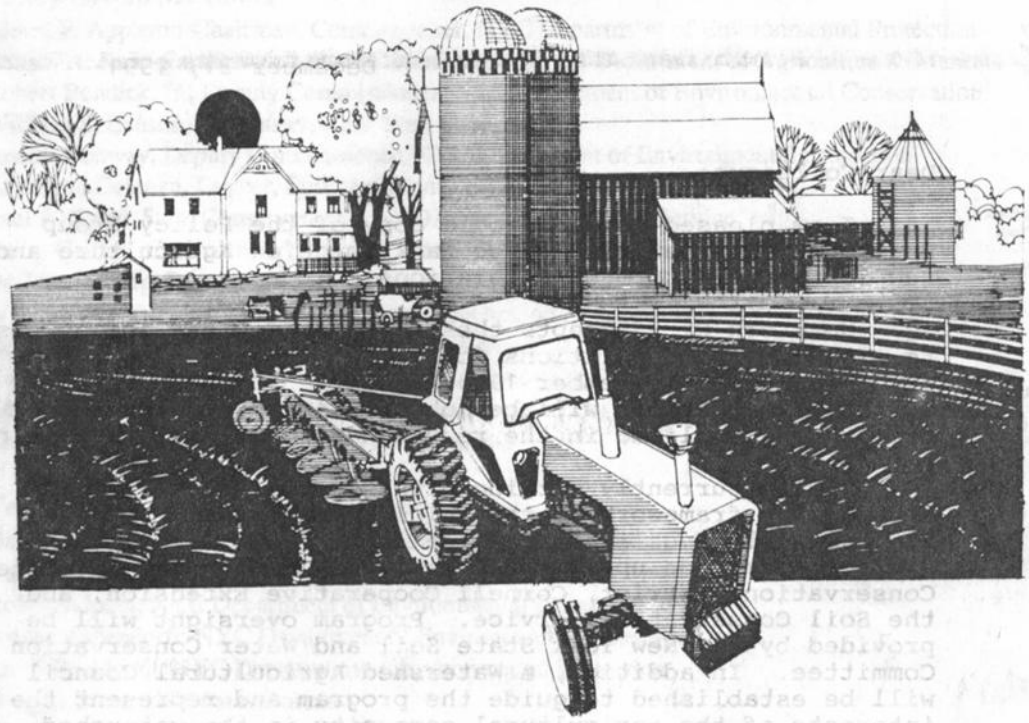

Ad Hoc Task Force on Agriculture and New York City Watershed Regulations

Policy Group Recommendations

December 1991

DEP

New York City
Department of
Environmental
Protection

59 - 17 Junction Blvd.
Elmhurst, New York
11373 - 5107
718 - 595 - 6579

ALBERT F. APPLETON
Commissioner

December 31, 1991

Dear Colleague:

I am pleased to send you a copy of the Policy Group Recommendations of the Ad Hoc Task Force on Agriculture and New York City Watershed Regulations.

New York City accepts these recommendations and agrees to withdraw the regulations for agriculture that were proposed in the September 1990 Discussion Draft. In place of those regulations will be substituted a voluntary program, as outlined in the recommendations.

DEP is currently working with several agencies to develop the framework of the voluntary program. This program will be delivered at the local level by a County Project Team made up of staff from the County Soil and Water Conservation District, Cornell Cooperative Extension, and the Soil Conservation Service. Program oversight will be provided by the New York State Soil and Water Conservation Committee. In addition, a Watershed Agricultural Council will be established to guide the program and represent the interests of the agricultural community in the watershed.

I want to personally thank all the members of the Ad Hoc Task Force for their dedication to this important effort, and I look forward to working closely with the agricultural community in the watershed.

Very truly yours,

Albert F. Appleton
Commissioner

Encl.

Acknowledgments

The Task Force's recommendations were a collaborative effort involving the following individuals and organizations:

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David Hawes, Hudson Valley Farm Credit
Ellen LaBerge, Dairylea Cooperative, Inc.
Maggie Vinciguerra, Hudson River Valley Greenway Council

Highlights of the Task Force's Report

New York City and an Ad Hoc Task Force on Agriculture have reached consensus on a comprehensive program for farming in the New York City Watersheds that satisfactorily addresses the City's objectives for drinking water quality protection and compliance with federal and state rules and standards, as well as the farm community's concerns for sustaining and enhancing the agricultural economy and way of life.

Withdrawal of City's Proposed Regulations for Agriculture

The City proposes to withdraw the sections of its Discussion Draft relating to agriculture. Except for a general prohibition to safeguard against individual farm operators who exhibit a willful and irresponsible intent to pollute in a manner that threatens to significantly increase pollution levels and degrades the source waters of the City's water supply, the program will be entirely voluntary.

Voluntary Whole Farm Program with 100% Cost Sharing

In place of regulation, farmers will be encouraged, through demonstration projects and a range of cost-sharing and other incentives, to work with their Soil and Water Conservation District, Cooperative Extension and Soil Conservation Service to develop individual farm plans to control point and non-point sources of pollution. These plans will cover the entire spectrum of farm management, including practices to improve farm profitability and sustainability. It is the Task Force's and New York City's intention that not one farm will be put out of business by this program. While actively participating in the development and implementation of their Whole Farm Plans, farmers will not have to pay for the planning, implementation, maintenance or operation of Best Management Practices recommended to meet the water quality objectives of New York City as outlined in the Whole Farm Plan.

City-Farm Partnership: the Watershed Agricultural Council

To help this voluntary Whole Farm Program, a Watershed Agricultural Council, representing local, state and City governmental agencies and the farm community, will be established as a permanent institution to replace the Ad Hoc Task Force. The Council will be instrumental in evaluating the program; advising the DEP Commissioner; reviewing individual farm plans; providing liaison to the larger agricultural community; reviewing the impacts of non-agricultural watershed regulations on agriculture; and dispute resolution.

Whole Farm Planning/Best Management Practices Program

The preferred approach to reduce potential pollution from farms is use of Best Management Practices (BMP's) developed to meet water pollution control policies under New York State Law and Section 319 of the Federal Clean Water Act amendments of 1987. The mechanism of choice for selecting agricultural BMP's is preparation of a Whole Farm Plan for each farm. A collateral objective for each Whole Farm Plan is to sustain and improve the economic viability of the farm.

Whole Farm Plans should be prepared by a County Project Team including personnel from the county Soil and Water Conservation District, Cornell Cooperative Extension, and the Soil Conservation Service.

Whole Farm Plans should involve these components: soil erosion control; animal waste management; plant nutrient management; domestic animal pathogen management; and chemical and pesticide management. Whole Farm Plans should address these agricultural contaminants: nutrients; pathogens; sediments; toxicants; and organic matter. The level of control required for each Whole Farm Plan should depend on the presence of hydrologically sensitive areas.

Continuing education, professional training and local involvement are essential components of the Whole Farm Program.

Whole Farm Program Participation, Sign-up and Evaluation

The city, state, local government representatives and the agricultural community have set a goal of 85% farmer participation in the Whole Farm Program by 1997. At that time, the Program will be evaluated, based on parameters and criteria established by the City and the Watershed Agricultural Council, and a range of options will be considered for future action. Based on the Program's level of success, future options could involve simply continuing of the Whole Farm Program as is; modifying it to reflect experience gained through the process; or establishing new regulations to achieve water quality objectives. The important point is that no options will be precluded from consideration in 1997. Nevertheless, farmers who do participate in good faith in the Whole Farm Planning/BMP Program and complete a Whole Farm Plan and agree to implement their BMP's according to the schedule agreed to in their plan will be held harmless from any regulations or actions that are taken after 1997. Farmers will have until December 31, 1996 to voluntarily sign up for the Program and begin planning for BMP implementation.

Phase I of the Whole Farm Program

Before the program can be offered to all farms within the NYC water supply watersheds, there is a need to develop, test, evaluate, demonstrate and promote the Whole Farm Planning Approach, develop new Best Management Practices, and to strengthen the New York City/local partnership. This start-up effort, a mini-version of the long-term effort, will begin in early 1992 in Delaware County, expanding eventually to the remainder of the New York City Water Supply Watershed Region, located in Greene, Schoharie, Sullivan, Ulster, Dutchess, Putnam, and Westchester counties. The NYS Soil and Water Conservation Committee will provide program coordination for this unique New York City, County, State and Federal partnership.

Other Farmland Retention Programs and Incentives

In addition to the Whole Farm Planning and Implementation Program recommended by the Task Force, New York City has agreed to explore with the Watershed Agricultural Council other programs and incentives that may be needed to help sustain the farm economy and agricultural land use in the City's watersheds. These include, but are not limited to:

- Farmland Retention through a variety of mechanisms, including lease, purchase or transfer of development rights by the City; land conservancy; property tax incentive programs; etc.
- Establishment of a Solid Waste Infrastructure for Agriculture, including manure management through centralized composting; providing shredded newspaper for cattle bedding; etc.

Contents

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I. Background

In September, 1990, the New York City Department of Environmental Protection (DEP) issued a Discussion Draft of revisions to its watershed regulations, under New York State Public Health Law Article 11 and New York City Administrative Code Sec. 24-302. The regulations have not been amended since 1953.

The Discussion Draft was developed to solicit input on approaches to meeting the City's overall objective: to prevent degradation of the sources of its water supply. It also attempted to meet the state and federal standards under the 1986 amendments to the Federal Safe Drinking Water Act. Under the federal Surface Water Treatment Rule, promulgated pursuant to the Act, communities which rely on surface water sources may avoid filtration if they show, by the end of 1991, that their source water meets federal and state raw water standards, that adequate disinfection is in place, and that an adequate watershed protection program to reduce the risk of waterborne disease can be implemented.

The New York City water supply system is the largest surface storage and supply complex in the world, covering over 1,900 square miles or 1,216,000 acres of land area (a map of the NYC Water Supply System can be found in the appendix). In addition to its residents, the City supplies drinking water to one million residents in upstate counties, as well as millions of daily commuters, tourists and visitors to the City. The City is hoping to avoid filtering water from the Catskill and Delaware watersheds, which on the average day accounts for 90 percent of the City's water supply. The potential savings for the City is $4-5 billion for construction of filtration systems plus annual operating costs estimated at $200-400 million.

Many members of the farm community, including local, state and federal agricultural agencies and Cornell University faculty, believed that the Discussion Draft sections on agriculture threatened the continued viability of farms in the New York City watersheds, especially dairy and livestock farms. Among other things, the Discussion Draft prohibited the application of manure and fertilizer within "limiting distances" from watercourses, controlled runoff from pastures, and prohibited the discharge of contaminants from barnyards.

At the same time, New York City believes that farms are a preferred land use in the watersheds for water quality purposes, compared to other forms of development, and their survival is essential to the long-term prosperity of the southeastern New York region.

Responding to the concerns of both the agricultural community and the City, the New York State Department of Agriculture and Markets convened an Ad Hoc Task Force on Agriculture and the New York City Watershed Regulations to address the Discussion Draft. The challenge for the Policy Group of the Ad Hoc Task Force was to recommend regulations and/or programs that both protect New York City's water supply, while also sustaining the long term viability of agriculture within the watersheds.

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[1] New York City Department of Environmental Protection, ***Discussion Draft of Proposed Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources*** (September, 1990).

[2] 40 CFR Chapter 1, Section 141.70, Subpart H (effective December 31, 1990).

The Task Force was advisory and had no legal standing. Its members collectively represented most of the entities with technical knowledge or legal and program authority to forge a workable program for agriculture in the watersheds.

The Task Force had three goals:

1) To improve mutual understanding of the laws and public policies that shape the City's watershed program.
2) To improve mutual understanding of the characteristics of farm operations and of the technology and art of farm management that are available to address the influences of farm practices on drinking water quality.
3) To explore ways in which the City may work in partnership with farmers and the network of agricultural support institutions to encourage a sustainable farm economy in the watersheds, yet achieve the City's water quality objectives.

All participants in this process agree that these three goals have been successfully achieved.

The Task Force was comprised of a Policy Group and a Technical Support Group. Members of the Policy Group represented agencies that are directly involved in issuing and administering the proposed watershed regulations, groups that are affected by the regulations, and organizations that may contribute to facilitating them. The Policy Group consisted of representatives from:

Agricultural Community (3 watershed farmers)
Delaware County Board of Supervisors
Farmers Preservation Alliance
New York City Department of Environmental Protection (DEP)
NYS Department of Agriculture & Markets (A&M)
NYS Department of Environmental Conservation (DEC)
NYS Department of Health (DOH)
NYS Farm Bureau
NYS Grange
NYS Soil and Water Conservation Committee (SWCC)
NYS Water Resources Institute (WRI)
Sullivan County Farm Bureau
USDA Soil Conservation Service (SCS)

The Technical Support Group had two functions: to make a series of presentations to the Policy Group during its first few meetings on subjects that would form a common basis of knowledge in later discussion of policy alternatives, and to be available during policy deliberations to help with technical information and judgments as they may be needed to explore practicable ways to address the agricultural elements of the watershed policies.

The Technical Support Group was composed of people with expertise in the natural and agricultural sciences, and representatives of organizations that work with agricultural producers to help them use the results of research and technology to improve the management of their farms.

The Technical Group consists of representatives from:

Catskill Center for Conservation and Development
Cornell Cooperative Extension of Delaware County (CCE)
Cornell University (10 faculty members)
Delaware County Planning Department
Delaware County Soil and Water Conservation District (SWCD)
New York City Department of Environmental Protection (DEP)
NYS Department of Agriculture & Markets (A&M)
NYS Department of Environmental Conservation (DEC)
NYS Department of Health (DOH)
NYS Soil and Water Conservation Committee (SWCC)
US Department of Agriculture Soil Conservation Service (SCS)

The Ad Hoc Task Force was chaired by Commissioner Albert F. Appleton of the New York City Department of Environmental Protection. It met regularly between December, 1990, and September, 1991.

II. New York City Agricultural and Watershed Protection Program

1. Whole Farm Planning/Best Management Practice Program for Agriculture in the New York City Watersheds

Farming in the New York City water supply watersheds presents a complicated environmental management problem. Farm practices are a potentially significant source of nonpoint source pollution and present a risk of pathogen introduction. Farm practice pollution control is critical for meeting the City's anti-degradation objectives, as well as the avoidance criteria of the federal Surface Water Treatment Rule and the state Filtration Rule. On the other hand, farming is a preferred land use, with significant long-term environmental benefits, and the City wants to take all appropriate steps to support it. This represents a significant challenge since agriculture is a rapidly declining industry in the region.

The Discussion Draft took a purely water quality perspective and set absolute technological standards for all farm practices, to be applied uniformly in all farm situations. Discussions in the Ad Hoc Task Force, however, have convinced members of the Task Force representing the City and the farm community that a locally developed and administered program of best management practices, tailored farm-by-farm, with the voluntary cooperation of the farm operator, would be far more beneficial for both pollution control and the viability of the farm industry.

The City, after consulting with appropriate regulatory bodies and after full review of federal and state regulations, is satisfied that such a program would meet the avoidance criteria for effective watershed regulations and represents the best strategy for dealing with concerns of both the City and the farm community.

The Policy Group therefore recommends the following program:

Whole Farm Planning/Best Management Practice Program Option: Guiding Principles

In place of the agricultural regulations proposed in the Discussion Draft, farmers will have the option of participating in a voluntary Whole Farm Planning/Best Management Practice Program. These are the guiding principles for the program:

a. The objective of the program is to protect the sources of the New York City water supply while keeping farms in operation. Agriculture should be continued and promoted as a preferred land use in the New York City watersheds. Except for a general prohibition to safeguard against individual farm operators who exhibit a willful and irresponsible intent to pollute in a manner that threatens to significantly increase pollution levels and degrades the source waters of the City's water supply, the program will be entirely voluntary.

b. The preferred approach to source protection for farms is the use of Best Management Practices (BMP's) developed to meet water pollution control policies under the 1989 NYS Nonpoint Source Water Pollution Control Act and Section 319 of the Federal Clean Water Act amendments of 1987.

c. The mechanism of choice for selecting agricultural BMP's is preparation of a Whole Farm Plan for each farm (see pages 10-14 for more information on the Whole Farm Planning Process). A collateral objective for each Whole Farm Plan is to sustain and improve the economic viability of the farm.

   Whole Farm Plans should be prepared by a local County Project Team including personnel from the county Soil and Water Conservation District, Cornell Cooperative Extension, and the Soil Conservation Service (see page 6).

   Whole Farm Plans should involve these components: soil erosion control, animal waste management, plant nutrient management, domestic animal pathogen management, and chemical and pesticide management.

   Whole Farm Plans should address these agricultural contaminants: nutrients, pathogens, sediments, toxicants, and organic matter. The level of control required for each Whole Farm Plan should depend on the presence of hydrologically sensitive areas.

d. Incentives, including cost-sharing, should be made available by the City to participating farmers, supplemented by a reasonable mix of state, federal and local funding sources, if available.

e. Continuing education, professional training and local involvement are essential components of the Whole Farm Program.

Withdrawal of Agricultural Regulations in the Discussion Draft

The City should withdraw the proposals for regulation of agricultural practices in the Discussion Draft. The City should substitute a simple prohibition against willful point and nonpoint source pollution by individual farm operators who exhibit a willful and irresponsible intent to pollute in a manner that threatens to significantly increase pollution levels and degrade the source waters of the City's water supply. Such acts of pollution are not acceptable farm practices. In addition, existing local, state and federal water quality and agricultural regulations will remain in force throughout the watershed. When feasible, and in non-emergency situations, before taking legal action against willful polluters the City will attempt to resolve matters on a cooperative, educational basis, working through the Watershed Agricultural Council (see pages 7-8) and the County Project Team.

Violations of Existing State and Federal Water Quality Statutes

Violations of existing state and federal environmental statutes by farmers should be addressed through a formal mechanism established between the regulatory agency and the local County Project Team. The farmer in violation would be referred to the County Project Team, working through the Watershed Agricultural Council. The County Project Team would arrange for a team of technical experts and representatives of appropriate regulatory authorities to visit the site and review the violation and recommend alternative solutions for correcting the problem. The farmer would have the option of selecting the alternative he or she felt would be most easily integrated into their farming operation, provided it is acceptable to the regulatory authority. A report would be prepared by the County Project Team and sent to the referring regulatory agency. Included in the report would be the alternatives discussed, the agreed upon solution and a schedule for implementation jointly agreed to by the farmer and the County Project Team.

The benefit of this approach is that the farmer could negotiate a solution with agricultural agencies that better understand the farmer's operation, and the farmer would be more likely to implement the needed practices. Additionally, the farmer would understand the need to maintain the practices installed for years to come. The regulatory agency would also avoid additional commitments of time and resources in solving the problem.

Since the City also has authority to enforce state or federal statutes in order to protect its water supply, the City, if it chooses to invoke this authority, will also utilize these same procedures whenever possible.

Streamlining the State's Permit Process

In order to accelerate installation of structural best management practices, there is a need to streamline the permitting process required under NYS Department of Environmental Conservation's Uniform Procedures Regulations for certain environmental permits, such as stream disturbance, that a farmer may be required to obtain. This could be accomplished by an agreement between the County Project Team and the appropriate regulatory agency.

Locally-Administered Whole Farm Planning/Best Management Practice Program

The City should establish a locally-administered program for the planning and implementation of Whole Farm Plans in conjunction with watershed farm operators, with assistance from the New York State Soil and Water Conservation Committee, Soil and Water Conservation Districts, Cornell Cooperative Extension, New York State Water Resources Institute, New York State Department of Environmental Conservation, the New York State Department of Agriculture and Markets, USDA Soil Conservation Service; and other appropriate institutions.

This program will be responsible for:

a. reviewing existing best management practices for their applicability to watershed pollution control objectives;
b. developing and implementing a series of immediate demonstration programs with local farm operators to test the feasibility and define the methodologies of the Whole Farm Planning approach to source protection (see Phase I Program, page 15);
c. working with farmers to prepare Whole Farm Plans; and implementing those plans; and
d. establishing a voluntary Whole Farm Planning/Best Management Practices Program for the entire farm community.

Voluntary Participation

Between January 1, 1992 and December 31, 1996, the City should offer farm operators the opportunity to voluntarily participate in the Whole Farm Planning/Best Management Practice Program. The Policy Group has established a goal of 85 percent participation in this program by farmers throughout the watershed.

Farm operators that choose to participate should be given until December 31, 1996, to work with their County Project Team to develop a Whole Farm Plan and agree to install practices according to the schedule outlined in the plan. Consideration should be given on a case-by-case basis to a year's grace period, until December 31, 1997, to have the plan prepared and agree to install the necessary BMP's. Farm operators voluntarily participating in the Whole Farm Planning/Best Management Practice Program should be held harmless and should not be required to amend the farm practices agreed to in their Whole Farm Plan if after the evaluation of the entire program in 1997 (see page 7) the City, in consultation with the Watershed Agricultural Council, determines there are changes needed in the watershed regulations or agricultural program. Participating farm operators would still remain responsible for violations of existing federal, state and local standards pertaining to water quality and for the regulatory provisions referred to above.

Cost Sharing

Participating farm operators should receive City cost-sharing for both the planning and implementation of the Whole Farm Planning/Best Management Practices Program, to the full extent of any cost incurred, adjusted for whatever funding is otherwise made available under existing or future federal and state

agricultural water quality and other cost-sharing programs. The City should pay the cost to the farmer of participating in development of the Whole Farm Plan. Cost incurred shall include BMP operation and maintenance costs identified in the Whole Farm Plan to the extent they represent new and additional farm operating costs.

Review of Progress in 1997

During 1997, the City, with the assistance of the Watershed Agricultural Council (see page 8) and other appropriate public and private parties, should engage in a review of the results of the voluntary agricultural best management program.

This review should assess the extent to which the practices and facilities called for by the whole farm plans have been, or are being, adopted on schedule and are being properly maintained. Also needed is an evaluation of whether the results are consistent with the requirements of the avoidance criteria and the City's anti-degradation water quality objectives. If the review does not justify a continuation of the program in its adopted form, the City should submit to the NYS Department of Health such revisions to the watershed regulations as it deems necessary to continue to meet its obligations and responsibilities.

The City will work with the Watershed Agricultural Council on developing parameters and criteria for evaluating the agricultural program in 1997, including a variety of program and regulatory options to consider in the event that changes may be needed. The Policy Group has concluded that all options must be available for consideration in 1997. In any case, as noted above, farm operators voluntarily participating in the Whole Farm Planning Program should be held harmless in the event that a regulatory program is pursued by the City after the 1997 review period.

2. *Watershed Agricultural Council*

The City should establish and adequately support a permanent Watershed Agricultural Council to advise and assist it in its relations with the agricultural community in the watersheds and to carry out other important functions, including participation in the resolution of violations of local, state and federal regulations in non-emergency situations and in development of regional partnership programs (see Other Incentives and Programs, page 8). Funding should be provided for reimbursement of time and travel expenses for private individuals and travel expenses of agency staff members of the Council.

Membership on the Watershed Agricultural Council should include: as a minimum, seven to ten farmers proportionately representing the agricultural distribution within the watershed, representatives from agricultural business interests, agricultural lending institutions, County Boards of Supervisors, Soil and Water Conservation Districts and Cooperative Extension, New York Farm Bureau and the New York State Grange. Representatives of the Commissioners of NYC Department of Environmental Protection, NYS Department of Agriculture and Markets, NYS Department of Environmental Conservation, NYS Department of Health, New York State Soil and Water Conservation Committee and USDA Soil Conservation Service should serve as ex-officio members of the Council. Each local agency representative serving on the Council may select one local agency staff person to serve in a technical advisory capacity to the Council members.

The Commissioner of DEP shall appoint the chairperson of the Council.

While the Council would function primarily in an advisory capacity to the Commissioner of DEP, with final decision-making residing with the Commissioner, it would be assigned a number of special functions. These would include, but not be limited to, coordinating administration of the agricultural portion of the watershed regulations. The Whole Farm Plan approach to protecting water quality from the influence of some farm practices calls for an oversight mechanism to perform a number of functions:

a) Review of individual Whole Farm Plans developed by the County Project Teams to assure consistency of the BMP approach, and acceptability to New York City as the basis for voluntary participation, and financing support.

b) Review and advice to the DEP Commissioner of progress in voluntary participation with Whole Farm Plans as reported by on-site evaluation performed by Soil and Water Conservation District and Cooperative Extension staff. Conversely, advice to the Commissioner on actions that should be taken for farms which are identified as having a willful and flagrant violation of water quality standards.

c) Monitoring progress of the education and training program for professionals and farmers to be conducted by Cornell University, and the broader public education program to be conducted for citizens and government officials in the watershed.

d) Assessing, in collaboration with the DEP's Bureau of Water Supply, NYS DEC and WRI at Cornell University, periodic progress in water quality maintenance and improvements resulting from the installation of alternative practices in agriculture and other aspects of watershed life.

e) Encouraging farmers to participate in the voluntary program, with a goal of achieving 85 percent participation.

f) Development and review of long and short term agricultural incentives, including farmland retention programs.

The Council shall meet on call of the Chair, or at least four times a year. The Chair shall prepare the meeting agendas.

3. *Other Incentives and Programs*

Participating farm operators should be eligible for the benefits from other regional partnership programs and incentives the City plans to develop in conjunction with the Watershed Agricultural Council.

The importance of significant incentives to the success of the voluntary program cannot be overstated. Although certain BMP's should benefit farmers from an economic stand point, some of these benefits may not be realized by the producer for years. That being the case, it is not realistic to assume that any supposed benefits of a given BMP will necessarily be viewed as an incentive for participation.

In addition to incentives to compensate producers for their management time lost during the planning phase of the Whole Farm Program, other incentives are necessary. Coming to consensus on what those incentives should be is extremely difficult, due to the varied resources on each farm.

Embarking into new territory, such as incentives, it may be premature to state absolutely what specific incentives are necessary. The incentive issue is so complex that it may be necessary to allow it to evolve over time. Phase I of the implementation program as well as informational meetings with producers will be necessary to determine what the realistic options are. The Watershed Agricultural Council will be another medium to help determine incentives required for the success of the program.

In addition to a farmer incentive program, the City should review other programs for feasibility, including:

a. *Composting and Manure Management*
   Under this proposal, the City should provide financing for and management of an off-farm infrastructure through which manure not required for crop nutrient management would be picked up, composted, and redistributed without charge, for use as a soil amendment.

b. *Farmland Retention Program*
   The City should consider supplemental ways to encourage the continuation of farming in the watershed region. These would include assisting local governments to support and nurture agricultural endeavors in their communities by adopting some of the farmland retention techniques successfully implemented in other parts of the state and country. A review of farmland retention programs that should be considered in a New York City Watershed and Agricultural Protection strategy include the following:

- Lease of Development Rights
- Transfer of Development Rights
- Purchase of Development Rights
- Establishment of Urban Growth Boundaries
- Conservation Easements
- Land Conservancy
- Prohibition on the Condemnation of Agricultural Land
- Direct Purchase of Dairy Products
- Support of Dairy Price Stabilization Initiatives
- Restructuring Local Property Tax Assessments on Agricultural Land
- Agricultural Real Property Tax Circuit Breaker
- Combination of Several Techniques

4. Program to Review the Impacts of Non-Agricultural Regulations on Agriculture

In addition to its on-going discussions with other watershed interests, including the Coalition of Watershed Towns, the City should consult with the Watershed Agricultural Council in revising these non-agricultural regulations proposed in the Discussion Draft, to accommodate and promote the voluntary best management practice approach where possible:

- definition of watercourses; nonpoint sources; impervious surfaces; erosion; junkyards; etc. as these apply to farms

- definition of watercourses; nonpoint sources; impervious surfaces; erosion; junkyards; etc. as these apply to farms
- management of on-farm septic systems
- storage of petroleum products on farms
- storage of toxic materials
- storage and use of de-icing materials on farms.

III. Whole Farm Plan Preparation

The Whole Farm Plan concept is predicated on an entirely volunteer approach and would not be undertaken without the farmer's approval and participation. The plan would have two major objectives:

1. To protect or enhance water quality, and
2. Maintain or enhance the potential for increasing profitability of the farm.

An analysis of the farm will be necessary. The degree to which an analysis needs to be done will be dependent upon yet to be developed criteria and known criteria for determining the potential hazard that a particular farm poses to water quality. The focus of those criteria will be dependent upon the threat of a farm delivering nutrients, pathogens, sediments, toxicants and organic matter into the water supply. The Whole Farm Approach is outlined later in this report and includes the need for collecting financial data on the farm business. Consistent with current farm conservation planning procedures, financial information disclosed by the farmer for the purpose of analysis or any other reason is not public domain and should not be disclosed to anyone without written permission of the farmer. It is absolutely necessary to keep this information private when it is released to an agency analyzing and utilizing the data for the expressed purpose of assisting the farmer in making decisions and providing proof that a given practice will negatively impact the farm management and profitability. The farmer should hold this financial information or allow it to be stored with the agency involved with the financial analysis.

The depth of financial analysis needed is a function of the degree to which changes are needed on each specific farm. The assumption is that the more changes needed, the greater the financial impact will be on the farm. The reason for the financial data is two fold. First, it provides baseline data to help determine what proposed changes will have on overall profitability. Second, it will help track changes in operating costs associated with changes in management practices associated with BMP's. It is completely possible that no more than a simple analysis of a few specific BMP's will be necessary and therefore there will be only a need to review the simple difference in the cost of conducting an activity under current practices as compared to the suggested BMP. On the other hand, in some cases, in depth financial analysis may be necessary.

The Whole Farm Plan Approach concept is very comprehensive, and on the surface appears to be overwhelming. It is unlikely that the majority of farms will have to undergo every step in detail, outlined on pages 13 & 14 of this report. As noted above, every farm is different and each will require a different degree of planning. An inventory of land resources, buildings and machinery, capital resources (only to the degree necessary in agreement with the farmer) and labor resources will be needed to help determine the feasibility of implementing suggested BMP's necessary to achieve the objectives of the plan.

In conclusion, the Whole Farm Plan will be implemented in various degrees on each farm, incorporating throughout the process, the farmer's input as the critical member of this team effort. Varying degrees of financial data collection is unavoidable. The objective of the plan is to protect water quality and, equally important, to maintain or enhance farm profitability.

Water Quality Protection Features of Whole Farm Plans

The following classes of agricultural contaminants pose potential threats to surface drinking water quality. Each should be addressed in the farm plan to the extent that the contaminant is generated by the farm operation. They are not listed in order of significance.

- Nutrients (phosphorous-primary, nitrogen-secondary)
- Pathogens (from domestic livestock)
- Sediments (from farmland)
- Toxicants (synthetic pesticides used in agricultural operations)
- Organic matter (e.g., manure, silage, and other incompletely decomposed organic matter generated by agricultural operations)

Principles and Standards of Control

The following principles and protection standards should govern the fashion in which each potential water quality contaminant is addressed in the farm plan:

a. Animal Waste

1. Principle

Manure and other waste produced by domestic livestock agricultural operations should be managed in ways that limit the amount of nitrates, phosphates, urea, and animal-borne pathogens that may be discharged to surface waters or percolate to groundwaters.

2. Water Quality Protection Standard to be Attained

Limit discharges and percolation, to the maximum extent practicable, with best available technology consistent with economically efficient farm and livestock management practices.

b. Plant Nutrient Management

1. Principle

Plant nutrient needs should be met in ways that supplement the nutrient availability of the soil, only to the extent necessary to economically satisfy the specific needs of each crop according to the demands of its growth cycle.

2. Water Quality Protection Standard to be Attained

Maximize nutrient utilization by crop plants, minimize nutrient loss to surface or ground water.

c. Domestic Animal Pathogen Management

1. Principle

Each agricultural operation that generates or uses domestic livestock waste should have a management program to control the release of pathogens to drinking water supplies.

2. Water Quality Protection Standard to be Attained

Limit release of pathogens to surface waters to the maximum extent technically and economically practicable.

d. Soil Erosion Control

1. Principle

Employ established Best Management Practices to minimize (1) siltation of natural water courses; (2) increased suspension of particles; and (3) nutrient and pathogen transfer to water courses that accompanies soil erosion.

2. Water Quality Protection Standard to be Attained

Prevent soil transfer to surface waters to maximum extent technically and economically practicable.

e. Pesticide Management

1. Principle

Minimize, to the extent possible, the discharge to ground or surface water of any toxic chemical used in farming operations, but in no case allow concentrations that exceed standards established by New York State.

2. Water Quality Protection Standard to be Attained

i. Use of chemical pesticides for the control of agricultural pests should be according to label as specified by EPA and New York State Department of Environmental Conservation registration requirements.

ii. Mixing, loading, washing of containers, calibration of equipment, and on-farm storage of pesticides should be according to established policies and regulatory requirements.

iii. IPM practices involving least-chemical use or complete dependence on biocontrols and cultural practices for pest control should be adopted as soon as they are available and proven effective and cost-efficient.

Implementation of Principles and Standards

Agricultural Best Management Practices, as developed by New York State in support of the nonpoint source water pollution control policies of State Law and Section 319 of the Federal Water Quality Control Act Amendments of 1987, are the preferred methodologies and techniques for implementing these principles and standards on farms in the New York City watershed system. The Whole Farm Planning Approach should be employed to tailor the applicability of relevant BMP's to conditions peculiar to each farm, while providing for a farm management plan that sustains or enhances the efficiency, productivity, and economic profitability of the farm enterprise.

Scientific uncertainty exists when relating agricultural practices to their effects on raw water compliance with drinking water standards. Drinking water standards for raw water at its source covering some of the agricultural contaminants of concern are not defined. Therefore, as a general rule, Whole Farm Plans should call for the design, installation, management, and maintenance of any combination of BMP's necessary to limit the release of nutrients, organic matter, domestic animal-borne pathogens, toxic chemicals, and soil to any surface or ground water body, consistent with applicable state and federal laws and regulations, as well as with the water quality goals established for the watershed. In those cases where it can be shown that an activity or a specific farm leads to an actual violation of a legally adopted water quality standard, the farm shall be required to alter the activity to the extent necessary to meet the water quality standard.

While it may be possible to achieve zero discharge of some contaminants during some periods, i.e., avoiding winter land application of manure or relying wholly on biocontrols or cultural practices to control some pests, universal attainment of zero discharge for all agricultural contaminants at their source is not practically achievable.

The Planning Process

The evaluation of current conditions and practices, and the development of options for both the business enterprise and water quality protection, should be a collaborative venture between the farm operator and County Project Team, supported by the Soil Conservation Service, Cornell University faculty/staff, and the New York State Soil and Water Conservation Committee.

Steps in Whole Farm Planning

A) Survey Farm Resources

1) Soils, crops, water, etc.
2) Buildings and equipment
3) Capital resources
4) Human resources

B) Prepare Economic Analysis of Farm Business

1) Establish farm business objectives
2) Analyze resources, considering economic and environmental opportunities
3) Examine operational alternatives
4) Develop revised business plan

C) Identify and Evaluate Alternative BMP's Available to Implement Revised BusinessPlan

1) Off-site impacts on water quality
2) On-site impacts
   a) environmental
   b) economic
3) Cost - benefit of BMP's recommended
4) Effect on overall farm operations
5) Change in management skills required

D) Select Most Appropriate BMP's to Meet the Individual Characteristics of the Farm Business in Cooperation with:

1) Farm operator
2) Local program delivery team (SWCD, SCS, CCE)

E) Develop a Schedule of Implementation of Selected BMP's Considering:

1) Resources available both on and off the farm
2) Training needed
3) Regulatory approval needed for selected practices

F) Submit Plan for Approval to SWCD and CCE Boards

G) Conduct Periodic Review of the Plan Implementation Needs by County Project Team.

The Whole Farm Plan should be considered complete when the farm operator and the professional planning assistance institutions listed above come into agreement on all of its features. The plan becomes official when it is approved by the Soil and Water Conservation District Board and the Cooperative Extension Board of Directors of the county in which the farm is located and reviewed by the Watershed Agricultural Council. It constitutes the guide to future farm business management, as well as the blueprint for modified management practices and the installation and maintenance of facilities designed to protect water quality.

Staff fully trained in all aspects of Whole Farm Planning are needed to complete plans for at least 550 farms within five years. Maps showing the approximate location of farms in the Catskill, Delaware and Croton Watersheds can be found in the appendix.

IV. BMP Implementation

The implementation of Whole Farm Plans may be viewed as a two level process. First, the "installation" of physical structures prescribed by the farm plan will need to be arranged. These structures may include grass waterways, manure storage facilities, barnyard improvements, diversions, etc. Engineering expertise is needed from the design through final certification of construction. Engineering technical assistance needed includes: gathering of site specific data on soil type, drainage characteristics, and

topography; preparing construction drawings, specifications, and contract documents; reviewing design with land owner; assisting land owner in securing contractors; surveying and staking out project site; inspecting ongoing installations/constructions; and certifying that projects meet contract standards.

The second level of implementing Whole Farm Plans requires the integration of a farm's physical, human and time resources so that prescribed changes can be incorporated into the operational routine of the farm. This level of implementation involves an array of educational activities targeted at changing perceptions, attitudes, practices, and beliefs of farm managers.

Costs of Planning and Implementation

Costs associated with the planning and implementation of the Whole Farm Plan/BMP Approach to protecting water quality are difficult to estimate before the Phase I Program (see below) is completed. The Phase I Program contains an evaluation component that will provide a basis for NYC to determine the watershed-wide planning and implementation costs.

V. Refinement and/or Development of Needed Technical Tools

In order to implement the Whole Farm Planning Approach, it is necessary that a consensus be developed on the process to be used in developing the components of the Whole Farm Plan, utilizing as a foundation SCS's existing conservation planning process, while incorporating Cooperative Extension's farm business management assistance programs, such as the Pro-Dairy Program. It is also extremely important that there is a consensus on which agricultural Best Management Practices should be promoted within the NYC watershed region for watershed protection as well as what new Best Management Practices may need to be developed. Also, not all farms or all areas on the farm pose the same level of off-site pollution threat, so identifying the hydrologically sensitive areas is critical to the successful implementation of a watershed protection program. Before changes in farm operations can occur, perceptions and attitudes about the significance of protecting water quality will need to be addressed through targeted educational initiatives aimed at farm managers and agribusinesses. There is also a need to ensure that the County Project Team has the needed technical expertise to successfully implement the Whole Farm Planning/BMP Program. Finally, analytical tools currently available to evaluate BMP effectiveness and predict pollutant loadings need to be reviewed and adopted for use in the NYC watershed region.

VI. Phase I Whole Farm Program

The purpose of Phase I of the Agricultural and Watershed Protection Program is to develop, test, demonstrate, and market the Whole Farm Planning/BMP Approach on selected farms and to strengthen the New York City/local partnership.

Phase I is anticipated to be a 2 1/2 year effort to refine the Whole Farm Planning/Best Management Practices Approach for watershed protection. Phase I will be a mini-version of the planning, implementation and evaluation activities to be accomplished over the life of the project. During the first 2 1/2 years, considerable time will be devoted to organizing the program, packaging the program, training agency staffs, developing new Best Management Practices as needed, explaining and develop-

ing support among the farm community and the public and evaluating initial accomplishments to determine overall program success and adjustments needed.

Delaware County is where the Phase I efforts will initially be focused, starting in early 1992. In year two, the program will be expanded into the remaining counties in the Catskill/Delaware Watersheds. Phase I will be considered completed when the Whole Farm Planning/Best Management Practices Program is fully operational in all the New York City water supply watersheds.

Details of the Phase I Whole Farm Planning/Best Management Practices Program are included in the appendix of this report.

Appendix

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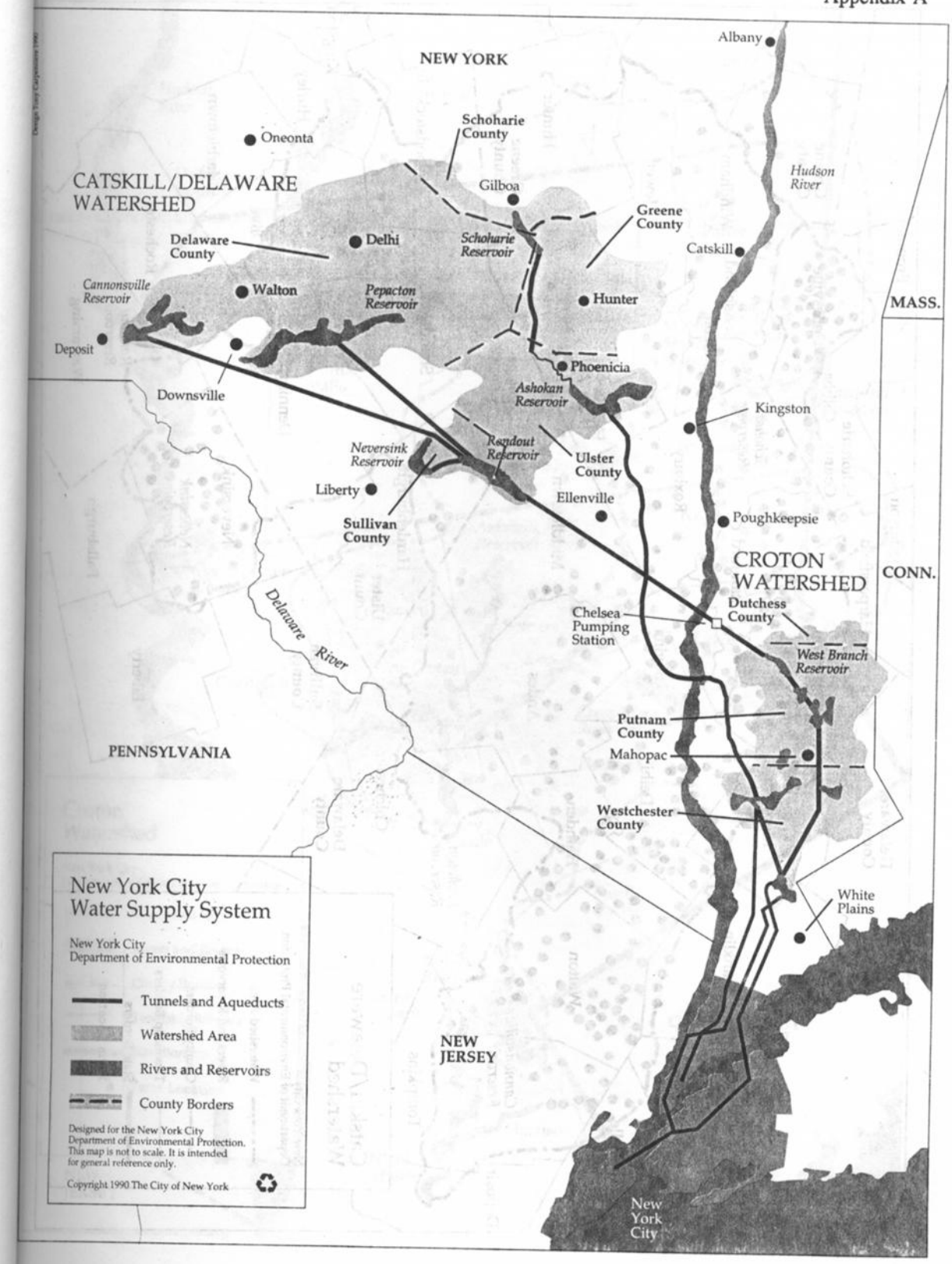
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Catskill
Cannonsville Reservoir
Walton
Pepacton Reservoir
Hunter
MASS.
Deposit
Phoenicia
Downsville
Ashokan Reservoir
Kingston
Neversink Reservoir
Rondout Reservoir
Ulster County
Liberty
Ellenville
Sullivan County
Poughkeepsie
CROTON WATERSHED
CONN.
Delaware River
Chelsea Pumping Station
Dutchess County
West Branch Reservoir
Putnam County
PENNSYLVANIA
Mahopac
Westchester County
White Plains
NEW JERSEY
New York City
New York City Water Supply System
New York City Department of Environmental Protection
Tunnels and Aqueducts
Watershed Area
Rivers and Reservoirs
County Borders
Designed for the New York City Department of Environmental Protection. This map is not to scale. It is intended for general reference only.
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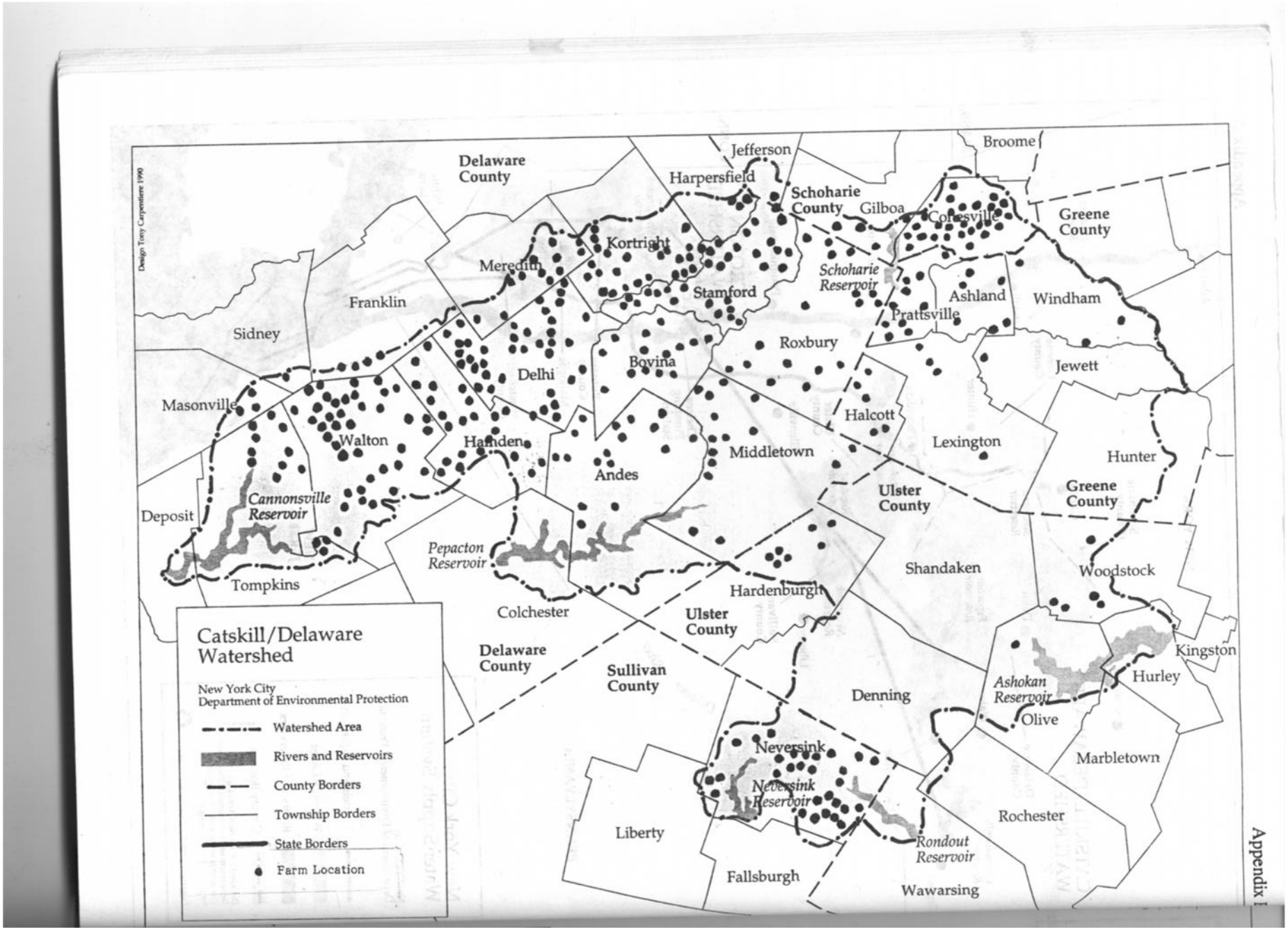
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Broome
Harpersfield
Schoharie County
Gilboa
Greene County
Kortright
Meredith
Schoharie Reservoir
Franklin
Stamford
Ashland
Windham
Prattsville
Sidney
Roxbury
Bovina
Delhi
Jewett
Masonville
Halcott
Walton
Hamden
Middletown
Lexington
Andes
Hunter
Ulster County
Greene County
Deposit
Cannonsville Reservoir
Pepacton Reservoir
Shandaken
Woodstock
Tompkins
Hardenburgh
Colchester
Ulster County
Kingston
Delaware County
Sullivan County
Ashokan Reservoir
Hurley
Denning
Olive
Neversink
Marbletown
Neversink Reservoir
Rochester
Liberty
Rondout Reservoir
Fallsburgh
Wawarsing
Catskill/Delaware Watershed
New York City Department of Environmental Protection
Watershed Area
Rivers and Reservoirs
County Borders
Township Borders
State Borders
Farm Location

Appendix

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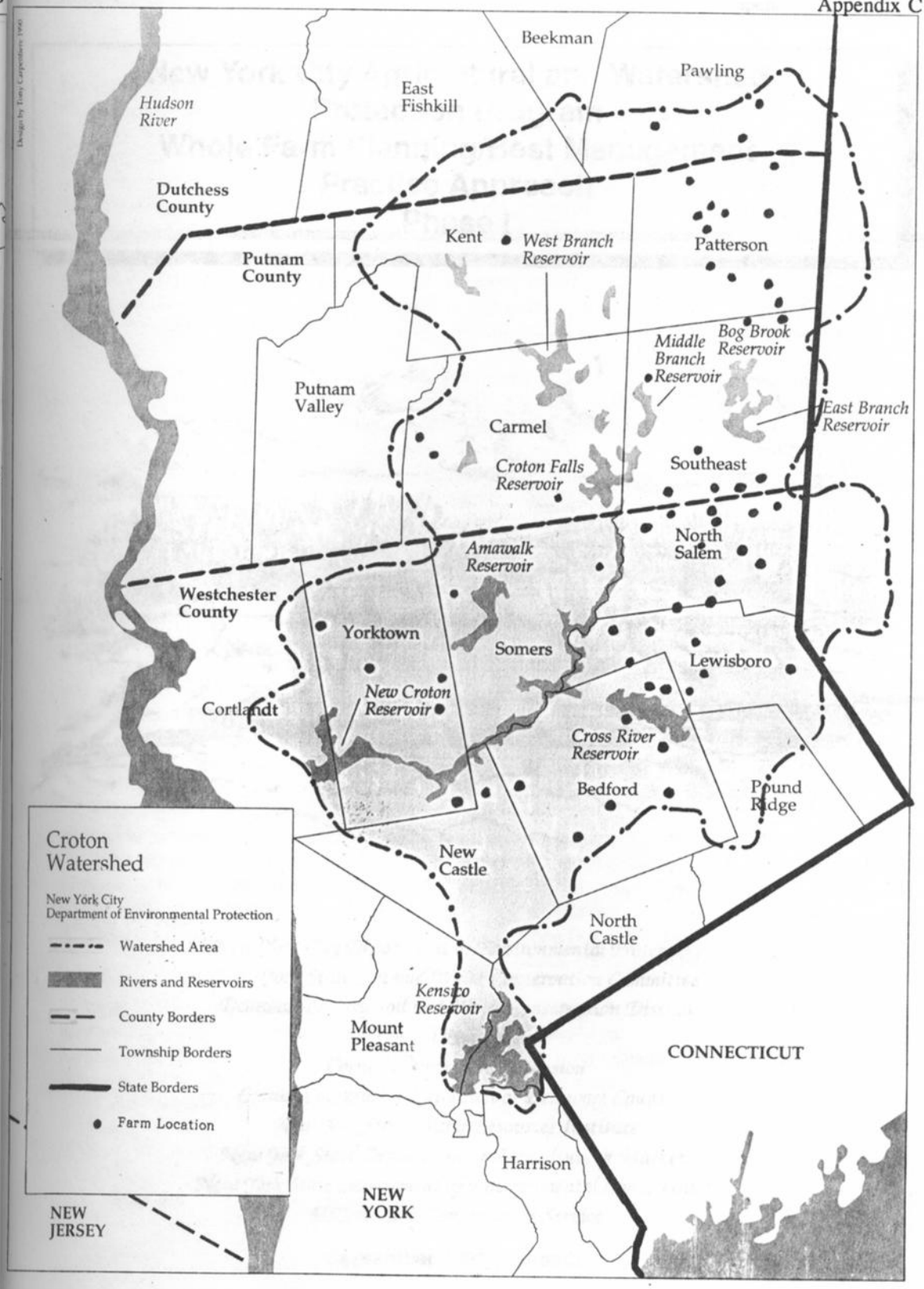
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Patterson
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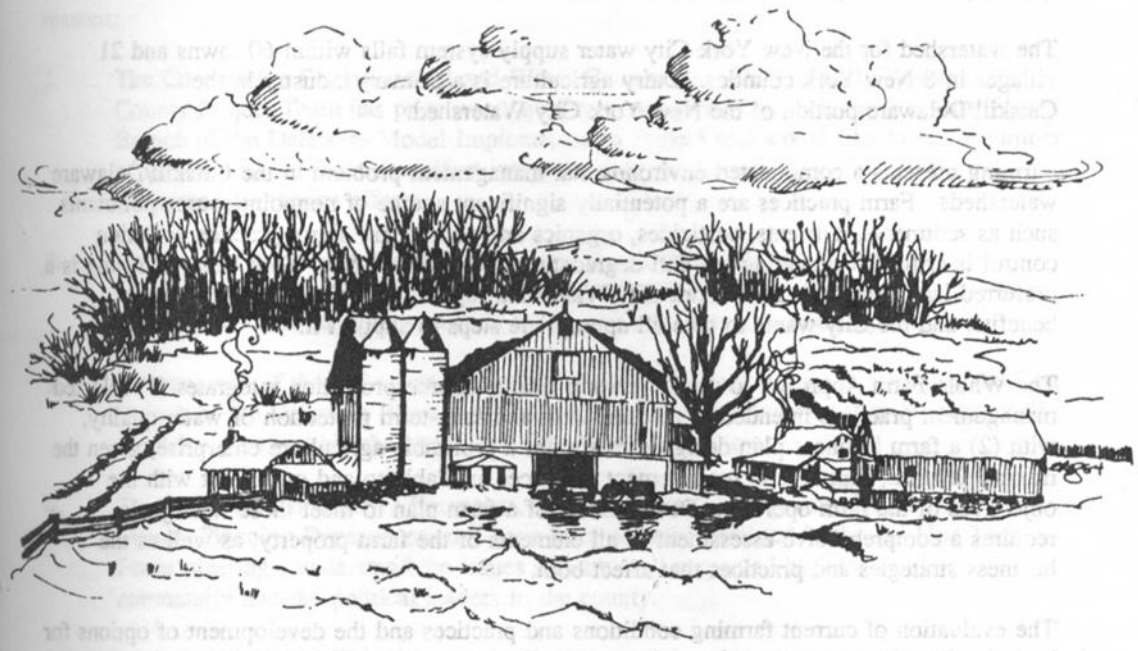
Middle Branch Reservoir
Bog Brook Reservoir
Putnam Valley
East Branch Reservoir
Carmel
Croton Falls Reservoir
Southeast
North Salem
Amawalk Reservoir
Westchester County
Yorktown
Somers
Lewisboro
New Croton Reservoir
Cortlandt
Cross River Reservoir
Bedford
Pound Ridge
New Castle
North Castle
Kensico Reservoir
Mount Pleasant
CONNECTICUT
Harrison
NEW YORK
NEW JERSEY
Croton Watershed
New York City Department of Environmental Protection
Watershed Area
Rivers and Reservoirs
County Borders
Township Borders
State Borders
Farm Location

New York City Agricultural and Watershed Protection Program Whole Farm Planning/Best Management Practice Approach Phase I



New York City Department of Environmental Protection
New York State Soil and Water Conservation Committee
Delaware County Soil and Water Conservation District
Cornell University
Cornell Cooperative Extension
Cornell Cooperative Extension of Delaware County
New York State Water Resources Institute
New York State Department of Agriculture & Markets
New York State Department of Environmental Conservation
USDA - Soil Conservation Service

September 1991 (revised)

New York City Agricultural and Watershed Protection Program
Whole Farm Planning/Best Management Practice Approach
Phase I

Introduction

The City of New York is the primary drinking water supplier for approximately half the population of New York State, including 8 million residents of New York City and an additional 1 million residents of upstate counties. This drinking water system flows from a watershed area of over 1,950 square miles and is distributed through three separate reservoir systems, the Croton, Delaware, and Catskill.

The watershed for the New York City water supply system falls within 60 towns and 21 villages in 8 New York counties. Dairy agriculture is a primary industry in the Catskill/Delaware portion of the New York City Watershed.

Farming presents a complicated environmental management problem in the Catskill/Delaware watersheds. Farm practices are a potentially significant source of nonpoint source pollutants such as sediments, nutrients, pesticides, organics and pathogens. Farm practice pollution control is critical for meeting the anti-degradation objectives of New York City. Farming is a preferred land use in the New York City Watershed region, with significant long-term benefits, and the City wants to take all appropriate steps to support it.

The Whole Farm Approach to drinking water quality source protection integrates (1) selected management practices intended to provide short and long-term protection of water quality, with (2) a farm business plan designed to sustain a profitable agriculture enterprise, given the mix of physical, capital, and management resources available to and consistent with the objectives of the farm operator. Development of a farm plan to meet these twin goals requires a comprehensive assessment of all elements of the farm property, as well as the business strategies and practices that affect both.

The evaluation of current farming conditions and practices and the development of options for both the farm business enterprise and water quality protection, will be a collaborative venture between the farm operator and the Cooperative Extension/Soil and Water District County Project Team, supported by the USDA Soil Conservation Service, Cornell University faculty/staff, New York State Soil and Water Conservation Committee and New York City Department of Environmental Protection.

The use of the Whole Farm Planning Approach to accomplish pollution prevention has not been previously attempted anywhere. The Whole Farm Plan is a new concept which requires the integration of the diverse views and convictions of the agencies involved. The purpose of Phase I of the Agricultural Watershed Protection Program is to develop, test and demonstrate the Whole Farm Planning Approach on selected farms and to strengthen the New York City/local partnership.

Phase I is anticipated to be a 2 1/2 year effort to refine the Whole Planning/Best Management Practices Approach for watershed protection. During the initial 2 1/2 year period a number of activities will begin which will need to be carried on throughout the remaining years of the program. Phase I will be a mini-version of the planning, implementation and evaluation activities to be accomplished over the life of the project. During the first 2 1/2 years considerable time will be devoted to organizing the program, packaging the program, training agency staffs, explaining and developing support among the farm community and the public and evaluating initial accomplishments to determine overall program success and adjustments needed.

Delaware County is where the Phase I efforts will initially be focused for the following reasons:

1. The Cooperative Extension/Soil and Water Conservation District/Soil Conservation County Project Team has prior water quality experience from their work on the West Branch of the Delaware Model Implementation Project and would like to see a number of lessons learned from that effort integrated into the current New York City Watershed Protection efforts.

2. The Cooperative Extension/Soil and Water Conservation District/Soil Conservation County Project Team are already working cooperatively on another agricultural water quality project in the county outside the New York City Watershed System.

3. The majority of the Delaware Watershed which includes the West Branch and the East Branch of the Delaware River is in Delaware County and contains over 80 percent of the dairy farms within the New York City Watershed Region.

4. The Delaware Cooperative Extension, Soil and Water Conservation District and the County Planning Department staff have been actively involved in the Ad Hoc Task Force Meetings, understand the issues and are well respected by both the farm community and the political leaders in the county.

In year two, the program will be expanded into the remaining counties in the Catskill/Delaware Watersheds.

Work Tasks for Phase I Program Start Up

1. Develop the Whole Farm Plan Management Components for
   - *a. Soil Erosion Control*
   - *b. Animal Waste Management*
   - *c. Plant Nutrient Management*
   - *d. Domestic Animal Pathogen Management*
   - *e. Pest and Pesticide Management*

2. Develop the Farm Business Management Analysis Component of the Whole Farm Plan

3. Develop a Procedure to Identify the Hydrologically Sensitive Areas

4. *Package the Whole Farm Plan Approach and Provide Training to the County Project Teams*

5. *Test and Evaluate the Whole Farm Planning Approach on Selected Farms*

6. *Validate and Document the Effectiveness of Best Management Practices (BMP's)*

7. *Conduct an Agricultural Enterprise Census--Development of Case Studies*

8. *Implementation of Selected BMP's on the Demonstration Farms*

9. *Develop Support in the Farm Community and the Public for the Whole Farm Planning Approach*

10. *Begin the Implementation of the Program Region-wide*

11. *Supporting Tasks*
    a. *Establish a System to Monitor Agriculture Land Use and Water Quality Effects*
    b. *Data Management*
    c. *Complete the Soil Survey of Delaware County*
    d. *Provide Individual Farm Soil Consultation*
    e. *Obtain New Aerial Photography*

12. *Program Coordination and Administration*

Task 1 - Develop the Whole Farm Plan Management Components

The Whole Farm Plan will address soil erosion control, nutrient management, pesticide management, pathogen management, milkhouse waste disposal, barnyard runoff control and alternative field production measures. Each one of these environmental components of the Whole Farm Plan has a combination of conservation practices or management measures which will need to be incorporated into one or more best management systems for that farm to obtain needed pollution prevention objectives. These best management system components will be developed by Cornell and SCS.

a. Soil Erosion Control

USDA Soil Conservation Service (SCS) currently utilizes two types of farm conservation planning: Food Security Act (FSA) and Resource Management System (RMS) planning. Resource Management System plans identify alternatives to treat five resource areas over the entire farm: Soil, Water Air, Plants and Animals. During the past five years SCS has concentrated on FSA planning, developing plans which focus on erosion control and wetland conservation to keep farmers eligible for USDA programs in accordance with the Food Security Act of 1985. As a result, senior SCS field and area staff are out of practice and newly hired personnel have not been trained in RMS planning. This task is designed to reintroduce the RMS planning process to the County Project Teams and to evaluate pre-FSA information, education and training

materials as well as newly developed materials.

The result of this effort will be: improved technical material and recommendations for modifications to standards and specifications to best fit the watersheds. Information and expertise gained through the planning demonstration will allow technical and program specialists to strengthen the conservation planning elements which will need to be incorporated into the Whole Farm Planning effort as part of Task 4. The USDA-SCS will take the lead for this task in cooperation with the County Project Team.

b. Animal Waste Management

Animal waste management is a planned system in which all necessary components of the system are installed in a manner which does not degrade air, soil or water resources and protects public health and safety. Pollutants from improperly managed manure include nutrients, organic matter and micro-organisms. Waste includes solid and liquid manure, milking center wash water and polluted runoff from barnyards. Each consecutive step in manure management, from the production of animal waste to its final use, presents options. Choices include: location of facilities on farm, access of livestock to water, initial collection of manure, storage, treatment and use. Choices at each step constitute trade-offs in efficiency and benefit. Task 1b will evaluate options for each step in manure management in three ways: the degree of risk to the quality of ground or surface water; their costs; and their compatibility with the overall operations and management of the farm.

Task 1b will identify and analyze for each demonstration farm, options governing the whole system of manure production and utilization. Options, which prevent pollution in the manure management system and which are most compatible with the farm economically and organizationally, will be adopted and demonstrated on each farm. The USDA SCS will take the lead for this task, in cooperation with the County Project Team.

c. Plant Nutrient Management

Nutrient management consists of integrating the availability of nutrients in the soil (supplied from organic matter, soil minerals, crop residues and animal manure) with the nutrient requirement of crops. A well-designed program controls nutrient loss by reducing excessive applications. To achieve this objective, it is necessary to determine the nutrient budget for the farm as a whole. Component practices include soil testing, nutrient analysis of the manure, manure spreader calibration and soil management practices to control surface runoff or leaching. This program will demonstrate how to establish the agronomic basis for developing a nutrient management and soil management plan consistent with economic and environmental considerations.

Task 1c will result in a nutrient management plan for each pilot farm created as a component within the Whole Farm Plan. A total nutrient budget will be constructed which matches nutrient inputs to crop needs as closely as is technically possible. The economic advantages of efficient nutrient management will be demonstrated. The

County Project Team will work with Cornell (Stu Klausner and Harold van Es, Department of Soil, Crop and Atmospheric Sciences) in creating nutrient management plans for each pilot farm.

d. Domestic Animal Pathogen Management

Wastes from wild and domestic animals and humans are sources of pathogens, especially with respect to coliform bacteria and enteric viruses. Recognition that wastes also can be sources of parasitic protozoa is a recent concern that has direct implications for human health. Methods to control the pathogens released in dairy operations require exploration and testing. Currently an inter-agency pathogen working group is developing a research program which will provide information for this task.

Task 1d will identify methods to treat and safely dispose of fecal matter from animals, especially calves. Simultaneously, cost effective ways of preventing enteric disease in calves and the herd generally, will also be identified. Where practicable, such improvements in herd husbandry will be adopted and demonstrated. Each pilot farm will adopt a pathogen control plan. Options to treat pathogens in manure will also be explored where economically feasible, and will be addressed and demonstrated. Members of the County Project Team will work with the Cornell Team (Alice Pell, Susan Wade, Bill Ghiorse, and Tom Richard, respectively in Departments of Animal Science, Veterinary Diagnostic Laboratory, Microbiology, and Agricultural and Biological Engineering) to determine risks posed by the various pathogens in the animal wastes, and methods by which they can be controlled. The team will assist in the adoption and demonstration of preferred options for pathogen control on each farm.

e. Pest and Pesticide Management

Pesticide management is highly regulated, but many options remain to manage pesticides and control pests. Pesticide management and pest control offers the farmer one of the best opportunities to save money and to protect water quality. Integrated Pest Management (IPM) is a pest population management system that uses all suitable techniques, such as natural enemies, pest resistant varieties, cultural management and, as needed pesticides in a total crop production system to anticipate and prevent pests from reaching damaging levels. IPM is a management approach which optimizes crop protection decisions by determining pest control needs, helping to identify all suitable control options and providing a framework to implement least toxic management strategies. These strategies include, where appropriate, decisions regarding the selection, timing, and application rate of registered pesticides.

Pesticide uses can be evaluated for risk to the environment. Choices that consider environmental parameters will minimize risk of contamination to ground or surface water. Cornell has created a training program for pesticide applicators which explains the need to consider water quality in making decisions about pesticide use. There is a corresponding need to better incorporate water quality considerations in IPM recommendations. In making applications of pesticides, it is important to select and

properly use the most suitable application equipment. In addition, accurate calibration of spraying equipment must be performed regularly.

Apart from the field application of pesticides, there are the serious questions of storage, mixing, loading, and disposal of pesticides. These activities, with pesticides in a more concentrated form, pose a greater risk of water pollution than do properly made applications of pesticides. In hydrologically critical management zones on farm, in particular, it may be deemed appropriate to relocate or construct a secure constrained structure for loading, mixing, and storing pesticides.

Task 1e will result in Cornell College of Agriculture and Life Sciences research based IPM practices utilized to enhance management efficiency regarding the key pests on the crops and livestock in the watershed. Within existing federal and state regulations, available options for pesticide management and pest control which best protect water supplies will be identified and utilized. Pesticide management options on the pilot farms which protect water supplies and if possible, will have the support of the agricultural-chemistry industry as well as the regulatory community will be sought.

The set of options selected and adopted on each farm will be assessed in terms of their water quality protection objective. This will include site inspections and edge of field water quality monitoring. A guide will be produced which integrates the three intersecting issues of this task: water quality protection, pesticide management to prevent pollution, and the use of Integrated Pest Management strategies.

Those members of the County Project Team with designated responsibilities for pesticide and pest management will develop a pesticide and pest management plan for each pilot farm as a component within each Whole Farm Plan. The team members will become trained to extend this planning to other farms in the watershed. The Cornell principals are Don Rutz, Keith Waldron, and Keith Porter (respectively in Departments of Pesticide Management Education Program, Integrated Pest Management, and the NYS Water Resources Institute).

Task 2 - Develop the Farm Business Management Analysis Component of the Whole Farm Plan

A farm business management analysis that assesses each farm's resources, i.e. land, labor, buildings, machinery, equipment, animals, management capabilities, organizational capabilities, and evaluates the farm's effectiveness in utilizing these resources in crop and animal productions is an integral part of the Whole Farm Plan Approach. This component of the plan will help to identify what is needed to maintain the long-term viability of the farm operation while also providing a mechanism to evaluate whether a Best Management Practice or system being recommended to solve a farm water quality problem will be compatible with the long-term business management needs of the farm. The overall goal of the economic component will be to optimize the profitability of the farm while minimizing the farm's operations environmental impacts. Members of the Cornell Dairy Working Group will develop the farm business management analysis component of the Whole Farm Plan in cooperation with the County Project Team.

Task 3 - Develop a Procedure to Identify the Hydrologically Sensitive Areas

In the past ten years our understanding of the hydrologic process has improved tremendously. We now realize that depending on the physical properties of the watersheds, only a portion, often a very small area, of the watershed contributes direct surface runoff. It is this direct surface runoff that transports many of the potential agricultural pollutants from farm fields to receiving streams and lakes. The contributing area is variable in both time and space because the factors that control direct surface runoff also vary.

Identification of hydrologically sensitive areas will allow farmers to adjust practices for these areas using more flexible management strategies and with more effectiveness in reducing pollution than proposed land use regulations, such as fixed buffer strips, recommended in the 1990 Proposed Draft Regulations.

Cornell/WRI in cooperation with the County Project Team and NYCDEP will develop a procedure for identifying and prioritizing hydrologically sensitive areas. On each demonstration farm hydrologically sensitive areas will be mapped and described. Appropriate Best Management Practices will be identified for use in these sensitive areas. A guide will be prepared that describes the criteria and methods to be used to delineate these hydrologically sensitive areas. Supporting informational materials will be produced to explain to farm operators how the hydrologically sensitive areas concept can be applied in practice.

Task 4 - Package the Whole Farm Planning Approach and Provide Training to the County Project Teams

There is a need to refine and package existing methodologies and tools available from USDA, Cornell, etc. so agriculture professionals at the county level can assist farmers in developing and implementing Whole Farm Plans for water quality protection.

County agency staffs do not presently have all the technical expertise they will need to assist farm operators to recognize and address all the water quality problems on their farms. Also, the expertise of the county level staff varies from county to county. Areas where technical expertise is lacking at the county level include: pesticide management, complete nutrient recycling, manure management and animal husbandry needs for maximum pathogen control and alternative field production measures. Initial training will be needed in the above area in order for the county level staff to be adequately prepared technically to begin preparing Whole Farm Plans for the demonstration farms. As technical issues arise the County Project Team and the Cornell Dairy Working Group will address these issues together.

All previous tasks produce informational products and technical tools to be used by the County Project Team. These materials will be packaged by Cornell into a Whole Farm Planning Core Manual to be used as a training tool and technical reference for the County Project Teams. The components of the core manual will be developed as a joint effort between Cornell, SCS and the Delaware County Project Team during preparation of Whole Farm Plans on the six demonstration farms in Delaware County.

The Whole Farm Planning Core manual will be completed by the second year of the program and used as a basis for training staff in the other counties. The principles, standards and methods developed for this dairy based program will be applicable to other agricultural enterprises in the watershed.

The environmental and economic components of the Whole Farm Plan will be integrated into SCS's existing conservation planning process. This will be the process utilized by the County Project Team to deliver the Whole Farm Plan Approach. The expanded conservation planning process provides a step-by-step mechanism for preparing the plan, documenting acceptable alternative best management systems for that farm, recording the farm operations decisions, maintaining a case file to record accomplishments and monitor changes in the farm operation as they occur.

Task 5 - Test and Evaluate the Whole Farm Planning Approach on Selected Farms

Testing the Whole Farm Planning Approach

At least ten farms will be selected by the County Project Team with assistance from Cornell, DEC and NYCDEP to have Whole Farm Plans prepared. The farmers selected will be within NYC's Catskill-Delaware Watershed System. The farms selected will span most of the watershed's diversity of site hydrologic vulnerability, farm economic viability, management style, and animal density. Also the farms selected will have the potential to attract interest from other farms in the vicinity.

The farmers selected will have indicated a willingness to:

1) Actively participate in the development of their Whole Farm Plan.
2) Allow the various agencies involved access to their farm.
3) Install the necessary BMP's, identified through the Whole Farm Plans of the demonstration project.
4) Have their farms monitored for water quality.
5) Serve as demonstration farms open to tours and needed studies as coordinated by the County Project Team.

Initially, six Whole Farm Plans will be prepared on dairy farms within Delaware County with staff from other counties within the New York City Watershed Region being encouraged to participate in the planning process.

In year two, at least one Whole Farm Plan will be prepared in each of the remaining counties in the Catskill-Delaware watershed (e.g. Greene, Schoharie, Sullivan, and Ulster Counties).

Evaluating the Whole Farm Plan Approach

In order to determine the effectiveness of the Whole Farm Planning Approach in meeting anti-degradation requirements for water supply protection and in order to assess the overall

success of the program, determine where adjustments might be needed and to assess whether the overall program resulted in changes in the level of understanding of farming impacts on water quality and whether the program resulted in permanent changes in farming practices, it is necessary that an ongoing evaluation component be included in the program. The evaluation will be conducted by an evaluation team established by NYCDEP consisting as a minimum of NYSDOH, NYSSWCC, USDASCS, NYSDEC, Cornell faculty and staff, NYSWRI and possibly the USEPA. The evaluation will also involve the Watershed Agricultural Council as appropriate. This evaluation will also provide a foundation for determining Phase II Implementation needs including costs.

Task 6 - Validate and Document the Effectiveness of Best Management Practices (BMP's)

The term Best Management Practice means methods, measures or practices determined to be the most practical and effective in preventing or reducing the impact of pollutants generated by nonpoint sources. Best Management Practices can be applied before, during or after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

There is a need to determine which BMP's based on economic efficiency, ease of adoption, ability to integrate the practice into the farm operation and water quality benefits, should be promoted within the NYC water supply watersheds.

The NYS DEC publication "A Guide to the Selection of BMP's to Improve and Protect Water Quality" needs to be augmented with additional criteria and guidelines to meet drinking water standards. The Agricultural BMP's adopted in support of Section 319 need to be reviewed and revised to the extent necessary to ensure that they are designed to serve prevention as well as remedial objectives.

There is also a need to validate the practices which prevent pollution. It is essential to confirm that after their adoption, pollution is indeed prevented as intended. The best information for validation is that which is obtained directly from the site where the practice applies, either through on-site investigation or edge of field monitoring. The major result of this task will be a list of BMP's which are validated as being effective in preventing pollution.

This task will be a cooperative effort between Cornell, the NYS Department of Environmental Conservation and the County Project Team.

Task 7 - Conduct an Agricultural Enterprise Census - Development of Case Studies

In order to develop a comprehensive implementation strategy, the number and location of all significant agricultural enterprises needs to be verified. In general the SWCD/SCS offices will have cooperator files on the majority of enterprises in the county with an approximate location on some printed map. In certain cases, particularly for nonparticipants in USDA programs, these files may be outdated. To resolve this a complete enumeration of all active enterprises will be conducted. A representative sample will be drawn from this census and

those agricultural enterprises will be interviewed on an intensive basis regarding farm operations.

Studies have shown that a farmer's most respected source of information about new crops, practices and technologies is another farmer. Case studies provide an organized fashion for obtaining field appropriate information from a credible source that will assist other farm operators in selecting a best management system or practice that meets their objectives and is compatible with those of the water supply.

This task will be done by SCS in cooperation with the County Project Team.

Task 8 - Implementation of Selected BMP's on the Demonstration Farms

It may be an overwhelming task for the farming community and the support agencies to address all components of the Whole Farm Approach at once. Operational changes dealing with erosion control, barnyard improvements, and manure handling, including nutrient management, offer the greatest benefit to water quality protection in the initial phases of the program.

These three areas of concern will be targeted initially on the demonstration farms to make marketing and delivery of the program less complicated.

Once the concepts of the Whole Farm Approach are accepted by these farm operators, it will be easier to implement needed pathogen management, pest and pesticide management, and milkhouse waste disposal practices.

A goal of the Phase I program will be to at least implement on the demonstration farms the more direct portions of the Whole Farm Plans (i.e. barnyard runoff control, manure storage, water course fencing, obvious soil erosion control measures) within two years after start of Phase I. Another goal of the program will be to enter into contract agreements before the end of Phase I with all the participating demonstration farms to ensure that there is a joint commitment between NYC and the farm operator to implement all the components of the Whole Farm Plans prepared. Also at least one farm will be encouraged to install during Phase I all the agreed to structural and management practices called for in their Whole Farm Plan. The County Project Team will be primarily responsible for this task.

Task 9 - Develop Support in the Farm Community and the Public for the Whole Farm Planning Approach

Before changes in farm operations can occur, perceptions and attitudes about the significance of protecting water quality will need to be addressed. Individual farm managers adopting the Whole Farm Approach will need to assume a sense of ownership and responsibility for the environmental soundness of their operations. A heightened awareness of environmental issues in agriculture can be achieved through demonstrations and farm tours, educational meetings and community discussions, and press articles and new releases about BMP's impacts on the environment.

There should be two major educational efforts as part of the Whole Farm Planning Project. The first part should occur over the first 18 months of the demonstration and will be targeted in Delaware County at dairy farmers, agribusiness professionals, and the public. Part two of the education effort should be targeted in the Catskill and Croton systems and should begin six months prior to completion of the pilot demonstration project.

Case study information from pilot farms will be developed for use in fact sheets, brochures, newsletters and other materials to be distributed to farmers within the watershed. Tours and field days on participating farms will be held to demonstrate the benefits of Whole Farm Planning to farmers and local officials and provided to local media to promote the concept of farmers as "good neighbors" and to provide recognition.

A quarterly newsletter for the NYC Watershed Region will be published to keep farm operators, agriculture businesses, county agency staff, farm organizations, local officials and the public informed on progress in carrying out the Phase I program.

The responsibility for these information and education efforts will be a joint effort among the County Project Team, NYSSWCC Project Administrator, and NYCDEP with support from Cornell and SCS.

Task 10 - Begin the Implementation of the Program Region-wide

The program initially for the first 18 months will be focused in Delaware County. The program will be expanded into the entire NYC Watershed Region by the end of year two to ensure the Whole Farm Planning/Best Management Practice program is fully operational by year three--the start of Phase II.

Task 11 - Supporting Tasks

11a - Establish a System to Monitor Agriculture Land Use and Water Quality Effects within each Watershed

In order to determine the effectiveness of agricultural Best Management Practices in protecting existing water quality, there is a need to institute a short range land monitoring program to determine the current extent of the agricultural nonpoint source problem, along with a longer range water quality monitoring program to measure the effects of changing current agricultural practices.

The land inventory analysis will be conducted by USDASCS in cooperation with the County Project Team.

NYS DEC Bureau of Technical Services and Research in cooperation with the Delaware County Project Team will begin water quality monitoring to determine if BMP's recommended and installed as a result of the Whole Farm Plan meet NYC water quality objectives.

Also NYS DEC Bureau of Technical Services and Research, under a separate 319 funded proposal, will be collecting and analyzing existing data on present land use in the West Branch of the Delaware River to document the extent of land use changes that have occurred over the last ten years since the EPA/USDA Model Implementation Program (MIP) ended. They will also document any changes in the Cannonsville Reservoir water quality since 1982 and try to relate the results to changes in land use. In addition they will also be evaluating the present status of Best Management Practices particularly barnyard runoff control installed during the MIP to determine BMP life expectancy and factors affecting the long-term maintenance of these BMP's.

11b - Data Management

There is a need to establish a database for the NYC watershed region to monitor land use practices in each watershed. This would also assist in evaluating progress in program implementation.

11c - Completion of the Soil Survey - Delaware County

An initial step in the inventory should be the completion of the soil survey and placing it in a digitized format that can be accessed by GRASS. Of the eight New York counties, Delaware would require the greatest acceleration of effort to reach this point. Delaware is a critical county since it has the most land in the watershed.

11d - Individual Farm Soil Consultation

Individual Farm Soil Consultations are needed to provide on site soil evaluations of sensitive areas (i.e.: when dealing with nutrient and pesticide management plans) at a mapping scale sensitive to individual management units. This information will be obtained for purposes of determining surface runoff and leaching potentials. Service to be provided by SWCD Soil Scientist as part of the County Project Team.

11e - New Aerial Photography

Aerial photography is used as the base map for the conservation plan. Currently, the only aerial photography available in Delaware County was taken in 1983 at a scale of 1 inch equals 2,000 feet. New photography is needed to reflect land use changes that have occurred since 1983. Additionally, the 1 inch equals 2,000 feet scale photography currently available cannot be enlarged to the 1 inch equals 500 feet scale needed for conservation planning purposes, due to the resolution of the photography. This is a one time cost to the City and provides up-to-date aerial photography for the entire watershed areas of the New York City Water Supply System.

Task 12 - Program Coordination and Administration

A Whole Farm/BMP Program Administrator position will be established by the NYS Soil and Water Conservation Committee in the Watershed. The Program Administrator will report

jointly to (a) the DEP Commissioner advised by the Watershed Agricultural Council and (b) the NYS Soil and Water Conservation Committee.

The DEP Commissioner with the Council, will be responsible for overseeing program progress, resolution of policy issues, and dispute resolution regarding funding and the content of Whole Farm Plans. The NYS Soil and Water Conservation Committee will be responsible for operational oversight, interagency coordination, and disbursement of funds.

Administrative Review Committee

An Administrative Review Committee, will be established to advise the Executive Director of the NYSSWCC and the Program Administrator on the administration of the program. This committee will consist of executive level representatives from NYCDEP, NYSDAM, NYSSWCC, NYSDEC, USDA-SCS, USDA-ASCS, and Cornell Cooperative Extension. The Committee would meet regularly to review the progress of the program and the status of funding, expenditures, staffing, and other administrative issues. The Department of Agriculture and Markets will take the lead to establish this committee and will serve as the chair to the committee.

Proposed Organizational Structures