	0
Lee	No Visits			

ATTACHMENT 2
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Livingston	No Visits			
Logan	No Visits			
Macon	No Visits			
Macoupin	0	0	0	0
Madison	No Visits			
Marion	No Visits			
Marshall	No Visits			
Mason	No Visits			
Massac	0	0	0	0
McDonough	1	2	0	0
McHenry	2	0	0	0
McLean	0	0	0	0
Menard	No Visits			
Mercer	0	0	0	0
Monroe	No Visits			
Montgomery	No Visits			
Morgan	0	0	0	0
Moultrie	No Visits			
Ogle	5	1	0	0
Peoria	1	0	0	0
Perry	No Visits			
Piatt	No Visits			
Pike	0	1	0	0
Pope	No Visits			
Pulaski	No Visits			
Putnam	No Visits			

ATTACHMENT 2
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Randolph	No Visits			
Richland	0	1	0	0
Rock Island	2	0	0	0
Saline	0	0	0	0
Sangamon	0	1	0	0
Schuyler	No Visits			
Scott	No Visits			
Shelby	0	0	0	0
Stark	No Visits			
St. Clair	1	0	0	0
Stephenson	5	1	1	1
Tazewell	1	0	0	0
Union	No Visits			
Vermilion	1	0	0	0
Wabash	No Visits			
Warren	0	0	0	0
Washington	0	2	0	0
Wayne	No Visits			
White	No Visits			
Whiteside	1	0	0	0
Will	No Visits			
Williamson	0	0	0	0
Winnebago	3	0	0	1
Woodford	1	1	0	5
Total	47	21	2	11

** Number of facilities receiving letters or referred only. Actual number of referrals or letters may be higher due to single facilities receiving multiple letters or referrals.

ATTACHMENT 3
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
List of NPDES Permits
Issued for Livestock Facilities in 2011

Facility	County	NPDES Number	Date Issued	Expiration Date
Maschhoffs- Riverview Genetics	Clinton	ILA010081	1/11/2011	9/30/2014
Maschhoffs – Wilder South	Fayette	ILA010051	1/11/2011	9/30/2014
Meier Cattle - Dakota	Stephenson	ILA010071	1/18/2011	9/30/2014
Maschhoffs – Archery Bald Eagle	Cass	ILA010025	1/18/2011	9/30/2014
Gene Bank of Na-Du Quoin Cattle	Perry	ILA010012	2/10/2011	9/30/2014
North Fork Pork – Carthage	Hancock	ILA010085	2/15/2011	9/30/2014
Maschhoffs – Laning 2	Brown	ILA010024	2/15/2011	9/30/2014
Varel Dairy – Bartelso Twin Levee	Clinton	ILA010075	2/22/2011	9/30/2014
Greenville Livestock - Centralia	Clinton	ILA010061	3/2/2011	9/30/2014
Declerck Bros Swine - Reynolds	Rock Island	ILA010062	3/2/2011	9/30/2014
Timmermann J B Dairy – Breese	Clinton	ILA010007	4/13/2011	9/30/2014
Dar Farms - Canton	Fulton	ILA010083	7/26/2011	9/30/2014
R3E Pork – Thawville	Iroquois	ILA010070	7/26/2011	9/30/2014
Mondt – Dairy Farm?Robert	Clinton	ILA010089	8/5/2011	9/30/2014
Scheetz Farm 4 – Gladstone	Henderson	ILA010020	10/21/2011	9/30/2014
Edmunds?Randy – Cambridge Farm	Henry	ILA010076	10/25/2011	9/30/2014
Strout Crossing – Nebo Swine	Pike	ILA010087	12/22/2011	9/30/2014

ATTACHMENT 4
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
List of Tax Certifications
Issued for Livestock Facilities in 2011[@]

Name	County	Docket Number	Certificate Date
Wildcat Farms, LLC – Dallas City	Hancock	PCB 2011-029	1/6/2011
Newcoers Confinements, Inc. - Landmark	Carroll	PCB 2011-030	1/6/2011
Louis Fowler - Macomb	McDonough	PCB 2011-031	1/6/2011
Brandon Hofman Finishing Barn	Mercer	PCB 2011-032	1/6/2011
Austin Greuel Farms, Inc. – East Moline	McDonough	PCB 2011-037	1/20/2011
Greuel Pork Farms - Industry	McDonough	PCB 2011-039	1/20/2011
Mark A. Phillips – Newton	Jasper	PCB 2011-040	1/20/2011
Prime Pork Holdings, LLC. – Kingston	DeKalb	PCB 2011-046	3/3/2011
Smith Agri Services - Barry	Pike	PCB 2011-047	3/3/2011
Jacob Bros. Farms, Inc. – Sterling	McDonough	PCB 2011-048	3/3/2011
Triple E Farms – Altona	Knox	PCB 2011-049	3/3/2011
Brandon and Jill Hoffman Finishing Barn Aledo	Mercer	PCB 2011-070	5/5/2011
Daniel Koster – Sterling	Whiteside	PCB 2011-071	5/5/2011
David and Harold Hawkinson – Galesburg	Knox	PCB 2011-072	5/5/2011
Clayton Pork, LLC. – Eureka	Woodford	PCB 2011-073	5/5/2011
Bohnerts Jerseys – East Moline	Rock Island	PCB 2011-075	5/5/2011
Scott H. Hueling	Effingham	PCB 2011-077	5/5/2011
Four Beck Dairy	Clinton	PCB 2011-078	5/20/2011
Jacob Bros. Farms, Inc. – Sterling	Whiteside	PCB 2011-087	6/2/2011
Assay Farms	Henry	PCB 2011-093	7/7/2011
Perfume Acres	Iroquois	PCB 2011-094	7/7/2011
Mircor Condos, LLC	Lee	PCB 2011-095	7/7/2011
Ringer Farms, Inc. – Gridley	McLean	PCB 2011-096	7/7/2011
Jeff and Mitzi Sharer	Henderson	PCB 2011-097	7/7/2011
Perfume Acres	Iroquois	PCB 2011-098	7/7/2011
JMTR, LLC. – Eureka	Whiteside	PCB 2011-099	7/7/2011
Keith Naftzger	Whiteside	PCB 2011-100	7/7/2011
George Mattern	Putnam	PCB 2011-101	7/7/2011
JKL Pork, LLC, - Eureka	Woodford	PCB 2011-106	7/7/2011
Brooks Farms	Whiteside	PCB 2011-107	7/7/2011
VOS Farms	Whiteside	PCB 2012-026	8/18/2011
Jeff and Mitzi Sharer – Little York	Henderson	PCB 2012-031	9/8/2011
Jeff and Mitzi Sharer – Little York	Henderson	PCB 2010-032	9/8/2011
Deborah Ann Rousoncles	Henderson	PCB 2012-033	9/8/2011
JKL Pork, LLC. – Minock	Woodford	PCB 2012-045	9/8/2011
JMTR, LLC. - Erie	Whiteside	PCB 2012-047	9/22/2011
Bush College Finishers	Pike	PCB 2012-062	12/2/2011
Thompson's Pearl Valley Eggs	Stephenson	PCB 2012-063	12/1/2011

[@] Procedure for obtaining Tax Certification for Pollution Control Facilities was changed during 2001. Effective January 1, 2002, all Certifications are granted or denied by the Illinois Pollution Control Board. A facility still sends the Tax Certification application to the Agency for review and the Agency then forwards the application to the Illinois Pollution Control Board along with a recommendation on what action the Board should take. Additional information can be found in 35 Illinois Administrative Codes, Subtitle A, Part 125: Tax Certifications.

ATTACHMENT 5
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Adams	2	2	1	0
Alexander	No Visits			
Bond	No Visits			
Boone	4	7	3	0
Brown	No Visits			
Bureau	1	1	0	0
Calhoun	No Visits			
Carroll	1	2	0	0
Cass	2	4	0	0
Champaign	1	1	0	0
Christian	No Visits			
Clark	No Visits			
Clay	5	6	0	0
Clinton	15	17	4	0
Coles	No Visits			
Cook	No Visits			
Crawford	No Visits			
Cumberland	1	1	0	0
DeKalb	6	9	0	0
DeWitt	No Visits			
Douglas	1	1	0	0
DuPage	No Visits			
Edgar	1	1	0	0
Edwards	No Visits			
Effingham	1	2	1	0
Fayette	1	2	1	1
Ford	No Visits			
Franklin	1	1	0	0
Fulton	6	7	2	2
Gallatin	No Visits			

ATTACHMENT 5
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Greene	No Visits			
Grundy	No Visits			
Hamilton	2	2	0	0
Hancock	7	13	1	0
Hardin	No Visits			
Henderson	No Visits			
Henry	7	12	6	3
Iroquois	1	1	0	0
Jackson	1	1	0	0
Jasper	No Visits			
Jefferson	No Visits			
Jersey	1	1	1	0
JoDaviess	7	19	3	1
Johnson	No Visits			
Kane	1	1	0	0
Kankakee	No Visits			
Kendall	No Visits			
Knox	6	17	0	0
Lake	No Visits			
LaSalle	5	6	0	3
Lawrence	3	4	0	0
Lee	No Visits			
Livingston	No Visits			
Logan	No Visits			
Macon	No Visits			
Macoupin	5	8	4	1
Madison	No Visits			
Marion	No Visits			
Marshall	No Visits			
Mason	No Visits			

ATTACHMENT 5
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Massac	1	1	0	1
McDonough	5	12	2	1
McHenry	3	3	3	1
McLean	2	2	0	0
Menard	0	0	0	0
Mercer	1	1	1	0
Monroe	No Visits			
Montgomery	No Visits			
Morgan	1	1	1	0
Moultrie	No Visits			
Ogle	9	16	0	0
Peoria	3	5	2	0
Perry	No Visits			
Piatt	No Visits			
Pike	3	3	1	0
Pope	No Visits			
Pulaski	No Visits			
Putnam	No Visits			
Randolph	No Visits			
Richland	4	5	1	0
Rock Island	6	8	1	1
Saline	1	1	1	0
Sangamon	2	2	1	2
Schuyler	No Visits			
Scott	No Visits			
Shelby	1	1	0	0
Stark	No Visits			
St. Clair	1	1	1	0
Stephenson	13	23	4	0

ATTACHMENT 5
Illinois EPA Livestock Program
2011 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Tazewell	1	2	0	0
Union	No Visits			
Vermilion	1	2	0	0
Wabash	No Visits			
Warren	1	1	0	0
Washington	10	15	3	0
Wayne	No Visits			
White	No Visits			
Whiteside	6	7	1	0
Will	No Visits			
Williamson	1	1	0	0
Winnebago	7	10	2	0
Woodford	11	25	4	3
TOTAL	189	297	56*	20*

* Actual number of complaints fielded may be higher. This total does not reflect a single facility that may generate multiple complaints or cause more than one pollution incident. The total is facilities generating at least one complaint.

Illinois EPA Livestock Program 2008 Livestock Facility Investigation Annual Report

produced
by

Bureau of Water
Division of Water Pollution Control
Field Operations Section

EXH. 16
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**Illinois EPA Livestock Program
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Section III: Water Pollution Page 5

Section IV: Odor/Air Pollution Page 7

Section V: Facilities Referred to Illinois Department of Agriculture..... Page 8

Section VI: Enforcement Activities Page 8

Section VII: Measures Taken in 2008 to Correct Pollution Problems Page 11

Section VIII: List of Attachments..... Page 12

Information for this report is gathered from the following Sections within the Bureau of Water - Compliance Assurance Section, Water Pollution Control/Field Operations Section, and Water Pollution Control/ Permits Section.

Information is also gathered from the Agency's Division of Legal Counsel.

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Section I: General Information

1. Total number of facilities surveyed during 2008..... 188
2. Number of facilities contacted for the first time during 2008..... 79
3. Total number of on-site visits conducted during 2008 316
4. Number of on-site follow-up surveys conducted in 2008 128
5. Number of facilities contacted/visited raising or boarding the following types of livestock:
 - Beef 68
 - Dairy..... 35
 - Swine 74
 - Poultry.....8
 - Sheep5
 - Equine 25
 - Other6
6. Number of operations contacted in 2008 where more than one type of livestock were raised or boarded - 25
7. Number of facilities contacted/visited falling within each of the following categories in terms of animal units:
 - <5039
 - 50-100.....31
 - 100-30029
 - 300-100034
 - 1000-500050
 - >50005
8. Number of facilities observed in 2008 using one or more of the following waste handling components:
 - Lagoons.....42
 - Covered Lagoons0
 - Holding Ponds.....17
 - Pit (beneath slats)72
 - In ground tank16
 - Above ground tank12
 - Settling Basins12
 - Manure Stack32
 - Vegetative Filter.....10
 - Other18
 - None.....59
9. Total number facilities utilizing lagoons and holding ponds observed during on-site surveys of livestock facilities in 2008 - 58

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10. Number of facilities observed in 2008 using one or more of the following livestock waste storage structures tabulated by facility type:

Structures	Beef	Dairy	Swine	Poultry	Sheep	Equine	Other	Total	Combined
Lagoons	5	3	36	1	1	0	0	46	4
Covered Lagoon	0	0	0	0	0	0	0	1	0
Holding Ponds	9	6	5	0	0	0	0	20	3
Pits (beneath slats)	12	3	62	1	1	1	0	80	8
In ground tank	4	6	6	0	0	0	0	16	1
Above ground tank	4	4	4	0	0	0	0	12	0
Settling Basin	6	4	3	0	0	0	0	13	1
Manure Stack	8	9	4	4	1	13	5	44	7
Vegetative Filter	5	4	3	0	0	0	0	12	2
Other	4	4	5	3	0	8	1	25	5
None	28	11	4	1	3	10	1	68	0

11. Number of facilities observed in 2008 using one or more of the following livestock waste storage structures tabulated by facility size:

Structure	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Lagoons	4	2	0	10	24	2	42
Covered Lagoon	0	0	0	0	0	0	0
Holding Ponds	0	0	4	8	4	1	17
Pit (beneath slats)	5	1	3	14	43	3	69
In ground tank	0	1	2	3	4	0	10
Above ground tank	0	0	5	0	5	0	10
Settling Basin	0	1	3	5	2	0	11
Manure Stack	15	7	2	3	2	0	29
Vegetative Filter	0	2	4	2	1	0	9
Other	5	4	2	1	2	1	15
None	18	18	12	10	1	0	59

**Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report**

12. Number of facilities observed using one or more of the following livestock operations during on-site surveys in 2008:

Total confinement building	94
Open front confinement units	64
Open concrete feedlot.....	76
Open earthen feedlot.....	78
Vegetated pasture	61
Other.....	8
Total	381

13. Facilities using open front confinement units and/or open concrete or earthen feedlots observed during 2008 without a livestock waste storage structure where even a concrete settling basin was not in place - 46

14. Number and percent of livestock facilities surveyed during 2008 where clean surface water needs to be diverted away from the facility - 87 (46%)

Section II: Regulatory Violations

15. Number of facilities characterized as having the following regulatory violations during 2008:

Water Quality Standards (Subtitle C)	49
Effluent Standards (Subtitle C)	30
Air Emissions.....	10
New Facility Location (501.402).....	0
Runoff Control Requirements (501.403).....	82
Handling/Storage Requirements (501.404).....	99
Field Application Criteria (560)	13
NPDES Permit Provision.....	0
No NPDES Permit(See note)	38
No Violation Occurred	59
Other.....	7

16. Number and percent of the livestock facilities contacted/visited having one or more regulatory violations in 2008 - 86 (46%)

17. Number and percent of livestock facilities contacted/visited having no regulatory violations in 2008 - 59 (31%)

18. Tabulation of the number and percent of each type of facility contacted/visited having one or more regulatory violations in 2008:

**Illinois EPA Livestock Program
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Type	No. Contacted	No. With Violations	Percent With Violations
Beef	68	53	78%
Dairy	35	27	77%
Swine	74	38	51%
Poultry	8	4	50%
Sheep	5	3	60%
Equine	25	19	76%
Other	6	4	67%
Combined	25	17	68%

19. Tabulation of the number and percent of each type of facility contacted/visited that caused no pollution problem or regulatory violations in 2008:

Type	No. Contacted	No. With No Problems	Percent With No Problems
Beef	68	15	22%
Dairy	35	8	23%
Swine	74	36	49%
Poultry	8	4	50%
Sheep	5	2	40%
Equine	25	6	24%
Other	6	2	33%
Combined	25	8	32%

Section III: Water Pollution

20. Total number of livestock facilities generating water pollution complaints during 2008 - 82*

21. Percent of unsubstantiated water pollution complaints - 21%

22. Tabulation of the number of livestock facilities by size and animal type generating water pollution complaints during 2008:

Type	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	11	14	15	16	12	0	68

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2008 Livestock Facility Investigation Annual Report**

Dairy	4	10	12	8	1	0	35
Swine	9	2	6	12	41	4	74
Poultry	2	3	0	1	1	1	8
Sheep	2	1	0	1	1	0	5
Equine	16	8	1	0	0	0	25
Other	5	1	0	0	0	0	6
Total	49	39	34	38	56	5	221
Combined	7	4	4	4	6	0	25

23. Sources of water pollution problems observed in 2008 tabulated by animal type:

Sources	Beef	Dairy	Swine	Poultry	Sheep	Equine	Other	Total	Combined
Feedlot runoff	39	18	7	0	1	10	1	76	12
Pit discharge	2	1	6	0	1	0	0	10	2
Lagoon/HP overflow	3	3	8	0	0	0	0	14	0
Intentional discharge/dumping	0	0	4	0	0	0	0	4	0
Tile connection	1	0	2	0	0	0	0	3	0
Manure stack	8	4	2	3	2	13	3	35	6
Field application	5	1	4	2	0	2	0	14	2
Irrigation equipment failure	1	0	0	0	0	0	0	1	0
Milk House Waste	1	9	0	0	0	0	0	10	1
Other	16	5	11	1	0	2	1	36	3
No Problem Existed	18	9	39	4	2	7	2	81	7

24. Sources of water pollution observed in 2008 tabulated by facility size:

Sources	<u>NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Feedlot	8	17	19	13	6	0	63
Pit discharge	1	1	0	2	3	1	8
Lagoon/HP overflow	1	1	2	4	5	1	14

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2008 Livestock Facility Investigation Annual Report**

Intentional discharge/dumping	2	0	0	0	2	0	4
Tile connection	0	0	0	0	2	0	2
Manure stack	15	6	1	3	3	0	28
Field application	1	2	1	2	5	0	11
Irrigation equipment failure	0	0	0	0	1	0	1
Milk House Waste	1	5	1	2	0	0	9
Other	2	6	5	5	13	1	32
No Problem Existed	15	6	3	14	28	2	68

Section IV: Odor/Air Pollution

25. Total number of livestock facilities generating odor complaints during 2008 - 40 *

26. Percent of unsubstantiated odor complaints - 45%

27. Tabulation of the number of livestock facilities by size and animal type generating odor complaints during 2008:

Type	NPDES Animal Units						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	2	2	1	2	5	0	12
Dairy	0	0	1	1	0	0	2
Swine	4	0	2	4	11	1	22
Poultry	1	2	0	1	0	0	4
Sheep	0	0	0	0	0	0	0
Equine	4	1	1	0	0	0	6
Other	3	0	0	0	0	0	3
Total	14	5	5	8	16	1	49
Combined	3	2	2	0	2	0	9

28. Sources of odor pollution problems observed in 2008 tabulated by animal types:

Sources	Beef	Dairy	Swine	Poultry	Sheep	Equine	Other	Total	Combined
Field application	2	1	2	0	0	0	0	5	0
Manure stack	3	0	1	1	0	2	0	7	1
Lagoon/holding pond	2	0	1	0	0	0	0	3	0
Feedlot	3	0	0	1	0	1	0	5	2
Agitation/manure handling	0	0	1	0	0	0	0	1	0

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2008 Livestock Facility Investigation Annual Report**

Confinement building/pit	1	0	2	1	0	0	0	4	0
Other	2	0	4	0	0	0	0	6	1

29. Sources of odor pollution problems observed in 2008 tabulated by facility size:

Sources	<u>NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Field application	1	0	0	3	1	0	5
Manure stack	4	0	0	1	1	0	6
Lagoon/holding pond	0	0	0	1	2	0	3
Feedlot	0	1	0	1	1	0	3
Agitation/manure handling	0	0	0	0	1	0	1
Confinement building/pit	0	1	0	0	2	1	4
Other	0	0	1	0	4	0	5

Section V: Facilities Referred to Illinois Department of Agriculture

30. Number and percent of facilities referred to the Illinois Department of Agriculture regarding either dead animal disposal or potential LMFA violations in 2008 - 13 (7%)

Section VI: Enforcement Activities

31. Number and percent of facilities sent a Noncompliance Advisory Letter (NCA) by the Illinois EPA in 2008 - 30** (16%)

32. Tabulation of the number of facilities by size and animal type receiving NCA letters in 2008:

Type	<u>NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	2	8	3	1	0	0	14
Dairy	0	5	2	1	0	0	8
Swine	1	0	1	2	0	0	4
Poultry	0	1	0	0	0	0	1
Sheep	0	0	0	0	0	0	0
Equine	5	2	0	0	0	0	7
Other	0	0	0	0	0	0	0

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2008 Livestock Facility Investigation Annual Report**

Total	8	16	6	4	0	0	34
Combined	1	2	0	1	0	0	4

33. Number and percent of facilities sent a Violation Notice Letter (VN) by the Illinois EPA in 2008 - 25** (13%)

34. Tabulation of the number of facilities by size and animal type receiving Violation Notice letters in 2008:

Type	<u>NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	0	2	7	3	1	0	13
Dairy	0	2	6	2	0	0	10
Swine	0	0	0	1	2	1	4
Poultry	0	1	0	0	0	0	1
Sheep	0	0	0	0	0	0	0
Equine	1	1	0	0	0	0	2
Other	0	0	0	0	0	0	0
Total	1	6	13	6	3	1	30
Combined	0	3	1	1	0	0	5

35. Number and percent of facilities sent a Notice of Intent to Refer Letter (NOIR) by the Illinois EPA in 2008 - 7** (4%)

36. Tabulation of the number of facilities by size and animal type receiving Notice of Intent to Refer letters in 2008:

Type	<u>* NPDES Animal Units</u>						Total
	<50	50-100	100-300	300-1000	1000-5000	>5000	
Beef	0	1	1	1	2	0	5
Dairy	0	1	0	1	0	0	2
Swine	0	0	0	0	1	0	1
Poultry	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0
Equine	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	0	2	1	2	3	0	8

**Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report**

New application equipment.....	4
Changed application site	5
Incorporation or injection	3
Reduced herd size	10
Went out of business	10
Revegetated Pasture/rotate grazing	3
Other practice implemented.....	55
No effort made to correct problem.....	16
No Problem existed.....	52
Unknown.....	32

* Actual number of complaints fielded may be higher. This total does not reflect a single facility that may generate multiple complaints or cause more than one pollution incident. The total is facilities generating at least one complaint.

** Number of facilities receiving letters or referred only. Actual number of referrals or letters may be higher due to single facilities receiving multiple letters or referrals.

**Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report**

Section VIII: List of Attachments

- Attachment 1 - 2008 livestock related fish kill data
- Attachment 2 - 2008 livestock facilities receiving enforcement letters and facilities referred to the Attorney General tabulated by county
- Attachment 3 - List of livestock facilities for which NPDES Permits were issued in 2008 (Information from DWPC Permit Section)
- Attachment 4 - List of livestock facilities for which Tax Certifications were issued in 2008 (Information from DWPC Permit Section)
- Attachment 5 - Summary of select 2008 data tabulated by county

ATTACHMENT 1
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Livestock Related Fishkill Data

County	Discharge ID	Assessed Value (\$)
Adams	DGGC/001/DS/7	\$ 1,246.33
Bureau	DQA/011/EA	\$ 8,658.45
Bureau		\$ 2,600.00
Henderson	LCD/071/AY/--	\$ 1,378.62
Pike	KCA/149/DE/7	\$ 0.00
Shelby	CS/173/BH/1	\$ 0.00
Warren	DJFD/187/BI/2	\$ 0.00
Woodford	DZK/203/CB/	\$ 20,699.68

ATTACHMENT 2
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Adams	1	0	0	2
Alexander	No Visits			
Bond	0	0	0	0
Boone	No Visits			
Brown	No Visits			
Bureau	0	0	1	2
Calhoun	No Visits			
Carroll	5	1	1	1
Cass	0	0	0	0
Champaign	No Visits			
Christian	No Visits			
Clark	No Visits			
Clay	No Visits			
Clinton	0	0	1	1
Coles	No Visits			
Cook	1	0	0	0
Crawford	No Visits			
Cumberland	No Visits			
DeKalb	1	0	0	0
DeWitt	No Visits			
Douglas	0	0	0	0
DuPage	0	0	0	0
Edgar	No Visits			
Edwards	0	0	0	0
Effingham	0	0	0	0
Fayette	0	0	0	0
County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General

ATTACHMENT 2
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

Ford	No Visits			
Franklin	0	0	0	0
Fulton	0	0	0	0
Gallatin	No Visits			
Greene	No Visits			
Grundy	No Visits			
Hamilton	0	0	0	0
Hancock	0	1	0	0
Hardin	No Visits			
Henderson	0	0	0	1
Henry	0	0	0	0
Iroquois	No Visits			
Jackson	0	1	0	0
Jasper	No Visits			
Jefferson	0	0	0	0
Jersey	No Visits			
JoDaviess	3	5	0	0
Johnson	No Visits			
Kane	2	0	0	0
Kankakee	0	0	0	1
Kendall	No Visits			
Knox	0	0	1	1
Lake	0	0	0	0
LaSalle	No Visits			
Lawrence	No Visits			
Lee	1	0	0	0
County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Livingston	0	0	0	0
Logan	0	0	0	0

ATTACHMENT 2
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

Macon	1	0	0	0
Macoupin	No Visits			
Madison	0	0	0	0
Marion	No Visits			
Marshall	No Visits			
Mason	0	0	0	0
Massac	0	0	0	0
McDonough	0	0	0	0
McHenry	0	0	0	2
McLean	1	0	0	0
Menard	0	0	0	0
Mercer	No Visits			
Monroe	0	1	0	0
Montgomery	0	1	0	0
Morgan	0	0	0	0
Moultrie	No Visits			
Ogle	4	2	0	0
Peoria	0	1	0	0
Perry	0	0	0	0
Piatt	0	0	0	0
Pike	1	0	0	0
Pope	No Visits			
Pulaski	No Visits			
Putnam	No Visits			
County	Noncompliance Advisory Letter Sent	Violation Notice Letter Sent	Notice of Intent to Refer Letter	Referred to Attorney General
Randolph	0	0	0	0
Richland	0	0	0	0
Rock Island	No Visits			
Saline	No Visits			

ATTACHMENT 2
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Livestock Facilities Receiving Enforcement Letters
And Facilities Referred to the Attorney General Tabulated by County**

Sangamon	1	0	0	0
Schuyler	0	1	0	0
Scott	1	0	0	0
Shelby	0	1	0	0
Stark	0	0	0	0
St. Clair	0	0	0	0
Stephenson	4	3	1	0
Tazewell	1	1	0	0
Union	No Visits			
Vermilion	0	0	0	0
Wabash	No Visits			
Warren	0	1	1	2
Washington	0	1	0	0
Wayne	0	0	0	0
White	No Visits			
Whiteside	0	0	0	2
Will	1	0	0	0
Williamson	0	0	0	0
Winnebago	1	3	1	0
Woodford	0	1	0	0
Total	30	25	7	15

** Number of facilities receiving letters or referred only. Actual number of referrals or letters may be higher due to single facilities receiving multiple letters or referrals.

ATTACHMENT 3
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
List of NPDES Permits
Issued for Livestock Facilities in 2008

Facility	County	NPDES Number	Date Issued	Expiration Date
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(No permits issued in 2008)

ATTACHMENT 4
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
List of Tax Certifications
Issued for Livestock Facilities in 2008@

Name	County	Docket Number	Certificate Date
Jet Farm – Prophetstown	Whiteside	PCB 2008-050	3/20/2008
Grote Stock Farm-Sims Wayne		PCB 2008-053	4/3/2008
Newcomber Confinements-Lanark	Carroll	PCB 2008-054	4/3/2008
McCune Farm Gold – East	Bureau	PCB 2008-056	4/3/2008
McCune Farm Gold – East	Bureau	PCB 2008-057	4/3/2008
Bible Pork – Louisville	Clay	PCB 2008-058	4/3/2008
Von Holten Farms – Lydon	Whiteside	PCB 2008-060	4/3/2008
Kollmann Hog Farms	Effingham	PCB 2008-063	4/17/2008
Mark Sturtevant – Shannon	Carroll	PCB 2008-064	4/17/2008
CAC Farms, Inc – Ashton	Ogle	PCB 2008-065	4/17/2008
CNS Farms, Inc – Malta	DeKalb	PCB 2008-067	4/17/2008
Harmet Farms – Cropsey	McLean	PCB 2008-068	4/17/2008
Ehnle Farms	Bureau	PCB 2008-069	4/17/2008
Honey Creek Hogs, Inc Pike		PCB 2008-070	4/17/2008
D & V. Pork	Adams	PCB 2008-071	4/17/2008
Kuntz Farms	McLean	PCB 2008-072	4/17/2008
Pine Ridge Farms, Inc	Adams	PCB 2008-073	4/17/2008
Jeff Hank – Aledo	Ogle	PCB 2008-074	5/15/2008
Hopkins Farms-Gilson Knox		PCB 2008-075	4/17/2008
Special K Hog Farm – Chenoa	McLean	PCB 2008-077	5/1/2008
Bible Pork – Louisville	Clay	PCB 2008-079	5/1/2008
Winters Creek, Inc	Mercer	PCB 2008-080	5/1/2008
Creasey Family Farms – Macomb	McDonough	PCB 2008-081	5/1/2008
Lazy B. Farms	Lawrence	PCB 2008-082	5/1/2008
Prime Pork Holdings, LLC Kingston	DeKalb	PCB 2008-084	5/15/2008
Keith Morby Finishing Barn – Aledo	Mercer	PCB 2008-085	5/15/2008
Dennis Biddle – Seaton Mercer		PCB 2009-012	9/16/2008
Lafever Farms-Joy	Mercer	PCB 2009-015	9/16/2008
Baby Bacon, Inc	Lee	PCB 2009-018	9/30/2008

@ Procedure for obtaining Tax Certification for Pollution Control Facilities was changed during 2001. Effective January 1, 2002, all Certifications are granted or denied by the Illinois Pollution Control Board. A facility still sends the Tax Certification application to the Agency for review and the Agency then forwards the application to the Illinois Pollution Control Board along with a recommendation on what action the Board should take. Additional information can be found in 35 Illinois Administrative Codes, Subtitle A, Part 125: Tax Certifications.

ATTACHMENT 5
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Adams	4	10	2	0
Alexander	No Visits			
Bond	1	1	1	0
Boone	No Visits			
Brown	No Visits			
Bureau	2	11	2	0
Calhoun	No Visits			
Carroll	11	19	1	2
Cass	1	1	1	1
Champaign	No Visits			
Christian	No Visits			
Clark	No Visits			
Clay	No Visits			
Clinton	4	4	1	1
Coles	No Visits			
Cook	2	4	1	0
Crawford	No Visits			
Cumberland	No Visits			
DeKalb	2	2	0	0
DeWitt	No Visits			
Douglas	2	4	2	2
DuPage	2	4	1	0
Edgar	No Visits			
Edwards	1	1	0	0
Effingham	1	1	0	0
Fayette	2	2	0	1
Ford	No Visits			
Franklin	1	1	0	0
Fulton	1	2	1	1
Gallatin	No Visits			

ATTACHMENT 5
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Greene	No Visits			
Grundy	No Visits			
Hamilton	1	2	1	1
Hancock	5	9	1	1
Hardin	No Visits			
Henderson	3	6	2	2
Henry	2	4	1	0
Iroquois	No Visits			
Jackson	8	9	0	0
Jasper	No Visits			
Jefferson	4	6	3	1
Jersey	No Visits			
JoDaviess	14	24	2	0
Johnson	No Visits			
Kane	2	2	2	0
Kankakee	1	1	0	0
Kendall	No Visits			
Knox	3	6	3	0
Lake	1	1	0	0
LaSalle	No Visits			
Lawrence	No Visits			
Lee	2	3	1	1
Livingston	1	1	1	0
Logan	4	4	0	1
Macon	1	1	1	1
Macoupin	No Visits			
Madison	1	1	0	0
Marion	No Visits			
Marshall	No Visits			
Mason	1	1	0	1

ATTACHMENT 5
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Massac	2	2	1	1
McDonough	1	3	1	0
McHenry	3	5	0	0
McLean	2	2	2	2
Menard	3	4	1	2
Mercer	No Visits			
Monroe	1	1	1	0
Montgomery	3	3	1	0
Morgan	4	4	1	2
Moultrie	No Visits			
Ogle	9	18	2	0
Peoria	4	9	2	1
Perry	1	1	0	0
Piatt	1	1	1	1
Pike	4	8	2	1
Pope	No Visits			
Pulaski	No Visits			
Putnam	No Visits			
Randolph	1	1	1	0
Richland	1	1	1	0
Rock Island	No Visits			
Saline	No Visits			
Sangamon	7	11	7	2
Schuyler	5	7	2	1
Scott	3	4	1	1
Shelby	1	1	0	0
Stark	1	2	1	1
St. Clair	1	1	1	0
Stephenson	13	19	5	2
Tazewell	2	2	2	1

ATTACHMENT 5
Illinois EPA Livestock Program
2008 Livestock Facility Investigation Annual Report
Summary of Investigation Data
Tabulated by County

County	Number of Facilities Contacted	Number of Total Visits	*Facilities With Water Complaints	*Facilities With Odor Complaints
Union	No Visits			
Vermilion	1	1	1	0
Wabash	No Visits			
Warren	2	8	2	1
Washington	2	2	0	0
Wayne	2	2	2	0
White	No Visits			
Whiteside	4	10	1	1
Will	2	2	1	0
Williamson	1	1	0	1
Winnebago	4	9	3	0
Woodford	7	26	6	4
TOTAL	188	316	82*	40*

* Actual number of complaints fielded may be higher. This total does not reflect a single facility that may generate multiple complaints or cause more than one pollution incident. The total is facilities generating at least one complaint.



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Illinois Ag News Headlines

Illinois AG Asked to Take Action Over Swine Manure Release

Illinois Ag Connection - 08/10/2012

Illinois Environmental Protection Agency (Illinois EPA) Interim Director John Kim has asked the Illinois Attorney General's Office to proceed with an enforcement action and seek immediate injunctive relief related to a discharge of swine manure into Beaver Creek and Hooper Branch in late July that resulted in a large fish kill in the streams.

The parties named in the referral are Hopkins Ridge Farms, LLC, which has more than 2,500 hogs; Belstra Milling Company of DeMotte, Indiana, which constructed and supports Hopkins Ridge Farms; Livestock Engineering Solutions, Inc., the consulting engineering firm for Belstra Milling; and Lebert Mercier, the owner of the land application area that received a mixture of liquid swine manure from Hopkins Ridge for irrigation spraying that occurred between July 20 and July 23 and is the possible cause of the extensive fish kill.

"Due to the threat of future and further release of the contained livestock waste to Hooper Branch and Beaver Creek, and Hopkins Ridge, Belstra, and Mercier's apparent unwillingness to more aggressively address the problem, the Illinois EPA believes an immediate order should be obtained in this matter compelling Hopkins Ridge, Belstra and Mercier to cease future and further discharges of livestock waste-contaminated water into Hooper Branch and Beaver Creek and begin an aggressive cleanup of the affected waterways," the Illinois EPA has requested of the Illinois Attorney General's Office.

Illinois EPA alleges that the parties named in the referral violated the Illinois Environmental Protection Act by placing contaminants on land in a manner so as to create a water pollution hazard, and caused the discharge of contaminants into the waters of the state without a National Pollutant Discharge Elimination (NPDES) Permit.

The referral also alleges the parties violated state environmental regulations by creating offensive conditions and offensive discharges, causing Beaver Creek to exceed ammonia nitrogen standards, violating field application of livestock waste requirements, violating handling and storage of livestock waste requirements, violating water quality standards and failing to have an NPDES Permit for very large operators.

A fish kill was first reported to Illinois EPA on July 25. Agency field staff, along with investigators from the Illinois Department of Natural Resources, conducted initial on-site investigations on July 25 and July 26, observing water that was dark in color and dead fish and conducting interviews with the parties cited in the referral to the Illinois Attorney General's Office.

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'It's devastating'

By JORDAN CROOK Reporter | Posted: Monday, July 30, 2012 11:23 pm

One area resident's views on the expanded impact of fish kill

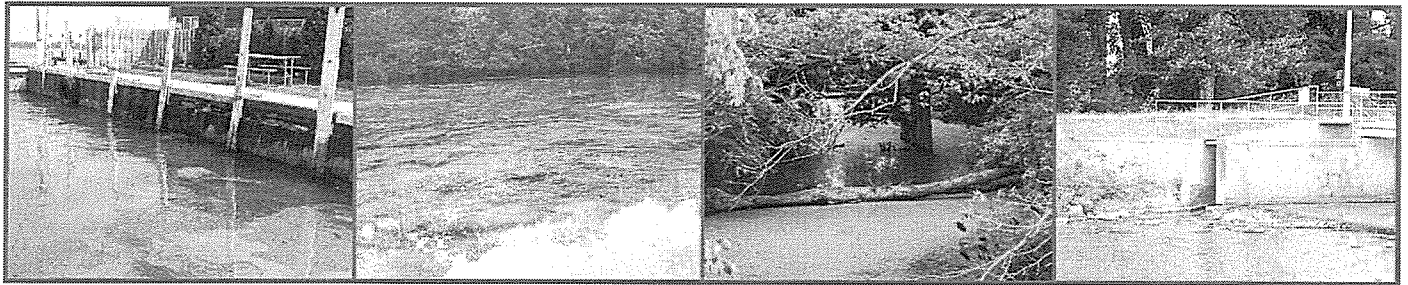
As Lee Ponton looked out across a bend in the stream Monday afternoon, a dead fish floated down the creek. As it floated by, it passed the bodies of two other fish, one trapped in the branches of a log and another baking on the bank of the stream in afternoon sun. These fish represent an estimated 63,000 fish that suffocated to death in a recent fish-kill on stretch of Beaver Creek near Papineau. Illinois Environmental Protection Agency and Illinois Department of Natural Resources Conversation Police officials believe the fish-kill was caused by liquid hog waste entering the stream. Evidence of this is clear when looking at the creek. What had previously been a pale green surface that a person could see right through is now a clouded dark brown brew that reveals nothing aside from the occasional dead fish rising from its depths. The creek also emits an unpleasant smell due to the contamination. Ponton's family has lived along the banks of this stream for 77 years and he himself has farmed near the banks since 1971, working to preserve as much of the wilderness along the banks of the creek as much as he can. In all of the time Ponton has lived near the creek, he has never seen it so devastated. "We've owned this property for 77 years, and in that time I have seen six feet worth of snow, I've seen floods and I've seen droughts, but I've never seen it as devastating as this," Ponton said. He believes this situation is worse than all of the others because the others were temporary as droughts would break, snow would melt and floods would recede. In this situation, the contamination must be washed away from the creek, a process that could take a great deal of time to be fully completed. For Ponton and others along the banks, the condition of the creek is upsetting. "It's devastating," Ponton said Monday afternoon, while standing at one of the places he and members of his family fish in the creek during the year. He said the only other time he can recall of a sizable fish-kill taking place on the creek in his lifetime was in 1977 when a severe freeze struck the creek and many fish were trapped below the ice. But Ponton doesn't believe the impact of the condition of the creek is limited to the tens of thousands of fish that were killed. Ponton pointed out that the condition of the creek impacts the entire ecosystem surrounding it. Various kinds of wildlife, rabbits, squirrels and deer, all depend on the creek for water, while others, such as birds, depend on the creek's fish for food. Yet, due to the contaminated nature of the creek as it is now, many of these creatures will have to find other sources of food and water or risk drinking contaminated water. While Ponton feels that deer will likely be able to find other sources of water in ponds, smaller animals like squirrels and rabbits will have a harder time making the trek to find alternate sources of water. The human population of the area around the creek, which cuts through some 40 acres of timber, will also be impacted by the situation. Ponton explained there were several people along the creek, including hunting clubs, that fish and hunt near the river, and while some merely do it for recreation, others do depend on the bounty of nature to

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sustain themselves. He believes the state of the creek will likely also drive property values down for those who might be wishing to sell their houses along the creek. Overall, though, Ponton is most concerned about the ability of the natural beauty around the creek being able to thrive with the river so contaminated. "It's there to be enjoyed, not to be destroyed," he said. "It's heartbreaking, it's sickening." The entire situation surrounding the creek has left Ponton and others asking one question: "Why did this happen?" As investigators work to find the cause of the contamination, Ponton wants to be sure the party responsible for the liquid hog waste entering the creek, is held responsible for the actions, intentional or not, and not simply given a "slap on the wrist." Ponton gave the example of a bald eagle's nest that was recently discovered near the creek. He said the IEPA told everyone that the nest was protected and anyone tampering with it would face penalties. Ponton believes the wildlife living in and nearby the creek deserves a similar form of protection and those who have harmed that wildlife should face similar penalties. Ponton is encouraging others who live along the affected area of the creek to contact him in the hopes of setting up a meeting to establish a petition regarding the status of the creek and the cause of it to be sent to the attorney general to raise awareness about the situation. For Ponton, protecting nature around the creek is a matter of ensuring future generations will have the chance to enjoy it as the years go by. To secure that natural beauty, he said, situations like this must be prevented in the future. He feels that an effort needs to be made to ensure state officials are aware of the situation so that proper punishment can be handed down to the person or business responsible for the contamination of the creek and also to ensure that proper safeguards are put in place to prevent it from ever happening again. Anyone wishing to contact Ponton can call him at 815-428-7401.

AN URGENT CALL TO ACTION

REPORT OF THE STATE-EPA
NUTRIENT INNOVATIONS TASK GROUP



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AUG 27 2009

The Honorable Lisa Jackson
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Subject: An Urgent Call to Action – Report of the State-EPA Nutrient Innovations Task Group

Dear Administrator Jackson,

We are pleased to transmit the enclosed **An Urgent Call to Action - Report of the State-EPA Nutrient Innovations Task Group** for your review and consideration. The initial concept for a joint State-EPA review of both existing and innovative approaches to nutrient management was introduced at the 2008 annual summer meeting of the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). Further discussions occurred in October 2008 at EPA's Water Division Directors meeting which included EPA regional and headquarters water managers as well as senior program managers representing ASIWPCA and the Association of State Drinking Water Administrators (ASDWA). At the October meeting, State and EPA surface water and drinking water program managers agreed to form an ad hoc Nutrient Innovations Task Group to identify and frame key nutrient issues, questions, and options on how to improve and accelerate nutrient pollution prevention and reduction at the state and national level.

As outlined in the enclosed report, the spreading environmental and drinking water supply degradation associated with excess levels of nitrogen and phosphorus in our nation's waters has been studied and documented extensively. Current efforts to control nutrients have been hard-fought but collectively inadequate at both a statewide and national scale. Concern with the limitations of current nutrient control efforts is compounded by the certain knowledge that as the U.S. population increases by more than 135 million over the next 40 years, the rate and impact of nitrogen and phosphorus pollution will accelerate - potentially diminishing even further our progress to date.

In this report, the Task Group presents a summary of scientific evidence and analysis that characterizes the scope and major sources of nutrient impacts nationally. This information is not new; it has been synthesized from a number of reports and examined in a holistic framework. The enclosed report also considers the tools currently used under existing federal authority and presents options for new, innovative tools to improve control of nutrient pollution sources. Finally the Task Group presents findings and suggests next steps needed to better address nutrient pollution.

Key findings address the points above, but also extend to a number of additional conclusions including the following:

- * Nutrient-related pollution significantly impacts drinking water supplies, aquatic life, and recreational water quality. While available cost data associated with these impacts is limited, what we *do* know paints a sobering picture and a compelling reason for more urgent and effective action.

- * Sound science, technical analysis, collaboration, and financial incentives will fail to adequately address nutrient impacts at a state-wide and national level without a common framework of responsibility and accountability for all point and nonpoint sources - this framework does not presently exist.

- * Current tools such as numeric nutrient criteria, water quality assessments and listings, urban stormwater controls, POTW nutrient permit limits, and animal feedlot controls are underused and poorly coordinated.

- * Other broadly applicable tools, such as CZARA, antidegradation, limits on discharges to impaired waters, and compliance with downstream water quality standards are rarely used.

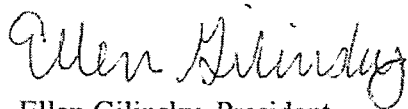
- * Current regulations disproportionately address certain sources in a watershed (e.g., municipal sewage treatment) at the exclusion of others contributing substantial loadings of similar pollutants to the same watershed.

- * Specific aspects of state nonpoint source programs have been highly successful in addressing individual sources of nutrients, but their broader application has been undercut by the absence of a common multi-state framework of mandatory point and nonpoint source accountability within and across watersheds.

The Nutrient Innovations Task Group believes that national leadership is vital to supporting and requiring more consistent and fuller utilization of existing tools from state to state and source to source. Establishing a cross-state, enforceable framework of responsibility and accountability for all point and nonpoint pollution sources is central to ensuring balanced and equitable upstream and downstream environmental protection. It is also essential to strengthen the ability of any single state to demand environmental accountability without jeopardizing the loss of economic activity that might shift to another state with less rigorous standards. We believe that absent a profound change in current approaches and support for the development of a multi-sector framework of accountability for both point and nonpoint sources, we collectively are unlikely to be successful in responding to an increasingly pervasive source of pollution that comes from multiple sources in every state and affects not only near-field waters and habitats, but also those of neighboring and downstream states.

We would welcome the opportunity to brief you and discuss the findings and conclusions of this report in more detail.

Respectfully,




Ellen Gilinsky, President
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An Urgent Call to Action—Report of the State-EPA Nutrient Innovations Task Group

I. Introduction

The amount of nutrients entering our waters has dramatically escalated over the past 50 years, and nutrients now pose significant water quality and public health concerns across the United States. In terms of growing drinking water impacts, expanding impairment of inland waters, and compromised coastal estuaries, nitrogen and phosphorus pollution has the potential to become one of the costliest, most difficult environmental problems we face in the 21st century (Boesch 1999).

Continuing the status quo at the national, state and local levels and relying upon our current practices and control strategies will not support a positive public health and environmental outcome.

Current efforts to control nutrients have been hard-fought but collectively inadequate at both a statewide and national scale. Perhaps even more disturbing than our current inadequate nutrient control strategies is the certain knowledge that as our population increases from about 300 million people in 2008 by more than 135 million over the next 40 years (U.S. Census Bureau 2008; U.S. Census Bureau 2009), the rate and impact of nitrogen and phosphorus pollution will accelerate—potentially diminishing even further our progress to date. As the U.S. population expands, nutrient pollution from urban stormwater runoff, municipal wastewater discharges, air deposition, and agricultural livestock activities and row-crop runoff is expected to grow as well.

The spreading environmental degradation associated with excess levels of nitrogen and phosphorus in our nation’s waters has been studied and documented extensively. Over the past decade, there have been numerous major reports, a substantially large number of national and international scientific studies, and a growing number of quantitative analyses and surveys at the state and national levels indicating that we are falling behind. The National Academy of Sciences has addressed the impacts of nutrient pollution on our coastal and estuarine waters in two major reports. The National Oceanic and Atmospheric Administration (NOAA) also has documented and analyzed this issue extensively. EPA’s Science Advisory Board has prepared two critical reports. The Agency itself has issued numerous reports over the years sounding the alarm. And this body of data, analysis and conclusions is substantiated by numerous published articles, state-level technical reports, and university studies across the country.

Faced with the reality of losing ground to a growing environmental crisis, state and EPA water quality and drinking water directors and program managers formed a State-EPA Nutrient Innovations Task Group (Task Group) to

Examples of recent key reports on nutrient pollution

- ✓ EPA SAB: *Reactive Nitrogen in the United States: An Analysis of Inputs, Flows, Consequences, and Management Options* (USEPA 2009a)
- ✓ EPA SAB: *Hypoxia in the Northern Gulf of Mexico* (USEPA 2007c)
- ✓ NRC: *Mississippi River Water Quality and the Clean Water Act: Progress, Challenges, and Opportunities* (NRC 2008a)
- ✓ NRC: *Urban Stormwater Management in the United States* (NRC 2008b)
- ✓ EPA: *National Coastal Condition Report III* (USEPA 2008a)
- ✓ EPA: *Wadeable Streams Assessment* (USEPA 2006b)
- ✓ NOAA: *Effects of Nutrient Enrichment in the Nation’s Estuaries: A Decade of Change* (Bricker et al. 2007)

review past nutrient control efforts and evaluate the potential for creating a new synthesis of existing tools and innovative approaches to change how we currently respond to nutrient pollution. The Task Group agreed on the following charge:

States and EPA recognize that eutrophication and nutrient overloading are significant environmental problems, not just for aquatic resources but also from a drinking water standpoint. In the past, we have been successful in some areas, but not in others. We agree to meet to develop a strategy to change the way we act to improve ways to reduce or eliminate nutrient releases.

In this report, the Task Group presents a summary of scientific evidence and analysis that characterizes the scope of nutrient impacts and the major sources of nutrients. This information is not new; it has been synthesized from a number of reports and surveys and examined in a holistic framework. This summary considers the tools currently used under existing federal authority and presents options for new, innovative tools to control sources of nutrient pollution. Finally, the Task Group presents findings and suggests next steps needed to better address nutrient pollution.

This summary report was developed through a series of discussions and iterations. The Task Group first met in December 2008 to determine the charge and identify work groups to evaluate the subjects considered in this summary. The Task Group met again in February 2009 to present the work groups' findings, in March 2009 to share with and receive input from state program directors, and finally in May 2009 to share the outline of this summary with EPA Water Division Directors for their input and feedback.

II. Scope and Impacts of Nitrogen and Phosphorus Pollution

Nutrient-related pollution significantly affects drinking water supplies, aquatic life and recreational water quality. These impacts occur in all categories of waters—rivers, streams, lakes, reservoirs, estuaries and coastal areas. Although only limited cost data are available, what we do know about the scope, impacts and costs of nutrient pollution presents a sober and compelling reason for more urgent and effective action. This chapter outlines the scope and impacts of nutrient pollution based upon recent and historical data and analyses. The first section of the chapter focuses on public health impacts associated with nutrient pollution in connection with public drinking water systems and private wells. The nature and scope of water quality impacts are then addressed in the following section.

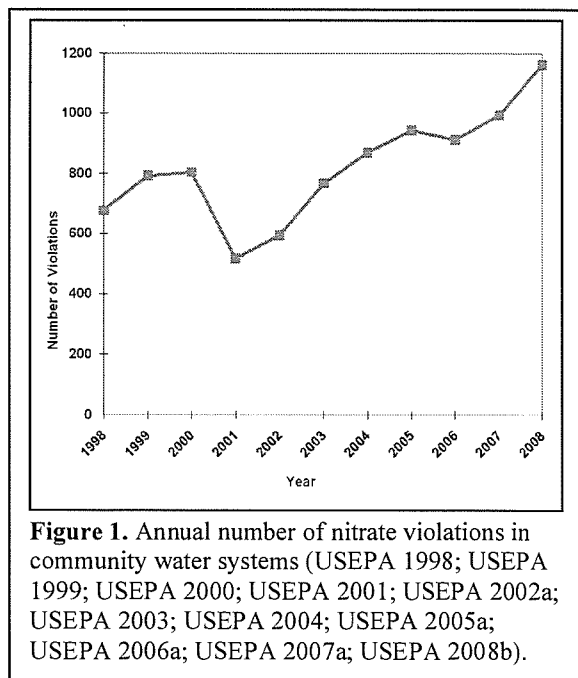
Drinking Water Supplies

There are approximately 52,000 community water systems across the United States serving more than 290 million people (USEPA 2009d). The community water systems serve many communities that are vulnerable to the public health impacts of a contaminated drinking water supply, as well as to the cost of continued contaminant monitoring and the substantial financial burden of adding or upgrading treatment. About 78 percent of these community water systems, serving 88 million people, use ground water as a drinking water supply. The vast majority of the community systems (78 percent) serve small to very small communities (defined as populations of 25 to 500 and 501 to 3,300) with minimal treatment and limited resources (USEPA 2009d).

Treatment and resources are even more limited for the 15 million households that rely on private wells for their drinking water (DeSimone 2009). In a recent report on the quality of water in domestic wells, the U.S. Geological Survey (USGS) found that contaminants such as nutrients co-occurred with other contaminants in 73 percent of the wells tested in the study (DeSimone 2009). Contamination of a ground water drinking water supply by both nutrient pollution and co-occurring pathogenic, pesticide, and emerging contaminants is a significant concern for small communities and individual households in terms of the need for treatment technologies or alternative water supplies.

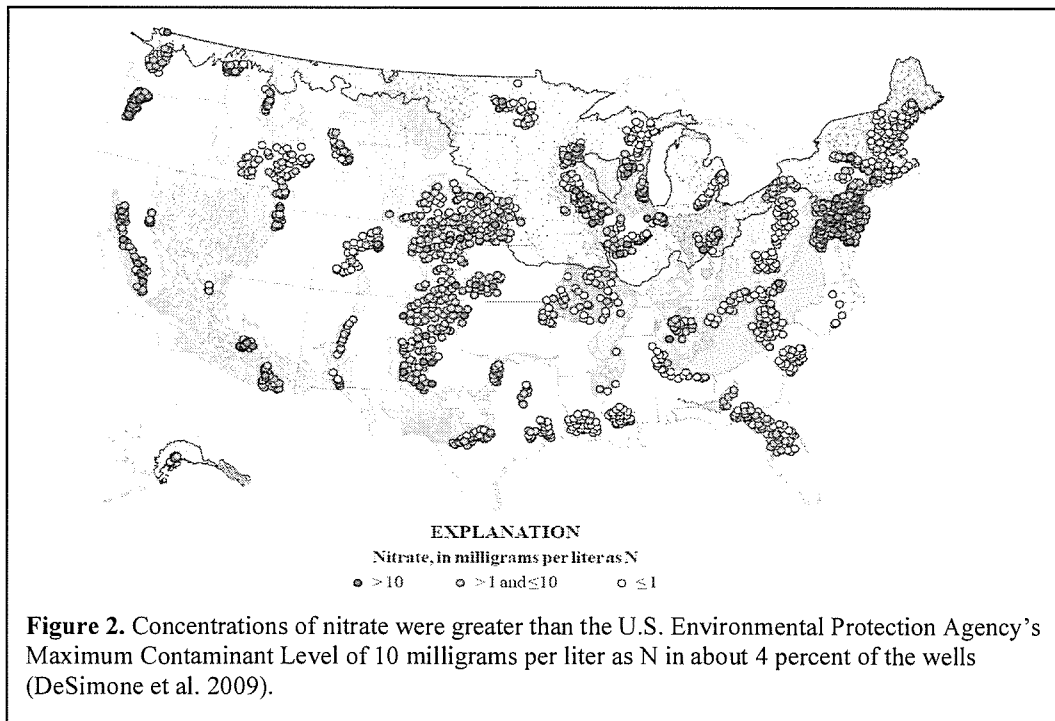
About 22 percent of community water systems, serving more than 200 million people (about two-thirds of the U.S. population), use surface water as their key drinking water supply (USEPA 2009d). These systems tend to be larger than those using ground water, but by virtue of their size, they are equally challenged (if not more so) by the cost and complexity of treatment for nutrients and associated co-contamination from nutrient pollution sources. They have the added challenge of needing to address widespread algal blooms and related toxins in their surface drinking water supplies caused by pollution sources that can occur not only locally but also across state lines and even hundreds of miles upstream. Appendix A presents several case studies that illustrate the problems and costs associated with nitrates in drinking water systems. Following is a summary of key information that describes examples of nutrient pollution problems in drinking water sources:

- High nitrate levels in drinking water have been linked to methemoglobinemia (a decrease in the oxygen-carrying capacity of red blood cells), which causes serious illness and sometimes death in infants, as well as other potential human health effects (DeSimone 2009).
- The combination of organic carbon (from algae in source waters) and disinfection agents used in water treatment can sometimes lead to elevated levels of disinfection by-products in drinking water. Yet another related concern is the possible direct role of organic nitrogen compounds in the creation of disinfection by-products. More than 260 million Americans are exposed to disinfection by-products in their drinking water each year (USEPA 2005b). Disinfection by-products such as trihalomethanes, haloacetic acids, bromate and chlorite have been linked to increased cancer and reproductive health risks in humans, as well as liver, kidney and central nervous system problems (USEPA 2009b).
- From 1998 to 2008, the number of reported violations for exceeding the maximum contaminant level (MCL) of 10 mg/L for nitrate in public drinking water systems varied from year to year. It ranged from 517 to 1,163 violations (Figure 1), affecting from about 200,000 to nearly 1.9 million people.



During these 11 years, nitrate exceedances showed a significant increasing trend, nearly doubling the number of violations (USEPA 1998; USEPA 1999; USEPA 2000; USEPA 2001; USEPA 2002a; USEPA 2003; USEPA 2004; USEPA 2005a; USEPA 2006a; USEPA 2007a; USEPA 2008b).

- USGS sampled 2,100 private wells in 48 states from 1991 to 2004 and found nitrate was detected in about 72% of the wells and was the most common contaminant derived from man-made sources. It was found at concentrations greater than the drinking water standard in about 4 percent of sampled wells. Elevated nitrate concentrations were largely associated with intensively farmed land such as the Midwest Corn Belt and the Central Valley of California (DeSimone 2009). Figure 2 illustrates the widespread nature of nitrate pollution in wells.
- For a small community water system serving 500 people, the estimated capital cost of a drinking water ion exchange treatment system to remove nitrates would be more than \$280,000 with annual operation and maintenance (O&M) of about \$17,500. That capital cost goes up to over \$550,000 with annual O&M of over \$50,000 for a community water system serving 3,300 people. Such treatment costs pose a difficult affordability challenge for small systems with a limited number of customers (Khera 2009, personal communication).



- Co-occurring contamination from sources of nutrients often carries the added risk of drinking water supply pollution from associated pathogens, anthropogenic chemicals, livestock medicines and other emerging contaminants (DeSimone 2009; Focazio et al. 2008).

- Taste and odor compounds and cyanotoxins, which are produced by cyanobacteria (also known as blue-green algae), represent a further challenge (Carmichael 2000). Taste and odor problems are treatable with ion exchange, oxidation or adsorption with activated carbon. For cyanotoxins, the source cyanobacteria often are no longer present when the public health problem occurs. Without continual monitoring, cyanobacterial toxins may pass through normal water treatment processes (Carmichael 2000).
- Ingestion of water contaminated with chemicals produced by harmful algal blooms can cause gastrointestinal complications, acute or chronic liver damage, neurological symptoms and even death (Falconer et al. 1994; WHOI 2007).
- In 1991 Des Moines (Iowa) Water Works constructed a \$4 million (1991 dollars) ion exchange facility to remove nitrate from its drinking water supply. Starting in 1992, this facility has been used an average of 43 days per year to remove excess nitrate levels with O&M costs of nearly \$3,000 per day (Jones et al. 2007).
- Water supply costs associated with the increased expense for bottled water purchased during taste and odor episodes have been estimated at \$942 million per year in 2008 dollars (Dodds et al. 2009).
- Fremont, Ohio (a city of approximately 20,000) has experienced high levels of nitrate from its source, the Sandusky River, resulting in numerous drinking water use advisories. An estimated \$15 million will be needed to build a reservoir (and associated piping) that will allow for selective withdrawal from the river to avoid elevated levels of nitrate, as well as to provide storage (Taft 2009, personal communication).
- In regulating allowable levels of chlorophyll *a* in Oklahoma drinking water reservoirs, the Oklahoma Water Resources Board estimated that the long-term cost savings in drinking water treatment for 86 systems would range between \$106 million and \$615 million if such regulations were implemented (Moershel and Derischweiler 2009, personal communication).

General Water Quality and Ecological Impacts

In addition to the public health and drinking water treatment issues outlined above, the range and severity of water quality impacts from nutrient pollution, principally through the mechanism and consequences of eutrophication, are even broader and ecologically more severe. The adverse effects of nutrient pollution on water quality are well documented in state water quality assessments (Clean Water Act (CWA) section 305(b) reports); state lists of impaired waterbodies (CWA section 303(d) lists); EPA's *Wadeable Stream Assessment*; state and USGS surveys of ground water contamination, and other sources of national, regional or local data.

Nationally, nutrient pollution is one of the top causes of water quality impairment; for those waters assessed, it is directly linked to 20% of impaired river and stream miles, 22% of impaired lake acres and 8% of impaired bay and estuarine square miles. Nutrients are also indirectly linked to additional listed impairments related to low dissolved oxygen, impaired habitat, algal

growth and noxious aquatic plants. These indirect links to impairments result in an additional 31% of impaired river and stream miles, 30% of impaired lake acres, and 50% of impaired bay and estuarine square miles (USEPA 2009c).

Increased plant or algal production can often adversely affect sensitive aquatic organisms by altering the type or quality of food resources available, resulting in impacts on the entire food chain. In addition, changes in algal/plant species in a waterbody can alter habitat structure, causing large-scale changes in aquatic community structure and function. Increased algal abundance in the water column can also negatively affect aquatic biota by increasing turbidity and impairing visual foraging by fish and other aquatic life. Increased turbidity is also linked to extensive loss of ecologically essential sea grasses (Chesapeake Bay Program 2009b).

Eutrophication is the process that occurs in waterbodies that receive excess nitrogen, phosphorus, or both. Elevated nutrient levels stimulate excessive plant growth (algae, periphyton-attached algae, and nuisance plants and weeds, often referred to as algal blooms). Some of these blooms are toxic and generate a range of paralytic, diarrhetic and neurotoxic effects with negative impacts on animals, humans and aquatic species (NOAA 2009). When the algae die, the resulting dead-plant organic material decomposes, pulling dissolved oxygen from the water and leading to hypoxic conditions, which in turn causes other organisms to die (NOAA 2009).

Stream Impairments

Streams serve as conduits of water flowing from the land, particularly during rainfall events. Nutrients carried from the land by stormwater runoff can cause significant local impacts. Streams and rivers also carry nutrient-rich runoff to downstream waters, including lakes, estuaries and coastal waters, where the degradation is even more widespread and significant.

- In the current EPA *National Summary of State Information on Water Quality Impairments* (USEPA 2009c), more than 80,000 miles of rivers and streams across the United States are listed as "impaired" and not meeting state water quality goals because of nutrients. Note, however, that this number is a substantial underestimate of total stream impacts because only 25 percent of the Nation's rivers and streams have been assessed.
- According to the *Wadeable Stream Assessment*, analysis of the association between the results of nutrient pollution (such as algal growth and changes to stream benthic communities) and the resulting changes to aquatic organisms in streams shows that high levels of nutrients and excess streambed sedimentation more than double the risk of poor biological condition (USEPA 2006b). For phosphorus, approximately 31 percent of the Nation's stream length (207,355 miles) had "high" concentrations; an additional 16 percent (108,039 miles) had "medium" concentrations.¹ With regard to nitrogen, 32 percent (213,394 miles) of the Nation's stream length had "high" concentrations, and an additional 21 percent (138,908 miles) had "medium" concentrations.¹ Figure 3 shows the distribution of nitrogen pollution in U.S. streams (USEPA 2006b).

¹ Medium concentrations are greater than the 75th percentile of reference condition, and high concentrations are greater than the 95th percentile of reference condition (USEPA 2006b).

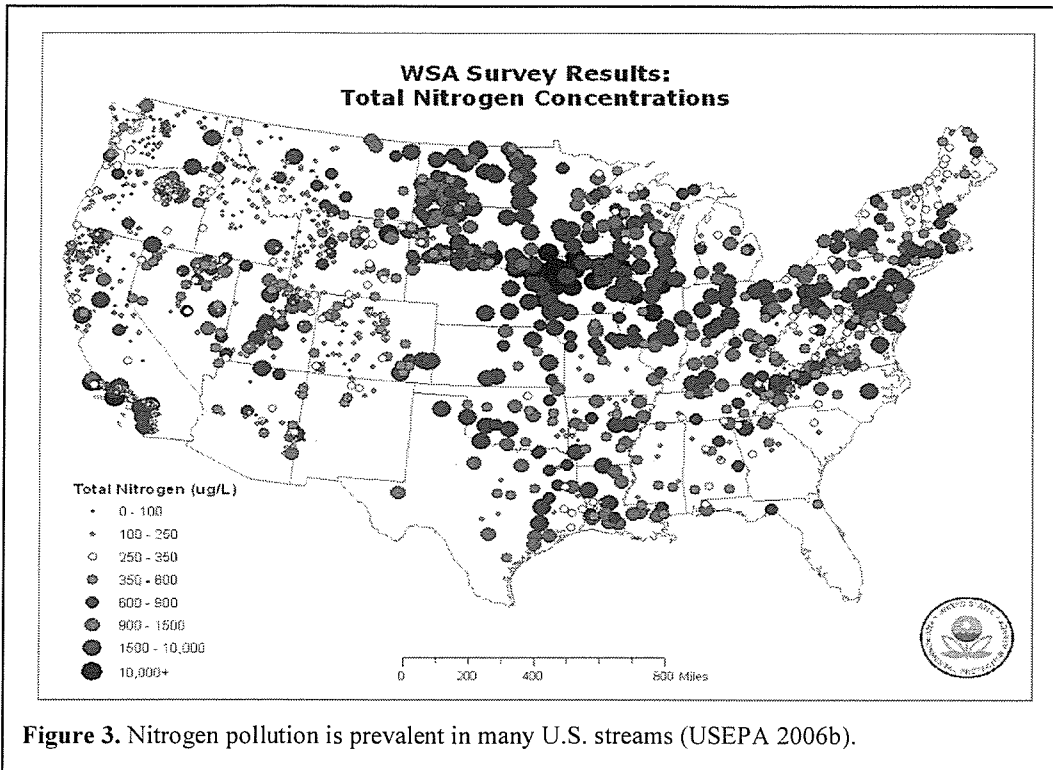


Figure 3. Nitrogen pollution is prevalent in many U.S. streams (USEPA 2006b).

- The *Wadeable Stream Assessment* (USEPA 2006b) evaluated a variety of environmental factors (stressors) that were likely to be detrimental to instream biological quality. These stressors included nitrogen and phosphorus pollution, riparian disturbance and vegetative cover, streambed sediments, instream fish habitat, salinity and acidification. Of these factors, impacts to streams from nitrogen and phosphorus pollution and excess streambed sediments result in over double the risk of impairment to the biological condition (Figure 4) (USEPA 2006b).

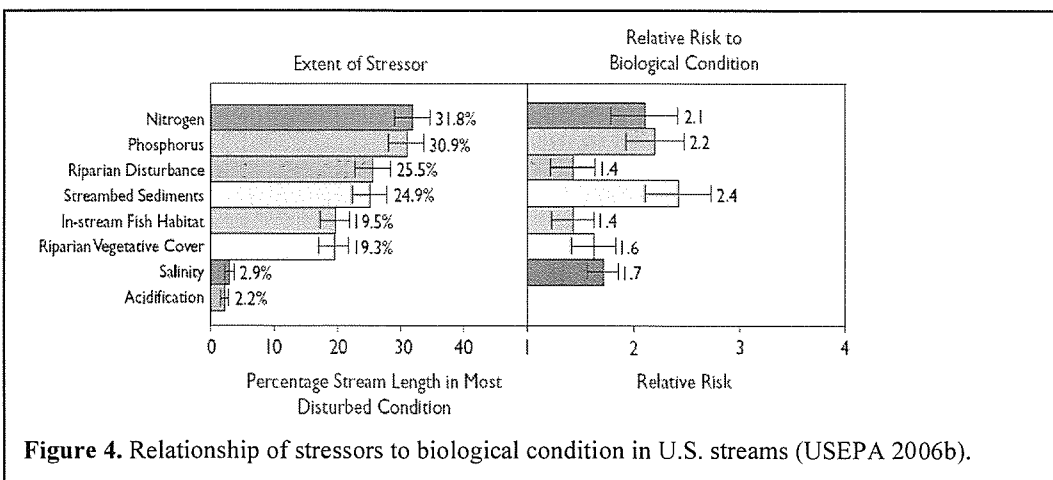


Figure 4. Relationship of stressors to biological condition in U.S. streams (USEPA 2006b).

Lake and Reservoir Impairments

Nutrient pollution in lakes and reservoirs is equally well documented. Excess loadings of nutrient pollution in lakes and reservoirs produce enhanced plant growth or extensive algal blooms, along with the associated reduced dissolved oxygen levels that result from the eventual decomposition of the excessive vegetative growth (Mueller and Helsel 1996). Accelerated plant growth coupled with the storage of nutrients deposited or accumulated in the sediment can lead to a substantial loss of aquatic resources as water quality becomes progressively worse and leads to low dissolved oxygen and loss of species diversity.

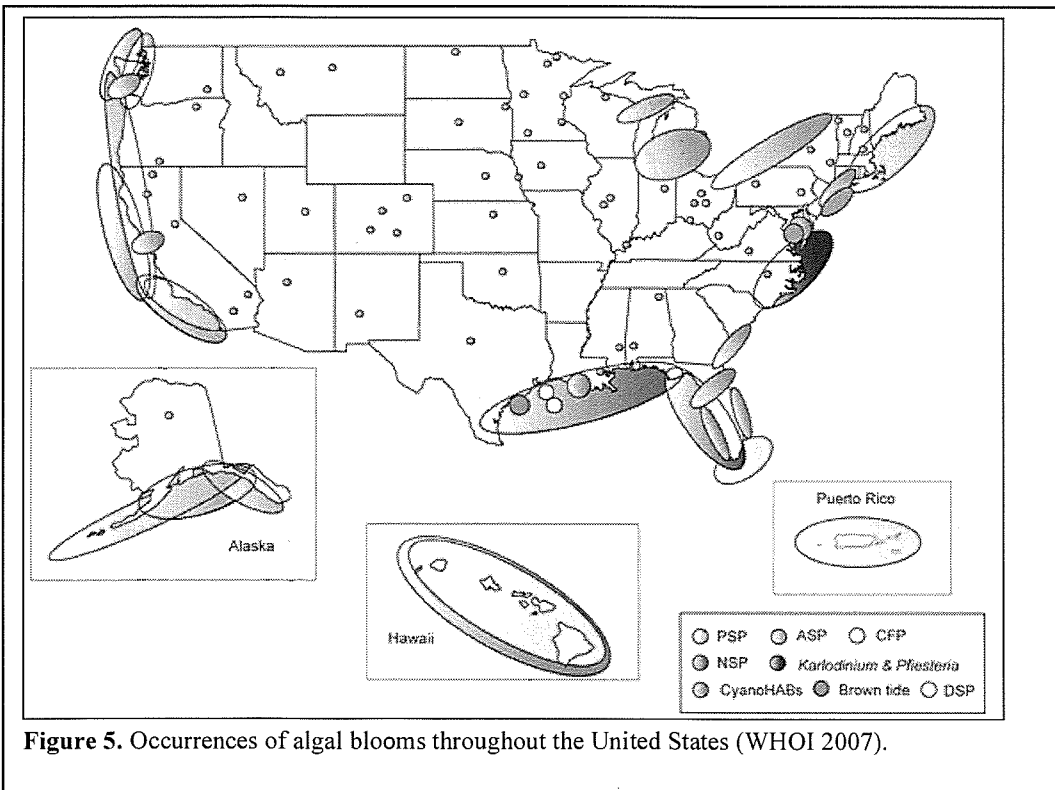
The state of Nebraska is concerned about harmful algal blooms resulting from excess nutrients in surface waters and has had a sampling program for microcystin (a cyanotoxin) in place for several years. Since 2005, 29 percent of the sampled lakes have exceeded the health alert level for microcystin. In 2008 eight lakes were closed to recreation for 2 to 11 weeks due to microcystin levels exceeding the state's health alert level (Nebraska DEQ 2009).

- In the current EPA *National Summary of State Information on Water Quality Impairments* (USEPA 2009c), over 2.5 million acres of lakes, reservoirs and ponds across the United States are listed as impaired and not meeting a state's water quality goals due to nutrients. Again, this is considered an underestimate; only about 43 percent of the Nation's lakes, reservoirs and ponds have been assessed.
- Nutrient problems and cyanobacteria plagued Lake Erie in the 1960s and 1970s, which prompted the United States and Canada to agree to develop and implement Lakewide Management Plans (Lake Erie LaMP Workgroup 2008a). Although phosphorus levels were reduced to record lows in 1995 and the goal levels of the *Great Lakes Water Quality Agreement* were met, within the past decade phosphorus levels have been increasing again. This has caused increased growth of algae, which in turn has created eutrophic conditions (Lake Erie LaMP Workgroup 2008b; USEPA 2007b).
- Despite extensive recent efforts to reduce pollution, the amount of phosphorus in Lake Champlain has not changed in most places and appears to be increasing in some parts of the lake. Wetter-than-normal weather and an increase in the population of the Lake Champlain Basin are thought to be the two most significant causes of increased phosphorus loading (LCC 2009a). Excess phosphorus in Lake Champlain is linked to toxic algal blooms (LCC 2009b). For example, in 2008, volunteer monitoring programs observed significant algal blooms in several sections of Lake Champlain, resulting in three high alerts and 21 low alerts issued to users of the lake (LCC 2009b). Low alert areas are open for recreation, but bathers are cautioned to avoid areas of dense algal growth; and high alert areas are not safe for recreational use (VDH 2009). Several actions have been taken in an effort to reduce phosphorus pollution in the lake. Many farmers have voluntarily instituted best management practices, including nutrient and waste management applications targeted to existing soil fertility levels and crop needs. Other programs address the problem of reducing phosphorus runoff from lawns and roads in developed areas. On a per acre basis, developed land contributes about 3.5 times as much phosphorus to Lake Champlain than does agricultural land (LCLT 2009).
- Algal blooms from cyanobacteria, the major harmful algal group in freshwater environments, also affect people through contamination of drinking water supplies and recreational areas (Falconer 1999; WHOI 2007).

- Grand Lake St. Marys, Ohio's largest inland lake, has become enriched with phosphates and nitrates from several sources. Water samples collected as a result of participating in EPA's *National Lakes Survey* indicated the presence of algal toxins in the lake. Ohio EPA performed follow-up analyses, which confirmed that high levels of microcystins were present in the lake water. On May 21, 2009, Ohio EPA, Ohio Department of Health and Ohio Department of Natural Resources issued a health advisory warning people to use caution and limit contact with the lake water (Ohio EPA 2009).
- For fresh waters, Dodds et al. (2009) predict losses in fishing and boating trip-related revenues of up to \$1.2 billion in 2001 dollars (\$1.4 billion in 2008 dollars) due to lake closures.
- Both Dodds et al. (2009) and Anderson et al. (2000) have noted declines in property values based on excessive algal growth fueled by excess nutrients. Dodds et al. focused on lakefront properties under private ownership. Estimated lake property value loss can be as much as \$2.8 billion annually because of nutrient enrichment.

Estuarine and Coastal Waters

Estuarine and coastal waters are perhaps the best indicators of the scope and magnitude of nutrient pollution impacts. Harmful algal blooms have been reported in almost every coastal state in the United States (Figure 5) (WHOI 2007). These blooms produce toxins that can kill fish, shellfish, and mammals (NOAA 2009; WHOI 2007). Higher tropic level animals are more susceptible to algal toxins because such toxins accumulate in the food web.



Submerged aquatic vegetation (SAV), or seagrasses, provides critical coastal and estuarine habitat in U.S. coastal waters. The primary functions of SAV are serving as a food source and habitat for aquatic species (especially for sensitive life stages such as larval and juvenile), trapping and anchoring sediment, lessening erosion by softening wave action, and absorbing some excess nutrients (FDEP 2001). Because SAV responds rapidly to water quality changes, its health can be an indicator of the overall health of the coastal ecosystem (Chesapeake Bay Program 2009b). Excess nitrogen and phosphorus cause an increased growth of phytoplankton and epiphytes (plants that grow on other plants). Phytoplankton growth leads to increased turbidity, blocking light attenuation, and epiphytic growth further blocks sunlight from reaching the SAV surface. When sunlight cannot reach SAV, photosynthesis decreases and eventually the submerged plants die.

- Of over 400 hypoxic zones reported worldwide, more than 40 percent (168) have been located in U.S. estuarine and coastal waters from 2000 to 2007 (Diaz and Rosenberg 2008).
- In addition, a disturbing 78 percent of the assessed continental U.S. coastal area exhibits symptoms of eutrophication, including excess algal growth, low dissolved oxygen and loss of SAV (Figure 6) (Selman et al. 2008).
- More than one-third of the 102 estuaries in the United States are identified as eutrophic, and this subset drains about 53 percent of the total land area of the continental United States (Campbell 2004; Engle et al. 2007; FDEP 2009; GulfBase 2009; MEOEEA 2009; Neuse River Education Team 2009; NSTC 2003; USACE 2004; USEPA 2009f; USFWS 1997; USFWS 2009).

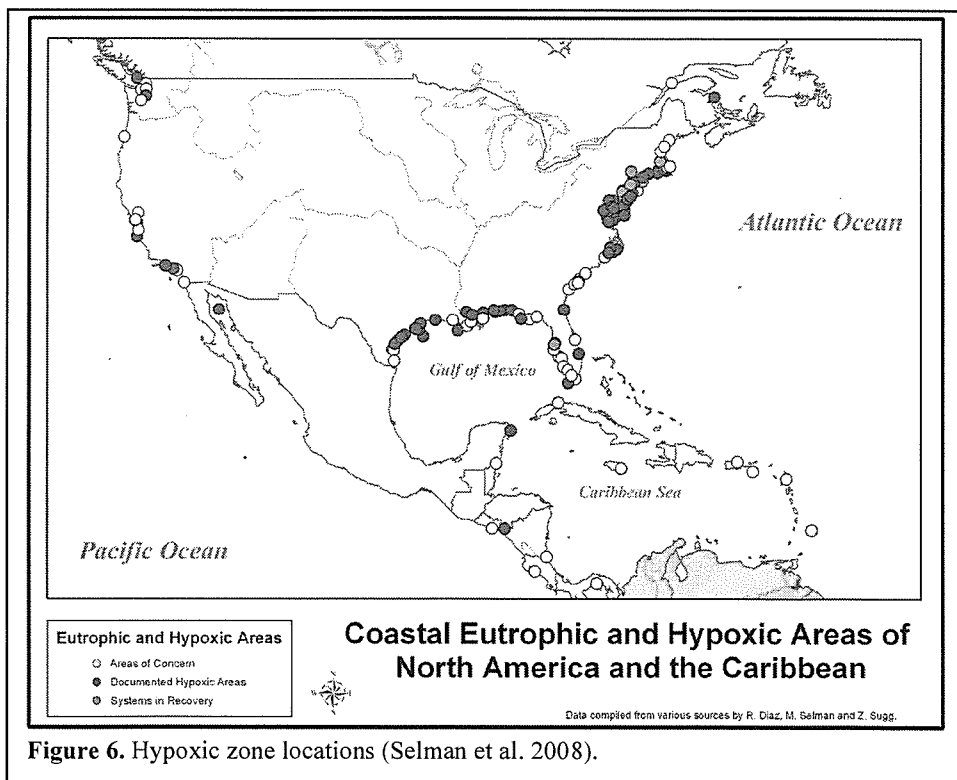


Figure 6. Hypoxic zone locations (Selman et al. 2008).

- The Gulf of Mexico receives flow from the Mississippi/Atchafalaya River Basin (MARB), which represents 41 percent of the contiguous United States and includes 31 states (NRC 2008a). In 2007 the measured size of the hypoxic zone in the Gulf of Mexico was 7,900 square miles, or about the size of Massachusetts in area. It was the third largest hypoxic zone since measurements began in 1985 (Mississippi River/Gulf of Mexico Watershed Nutrient Task Force 2008).
- Anderson et al. (2000) reported commercial fishery losses as high as \$25.3 million (\$31.3 million in 2008 dollars) as a result of harmful algal blooms.
- The Chesapeake Bay receives flow from a watershed which stretches across parts of six states and the District of Columbia (Chesapeake Bay Program 2009a). The area of the Chesapeake Bay is about 4,480 square miles, and the hypoxic zone is typically on the order of 40 percent of its area (about 1,792 square miles) (Chesapeake Bay Program 2008; Malmquist 2008).
- Researchers in Florida looked at the relationship between nutrient inputs and SAV growth in two estuaries in Southeast Florida. Study results showed that between 1938 and 1976, nitrogen loadings in Tampa Bay increased by five times. This resulted in a 46 percent decline in SAV between 1950 and 1982. After implementing significant improvements in the treatment of domestic wastewater, and thereby achieving large-scale reductions in point source nitrogen loadings, there was a 57 percent reduction of nitrogen inputs to Tampa Bay. This reduction resulted in a 24 percent increase in SAV from 1982 to 1996 (Tomasko et al. 2005).
- Similarly, Tomasko et al. (2005) estimated that Sarasota Bay experienced a five times increase in nitrogen loadings from 1890 to 1988, resulting in a 28 percent decline in SAV from 1950 to 1988. Point source nitrogen loadings were reduced 46 percent from 1988 to 1990 with improvements to wastewater treatment facilities, resulting in a SAV increase of 19 percent by 1996 (Tomasko et al. 2005).

III. Primary Sources of Nutrients

The primary sources of nitrogen and phosphorus pollution are urban and suburban stormwater runoff, municipal wastewater treatment systems, air deposition, agricultural livestock activities, and row crops. In the sections that follow, each of the primary sources of nutrient pollution will be discussed, along with their contribution to the scope of nutrient impacts. This chapter presents a general overview of nitrogen and phosphorus pollution.

Background Information

Nitrogen and phosphorus are essential nutrients that control the growth of plants and animals. Nitrogen is readily abundant in the environment as an inert gas, N_2 , that composes over 70 percent of the earth's atmosphere. To be used by living organisms, however, nitrogen gas must be fixed into its reactive forms—for plants, either nitrate (NO_3^-) or ammonium (NH_4^+). Nitrogen can be fixed naturally in soils through bacteria (biological nitrogen fixation (BNF); BNF-terrestrial; and BNF-cultivation) or in the air by lightning. Chemically (artificially), nitrogen is fixed through industrial (Haber-Bosch) and combustion processes

(fossil fuels). Most of the reactive nitrogen produced per year—about 24 billion pounds—is artificially produced (Haber-Bosch process) and used to make fertilizers for agriculture and lawns and in some industrial processes. As shown in Figure 7, the artificial production of nitrogen fertilizers has grown exponentially since the 1950s and will continue to grow into the foreseeable future without a significant change in demand and how it is utilized (Nielsen 2005). Phosphorus occurs naturally, mainly as phosphate (PO_4^{-3}), and has been mined for its use as a fertilizer, detergent or animal feed. Like most chemicals, nitrogen and phosphorus become problematic when they occur in excessive amounts in a given area.

The sources of nitrogen or phosphorus pollution to a waterbody depend on the prevailing land use activities surrounding and upstream of a particular waterbody. For example, Figure 8 shows how these proportions can vary regionally for two large watersheds (the land draining into the Chesapeake Bay and the Gulf of Mexico) and illustrates the variability of the relative proportions of the sources.

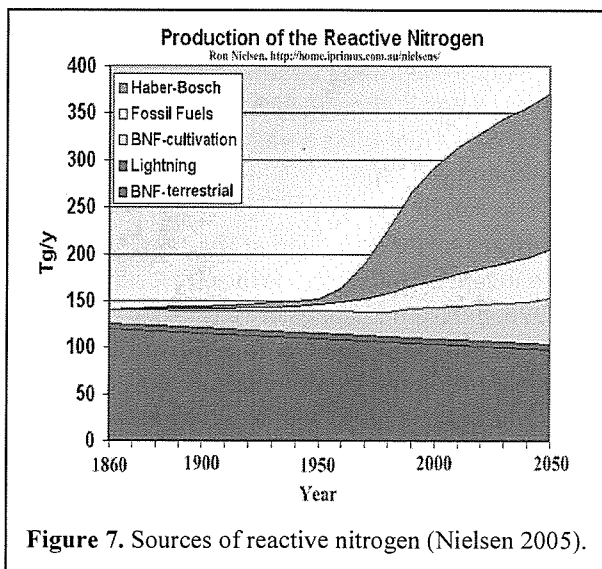
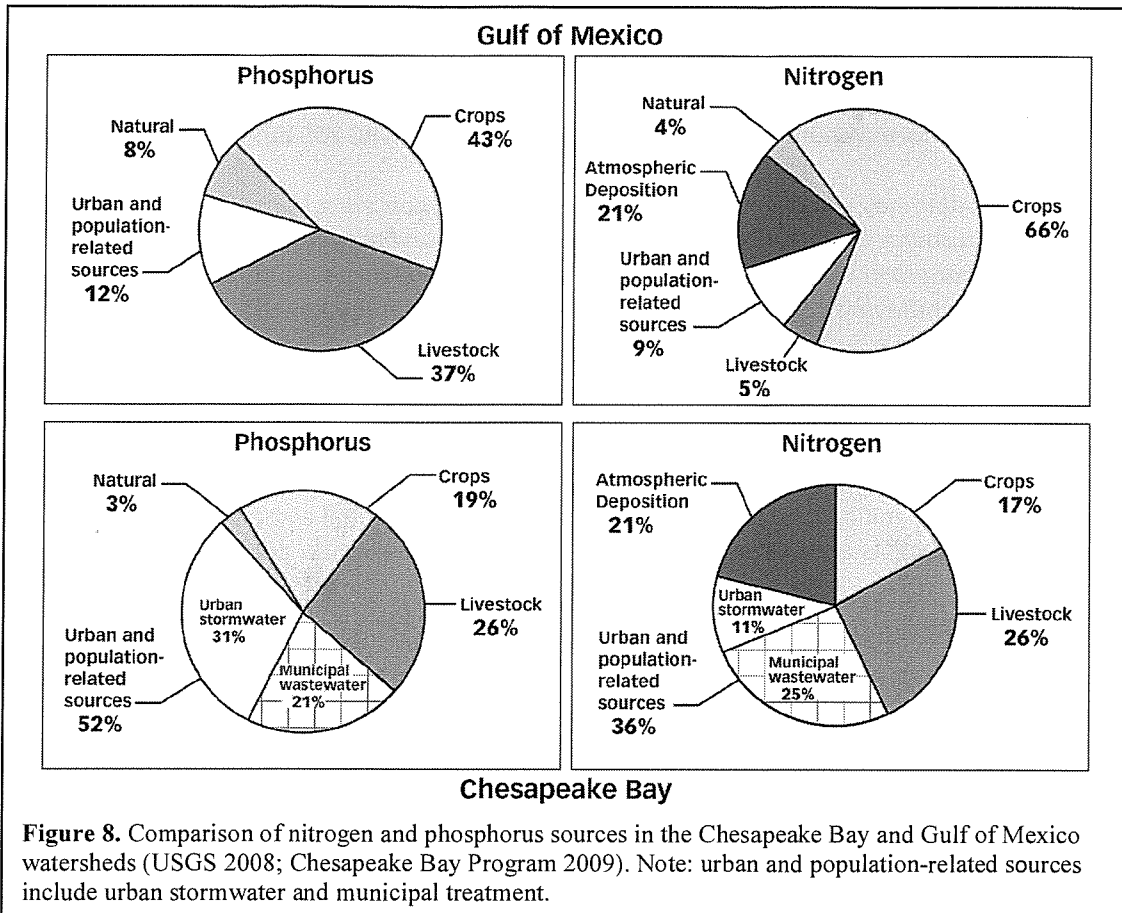


Figure 7. Sources of reactive nitrogen (Nielsen 2005).



Year	U.S. Population*
1950	152 million
2008	304 million
2050	439 million

*U.S. Census Bureau 1952; U.S. Census Bureau 2008; U.S. Census Bureau 2009

The dramatic increase in the U.S. population over the past 50 years has boosted the demand for food, required additional wastewater treatment needs, increased burning of fossil fuels and expanded urban environments. The projected growth of the U.S. population from 2008 to 2050 will result in an additional 135 million people—continuing and slightly accelerating the annual rate of population growth over the previous 50-year period. This will further increase the public

health risks and aquatic resource degradation from nutrient pollution as discussed in Chapter II.

Urban Stormwater Runoff

The U.S. population is primarily consolidated in urban areas; 80 percent of the people live on less than 10 percent of the land. With a total U.S. land area of over 2.3 billion acres, urban areas accounted for about 66 million acres in 1997 (based on Vesterby and Krupa 2001). Our urban landscape will continue to change and expand over time. For example, about half of the current urban areas are expected to be redeveloped between 2000 and 2030, and an estimated 30% (131 billion square feet) of the needed built environment for 2030 does not yet exist (Nelson 2004). Urban landscapes contain a variety of features pervious and impervious to water. Some of the more common pervious features of the urban landscape are landscaped and turf areas,

recreational areas, and undeveloped tracts of land. Impervious lands include roofs, parking lots and streets. Stormwater collects fertilizers and other applied nutrients, as well as other pollutants on impervious surfaces, before it is discharged to receiving waters. As noted in the EPA SAB report *Urban Stormwater Management in the United States* (NRC 2008b):

Urban stormwater may actually have slightly lower pollutant concentrations than other nonpoint sources of pollution, especially for sediments and nutrients. The key difference is that urban watersheds produce a much larger annual volume of runoff waters, such that the mass of pollutants discharged is often greater following urbanization.

Urban stormwater discharges via municipal separate storm sewer systems (MS4s) and combined storm sewer systems (CSSs) are regulated under the National Pollutant Discharge Elimination System (NPDES) permit program of the CWA. There are several thresholds for MS4 stormwater regulations. However, a significant number of communities and a substantial amount of urban growth occur outside of MS4s and are only subject to construction stormwater general permits.

Municipal Wastewater Treatment

Municipal wastewater treatment plants, also known as publicly owned treatment works (POTWs), usually discharge both phosphorus and nitrogen. Depending on the local ecological conditions and their relative contribution, POTW discharges can be a significant source of nutrients in some watersheds. People produce about 18 million tons of solid waste (feces) annually (based on Freitas Jr. 1999; MERCK 2007). U.S. municipal wastewater treatment facilities currently treat about 34 billion gallons of wastewater per day (USEPA 2008c).

For most of the country, municipal wastewater treatment generates two waste streams—biosolids and discharges of treated wastewater to surface water—which are regulated under the provisions of sections 301, 402, and 405 of the CWA, respectively. Municipal or sewage waste biosolids that are to be land applied must meet specific CWA and state regulatory standards to protect surface water and groundwater from contamination. Treatment for surface water discharges is regulated through NPDES permits, which must reflect both the technology-based requirements of secondary treatment (biological oxygen demand (BOD), total suspended solids (TSS), and pH) and applicable water quality standards. However, only a subset of POTW permits currently contain nitrogen and phosphorus limits. Of more than 16,500 municipal POTWs nationwide (USEPA 2008c), approximately 4 percent have numeric limits for nitrogen² and 9.9 percent for phosphorus (USEPA 2009e). Estimated costs for municipal nutrient removal can vary widely depending on level of treatment and process used, wastewater characteristics, plant capacity, existing treatment facilities, and other site-specific factors.

The estimated cost to upgrade all the POTWs in the United States to achieve the more stringent technology-based limits—3 mg/L for nitrate and nitrite and 0.1 mg/L for phosphate—would be about \$44 billion to remove nitrogen, about \$44.5 billion to remove phosphorus, and approximately \$54 billion to include capabilities to simultaneously remove both nitrogen and phosphorus (based on USEPA 2008c). In addition, our growing population will result in

² Although 43.5 percent of POTW permits have limits for ammonia, limiting ammonia generally does not reduce overall nitrogen loadings because nitrates and nitrites continue to be discharged.

expanding urban and suburban communities. The capacity of wastewater treatment facilities to treat for nitrogen and phosphorus will require further upgrades to decrease future loadings associated with this population growth. In addition, municipal collection systems (sewers) can also be sources of excess nutrients when aging sewer collection systems in cities overflow and are discharged to urban waters or leak nutrient-rich water that infiltrates into the ground.

Onsite and decentralized wastewater treatment systems (septic systems) are used in approximately 20 percent of U.S. homes, and they can be significant contributors of nutrients in the watershed (USEPA 2008d). Almost 25 million homes, including about one-third of new homes and more than half of all mobile homes nationwide, depend on decentralized systems (U.S. Census Bureau 1999). It has been estimated that more than half the systems in the United States were installed more than 30 years ago. Older conventional onsite systems may not be adequate for minimizing nitrate contamination of ground water, depending on design and maintenance by homeowners. Studies reviewed by USEPA cite failure rates ranging from 10 to 20 percent (USEPA 2002b). The actual problem might be worse because system failure surveys typically do not include systems that may be designed and installed according to appropriate standards, but are currently contaminating surface or ground water with nutrients due to poor maintenance. However, nutrient contamination from septic systems is typically detectable only through site-level monitoring (USEPA 2002b).

Atmospheric Nitrogen Deposition

Gaseous and particulate forms of nitrogen oxides (NO_x) are emitted into the air from the burning of fossil fuels and other combustion processes. Mobile sources (e.g., vehicles) account for approximately 55 percent of NO_x emissions to the atmosphere; stationary sources account for the remainder. Nationwide, the deposition of NO_x compounds released to the air during fossil fuel combustion contributes significant inputs of additional nitrogen to the land and surface water (USEPA 2007c). Although atmospheric deposition is a major contributor to nitrogen loadings affecting many waterbodies, EPA lacks the statutory authority to regulate air emissions of such sources under the CWA. The Clean Air Act (CAA), however, does offer a number of options for controls on nitrogen through other regulations, as well as creative and innovative options to control greenhouse gases.

Agricultural Livestock Activities

As our population grows, more food production will be required through a range of agricultural practices. Current livestock agricultural practices are one of the largest sources of nutrient pollution to our nation's waters. Estimates of major livestock production for 2008 in the United States were as follows (USDA 2009a; USDA 2009b; USDA 2009c; USDA 2009d):

- 96 million head of cattle (including about 9.3 million head of dairy cows)
- 68 million head of swine
- 9 billion broilers and 446 million laying hens

The value of U.S. agricultural livestock production at the farm (estimated as the gross producer income; USDA 2009a; USDA 2009b; USDA 2009d) includes:

- Cattle and calves: \$48.6 billion

- Hogs: \$16.1 billion
- Dairy (milk production): \$34.8 billion
- Poultry (broiler production): \$23.1 billion
- Poultry (egg production): \$8.2 billion

In contrast to the 18 million tons of human fecal material treated annually (based on Freitas Jr. 1999; MERCK 2007) at POTWs, animal agriculture production results in the generation of more than 1 billion tons of manure each year (based on Brodie 1974; Chastain et al. 2003; USDA 2009a; USDA 2009b; USDA 2009c; USDA 2009f). This manure results in over 8 million pounds per day of nitrogen and 3 million pounds per day of phosphorus. Much of the manure is applied to farmland as organic fertilizer for crops. Some of the nutrients in this applied manure end up in harvested plant tissue, but significant portions end up in our nation's waters.

Although evidence shows that livestock production is a leading source of nutrient pollution, significant parts of this activity nonetheless remain generally unregulated. The exception is the portion of livestock production that meets the definition of a Concentrated Animal Feeding Operation (CAFO). CAFOs are considered point sources under CWA section 502(14) and are regulated by the NPDES program if discharging or proposing to discharge (see text box). Under the current regulation at 40 CFR 122.23, CAFOs are generally described as large-scale agricultural feeding operations where animals are confined and raised in concentrated areas. There are many ways in which these operations can reduce the amount of nutrients released, such as covered storage and the use of nutrient management plans, buffers and stream fencing.

Technology-based limits for most existing Large CAFOs include the following:

- Production area: The regulations require no discharge from the production area.
- Land application: Each facility must develop and implement a nutrient management plan, analyze the nutrient content of the manure and soils, and ensure setbacks or buffers adjacent to surface waters, well heads and the like.

CAFOs are point sources under section 502(14) of the CWA. Under the current regulation at 40 CFR 122.23, CAFOs are generally described as large-scale agricultural feeding operations where animals are confined and raised in concentrated areas. An operation is defined as a Large CAFO if it confines above the threshold number of animals in a particular sector, such as 700 mature dairy cows or 1,000 beef cattle. A large broiler CAFO has 125,000 chickens, but 30,000 chickens if the facility has a system defined as a liquid manure handling system. Medium AFOs may be CAFOs either by definition (number of animals plus discharge through conveyance or stream running through facility) or designation. A small operation may be a CAFO only if it is so designated by the Regional Administrator or state permitting authority.

Agricultural Row Crops

Row crop agriculture is also driven by the need to keep pace with our growing population. It now represents over a \$120 billion industry nationally on an annual basis. The current trend of increasing row crop agriculture yields is due in part to the expanded use of livestock manure and chemical fertilizers. Table 1 shows the extent of the crop acreage for the top 10 commodities produced in 2008. Although the creation and use of chemical fertilizers and the overabundance of animal manure from expanded production has enabled contemporary farming to keep pace with the increasing population's demands for food and fiber, the amount of nitrogen the crop plants need and use (and similarly for phosphorus) does not match the amount of nutrients applied to crops. Even when fertilizers (in the form of manure or chemical fertilizers) are applied at agronomic rates, agricultural production of crops typically has an efficiency of less than 30 percent for nitrogen (based on Galloway et al. 2003). The nutrients not used by crops can volatilize into the air, infiltrate into ground water or run off the land with stormwater. Simply put, only a fraction of the applied nitrogen and phosphorus in fertilizers is converted into and used by plants, and only a fraction of the nitrogen and phosphorus content of plants is used by humans and livestock; the excess that is applied and not used in row crop production becomes a waste product in the environment (NRC 2008b).

Table 1. Acreage, production and value of major agricultural row crops in 2008 (USDA 2009e)

Crop	Acreage (thousand acres)	Production (thousand)	2008 Value (\$1,000)
Corn	85,982	12,101,238 (bushels)	47,377,576
Sorghum	8,284	472,342 (bushels)	1,681,558
Barley	4,234	239,498 (bushels)	1,208,173
Oats	3,217	88,635 (bushels)	262,240
Wheat	63,147	2,499,524 (bushels)	16,568,211
Rice	2,995	203,733 (hundred wt)	3,390,666
Soybeans	75,718	2,959,174 (bushels)	27,398,638
Cotton	9,471	12,815 (bushels)	3,538,573
Hay	60,062	145,672 (tons)	18,777,138
Total	313,110	NA	120,202,773

Nutrient pollution from row crop agricultural operations, a by-product of excess manure and chemical fertilizer application, is the source of many local and downstream adverse nutrient-related impacts. Currently, stormwater runoff and irrigation return flow from row crop agriculture are exempt from regulation under the CWA generally and the NPDES program specifically. There are many ways in which agricultural operations can reduce the amount of nutrients released from farm fields, namely, by applying nutrients at the proper rate and timing, with the appropriate application method, and in the proper form or by using cover crops.

IV. Tools and Authorities

Existing Tools

The Task Group was unanimous in its assessment that existing CWA tools have not been fully implemented to reduce nutrients. As a first step, the Task Group developed a list of tools (Appendix B) currently being used by EPA and the states to address nutrient pollution; then the Task Group analyzed the effectiveness and limitations of the tools in achieving the desired results. Appendix B contains a spreadsheet listing the full array of existing point and nonpoint source tools currently in use and explaining how well they are working. The list includes a range of traditional tools, predominantly CWA, that are either directly regulatory in nature or can form the foundation of an effective regulatory program, such as water quality standards, waterbody assessments, impairment listings, Total Maximum Daily Loads (TMDLs), national technology-based performance standards, stormwater controls and NPDES permit tools (both individual and general) that are broadly applicable to any point source but are not always fully utilized. The most commonly used tools are highlighted below, along with an analysis of why they have not been effective to date in reducing nutrient pollution and suggested ways in which they could be better utilized.

NPDES permit requirements for municipal wastewater treatment. There are over 16,500 POTWs across the country that constitute a major source of nitrogen and phosphorus to the Nation's waterways. Most of these facilities are regulated under state NPDES permits and are currently subject to national technology-based "secondary treatment" limits on BOD, TSS and pH. They also must comply with applicable water quality standards. In terms of a targeted nutrient pollution focus, however, only a limited number of POTWs have specific numeric nutrient permit limits—4 percent with numeric limits for nitrogen and 9.9 percent with numeric limits for phosphorus—which is a reflection of the few state numeric nutrient standards in place. Although not all POTW permits may need numeric phosphorus and nitrogen limits to address water quality issues, there is a potential for more widespread use of nutrient limits in NPDES POTW permits where impaired or vulnerable waters are present. Also, the Task Group considered the use of technology-based requirements to set minimum technology-based effluent limitations for nutrients. An alternative limits-of-technology approach could incorporate the flexibility to consider the cost in combination with loadings reductions. Detailed NPDES permit language stipulating proper operation and maintenance of municipal collection systems and aggressive enforcement of this can be effective in curbing nutrient pollution from sanitary sewer overflows, exfiltration and leakage from aging infrastructure.

NPDES permit requirements for urban stormwater controls. Polluted urban stormwater runoff, a major cause of waterbody impairments, is currently regulated under the CWA section 402(p) National Stormwater Protection Program. The program's current focus is on runoff from MS4s and 29 industrial sectors that discharge stormwater to an MS4 or to surface waters. The national stormwater program applies to medium and large MS4s that serve incorporated communities in urbanized areas with a population of over 100,000, as well as to other "small" MS4s in urbanized areas that have been specifically designated by the NPDES permitting authority. Industrial facilities and certain construction activities are covered by a range of "general permits," and MS4s are required to adopt pollution prevention practices that prevent stormwater discharges to the "maximum extent practicable." The national stormwater program more than doubled the universe of NPDES permittees when it was established in 1990, thereby significantly extending a pollution prevention regulatory focus to urban stormwater.

Section 305 Assessments and 303(d) Listings. States have listed more than 14,000 waters as impaired by nutrient-related causes under the state section 303(d) programs. Given the incomplete scope of current assessments and listings referenced in Chapter II, the full impact of nutrient impairment is larger than these figures suggest but will remain not quantified until more of the Nation's waters can be evaluated.

TMDLs. Under CWA section 303(d), once waters are listed as impaired, TMDLs must be developed. A TMDL identifies the pollutant reductions needed from point and nonpoint sources to meet water quality standards. Once approved, TMDL allocations are implemented through NPDES permit limits for point sources and discretionary loading reduction targets for nonpoint sources. To date, more than 7,000 nutrient-related TMDLs have been developed (or about one-quarter of all TMDLs). More extensive numeric water quality standards and increased water quality assessments could lead to a larger number of section 303(d)-listed waters, resulting in additional TMDLs being developed and implemented through point source requirements. Where "reasonable assurance" exists that nonpoint sources will reduce their nutrient pollutant loadings, a state may allocate more of the needed loadings reductions to nonpoint sources, allowing for less stringent point source reductions. States have undertaken and explored different limited approaches to control nonpoint sources. Authority at the federal level for state development of effective, enforceable and transparent nonpoint source accountability is lacking.

CAFO regulations. At present, federal requirements for the management of concentrated animal feedlots apply to only a small subset of the total confined animal production in the United States. This suggests a potential for significant additional reductions in nutrient loadings if federal requirements are applied to a larger portion of animal production operations by decreasing the size threshold, regulating the offsite transport of manure and/or expanding the reach of nutrient management plans. Some states have already taken this approach.

Water quality standards. Standards define the goals for a waterbody but do not, by themselves, result in a reduction. Narrative nutrient criteria are widely used but are not easily applied. Adopting numeric nutrient water quality criteria would provide the basis for better assessment of impairments, and for NPDES permit writers to require numeric limits for point source dischargers. Numeric criteria could also be used as a tool to set nutrient capping levels for point and nonpoint sources.

Water quality trading. Programs are increasingly using water quality trading as a means to provide cost-effective reductions in nutrient loading within a watershed. This approach requires a target load or water quality standard in order to generate "credits" or have some idea of how many pounds are available for trading in a particular watershed. The process is usually implemented through an NPDES permit.

Section 319. Grant money from the CWA Section 319 Program supports a wide variety of activities, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. The program relies on watershed plans as a primary tool. The effectiveness of the program in achieving nutrient reductions depends on the comprehensiveness of the plan, the management of the grant funds, and how completely the

plan is implemented. As a voluntary program, the Section 319 Program relies on the commitment of watershed groups and other stakeholders to implement and maintain controls.

Farm Bill. The Farm Bill includes funding for a variety of conservation programs, including the Environmental Quality Incentives Program (EQIP). The program offers financial and technical help to assist eligible participants in installing or implementing structural and management practices on eligible agricultural land. The effectiveness of this tool will depend on the willingness of farmers to implement voluntary nutrient controls. Agriculture has been identified as a primary source of nutrients in many areas of the country; this program could help achieve the reductions needed in those areas. Current limitations of the program are that it is dependent on the willingness of farmers to install and maintain controls that will reduce nutrients and the willingness of state technical committees/county offices to distribute funds for nutrient controls.

Coordinated land application permitting. Permitted activities regarding land applications could be required to consider the total nutrient loading within a watershed.

New and Innovative Tools

The Task Group identified a number of tools that are appropriate for use by national or state programs to reduce the discharge of and impacts from nutrients to our nation's waters. In some cases, there are examples at the state level where these tools have been successfully used to control nutrients. In other cases the Task Group identified a number of tools, particularly regulatory mechanisms, that are only partially used, as well as some that are underutilized but could potentially offer state and national programs innovative ways to effectively control nutrients.

Table 2 lists the tools that the Innovative Tools and Accountability Work Groups identified. The highlighted tools in the table are the top five tools, judged by the work groups as potentially the most effective for reducing sources of nutrient pollution. Appendix C provides a complete list of the tools with descriptions and a summary of the process used by the Workgroup to evaluate and derive the list of tools as well as the top 5 recommended tools. In addition, the group identified a number of existing, but rarely or unused, regulations that can be effective in controlling nutrient pollution. Collectively, these three mechanisms (Innovative Tools Work Group, Accountability Work Group, and Task Group brainstorming) resulted in the Task Group identifying over 35 tools and authorities that could be used to address nutrient pollution impacts. The tools can be grouped into two categories: (1) incentive-based and (2) regulatory.

Table 2. Tools recommended by Innovative Tools and Accountability Work Groups

<ul style="list-style-type: none"> • Water quality trading • Detergent phosphate ban* • Protection of natural nutrient sinks • Expand NPDES permit post-construction requirements • Comprehensive CAFO regulation • NPDES stormwater regulation of smaller communities • Market based nutrient reduction land use incentives • Control onsite wastewater treatment systems discharge • Implement large-scale watershed TMDL • Nutrient load reduction strategy • Pilot studies • Volunteer monitoring • Nonpoint source regulation* • Issue nutrient limit permits 	<ul style="list-style-type: none"> • Federally required state WQS numeric nutrient water quality criteria* • Update secondary nutrient treatment requirements* • Adoption of a monitoring paradigm/watershed action level for fertilizer application • Green labeling* • Develop nutrient numeric criteria-permit limits guidance • State-established nutrient ceiling for listings • Tracking of watershed and TMDL implementation plans • Tscs required reduction of phosphorus in detergent and water solubility of fertilizer • Control air deposition of nitrogen • Tri for nutrient releases • Sip process 	<ul style="list-style-type: none"> • Nutrient capping for point and nonpoint sources at current levels • Nutrient bioharvesting • MS4-type regulations • Corporate stewardship program • Use of USDA EQIP funds • Watershed impervious surface limit action levels • Agricultural waste composting • Voluntary agreements • Phased WQS for “restoration uses” • Nutrient-focused targeted watershed initiative EPA/USDA • Regulate point source treatment and post-nonpoint source BMP application loading
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*Voted top five most promising tools by the work groups.

The following section of the report provides a brief, descriptive summary of the tools identified by the Task Group that could be used nationally or regionally, and it offers a number of examples or points contained in the fact sheets referenced in the box. The section also provides a synthesis of the Task Group’s deliberations, which led to innovative recommendations of combinations of incentive-based and regulatory tools that national or state programs can use to control nutrients from the five main sources of nutrients (urban stormwater runoff, municipal wastewater treatment, atmospheric nitrogen deposition, agricultural livestock activities, and agricultural row crops).

Incentive-based Tools

Incentive-based, nonregulatory tools comprise a variety of mechanisms to encourage the voluntary implementation of activities that promote source controls of nutrients. The use of economic incentives allows interested parties to implement measures that would otherwise be unaffordable, and these practices might eventually lead to savings in other areas (e.g., use of less water).

Accountability fact sheets (Appendix D)

- Numeric Nutrient Criteria
- Maryland BayStat Program
- Florida's Impaired Waters Rule
- Economic Incentives and Disincentives
- Green and Eco-Labeling of Farm Products (Based on Farming Methods)
- Voluntary Agreements with Private Sector
- The Massachusetts Wetlands Protection Act
- Toxic Release Inventory
- Pinto Creek Decision
- Virginia Watershed-based Permit
- Strengthening Reasonable Assurance for TMDLs
- Connecticut Nitrogen Credit Exchange Program
- Dutch Nutrient Trading System
- Maryland Policy for Nutrient Cap Management and Trading
- Ohio Water Quality Trading
- Pennsylvania Nutrient Trading Program
- California Nonpoint Source (NPS) Program
- Iowa Onsite Wastewater Loan Program
- North Carolina Community Conservation Assistance Program (CCAP)
- Wisconsin's Priority Watershed and Priority Lake Program
- CAFO/AFO Nutrient Management
- California Agricultural Water Quality Grant Program
- Delaware's Nutrient Management Program
- Iowa Livestock Water Quality Facilities Program
- Kansas Clean Water Farms—River Friendly Farms Project
- North Carolina Agriculture Cost Share Program (ACSP)
- Ohio Agriculture Pollution Abatement Program
- Virginia Agricultural Stewardship Act
- Wisconsin Agriculture Performance Standards
- Clean Air Act: State Implementation Plans

Accountability for incentive-based tools should include transparency, public input, monitoring, regular progress reports, and consequences for failing to spend money or maintain funded practices. States can consider these components or elements of a potentially more comprehensive accountability approach that might merit further evaluation.

However, as noted in the attached fact sheets (Appendix D), some of the challenges with exclusive reliance on incentive-based tools:

- The absence of sustainable long-term funding for all projects
- Uncertain follow-up accountability and documented results
- The ability of certain nonpoint sources to simply “opt out” of voluntary programs
- Growing resistance of heavily regulated point sources to accept major increases in required loading reductions when unregulated nonpoint sources that might be contributing substantial nutrient pollution to the same watershed are not held accountable (through, for example, regulation under the CWA) for achieving comparable load reductions

The Task Group recommends consideration of the following incentive-based tools as components of programs to control nutrient pollution:

Agricultural waste composting. Unused portions of harvested crops, manure, and other organic forms of agricultural wastes are composted and recycled for their nutrient and soil additive value, rather than being wasted.

Corporate stewardship program. Provides corporations, such as food services, with an opportunity to actively participate in conservation activities by establishing continuous

improvement programs to reduce nutrient pollution at all levels of the food production process (farms, processors, distributors, and wholesale buyers).

Green labeling. Labeling of products from farms that are certified in the implementation of nutrient reduction practices (e.g., organic and sustainable farming practices).

Market-based nutrient reduction land-use incentives. Programs that encourage and reward effective manure management and nutrient reduction practices on farms and urban landscapes.

Nutrient bioharvesting. Harvesting nutrients in the form of algae or other aquatic plants for use in animal feed or biofuels.

Pilot studies. Innovative studies, funded through grants and performed on a small scale to determine the feasibility of application at a larger scale.

Tracking of watershed or TMDL implementation plans. Using a rigorous tracking system for watershed and TMDL implementation plans and providing regular progress reports to the public on actions completed to meet the plans' objectives.

TRI for nutrient releases. Creating an inventory of agricultural and urban nitrogen and phosphorus "releases" or discharges (similar to the Toxics Release Inventory of industrial toxic chemicals) based on a national reporting requirement. The program would rely on the public, academic institutions and other organizations to review the data and convey what is acceptable and unacceptable.

Use of USDA EQIP funds for nutrient control projects on farms. More fully use existing grant programs and available federal dollars to directly fund implementation of best management practices and other nonpoint source management programs in vulnerable or targeted watersheds; currently, the 2009 funded USDA budget calls for about \$3.2 billion in funding for conservation program payments.

Voluntary agreements. An agreement to reduce nutrient pollution, which could be made by a corporation, a farmer or a resident.

Volunteer monitoring. Local groups develop a monitoring program for a local waterbody; data can be used to track progress or identify problems associated with nutrient pollution.

Regulatory Mechanisms That Are Rarely Used

The Task Group also identified a second set of potentially broader regulatory authorities that could be applied to address nutrients and, when implemented, might result in creating strong incentives for more effective cross-sector point and nonpoint nutrient control programs. In the

Financial assistance programs

States have developed a variety of financial assistance programs to encourage the voluntary implementation of measures to reduce nonpoint source (NPS) pollution. Some states, including North Carolina and Ohio, provide cost-sharing for installation of best management practices to address issues such as erosion, flooding, poor drainage, stream restoration, and other water quality concerns. Kansas is among the states that offer cost-share and planning assistance for parties willing to adopt clean water farming practices in vulnerable watersheds. States such as Iowa offer loans for a variety of activities that reduce NPS pollution, including replacement of inadequate or failing septic systems by rural homeowners and preventing, minimizing, and eliminating NPS pollution from animal feeding operations by implementing best management practices. Other states, such as Wisconsin and California, offer grants focused on runoff and NPS discharges from agricultural lands, respectively. Many financial assistance programs also offer technical assistance (e.g., design assistance).

rarely used category, the Task Group identified a mix of CWA, CAA, and Coastal Zone Management Act authorities.

Detergent phosphate ban. States and local governments are prohibiting the use of detergent phosphates to reduce phosphorus loadings to waters.

Protection, restoration and enhancement of natural nutrient sinks. Some areas, such as wetlands, tend to store organic matter and therefore often act as nutrient sinks.

State programs can be implemented to protect these natural nutrient sinks to maintain their nutrient removal functionality.

40 CFR section 122.4(i) (CFR 2000). This regulation restricts the issuance of new point source permits in watersheds with impaired waters. This restriction applies in cases where the impairment is caused by NPDES-permitted facilities, as well as when the impairment is caused by nonpoint sources. The provisions of section 122.4(i) focus on permits for new point sources. However, its applicability in the case of nutrients will often be triggered by the combined loadings from point and nonpoint sources in a particular watershed that have caused the initial impairment. In other words, while the result of the impairment is a potential restriction on new point source discharges and potentially associated economic development, the cause and solution lie with both point and nonpoint sources and their combined ability to reduce loadings. An effective response to a section 122.4(i) challenge may lie with a State's ability to demonstrate that it has an effective, enforceable and transparent nonpoint source program in place to assure loadings reduction from both nonpoint and point sources are being addressed.

CWA section 402(p)(6). This section authorizes EPA to establish priorities and develop "comprehensive" state stormwater management program requirements that may include

The CWA provides a number of options for protecting water quality at both the federal and state levels. States have the options of developing more stringent laws, regulations and policies to protect water quality from nonpoint source nutrient pollution impacts. The states have varying levels of regulatory authority to control nonpoint sources of nutrients. California presents the best example of broad legal authority that can address all point sources and nonpoint sources. The state authority presents a tiered system to encourage nonpoint source control implementation, with the lower tiers providing a strong regulatory program as needed. This law, the Porter-Cologne Act, has been used to protect water quality from impacts from irrigated agriculture, small animal feeding operations, and forest tracts, among other sources.

States such as Wisconsin and Massachusetts have used regulatory mechanisms to manage nutrient pollution. Massachusetts' Wetlands Protection Act requires careful review of activities that could impact wetland and coastal areas. In Wisconsin, performance standards for agriculture, nonagricultural construction and post-construction, and development of urban areas are codified. These standards have the potential to reduce nutrient inputs to waterways.

performance standards, guidance, management practices and treatment standards. This authority could be used to expand MS4-type regulations to include more nutrient controls in urban/suburban areas. It could also be used to require NPDES stormwater regulation for smaller communities, establish independent performance standards applicable within and outside existing MS4s, or to establishing best management practice standards for urban stormwater outside existing MS4s. Section 402(p) also provides authority to make "residual" designations of urban stormwater sources that are affecting water quality.

Antidegradation. Provisions in the current CWA regulations at 40 CFR 131.12 offer a mechanism to protect high-quality waters where existing conditions are better than necessary to support the designated use of the water. Under these provisions, states may authorize a lowering of water quality to existing uses and applicable standards “to accommodate important economic or social development” under certain conditions, including a demonstration that “all cost-effective and reasonable best management practices for nonpoint source controls” are achieved. Where nonpoint sources are not included in a common effort to reduce nutrient loadings and those best management practice controls are not in place, a state may lose its flexibility to issue permits for increased point source discharges even though, for other reasons, it might be appropriate. Thus, states may choose to consider using existing antidegradation provisions to better address nonpoint sources in addition to increasing the use of antidegradation for point sources.

CZARA section 6217. A joint program of NOAA and EPA, which distributed \$200 million to grantees in 2009, requires coastal states to establish programs to control nonpoint sources of pollution that are affecting coastal and estuarine waters. These programs are required to contain enforceable policies and mechanisms, such as nutrient load reduction strategies and control plans, to ensure the implementation of management measures. As currently defined, section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) applies only to coastal states with Coastal Zone Management Programs. EPA could withhold CWA section 319 funds where CZARA programs are not fully implemented.

CWA section 504. Section 504 grants power to the EPA Administrator “upon receipt of evidence that a pollution source... may bring suit on behalf of the United States in the appropriate district court to immediately restrain any person causing or contributing to the alleged pollution to stop the discharge of pollutants causing or contributing to such pollution or to take such action as may be necessary.” The section provides the Agency an option to reduce nutrient pollution in the areas that are exempt from the CWA, such as agricultural stormwater.

SIP process. The development and submittal of a state implementation plan that provides for implementation, maintenance and enforcement of National Ambient Air Quality Standards for NO_x could reflect implementation of more stringent nutrient control strategies.

Control of air deposition of nitrogen. Emissions into the air from vehicles, industries, power plants, dry cleaners, gas-powered lawn tools and other emission sources are major sources of nitrogen in waterbodies that can be controlled to reduce air deposition problems downwind.

TSCA-required reduction of phosphorus in detergent and water solubility of fertilizer. The Toxic Substances Control Act (TSCA) was enacted to ensure that chemicals manufactured, imported, processed, or distributed in commerce, or used or disposed of in the United States, do not pose any unreasonable risks to human health or the environment. TSCA could be applied to detergent manufacturers to require reduced phosphorus levels in detergents and in the manufacturing of fertilizers to reduce water solubility of nutrients after application.

CWA section 303(d) assessments. Current ecoregional numeric nutrient water quality criteria recommendations could be used as numeric benchmarks to facilitate section 303(d) assessments of waters as impaired.

Examples of Innovative Tools Applied to Sources of Nutrients

The following are examples of innovative uses of the incentive-based and regulatory approaches outlined above to control nutrients. They are presented for the five sources of nutrients: urban stormwater, POTWs, air deposition, agricultural livestock, and agricultural row crops.

Urban Stormwater

EPA has recently begun to act to strengthen and add tools to the policies and regulations that allow for controls of nutrient pollution from urban stormwater. EPA is finalizing the Construction Storm Water Effluent Guideline. Development of a Post-Construction Storm Water Rule to complement these new controls would make a significant impact on urban stormwater pollution prevention practices. In addition, section 438 of the Energy Security Independence Act (EISA) requires all new development on federal lands to adhere to strict stormwater guidelines, which are currently being developed. Although there are many tools in place through the point source provisions in the CWA, EPA has clear opportunities to expand existing regulations to reduce the nutrient impacts from urban stormwater on the Nation's water quality.

- Expand some of NPDES MS4-type stormwater regulations to communities at a smaller size than those addressed by the current regulations, either by using residual designation authority or by creating a new "Phase III" under CWA section 402. This option could exempt any community that has a program and authorities in place to ensure that all new development activity maintains an effective impervious cover below a particular threshold, protect drinking water sources, and establish turf fertilizer limits.
- Initiate an aggressive policy to use CWA section 402(p)(2)(E) to regulate stormwater discharges causing or contributing to nutrient-related impairments of water quality standards or "significantly contributing" nutrient pollution to waters of the United States.
- Expand the use of stormwater residual designation authority to reach currently unregulated sources of nutrients.
- Consider clarifying that the CWA agricultural stormwater exemption applies only where agriculture is consistent with sustainable agricultural practices (e.g., fertilizer application no greater than agronomic rates).
- Implement nutrient capping to regulate growth and development (e.g., cap nonpoint source and point source at current (2010) load).
- Protect natural nutrient sinks.

Municipal Wastewater Treatment

- Consider redefining the secondary treatment requirement for wastewater treatment plants to include nitrogen and phosphorus by adding them to the list of pollutants that require technology-based effluent limits.

- Require all municipal wastewater treatment facilities to monitor nitrogen and phosphorus effluent levels.
- Provide guidance on specific nitrogen and phosphorus reduction technologies that can meet the technology-based requirement to promote broad-scale implementation of available and economically achievable technologies to encourage facilities to upgrade.
- Provide economic incentives (such as grants and low-interest loans) for implementing new nutrient control technologies.
- Require better management of biosolids applications, ensuring that they are consistent with the agronomic rates for the land to which they are applied, and reduce runoff or volatilization of unincorporated nutrients. This could include expanding the agronomic rate restriction for nitrogen to phosphorus in the CWA section 503 biosolids program.
- Investigate and control improperly surface-discharging wastewater treatment systems (onsite or septic systems).
- Explore the use of section 6 of TSCA to require reformulation of detergents to reduce phosphorus.
- Encourage broader adoption of nutrient trading programs, such as point source-to-point source trading, including guidance on the costs and how to ensure transparency.

Atmospheric Nitrogen Deposition

- Maximize projected reductions through a new Clean Interstate Air Rule (CAIR).
- Leverage air quality programs to decrease air deposition of nitrogen by using opportunities to replicate and implement existing air quality programs and regulations to the benefit of water quality.
- Ensure that existing air regulatory authorities and programs, such as the National Ambient Air Quality Standards, fully take into account and ultimately reduce nitrogen deposition to water.
- Encourage trading between air sources of nitrogen and POTW or nonpoint source reductions.

Agricultural Livestock Activities

- Establish a lower regulatory size threshold for AFOs under section 402(p)(6) of the CWA, or multiple AFOs in impaired watersheds that are determined to collectively contribute to water quality impairments.

- Initiate a comprehensive data collection program authorized by section 308 of the CWA in an effort to demonstrate that all CAFOs discharge and thereby all CAFOs must apply for NPDES permits.
- Inspect more AFOs to determine which might be significant contributors of nutrient pollution to waters of the United States, warranting designation of the AFO as a CAFO under 40 CFR 122.23(c). (This could be done through case-by-case designations and/or enforcement actions.)
- Require more liquid manure and process wastewater storage capacity, and covered storage of solid manure, in those areas where there is a need to better protect water quality standards.
- Include controls to protect ground water through permits in source water protection areas.
- Subsidize transportation to remove land-applied nutrients to where they can be of beneficial use.
- Develop markets for easily transportable fertilizer pellets made from litter.
- Work with USDA to expand the number of certified technical service providers to help farmers develop and implement nutrient management plans.
- Work with states to develop projects that encourage the use the manure as a source of fuel to reduce the amount of nutrients that are land applied, redistributing nutrient concentrations.
- Work with state transportation departments to obtain manure from CAFOs so that it can be applied, at agronomic rates, during high landscaping.

Agricultural Row Crops

- Explore the use of CWA section 402 to determine point source application when fertilizer, manure or another water-based row crop application is applied in excess of agronomic rates near or overlapping a water of the United States.
- Place additional requirements on states to ensure that CWA section 319 funding is used to implement sound watershed plans with reasonable assurance that the nonpoint sources will be reduced.
- Explore the use of section 6 of TSCA to require reformulation of fertilizers from highly water-soluble formulations to less water-soluble formulations.
- Adopt a monitoring paradigm or watershed action level for fertilizer application (based on the Atrazine example for pesticides).

- Increase accountability among the fertilizer user community by establishing a registration process leading to monitoring and reporting on a watershed level.
- Work with large food and beverage companies, integrators and/or distributors (or other market intermediaries who have a direct purchasing relationship with producers) to develop practice standards and processes for the producers that supply them.
- Develop a system for voluntary monitoring and provide an incentive for responsible fertilizer use tailored to agronomic rates, growing season limitations, runoff timing, and watershed sensitivity.
- Work with third parties to establish independent certification programs and to develop economic incentives based on them.
- Explore farmers selling credits based on reduced fertilizer use.
- Require or provide heavy incentives to place constructed wetlands or bioreactors at tile drain outlets.

Summary

The following chart presents more detailed examples of the specific tools that were analyzed by the Task Group.

Existing but currently underutilized tools	Possible expansion of current tools either geographically or to include more sources
Regulatory	
Drinking water regulations	Safe Drinking Water Act section 1438 emergency response authority
CAFO regulations	Apply to smaller AFOs
	Water quality-based residual AFO designations
	Broader manure management controls
	Technology-based nitrogen and phosphorus limits
Municipal wastewater NPDES permits	Numeric nutrient standards to support nitrogen and phosphorus limits
Urban stormwater MS4s	Finalize active construction effluent limitation guidelines
	Use section 402(p)(6) to address post-construction outside MS4s
	Define MEP to address post-construction
State numeric nutrient criteria (only 7 states have statewide and 18 have partial)	More states to develop to protect vulnerable waters and address downstream impacts
Implementation of narrative standards in permits	EPA determinations to establish numeric standards in response to litigation
Technology-based requirements	EPA finding that new and revised standards not necessary because transparent, effective and enforceable NPS state program in place
TMDLs	Enhanced guidance on reasonable assurance
State NPS programs	Accountability for nonpoint sources
	State programs that are comprehensive and locally enforceable
Non-municipal NPDES permits	Read 40 CFR 122.4(i) to ban new discharges to impaired waters unless transparent, enforceable NPS program in place
	131.12(a) ban on new discharges to high-quality waters unless "all cost-effective and reasonable best management practices for nonpoint source control" are in place
	New permits must ensure compliance with downstream standards
State water quality standards	Must ensure compliance with downstream standards
	Section 504
Nonregulatory: Policy and Program	
	Expand CZARA-like program nationally
Incentive	
Funding	Enhance and target section 319 watershed planning and implementation in states
	Better targeting of USDA funding
Corporate Stewardship	Engage major food corporations in sustainability efforts for suppliers

V. Task Group Findings and Call to Action

State and EPA drinking water and surface water quality program directors agree that the current national approach to controlling nutrients will not result in adequate water quality protections. We are losing ground in addressing existing sources of nitrogen and phosphorus pollution. Although certain federal and state programs have made some progress in reducing nutrient impacts, without a comprehensive approach that holds all sectors accountable, population growth will lead to an expansion of our nutrient pollution concerns. More specifically, we know that absent a change in our current approach, nutrient loadings and resulting impacts will grow sharply over the next 40 years as a result of increased urbanization, expanded agriculture, demand for energy, and need for increased transportation. In light of these facts, the Task Group's key findings are outlined below.

- The nutrient pollution problem is nationally significant, expanding, and likely to substantially accelerate.
- Existing efforts are not succeeding at improving water quality.
- Knowledge, collaboration and financial incentives will fail without a common framework of responsibility and accountability for all point and nonpoint sources.
- TMDL implementation, while an effective tool for point sources, has not been able to fully address the larger problem of nonpoint sources.
- Current tools such as numeric nutrient criteria, water quality assessments and listings, urban stormwater controls, POTW nutrient limits, and animal feedlot controls are underused and poorly coordinated.
- Other broadly applicable tools, such as CZARA, antidegradation, 40 CFR part 122.4 limitations on discharges to impaired waters, and compliance with downstream water quality standards, are rarely used.
- Current regulations disproportionately address certain sources (e.g., municipal sewage treatment) at the exclusion of others (e.g., row crop agriculture).
- Uneven responsibility between point and nonpoint sources continues to be a major barrier to coordinated and collaborative multi-sector partnerships.
- Specific aspects of state nonpoint source programs have been highly successful in addressing individual sources of nutrients, but their broader application has been undercut by the absence of a common multistate framework of mandatory point and nonpoint source accountability within and across watersheds.

The evidence presented and referenced in this Task Group report clearly indicates that nitrogen and phosphorus pollution is widespread and significant. Increased public health risks and treatment costs from contamination of drinking water supplies is a major concern. Almost 50 percent of our nation's smaller streams have elevated levels of nitrogen and phosphorus. Over

2 million acres of lakes and reservoirs across the country are impaired and not meeting water quality standards due to excess nutrients. A startling 78 percent of the assessed continental U.S. coastal area exhibits symptoms of eutrophication. And, as the sidebar illustrates, the numerous impacts from this pollution are well documented and severe.

The costs of these impacts across the country have not been comprehensively estimated, but there are some powerful and cautionary examples. The Chesapeake Bay is a national model of research, information collection, analysis, voluntary partnerships, stakeholder involvement, extensive outreach and collaboration, and a collective investment of over \$10 billion that, to-date, has achieved only about 27 percent of the water quality standards targets for dissolved oxygen, water clarity and chlorophyll *a*. The estimated remaining cost of restoration for the Chesapeake Bay exceeds \$28 billion.

The Gulf of Mexico hypoxic zone surpasses that of the Chesapeake Bay by several orders of magnitude, and it continues to grow. It represents a comparable undertaking of investments in research, analysis of new information, multistate alliances, action plan development, local/state/federal partnerships, local and regional pilots, targeted resources, and financial incentives. And yet, to date, extensive analysis of state and basin-wide data document a picture of water quality progress in reverse (NRC 2008a; USEPA 2007c). Unlike the Chesapeake Bay, the cost to restore and recover the lost and damaged aquatic resources adversely affected by nutrient pollution from the Mississippi Basin has not yet been fully calculated.

The magnitude of these regional impacts is formidable but does not include comparable examples from Puget Sound, Casco Bay, portions of the Great Lakes, and literally thousands of lakes and reservoirs across the country in combination with hundreds of other coastal areas and numerous river and stream segments. Bringing the focus closer to home in a context less widely appreciated or understood is the challenge and dilemma facing individual communities. For a community whose water supply is contaminated with nitrates requiring new treatment or a town whose tourism, fishing or recreational economic base has been impacted, the consequences can be even more severe.

It should not go unstated that application of both regulatory and incentive-based tools will have associated costs if they are to be implemented effectively. Costs to dischargers of excess nutrients will increase as the dischargers implement controls, and costs to state agencies to implement, monitor and enforce controls will also expand unless other water programs are dropped or decreased. Those implementation costs, however, are expected to be dwarfed by the benefits attained from reduced health care costs, reduced drinking water treatment costs,

The impacts of nutrient pollution

- Disinfection by-product and methemoglobinemia (blue baby syndrome)
- Co-occurring contaminants (pathogens, pesticides, industrial chemicals)
- Toxic algal blooms (neuro-toxins, paralytic, and diarrhetic effects)
- Increased treatment costs
- Recreation and tourism economic impacts
- Widespread water quality impairments
- Low dissolved oxygen levels (hypoxia/anoxia)
- Decreased species diversity and increased species vulnerability
- Significant habitat loss (seagrasses and submerged aquatic vegetation)

The high cost of nutrient pollution

- \$28 billion to restore Chesapeake Bay health
- \$1.2 billion in 2001 for lost fishing and boating revenues
- \$15 million for Fremont, Ohio, for nutrient control
- \$4 million for Des Moines for drinking water taste and odor
- \$280,000 for a community of 500 to install ion exchange to treat nitrate contamination

increased recreational opportunities, increased property values, increased abundance and diversity of fish and shellfish, and higher quality water for agricultural and industrial uses.

Although there is no single tool for achieving reduced nutrient loadings to our ground water and surface waters, significantly more can be done by integrating and more fully utilizing existing tools; implementing new, innovative approaches to create common frameworks of accountability, both nonregulatory and regulatory; and expanding the application of existing general authorities while exploring the availability of additional authority.

The major sources of nitrogen and phosphorus are well understood. But the application of a combination of new and existing tools that could apply to all sources is less well recognized, and the existing architecture to ensure common accountability between sources has rarely been emphasized. The Task Group believes that a coordinated and innovative synthesis of existing regulatory authorities and voluntary tools must be used across all sources and sectors of nutrient pollution. To address these needs, the Task Group makes these primary recommendations:

- Fuller utilization of existing point source tools; some tools are being only partially used, and others could be expanded in scope.
- A national framework of accountability for nonpoint sources is necessary to make a significant and essential difference, without which long-term success is doubtful.
- Broader reliance on incentives, trading and corporate stewardship—but only within a multistate framework of public transparency, common responsibility, and both point and nonpoint source accountability for meeting water quality and drinking water goals.

CALL TO ACTION

All major sources of nutrients must be held accountable for their contributions to the problem. The valid and growing perception that nutrient reduction burdens are not equitably shared or cost-effectively managed across all sources or between upstream and downstream contributors is a major barrier to accelerating progress. There is growing reluctance and resistance on the part of highly regulated entities and downstream users to pay for increasingly expensive loading reductions, even where necessary and possible, when upstream sources are not held responsible for their own nutrient contributions to the same watershed. Combating the challenge of widespread nutrient pollution will require a renewed emphasis on prevention and a profound change in how we share accountability and responsibility between sources, within watersheds, and across state lines.

The Nutrient Innovations Task Group believes that national leadership is vital to supporting and requiring a more consistent and full utilization of existing tools from state to state and source to source. Establishing a cross-state, enforceable framework of responsibility and accountability for all point and nonpoint pollution sources is central to ensuring balanced and equitable upstream and downstream environmental protection. It is also essential to strengthening the ability of any single state to demand environmental accountability without jeopardizing the loss of economic activity that might shift to another state with less rigorous standards. Establishing a national

framework of accountability that includes nonpoint sources would create a level playing field of responsibility for all sources to reduce nutrient loadings. Continuing the status quo, on the other hand, will ensure increasingly degraded ecosystems, lost aquatic habitat and species diversity, abandonment of water quality standards in vulnerable watersheds, increased drinking water risks, and the greater future costs associated with lost economic opportunity, vanishing recreational resources, and increased treatment, recovery and restoration.

At the end of the day, innovation in the context of nutrient pollution means:

- **Acting** on what we know
- **Fully using** the tools we have
- **Exploring** new authorities that we need
- **Demanding** of each other, from the local to national levels, stronger, multi-sector cross-state engagement and support for a shared commitment to environmental protection, public health, and shared economic opportunities.

In short, urgent action is needed.

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Appendix A: Drinking Water Case Studies

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High Nitrogen Levels in Wastewater Effluent Contaminating Water Source: Mashpee, MA

Topic

Case study illustrating the cost to reduce nitrogen from a community on-site septic system.

Problem

High nitrogen levels from a community septic system effluent are occurring in a wellhead protection area and need to be reduced to meet strict water quality regulations. The nitrogen levels in the septic tank have averaged 57 mg/L.

Impacts

The Town of Mashpee in Cape Cod, Massachusetts, consists of 24 units of mixed housing styles with 9,800 square feet of shops. The town was faced with a dilemma of how to meet the strict water quality regulation of ten mg/L maximum total nitrogen concentration in its wastewater effluent in a cost effective manner. The town is located in a wellhead protection area and its wastewater discharges contribute to water supply aquifers.

Solutions

The town added a new passive nitrogen removal process that includes a biofilter and a nitrogen filter to its community septic system at an average cost of less than \$30,000 per household, plus an electrical cost of about \$0.75 per day. The operation and maintenance costs are minimal and can be monitored from a remote location. The effluent discharged from the system now averages 3.53 mg/L.

For more information

www.ci.mashpee.ma.us

Regional Strategy to Address Nutrient Problems from Runoff, Fertilizers, and Septic Systems: Newport, RI

Topic

Case study illustrating the social non-monetary costs of a nutrient problem.

Problem

Much of Newport's water supply protection area (the Aquidneck Island Watershed) is intensely developed, with serious pollution risks posed from urban development, active agriculture, and continued suburbanization. Treated water meets all drinking water standards but the Rhode Island Department of Environmental Management has ranked all water supply reservoirs and tributaries as "impaired" due to poor habitat, high bacteria, or excessive algae.

Impacts

The Newport Water Division maintains a system of seven interconnected surface water reservoirs in the Aquidneck Island Watershed. These reservoirs serve the entire City of Newport; and about 70 percent of residents in Middletown and Portsmouth. Newport Water's distribution network consists of two interconnected systems with three drinking water treatment plants.

Solutions

The Aquidneck regional water supply protection strategy includes:

- Inspecting water supply and the protection area regularly for potential pollution sources.
- Expanding reservoir sampling to monitor nutrient enrichment levels and track the frequency and duration of algal blooms.
- Town planning and land use ordinances.
- Coordinating drinking water protection with Phase 2 Stormwater Plans.
- Expanding community pollution prevention education.
- Controlling runoff and nutrients.
- Using zoning setbacks for maximum protection of small headwater streams and wetlands.
- Developing standards for redevelopment and infill to limit impervious cover; retrofit storm water systems and restore wetland buffers.
- Using creative development techniques to preserve farmland and open space.
- Restricting use of hazardous materials.
- Inspecting and maintaining sewers to prevent leakage and infiltration.
- Adopting septic system management programs requiring regular inspection and maintenance.
- Phasing out cesspools in critical areas.

No comprehensive cost data is available.

For more information

www.cityofnewport.com

http://www.uri.edu/ce/wq/RESOURCES/dwater/Assessments/PDFs/aquidneck_factsheet.pdf

Feasibility Study to Address Nitrate Contamination of County Water Supplies: North Whatcom County, WA

Topic

Case study illustrating the cost of treatment or using an alternative supply to reduce nitrates in a ground water supply.

Problem

Nine community water systems in North Whatcom County have high nitrate concentrations in their groundwater supplies. Samples taken at various sites throughout the Abbotsford Aquifer (the largest unconfined and the most extensively used aquifer in the region) have frequently exceeded 10 mg/L of nitrate as nitrogen, with individual values ranging from 0.03 mg/L to 91.9 mg/L.

Impacts

These systems are under compliance orders to reduce the nitrate levels to meet drinking water standards.

Summary of Study

The Washington Department of Health contracted with the nearby City of Lynden to evaluate the most feasible method of reducing nitrate concentrations for these systems. The study included a minimum of two alternatives: 1) Water system treatment; 2) Water supplied by the City of Lynden. Two other alternatives were considered for two of the systems which were using blended water from each base alternative.

It was found (from all cost standpoints) that connection to the City of Lynden was the most economical solution. However, water availability associated with legal rights may ultimately render the most economical alternative solution to be infeasible. The report supplies additional details regarding the cost estimates and findings.

Nitrate from Fertilizer Cooperative with Waste Lagoon Contaminates City's Water Supply: Chippewa Falls, WI

Topic

Case study illustrating the cost of protection from and treatment of nitrates.

Problem

High nitrate levels in a well that provided approximately 60 percent of the city's water.

Impacts

The City of Chippewa Falls, which is located in rural northwestern Chippewa County, receives 100 percent of its drinking water from groundwater. Local geology consists of deep outwash deposits, which are fairly permeable and allow contaminants to easily reach groundwater.

Solutions

The solution started with the development of a watershed management plan that was coordinated with some neighboring towns. In response to a recommendation that came out of the watershed plan, the city developed a proactive wellhead protection plan, and later added a new well and nitrate removal system. Furthermore, the city filed a lawsuit against a fertilizer cooperative that was determined to be a major nitrate source. The known costs associated with these efforts totaled \$2,596,700 from the following expenditures:

Cost	Component
\$40,000	Expenditure to prepare a wellhead protection plan. This funding came from grants from the Wisconsin DNR as well as \$8,000 from the City of Chippewa Falls.
\$160,700	Expenditure for ongoing groundwater monitoring studies conducted over the course of ten years. This was funded by the City.
Unknown	A consultant had previously delineated and mapped recharge areas, and time of travel zones for city wells.
\$115,000	A consultant had previously delineated and mapped recharge areas, and time of travel zones for city wells.
\$2.2 million	Expenditure to install a nitrate removal system in the east well-field after nitrate levels failed to decrease. This cost customers \$170 each.
\$81,000	Annual expenditure for chemicals, labor, and maintenance.
Unknown	A lawsuit was filed against a local fertilizer cooperative. After three years of litigation, the city opted for a monetary settlement as continuing with the case would have cost the city too much and was unlikely to recover the entire costs of cleanup, monitoring and new well construction, much less result in additional compensation.

For more information

<http://www.uwsp.edu/cnr/landcenter/groundwater/casestudies/ChippewaFallsWHP.pdf>

Nitrate in City Wells Addressed by Wellhead Ordinance and Cropping Agreement: City of Waupaca, WI

Topic

Case study illustrating the social non-monetary costs of a nutrient problem.

Problem

Approximately 55% of Waupaca County is agricultural land which often use nitrogen based fertilizers; and this has resulted in a decrease in water quality. In some wells, the city was still struggling with nitrate levels close to ten parts per million (ppm) (the Maximum Contaminant Level for drinking water) during the early to mid 1990s.

Impacts

Some of the City of Waupaca's wells are located in rural areas outside of the city near agricultural land.

Solution

The city adopted a wellhead protection ordinance in 1992 and at the advice of the wellhead protection commission, 24 monitoring wells were installed around the two most productive wells. -

Cropping agreements were made to reward farmers for growing crops that require less nitrogen fertilizer. These voluntary agreements have had a positive effect on groundwater while allowing farmers to continue their livelihood. Even though nitrates are still a concern, the city is now well within compliance of standards. The cropping agreements are ongoing and take less time to monitor now that they have been implemented. More farmers have become interested in cropping agreements as they see their neighbors participating; and some of these farmers will likely enroll in cropping agreements in the future.

For more information

<http://www.uwsp.edu/cnr/landcenter/groundwater/casestudies/Waupacacroppingagreement.pdf>

Appendix B: Nutrient Innovations - Review and Analysis of Existing Tools

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
<p>I. Tools for Point Sources and Non-Point Sources</p> <p>Water Quality Standards (WQS)</p>	<p>Water quality standards define the goals for a waterbody but do not, by themselves, result in a reduction. Narrative nutrient criteria are widely used but are not easily applied. A numeric nutrient criterion would provide a tangible water quality goal against which other programs can tailor pollution controls.</p>	<p>(1) One numeric criterion may not be applied uniformly across the Nation. (2) Additional analysis and site specific monitoring data are needed to develop numeric nutrient limits. (3) WQSs adoption process may be quite lengthy, especially due to lack of scientific basis for establishing effects-based numeric criterion for pollutants like nutrients that do not exhibit threshold response.</p>	<p>WQSs are not a stand alone tool. For reductions to occur, the WQSs need to be implemented through NPDES permit limits, TMDLs, Watershed Plans, etc. WQS do however provide the ideal framework within which to integrate programs and approaches to insure that WQS goals are met.</p>	<p>The costs will vary depending on the site specific analysis conducted to develop criteria. The use of ecoregional values could minimize significant additional costs for WQS development. Ecoregional criteria based on the statistical methodology in EPA guidance may not be scientifically defensible. Maintaining those criteria in order to maintain/support designated uses is not currently possible (most waters already above criterion). Site-specific criteria require criteria for secondary impacts, e.g. DO, Chlorophyll a, etc.</p>	<p>Moderate</p>
<p>Total Maximum Daily Loads (TMDLs)</p>	<p>TMDLs provide loading limits for point and nonpoint sources that, if implemented will achieve WQSs. Nutrient TMDLs have been developed using existing narrative criteria, but the availability of numeric nutrient criteria would likely facilitate the TMDL process. Expression of criteria in terms not conducive to assessing consistency under a range of flows will make TMDL development difficult since both wet and dry conditions must be considered.</p>	<p>(1) Approaches to translate narrative criteria into TMDL endpoints are not applied consistently. (2) Wasteload allocations have to be implemented through permit limits. (3) Nonpoint source reductions are not enforceable. (4) Adoption of TMDL likely to lead to difficulties in NPDES based on reasonable assurance problems with NPS bringing PS allocations to levels that are not reasonable or fair.</p>	<p>TMDLs provide loading limits for point and nonpoint sources that, if implemented will achieve WQSs. The TMDL, by itself, does not result in implementation of controls. It relies on NPDES permits to implement point source controls and mostly on voluntary programs to implement nonpoint source controls. Developing WLAs for NPDES regulated stormwater leads to issues with permitting these intermittent wet weather sources as well.</p>	<p>Nutrient TMDLs, particularly those for tidal waters, may require complex models (which also need more monitoring data). Staff would also need to have training and access to these models. Large scale models (such as Long Island Sound, Mississippi basin, Chesapeake) provide ample opportunity for debate over input/output and who is responsible for what, etc.</p>	<p>Point Sources – High Non-Point Sources - Low</p>
<p>SRFs</p>	<p>Provides funding to achieve nutrient removal.</p>	<p>In many states, funds nutrient removal for municipal point sources only. Limited by amount of funding available.</p>	<p>Does not effectuate nutrient removal by itself; relies on permit requirements to force nutrient removal and a local government entity to seek a loan for a nutrient removal project.</p>	<p>Nutrient reduction projects must compete with other WQ projects such as CSO, SSO and I&I for available funding.</p>	<p>Low</p>

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
Water quality trading	Provides cost-effective reductions in nutrient loading, on balance, within a watershed.	May work best for reducing downstream effects of nutrients. Relative location of, for example, non-point source reductions to the location of a point source discharge may influence how effective the "trade" is in improving local water quality. If the trade is between non-point sources and point sources, need to have non-point sources willing to implement controls.	Need to have a target load or water quality standard in order to generate "credits" or have some idea of how many pounds are available for trading in a particular watershed. Usually implemented through a NPDES permit. If the trade is between non-point sources and point sources, need to have non-point sources willing to implement controls.	May be political issues to deal with about point sources being the only sources that can be forced to trade. There needs to be a state trading program established and studies of control technology/BMP effectiveness and costs, all of which take additional resources to run. Probably need to have a cost-share program, which again requires resources to capitalize, staff resources to administer and voluntary action by non-point sources.	Moderate
Load reduction targets/optimal loading	Provides a land use or watershed specific target for nutrient reduction that doesn't rely on WQS or TMDL.	Implementation is most reliable for point sources, because reductions can be mandated through NPDES. Although development of reduction targets or optimal loading may occur through a stakeholder process, there is still not a tool for reliable reductions from non-point sources.	Implementation for point sources is through the NPDES permit. Implementation of reductions for non-point sources relies on voluntary action.	Could get cost-effective reductions from point sources but states still challenged with getting reliable reductions from non-point sources.	Moderate
II. Tools for Point Sources					
National Pollutant Discharge and Elimination System (NPDES) Permits	NPDES permits have been developed for nutrient dischargers. NPDES permit limits are enforceable and effective in achieving controls for point sources. Watershed permitting approaches have been applied to addressing the nutrient problem at a broader scale.	(1) Does not directly address nonpoint source contributions. (2) Water quality trading markets are not widely available, particularly with nonpoint sources. (3) Rapid nutrient reduction requires that permits actually get issued when they expire and dischargers comply with permit limits. Limit of technology mandates, such as can occur via the TMDL route, can cause multiple years' delay before permits are effective due to appeals and extended compliance schedules.	Stand alone for point source controls. May rely on water quality trading to address nonpoint source reductions.	Costs of nutrient reductions could be very high depending on the controls that are put in place to achieve the limits on the permit. In the case of POTWs the costs of controls may impact the rates paid for water use by the community. Costs for infrastructure improvements to provide treatment also impact on available funds to deal with other WQ issues (CSO, SSO, I&I, basic repairs to infrastructure, urban stormwater).	High

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
Wastewater utility tools	Treatment technologies are available to remove P and N compounds.	EPA's recent evaluation of nutrient treatment technologies suggest that even with state-of-the-art treatment, many facilities may not be able to comply with likely nutrient WQBELs. Many discharges' concentrations currently may be one order of magnitude higher than expected criteria. Nutrient removal to approach WQBELs will require substantial modifications to POTWs. Facility upgrades will be expensive and SRF funding may be overburdened by the number of facilities undergoing simultaneous upgrades. WQBELs may be unrealistically restrictive due to TMDL/NPDES rules that force limit of technology on PS because NPS implementation not reasonably assured. Inability to consider cost/benefit makes implementing permits unacceptable to regulated community.	Stand alone tool but in watersheds dominated by nonpoint sources of nutrients, installation of treatment technologies by POTWs will not get the watersheds back in attainment without significant reductions in NPS loadings.	Many POTWs are claiming that they are unfairly being targeted for additional nutrient controls while NPS of nutrients are given a pass. Nutrient removal to approach WQBELs will require substantial modifications to POTWs. Facility upgrades needed to attain water quality standards will cost money and will be needed by many point source dischargers over a short period of time (5-10 years). SRF funding may be overburdened by the number of facilities undergoing simultaneous upgrades. Compliance will be an issue because many facilities may not be able to comply with nutrient WQBELs even if they install state-of-the-art treatment. POTWs are also asking for other compounding factors to be considered (e.g., increases in energy use, footprint, sludge production, greenhouse gas emissions) when evaluating the costs/benefits of nutrient treatment technology upgrades.	High
State effluent limits	Very effective in getting reductions from point sources.	Does not address non-point sources.	Implemented through NPDES permit.	Good tool for addressing nutrient pollution in a watershed dominated by point sources. Across the board, even-handed and predictable for point sources. May be costly and burdensome for municipalities, depending on technology required to meet the limit.	High
Federal technology requirements	Very effective in getting across the board reductions from point sources.	Does not address non-point sources.	Implemented through NPDES permit.	Good tool for addressing nutrient pollution from point sources. Across the board, even-handed and predictable for point sources. May be costly and burdensome for municipalities, depending on technology required.	High

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
III. Tools for Non-Point Sources					
CWA Section 319 (Nonpoint Source Management Program)	Under section 319, State, Territories, and Indian Tribes receive grant money which support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. The program relies on watershed plans as a primary tool. Effectiveness will depend on the comprehensiveness of the plan, the management of the grant funds and how completely the plan is implemented.	(1) As a voluntary program, it relies on the commitment of watershed groups and other stakeholders to implement and maintain controls. (2) Depends on the availability of grant funds. (3) May need to increase availability of resources and training on various BMPs.	Stand alone for nonpoint source controls	The implementation of controls depends on availability of grant funds and voluntary action.	Moderate
Phosphate bans	Phosphate bans (e.g., detergents) have been effective at the State level. Local ordinances have been used effectively to require use of low P or no-P fertilizer in residential areas.	(1) Bans don't address agricultural applications of fertilizer. (2) Bans need to be comprehensive to be effective, e.g., restrict commercial applicators, have P-free alternatives available, and educate self-applicators. (3) Phosphate bans don't impact other nutrients (e.g., nitrogen). (4) Phosphate bans typically work best at State level--difficult to implement at the local level as shoppers purchase products outside of their immediate area.	States may need to review their authorities for implementing a phosphate ban. This may require legislative action in many States. Likely to involve other State agencies (e.g., commerce) due to regulating a product. Education and enforcement is required.	States implementing a phosphate ban would have costs for legislative actions, education, outreach, and enforcement. Costs for fertilizer ordinance adoption and enforcement borne for the most part by local units of government. State and Federal agencies may need to develop model ordinances, conduct education and outreach, and to try to develop incentives (or requirements) to get local units of government to enact appropriate ordinances.	High
Optimization of agricultural fertilizer application	Optimizing the amount and timing of fertilizer application to the needs of the crop and soil can be very effective in reducing nutrient loading in watersheds where over application of fertilizer is a main contributor	Relies on education of crop producers on how to optimize, and their voluntary action to do so (unless required by a Nutrient Management Plan pursuant to a CAFO permit).	Variable--nutrient management plans can be voluntary or can be required under a CAFO permit or state law/regulation	Recent high fertilizer prices have driven producers to implement optimization. If manure or biosolids are the fertilizer source, optimization may result in less demand and therefore a need to dispose of these materials, i.e., an increased cost to the generator.	High

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
<p>Food, Conservation, and Energy Act of 2008 (2008 Farm Bill)</p>	<p>The Farm Bill includes funding for a variety of conservation programs, including the Environmental Quality Incentives Program (EQIP). The program offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land. Effectiveness will depend on the willingness of farmers to implement voluntary nutrient controls. Agriculture has been identified as a primary source of nutrients in many areas of the country; this program could help achieve the reductions needed in those areas.</p>	<p>(1) Dependent on the willingness of farmers to install and maintain controls that will reduce nutrients and the willingness of State Technical Committees/county offices to distribute funds for nutrient controls. (2) Relies on availability of funds. (3) Though the controls implemented through this program may reduce nutrients, the main focus of the program is not the improvement of water quality. (4) Funding cannot be targeted to watersheds with highest nutrient pollution loading.</p>	<p>Stand alone for nonpoint source controls.</p>	<p>The program is managed by the US Department of Agriculture.</p>	<p>Low</p>
<p>Local planning & zoning</p>	<p>Local ordinances can be used effectively to regulate release rates and stormwater volumes, and to protect/preserve areas where stormwater can infiltrate. Huge opportunity to encourage or mandate the use of BMPs including low impact development (LID) practices on new development. Most jurisdictions have erosion and sedimentation requirements that should help with P by reducing particulates. Also local ordinances can be very effective in maintaining buffers around wetlands and watercourses that help with nutrient reductions.</p>	<p>(1) Local ordinances will typically not address the concentrations of nutrients in discharges. (2) Local politics may sometimes result in local requirements that are not overly stringent. (3) Some areas where there are nutrient contributions may be outside the jurisdiction of municipalities (i.e., unincorporated areas). (4) Municipalities need education/motivation to implement better land use controls including reasons not related to WQ such as transportation benefits, sustainable communities, etc.</p>	<p>Stand alone but education and enforcement is required.</p>	<p>Costs for ordinance adoption and enforcement borne for the most part by local units of government. State and Federal agencies may need to develop model ordinances, conduct education and outreach, and to try to develop incentives (or requirements) to get local units of government to enact appropriate ordinances. Municipalities may need to amend their local ordinances to remove barriers to use of LID or BMPs.</p>	<p>Low</p>

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
Development requirements for runoff	Local requirements can be enacted to prevent flooding (e.g., detention basins) in order to reduce the volume of water hitting a sewer system during a rain event. Low impact development ordinances (e.g., bioswales, artificial wetlands, rain gardens, etc.) can be very effective at reducing the volume of runoff and absorbing/retaining nutrients. States can reinforce requirements through incorporating them into general NPDES permits for construction stormwater.	Requirements to control/reduce flooding can be effective in moderating flow/volume but are not as effective in nutrient removal.	Stand alone but education and enforcement is required.	Costs for ordinance adoption and enforcement borne for the most part by local units of government. State and Federal agencies may need to develop model ordinances, conduct education and outreach, and to try to develop incentives (or requirements) to get local units of government to enact appropriate ordinances. Municipalities may need to amend their local ordinances to remove barriers to use of LID (in many cases developers need to get variances to incorporate LID practices).	Low
Watershed plans	Watershed groups can receive incremental Section 319 funds to develop watershed plans. Although there is no formal requirement for EPA to approve watershed plans, the plans must address nine required elements if they are developed in support of a section 319-funded project. These watershed plans are good vehicles to build stakeholder/ local involvement and to direct 319 funds to the most beneficial implementation projects.	Watershed plans are not self-implementing; they need funds (e.g., 319 grants) and committed voluntary action to implement.	Need other programs/funds to implement the plans.	Local groups can be very enthusiastic about protecting/restoring their watershed but can get frustrated by the bureaucratic process and limited funds available to get plans implemented.	Low

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
<p>IV. Tools for Other CWA Section 401 Certification</p>	<p>Under 401, States/Tribes can review and approve, condition, or deny all Federal permits or licenses that might result in a discharge to State/Tribal waters. Major Federal actions subject to 401 are Section 402 and 404 permits (in nondelegated States), FERC hydropower licenses, and Rivers and Harbors Act Section 9 and 10 permits. Through 401 certification, States/Tribes can address associated chemical, physical and biological impacts (e.g., DO levels, turbidity, inundation of habitat, stream volumes/fluctuations, filling of habitat, loss of aquatic species as a result of habitat alterations, etc.). States/Tribes could also look at the impacts of the action on narrative and numeric nutrient criteria. States/Tribes can negotiate with developers who need a 401 cert for a stream crossing or small wetland fill to incorporate mitigating measures into the site design to reduce environmental impact (bigger setbacks from sensitive habitats, fewer lots, better storm water BMPs, etc).</p>	<p>(1) Limited to any permit or license issued by a federal agency for any activity that may result in a discharge into waters of the state/tribe. (2) A large project often requires an extended period of time for certification because they are complex and require significant state/tribal involvement. (3) Denials based on potential exceedances of narrative criteria may be more difficult to document and more difficult to defend if challenged vs. numeric criteria. (4) Nutrient-control related conditions included with certifications most likely to be focused on no net increase instead of overall net reduction. (5) Recent decisions on the scope of 401 review may make mitigating measures for wetlands more difficult.</p>	<p>Stand alone but rely on a State's or Tribe's water quality standards.</p>	<p>Political pressure to get some of these projects through. State/Federal resources limited in terms of reviewing all of these potential 401 certification projects.</p>	<p>Low</p>
<p>Drinking water utility tools</p>	<p>Treatment technologies are available to remove nitrate/nitrite in drinking water (ion exchange, reverse osmosis). These can remove other nutrients.</p>	<p>Removing the nutrients from drinking water is more costly and less efficient than preventing or reducing nutrients from entering the source water in the first place.</p>	<p>Nitrate treatment can be stand alone. Reduction of levels in the source water is attempted as another barrier.</p>	<p>Installation of nitrate treatment is expensive. Unless levels in the source water can be reduced or a new source of water found, there is no choice but to install treatment.</p>	<p>High</p>

Tools	Effectiveness in Reducing Nutrients	Limitations	Stand alone or rely on other tools	Implications/Costs/ Resources	Overall Usefulness
<p>Dam relicensing/ removal</p>	<p>FERC relicensing is subject to NEPA although most projects involve environmental assessments (EAs) rather than EISs. Planned projects are supposed to minimize damage to the environment and incorporate requirements to reduce environmental impacts. Nutrient removal might play out on a site-specific basis but isn't the biggest issue associated with relicensing. In some cases, operational rules might enhance a reservoir's capacity as a summer nutrient sink/winter nutrient source. Manipulation of flushing rates might be helpful but certainly won't be a big part of any nutrient solution. Dam removal will move the nutrient load downstream and will likely bring a nutrient impaired reservoir back to attainment.</p>	<p>Re-licensing: Different criteria in different states; safety, rather than water quality is primary goal. Issues involving sedimentation, flow, stagnant pools, low dissolved oxygen, heavy metals, and habitat alterations/scouring tend to be issues looked at under relicensing. Nutrients might be considered secondarily.</p>	<p>Stand alone but the direct linkage to nutrient reduction is a stretch.</p>	<p>Relicensing of dams is often controversial, very time consuming, political, and a lengthy process.</p>	<p>Low</p>

Appendix C: Review and Analysis of Alternative Tools

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Table C-1. Review and Analysis of Alternative Tools

Type	Governmental Level of Implementation: Federal/State/Local	TOOLS	Threshold Criteria			Balancing Criteria		Scale of Implementation			Means of Implementation [Legislative, Regulatory, Non-Regulatory, Incentive]
			Effectiveness [3= High, 2= Medium, 1= Low]	Degree of Accountability for Environmental Improvement [3= High, 2= Medium, 1= Low]	Technical Feasibility [3=Excellent, 2=Fair, 1=Poor]	Stakeholder Acceptance [3= High, 2= Medium, 1= Low]	Cost 1 > \$2M, 2 >\$1M - <\$2M, 3 < \$1M (relative to the avg NPS Grant)				
PS	F	Detergent Phosphate Ban	2	3	3	2	2		S	W	L/R
NPS/PS	All	Protection of Natural Nutrient Sinks	2	2	2	2	2	N		W	R
PS	F	Expand NPDES Permit Post Construction Requirements	2	2	3	2	2		S	W	L/R
PS/NPS	F	Comprehensive CAFO Regulation	2	2	3	2	2		S	W	R
PS/NPS	F	NPDES Stormwater Regulation to of Smaller Communities	2	2	2	2	2		S	W	R
PS/NPS	F	Market Based Nutrient Reduction Land Use Incentives	2	2	2	2	2		S	W	I
PS	F	Control Onsite Wastewater Treatment Systems Discharge	2	2	2	2	2		S	W	R
PS/NPS	F	Implement Large-Scale Watershed TMDL (e.g., Mississippi River Basin)	2	2	2	2	1	N	R	W	L/R/I
NPS	All	Nutrient Load Reduction Strategy	1	1	2	2	3	N	R	W	NR
NPS/PS	S/L	Pilot Studies	1	1	2	2	2	N		W	I

Type	Governmental Level of Implementation: Federal/State/Local	TOOLS	Threshold Criteria			Balancing Criteria		Scale of Implementation			Means of Implementation [Legislative, Regulatory, Non-Regulatory, Incentive]
			Effectiveness [3= High, 2= Medium, 1= Low]	Degree of Accountability for Environmental Improvement [3= High, 2= Medium, 1= Low]	Technical Feasibility [3=Excellent, 2=Fair, 1=Poor]	Stakeholder Acceptance [3= High, 2= Medium, 1= Low]	Cost 1 > \$2M, 2 > \$1M - < \$2M, 3 < \$1M (relative to the avg NPS Grant)				
NPS/PS	S/L	Volunteer Monitoring	1	1	2	2	3				NR / I
NPS	F	NPS Regulation	3	3	2	1	1	N			R
PS	S/L	Issue Nutrient Limit Permits	2	3	3	2	2	N			L/R
PS/NPS	F	Federally Required State WQS Numeric Nutrient Water Quality Criteria	2	2	3	2	2	N			L/R
PS	F	Update Secondary Nutrient Treatment Requirements	2	3	3	2	2	N			L/R
NPS	F	Adoption of a Monitoring Paradigm/Watershed Action Level for fertilizer application based on the Atrazine example for pesticides registration	2	2	2	2	2	N			R
PS/NPS	F	Green Labeling	2	2	3	3	3	N			I
PS	F	Develop Nutrient Numeric Criteria- Permit Limits Guidance	2	2	2	2	3	N			I
NPS	S/L	State Established Nutrient Ceiling for Listings	2	2	2	2	3	N			I

Type	Governmental Level of Implementation: Federal/ <u>State</u> / <u>Local</u>	TOOLS	Threshold Criteria			Balancing Criteria		Scale of Implementation			Means of Implementation [<u>L</u> egislative, <u>R</u> egulatory, <u>N</u> on- <u>R</u> egulatory, <u>I</u> ncentive]
			Effectiveness [3= High, 2= Medium, 1= Low]	Degree of Accountability for Environmental Improvement [3= High, 2= Medium, 1= Low]	Technical Feasibility [3=Excellent, 2=Fair, 1=Poor]	Stakeholder Acceptance [3= High, 2= Medium, 1= Low]	Cost 1 > \$2M, 2 > \$1M - < \$2M, 3 < \$1M (relative to the avg NPS Grant)	N	S	I	
NPS	S/L	Project Implementation Plan Tracking	1	1	2	2	3	N	S	I	
NPS	F	TSCA required reduction of phosphorus in detergent and water solubility of fertilizer	2	3	3	2	2	N		I	
PS/NPS	F	Control Air Deposition of Nitrogen	2	2	2	2	1	N		R	
PS/NPS	F	TRI for Nutrient Releases	2	2	3	2	2	N		R	
NPS	F	SIP Process	2	3	2	2	2	N		R	
NPS/PS	S/L	Regulate PS Treatment and Post NPS BMP Application Loading	2	2	2	2	2	N		L/R	
NPS	S/L	Capping	2	2	2	2	2	N		R	
PS	F	Cap PS at current (2010) load	2	2	3	2	2	N		R	
NPS	F	MS4-type regs	2	2	2	1	2	N		R	
NPS	F	Cap Non-Point Source at Current Load	2	2	2	1	2	N		R	
NPS	F	Corporate Stewardship Program	2	2	3	3	2	N		I	

Type	Governmental Level of Implementation: Federal/State/Local	TOOLS	Threshold Criteria			Balancing Criteria		Scale of Implementation		Means of Implementation [Legislative, Regulatory, Non-Regulatory, Incentive]
			Effectiveness [3= High, 2= Medium, 1= Low]	Degree of Accountability for Environmental Improvement [3= High, 2= Medium, 1= Low]	Technical Feasibility [3=Excellent, 2=Fair, 1=Poor]	Stakeholder Acceptance [3= High, 2= Medium, 1= Low]	Cost 1 > \$2M, 2 > \$1M - < \$2M, 3 < \$1M (relative to the avg NPS Grant)	Scale of Implementation [National, Regional, State, Watershed]	Incentives for voluntary compliance prior to Regulatory action.	
NPS	F	Use of EQIP Funds	2	2	2	3	2	N		Incentives for voluntary compliance prior to Regulatory action.
NPS	S/L	Watershed Impervious Surface Limit Action Levels	2	3	2	2	2		S / W	L / R / Non-regulatory incentives
NPS	S/L	Agricultural Waste Composting	2	1	2	2	2		S / W	I
NPS/PS	All	Voluntary Agreements	1	1	2	2	3		W	I
NPS/PS	S/L	Tracking of Watershed Implementation Plans	1	1	2	2	3		S / W	NR
PS/ NPS	F	Phased WQS for "Restoration Uses"	2	2	3	2	2		W	L / R
PS/NPS	F	Nutrient Focused Targeted Watershed Initiative EPA/USDA	2	2	2	2	2		W	I
	S/L	Nutrient Bioharvesting	2	2	2	2	1		W	I

Recommendations for New Tools to Reduce Nutrient Loadings

The members of the Nutrient Innovations Task group who identified and evaluated potential new tools to address the increasing nutrient problem in our nation's waters included senior managers from water programs in EPA headquarters, EPA regions, and 7 states. Nearly 40 new tools were identified, discussed and evaluated. Tools such as tracking watershed implementation plans, encouraging voluntary monitoring, capping phosphorus discharges, regulating nonpoint source discharges, and many others were considered by a subset of EPA and state senior managers. Some tools depended on statutory or regulatory changes and some depended on the creation of new programs. The appendix to this report contains the full list of tools that were considered.

To identify the tools that held the most promise to reduce nutrient loadings into our nation's waters, the managers ranked the tools based on overall effectiveness, degree of accountability for environmental improvement, and technical feasibility. The managers also took into account public acceptance and cost. The managers relied on their experience in implementing water programs and qualitatively ranked these tools based on their best professional judgment. We recommend the 5 highest ranked tools in terms of overall effectiveness for further evaluation to determine how they might best be structured for purposes of implementation. A broader discussion among stakeholders towards that end is warranted and encouraged. We see these recommendations as the first step in engaging in such a discussion about what we can and need to do differently to be more successful in abating the increase in nutrient loadings to our waters and start on the path of significant reductions. Current regulatory and incentive-based tools and approaches are not yielding the results needed to protect water quality.

The tools that were most highly ranked as having the most promise to reduce nutrient loadings and therefore judged to have the highest overall effectiveness were the following:

Type	Tools	Scale of Implementation		Point Source	Non-point Source
		National	State		
Regulatory	Nonpoint Source Regulation: Seek legislative change(s) to authorize regulation of nonpoint source pollution to require nonpoint sources to achieve water quality targets and/or technology-based performance standards.	√	√		√
Regulatory	Establish technology treatment requirements for nutrients and thereby establish technology based limits for NPDES point sources that discharge nutrients to waters—update secondary treatment requirements.	√	√	√	
Source Reduction	Detergent Phosphate Ban		√	√	
Regulatory	Federally Promulgate Numeric Nutrient Water Quality Criteria/Standards	√	√	√	
Incentive-based	Green Labeling	√	√	√	√

It is fair to point out that the recommendation to seek to regulate nonpoint sources with a similar rigor to that of point sources was judged to be the most effective tool in reducing nutrient loadings to our nation's waters since it is broadly recognized that nonpoint sources contribute the bulk of the nutrient loadings to waters and those loadings have been the most difficult to control and reduce.

It is also important to point out that while Green Labeling did not rank in the top five for overall effectiveness, in the category of incentive-based tools it did rank highest in terms of overall effectiveness. Corporate stewardship was also a new tool that was ranked highly in terms of overall effectiveness in the incentive-based category. When presenting our recommendations, the workgroup considered it important to provide a mix of tool types: regulatory, source reduction, and incentive-based.

Finally, one prominent tool that is included in both the existing tools table and the new tools table in the appendix is water quality trading. Many on the workgroup commented that water quality trading is an important tool that has not yet been fully realized to yield the results in nutrient reductions that are needed. It is a tool that could be bolstered and made to work better. Its success depends on the creation of markets for nutrient trading. Certainty in regulatory requirements and establishment of clear numeric targets for nutrients provide the necessary framework for water quality trading to work. The recommended tools to regulate nonpoint sources and establish numeric criteria for nutrients would potentially expedite the use of water quality trading.

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Numeric Nutrient Criteria

Overview

This accountability method is based on the Clean Water Act, which requires states to adopt water quality standards. Numeric nutrient criteria employ ecoregional or site-specific water quality standards that utilize criteria for one or several key nutrient parameters to protect aquatic and recreational designated uses from nutrient inputs.

Description

Many states are in the process of developing numeric nutrient criteria. Other states (e.g., Minnesota, Virginia, Washington) have already approved numeric nutrient criteria for types of waterbodies, such as lakes and reservoirs on a regional basis. Some states have developed site-specific criteria for a specific waterbody or criteria based on supporting a particular designated use. Criteria development is generally employing recommendations from EPA's ecoregional nutrient criteria guidance documents, developing criteria that focus on one or a combination of the following parameters: TN, TP, chlorophyll-*a*, and turbidity (Secchi disc depth). The principal focus of numeric criteria development has been on lakes and reservoirs, with efforts to reduce nutrient inputs into streams resulting in facility specific effluent limitations.

Assessment of How the Approach is Working

Minnesota currently has two groups of numeric nutrient criteria, one for designated lake trout lakes in all ecoregions, and one for trout lakes (with no resident lake trout) in all ecoregions. Criteria exist for total phosphorus, chlorophyll *a*, and Secchi disc depth. Class 2a lakes and reservoirs (both lake trout and non-lake trout waterbodies) are also subject to narrative nutrient standards (MPCA 2008). The Minnesota Pollution Control Agency (MPCA) has drafted eutrophication criteria to replace these existing standards. The new standards have been developed for a particular lake or reservoir designated use (classes 2A, 2B, 2a, and 2b) and are specific to one of four ecoregions in Minnesota (Heiskary and Wilson 2004).

Virginia has developed site-specific numeric nutrient criteria for concentrations of chlorophyll *a* and TP to protect aquatic life and recreational designated uses in lakes and reservoirs. Additional listings are made when a new reservoir is constructed or recent data availability warrants development of nutrient criteria for a particular waterbody. The TP criteria are only applicable if the lake or reservoir has received algaecide treatments during the monitoring and assessment period (April 1 through October 31). Sampling is conducted in the lacustrine portion of the lake at a depth of one meter or less over the 7 month monitoring period and distributed in a manner to be representative of the whole waterbody. If monitoring reveals that the applicable criteria are exceeded, the waterbody is listed as impaired and Virginia's State Water Control Board will consult with the Department of Game and Inland Fisheries to determine the health of the waterbody's fishery and the status of designated uses. If the numeric nutrient criteria of a lake or reservoir does not provide for the attainment and maintenance of water quality standards of downstream waters, then the nutrient criteria may be modified on a site-specific basis to ensure protection of water quality standards of downstream waters (VSWCB 2007).

Washington has developed ecoregion specific numeric nutrient criteria that vary according to a lake or reservoir's trophic state (i.e. oligotrophic, mesotrophic, or eutrophic). Each ecoregion has a particular action value for epilimnetic TP, a trigger value that when exceeded by a waterbody within that ecoregion will initiate further regulatory action. If monitoring of a lake or reservoir reveals a TP value below the relevant action value, the trophic status of the waterbody is determined via epilimnetic sampling, and the TP criterion is set at or below the upper limit of the TP range for that trophic state. On the other hand, if monitoring reveals TP values in excess of the action value, then a lake-specific study is conducted. Lake-specific studies are site-specific and tailored to the particular source of the impairment, whether it be from phytoplankton blooms, toxic phytoplankton, or excessive aquatic plants. A lake-specific study may quantify the following measures: total phosphorus, total nitrogen, chlorophyll *a*, dissolved oxygen in the hypolimnion in thermally stratified waterbodies, pH, hardness, or other measures of the physiochemical state of the waterbody being studied. If upon further investigation it is determined that the designated uses of that water body are not impaired by the elevated TP concentration, then a new site-specific phosphorus concentration is set at the existing TP concentration. If the study reveals impairment to designated uses, then new criteria must be established that is protective of existing uses. Lake-specific nutrient criteria are considered during water quality standards rule makings and adoption by rule formally establishes the criteria for the lake (WDE 2006).

Summary of Strengths and Weaknesses

Strengths

- Ecoregional and site-specific numeric nutrient criteria tailored to the ambient physiochemical state of a waterbody given its geographical position
- Numeric nutrient criteria provide a definitive standard by which degradation caused by nutrients can be assessed, and the degree of degradation ascertained
- Numeric nutrient criteria are more prescriptive than narrative criteria that are open to interpretation due to their vaguely descriptive nature
- Exceedances of criteria result in impairment listings and subsequent action by the regulatory and/or permitting authority to address the impairment, which can impact downstream waters as well as initiate a watershed scale effort to reduce loadings, such as a TMDL
- Numeric nutrient criteria that employ several key parameters conducive to establishing the trophic status of a waterbody ensure a more rigorous assessment
- Criteria exceedances are tied to a regulatory mechanism to address impairments

Weaknesses

- Only a limited number of states currently have numeric nutrient criteria, and the degree of programmatic and regulatory development amongst those states varies greatly
- Most states have focused on lakes and reservoirs when developing numeric nutrient criteria since these systems serve as nutrient pools; streams and rivers rarely have numeric nutrient standards despite the impact nutrient inputs can have on these waterbodies and how these waterbodies serve as conduits of nutrient delivery; factors such as frequency and duration need to be considered when determining which waterbodies need numeric nutrient standards

- States have been slow in developing numeric nutrient criteria for coastal waters and estuaries, which have inherent difficulties as efforts may require regional considerations and interstate cooperation
- States are developing numeric standards with only one to two indicators of nutrient degradation
- Difficult to ensure nonpoint source reductions
- Regulations can be contentious

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Maryland BayStat Program

Overview

This accountability method is based on an executive order issued by Maryland Governor Martin O'Malley and coordinates state agencies and stakeholders within the State of Maryland. BayStat is tracking progress of the State of Maryland in its efforts to clean-up the Chesapeake Bay (O'Malley 2007).

Description

BayStat is a state initiative started by Maryland Governor Martin O'Malley with an executive order on February 14, 2007. The goal of BayStat is to coordinate Maryland's efforts to clean-up the Chesapeake Bay and more effectively measure progress of state initiatives to clean-up the Chesapeake Bay. The efforts of the State's Departments of Agriculture, Environment, Natural Resources, and Planning as well as the University of Maryland are tracked and coordinated to more accurately and specifically measure progress. Information and statistics gathered because of BayStat inform policymakers and provide accountability of the state agencies to ensure that efforts to clean-up the Chesapeake Bay are targeted and efficient (Nunley 2007).

Assessment of How the Approach is Working

The BayStat program utilizes a number of pre-existing indicators developed by U.S. EPA's Chesapeake Bay Program to evaluate the bay's health, protection, and restoration efforts (Cadogan 2006). Indicators that are tracked include water quality data, nutrient and sediment loads, biotic integrity, fisheries data, and protected land status. The BayStat program also incorporates the basin-specific tributary strategies for the 36 major basins in the bay watershed developed as part of the Chesapeake 2000 agreement.

This data is used to more effectively target its efforts and develop more effective strategies. BayStat helps to coordinate state efforts with efforts of other stakeholders like other State governments and Federal government agencies (Nunley 2007). Members of the BayStat team meet with Governor O'Malley monthly to assess progress and determine what is working and what is not working.

In addition to its role in improving efficacy and providing accountability of state agencies, BayStat functions as a tool for informing the public on the current causes of the poor health of the Chesapeake Bay and the progress towards improving the health of the bay. The BayStat team releases monthly newsletters and provides interactive progress tracking data on its website available to the public. Since BayStat was started recently, February 2007, the effectiveness of the program relies on the BayStat team being able to revise their approach towards improving the health of the Bay using all of the gathered data. At this time the BayStat program has been fully implemented to allow for agency accountability (O'Malley 2007).

Summary of Strengths and Weaknesses

Strengths

- Makes coordinated efforts by state agencies both within Maryland and with other states possible and much more likely to be effective
- Provides an integrated approach to measuring overall progress in improving the health of the Chesapeake Bay
- Provides the ability to evaluate whether one seemingly unrelated program has an effect on other conservation practices or restoration programs
- Could function as an effective state repository of information that could be compiled at the federal level (e.g., each state's BayStat program (or equivalent) could share information and techniques to increase effectiveness)
- If fully implemented, BayStat should act as a mechanism for increasing agency accountability by both public pressure and changes by the Governor's office
- No legislation is needed for this approach to be implemented and tracking progress as a tool to encourage more action is less contentious than other approaches

Weaknesses

- The BayStat program attempts to address a problem that is bigger than the jurisdiction of the stakeholders involved; a similar program at the federal level could coordinate all stakeholders
- Limited regulatory authority to target specific sources of nutrients
- The program is supposed to provide public accountability about specific projects or agencies that are performing well at cleaning up the bay or not performing well, but this information is currently not readily available and may indicate that the program is not yet fully implemented
- While simple statistical summaries of impairments and pollutant reduction activities are easily understood, there is no measure of effectiveness to indicate the contribution of a pollutant reduction effort to cleaning up the bay
- BayStat tracks what is being done to address the Bay's water quality issues, but does not thoroughly address the sources of nutrient pollution (e.g., responsible parties)

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Florida's Impaired Waters Rule

Overview

This accountability method is based on a Rule (F.A.C. 62-303) issued by the Florida Department of Environmental Protection (FDEP) to revise its methodology for identifying impaired waters and issuing TMDLs. Florida's Impaired Waters Rule (IWR) brings many nonpoint source pollutants under a regulatory framework for the first time. The IWR holds nonpoint sources partly responsible for causing impaired waters and requires the implementation of Best Management Practices (BMPs).

Description

In the late 1990's Florida was under pressure from environmental groups, EPA, and regulated industries to better identify impaired waters and establish TMDLs. At the time, Florida, like most states, had only recently begun pursuing the TMDL program as a tool to improve water quality. Just prior to a consent decree being reached with EPA to establish TMDLs for waters on its 303(d) list, the Florida Legislature passed the Watershed Restoration Act, which allowed FDEP to revise its methodology for identifying impaired waters and developing TMDLs (Norgart 2004). Shortly thereafter the FDEP adopted chapter 62-303, *Florida Administrative Code*, the Identification of Impaired Waters (IWR) Rule to establish a methodology for identifying impaired waters and to subsequently develop TMDLs for those waters (Florida Administrative Code 2001).

According to the IWR, waters in Florida are assessed to see if they meet Florida water quality standards (Id., §403.021). Those waters determined by FDEP to not meet water quality standards for a specific pollutant are listed as impaired on the verified 303(d) list. The impairment could be due to point source pollutants, nonpoint source pollutants, or both. The State of Florida also creates a "planning list" of those waters that might be impaired but need more data to confirm or deny the status.

Once a waterbody is listed as impaired, a TMDL is developed for that waterbody. The TMDL includes an analysis of the load allocation of all sources of the pollutant to the waterbody and "reasonable and equitable allocations of the total maximum daily load between or among point and nonpoint sources" (Id., §403.067(6)(b)) (Florida Statutes, 2008). After the TMDL is issued, the FDEP coordinates with a group of stakeholders to develop a Basin Management Action Plan (BMAP) to implement the TMDL. Under the BMAP, a number of point and nonpoint sources of pollution are regulated:

- NPDES permits may be reopened to add conditions to meet the load allocation specified in the TMDL.
- NPDES permits regulating stormwater are required to implement "best management practices or other management measures...to the maximum extent practicable" (Id., §403.067(7)2.b).
- Other state, regional, or locally permitted (non-NPDES) nonagricultural dischargers are required to undertake "pollutant reduction actions" to the "maximum extent practicable" (Id., §403.067(7)2.f).
- All other unpermitted nonpoint dischargers included in a BMAP must demonstrate compliance by either implementing best management practices (BMPs) or conducting

water quality monitoring (Id., §403.067(7)2.g). These dischargers include agricultural dischargers and any other dischargers that are identified during the TMDL and BMAP processes as significant sources of nonpoint pollution to the impaired waterbody.

Nonpoint sources are also provided additional incentives to implement management measures and flexibility in meeting its requirements under a BMAP (Hamann 2008). When a nonpoint source implements BMPs, compliance with water quality standards is presumed and additional measures cannot be “require by permit, enforcement action, or otherwise” (Id., §403.067(7)2.i). However FDEP can still amend the BMAP if improvements in water quality are not seen that could add additional requirements. Flexibility is provided to nonpoint sources by the water quality credit trading program. A discharger (point source) required to provide a reduction in load can purchase water quality credits from another discharger identified in the BMAP and allow for the reduction in load to be consolidated to one source (Id., §403.067(8)). Water quality credit trading can provide cost savings and efficiency gains.

Assessment of How the Approach is Working

For many years Florida has been aggressively pursuing the regulation of nonpoint source pollutants. Florida was the first state in the country to require treatment of stormwater from all new development with its comprehensive stormwater permitting program in 1982. The stormwater rule is a technology-based program which requires a stormwater management system and BMPs to reduce stormwater pollutants for new development (FDEP 2008). In addition to this rule, Florida regulates stormwater with a variety of other programs regulated by the FDEP, water management districts, and local governments (Hamann 2008). In 1987, Congress reauthorized the Clean Water Act and designated certain stormwater sources as “point sources” thereby requiring NPDES permits (Wu et al. 2003). In response to increased complexity, FDEP is developing a unified state stormwater rule to provide more uniform regulations.

The nonpoint source pollution requirements of the BMAP are another tool that Florida uses to further reduce nonpoint source pollution in a more targeted manner. The BMP requirement allows for a reduction of nutrient runoff to waters for which water quality testing has shown are in the highest need for clean-up. Since the IWR rule was issued the courts have upheld that a waterbody with no point source pollutants can be listed as impaired. In 2002, the Ninth Circuit court in *Pronsolino v. Nastri* determined that EPA was correct in identifying a waterbody as impaired even though it was polluted by only nonpoint sources (Norgart 2004).

Despite the progressive efforts in Florida to target nonpoint source pollution and its contributions to nutrient impairment, water quality degradation from nutrient impairment remains a significant challenge. According to the 2008 Florida Integrated Report, approximately 1,000 miles of rivers and streams, 350,000 acres of lakes, and 900 square miles of estuaries are impaired for nutrients in Florida (FDEP 2008). In January 2009, EPA issued a determination under Clean Water Act section 303(c)(4)(B) that numeric nutrient criteria are necessary to meet CWA requirements. Numeric nutrient criteria should speed up the TMDL process and allow for more widespread application of the BMAP program (Grumbles 2009).

Summary of Strengths and Weaknesses

Strengths

- Provides a regulatory mechanism to require BMPs for nonpoint source pollutants on waters that have already been prioritized as the most impaired waters for that pollutant in Florida.
- Allows for flexible options to meet nonpoint source regulatory requirements and incentives for implementing the BMPs.
- The BMAP BMP mechanism is not the only tool to regulate nonpoint source pollutants in Florida; it is effective as a targeted measure.

Weaknesses

- While FDEP claims to assess all of its waterbodies, a large portion of the waterbodies remain in limbo because sufficient water quality data is not available to determine impairment status.
- Targeting nonpoint sources of pollution to impaired waters could be seen as an inequitable restriction on only certain polluters, while other nonpoint polluters are not being regulated.
- Could be a contentious mechanism for regulating nonpoint source pollutants and provisions of Florida's IWR have been challenged in court.

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Economic Incentives and Disincentives

Overview

This accountability method is based on a variety of options available to policymakers using economics to limit nonpoint source pollution. Methods summarized include public and private grants and funding, credit and trading programs, purchasing and transferring of development rights, and voluntary or enforced certifications.

Description

A number of economic incentives and disincentives are available to policyholders to limit nonpoint source pollution. Public or private grants and funding will never be enough to fully fund all watershed restoration projects and nonpoint source pollution control strategies. As a result innovative incentive programs need to be used to drive down costs and to most efficiently use the funding that is available. Methods available include public and private grants and funding, credit and trading programs, purchasing and transferring of development rights, and voluntary or enforced certifications.

Grant money and public funding is available from a large number of private and public entities to limit nonpoint source pollution either directly or indirectly. Federal funds are available through programs like EPA's Clean Water Act (CWA) section 319 program or USDA's Environmental Quality Incentives Program (EQIP) to directly fund the implementation of best management practices (BMPs). States also have funds available such as the Clean Ohio Fund or Pennsylvania's Growing Greener Program. Prominent case studies using direct money payments to reduce nonpoint source pollution include New York's Agricultural Environmental Management (AEM) Program, West Virginia's North Fork Project, and Utah's Water Quality Project Assistance Program (WQPAP). New York's AEM Program provides farmers with technical and financial assistance in developing BMPs using 319 program funds and additional state funds (USEPA 2002a). The North Fork project in West Virginia worked to solve water quality problems in the headwaters of the Potomac River. BMPs to limit nonpoint source pollution included riparian buffers, streambank fencing, and developing alternative livestock watering and feeding strategies. This project included 319 funding and Flood Control Act (PL-534) funding (USEPA 2007). Utah's WQPAP program provides low interest loans through the state revolving loan program to nonpoint source reduction practices such as agricultural runoff control and streambank restoration (Utah Administrative Code 2009).

Some municipalities and state governments use innovative credit trading programs to fund nonpoint source pollution reductions. These programs can save money while allowing the groups that can most efficiently reduce nutrient or sediment pollution to take action. Examples of these programs include stormwater rate credits in Jefferson County, Kentucky, nonpoint source education incentives in Griffin, Georgia, water quality trading programs, and cap and trade air emissions regulations. In Jefferson County, Kentucky the stormwater utility charges a stormwater utility fee based on the square footage of impervious surface on a property. Credits are offered to property owners that decrease stormwater runoff from the property using retention or detention facilities. For example if the customer reduces stormwater runoff from their property by 30%, the utility would effectively treat the impervious surface area as 30% less square footage (IUPUI undated b). Griffin, Georgia also has a stormwater utility that charges a

stormwater utility fee and has a similar credit for peak flow reduction. In addition, public and private schools are given up to a 50% reduction in stormwater fees if the school participates in teaching a "Water Wise" curriculum to their students (IUPUI undated a). Water quality trading programs like the program in Florida (See Florida's Impaired Waters Rules F.A.C. 62-303), allow identified dischargers to a waterbody with a TMDL to trade loading credits. For instance, a treatment plant can be paid to reduce even more than its allocated load by a nonpoint source polluter that would cost more to implement BMPs themselves (Florida Statutes 2008). The cap and trade market created as part of air pollution regulations under the Clean Air Act has long been lauded as an efficient approach to pollution regulation. Cap and trade programs work well when the source and quantity of an emission is transparent and able to be linked to a responsible party. Linking nonpoint source pollutants and quantifying the contribution on a large-scale has been challenging.

Another way to preserve land and its natural nonpoint source pollution control function is fee simple acquisition. Land or development rights can be purchased or donated by state and local governments and private groups that have become land stewards to prevent future development, but this can be very costly. A promising solution to this funding problem has been transfer of development rights (TDR) systems. Instead of buying the development right, by setting up a TDR system, a market is created for development rights and one area is designated as a receiving area and the other a sending area. When a developer wants to develop in a receiving area at a higher density than the current zoning they can purchase development rights from the sending area which effectively places that property under a form of conservation easement. Therefore the developer pays to preserve land elsewhere in order to develop an area more densely (USEPA 1993). A TDR system promotes smart growth and reduces the impact of development on nonpoint source pollution. Prominent successful examples of effective TDR systems include Montgomery County, Maryland, The New Jersey Pinelands, and the Tahoe Regional Planning Agency (Preutz 1999).

Voluntary programs that use a certification and/or public pressure to encourage proper nonpoint source pollutant control strategies are also an important economic tool. Products with an environmental certification can increasingly be sold for at higher value than equivalent products without a certification. Examples of these programs include South Carolina's Forestry BMP Program and Clean Marina Programs. South Carolina runs a voluntary BMP compliance program that uses pressure from timber purchasers and the public as a mechanism for increasing BMP compliance (USEPA 2002b). Several states have instituted Clean Marinas Programs that call for voluntary adoption of BMPs at marinas to minimize impact on water quality. These states offer recognition or certification to those marinas that adopt the appropriate BMPs, for instance, in Maryland marinas, boatyards, and yacht clubs that adopt enough BMPs receive a "Maryland Clean Marinas" certificate and other associated recognition (USEPA 2007).

Assessment of How the Approach is Working

Grants and public funding work well to reduce nonpoint source pollution but are limited in their quantity. In addition, grants are often short-term funds that can be useful as seed money for a program but can be difficult to maintain over the long-term. Credit trading such as water quality trading or stormwater incentives has great potential for increased use, but often requires enabling legislation or regulatory requirements to setup a credit system. TDR systems have

shown success in certain markets but require a sophisticated and coordinated local government to get it started and maintain the TDR. In addition, TDR systems tend to be focused in wealthy areas and areas where demand for development is great. For every example of a successful TDR system, many examples of unsuccessful TDR systems or systems with very limited success exist. Voluntary programs such as recognition or certifications can be very effective in certain arenas and very cost effective, but they certainly will not work for every type of nonpoint source pollutant in every market.

Summary of Strengths and Weaknesses

Strengths

- Incentives or disincentives (other than just paying for pollution reduction) have the potential for high efficiency gains and cost savings
- Increased public pressure and perception will be a driver for polluters to participate in certifications and implement BMPs
- Existing regulations have many options for efficiency gains using market driven techniques such as water quality trading or credit exchanges
- Little if any legislation is required to implement these approaches and they are often less contentious than regulatory approaches

Weaknesses

- Public participation and involvement in incentive programs, like TDRs or certifications, is vital for success and sometimes very difficult to achieve
- Some programs, such as TDR systems, would not be effective if scaled up to a regional or national level
- Incentives or disincentives are often not backed up with a consequence through a regulation or other enforcement mechanism
- Overall nonpoint source reduction goals are often not included in these incentive approaches

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Green and Eco-Labeling of Farm Products (Based on Farming Methods)

Overview

The accountability method of green and eco-labeling of farm products is voluntary and based on the potential for increased consumer acceptance of environmentally friendly products and reimbursement for costs of certification.

Description

The Organic Foods Production Act (OFPA) of 1990, adopted as part of the 1990 Farm Bill, requires the United States Department of Agriculture (USDA) to develop national standards for organically produced agricultural products to assure consumers that agricultural products marketed as organic meet consistent, uniform standards (USEPA 2007). USDA promulgated final rules that implemented this legislation in October 2002, which required all growers and handlers who labeled their products as organic to be certified by a state or private agency accredited under the uniform standards developed by USDA. The national organic standards address methods, practices, and substances used in producing and handling crops, livestock and processed agricultural products (Kremen et al. 2004).

USDA's Agricultural Marketing Service implemented a National Organic Program in 2002 as a way to support organic farmers and processors and provide consumer assurance. USDA harmonized the differing standards among dozens of state and private certification organizations that had emerged by the late 1990s, and continues to update rules on organic production and processing. The steps to become a certified organic operation include picking an organic certifier, following national organic standards, keeping records of practices and materials used, and having an annual inspection (USDA 2007; USDA 2009).

The USDA Natural Resources Conservation Service (NRCS) helps organic farmers through programs such as the Agricultural Management Assistance Program, Conservation Technical Assistance Program, and the Environmental Quality Incentives Program. The Agricultural Management Assistance Program, established under the Agricultural Risk Protection Act of 2000 and amended under the 2002 Farm Act, provides financial assistance for conserving practices, such as those used in organic farming, under 3- to 10-year contracts. The program focuses on producers in 15 states where participation in the Federal Crop Insurance Program has historically been low (USDA 2008b). Organically grown crops help reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages from floods and other natural disasters (USDA 2007). Although the Federal Government does not currently offer support for transitioning to organic agriculture, technical assistance is becoming more available (USDA 2007).

Increasingly, timber harvesters are seeking green certifications like those provided by the Forest Stewardship Council (FSC) or South Carolina's Forestry BMP Program. These certification programs have requirements for sustainable timber harvesting practices like BMPs to reduce erosion. Forest certifications improve the price and markets that are available to timber harvesters, while reducing nonpoint source pollution associated with logging operations. The South Carolina Forestry Commission (SCFC) provides voluntary courtesy BMP inspections to forest managers. Active forestry operations are identified by regular flights over priority

watersheds, voluntary notification, and response to complaints. Forestry BMP specialists provide site-specific BMP recommendations during the initial inspection and then a final inspection is performed after logging is complete to see if the BMPs are implemented. The list of loggers that pass compliance and those that do not is given to the state and to timber product purchasers. Compliance with the voluntary BMP measures has shown a significant increase since the inspection program began (South 2002).

Assessment of How the Approach is Working

Organic farming has been one of the fastest growing segments of U.S. agriculture for over a decade. By the time USDA implemented national organic standards in 2002, certified organic farmland had doubled between 1990 and 2002 from 1 million acres to 2 million acres. By 2005, the acres doubled again to 4 million acres. California remains the leading state in certified organic cropland, with over 220,000 acres, mostly for fruit and vegetable production. Other top states for certified organic cropland include North Dakota, Montana, Minnesota, Wisconsin, Texas, and Idaho. Only a small percentage of the top U.S. field crops—corn (0.2 percent), soybeans (0.2 percent), and wheat (0.5 percent)—were grown under certified organic farming systems. On the other hand, organic carrots (6 percent of U.S. carrot acreage), organic lettuce (4 percent), organic apples (3 percent) and other fruit and vegetable crops were more commonly organic grown in 2005 (USDA 2008a). Some other examples of voluntary approaches that were relatively successful are Dolphin-Safe tuna labeling and Energy Star. Dolphin-Safe tuna labeling was brought on by consumer pressure, while Energy Star is led by the government to help consumers choose energy-efficient products to save money and energy.

Summary of Strengths and Weaknesses

Strengths

- Reduction in non-point source pollution such as nutrients, sediments, and pesticides
- Reduction in erosion and overall runoff
- Promotion of conservation of water resources (nonrenewable resources)
- Lowering of costs and increased farm income
- In relation to nutrients programs, this voluntary approach would save farmers fertilizer costs and a non-regulatory program would be less contentious

Weaknesses

- Eco-labeling is voluntary and has little regulatory oversight
- Little incentive to switch to organic if crops need to be distributed widely due to market pressure
- Limited mechanisms to reward farmers for switching to organic
- Farmers must risk high managerial costs and shifting to a new way of farming
- Little awareness and education for the consumers to support organic farmers
- Lack of marketing and infrastructure, and no direct payment method to the farmers
- Require a market mechanism or educational outreach program to encourage consumers to select goods produced by methods that reduce the amount of nutrients entering our waters

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Voluntary Agreements with Private Sector

Overview

This accountability method is based on the Water Stewardship Program, a non-profit organization with the goal to reduce nutrient loadings to waters of the U.S. from the food services industry. The program employs Continuous Improvement Programs (CIPs), Corporate Social Responsibility Initiatives (CSRs), and integrated regional efforts to set targeted reduction goals for nutrient releases to waters of the U.S.

Description

Water Stewardship Program, Incorporated, is a non-profit organization dedicated to strengthening voluntary industrial efforts to reduce nutrient inputs to waters of the U.S. by improving ties with government and third party entities to provide scientific and expert advice, and open venues of funding. The program's ultimate goal is to reduce nutrient pollution to allow the restoration of economically critical functions of water resources. The program has focused on reducing nutrient losses from agricultural production areas to 40% of a predefined baseline and optimizing nutrient inputs to reduce production costs and offset the cost of mitigation measures. The program is overseen by the Water Stewardship Council, which is comprised of representatives from the food services industry, government agencies, and non-government organizations. The Council will also be a forum by which to share findings from CIPs, and discuss programmatic needs and direct future efforts (Water Stewardship Program 2008).

Assessment of How the Approach is Working

The Water Stewardship Program has focused largely on improved accountability using CSRs, which ensure a high level of corporate staff responsibility due to the need to deliver measurable results and the fact that annual CSR reports will be distributed to shareholders. The program also uses CIPs, which are developed by the industry participants in concert with third party professionals recruited and trained by the Water Stewardship Program. CIPs outline conservation choices and measurable practices and innovations to be employed by the industry. The industry's success in meeting the goals of the CIP is verified biennially by project scientists, and for those failing to meet the predefined goals, a remedial plan is developed to clearly define how the industry can meet the goals of its CIP in the future. The following elements are assessed during the periodic reviews: (1) remedial efforts to achieve targets; (2) the implementation and documentation of improvements; and (3) the successful communication of efforts and improvements. The program also aids the food services industry in procuring governmental agency and independent (i.e. private foundations) expenditure incentives, by leveraging substantial financial contributions from these sources (Water Stewardship Program 2008).

The initial focus of the Water Stewardship program will be on the production level, but the program plans to target the entire food chain, including processors, distributors, and wholesale buyers. Efforts are being piloted in the Chesapeake Bay, Illinois River, and Minnesota River watersheds. One initial effort of the program is the development of nutrient budgets for mid-Atlantic states, specifically Maryland, Pennsylvania, Virginia, and West Virginia. The program is coordinating efforts from land grant universities within each state to develop nitrogen and phosphorus budgets for cropland down to a watershed level. This effort is part of the interstate

and interagency program to mitigate nutrient impacts on the Chesapeake Bay by achieving reductions of 40% as compared to inputs in 1985 (Mid-Atlantic Regional Water Program 2005).

Summary of Strengths and Weaknesses

Strengths

- Aids the food services industry with procuring funds to reduce nutrient inputs to waters of the U.S.
- Coordinates private sector efforts with those of government agencies and other stakeholders
- Holds industry accountable via the use CSRs and biennial reviews of the progress made toward meeting the goals of the CIP
- Provides access by the industry to government and third party professionals whose expertise can be called on to help industry achieve nutrient pollution reductions
- Provides logistical and economic incentive for industry to voluntarily take measures to mitigate nutrient impacts on waters of the U.S.
- Use of third party review ensures an independent unbiased review of the success of a CIP in meeting its goals
- Non regulatory, which is less contentious and there is no need for new legislation

Weaknesses

- Program is a new effort, industry participation and program success cannot yet be gauged
- The voluntary nature of the program means it lacks regulatory backing to ensure industrial compliance with the goals of the CIP
- Program incentives may be too little to entice significant commitments from the food services industry
- Unclear as to how certain elements of the program will be funded, specifically the acquisition and training of project scientists and assessment teams to conduct CIP reviews
- The use of CSRs and other measures of accountability may make the industry reluctant to participate
- No public accountability
- Unclear as to which stakeholders are notified when an industry fails to meet its goals

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The Massachusetts Wetlands Protection Act

Overview

The Massachusetts Wetlands Protection Act¹ (the Act) protects wetlands and related public interests (e.g., flood control, prevention of pollution and storm damage, protection of public and private water supplies, groundwater supply, fisheries, land containing shellfish, and wildlife habitat). Under the Act, the state protects these public interests by requiring a careful review of any activity that would “remove, fill, dredge or alter any bank, riverfront area, fresh water wetland, coastal wetland, beach, dune, flat, marsh, meadow, or swamp bordering on the ocean or on any estuary (a broad mouth of a river into which the tide flows), creek, river, stream, pond, or lake, or any land under said waters or any land subject to tidal action, coastal storm flowage, or flooding” (MADEP undated a; MADEP undated b).

Description

The Act is implemented and administered at several jurisdictional levels. Local conservation commissions (the commission),² consisting of a volunteer board of three to seven members selected by the city council, are responsible for implementation of the Act. At the state level, the Massachusetts Department of Environmental Protection (MADEP) oversees the administration of the law, provides technical training to local commissions, and hears appeals of decisions made by the commissions (MADEP undated a).

The Act is carried out in the following steps (Berkshire Environmental Action Team undated; MADEP undated a):

- 1) Any party concerned about the impact of a proposed project may file a Request for Determination of Applicability (RDA) to MADEP.
- 2) Upon receiving an RDA, the commission must schedule a public meeting within 21 days to review the facts and determine whether a project permit will be necessary. The commission should make a site visit before the meeting to prepare for their evaluation of the proposed work. Once a determination is made, the commission will report the decision to MADEP.
- 3) If a proposed project requires a permit, the party undertaking the activity must file a Notice of Intent (NOI) with both the commission and MADEP, and pay an application fee. The NOI requires a plan that describes the details of the proposed project, buffer zones, and methods that will be taken to prevent degradation.
- 4) After receiving the NOI, the commission must schedule a public hearing within 21 days after advertising it. The commission should review the NOI and supporting material to prepare for the evaluation of the proposed project.
- 5) The commission reviews the information and will determine one of the following:
 - a. The applicant needs more information before the commission can reach a decision.
 - b. There is sufficient information, and the commission will issue a permit.
 - c. There is sufficient information and the commission will deny a permit.

¹ Massachusetts General Laws (MGL) Chapter 131, Section 40.

² Formed under MGL Chapter 40: Section 8C. *Conservation commission; establishment; powers and duties.*

- 6) The decision can be appealed by the applicant, MADEP, or third parties (specified under the law) during a 10-day appeal period.
- 7) Upon issuing a permit, the commission will issue an Order of Conditions if there are certain conditions necessary to prevent endangering nearby wetlands.

This regulation works in parallel with the Inland and Coastal Wetlands Restrictions Acts,³ under which permanent restriction orders have been placed on selected wetlands in over 50 communities. The Inland and Coastal Wetlands Restrictions Acts provide additional protection for selected wetlands by prohibiting certain activities in advance of any work being proposed (MADEP undated a).

Assessment of How the Approach is Working

There is little publicly available information on how the program is working. The Act does provide a mechanism for oversight by both local entities and the state. This mechanism also includes a way for concerned parties to participate in a public process to protect state waters. However, because the Act only provides a minimum level of protection, over 100 communities have local wetlands protection bylaws (e.g., zoning) that provide additional regulatory oversight and protection to wetland resources (MADEP undated a).

Summary of Strengths and Weaknesses

Strengths

- This regulatory method of state oversight, implementation by local agencies, and involving the public, may be a good example of transparent implementation of a regulation.

Weaknesses

- The issuance of the permit is dependent on the local commissions, which means the commission may need people with specific skill sets to understand the full breadth of impacts of a proposed project.
- There is little publicly available information on how much oversight of approved projects exists (e.g., whether an agency assesses a project after it is finished to see its actual impacts).
- It may be difficult to standardize the reasoning behind the issuing/denying of a permit if there are multiple commissions that do the decision-making within the state.

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Toxic Release Inventory

Overview

This accountability method creates an inventory of the releases of toxic chemical from industrial and federal sites from data collected based on a reporting requirement. The program relies on the public, academic institutions, and other organizations to review the data and convey what is acceptable and unacceptable.

Description

Following several U.S. chemical accidents, Congress passed the Emergency Planning and Community Right-to-Know Act (EPCRA) as a part of the Superfund reauthorization in 1986 (USEPA 2009a). EPCRA's mandate is twofold: (a) to promote contingency planning for chemical emergencies and (b) to provide the public with previously unavailable information about toxic and hazardous chemicals in their communities. Section 313 of EPCRA created the Toxics Release Inventory (TRI), requiring federal facilities and companies in manufacturing to report specified quantities of certain chemicals released from their facilities. In 1990, Congress passed the Pollution Prevention Act (PPA), requiring facilities to report to the TRI quantities of toxic chemicals managed in waste and the pollution prevention activities they undertake. In 1998, the public gained access to data from additional industrial sectors. Other industries now required to report under EPCRA and the PPA include metal mining, coal mining, coal and oil burning electrical utilities, hazardous waste treatment and disposal facilities, chemicals distributors, petroleum bulk plants terminals, and solvent recycling operations (USEPA 2003).

EPA compiles the TRI data each year and makes it available through several data access tools, including TRI Explorer (<http://www.epa.gov/triexplorer>) and Envirofacts (<http://www.epa.gov/enviro>) (USEPA 2009b; USEPA 2008b). Other organizations make the data available through their own data access tools, including Unison Institute, which supports "RTKNet" (<http://www.rtknet.org>) and Environmental Defense, which developed "Scorecard" (<http://www.scorecard.org>). Armed with TRI data, communities have more power to hold companies accountable and make informed decisions about how toxic chemicals are to be managed. The data often spurs companies to focus on their chemical management practices since they are being measured and made public. In addition, the data serves as a rough indicator of environmental progress over time (USEPA 2008a).

Assessment of How the Approach is Working

The availability of TRI data to the public is a useful resource for many organizations (USEPA 2003):

- Communities use TRI data to begin dialogues with local facilities and to encourage them to reduce their emissions, develop pollution prevention plans, and improve safety measures.
- Public interest groups, government, academicians, and others use TRI data to educate the public about toxic chemical emissions and potential risk.

- Industry uses TRI data to identify pollution prevention opportunities, set goals for toxic chemical release reductions, and demonstrate its commitment to and progress in reducing emissions.
- Federal, state, and local governments use TRI data to set priorities and allocate environmental protection resources to the most pressing problems.
- Regulators use TRI data to set permit limits, measure compliance, and target enforcement activities.
- Public interest groups use TRI data to demonstrate the need for new environmental regulations or improved implementation and enforcement of existing regulations.
- Investment analysts use TRI data to provide recommendations to clients seeking to make environmentally sound investments.
- Governments use TRI data to assess or modify taxes and fees based on toxic emissions or overall environmental performance.
- Insurance companies use TRI data as one indication of potential environmental liabilities.
- Consultants and others use TRI data to identify business opportunities, such as marketing pollution prevention and control technologies to TRI reporting facilities.

The key driving factor of this program is for EPA to collect data and populate a user-friendly, easily accessible database the public can view. Once data is updated, the public is informed and they then have the means to promote direct dialogue with a facility/industry (USEPA 2008d; USEPA, 2009c). Facilities/ industries must change their operations to reduce releases voluntarily, with no direct incentive (e.g., government funding). This method of providing data may be a first step to promoting further understanding among the public about nutrient problems in the United States. For example, reports on agriculture could include the type and amount of fertilizers used on individual farms per year or tons of animal manure produced annually. POTWs could be required to report annual nitrogen and phosphorous loads. Urban areas could report estimates of nitrogen and phosphorous in stormwater discharges annually. In addition, EPA may need guided educational programs.

Summary of Strengths and Weaknesses

Strengths

- Easy access to a user-friendly TRI database (USEPA 2008c)
- Readily available information results in more opportunities to inform the public of current conditions and for citizens and organizations to begin direct dialogue with a facility/industry of concern
- With reporting requirements in place, national organizations can conduct risk screening and risk assessments, and initiate discussions with a facility/industry
- TRI data convinced some facility managers of the need for an Environmental Management System, which ultimately can help reduce costs and become a public relations and marketing tool

Weaknesses

- The program relies heavily on public participation after providing data; unless the public speaks out, there is little incentive for facilities/industries to change “business-as-usual” on their own

- Even if a case is made that a facility is a problem, any changes are voluntary, thus there is little incentive for change due to the lack of funding support and regulatory oversight
- For nutrients using a TRI approach may need legislation and can be contentious if involved with agricultural fertilizer application

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Pinto Creek Decision

Overview

This accountability method is based on a Ninth Circuit court decision interpreting part of the NPDES program. Limits for new dischargers on impaired waters must be factored into permitting decisions.

Description

Carlota Copper Company proposed to construct and operate an open-pit copper mine and processing facility near Miami, Arizona. At the time, Pinto Creek (a nearby waterbody) was listed on the 303(d) list as impaired because of non-attainment of copper water quality standards. In 1996 Carlota applied for an NPDES permit because they would be discharging pollutants into Pinto Creek. EPA published an initial draft permit in 1998 and later a revised permit in July 2000 (with two new provisions). Petitioners filed for review of the permit and associated NEPA documents one month later. In response, EPA withdrew portions of the NPDES permit and prepared a supplemental environmental assessment analyzing the two new permit conditions. EPA also completed a TMDL for Pinto Creek in 2001. EPA reissued the permit in February 2002 (*Friends of Pinto Creek v. United States Environmental Protection Agency*, 504 F.3d 1007 (9th Cir. 2007)).

In response to the new permit, petitioners filed an appeal on April 1, 2002 to challenge EPA's issuance of the permit. The Appeals Board upheld the permit on September 30, 2004, and EPA issued a final NPDES permit (*Friends of Pinto Creek 2007*). The Petitioners later filed for review in the Ninth Circuit, which vacated the permit because "there [we]re no plans or compliance schedules to bring the Pinto Creek segment 'into compliance with applicable water quality standards'." The Court held that issuance of the permit was inconsistent with 40 CFR 122.4(i), an NPDES regulation. (Brief for the Federal Respondent in Opposition to Certiorari, 2008). According to the Court, section 122.4 states that no permit may be issued (*Friends of Pinto Creek 2007*):

(i) To a new source or a new discharger if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water quality standards or is not expected to meet those standards . . . and for which the State or interstate agency has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate, before the close of the public comment period, that:

- 1) There are sufficient remaining pollutant load allocations to allow for the discharge; and
- 2) The existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards.

On March 7, 2008, Carlota's petition for a rehearing was denied. On June 4, 2008 Carlota sought Supreme Court review of the Ninth Circuit Court of Appeals Decision (Brief for Federal Respondent in Opposition to Certiorari 2008), but the Supreme Court denied the petition in January 2009 (Sierra Club 2009).

Compliance schedules in general are schedules of "remedial measures included in a permit or an enforcement order, including a sequence of interim requirements (for example, actions, operations, or milestone events) that lead to compliance with the CWA and regulations" (USEPA 1996). Typically a compliance schedule should only be long enough for dischargers to attain compliance, so they move towards compliance and demonstrate progress throughout the schedule. When a compliance schedule is longer than 1 year, interim dates/milestones are typically included in the permit (to show progress towards attaining compliance with the effluent limitations/requirements).

According to Karl Blankenship, the editor of the Bay Journal, the Pinto Creek case has the potential to prohibit various permits under CWA jurisdiction, including permits for stormwater systems, large animal feedlots, and construction sites greater than one acre in size. In addition, the ruling is in effect for 11 states in the Ninth Circuit and could set a precedent for other decisions throughout the country. As interpreted by the Ninth Circuit, EPA could use the Pinto Creek case to gain leverage to force cleanup of waters throughout the United States. An attorney with the Chesapeake Bay Foundation stated that the ruling could even strengthen the Foundation's claim in a different lawsuit that EPA has not exercised its full authority to clean up the Chesapeake Bay. Some dischargers in the Bay watershed have already objected to nutrient discharge limits in their permits and want to increase discharges (Blankenship 2009). The Task Group understands that EPA is currently reviewing and evaluating the implications of the Ninth Circuit decision.

Assessment of How the Approach is Working

The Supreme Court denied the petition in January of 2009; no NPDES permit has been issued to Carlota Copper Company.

Summary of Strengths and Weaknesses

Strengths

- A new discharger will not be allowed under 122.4(i) if the discharge will cause or contribute to violation of WQS
- Compliance schedules for existing point sources not already meeting their applicable WQBELs are required when a new discharger proposes discharging to a water segment that does not meet applicable WQS
- Compliance schedules provide milestones/accountability for bringing a discharger into compliance with the relevant WQBEL

Weaknesses

- No flexibility in compliance schedules
- There could be unintended consequences associated with this type of approach; for example, the ruling could create incentives for lower density development to avoid applying for permits such as stormwater or construction and development

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Virginia Watershed-based Permit

Overview

This accountability measure is based on state regulation to establish watershed level effluent loading limits for nitrogen and phosphorus in a general NPDES permit. The permit limits for nitrogen and phosphorus are established in addition to other individual permit limits for a facility. Facilities may opt to have an individual permit for nitrogen and phosphorus in lieu of the general permit.

Description

In September 2006, the state adopted a general Virginia pollutant discharge elimination system (VPDES) watershed permit for total nitrogen and total phosphorous discharges for the Virginia tributaries to the Chesapeake Bay (9 VAC 25-820-10 et seq.). The general permit establishes annual effluent loading limits for nitrogen and phosphorus and caps the loads for the watershed. The general permit also establishes the conditions for exchanging credits and purchasing offsets. Existing facilities that have exceeded their allocation, or new/expanded facilities not assigned a waste load allocation can purchase offsets to meet limits (VA DEQ, undated). Only new facilities and those with expanding loads can trade with nonpoint sources to allow for expanded capacity in a watershed.

The permit covers facilities with individual VPDES permits that discharge or propose to discharge total nitrogen or total phosphorous to the Bay or its tributaries (9 VAC 25-820-20). Specifically, the criteria for coverage under the general permit are (USEPA 2007):

- A significantly discharging facility: Existing facility that discharge 100,000 gallons or more per day (or an equivalent load) directly into tidal waters, or 500,000 gallons or more per day (or an equivalent load) directly into nontidal waters
- New or expanding facility: A permitted facility that proposes to discharge 40,000 gallons or more per day (or an equivalent load) directly into tidal or nontidal waters as a result of that new construction

Important information about the general permit (VA DEQ undated):

- Virginia's general permit was effective January 1, 2007 and expires December 31, 2011.
- Authorization for all dischargers under this permit expires on the same day and will be renewed on the same day.
- All facilities covered by the general permit are required to register by submitting a registration statement (new or expanding facilities applying after the effective date must submit the registration statement with the application for an individual VPDES permit).
- For total nitrogen and total phosphorous requirements, general permit requirements for each facility supersede any individual permit requirements.
- Waste load allocations are assigned to each permitted facility, and allocations may be aggregated for owners of multiple facilities.

- A compliance schedule is required for the combined waste load allocation for each tributary. Covered facilities must submit compliance plans, either individually or through the Nutrient Credit Exchange Association within nine months of the general permit's effective date.
- Permittees must submit monthly loading data on the date required in the facility's individual permit.

Assessment of How the Approach is Working

This approach has allowed for a much more streamlined and efficient permitting process for the Virginia DEQ, allowing a few staff members to negotiate a single consolidated permit with 125 load limits and ten schedules of compliance over 15 months instead of having more than a dozen permit writers to negotiate 125 permits with 125 load limits and 125 compliance schedules over five years (USEPA 2007). In addition, the flexibility, cost-effectiveness, and collaboration-oriented approach of the program are anticipated to result in much quicker nutrient reductions than solely relying on technology upgrades (USEPA 2007). Due to the newness of the program, however, there is little information on how well the approach works in practice—no public information on the relative success of the project was readily available for this analysis.

Summary of Strengths and Weaknesses

Strengths

- Using a watershed based approach for the development of their general permit allowed Virginia to help address problems with nitrogen and phosphorous in the Chesapeake Bay and its tributaries. The previous individual permits were not based on the same type of watershed analysis.
- Exchanging and purchasing credits provides flexibility to facilities that cannot meet limits and rewards facilities that are meeting limits, while still ensuring the total amount of nitrogen and phosphorous in the watershed remains the same.
- A general permit provides accountability through the waste load allocations set for each facility.
- The trading component of the permit creates a mechanism for point sources to assist in the reduction of nonpoint source loads
- Can get greater nonpoint source reductions if new or expanded point source dischargers are forced to reduce more than an equal amount of a nonpoint source load

Weaknesses

- Nonpoint source loads only lower to compensate for an increased load from point sources
- The program is only for "significant dischargers," as well as new and expanding facilities— so not all sources are accountable (USEPA 2007).
- As of 2007, the nonpoint source trading alternative is still under development due to issues related to estimating nonpoint source loading and BMP load reductions, inspection and monitoring of BMP installation, and enforceability (USEPA 2007).

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Strengthening Reasonable Assurance for TMDLs

Overview

This accountability method is based on reasonable assurances, which are part of TMDLs under the Clean Water Act (CWA). Reasonable assurances are the documentation of the accountability from states for meeting Total Maximum Daily Load (TMDL) load allocations for nonpoint sources.

Description

When a TMDL is developed for waters impaired by only point sources, NPDES permits provide reasonable assurance that the TMDLs' wasteload allocations (WLA) will be implemented. In cases where a TMDL is developed for waters impaired by a combination of point and nonpoint sources (and the WLA is based on assumed reductions from nonpoint sources), EPA's *Guidance for Water Quality Decisions: The TMDL Process* (1991) and policy memorandum "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)" (Perciasepe 1997) maintain that the state provide reasonable assurances that the nonpoint source load allocations will be met. Although, EPA regions are encouraged to work with states to attain load allocations for waters impaired by nonpoint sources alone. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that nonpoint source load allocations will be achieved, because such a showing is not required by current regulations. (USEPA 2002).

Reasonable assurances can be non-regulatory, regulatory, or incentive-based and should be consistent with applicable laws and programs (Perciasepe 1997). Inclusion of reasonable assurance in TMDLs typically ranges from general description of the programs available to support load allocation implementation (e.g., CWA section 319 grant program) to detailed implementation plans documenting planned implementation activities, responsible parties, schedules, and funding estimates. The types of information included to provide reasonable assurance can reflect the agencies involved in implementation. For example, when local municipalities will be responsible for implementing load allocations, reasonable assurances might include descriptions of local ordinances or zoning regulations in addition to planned management practices. Alternatively, in areas with federally managed land, a memorandum of understanding between the responsible agency (e.g., U.S. Forest Service) and the state might be included to provide reasonable assurance.

In cases where a state has not developed a plan for achieving TMDL load allocations for nonpoint sources, the regions may take additional steps for encouraging states to do so. For example, Perciasepe (1997) recommends that the regions focus grant funding toward states that provide reasonable assurances that nonpoint source load allocations will actually be achieved. The grants may take the form of Performance Partnership grants or grants under CWA sections 104(b)(3), 106, 319, or 604(b) (Perciasepe 1997).

Assessment of How the Approach is Working

When the state provides reasonable assurance based on specific and planned implementation activities, this can be beneficial in reducing nutrients. However, when reasonable assurance is generic and not site-specific, it is probably less likely that that TMDL will be implemented.

Summary of Strengths and Weaknesses

Strengths

- To maintain NPDES permit limits based on the waste load (i.e., point source) allocation in a combination point and nonpoint source TMDL, heightened accountability exists for achieving and maintaining the nonpoint source load allocation in the TMDL.
- Places focus on implementation of TMDLs and related allocations, rather than just development
- No new regulations required

Weaknesses

- Reasonable assurance is not the mechanism that provides regulatory nonpoint source controls. Rather, reasonable assurance is the document of existing mechanisms to achieve nonpoint source controls.
- Lack of reasonable assurance is not a basis for disapproving a nonpoint source only TMDL.
- Development and review of a TMDL may be labor intensive depending on the level of reasonable assurance needed to demonstrate nonpoint source loads in the TMDL can be achieved and maintained.
- Loads and reductions for differing watersheds are not the same (equity issue)

References

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Connecticut Nitrogen Credit Exchange Program

Overview

In 2001, Connecticut and New York, together with EPA, developed a TMDL for Long Island Sound. One of Connecticut's management strategies to reduce nitrogen was to develop a nitrogen trading program among 79 sewage treatment plants located throughout the state. Established in 2002, the Nitrogen Credit Exchange Program aims to reduce the nitrogen load from sewage treatment plants by 65 percent by 2014 (CTDEP undated). This program is driven by the Comprehensive Conservation and Management Plan (CCMP) for the Long Island Sound National Estuary Program, or the Long Island Sound Study (LISS), which calls for the reduction of total enriched nitrogen from point and nonpoint sources by 58.5 percent from the 1990 established base loads (CTDEP 2007).

Description

A key component of Connecticut's Nitrogen Credit Exchange Program is a general permit for nitrogen that includes all participating publicly owned treatment works (POTWs). The general permit establishes annual nitrogen removal limits and sets monitoring and reporting protocols. Facilities that discharge less total nitrogen than the limit established in the general permit will be considered in compliance with the general permit and will be credited for the amount of nitrogen removed beyond the set limit. The Connecticut Department of Environmental Protection (DEP) will purchase all equivalent nitrogen credits generated by facilities that achieve compliance in this way (CTDEP 2003). Alternatively, facilities may achieve compliance by purchasing nitrogen credits from the state (CTDEP 2003).

The general permit accounts for the effects of geographical differences between POTWs with the establishment of attenuation or equalization ratios. These ratios give plants closer to the Sound an "economic incentive to upgrade their facilities and create nitrogen credits, and encourage distant plants to purchase credits" (USEPA 2007).

The Nitrogen Credit Exchange Program does not currently include nonpoint sources in its nitrogen trading program, though the enabling legislation includes provisions that allow the Nitrogen Credit Advisory Board (the regulatory body that oversees the general permit) to consider the "potential and viability of including other nitrogen sources" (CTDEP 2007). DEP conducted an evaluation of the potential for stormwater and nonpoint source trading and found that "the costs to generate a nitrogen credit far exceed those applicable to POTWs" (CTDEP 2007). Also, the difficulty of tracking and monitoring diffuse sources within Connecticut's 169 municipalities create a number of accountability constraints (CTDEP 2007).

Despite these challenges, DEP will continue to explore the possibility of including nonpoint sources in the trading program, most likely as an incentive-based program rather than a free-market approach (CTDEP 2007). The benefits of including stormwater/nonpoint source trading may outweigh potential disadvantages, especially as the price of credits within the program continues to rise over time. "Connecticut and New York are also obligated to meet a stormwater and nonpoint source load allocation under the TMDL and are using Phase II (MS4) permitting programs, CWA section 319 nonpoint source programs, and CZARA Section 6217 coastal nonpoint source programs as the mechanisms to meet the load allocation" (CTDEP 2007). This

may provide further incentive for implementing a stormwater/nonpoint source trading component.

Assessment of How the Approach is Working

After five years of implementation, the program is well underway, and won EPA's first Blue Ribbon Water Quality Trading Leadership Award in 2007 (CTDEP 2008). According to US EPA:

Nearly \$11.6 million in credits have been generated and sold, representing 5,533,686 credits for a net equalized nitrogen removal of 508,626 pounds. The total aggregate equalized load to the Sound has kept pace with Connecticut's reduction goals. The price per pound of nitrogen discharged has ranged from \$1.65 (in 2002) to \$3.40 (in 2006), with an anticipated increase over the next ten years. The economic benefit is realized when considering that 46 municipalities have purchased credits totaling \$11,523,094 (with the state of Connecticut contributing only \$33,017 to the program) to pay 33 municipalities for the sewage treatment plant (STP) improvements that enable those plants to discharge nitrogen at levels below their permitted wasteload allocation (WLA) of nitrogen. This greatly helped toward the aggregate goals of nutrient reduction (USEPA 2007).

Summary of Strengths and Weaknesses

Strengths

- The program provides an innovative approach to achieving water quality goals efficiently and economically (CTDEP 2008).
- The program allows facilities facing higher pollutant control costs to "meet regulatory obligations by purchasing equivalent pollutant reductions (i.e., credits) from other sources that are discharging pollutants below their allotted limits and thus have credits to sell" (CTDEP 2008).
- The program is expected to save the state between \$200 million and \$400 million in wastewater treatment construction costs over the alternative of implementing nitrogen removal projects at all 79 facilities listed in the general permit (CTDEP 2007).

Weaknesses

- The Nitrogen Credit Exchange Program does not currently include a nonpoint source component.

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Dutch Nutrient Trading System

Overview

Agricultural operations in the Netherlands function under manure management regulations established in response to a manure surplus from intensive livestock operations that experienced rapid growth in the 1960s and 1970s. Regulations include a nutrient trading program and other tools and programs to manage manure.

Description

The Dutch Nutrient Trading System was established as part of a suite of manure management policies. In 1984, the Interim Law for Restriction of Pig and Poultry Farms was passed to prohibit new livestock farms in specific regions and limit development in other areas (Wossink 2003). In 1987, the Manure Law and the Soil Protection Act were passed, replacing the Interim Law.

The Manure Law established a cap of 125 kilograms of phosphate per hectare of land from all animal sources (Wossink 2003). The difference between the farm's actual manure production (reference amount) and the assessed acreage-based phosphate rights was used to determine which farms had a manure surplus and which had a manure deficit (Wossink 2003). A deficit farm could increase animal production on the basis of unused land-based manure production rights. For a manure surplus farm, such an increase in production capacity was possible only by buying additional land (Wossink 2003).

Between 1990 and 1998, phosphate limits for manure production were lowered in a series of stages and a subsidized infrastructure was set up for transporting manure from areas with manure surplus to areas with a deficit (Oenema 2004). This period also saw a shift in focus to nitrate in groundwater with the approval of the 1991 EU Nitrates Directive, which aims to reduce pollution caused by nitrogen from agricultural sources, including the potential pollution of groundwater (Oenema 2004).

In 1994, manure production rights became tradable and nutrient accounting became obligatory for both phosphate and nitrogen (Wossink 2003). For each farm, the difference between the land-based quota of 125 kilograms of phosphate per hectare and the farm's reference amount was designated as tradable (Wossink 2003). Regulations for trading these non-land-based quotas were established to limit any increase in swine production (including animal type-based trading rules and geographical trading restrictions), which was perceived to be the source of the most serious environmental problems (Wossink 2003). Also, taxes were placed on nutrient surpluses above the allotted quotas and additional requirements for new buildings were announced with a goal of reducing ammonia emissions (Wossink 2003).

In 1998, policies moved away from quotas, and the Mineral Accounting System (MINAS) (a farm level record of all inputs and outputs of nitrogen and phosphate) and manure application limits based on nitrogen were implemented. MINAS set limits of nitrogen and phosphate that can be applied and taxes any surpluses over those limits (Oenema 2004). This change meant that a farm's legal production capacity was no longer determined by the amount of quota but by its capacity for manure disposal—either by land application (on-site) or by hauling manure to a

crop farm in a deficient region (Wossink 2003). These limits have helped drive up the cost of manure disposal (Oenema 2004).

Assessment of How the Approach is Working

The effectiveness of the manure policies is uncertain. Monitoring programs show nitrogen and phosphate application limits have decreased surpluses and improved nitrogen and phosphate use efficiency by over 50 percent at the farm level within a 15-year period (Oenema 2004). In cattle and dairy farming, reduction in animal numbers can be completely ascribed to factors unrelated to the quota system. During the 15 year period, the quota system for swine and poultry seemed to prevent an increase in animal numbers. Overall, waste production likely would have been 5-10 percent higher without the quota system (Wossink 2003).

The economic costs and administrative burden of the program are quite high—especially for specialized livestock farmers and the government. In 1998 to 2000, dairy farms paid on average 1,000 to 2,000 euro and pig and poultry farms paid 4,000 to 5,000 euro on average (per farm) to account for nitrogen and phosphate surpluses at farm level (Oenema 2004). The administrative costs of the quota system (along with the related manure management policies) are about 44 million euro per year (as of 2003) (Wossink 2003).

Generally, the manure management policies have not been favorably received. The shift to nitrogen and phosphate application limits in the 1990s was met by massive protests from farmers, forcing union leaders to distance themselves publicly from the plan. Environmental organizations, stakeholders, and drinking water suppliers also had concerns about meeting environmental goals (Wossink 2003). In 1993, the Ministries of Agriculture and the Environment and the farmer's union agreed that by 1998 the quota system would become obsolete and replaced by a nutrient accounting scheme at the farm level. Some questioned whether the quota system had to be introduced, and there was friction between farmers and the government (Wossink 2003).

The European Commission has not accepted MINAS as a suitable instrument for achieving the objectives of the EU Nitrate Directive. By the end of 1999, the European Commission brought the Netherlands government to court, which condemned the manure policy. The Netherlands must soon implement new regulations for nitrogen and phosphate compatible with the Nitrate Directive (Oenema 2004).

Summary of Strengths and Weaknesses

Strengths

- Increased economic costs for nutrient application (in the form of the levy's administrative and manure disposal costs) have encouraged farmers to become more efficient in their use of nitrogen and phosphate (especially in the case of animal nutrition), decreasing the average surpluses of nitrogen and phosphate by more than 50 percent in 15 years (Oenema 2004).
- Manure quotas were established to account for differences in livestock type and geographical region to target intensive agricultural practices (such as swine and broiler production) in manure surplus areas.
- The system encourages compliance with a tax penalty.

Weaknesses

- The initial quota over-allocated by 10-25% due to inaccurate data (Wossink 2003).
- Uncertainty in the stability and effectiveness of the policy affected quota market and prices considerably (Wossink 2003).
- Many policy experts placed too much faith in technical solutions and ignored insights provided by ex ante studies; misunderstanding the local agricultural economy weakened the policy (Wossink 2003).
- The policy did not reflect the position of the swine industry as an exposed sector (an industry affected by foreign competition). This became a major bottleneck in the system (Wossink 2003).
- Administration costs for the manure programs are high (about 44 million euro per year) and there might be little environmental benefit (Wossink 2003).
- Many farmers (especially those raising pigs) were unconvinced of the environmental benefits of the policy and were reluctant to adopt the manure management measures. This sector was most affected by the fees and restrictions imposed by the policy (Wossink 2003).

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Maryland Policy for Nutrient Cap Management and Trading

Overview

Maryland's Policy for Nutrient Cap Management and Trading is a voluntary program that allows for identifying and trading nutrient "credits" between point and nonpoint sources. It is designed to accommodate growth while maintaining nutrient caps (MDE 2008).

This trading program, which was developed to help Maryland meet nutrient reduction goals for Chesapeake Bay restoration and TMDL requirements, will be issued in three phases. Phase I (issued in March 2008) addresses trading among point sources, and Phase II (agricultural draft issued February 2009) addresses trading among point sources and nonpoint sources. There are also plans for Phase III, which will address trading among nonpoint sources (MDA and MDE 2008). This fact sheet focuses primarily on Phase II, trading between point and nonpoint sources.

Description

Phase II of the Policy for Nutrient Cap Management and Trading allows point sources to purchase nutrient credits from nonpoint sources. Anticipated buyers include new and expanding point sources that need to acquire credits to achieve their baselines once they have met their minimum requirements (MDE 2008).

Nutrient loads are calculated on a watershed scale. Geographical boundaries of trading are based on three large watersheds or "trading regions" that include the Potomac, Patuxent, and Eastern Shore and Western Shore tributary watersheds (including the Susquehanna watershed). Pollutant reductions will be calculated within these defined regions to ensure that baseline requirements are met (MDE 2008).

Key principles of Phase II include the following (MDA 2008):

- 1) Any generator of agricultural nonpoint source credits must first demonstrate that they have met the baseline water quality requirements of their watershed. These include the minimum level of nutrient reductions outlined in the Tributary Strategies of the applicable TMDL requirements.
- 2) Agricultural generators must be in compliance with all local, state, and federal laws, regulations, and programs. The credit generator and trade can not cause or contribute to water quality effects locally, downstream, or bay-wide.
- 3) Those portions of best management practices (BMPs) funded by federal or state cost share can not be used to generate credits during the life span of the project. However, credits derived from practices implemented with the sellers out of pocket share are eligible after the effective date.
- 4) The Agricultural Trading Program is not intended to accelerate the loss of productive farmland. Therefore, credits will not be generated under this policy for the purchase and idling of whole or substantial portions of farms to provide nutrient credits for use off site.

- 5) Trades must result in a net decrease in loads. A portion of the agricultural credits generated in a trade will be retired and used to achieve Tributary Strategies or TMDLs. The other portion becomes tradable credit.
- 6) An agricultural practice can only generate credits once it is installed or placed in operation.

“Tradable credits can be generated from any planned agronomic, land conversion, or structural practice that is shown to reduce nutrient loadings below the applicable baseline” (MDA 2008). These credits are determined using BMP efficiency rates, using the latest science and technical information (MDA 2008). The three categories of credit-generating practices include the following (MDA and MDE 2008):

- 1) BMPs with “approved” load reductions
- 2) BMPs requiring technical review
- 3) Other BMPs, practices, or innovative approaches

The Maryland Department of the Environment (MDE) intends to create a central trading registry to post, track, and market agricultural credits once certified (MDA 2008).

Assessment of How the Approach is Working

Very little information is currently available on the effectiveness of the program. This policy is still in its infancy and additional time is required to fully appreciate its effectiveness in managing nutrient loading in Maryland waters.

Summary of Strengths and Weaknesses

Strengths

- The Policy is designed so that trading is not available as a substitute for required upgrades to waste water treatment plants (WWTP). Nutrient reductions achieved through these upgrades must be maintained regardless of nutrient trading activity (MDE 2008).
- The Policy provides financial incentive for nonpoint sources to install and maintain BMPs to reduce nonpoint source pollution.
- Phase II provides an alternate way for point sources to reduce nonpoint source pollution and meet reduction targets.
- This program allows for continued growth despite fixed nutrient caps (MDE 2008).

Weaknesses

- Because the program is in its early stages, there is not enough information to determine its effectiveness to control nutrients and maintain growth.
- The program is voluntary, especially for the agriculture community.
- Changes in agronomic practices (such as crops grown) may have an impact on the effectiveness of the program.

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Ohio Water Quality Trading

Overview

Ohio's water quality trading rules include provisions for establishing a water quality trading program in Ohio. Water quality trading is a "voluntary program that allows National Pollutant Discharge Elimination System (NPDES) permit holders (point sources) to meet regulatory obligations by using pollutant reductions generated by another wastewater point source or nonpoint source" (OEPA 2007).

Description

Ohio's water quality trading rules establish requirement that water quality trading activities can only happen with an approved water quality trading management plan (the rules set forth timelines and procedures for the submittal of water quality trading management plans for trading activities already in effect) (OAC 2007).

The goals of Ohio's Water Quality Trading Rules include the following (Stuhlfauth 2008):

- Facilitate watershed-based approaches to improving water quality.
- Improve water quality and minimize the costs of achieving and maintaining water quality standards.
- Provide economic incentives for voluntary pollutant reductions from point and nonpoint sources.
- Achieve additional environmental benefits beyond pollutant reductions, such as restoring natural flow patterns, improving aquatic habitat, increasing the ability of streams to process certain pollutants, and creating stream buffers and shading.

The water quality trading rules are voluntary, so an NPDES permit holder will be affected by the rules only if the permittee decides to participate in a water quality trading program. Participating in a water quality trading program gives permit holders an alternate means of complying with permit limits that could result in cost savings when compared to installing additional treatment capabilities at the wastewater treatment plant. These water quality trading rules provide "an opportunity for point sources and nonpoint sources to work together in mitigating water quality impacts within their watershed" (OEPA 2007).

Current Water Quality Trading Activities in Ohio

Great Miami River Basin—This is a wastewater-scale program with the Miami Conservancy District acting as a third party broker. Wastewater treatment plants will participate by funding nonpoint source nutrient reduction projects in the Stillwater River sub-basin. There is an approved TMDL for the Stillwater basin. A TMDL for the Great Miami River mainstem is projected for 2013 (Stuhlfauth 2008).

Sugar Creek, Tuscarawas River Basin—The Alpine Cheese Company installed treatment for part of its required phosphorus reduction. They will fund nonpoint source projects to generate credits for the remainder of the reduction. The Holmes County Soil and Water Conservation District will act as third party broker. There is an approved TMDL for this area (Stuhlfauth 2008).

Upper Little Miami River Basin—Provisions that allow trading to meet Phase 2 phosphorus reductions are included in the NPDES permits of wastewater treatment plants. There is an approved TMDL for this area. Greene County may use a point source/point source trade and a point source/nonpoint source trade to achieve TMDL limits (Stuhlfauth 2008).

Assessment of How the Approach is Working

The water quality trading rules have only been in effect for a little over a year, so there has not been much time to develop a good understanding of how the program is functioning. The new rules, however, should make it easier for future development of water quality trading programs in Ohio, as the rules establish common procedures and regulations that can lead to a systematic and coordinated approach to water quality trading.

Summary of Strengths and Weaknesses

Strengths

- The water quality trading rules support the development of water quality trading programs in Ohio and accommodate programs already in effect, stipulating timelines for existing programs to adjust to the new regulations (OAC 2007).
- The rules accommodate the generation of credits from both point and nonpoint sources of pollution (OAC 2007).
- The rules allow for a great deal of flexibility—each new program can establish its own baselines and trading ratios, for example, allowing for customization to different circumstances (OAC 2007).
- The rules include provisions for establishing a public participation process, allowing for open participation in the planning process (OAC 2007).

Weaknesses

- Flexible rules may cause discrepancies in how trading is managed by different groups.

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Pennsylvania Nutrient Trading Program

Overview

The voluntary Pennsylvania Nutrient Trading Program (the Program), modeled after the national emissions cap and trade programs, helps maintain and improve water quality using market mechanisms to reduce nutrients at lower costs. Trading can take place between any combination of eligible point sources, nonpoint sources, and third parties. Currently trading can only occur in the Susquehanna and Potomac River Watersheds, and only total nitrogen, total phosphorus, and total sediment reduction credits can be traded (PADEP 2008).

Description

In December 2006, the Pennsylvania Department of Environmental Protection (PADEP) issued the *Final Trading of Nutrient and Sediment Reduction Credits—Policy and Guidelines*, which provided guidance for the Program (Commonwealth of Pennsylvania 2008). The Program is a voluntary mechanism that is subordinate to applicable laws and regulations.⁴ It allows point and nonpoint sources that meet their environmental obligations to generate credits, which can then be traded to others who are in need of nutrient reduction credits. The trading program is operated through a joint effort between the Central Office and Department Regional Offices (PADEP 2006).

For a point source to generate and sell credits, a facility must operate below the discharge loading limits set in its National Pollution Discharge Elimination System (NPDES) permit. These “credits” can be purchased by another facility who cannot meet its discharge requirements (due to various reasons, including holding off upgrades to technology for a future date). Credits can also be generated by nonpoint source dischargers, such as farmers. To be eligible, a farmer implements one of 24 established best management practices (BMPs) that are calculated into credits (PADEP 2006; PADEP 2007).

The Program allows the trading of nitrogen, phosphorus, and sediment under the following principles: “(1) trades must involve comparable credits (e.g., nitrogen must be traded for nitrogen); (2) trades must be expressed as mass per unit time (e.g., pounds per year); (3) trades can occur only between eligible parties; and (4) credits generated by trading cannot be used to comply with existing technology-based effluent limits except as expressly authorized by federal regulations” (PADEP 2006).

The process for approving and tracking nutrient credits is as follows (PADEP 2006; PADEP 2008):

Certification

- Dischargers seeking credit approval will use pre-approved calculation methods to calculate their credits. For nonpoint sources, PADEP expects that proposals will contain scientifically-recognized methods to demonstrate nutrient and sediment reductions.
- Submittal of a proposal by the discharger.

⁴ Pennsylvania Clean Streams Law (35 P.S. §§ 691.1 –691.1001); Federal Water Pollution Control Act (33 U.S.C.A. §§ 1251 - 1387); 40 CFR Part 122; and 25 Pa Code Chapters 92, 93 and 96

- Proposals will be reviewed by a panel of PADEP and selected experts for technical acceptability and consistency with the Program, policy, and legal requirements.
- PADEP will make a determination, and if credits are approved, PADEP may include conditions that must be met before registration of a trade

Verification

- A Verification Plan is submitted by the discharger (annually) with documentation that nutrient reduction activities have taken place.
- PADEP (or approved third parties) use a combination of record keeping, monitoring, reporting, inspections (including site-visits), self-certifications, and compliance audits to ensure that the credit-generating obligations are being met.

Registration and Tracking

- Credits must be approved by PADEP and are registered before a trade can occur. PADEP uses an online marketplace tool such as *NutrientNet* (<http://pa.nutrientnet.org>) to assist with the registration, tracking and application of credits. *NutrientNet* is an online application that includes estimation tools to calculate the amount of credits needed or generated by a particular practice, and where users can buy or sell credits.
- PADEP register credits annually and provide credits with registry number for reporting and tracking purposes.

Assessment of How the Approach is Working

The trading program is a relatively new program, and its guidelines (*Trading of Nutrient and Sediment Reduction Credits — Policy and Guidelines*) were finalized in December 2006 (PADEP 2008). As of August 2008, 57 proposals have been submitted for review. Thirty two proposals have been approved for 702,892 nitrogen credits, 80,072 phosphorus credits, and 35,593 sediment credits (Reuters 2008). Although there are real-time updates of registered credits on *NutrientNet*, as well as on state *Bulletins* (e.g., Commonwealth of Pennsylvania 2008), which seem to be posted irregularly, there seems to be little publicly available information on program effectiveness, or whether any specific problems have been encountered. On its Web site, PADEP has posted some questions and comments that have been received about the program, such as a few from the Citizens Advisory Council (PADEP 2005).

Summary of Strengths and Weaknesses

Strengths

- Reduction of transaction costs through the use of *NutrientNet* (WRI 2007).
- *NutrientNet* allows PADEP to track projects, credits, and trades (WRI 2007).
- Standardized calculations of nonpoint source credits (WRI 2007).
- Market mechanisms create efficient and effective means of solving environmental challenges.
- The Program creates flexibility to meet legal requirements, especially conducted on a watershed basis.
- Public participation/oversight: *NutrientNet* allows market activity be seen by the public (WRI 2007).
- The Program creates a monetary incentive for NPS nutrient reductions for dischargers.

Weaknesses

- Difficulty trading between point and nonpoint sources. It is easy to quantify and monitor point sources; this is more difficult for nonpoint sources.
- No mandatory monitoring program: one reason the national emissions cap and trade programs are successful is because all dischargers are obligated to reduce emissions while they are held accountable through monitoring. It is difficult to “measure” efforts when the program is voluntary.
- Accuracy of nutrient reductions: there is no checking mechanism to see if the credits calculated through the model is accurate.
- Equity issues for POTWs: POTWs have to meet required reductions and then apply for credits, while nonpoint sources do not have that initial requirement. This may not be equitable (PADEP 2005).
- “Fairness” is difficult to determine in some cases. For instance, if the landowner has received public money (e.g., from the federal Farm Bill money) to implement BMPs then sells credits created by those BMPs, that farmer might have a financial advantage (PADEP 2005). There should be a guideline to prevent farmers from selling credits in addition to receiving public money.
- Retiring of credits: There seems to be no formal, publicly available guideline to retire credits.
- There is little publicly available information about the Program or Program results.

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California Nonpoint Source (NPS) Program

Overview

The California State Water Resources Control Board (SWRCB), the nine state Regional Water Quality Control Boards (RWQCBs), and the California Coastal Commission (CCC) are the lead state agencies for implementing the Nonpoint Source (NPS) Pollution Control Program through the *Plan for California's Nonpoint Source Pollution Control Program*. The purpose of the NPS Pollution Control Program is to improve the state's ability to effectively manage NPS pollution (SWRCB 2009).

Description

Under the California Porter-Cologne Water Quality Control Act, the NPS Pollution Control Program addresses both surface and ground water quality. The program achieves its goals through several means (SWRCB undated a):

- Watershed-based approaches with management measures consisting of site-specific management practices.
- Implementation and enforcement through California's *NPS Implementation and Enforcement Policy*.
- Public education and technical information through workshops on the most current management techniques.
- Financial and technical assistance for projects and programs that address NPS pollution, land use, and watershed management.
- Tracking, monitoring, and assessing the effectiveness of management measure implementation.

Funding sources for the NPS Pollution Control Program include California bond funds and Clean Water Act section 319 grant funds that support development and implementation of watershed management and total maximum daily load (TMDL) plans; implementation of management measures and practices; and education and technical assistance on NPS pollution problems and solutions (SWRCB undated a).

The NPS Pollution Control Program identified six categories of land use that contribute to NPS pollution—agriculture, forestry (silviculture), urban, marinas, hydromodification, and wetlands/riparian areas. The Program partners with more than 20 other state agencies that have programs in the six land use categories (SWRCB undated a).

NPS pollution control activities that fall under the NPS Pollution Control Program must meet the requirements of the following five key elements described in the *Policy for Implementation and Enforcement of the NPS Pollution Control Program*. Each activity must be endorsed or approved by the appropriate RWQCB and include the following (SWRCB undated b).

- The purpose and a method to address NPS pollution control in a manner that achieves and maintains water quality objectives.

- A description of the management practices (MPs) and other program elements, along with an evaluation program that ensures proper implementation and verification.
- A time schedule and quantifiable milestones (as required by the RWQCB)
- Feedback mechanisms so that the RWQCB, dischargers, and the public can determine whether the implementation program is achieving its stated purpose(s), or whether additional or different MPs or other actions are required.

Each RWQCB shall make clear, in advance, the potential consequences for failure to achieve an NPS implementation activity's objectives, emphasizing that it is the responsibility of individual dischargers to take all necessary implementation actions to meet water quality requirements.

Overall NPS Pollution Control Program accountability is critical to reassure the public of the state's commitment to deal with NPS pollution. The *Nonpoint Source Program Strategy and Implementation Plan* contains actions that will result in consistent and timely evaluation and reporting of the Program's progress in effectively dealing with NPS pollution. This includes annual, biennial, and 5-year reporting cycles and the use of internet-based interactive information tools. There is also public participation through: (1) development of 5-year implementation plans; (2) tracking the implementation of and assessing effectiveness of management measures; (3) use of public reports; (4) expanded volunteer monitoring and education programs; (5) use of the internet; and (6) expansion of public outreach workshops (SWRCB 2000).

Assessment of How the Approach is Working

Annual, biennial, and 5-year progress reports on the Program, as well as a list and description of funded projects and its progress are posted on the internet on a regular basis, which helps the public assess whether the projects are working. More detail could be provided for each project on the SWRCB site.

Summary of Strengths and Weaknesses

Strengths

- Information is shared with the public. Regular online updates and lists of success stories of the Program through reports and individual projects help keep the public informed about ongoing activities.

Weaknesses

- From available information, it is unclear whether projects have been successful or not, and what would make them better.

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Iowa Onsite Wastewater Loan Program

Overview

The Onsite Wastewater Systems Assistance Program (OSWAP) offers low-interest loans through participating lenders to rural homeowners for replacement of inadequate or failing septic systems (IFA undated). OSWAP was created to help replace outdated septic systems that still dump untreated wastewater from household septic tanks to open ditches or underground tile lines that flow directly to streams, rivers, lakes, or fractured bedrock (Iowa DNR undated a).

Description

OSWAP is one of four financing programs through the Iowa Water Quality Loan Fund, the NPS fund of the Clean Water State Revolving Fund (CWSRF), which helps Iowans address NPS water quality problems (Iowa DNR undated b). The Iowa Department of Natural Resources (DNR) administers OSWAP in cooperation with County Sanitarians, and the Iowa Finance Authority (IFA) acting as the financial agent (IFA undated).

The program funds the replacement of outdated septic systems with approved onsite systems, which include both a septic tank and a secondary treatment system, such as a leachfield (Iowa DNR undated c). According to Iowa law, all septic systems must have a secondary wastewater treatment system following a septic tank (Iowa DNR undated a). All costs directly related to the repair, rehabilitation, or replacement of an onsite treatment system are eligible, including costs directly related to the design, permitting, and construction of the onsite wastewater system. Costs for removing existing structures, earth moving, and any land purchases directly related to proper wastewater treatment are also eligible. Ineligible costs include additional earthwork, reseeding, replanting, and maintenance or monitoring costs (IFA undated).

The following conditions must be met in order to obtain a grant (IFA undated; Iowa DNR undated d):

- Homeowners must reside in a participating county listed on the Iowa DNR site.
- Homeowners begin the OSWAP loan process by obtaining a septic construction permit from the County Sanitarian after a preliminary site evaluation and approval.
- An OSWAP approval form must be completed by the homeowner (loan recipient).
- Homeowners apply online for a loan through a participating lender. Loan amounts can finance up to 100% of project costs starting at \$2,000 and up, and the loan terms can be up to 10 years. The interest rate charged does not exceed 3%. Loan applicants must be credit-worthy and apply for a loan through participating lenders.
- After the project has been completed, inspected, and certified by the County Sanitarian, DNR must approve the project and loan amount online and then IFA approves the loan.

As of August 2009, Iowa had made 892 loans in 78 counties for a total of \$6.1 million (Iowa DNR undated a).

Assessment of How the Approach is Working

There is not a great deal of publicly available information on how the program is working. Based on the information available online, an estimated 100,000 septic systems in Iowa do not meet the standard. Funding is available for virtually all of the remaining substandard systems to be upgraded.

Summary of Strengths and Weaknesses

Strengths

- The Program is a source of low-cost financing available to landowners. This opportunity is available specifically to assist and encourage landowners to address nonpoint source pollution of Iowa streams and lakes.
- Applications are accepted any time of the year and turnaround time is quick (characteristic of CWSRF) (IDALS undated).
- Quick loan processing and friendly loan repayment terms let borrowers implement projects done right away (characteristic of CWSRF) (IDALS undated).
- Significant cost savings: interest rates are lower than those from other financing sources (characteristic of CWSRF) (IDALS undated).
- Complements other funding sources: can be used to provide project share costs for other funding sources (characteristic of CWSRF) (IDALS undated).

Weaknesses

- There is little publicly available information about the program's direct impacts on water quality. Monitoring data before and after the implementation of the program may be one way to show that the program has been successful. Monitoring for septic system constituents alone is not financially feasible and monitoring for indicators is hampered by the agricultural nature of Iowa.
- Enforcement issues: although it is Iowa's state regulation that all septic systems must have a secondary wastewater treatment system following the septic tank, it is unclear how the state can enforce this regulation unless a homeowner knows that his septic system is failing and needs to be replaced.
- Iowa has instituted a time of transfer septic system inspection program beginning July 1, 2009. This new law requires every building with a septic system have that system inspected prior to the transfer of the deed. This has dramatically increased the number of sub-standard systems being repaired and also provided an effective new public information tool about what constitutes a legal septic system. Many homeowners have chosen to fix their sub-standard systems prior to selling their homes.

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North Carolina Community Conservation Assistance Program (CCAP)

Overview

The Community Conservation Assistance Program (CCAP), patterned after the NC Agriculture Cost Share Program, is a voluntary, incentive-based program designed to improve water quality through the installation of various best management practices (BMPs) on urban, suburban, and rural lands that are not directly involved with agricultural production. The Agriculture Cost Share Program has a similar structure but only targets agricultural operations (NCDENR undated). The CCAP provides educational, technical, and financial assistance to landowners through local soil and water conservation districts (SWCDs) (NCDENR undated).

Description

Established in 2006, the CCAP is a grant funded program that enables local SWCDs to help landowners install practices to address erosion control, stormwater, flooding, drainage, stream restoration, and other land and water quality concerns (NCASWCD 2009). CCAP efforts focus on retrofitting stormwater BMPs on existing land uses; the program is not used to assist new development sites to meet state and federal stormwater mandates (Hunt et al. undated). Support can go to eligible landowners (e.g., homeowners, businesses, schools, parks, churches, and community groups) on sites that have been developed for a minimum of three years (NCDENR undated).

Applications for CCAP funding must be submitted to local soil and water conservation districts. They are then ranked based on local water quality priorities. If an applicant is deemed eligible, a conservation plan is prepared by local SWCDs for BMP installation (a landscaper may also prepare plans) (NCDENR undated).

The CCAP may provide funding of up to 75 percent cost share to eligible applicants to implement BMPs (up to \$50,000) and funding to provide up to 50 percent cost share to local soil and water conservation districts for technical employees to assist with design and installation oversight and to administer the program locally (NCASWCD 2009).

Assessment of How the Approach is Working

The CCAP is intended to operate under the same guidance and accountability as the highly successful North Carolina Agriculture Cost Share Program and achieve the same success (Hunt et al. undated).

Since its inception in 2006, the CCAP has grown dramatically. In fiscal year 2007 the program was available in 17 districts. In fiscal year 2008, the program grew to include 40 districts. In fiscal year 2009 the CCAP is available in 65 districts (NCASWCD 2009). Additional funding was requested in 2009 to increase the budget by \$3.4 million for program assistance and to add an additional position in the Division of Soil and Water Conservation offices to provide program support (NCASWCD 2009).

Summary of Strengths and Weaknesses

Strengths

- The CCAP encourages local governments, individual landowners, and businesses to voluntarily incorporate stormwater BMPs by providing a source of funding and technical support (Hunt et al. undated).
- In addition to providing significant water quality benefits, several of the approved practices (e.g., cistern rain gardens/bioretention areas) have the added benefit of enabling reuse of runoff from impervious surfaces or other desirable uses. Other practices increase infiltration of rainfall, thereby increasing the resiliency of water supplies (e.g., impervious surface conversion, permeable pavement) (NCASWCD 2009).
- The presence of a statewide CCAP coordinator had helped the program's development and growth throughout the state (NCASWCD 2009).
- Projects are ranked and assessed based on water quality priorities.
- The CCAP addresses a lower profile source of nutrients.

Weaknesses

- At this time, not all districts are eligible for funding, though allocations have increased each year since the programs inception (NCASWCD 2009).
- The program only applies to retrofits, and does not provide support for new development (Hunt et al. undated).
- At this time, many of the eligible CCAP practices, such as stormwater wetlands and impervious surface conversion to permeable pavement, require engineering designs that can not be met with the limited existing engineering resources in the Division of Soil and Water Conservation (NCASWCD 2009).
- The program lacks a specific goal.
- The program does not address all sources within a sector.
- If an applicant sells property that contains a cost shared BMP during the maintenance period (the specified minimum life of the practice), they are required to repay the state a pro-rated amount of the original cost or arrange for the buyer to assume the maintenance of the BMP (NCDENR 2007).
 - Any conversion from the intended use of the BMP during the maintenance period will require the operator to repay the state a pro-rated amount of the original cost share payment.
 - Damaged BMPs may or may not negate the cost share agreement (depends on circumstances).

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Wisconsin's Priority Watershed and Priority Lake Program

Overview

The Priority Watershed and Priority Lake Program, outlined in Wisconsin Department of Natural Resources (WDNR) regulation chapter NR 120, Wisconsin Administrative Code, provides financial assistance to local governments in priority watersheds to address land management activities contributing to rural runoff. WDNR issues grants for implementing watershed and lake projects through a cost-share approach. Grantees use funds to reimburse costs to landowners for installing voluntary best management practices (BMPs) (WDNR undated a). The program is a joint effort of WDNR; the Department of Agriculture, Trade, and Consumer Protection (DATCP); the University of Wisconsin Extension (UWEX); counties (usually through Land Conservation Departments); municipalities; and lake districts with assistance from a variety of federal, state, and local agencies.

Description

The nonpoint source (NPS) priority watershed grant program provides funds to prevent or eliminate NPS water pollution in existing, designated priority watershed projects in Wisconsin. The program was originally designed to address both urban and rural runoff however, in the mid 1990s the Urban Nonpoint Source and Storm Water Management Grant Program was established to address urban runoff.

To select projects, the Wisconsin Land and Water Conservation Board developed watershed-ranking criteria by ranking streams, lakes, and groundwater separately (by watershed) by high, medium, or low priority (WDNR undated b).

Potential local sponsors in watersheds with high priority ranking were notified of watershed project eligibility and, if interested, they submitted an application to WDNR. Final designation of projects was granted by the Land and Water Conservation Board (WDNR undated c). Once a priority watershed was designated, funding was provided to support local staff and conduct extensive land use inventories and detailed water resources appraisals. Following the initial planning process, watershed plans were implemented locally, with WDNR providing up to 70 percent cost sharing for the installation of BMPs. Implementation of priority watershed plans generally occurs over a 10 to 12 year period (WDNR undated b).

Priority watershed/lake project goals focus on water quality improvements or protection from reductions in pollutant levels delivered to streams, rivers, and lakes. Each year, grantees submit reports to WDNR showing progress made towards meeting pollutant reduction goals in the watersheds/lakes. For a given project, information may be submitted as reductions in sediment or soil loss from uplands, streams, gullies, and phosphorus reductions from barnyards and croplands. Other projects focus on protecting shoreline and habitat in a watershed or lake (WDNR undated a). Some BMPs used in priority watershed projects include:

- In cropped fields: contour strip cropping, changes in crop rotations, reduced tillage methods, nutrient management, and pesticide management.

- In eroding or trampled stream banks: shaping and reseeding, fencing to restrict cattle access, alternate livestock watering locations, controlled grazing, and rip-rap.
- In animal feedlots: upslope diversion berms, filter walls, and vegetated filter strips.

While the vast majority of practices installed within a watershed are done so on a voluntary basis, in 1993 a regulatory component was introduced. These regulations required the identification of critical sites within the watershed where BMP implementation was most necessary to achieve desired runoff reduction. During implementation, local project managers work closely with landowners that have sites that meet the critical site criteria in the watershed plan to obtain pollutant loading reductions. Operators had three years to accept cost-sharing to fix the problem or they were required to fund BMP implementation themselves. After three years, operators could be subject to enforcement (Holden 2009, personal communication).

Assessment of How the Approach is Working

As of 2007, 93 percent of the critical sites in the priority lake and watershed areas had been resolved with little need for enforcement (Holden 2009, personal communication). As of early 2009, the program has resulted in projects reaching 67 percent of its phosphorus reduction goals, 61 percent of its sediment reduction goals, and 74 percent of the streambank/shoreline sediment reduction goals (Holden 2009, personal communication). The program is currently closed to new applicants, however, and the program will end December 31, 2009 (WDNR undated c).

Summary of Strengths and Weaknesses

Strengths

- Program addressed both agricultural and urban NPS pollution (Holden 2009, personal communication).
- Program took a targeted approach; projects were selected based on watershed priority (with additional targeting of critical areas), maximizing effectiveness of state and federal dollars (Holden 2009, personal communication).
- Program emphasized the development of partnerships, giving each project a broad stakeholder base and increasing potential sources for financial and technical assets.
- Funding was provided to support local Land Conservation Department staff, strengthening local resources.
- Program took a watershed approach, which was more comprehensive and efficient than a project-by-project deployment of money and staff (Holden 2009, personal communication).
- Each project went through a lengthy planning process (2 years on average) that provided a detailed plan for future project implementation and building a knowledge base for subsequent efforts (Holden 2009, personal communication).
- Project implementation occurred over 10 to 12 years, giving ample time for course correction and providing project continuity.
- This program was largely voluntary and little enforcement was necessary to achieve watershed goals.

Weaknesses

- The program was very expensive, costing over \$200 million for 86 projects (Holden 2009, personal communication).
- Early on, the program put too much emphasis on concrete structures (e.g., barnyards), with limited public benefit. Little attention was given to cropland and streambank/lakeshore erosion control practices that are less costly and serve a greater public good but are harder to “sell” to a producer. This misplaced focus was partly due to the type of funding that could be used for hard practices (e.g., manure storage systems). Later in the project additional funding was allocated for “soft practices,” such as nutrient management and soil erosion control practices (Holden 2009, personal communication).
- Before the critical site element was added, the voluntary approach allowed some of the worst sites to go untreated if landowners refused to cooperate (Holden 2009, personal communication).
- Watersheds were often too large to be relevant to all landowners. People living far from targeted waterbodies felt less incentive to change. It also took a long time for changes to manifest and required high participation rates to see a difference in water quality (Holden 2009, personal communication).
- The last watershed project was designated in 1995. The program will end December 31, 2009.

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CAFO/AFO Nutrient Management

Overview

This accountability measure is based on regulatory mechanisms under the Clean Water Act for Concentrated Animal Feeding Operations (CAFOs) and state programs for smaller animal feeding operations (AFOs). Nutrient management plans (NMPs) provide the implementation mechanism in NPDES permits to ensure nutrients from CAFOs are not being discharged.

Description

CAFO facilities that discharge or propose to discharge are required to seek NPDES permit coverage. The most recent iteration of the national regulations for the permitting of CAFOs was signed on December 22, 2008. In determining if a facility is required to seek permit coverage, the facility's owner/operator will assess the CAFO's design, construction, operation, and maintenance to determine if the facility is discharging from or will discharge from its production area or land application area to waters of the U.S. Owner/operators are also given the voluntary option of certifying that the facility is a no discharge facility. Permitted or certified facilities are not liable under § 122.23(d)(1) duty to apply, and only permitted discharges (those authorized by a NPDES permit) or discharges defined as agricultural stormwater (precipitation-related discharges from facilities land application area) are allowed (USEPA 2008).

Those facilities seeking permit coverage must develop a Nutrient Management Plan (NMP), the terms of which must be incorporated into the NPDES permit, and thus subject to permitting authority review and public comment. Terms of the NMP to be incorporated into the NPDES permit "are the information, protocols, best management practices, and other conditions" necessary to meet the requirements of 40 CFR 122.42(e)(1), and in addition for large CAFOs the best management practices necessary to meet the requirements of 40 CFR 412.4(c) (USEPA 2008). Specifically, terms of the NMP would need to demonstrate the facility has the structural design capacity to meet the storage requirements imposed by the volume of manure, litter, and process wastewater generated from the facility. Those facilities applying manure, litter, and process wastewater must incorporate specifics regarding the fields available for land application, the rates of application, and the timing limitation for application (USEPA 2008).

Assessment of How the Approach is Working

Permitted CAFOs are required to submit annual reports detailing how the facility has achieved substantive compliance with the terms of the NMP. Annual reporting requirements include total amount of generated waste, amount of waste transferred, the facility's total land application acreage, total acreage utilized, specific crops planted, yields for each field, the nitrogen and phosphorus content of all waste land applied, the total amount of waste applied to each field, and a summary of production area discharges (USEPA 2008).

The 2008 Final CAFO Rule estimated annual pollution reductions of 56 million pounds of phosphorus and 110 million pounds of nitrogen. EPA utilized Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) model, which relies on information on soil characteristics and climate, along with characteristics of the applied manure and commercial

fertilizers, to estimate losses of nutrients in surface runoff, sediment, and ground water leachate (USEPA 2008).

Specific state programs vary, though all have one year from EPA's 2008 Final CAFO Rule effective date of December 22, 2008, to revise their NPDES requirements to adopt the requirements of the 2008 Rule. States, such as New York, utilize inspectors for random and complaint-based CAFO investigations to determine compliance with state and federal water quality regulations, and to determine the adequacy of a facility's waste management system (NYDAM 2003). Illinois develops statewide annual reports summarizing yearly activities of the state regarding CAFO enforcement and compliance. This information includes facility specifics, such as the number/type of animals, as well as waste management structures and regulatory violations. The reports may detail water pollution concerns, facility specific sources of water pollution, and measures taken by facilities to correct pollution sources (IEPA 2006).

California has achieved substantive compliance with its CAFO/AFO permitting program for dairy by utilizing the California Dairy Quality Assurance Program (CDQAP), which provides dairy operators training and technical assistance. To help offset programmatic costs, the state requires permitted facilities to pay a surcharge in support of the states' Surface Water Ambient Monitoring Program (SWAMP), and pay an annual fee based on a facilities' animal population that ranges from \$200 to \$4,000. California's permitting program also includes groundwater monitoring provisions in some facilities' permit conditions (CEPA 2007). Oregon's CAFO/AFO permitting program has been in effect since the 1980's, and currently is under the authority of the Oregon Department of Agriculture (ODA), which recently implemented a NPDES permitting program. Permitted facilities are inspected, on average, once a year to determine permit compliance, and any violations require the formulation of a compliance schedule. Facilities implementing a compliance schedule will often receive routine visits by state inspectors. Oregon also utilizes a complaint based inspection system, in which facilities with validated complaints will be inspected and any problems relating to the complaint rectified (ODA 2009).

Wisconsin's Department of Natural Resources (WDNR) began regulating the handling, storage, and application of wastes from CAFOs/AFOs in 1984. All facilities with greater than 1,000 animal units are permitted via Wisconsin Pollutant Discharge Elimination System (WPDES) Concentrated Animal Feeding Operation permits. Smaller facilities are not permitted, but like larger facilities, they are required to follow agricultural performance standards and the state's four Manure Management Prohibitions. The state also utilizes complaint-based inspections to address water quality issues, with regulatory action being taken on any facilities found to be discharging. The state provides both technical and financial assistance (cost-share programs) to help facilities address water quality issues (WDNR 2008).

Summary of Strengths and Weaknesses

Strengths

- NMP approach is flexible to accommodate dynamic conditions associated with agriculture.
- Annual reporting requirements ensure permitting authority oversight and public involvement.
- Terms of the NMP are flexible to accommodate changing facility conditions but specific enough to ensure adequate nutrient management.

- Based on estimated annual nutrient reduction loads, program will achieve a significant reduction in the amount of nitrogen and phosphorous reaching U.S. waters.
- Voluntary certification option allows CAFO facilities to certify they do not discharge via submission of a signed certification option after an objective assessment of the facility by the owner/operator.
- States are able to modify CAFO permitting programs to satisfy state-specific needs and concerns.
- Successful permitting of a traditionally nonpoint source industry via modified NPDES permitting.

Weaknesses

- Site-specific inspections are resource intensive.
- Legislative history has promoted confusion and atmosphere of inaction among states and producers, as stakeholders await further litigation.
- No nationwide assessment of programmatic success or goals to judge water quality and pollution reduction programmatic success; success seems measured more by administrative outcomes (number of facilities permitted) rather than environmental outcome-based performance.
- Large degree of variability among states regarding enforcement and compliance actions, including frequency and reasons prompting facility inspections.
- Receiving water monitoring is not explicitly required by the 2008 CAFO Final Rule; principal focus is to monitor land application (e.g., routine soil testing, determining nutrients in land-applied wastes).

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California Agricultural Water Quality Grant Program

Overview

The Agricultural Water Quality Grant Program (AWQGP) provides grants to eligible recipients for projects that reduce or eliminate the discharge of nonpoint source pollution (NPS) to surface waters from agricultural lands (SWRCB 2007).

Description

The AWQGP is administered by the State Water Resources Control Board (SWRCB) and given to public agencies and non-profit organizations (SWRCB 2007). Funding sources for the AWQGP include state bond monies and Clean Water Act (CWA) section 319 funds listed below.

- State Proposition 40 and 50: Coastal Protection Act of 2002 (Proposition 40) and Coastal and Beach Protection Act of 2002 (Proposition 50) were passed in 2002 by California voters. The propositions authorized the sale of bonds to finance a variety of resource programs, including the AWQGP. Under Proposition 40 and 50, grants are available for \$11.4 million and \$29.5 million, respectively, for agricultural water quality improvement through monitoring and implementation of NPS management measures and practices (SWRCB and RWQCB 2004).
- State Proposition 84: Starting in fiscal year 2007–2008, \$15 million has been allocated for AWQGP (DOF 2008).
- Federal CWA Section 319: Under section 319, EPA provides funding to SWRCB to support implementing the *Plan for California's Nonpoint Source Pollution Control Program* (NPS Program Plan). The SWRCB uses some of the section 319 funds to provide grants for NPS implementation projects. Approximately \$5.5 million is available under this funding source (SWRCB and RWQCB 2004).

To further define and identify the source of water quality problems related to agriculture, the state uses funds outlined under Proposition 40 for surface water quality monitoring projects, referred to as Project Planning Monitoring. These projects must be used to develop a plan to implement appropriate management measures to address the identified water quality problem. Proposition 50 and section 319 monies are used to fund implementation projects that demonstrate immediate and long-term improvements to surface water quality (SWRCB and RWQCB 2004).

Proposals are evaluated in two stages. First, SWRCB and Regional Water Quality Control Board (RWQCB) staff review all proposals for completeness and eligibility, and then rank them for funding priority. Second, SWRCB request technical assistance for proposal review from agencies including RWQCB, USEPA, USGS, and external agencies⁵. All eligible proposals undergo a thorough review and ranking process by which the appropriate funding source is determined. All

⁵ The SWRCB requests technical assistance for proposal review from the state and federal agencies including: California Department of Pesticide Regulation; California Department of Water Resources; California Department of Food and Agriculture; UC Cooperative Extension; USEPA, United States Geological Survey; and United States Department of Agriculture.

projects must be consistent with the NPS Program Plan and either implement appropriate management measures or monitor water quality (SWRCB and RWQCB 2004).

Each implementation project must include a plan to evaluate project effectiveness, specific information as delineated in the proposal guidelines, and a plan to document results including water quality improvement. A monitoring plan and Quality Assurance Project Plan (QAPP) with associated schedules and budgets are required for all projects that include water quality monitoring. Qualified impartial experts must assist in developing and implementing the plan and certifying the results (SWRCB and RWQCB 2004). Plans are selected by the Project Selection Panel (consisting of one member from the agencies listed above) and must be approved by SWRCB before funds can be allocated.

Projects selected for funding under AWQGP are required to spend grant funds according to the approved project scope and budget. SWRCB requires progress reports (no less than quarterly) for all projects and conducts site visits during construction of each development project. Payment requests must include a certification by the grantee that each expense complies with requirements outlined in the grant agreement. Grantees must also submit supporting documentation for each expense, with reimbursements approved only for eligible expenses pursuant to program guidelines and contained within the approved project budget (SWRCB 2007).

SWRCB prepares and presents an annual project accounting report on projects under AWQGP to the Department of Finance (DOF) and DOF performs audits on select projects. SWRCB maintains a publicly accessible Web site listing all current projects by program, the funding source, and the timeframe for completion (SWRCB 2007).

All projects funded through AWQGP receive a close-out site visit conducted by SWRCB or RWQCB staff when a project has been completed. The purpose of the close-out site visit is to ensure all project components were completed according to program guidelines and the terms of the grant agreement, including project scope and budget. Grantees must submit a final report, which documents the outcomes of the project and summarizes all project data and expenditures. In accordance with all current laws and regulations that apply to the project, grantees must also submit documents summarizing total project costs and all additional funding sources. The SWRCB is enhancing its Web site to post final project reports (SWRCB 2007).

Assessment of How the Approach is Working

There is limited information available on the effectiveness of AWQGP. There seems to be little public information available on what projects were accepted, progress of those projects, the results, and final assessments. Therefore it is difficult to assess the implications for future NPS pollution reduction policies.

DOF conducted an audit on bond funds in *An Audit of Bond Funds: State Water Resources Control Board Propositions 13, 40, and 50* (2008) to determine whether SWRCB awarded and expended bond funds that were consistent with applicable legal requirements and established criteria, and whether SWRCB had adequate project monitoring processes. DOF concluded that there is a lack of supporting documentation and that SWRCB does not always monitor the financial aspects of bond funded projects to ensure eligibility of project costs (DOF 2008).

However, it is not possible to draw specific conclusions about AWQGP from the DOF report. The report does not list specific projects audited, but rather highlights general trends.

Summary of Strengths and Weaknesses

Strengths

- Specific grants geared towards finding a solution to the reduction of NPS pollution from agriculture may hold the key to future reduction.
- Projects with this specific goal will not have to compete against other NPS pollution funds.
- Project assessment at various stages will help determine the success of future projects.

Weaknesses

- There is little public information available on whether or not the project had been successful and how it can be improved.
- It is unclear whether funds were actually used in compliance with project guidelines. There may be insufficient oversight by SWRCB.

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Delaware's Nutrient Management Program

Overview

The Delaware Nutrient Management Program was established in June 1999 under the Delaware Nutrient Management Law to regulate activities involving the generation and application of nutrients and to protect water quality. The Delaware Nutrient Management Commission (DNMC) (also established by the Law) is responsible for directing the program and developing regulations pertaining to nutrient management, waste management for animal feeding operations (AFOs), and National Pollutant Discharge Elimination System (NPDES) permits for concentrated animal feeding operations (CAFOs) (DDA, n.d.).

Description

The Nutrient Management Program, as defined by the Nutrient Management Law, consists of the following (DE, 2009):

- Certification of persons directly involved with generating or applying nutrients within Delaware.
- Development and implementation of best management practices (BMPs) designed to improve water quality, optimize nutrient use, and maintain a profitable agricultural industry in the state.
- Establishment of educational programs instructing on the use of BMPs.
- Development of a method for certifying applicants by testing comprehension of BMPs.
- Any other programs established by the Commission.

More specifically, the Nutrient Management Law states that all affected operations must have nutrient management plans in place by dates specified in the Law. Operations that generate manure, but do not land apply any nutrients, must develop an Animal Waste Management Plan (Hanson, 2002). In addition, at least one person from each operation must become certified by participating in approved classroom instruction (Hansen and Binford, 2004).

The Law affects two categories of people (Hanson, 2002):

1. Those who operate any animal feeding operation in excess of 8 animal units (8,000 pounds).
2. Those applying nutrients to land in excess of 10 acres as a component of a commercial venture.

In addition to farmers, commercial nutrient applicators (e.g., fertilizer companies), golf courses, school districts, lawn care companies, and landscaping firms must develop and implement nutrient management plans (Hanson, 2002).

The Delaware Department of Agriculture provides a suite of services as part of the Nutrient Management Program (DDA, n.d.):

- Nutrient Management Relocation Program: This is a cost assistance program to assist in the transport of manure from areas of excess manure to areas in need.

- Delaware Manure Matching: This service provides names and contact information for manure providers, receivers, and manure brokers/transport agents.
- Complaints and investigations: DDA staff members handle and resolve complaints related to manure management and general nutrient management practices.
- Nutrient Management Planning Program: This is a cost assistance program for implementing nutrient management plans. Cost share is available at \$5 per acre for a 3-year plan. Funds are provided on a first-come-first-serve basis.
- Certification and Education: Individuals must be certified if they:
 - Apply nutrients to 10 acres or greater.
 - Operate an animal feeding operation of 8 animal units or greater.
 - Apply nutrients to lands as a component of a commercial agriculture business in exchange for a fee or service charge.
 - Advise or consult with persons as part of the development of a Nutrient Management Plan.

Assessment of How the Approach is Working

By 2008, 92,157 tons of excess poultry litter was relocated to alternative use projects, 355,984 acres of nutrient applied farmland was managed under a current nutrient management plan with assistance from the program, 44 nutrient management compliance complaints had been resolved, and 12 farms were managed under an EPA CAFO permit administered by the program (UDaily, 2008). In addition, more than 2,600 individuals have attended nutrient management certification classes since 2001 (UDaily, 2008).

Summary of Strengths and Weaknesses

Strengths

- The Law applies to both agricultural and non-agricultural lands.
- The Law and regulations require certification. Certification requires continuing education to keep all certified generators, handlers, and consultants up-to-date with recent information and requirements.
- The Law requires phosphorus limited nutrient management plans and application rates.
- Local conservation district offices have certified planners that will write free plans (Hanson, 2002) and the Nutrient Management Program provides funding to farmers who hire private consultants.
- Regulations require that all nutrient handlers maintain records of nutrient handling, storage, application, and disposition.
- Regulations require that farmers submit an annual report to the Nutrient Management Program.

Weaknesses

- The program emphasizes education, there is little in the way of a regulatory component.
- The program relies heavily on “professionalism, judgment and experience” of certified consultants to develop reasonable recommendations (Bill Rohrer, from Hanson, 2002). The plans are only as good as the certifiers and their certifications.

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Iowa Livestock Water Quality Facilities Program

Overview

The Livestock Water Quality Facilities Program (the Program), started in 2006, offers low-interest loans through participating lenders to Iowa livestock producers for projects to prevent, minimize, or eliminate nonpoint source (NPS) pollution of Iowa's rivers and streams from animal feeding operations (IFA undated).

Description

The Program is one of four financing programs through the Iowa Water Quality Loan Fund, the NPS fund of the Clean Water State Revolving Fund (CWSRF), which helps Iowans address NPS water quality problems (Iowa State University 2005; Iowa DNR undated). The Program is operated by the Division of Soil Conservation (DSC) and the Iowa Department of Natural Resources (DNR), with the Iowa Finance Authority (IFA) acting as the financial agent. Local Soil and Water Conservation Districts (SWCDs) help with Program implementation (IFA undated; Iowa DNR undated).

Loans funded under this program are available to livestock and poultry producers who are not required to have a National Pollutant Discharge Elimination System (NPDES) permit (Iowa DNR 2008). Types of eligible projects include lagoons, manure management structures, equipment⁶, vegetative filters, and development of manure management plans. Assistance is limited to existing facilities for animal feeding operations with less than 1,000 total animal units⁷ (IFA undated; Iowa State University 2008).

For riparian water protection practices, such as grass waterways, terraces, pasture or hayland planting, streamside forest buffers, and filter strips, the loan amounts can range from \$5,000 to \$50,000, with a loan term of up to 10 years. For manure management projects, developing manure management plans, and construction of manure management structures, the minimum loan amount is \$10,000 with no maximum loan amount for a loan term up to 20 years (Iowa State University 2008).

The following process is used to allocate funds and monitor projects (IFA undated):

- A landowner must receive project approval prior to receiving a loan from the local SWCD and complete the online loan application.
- After the project has been completed, inspected, and certified by local Natural Resources Conservation Service (NRCS) staff, DSC approves the project and loan amount online.
- IFA approves the application and provides funding to the borrower. The interest rate charged will not exceed 3% and borrowers can finance up to 100% of the project cost.

⁶ Due to high demand for the loans, DNR and IDALS reprioritized funding requests. Manure management equipment was funded when the Program started, but was not eligible after October 2008 (Iowa DNR, 2008).

⁷ 1,000 animal units are equal to 1,000 beef cattle, 700 mature dairy cattle, or 2,500 finishing swine.

By 2008 109 projects had been funded, totaling more than \$7 million. The average loan amount for the funded projects was \$65,000 (Iowa State University 2008).

Assessment of How the Approach is Working

The Program has been so successful that livestock producers have requested nearly all of the \$12 million allotted for this year in the first three months of the 2009 fiscal year. Due to the high demand for the loans, DNR and IDALS have prioritized funding requests, and since October 2008 no longer fund loans for manure management equipment. This change will leave more loan money for practices that offer more benefits to water quality (Iowa DNR 2008). One reason for the success of the program is producers' willingness to address existing problems. However there seems to be little information publicly available, such as monitoring data, on direct impacts that the program has had.

Summary of Strengths and Weaknesses

Strengths

- The Program is a source of low-cost financing available to landowners. This opportunity is available specifically to assist and encourage landowners to address NPS pollution of Iowa streams and lakes.
- Applications are accepted any time of the year and turnaround time is quick (characteristic of the CWSRF) (IDALS undated).
- Quick loan processing and friendly loan repayment terms let borrowers implement projects right away (characteristic of CWSRF) (IDALS undated).
- Significant cost savings; interest rates are well below other financing sources (characteristic of CWSRF) (IDALS undated).
- Complements other funding sources; can be used to provide project share costs for other funding sources (characteristic of CWSRF) (IDALS undated).

Weaknesses

- The program is so popular that the state has had to reprioritize funding. Manure management equipment will no longer be funded under the program (Iowa DNR 2008).
- It is unclear what direct impacts the program has had on water quality. Monitoring data before and after the implementation of the program may be one way to prove that the program has been successful.

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Kansas Clean Water Farms—River Friendly Farms Project

Overview

The Clean Water Farms Project (CWFP) was initiated in 1995 by the Kansas Rural Center (KRC). With the 2001 use of the River Friendly Farm Environmental Assessment, CWFP became the Clean Water Farm—River Friendly Farm Project (CWF-RFFP) (KRC 2007a). CWF-RFFP helps farmers and ranchers in Kansas adopt land management practices to address water quality issues involving nonpoint source (NPS) pollution (Kansas University 2007).

Eligible practices include planning and implementing extended legume-based crop rotations; use of cover crops, buffer strips, riparian filter strips, field grass filter strips, and stream bank stabilization efforts; livestock management systems that reduce confinement feeding and potential pollution; livestock waste management systems that limit potential pollution from feedlots, wintering, feeding, and storage; high residue cropping systems; conversion to no-till or minimum till with a planned crop rotation; household wastewater systems (e.g., septics); and construction of fuel containment structures (KRC 2007a).

Description

The KRC is a non-profit research, education, and advocacy organization, working to promote an environmentally sound, economically viable, and sustainable system of agriculture (French et al. 2001). Since 1995, with funding from EPA Clean Water Act section 319 NPS funds through the Kansas Department of Health and Environment (KDHE), KRC has been able to offer cost-share and planning assistance to Kansas farmers and ranchers willing to adopt clean water farming practices in vulnerable watersheds (KRC 2007b).

Since 2001, the CWF-RFFP has included the use of the River Friendly Farm Environmental Assessment. The River Friendly Farm Environmental assessment consists of a notebook with questions to help farmers assess and score the status of soil conservation, nutrient management, pest management, and livestock waste utilization on their farms. Most farmers can complete the assessment within a day and a half, using information they already have from conservation plans, aerial maps, and field and yield data (KRC 2007a). The project assessments and costs share demonstrations have been incorporated in the state's Watershed Restoration and Protection Strategy (WRAPS) since 2005.

For farmers or ranchers to receive a grant through CWF-RFFP the following steps are taken (KRC 2007a):

- Participating farmers complete the environmental self-assessment for their farms with assistance from KRC staff. The farmer develops an action plan to protect or improve water quality on the farm. Farmers who complete the assessment and develop an approved action plan are eligible for a \$250 incentive payment.
- With an approved action plan, farmers and ranchers are eligible to apply for up to \$5,000 in cost-share funds to implement their plan, which can be used in conjunction with state and federal cost-share programs.

- To be eligible for the incentive payment or cost share program, participants must operate or own a farm or ranch within a WRAPS watershed or high priority total maximum daily load (TMDL) watershed area.
- A CWF-RFFP advisory team will review the action plans and cost share applications for approval. CWF-RFFP staff will work with individual farmers through all phases of the project: completing the assessment; developing the action plan; identifying possible solutions; and monitoring progress.
- Cost-share recipients must match the requested cost share funds with an equal value of labor, machinery or land use, and/or purchased materials.
- At the completion of the project, a final accounting of expenditures and contributed resources is required. If funded at the full \$5,000 limit, the project is considered a “demonstration project” and the participant will be asked to host a farm tour or share information through workshops or other outreach methods.
- KRC monitors the completion of the BMPs and final payments of cost-share dollars are not made until the projects are verified.

Assessment of How the Approach is Working

By September 2001, KRC had provided nearly \$150,000 in cost-share funds to 35 farmers and ranchers through the CWRP. These farms and ranches were located in 20 counties and covered over 24,000 acres within eight of the 12 major river basins in the state. The size of the participating farms ranged from 60 acres to over 5,000 acres, and covered a wide range of operations and management styles (French et al. 2001).

By 2005, there had been over 80 on-farm demonstrations, farm tours, workshops, and feature stories in the media. Through these KRC has brought good examples or models of clean water farming practices to hundreds of other farmers and ranchers (KRC 2007b).

Summary of Strengths and Weaknesses

Strengths

- Better defined farm goals and a clear plan for achieving those goals (KRC 2007a).
- Farmer control over the process; assessment of information remains confidential (KRC 2007a).
- Improved conservation management, which translates into money saved (KRC 2007a).
- Improved position for qualifying for cost-share funds from a variety of sources (KRC 2007a).
- Better position to comply with (or avoid) future environmental regulation (KRC 2007a).
- Incentive for farmers to implement these management practices.

Weaknesses

- Marketing of the program: not all farmers or ranchers know about this program.
- KRC does not measure the load reductions, or impacts of the installed BMPs. KRC provides the information (acres, feet, livestock units involved, etc.) to the KDHE to calculate the benefits.

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North Carolina Agriculture Cost Share Program (ACSP)

Overview

North Carolina's Agriculture Cost Share Program (ACSP) is a voluntary program designed to protect water quality by installing best management practices (BMPs) on agricultural lands. The program is supported by "financial incentives, technical and educational assistance, research, and regulatory programs provided to farmers by local soil and water conservation districts" (NCDENR undated).

Description

The ACSP was established in 1984 in response to nutrient enrichment concerns in two Piedmont lakes. The program originally included 16 counties in the watersheds of Jordan Lake, Falls Lake, and the Chowan River Basin, but was expanded to all 100 counties in North Carolina in 1990 (Williams 2007).

The ACSP provides landowners and renters of existing agricultural operations (in operation for more than three years) with cost-sharing funds and technical design assistance. Farmers submit applications for the program with their local soil and water conservation districts. Applications are accepted and reviewed on a rolling basis, and ranked based on county resource concerns (NCDENR undated).

Farmers receive up to 75 percent of the pre-determined average cost of installed BMPs (up to \$75,000/year) used to protect water quality in streams adjoining their agricultural lands (NCDENR undated). Farmers may supply the remaining balance through a financial contribution, existing materials, or labor (CCSWCD undated). The ACSP also provides up to 50 percent cost share for technical positions in the districts (districts must match with local funds) (Williams 2007).

Approved BMPs include vegetative, structural, or management systems that can improve the efficiency of agricultural operations and reduce the potential for polluting surface and groundwater (NSWCD undated). Installation of the BMP must be accomplished within 3 program years, beginning with the program year in which the cost share contract was approved (NCDENR 2007). Also, BMPs must be maintained for ten years and are subject to random checks by Division staff and the District personnel. Farmers who fail to keep their BMPs in proper working order are subject to repaying some or all of the original cost share funds (NCDENR 2007).

Overview of Program Responsibilities (Williams 2007)

- The North Carolina Soil and Water Conservation Commission sets program requirements and allocates funds to districts.
- Local soil and water conservation districts establish local priorities, solicit and rank applications, prepare/approve conservation plans and contracts and submit them for state approval, oversee and assist practice implementation, certify installation according to standards, conduct maintenance spot checks, and enforce contracts.
- The North Carolina Division of Soil and Water Conservation is responsible for the overall program development and administration, and approval of contracts and payments.

- Natural Resources Conservation Service supplies technical standards, design and job approval authority, and advice technical aspects.
- The North Carolina Cooperative Extension Service researches and develops new practices and develops tools to quantify benefits.

Annual funding for the program is \$5.24 million for financial assistance (monies paid directly to farmers for BMP installation) and \$2.45 million for technical assistance (monies allotted to Soil and Water Conservation Districts to fund new positions or support program implementation) (as of 2007) (Williams 2007).

Assessment of How the Approach is Working

In 2007, \$8.2 million was allocated for 1,412 contracts. Prominent BMPs include poultry litter storage structures, livestock exclusion and alternate watering systems, cropland conversions to grass and trees, cover crop incentives, and mortality management systems (Williams 2007).

By the end of 2007, nearly \$143 million had been expended through 48,000 contracts, nearly 1,000 miles of livestock exclusion fencing has been installed, over 2,000 waste management systems have been installed, over 600,000 acres have been converted to conversion tillage or long term no till, 17,000 acres of riparian buffer have been installed, and 128,000 acres of sensitive cropland have been converted to permanent vegetation or wildlife cover (Williams 2007).

From 1998 to 2007, more than 6.8 million tons of soils have been saved annually, nitrogen losses were reduced by more than 19 million pounds, and phosphorus losses were reduced by more than 5 million pounds (Williams 2007).

Summary of Strengths and Weaknesses

Strengths

- By providing funding for technical employees in the districts, ACSP provides technical support for planning and installation, which builds district capabilities (Williams 2007).
- The program helps build resources for districts to respond to water quality needs.
- Infrastructure developed for this program can be used for other programs (nearly 20 different special programs use ACSP infrastructure) (Williams 2007).
- ACSP provides a ready source of non-federal match funds for federal grants, which encourages districts to apply for grants (Williams 2007).
- Projects are prioritized based on watershed needs.

Weaknesses

- The program lacks a strong evaluation aspect, limiting the potential for future analysis and correction.
- The program is not universally applied because it is voluntary.
- The only stated goal of the program is to "reduce the input of agricultural nonpoint source pollution," there are no specific reduction goals (NCDENR, 2007).
- No publicly available information was found regarding numeric targets.

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Ohio Agriculture Pollution Abatement Program

Overview

Ohio's Agriculture Pollution Abatement Program (APAP) provides farmers with cost share assistance to develop and implement best management practices (BMPs). This voluntary program provides agricultural producers with state funds to alleviate associated financial burdens (ODNR undated).

Description

APAP was created in 1979 and is used by Ohio Department of Natural Resources, Division of Soils and Water Conservation (ODNR-DSWC) and Soil and Water Conservation Districts (SWCDs) to reach out to farmers to promote the wise use of BMPs and help resolve pollution problems to prevent pollution on many small and medium sized agricultural farms (OLEPTF 2008).

ODNR-DSWC administers APAP, and it is implemented locally by all 88 soil and water conservation districts. Depending on the BMP installed, the program offers three levels of funding caps: high (\$15,000), medium (\$10,000), and low (\$5,000) (ODNR undated).

If other public funds are involved in cost sharing to establish eligible BMPs, state funds can only be used to the extent that the combined allocation of public funds amount to no more than 75% of the cost of establishing the BMPs, or not more than \$15,000 per person per year, whichever is smaller (OAC 2005a). However, the \$15,000 maximum in public funds per person per year limit may be waived by majority vote of the Ohio Soil and Water Conservation Commission (OAC 2005a).

Restrictions on use of cost share funds include the following (OAC 2005a):

- Eligible practices which, through natural causes have lost their effectiveness, will qualify for further financial assistance. However, cost share monies will not be awarded to reestablish previously installed practices that have deteriorated due to operator negligence or mismanagement.
- Surface mined lands and oil and gas well drilling areas must have been reclaimed and be in active agricultural production or silvicultural uses as determined by the district to be eligible for cost sharing on needed conservation practices.
- Cost share funds may only be used for those practices necessary to control agricultural pollution as determined by the district with the approval of the chief of the division of soil and water conservation.
- Cost share funds will be available only to owners with a current operation and management plan.

All practices must meet the standards and specifications listed in the Ohio NRCS *Field Office Technical Guide*. If the *Field Office Technical Guide* does not apply, practices must meet standards and specifications approved by the chief of the division of soil and water conservation (OAC 2005a). Farmers wanting to know more about the program should contact their local SWCD for more information.

Assessment of How the Approach is Working

APAP is now entering its 30th year. Little publicly available information is available, however, on whether water quality improvements have been realized and how many agricultural operations have benefitted from the program.

Summary of Strengths and Weaknesses

Strengths

- The program provides valuable monetary assistance for BMP implementation for agricultural operations (ODNR undated).

Weaknesses

- This is a voluntary program and does not include enforcement provisions that allow the state to take action against an agricultural operation unless a complaint is submitted by a third party (DSWC, other agencies, or private citizens). One potential method for enforcement or penalty: if any person fails to comply with an order of the chief (of SWCD, OHDNR) they are guilty of a misdemeanor of the first degree. Action can also be taken if a person is found to have created some sort of danger to public health (OAC 2005b).
- There are no goals for water quality or load reduction.
- The program does not address all sources of NPS nutrients.

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Virginia Agricultural Stewardship Act

Overview

This accountability method is based on a regulation in Virginia, which allows the state to address water pollution concerns, including nutrients, posed by agricultural operations by utilizing a complaint-based system that affords voluntary compliance, with regulatory action available to the state in the event of continued noncompliance.

Description

In response to increased public concerns for a clean environment, Virginia's agricultural leadership sought a way of addressing agricultural water pollution that was different from previous approaches used with other industries, such as manufacturers. Most manufacturing plants must obtain permits and follow strict rules of operation. The agricultural community desired a different approach that did not rely on permits and strict operating rules, but took into account the wide variety of farming practices used in Virginia.

The state's Agricultural Stewardship Act (ASA) offers a positive approach to addressing pollution involving agricultural operations. The ASA provides procedures by which individual agricultural producers can be alerted to areas of their operations that may be causing water pollution. Rather than developing regulations with strict rules governing every type of farming practice, the ASA looks at each farm individually (VDACS 2004).

Assessment of How the Approach is Working

The procedures under the ASA are initiated when a complaint is made to the Commissioner of the Virginia Department of Agriculture and Consumer Services (VDACS). The Commissioner must accept those complaints alleging that a specific agricultural activity is causing or will cause water pollution. After the Commissioner receives a complaint warranting further investigation, the local soil and water conservation district (District) is contacted to determine whether the District wishes to investigate the complaint. If the District does not wish to investigate the complaint, the Commissioner will conduct an investigation. The purpose of the investigation is to determine whether the agricultural activity that initiated the complaint is causing or will cause water pollution. If no causative effect is found from the activity in question, the Commissioner will dismiss the complaint (VDACS 2004).

If the agricultural activity is causing or will cause water pollution, the owner/operator of the agricultural facility is given an opportunity to correct the problem. The owner/operator is tasked with the development of an agricultural stewardship plan that contains "stewardship measures" (i.e. best management practices), corrective measures to address the source of the water pollution or mitigate its impact on surface waters, as well as an implementation schedule (VDACS 2004). The District reviews the owner/operator's plan and makes recommendations to the Commissioner. If the Commissioner approves the plan, VDACS requests the owner/operator to implement the plan within 18 months (VDACS 2008).

If the owner/operator fails to implement stewardship measures after a plan is approved, enforcement action under the ASA is taken against the owner/operator in the form of levied

fines. In some cases, the ASA investigation will not produce sufficient evidence to support the conclusion that the agricultural activity in question is causing or will cause pollution. In those cases, the investigator will determine if the owner/operator is receptive to voluntarily implementing best management practices that will prevent future complaints (VDACS 2004).

The ASA also requires that the Commissioner develop and distribute an annual summarization of all ASA cases received and processed. The Virginia Agricultural Stewardship Act Annual Report includes an analysis of official complaints (those warranting further investigation) that categorizes complaints based on agricultural activity, the pollutant type responsible for the complaint (nutrients, sediments, and toxins), and the results each investigation grouped into founded, unfounded, dismissed, and carryover. The annual report also highlights the educational efforts undertaken by VDACS over the previous year (VDACS 2007)

Summary of Strengths and Weaknesses

Strengths

- Effective complaint based regulatory scheme of nonpoint agriculture
- Effective means of enforcement via fines
- Achieves program accountability via the Virginia Agricultural Stewardship Act Annual Report
- Transparent and simplistic process allows for quick action on agricultural pollutant sources and adequate remediation to address the problems
- Efficient use of state resources achieved via initial screening of complaints to determine those that warrant further action
- Holds nonpoint sources accountable

Weaknesses

- Investigative responsibilities of the Commissioner and Districts is not well defined, which may create confusion and lend to programmatic hurdles
- The annual report does not include any information concerning programmatic successes in terms of pollution reduction, instead success seems to be focused on administrative outputs, such as the number of complaints addressed
- The voluntary aspect of the ASA should offer the producer some incentive other than avoiding further complaints, which could be expert advice and logistical and economic support
- There are no goals or benchmarks for total nutrient reductions
- Not all sources are held responsible for reducing loads, just those with a complaint
- Equitability issue arises from the fact that those farms around higher population areas have an increased chance of being cited
- No quantification of loading or reductions

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Wisconsin Nonpoint Source Performance Standards and Prohibitions

Overview

The Wisconsin Department of Natural Resources (WDNR), in conjunction with the Department of Agriculture, Trade, and Consumer Protection (DATCP), manages legislation regulating nonpoint source (NPS) pollution from agricultural and urban areas. WDNR administers regulation NR 151 (in effect since October 2002), which contains agricultural cropland and livestock performance standards, manure management prohibitions, and non-agricultural performance standards for construction site erosion control, post-construction stormwater runoff and runoff from established urban areas (Holden 2009, personal communication). DATCP administers regulation ATCP 50, which outlines the technical standards required to implement the agricultural performance standards (including manure management prohibitions) in NR 151. Performance standards for non-agricultural construction/post-construction, developed urban areas (including turf management) are administered through NR 216, Storm Water Discharge Permits. Both the WDNR and DATCP administer state cost share programs to help farmers achieve compliance with the agricultural standards and prohibitions. WDNR administers cost share programs to assist urban municipalities in meeting non-agricultural performance standards.

Description

Agricultural Standards

All cropland and livestock operations in Wisconsin, regardless of size, must abide by the agricultural performance standards and manure management prohibitions established in NR 151. These include:

- Cropland Performance Standards
 - Reduce cropland soil erosion to meet tolerable soil loss (T)
 - Manage nutrient applications of fertilizer and manure to meet crop needs and reduce delivery of nutrients to waters of the state
- Livestock Performance Standards
 - Construct manure storage facilities to accepted standards
 - Properly close abandoned manure storage facilities
 - Abandon, upgrade or replace failing or leaking manure storage facilities
 - Divert clean water around feedlots in water quality management areas (300 feet from streams, 1,000 feet from lakes and in areas susceptible to groundwater contamination)
 - Manure Management Prohibitions
 - No overflow of manure storage structure
 - No unconfined manure stacks in Water Quality Management Areas
 - No direct runoff from feedlots or stored manure to waters of the state
 - No unlimited livestock access to waters of the state such that adequate sod cover is not maintained

ATCP 50, the companion regulation to NR 151, identifies the technical standards that can be used to comply with the agricultural performance standards set in NR 151. Many of the technical standards offered in ATCP 50 cross-reference NRCS technical standards.

Most agricultural performance standards and prohibitions became effective on October 1, 2002. Some exceptions were:

- Standards for new cropland went into effect October 1, 2003.
- Nutrient management standards for areas draining to outstanding, exceptional or impaired resource waters, or in source water protection areas, went into effect on January 1, 2005.
- Nutrient management standards for areas draining to all other waters went into effect on January 1, 2008.

Compliance with agricultural performance standards and prohibitions for cropland practices and livestock facilities in place prior to the effective date of the standard can only be required if a bona fide cost share offer is made to the landowner or operator. This is true whether the compliance requirement is imposed by a state agency under NR 151 or by a local governmental unit under local ordinance. This offer must be 70% (90% in cases of economic hardship) of the actual installation cost of required best management practices. Eligible best management practices are set forth in cost-share programs administered by DATCP (ATCP 50) and DNR (NR 153). Funding for the offer can be from any source (federal, state, local private nonprofit). If an offer is refused by the farmer, compliance can be required regardless of any future cost-share offer. In some cases, cross-compliance requirements impose compliance with NR 151 standards and prohibitions regardless of any additional cost sharing. This is the case for farmers that collect farmland preservation tax credits, obtain a livestock siting permit or are required to hold a WPDES permit for their livestock operation. Once compliance is documented, it must be maintained by the landowner and all future landowners, heirs and assign, regardless of future cost sharing.

Urban Standards

NR 151 contains performance standards for construction site erosion, post construction runoff from new construction and runoff from established urban areas. Construction sites must reduce delivery of eroded sediment by 80%. Post-construction runoff from new development must be managed to maintain pre-development peak flow discharges, maintain 60 – 90% of the pre-development infiltration volume, protect riparian areas and control runoff from fueling and maintenance areas. In addition, established urban areas are required to reduce total suspended solids on a municipality-wide basis by 20% (as compared to no controls) by March 10, 2008 and by 40% by March 10, 2013. These standards are implemented primarily through the WPDES storm water permits for construction sites and municipal separate storm sewer systems. In addition, there are additional developed area standards that apply to permitted and non-permitted municipalities alike provided they are incorporated and have a population density of at least 1,000/square mile. This requires primarily housekeeping practices and nutrient management for larger (over 5 acres) turf areas.

No cost share requirements apply to non-agricultural construction/post-construction, developed urban area, or turf management performance standards (Holden 2009, personal communication).

Assessment of How the Approach is Working

The state provides some funding to DNR and DATCP as pass-through funding to pay for best management practices (BMPs), staff, and technical support. For 2007, DNR provided \$2.3 million for BMPs and \$1 million for urban NPS planning (money for urban BMP construction was not available that year, but \$2.4 million was provided in 2006). DATCP provided \$9.3 million in staffing and support to county land conservation departments (who implemented the agricultural performance standards and other programs) and \$4.9 million in cost sharing. The 30 percent local share is often provided by federal sources and a few county cost share programs and nongovernmental organizations. DNR also passed through \$0.9 million in Clean Water Act section 319 funds. NRCS provided \$17 million through the Environmental Quality Incentives Program (EQIP) and \$0.5 million for the Conservation Reserve Enhancement Program (CREP) (Holden 2009, personal communication).

WDNR is in the process of revising NR 151. Propositions include new agricultural performance standards and modification of several agricultural and non-agricultural performance standards (Holden 2009, personal communication).

Summary of Strengths and Weaknesses

Strengths

- Program addresses both agricultural and non-agricultural NPS (Holden 2009, personal communication).
- Program sets a minimum level of expected nutrient management measures and provides a consistent framework for implementing agricultural BMPs (Holden 2009, personal communication).
- Provides cost-share options to support initial implementation of standards.
- The concept of “once in compliance, always in compliance,” means that the state only pays once for a BMP and does not have to further cost share practices that come out of compliance (Holden 2009, personal communication).
- Regulatory component provides a structure by which the worst sites can be targeted for remediation (Holden 2009, personal communication).
- Program gives local governments authority to enact ordinances to enforce performance standards at the local level. This increases local regulatory authority and reduces the burden on the state (Holden 2009, personal communication).
- Following the adoption of NR 151, several state NPS program partners worked together to develop a detailed implementation strategy that provides additional guidelines for complying with the standards. This approach supports implementation of the performance standards.

Weaknesses

- There is often a delay in the availability of cost share funds and staff time is often spent organizing and directing project resources. This can hamper regulatory enforcement of standards, as cost sharing must be offered to a producer before an agricultural performance standard can be enforced (Holden 2009, personal communication).
- Some city leaders have protested the structure of the cost share system. Cost sharing is not required for enforcement of non-agricultural practices, which some believe to be

unfair. The decision to create different enforcement rules was done to protect farmers who cannot pass on their costs like those in the non-agricultural sector (municipalities, construction companies, etc.) (Holden 2009, personal communication).

- The program lacks planning and evaluation components, which makes it difficult to connect performance standards to water quality improvements (Holden 2009, personal communication).
- The existing suite of performance standards is not as strong as DNR originally proposed (a result of modifications required to get the legislation passed) (Holden 2009, personal communication).

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Clean Air Act: State Implementation Plans

Overview

The accountability method for the Clean Air Act state implementation plans (SIPs) is based on mandatory reporting and EPA's regulatory authority to impose sanctions on states who do not comply.

Description

The Clean Air Act (CAA), last amended in 1990, is the comprehensive federal law that regulates air emissions from stationary and mobile sources. The CAA authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants (USEPA 2009). The CAA also requires states to submit state implementation plans (SIPs) to EPA which provide for implementation, maintenance, and enforcement of the NAAQS established (carbon monoxide, lead, nitrogen dioxides, ozone, particulate matter and sulfur dioxide) (USEPA 2008b; USEPA 2008e).

Only one SIP exists for each state, and revisions are necessary when new federal or state requirements are enacted, when new data improves modeling techniques, when a specific area's attainment status changes, or when an area fails to reach attainment. Revisions are usually prepared for a specific area and include an assessment of the problem and measures to fix it (TCEQ 2008).

The contents of a typical SIP fall into several categories (USEPA 2008a):

- 1) State-adopted control measures which consists of either rules/regulations or source-specific requirements (e.g., orders and consent decrees)
- 2) State-submitted comprehensive air quality plans (e.g., attainment plans, maintenance plans, rate of progress plans, transportation control plans) demonstrating how state regulatory and source-specific controls, in conjunction with federal programs, will bring and/or keep air quality in compliance with federal air quality standards
- 3) State-submitted "non-regulatory" requirements (e.g., emission inventories, small business compliance assistance programs, statutes demonstrating legal authority, monitoring networks, etc.)
- 4) Additional requirements promulgated by EPA (in the absence of a commensurate State provision) to satisfy a mandatory requirements

Each SIP revision submitted by the state must undergo reasonable notice and public hearing at the state level, and SIPs submitted to EPA to attain or maintain the NAAQS must include enforceable emission limitations and other control measures, schedules and timetables for compliance. EPA evaluates submitted SIPs to determine if they meet the CAA's requirements. If a SIP meets the Act's requirements, EPA will approve the SIP. EPA's notice of approval is published in the Federal Register and the approval is then codified in the Code of Federal Regulations (USEPA 2008b).

The enforcement of the SIP is a state responsibility. However, after the regulation is federally approved, EPA is authorized to take enforcement action against violators. Citizens are also

offered legal recourse to address violations as described in Section 304 of the CAA (USEPA 2008a).

Under the CAA, EPA is required to impose highway fund and other sanctions if they find that a state has failed to submit a required SIP or revision, if they disapprove a required SIP or revision, or if they find that a requirement of an approved SIP is not being implemented (USDOT 2008).

Assessment of How the Approach is Working

Prior to 1990, it was difficult for EPA to penalize violators of the CAA because courts were the only mechanisms for even minor violations. The 1990 Amendments strengthened EPA's power to enforce the CAA by increasing the range of civil and criminal sanctions available. When EPA finds that a violation has occurred, the agency can issue an order requiring the violator to comply, issue an administrative penalty, or bring a civil judicial action (USEPA 2008c).

The threat of sanctions is a powerful tool that Congress gave EPA to encourage state compliance with the CAA's objectives. EPA has formally notified the states of its intent to use sanctions 855 times since 1990. The actual imposing of sanctions, which cannot occur until 18 months after formal notification, is a relatively rare event. EPA imposed sanctions 14 times since 1990, and the only sanction currently in effect is for one small area in Montana (McCarthy 1997).

Examples of EPA action

- Clark County, Las Vegas: In August 1999, EPA found that Clark County missed a deadline to submit their SIP, which was in May 1999. The finding started an 18-month Clean Air Act "sanction clock," where it would have imposed more stringent permit requirements for industrial sources and limitations on the county's federal highway funds after 24 months. EPA determined that the SIP was complete in September 2000, which stopped the sanctions from applying. In July 2004, EPA finalized its approval of the SIP revisions for the attainment of carbon monoxide NAAQS, and in May 2005, EPA made the final decision that the area meets air quality standards for carbon monoxide (USEPA 2008d).
- Maricopa County, Arizona: In June 2007, EPA found that the Phoenix metropolitan area failed to attain particulate matter NAAQS by the December 2006 deadline. This required a SIP revision by December 2007, which provides for annual reductions of particulate matter of more than 5% per year of emissions until the NAAQS is attained. The County developed a plan to reduce emissions by 5% each year until NAAQS is attained, and submitted revised SIP to EPA in December 2007 (MCAQD undated).

The strength of this program is that when a state fails to submit a SIP, or depending on the contents of the SIP, the EPA can enforce sanctions. The direct linkage between failing to meet air quality standards and not providing highway funds helps EPA implement air quality standards. For water quality and nutrients, finding a direct leverage item may be important. If agriculture and urban development are penalized for not promoting best management practices, it may help reduce nonpoint source pollution.

Summary of Strengths and Weaknesses

Strengths

- Provides EPA with the legal tools to implement the submittal of SIPs, and impose sanctions if states do not comply (has regulatory teeth)
- Creates a strong negative incentive for states to comply
- Provides access for communities to get access to the document and file suits if necessary (because SIPs are mandatory)

Weaknesses

- EPA is responsible for many administrative tasks, such as tracking SIP due dates for each state.
- EPA needs to evaluate the SIPs and respond to the states with their decision within a set timeframe.
- Communication between the states and EPA is imperative.

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