Chapter Four

Implementation

Introduction

The preceding chapters have described a number of general and site-specific watershed management issues and have offered a comprehensive set of recommendations designed to provide maximum protection of the groundwater in the SGPAs. This chapter focuses on the ways and means for translating management proposals into actions that will preserve the relatively uncontaminated portions of Long Island’s sole source aquifer.

For ease of comprehension, problem statements, recommendations, responsible agency or agencies and implementing actions are grouped under three major headings:

- reducing current and future contamination associated with existing sources
- avoiding the establishment of new sources
- providing the necessary management tools, manpower and money

Approximately one third of the proposed actions relate to contaminant source elimination or reduction; a similar proportion, to new source prevention, and the remainder, to the provision, enhancement or more effective application of the tools and techniques for watershed management. A discussion of staffing requirements and costs closes the chapter.

Reducing Contamination from Existing Sources

Problem

Unpermitted discharges pose a major threat to the groundwater resource. Suffolk County’s Department of Health Services in its source monitoring program clearly demonstrated that discharges of highly concentrated toxic materials to on-site septic systems, unregulated injection wells, storm drains or ground surfaces are a major concern.

- Recommended Actions

  - The Nassau County Department of Health and the Suffolk County Department of Health Services should focus their regulatory efforts on industries that are known or suspected sources of contamination and are located in geographic areas where the impact of discharges is most significant, i.e., pollution sources in SGPAs.
  - The health agencies, with their technical expertise and extensive groundwater and contaminant data bases, should bear the major responsibility for ensuring the reduction of inadvertent or deliberate illicit or unpermitted discharges.
  - The Suffolk County Department of Health Services should increase monitoring of discharges to septic tanks and stormwater recharge basins located in industrial areas.
  - As a first step, the Suffolk County Department of Health Services should develop a pilot program for the monitoring of inadvertent or deliberate discharges of toxics to septic tanks and/or stormwater recharge basins in industrial areas. Such a program should involve the sampling of septage during pumpouts at a representative cross section of industrial and commercial establishments and the collection of grab samples of stormwater runoff from a similar selection of catch basins. The SCDS should then review the analytical data obtained during the study to determine whether a full scale sampling program is likely to provide significant contaminant reductions and, if so, the most cost-effective method for achieving the desired results.
  - In the interim, the Suffolk County Board of Health should amend the Sanitary Code to require sampling of soils at industrial and commercial facilities where analysis of septage reveals concentrations of toxic contaminants considered likely to impair the quality of the groundwater.

Problem

Although all of Long Island’s groundwater has been classified as G.A., and a policy of antidegradation has been established, indicating that it should be considered for best usage — drinking water supply, activities have been allowed that have resulted in contamination entering the groundwater and precluding its best usage. Some contamination of the groundwater has been caused by violations of SPDES permits, while other contamination may have resulted from permitted activities that allowed the discharge of contaminants in concentrations that exceed the State Health Department’s current maximum contaminant levels (MCLs). Drinking water standards or MCLs have become more restrictive, e.g., the reduction of VOC levels from 50 ppb to 5 ppb for some constituents. However, SPDES permits, which are issued for a five year period, may be slow to reflect the new standards.
RECOMMENDED ACTION

- The State and the County Health Departments should expand SPDES monitoring and enforcement activities within SGPA.
- The health agencies should examine the existing industrial and non-industrial permits for discharges located within the SGPA and should assess the adequacy and applicability of permit conditions and the need, if any, for changes to assure better groundwater protection. As part of that effort, the SCDHS should review the self-monitoring data furnished by SPDES permit holders as well as other relevant information and should request that NYSDEC modify permit conditions whenever changes in industrial processes or activities or applicable water quality standards so warrant.

PROBLEM

Non-industrial SPDES permittees are not required to monitor their domestic wastewater discharges for organic chemicals. In addition, certain facilities that are not covered by SPDES permits, such as small commercial establishments and residences housing medical practices with discharges less than 1,000 gallons per day, may also be contributing to groundwater contamination.

RECOMMENDED ACTION

- The S.C. Board of Health should amend the Sanitary Code to require the pump-out of septic tanks and the chemical analysis of septi tank wastes at non-industrial SPDES permitted facilities and at small commercial establishments and residences housing medical facilities located within an SGPA in accordance with the following schedule:
  - residential facilities with SPDES permits (i.e., multi-family units) — every three years
  - residential systems handling medical and other potentially damaging wastewaters — annually; and,
  - all commercial facilities — annually
- If problems are detected, the sampling of leaching pools, and more pump-outs and/or groundwater monitoring, should be required.

PROBLEM

Virtually no sewage treatment facility can be adequately monitored for toxic or hazardous wastes that may enter its system. Large STPs do not enforce pre-treatment regulations adequately. Small plants have no way of preventing homeowners or businesses from dumping inappropriate chemicals into the waste line. The discharge of inadequately treated effluent capable of contaminating groundwater is predominantly a Suffolk County issue, especially in the Central Suffolk SGPA.

RECOMMENDED ACTION

- The Suffolk County Legislature should adopt a policy supporting the expansion of existing STPs with effluent discharge to surface waters whenever such expansion will allow the extension of service to nearby SGPA areas where existing unsewered development has impaired or threatens to impair the quality of the groundwater.
- The Legislature should also go on record in support of the consolidation of small sewer districts in order to facilitate the elimination of poorly operated or otherwise inadequate facilities.
- Neither the SCDHS, the S.C. Sewer Agency nor the NYSDEC should sanction the establishment of a new STP within an SGPA unless it meets one or more of the criteria set forth in Chapter 2.

PROBLEM

In those parts of the SGPA's served by sewage collection and treatment systems with effluent discharge to surface waters outside the SGPA, the diversion of effluent that would otherwise recharge the aquifer will be lost and the amount of water stored in the aquifer will be reduced.

RECOMMENDED ACTION

- The county agencies with water supply oversight responsibilities should cooperate with the individual purveyors and with the Long Island Water Conference in promoting water conservation practices and devices within those SGPA's or portions of SGPA's where STP effluent discharges to surface waters are likely to create an imbalance between withdrawal and recharge. See Appendix C for a discussion of conservation practices, water saving fixtures and regulatory measures.

PROBLEM

Unsewered development on half acre or smaller lots may be contributing nitrate and/or organic contamination to groundwater.

RECOMMENDED ACTION

- In Nassau County, where all municipal STPs discharge to surface waters and in Suffolk County, where STPs discharge to surface and to groundwater, the counties should undertake 201-type studies to investigate the need for sewers in developed areas within SGPA's where the current density exceeds existing 208 study criteria and there are demonstrated adverse groundwater impacts.

PROBLEM

Agriculture is a vital segment of the economy of eastern Suffolk County. Its continuance is strongly supported by local, County and State programs and funding. However, past agricultural practices related to fertilization, irrigation, and the use of toxic and hazardous chemicals for pest control have contributed to groundwater pollution. New approaches are needed to minimize agricultural chemical damage to groundwater.
RECOMMENDED ACTION

- Suffolk County should continue to provide support for the Cornell Cooperative Extension Service outreach programs that assist farmers in reducing excessive or inappropriate use of agricultural chemicals or irrigation.
- The Extension Service should continue to inform growers of alternatives to traditional pesticide applications, including but not limited to biological controls such as the use of pheromone-treated ties to prevent grape berry moth damage to vineyards; the application of non-phytotoxic oils for mite control early in the season, thereby eliminating the need for miticidal sprays on woody ornamentals later in the season; and the financial as well as environmental benefits of Integrated Pest Management.

PROBLEM
For many years, the Long Island farm economy was based to a great extent on a single fertilizer intensive, pesticide dependent crop — potatoes. Excessive or poorly timed fertilizer applications and the use of pesticides that leached more readily than anticipated have resulted in locally significant groundwater contamination.

RECOMMENDED ACTION
- The Cornell Cooperative Extension Service should encourage the ongoing shift from potatoes to crops that require lesser amount of agricultural chemicals and water such as fruits and horticultural products. Nitrogen loading alone can be reduced from 180 pounds to 20 pounds per acre by this change in crop.
- Cooperative Extension should urge those farmers who continue to grow potatoes to rely on split applications of fertilizer and better timing of fertilization in order to ensure maximum crop uptake and minimum groundwater impact. Cooperative Extension should attempt to minimize the groundwater effects of necessary pesticide use through technical assistance to growers in respect to pesticide selection, application techniques and timing, methods for increasing biological activity within the soils and lowest effective pesticide application rates.

PROBLEM
Farmers may be slow to change long-standing management practices in order to reduce agricultural chemical usage without financial assistance for capital costs and ample evidence of the efficacy of proposed modifications.

RECOMMENDED ACTION
- Congress should increase the level of support for the existing cost-sharing Integrated Crop Management (ICM) program of the Agricultural Stabilization and Conservation Service to provide funding for additional pilot programs to reduce the use of agricultural chemicals.
- Suffolk County and the towns should encourage owners of parcels already in or to be added to farmland development rights programs to rely on Integrated Pest Management (IPM) for crop protection with minimal groundwater impact.

PROBLEM
Almost one-half of the greenhouse production in New York State is located on Long Island with the greatest concentration in Suffolk County.

Greenhouse production involves a more concentrated use of water, pesticides, growth regulators and fertilizers than conventional agriculture because
- greenhouses are operated year round
- intensity of growth is greater
- there is a greater turnover in crop production

The capability to control all inputs and environmental factors within a greenhouse makes it feasible to also control potential contamination of the environment. Research efforts have been targeted to
- reduce use of irrigation water
- limit or eliminate the release of agricultural chemicals into surface and groundwater.

Educational programs are essential to enable greenhouse operators to develop and utilize cost effective systems that meet increasingly strict environmental standards while maintaining a viable business.

RECOMMENDED ACTION
- Cornell Cooperative Extension should continue to develop educational programs that will result in the decreased use of chemical pesticides and fertilizers and to encourage growers to adopt these methods:
- Integrated Pest Management
  - Improve sanitation practices in and around the greenhouse to decrease pest problems.
  - Pest control practices based on monitoring and the use of action thresholds.
  - Alternatives to chemical pest control, including isolation (e.g. screening).
  - Selection of effective but least toxic pesticides.
- Environmental control of crop growth to reduce or eliminate the need for plant growth regulators where possible.
- Irrigation and fertilization technology.
  - Subirrigation to reduce the quantity of water used.
  - Recirculation of irrigation solution to achieve zero discharge.
  - Reduction of fertilizer rates based on zero discharge technology.
  - Alternative methods of fertilization, especially the use of control release fertilizers.
  - Optimize crop production by monitoring levels of essential fertilizer elements and levels of toxins that limit plant growth.
PROBLEM
Non-farm uses of agricultural chemicals to maintain turfgrass and ornamental plantings around homes and buildings and on parklands and golf courses may result in groundwater contamination. The choice of plant materials that require large amounts of fertilizers, pesticides and water as well as excessive or poorly timed applications of agricultural chemicals threaten groundwater quality.

☐ RECOMMENDED ACTION
- Cornell Cooperative Extension should continue to inform homeowners, turf managers, landscape design and maintenance professionals and lawn and landscaping products dealers regarding best management practices to minimize groundwater impact. Such practices should include increased reliance on native vegetation or non-native species that require relatively little water, fertilizers or pesticides, as well as the use of slow-release fertilizers, of proper timing of chemical applications, and of techniques for minimizing water loss associated with unavoidable irrigation.
- The water purveyors should assist the Cooperative Extension by including informational inserts describing best management practices in their spring and summer billings.

PROBLEM
In the past, the improper handling of hazardous materials and the on-site disposal of hazardous wastes at federally owned facilities have led to localized groundwater contamination.

☐ RECOMMENDED ACTION
- NYSDEC and the county health departments should continue and expand initial local, state and federal cooperative efforts to remediate existing contamination and prevent future degradation of the groundwater.

AVOIDING THE ESTABLISHMENT OF NEW SOURCES OF CONTAMINATION

PROBLEM
Suffolk County has already earmarked one-half of the estimated revenues to be raised during this decade from a one-quarter cent sales tax or approximately $300 million for open space purchases. The other one-half of the revenues are to be used for a variety of water-related projects. Nassau County, which has less than 1000 acres of undeveloped lands within SGPAAs, has been acquiring open space but does not have a dedicated source of funding for open space acquisition.

☐ RECOMMENDED ACTION
- Nassau County and its municipalities should expand the ongoing acquisition program in order to save crucial parcels identified in this study, such as the recently acquired Boegner Estate in Old Westbury and the Schiff property in Oyster Bay Cove.

PROBLEM
At the same time Nassau and Suffolk Counties and some municipalities are purchasing open space, the State of New York and various school districts are selling lands that should be retained for watershed protection.

☐ RECOMMENDED ACTION
- The State of New York should refrain from disposing of the open lands on its university and college campuses, mental hospitals and other State owned sites. The retention of open land associated with institutional uses provides opportunities for reuse, and offsets the very intensive use of the developed portion of the site.
- The New York State Department of Education should prohibit school districts from disposing of open, unused or buffer areas while the sites are utilized for educational purposes. The DEC should require school districts to protect the open status of the undeveloped areas to the maximum extent feasible when the sites are sold or leased for non-educational use.

PROBLEM
The introduction of inappropriate or overly intensive land uses and activities may create new sources of groundwater contamination.

☐ RECOMMENDED ACTION
- The municipalities should utilize their police power authority to enact land use controls that will preclude or limit new sources of contamination within the SGPAAs. As part of their watershed protection efforts, they should amend their zoning ordinances as necessary to achieve the following:
  - Reduce the amount of vacant acreage zoned for industrial or commercial use outside of already developed non-residential areas.
  - Limit residential densities to five acres or more per dwelling unit. In those communities where established land use patterns cannot support a five acre lot size, steps should be taken to upgrade the zoning wherever possible to at least two acres per dwelling unit. In-filling should be allowed on previously platted lots of less than two acres where higher density development has already occurred.
• Cluster units on one acre or on larger parcels, provided the overall density or average density of the entire parcel does not exceed one unit per five acres and provided the undeveloped portion of the parcel remains in open space. Cluster development on parcels of one acre or more with the imposition of clearance standards and limitations on fertilized vegetation is preferable to build out at one unit per five acres, since the foliage affords considerable protection to water quality while preserving contiguous open space for clean recharge.

• Restrict multi-family or condominium development that exceeds recommended single family residential densities to those sites where connection to a sewage treatment plant that maximizes SGPA watershed protection can be assured prior to occupancy of any of the dwelling units.

PROBLEM
The Central Suffolk, Oak Brush Plains, South Setauket and South Fork SGPAs all contain vacant or largely vacant areas that were platted prior to the advent of zoning and subdivision regulations. In many cases individual lots within these old filed maps are too small to meet current density requirements, and necessary infrastructure is virtually non-existent. The courts have held that any owner of an old filed map lot that has been retained in single and separate ownership may develop his property, zoning and Health Department regulations notwithstanding. The continued existence of these legal but substandard subdivisions poses a severe localized threat to groundwater.

☐ RECOMMENDED ACTION
• Suffolk County and/or the municipalities should attempt to acquire undeveloped old filed maps or portions thereof and should either retain the land as open space or, where sufficient acreage cannot be assembled, replat to mitigate groundwater impacts by increasing lot sizes and improving site design.

PROBLEM
A change in ownership or tenancy of an industrial or commercial property may result in a shift from an acceptable to a potentially polluting activity without knowledge of the responsible regulatory agencies.

☐ RECOMMENDED ACTION
• The municipalities should require all new property tenants to obtain a Certificate of Compliance from the County health agency indicating that proposed activities will be in conformance with all relevant regulations.
• Water suppliers should withhold service to new owners and tenants until presented with a copy of the Certificate of Compliance.

PROBLEM
Currently permissible SPDES discharges from industrial and non-industrial point sources may impair future water quality.

☐ RECOMMENDED ACTION
• NYSDEC, the State Department of Health and the county health departments should jointly consider the need to establish more stringent groundwater effluent standards for SPDES discharges within the SGPAs, pursuant to Title 6, Section 702.18 of the Environmental Conservation Law.

PROBLEM
Landscape designs that call for plant materials that require large quantities of water and agricultural chemicals for survival create the potential for further groundwater contamination.

☐ RECOMMENDED ACTION
• Municipalities should require a landscape management plan for new business properties, single family homes, condominiums and apartment complexes. These plans should call for the use of lawn grasses and landscape plants that require relatively small amounts of water, fertilizers and pesticides.

PROBLEM
In the past, NYSDEC reliance on federal pesticide registration data provided by the manufacturers and based on field trials in other parts of the country led to the local use of a pesticide which, although effective, caused serious contamination of the groundwater in farm areas where it was applied. Subsequent testing of other commonly used pesticides indicated similar leachability under Long Island conditions.

Although federal registration requirements have been strengthened, EPA cannot provide assurance of the environmental acceptability of registered products under all conditions. The recently developed National Pesticide Strategy recognizes the need for state determination of acceptability for use.

☐ RECOMMENDED ACTION
• NYSDEC should review its pesticide registration procedures and strengthen them as necessary to prevent pesticide contamination of recharge.
• NYSDEC should cooperate with Cornell and with the Suffolk County Department of Health Services in testing new pesticides on Long Island prior to registering them for use in the bi-county area.
• NYSDEC should utilize its authority to restrict or to cancel the application within an SGPA or other environmentally sensitive area of any highly leachable pesticide considered likely to contaminate the groundwater.
PROBLEM

Current county health department standards allow for new on-site sewer systems on one acre lots in unsewered areas.

☐ RECOMMENDED ACTION
- The Nassau County Department of Health and the Suffolk Department of Health Services should consider amending their respective Sanitary Codes to increase the minimum lot size to two acres for new onsite systems in unsewered areas whenever the onsite system is located in Hydrogeologic Zone III or in a sparsely developed portion of an SGPA in Hydrogeologic Zone I.

PROBLEM

Maximum recharge of stormwater runoff is essential to offset groundwater losses due to surface water discharge of sewage treatment plant effluent and to various other consumptive uses.

☐ RECOMMENDED ACTION
- Municipalities should require the recharge of stormwater runoff as close as possible to the point of origin. They should also adopt DEC’s recently prepared Stormwater Regulations. The best management practices (BMPs) developed by the LIRPB in the Nationwide Urban Runoff Program study and the BMP Handbook relating to stormwater management should also be fully implemented within all SGPAs.

PROBLEM

Municipal programs for the collection and disposal of hazardous products and product containers are lacking or in need of expansion.

☐ RECOMMENDED ACTION
- Nassau and Suffolk Counties should provide financial or other assistance to municipalities for the establishment of additional sites and ongoing collection programs for the safe disposal of hazardous household products and/or product containers. Suffolk County should consider the establishment of a county site in addition to town locations. Nassau County has already done this.
- The counties should evaluate parcels acquired through the purchase of tax liens and, where appropriate, reserve them for use as hazardous waste collection sites. These properties should not be sold but should be transferred to the municipality in which the land is located as authorized by Section 72-h of the N.Y.S. Real Estate Law.
- Both counties should also establish an educational program to inform the public how to dispose of these products properly.
- The State Legislature should consider the use of State initiated incentives for proper disposal, such as a deposit that would be refunded when the items are surrendered to a collection facility.
- NYSDEC should establish and enforce strict performance standards for the use, handling, storage and disposal of small quantities of toxic and/or hazardous materials.

PROBLEM

The widespread use of consumer products containing hazardous substances also poses a threat to the groundwater resource. The presence of effective but potentially toxic chemicals in some cleaning, laundry, home improvement and hobby-related products increases the likelihood of inadvertent groundwater contamination. Suffolk County has enacted a Household Hazardous Waste Reduction Law but has not moved to implement it.

☐ RECOMMENDED ACTION
- The counties should encourage the use of less hazardous consumer products whenever these are available.
- Suffolk County should establish the consumer information/education program called for in its Household Hazardous Waste Reduction Law.

PROBLEM

Even the best managed construction and demolition debris (C&D) landfill can become a repository for hazardous materials. This study recommends the curtailment of clean fill construction and demolition debris (C&D) landfills in SGPAs and the prohibition of new C&D landfills except in previously mined areas where a properly designed site and carefully monitored disposal of non-hazardous C&D materials can be used to restore the land to an acceptable grade. Although the current state requirements (Part 360-8) mandate that any clean fill landfill in the deep flow recharge areas of Long Island must have a double synthetic liner, this does not seem sufficiently protective for a disposal site located within an SGPA.

☐ RECOMMENDED ACTION
- The State should require that C&D landfills located within an SGPA be double lined, with the primary liner being a synthetic membrane, and the secondary liner being a composite liner. Primary and secondary leachate collection and removal systems should be constructed as part of the liner system.
- The State should also require that any clean fill landfill located in an SGPA should have an environmental technician monitoring the site during all hours of operation. The monitor should be employed by NYSDEC but paid by the permittee. The monitor would inspect all materials brought to the facility, to ensure compliance with all permit conditions.
- One way of ensuring compliance with permit conditions would be to construct a presorting facility or building at the site where C&D materials could be deposited for inspection. The inspectors could separate out unsuitable materials that would have to be disposed of elsewhere. The C&D operator should not accept any shredded materials since it is not always possible to determine the components of such material.
PROBLEM

Failure to deal expeditiously with petroleum product or other hazardous materials spills may result in otherwise avoidable groundwater contamination. There is a need to reduce emergency response time and to provide compensation for third parties damaged as a result of such spills.

☑ RECOMMENDED ACTION

- The Nassau County Board of Supervisors and the Suffolk County Legislature should each establish a contingency fund for emergency cleanups.
- They should also authorize their respective county attorneys to initiate litigation to recover costs and should provide County Comptrollers with the authority and staff needed to assess claims.

FACILITATING PLAN IMPLEMENTATION

PROBLEM

Successful plan implementation depends in large measure upon public understanding of its stake in the protection of Long Island’s groundwater and of the actions it and others can take to preserve the quality and quantity of the resource. Both the public and its officials are often unaware of what can and should be done to avoid groundwater pollution from point and non-point sources.

☑ RECOMMENDED ACTION

- New York State, Nassau and Suffolk Counties, municipalities and all water purveyors should provide informational materials that describe current methods for the elimination of non-point source pollution and indoor and outdoor water conservation. These materials should be distributed to homeowners, professional horticulture groups, the landscape service industry, business, civic organizations and governmental agencies. A mechanism to provide speakers to interested groups should be expanded (perhaps in conjunction with a Long Island Water Resources Institute). See Appendix C for information on public education programs conducted by Cornell Cooperative Extension, Nassau County Department of Public Works and other agencies. Cornell Cooperative Extension of Nassau and Suffolk Counties is a resource for information on the following topics:
  - proper fertilizer and pesticide use and disposal
  - household toxic product use alternatives and proper disposal
  - septic system maintenance
  - water conservation inside the home
  - water conservation in the landscape
  - protection of our water supply
  - proper disposal of automotive waste products
  - disposal of animal waste

- Education is one of the most cost-effective methods to protect groundwater. Several approaches can be undertaken or expanded immediately. For example:

  - Government and local merchants can send welcome letters and information packets to new residents. Information on water protection could be included.
  - Water purveyors could send relevant information to customers with each bill, as LILCO does on matters of energy conservation.
  - Towns could distribute such information at Town Hall and include flyers in mailings to constituents.
  - The media could present public service programs and articles to keep the issue of water protection before the public.
  - Local public and school libraries could expand their educational role by having reference material available for display and distribution.

- NYSDEN, the health agencies, major water purveyors, and the two county extension services could organize seminars for the benefit of retailers such as hardware stores, garden centers, auto repair and auto supply shops, etc., to inform them of water protection practices relative to the product they handle or sell, and could provide brochures or other informational materials to purchasers of such products as to proper use and disposal of these materials. NYSDEN and Cornell Cooperative Extension could provide additional displays of water conserving landscapes at public sites.

PROBLEM

State Environmental Quality Review Act (SEQRA) requirements constitute a potentially useful tool for minimizing adverse impacts of proposed development within the SGPAs. Confusion as to the requirements and reluctance or inability to assume the associated administrative burdens have limited SEQRA's effectiveness in protecting groundwater.

☑ RECOMMENDED ACTION

- NYSDEN, other state agencies and local municipalities should take all necessary steps to require the preparation of an environmental impact statement (EIS) pursuant to SEQRA and Article 55 for any actions expected to have a significant environmental impact within the SGPA. Any project that contravenes the recommendations of the SGPA Plan should be regarded as having a significant impact. The EIS should include a detailed statement of the effects of any proposed action on, and its consistency with, the Comprehensive Management Plan of the Special Groundwater Protection Area Program as certified by the Commissioner of DEC.

- The municipalities should handle all non-exempt non Type II actions (unlisted actions) occurring within an SGPA as Type I actions. This is already required for any SGPA or portion thereof that has been legally designated as a Critical Environmental Area (CEA) and
will be required throughout all SGPs upon approval of the Management Plan by the LIRPB or certification by the Commissioner of the New York State Department of Environmental Conservation.

PROBLEM
The EIS may be flawed because the lead agency responsible for project evaluation is unaware of the existence of relevant information or lacks access to it. Improved procedures are essential if SEQRA is to help insure consistency and compatibility with the Management Plan.

☑ RECOMMENDED ACTION
- The lead agency should consider the LIRPB and the affected water utilities as interested parties pursuant to SEQRA and should provide them with copies of Environmental Assessment Forms (EAFs) prepared for all projects located within an SGPA.
- The county health departments should coordinate their mandated reviews with the SEQRA process and should provide the lead agency with information indicating whether and to what extent the proposed action and the departmental determination in respect to it is consistent with the recommendations of the SGPA Management Plan.

PROBLEM
Many agencies collect or receive data that relate directly or indirectly to groundwater management. There is some inter-agency data sharing; however, much information that could enhance the effectiveness of implementation efforts remains relatively unavailable.

A complete, organized data management system for groundwater quality and quantity does not exist, although several local agencies do have significant G.I.S. systems available for their respective areas.

☑ RECOMMENDED ACTION
- A Groundwater Institute should be established on Long Island in cooperation with both Counties, all fifteen major municipalities, the eight-three water purveyors operating in Nassau and Suffolk, and NYSDEC and DOH. The institute should have two primary functions:
  - To assemble in one location and to maintain a comprehensive data management system pertaining to groundwater and all potential sources of contamination.
  - To establish a research agenda based on the needs of the local governments and water purveyors of Long Island.

PROBLEM
Article 55 of the Environmental Conservation Law calls for the inclusion of wellhead protection measures as part of the SGPA Management Plan. However, wellhead protection as envisioned in the Safe Drinking Water Act and EPA publications and in the New York State's Wellhead Protection Plan as it applies to other parts of the state is largely based on the notion that there is a discrete, readily identifiable area from which and through which water flows to each well. The imposition of the most stringent controls to eliminate all existing or potential contaminant sources in the immediate vicinity of the wellhead or wellfield, slightly less stringent controls to regulate contaminant sources in the adjacent area or Zone of Contribution, and moderate or even minimal controls in the remainder of the watershed or recharge area is presumed sufficient to protect the water supply. It is also expected to provide early warning of any water quality problem and allow time for corrective action.

On Long Island, where the recharge areas for the large, interconnected aquifers cover almost all of the Island and where numerous wells or wellfields and variations in aquifer geology distort flow patterns, the narrowly focused wellhead protection concept provides for fewer water quality benefits than a broader watershed management approach.

☑ RECOMMENDED ACTION
- The water suppliers, the towns, the counties and NYSDEC should rely on the SGPA Plan in combination with existing ordinances, county sanitary codes and NYSDEC regulatory programs for wellhead protection beyond the immediate well site. The SGPA Plan reflects an overall resource preservation philosophy that is compatible with the zonal approach but extends the area of protection beyond the five or ten year presumed travel time for water to reach a well to encompass the entire SGPA.
- Water suppliers should control the immediate wellhead area, not so much to protect water quality as to prevent vandalism. Individuals and public purveyors sitting upper glacial aquifer wells in Suffolk County must also observe Department of Health Services areal protection requirements.

PROBLEM
Prudence would dictate the siting of public supply wells in protected open space areas whenever possible. However, current policies or regulations often preclude or severely limit access to appropriate sites.

☑ RECOMMENDED ACTION
- The State of New York, the counties, and the localities should enact laws or pass resolutions that will allow for the installation of public wells, where appropriate, on lands acquired for open space or watershed protection in order to provide the public with the highest quality water supply at the lowest cost.
- Within the SGPs, developers should dedicate open space within clustered sub-divisions to the municipality or the county. Where appropriate this open space should also be available for water supply purposes.
PROBLEM
A former Nassau County proposal to establish pumping centers at Muttontown and Manetto Hills could cause significant water table and streamflow reductions in Suffolk County that would impact the deep recharge areas including nearby SGPAs.

RECOMMENDED ACTION
- The technical agencies involved, i.e., the two county health departments, Nassau County DPW, SCWA, and NYSDEC should draft a bi-county water development agreement to be ratified formally by the two county legislative bodies.

PROBLEM
Chapter 662 of the Laws of 1983 requires NYSDEC to notify water suppliers in the Sole Source Aquifer of any SPDES permit violation occurring within three miles of their wells. This law has not been adequately complied with.

RECOMMENDED ACTION
- DEC should publish a report of any substantive SPDES violations for Region I in the Environmental Notice Bulletin and should send a copy to every water purveyor.

PROBLEM
The effectiveness of water resource management efforts rests to a great extent on a thorough understanding of the groundwater system and the stresses that are placed upon it. A comprehensive, coordinated network of monitoring wells can provide essential information. Numerous public and private monitoring wells already provide water level and water quality data; however, selective expansion and better integration of monitoring activities is needed.

RECOMMENDED ACTION
- Suffolk County Department of Health Services, in cooperation with the water purveyors, should install additional monitoring wells where needed to identify and map the source of water to glacial wells and to document existing and potential sources of contamination. NYSDEC or SCDHS should require installation of a minimum of three wells — one upgradient, two downgradient — at every industrial discharge location. The cost of drilling and monitoring these wells should be borne by the discharger.

- The USGS, NYSDEC, the Nassau County Departments of Health and Public Works and the Suffolk County Department of Health Services should coordinate the design and operation of a groundwater monitoring system that would allow the regulatory agencies to document existing or potential sources of contamination, while allowing the water suppliers to focus on the source of water to wells.

PROBLEM
The transfer of development rights, a cost effective way of protecting environmentally sensitive lands such as Special Groundwater Protection Areas has been used infrequently.

The primary obstacle to TDRs has been the fact that the sending areas are often not within the same school district as the areas. Thus, one school district loses a tax base and another one gains it.

RECOMMENDED ACTION
- Municipalities should encourage school districts planning consolidation to achieve educational efficiency and cost savings to consider ways to facilitate TDR. Wherever feasible, district boundaries should be redrawn to facilitate use of this planning tool.

PROBLEM
This last section is an acknowledgement that implementation cannot be successful without sufficient staff to carry out the research, monitoring, regulation and enforcement called for in the overall plan. The need for additional public funding at this time when the State and all units of local government are experiencing a serious fiscal crisis is recognized. Suggestions are offered to ameliorate the budgetary shortages and allow implementation of SGPA objectives. A table summarizing the various agency responsibilities in effectuating the SGPA comprehensive management plan concludes the chapter.

PROBLEM
Chapter 951 of the Laws of 1983 directed DEC to promulgate regulations to restrict or prohibit incompatible uses in Hydrogeologic Zones I - V. This has never been done. The reason DEC has not implemented this law is that funding was not provided to carry out the work.

RECOMMENDED ACTION
- The State of New York should provide adequate funding to allow DEC to fulfill the mandate. In promulgating regulations, the DEC should give first attention to the protection of pristine, largely undisturbed or undeveloped areas.

PROBLEM
New York State and County agencies responsible for groundwater protection and regulation on Long Island are inadequately staffed to permit proper enforcement of existing laws—let alone permit the assumption of additional assignments.

RECOMMENDED ACTION
- NYSDEC and the two County Health Departments should prepare budget requests for the 1993 budget year based on the staffing, laboratory and operational expenses necessary to permit adequate management of the SGPAs. They should also increase interagency coordination and pool their resources in order to minimize expenses and duplication.
PROBLEM

Although there is general agreement that the groundwater should be protected, there is a significant mismatch between public policies, governmental programming and budgetary allocations to support the necessary research, monitoring and regulatory control.

RECOMMENDED ACTION

- Suffolk County should establish a dedicated fund for the upgrading of existing STPs and for financing inspections and enforcement actions. This fund could be financed through user fees, activity fees, fines and surcharges. For example:
  - Groundwater protection assessments could be charged for commercial/industrial establishments occupying land located within the SGPAs. Modest charges could be justified by the need for additional inspection and monitoring of commercial and industrial properties.

- Additional activity fees should be charged for the use of SGPA related facilities, such as parks, golf courses, trails, etc.

- NYSDEC fines should increase for failure to comply with all substantive aspects of SPDES permits. Differentiation should be made between paperwork violations and substantive violations that pose an actual threat to the groundwater.

- The health agencies should charge a reasonable fee to help defray the cost of inspection in all cases of change in ownership or tenancy of commercial and industrial properties.

- Water suppliers should establish a dedicated fund for watershed protection and source reduction programs. This fund could be financed by a small surcharge on all water bills.
Chapter Five

Citizen Participation

Introduction

In addition to the regular sessions of the Special Groundwater Protection Area Advisory Council (SGPAAC) which met monthly during the three year preparation of the plan, and the separate sub-committee meetings that contributed specific inputs to the plan, the Board held a series of informational meetings and received testimony at four public hearings.

Informational meetings were held in eight of Suffolk’s ten towns, and at the Suffolk County Planning Commission, and the Suffolk County Pine Barrens Commission. Meetings were also held with the North Hills and Lake Success Villages and the Town in the North Hills SGPA, the Oyster Bay Town government, and with the environmental committee of the Long Island Association.

Formal public hearings were held in Brookhaven, North Hills, Oyster Bay, and the Huntington/Babylon/Smithtown SGPA's.

The purpose of this chapter is to provide a record of the comments of those who criticized various portions of the plan document and the response of the LIRPB and the SGPAAC to the criticisms. Comments from the public in support of the plan have not been included since they did not call for further amendment consideration. Oral and written testimony received from the participants at the hearings have been aggregated according to subject matter and is addressed herein:

The SGPAAC was reconvened to consider the criticisms and a vote was taken on whether or not the plan should be amended to reflect these views. The following text indicates either agreement with the changes that were requested, in which case the plan maps contained in Chapter three for each SGPA were amended, or rejection of the criticism. If the rejection referred to an issue of substance, e.g., well-head protection zones, or a model existing use zoning ordinance, the materials submitted were included in the Appendices.

This chapter addresses the eight broad topics that reflect the range of concerns. They are as follows:

- The plan is too stringent in its impact on affordable housing, commercial and industrial activities and, therefore, will negatively impact on the economy of Long Island if implemented.
- The plan addresses anti-degradation and not non-degradation.
- The plan does not address the eleven points contained in the law.
- The plan does not address requirement number 5 specifically in regard to cumulative impacts.
- The plan improperly designated land for an industrial use north of Suffolk County’s Airport. That site should have been recommended for acquisition.
- The plan is not imaginative enough on the subject of innovative land use controls, since it omits any discussion of existing use zoning.
- The plan does not adequately address watershed rules and regulations and more specifically the issue of wellhead protection.
- The plan does not justify the five acre recommendation as strongly as it should.

The concluding section of the chapter identifies the resolutions of support from those governmental entities that have the statutory power and jurisdiction to implement zoning and subdivision powers.
Business Community Concerns

The Long Island Associations’ Environmental Committee submitted a detailed listing of questions concerning various recommendations contained in the draft plan that it interpreted as potentially injurious to the sound economic development of the Island.

The following paragraphs identify each of the concerns and present the Board’s response. An eighteen point list of concerns and objections to the SGPA plan was submitted by the Environmental Committee of the Long Island Association and discussed at two meetings with the L.I.A. participants. The questions and/or concerns and the LIRPB responses follow.

QUESTION A

The imposition of the proposed land use control strategy will make it difficult, if not impossible, to develop or sustain many businesses and support affordable housing in SGPA. The Plan will create major economic hardship for residential and commercial/industrial developers and for existing commercial/industrial firms or property owners.

☐ ANSWER

The effect on existing businesses will be minimal in nearly all cases. Industrial expansion within all but two of the SGPA—Hither Hills and Southold—is already covered by the provisions of either the Nassau or Suffolk County Sanitary Code. The proposal to limit new industrial or business activity to infill sites within existing business areas is not only good environmental but good land use planning that should result in enhanced property values in both the commercial areas and the residential areas protected from the haphazard intrusion of commercial uses.

Opportunities for constructing affordable housing within the SGPA may be reduced. There is a tradeoff between densities that may endanger groundwater quality and recharge and affordable housing. The construction of affordable housing may be feasible at a few sites within SGPA where sewage treatment is available.

It must be stressed that the question raised by the LIA is legitimate. A great deal of attention has been paid to this issue in the preparation of the plan. The majority of vacant industrially zoned land within SGPA was mainly contained within the Central Suffolk SGPA, which includes more than half of all the acreage in the 9 SGPA. The Planning Commission did a separate study and recommended the creation of a planned industrially zoned area in South Yaphank outside the SGPA in exchange for the elimination of the greater part of the vacant industrially zoned land within the SGPA.

On the issue of affordable housing, it has been a long-standing planning recommendation that such housing be located in already existing communities where services, utilities, transportation and shopping are available. Furthermore, in the commercial segment of the Comprehensive Plan, the LIRPB has recommended that much of the vacant commercially zoned land be rezoned to permit residential development at densities that will allow the construction of affordable housing.

In addition, the SGPA plan recommends the use of TDR both to encourage preservation within the SGPA and to foster low cost residential construction outside the SGPA by giving the developer an increase in yield for using TDR.

QUESTION B

The proposed SGPA land use controls will serve to enhance the image of Long Island as being inhospitable to business. Certainly, the future supply of adequate potable water to serve the projected Long Island population would not require such rigid and unrealistic anti-degradation approaches in 208,398 acres, (28% of the total and one-half of the remaining open areas of Long Island).

☐ ANSWER

It should be noted that of the 208,000 acres, approximately 1/3 is already developed. Within these areas the plan recommends that development or infilling on vacant parcels be allowed to continue in accordance with the previously established pattern.

One-third of the acreage is already in the public domain in the institutional, open space and agricultural categories. Thus, the plan really affects about 60,000 acres in currently vacant large tracts. Instead of affecting 28% of the Island’s real estate, the correct number is closer to 8%.

The proposed land use controls may well add to the perception that Long Island does not welcome development at any price. However, a careful reading of the recommendations will reveal that the LIRPB is not hostile but selective in respect to the nature and location of economic development. In proposing the sewer or, as a last resort, the elimination of contaminating uses and the prohibition of new ones, the LIRPB is enlisting the assistance of the County Health Departments and municipalities in protecting the public’s health and pocketbook.

To the extent that the recommendations minimize groundwater contamination, they also reduce the risk that a business or industry may find itself liable for environmental impairment.

QUESTION C

Perhaps it is time to re-evaluate the state and local governmental unquestioned commitment to viewing the entire Long Island aquifer system as a source of potable
water. Should all Long Island groundwater be classified as GA? A carrying capacity needs/benefits study should be considered. The real question should be what we can and should afford in assuring an adequate source of potable water. Let's stop mixing the need for open space with the question of future adequate water supply.

Answer

The issue of State classification of surface and groundwater is something of a sacred cow, and has not been addressed in this report. It may be that the cost and difficulty of mapping minor differences in groundwater quality—there are no dead fish floating on the water table—make reclassification unlikely at this time. The LIRPB is in no position to undertake a needs/benefits study; however, it would support a well-designed study that builds upon the vast amount of water resource and water supply data that has been collected by federal, state and Long Island agencies.

In our judgment the real issue is not one of classification. The LIRPB would not support a downgrading of our potable water. In the 208 Study we identified areas such as Zone II (Bethpage area) that do not meet the GA (potable water) standard.

The second part of your point C is well taken. You are entirely correct in asserting that the justification for open space is not synonymous with the issue of a future adequate water supply. The 208 Study and the SGPA Study, including the modeling work carried out by Cornell University clearly demonstrate that between one and two acre residential zoning will meet the more stringent 208 nitrate guideline of no more than 6 mg/l.

The USGS modeling indicated that one or more acre residential development would not be likely to cause shallow aquifer groundwater impairment due to organic contamination. It is clear that the 2, 3, 4, and 5 acre residential zoning that currently exists within the overwhelming majority of the nine SGPAs is already protective of the aquifer. The reason for open space acquisition to preserve farmlands, golf courses, unique habitats, while parallel to the need to preserve groundwater, is a separable issue. The Board agrees with the LIA that each of these two topics must be viewed in its appropriate context.

Question D

We can support water conservation programs which include public education, limits on turf irrigation and the use of water conserving fixtures and appliances. We would not support the imposition of water caps on the water purveyors unless sufficient technical justification exists for the cap on a particular supplier or area serving Long Island since 1926.

Answer

The LIRPB is in full agreement with the LIA. The SGPA Plan does not deal with water caps. It does support conservation and includes a discussion of the subject in the Appendix C to the report.

Question E

While Nassau would be minimally affected by the proposed land use controls, Suffolk would be severely impacted by restrictions on a range of commercial/industrial activities, including a sunset (i.e. closings), on some businesses.

Answer

It is incorrect to say that Suffolk would be severely impacted by restrictions on a range of commercial/industrial activities. Many restrictions are already in place. The proposal for sunset provisions based on documented groundwater impact is new, but should not prove particularly onerous since its applicability is limited.

Question F-1

No new sewage treatment plants to be permitted in SGPAs unless the discharge is downstream of well sites and outside the SGPAs (surely no Long Island community would accept the treated sewage effluent of another community).

Answer

The Plan does allow for new sewage treatment plants in SGPAs provided they meet specific criteria.

There are 33 sewage treatment plants (STPs) located within five of the nine SGPAs. Two serve educational facilities in Oyster Bay; one serves the State Developmental Center in the West Hills-Melville SGPA; one, the Pilgrim State Hospital in the Oak Brush Plains SGPA; one, the SUNY Campus at Stony Brook in the South Setauket SGPA; and the remaining 28 serve a variety of public and private institutional facilities and residential developments in the Central Suffolk SGPA. An additional ten STPs are proposed or under construction, including one in the West Hills-Melville, one in the South Setauket Woods and eight in the Central Suffolk SGPA.

The Stony Brook STP, the Brookhaven National Laboratory STP and the Calverton (Grumman) STP discharge to surface waters. New York State has agreed to replace the substandard Pilgrim State STP with a connection to the collection system of the Southwest Sewer District treatment plant in Babylon, which also discharges to surface waters.

There are divergent views as to the best way to protect groundwater from point source discharges such as those
covered by SPDES permits. One recommendation would be to bar additional significant SPDES discharges within SGPs, except in the case of new STPs where they are essential to the improvement or maintenance of water quality. Another would be to minimize but not preclude the establishment of either remediation and cooling water discharge. There is agreement that it is necessary to reduce contaminant loadings from existing STPs and from septic systems.

Expansion of the Southwest Sewer District STP, the State University at Stony Brook STP, the Yaphank and the Riverhead STPs to serve portions of the West Hills-Melville and the Oak Brush Plains, the South Setauket Woods and the southwestern and northeastern sectors of the Central Suffolk SGPs, respectively, could be expected to reduce or minimize the potential for groundwater contamination. Since there would also be a reduction in recharge, it would be essential to increase water conservation efforts in areas served by these STPs. See Appendix C for water conservation recommendations.

Other actions to reduce or minimize the potential for pollution include the regionalization and centralization of treatment facilities in those portions of the Central Suffolk SGP that cannot be served by STPs with discharges to surface water or shallow flow groundwater; the consolidation of the remaining existing and proposed facilities, wherever feasible, in order to insure the creation or continuation of viable state of the art sewage treatment within the SGPA; and the prohibition of the establishment of new small STPs, unless the applicant can demonstrate that the operation of the facility will result in the improvement of groundwater quality, or local recharge through the inclusion of existing sources.

New sewage treatment plants should be permitted in Special Groundwater Protection areas whenever they meet one or more of the following conditions:
- As a replacement to an existing sewage treatment plant or plants where due to the new siting standards or new operating and discharge standards, it is not feasible to expand and upgrade an existing facility or facilities.
- Where the clustering of development or the creation of a PUD (Planned Unit Development) will require the averaging of the discharge over the entire property and where this will result in an unacceptable discharge to groundwater.
- Where the pattern of existing development has already caused contamination of the groundwater, and the establishment of an STP can be expected to minimize further contamination.

In Nassau County, where all municipal STPs discharge to surface waters, and in Suffolk County where STPs discharge to surface or to groundwater, 201-type studies should be undertaken to investigate the need for sewer-

ing of already developed unserved areas within the SGPs where the current density exceeds existing 208 Study criteria and where there are documented adverse groundwater impacts.

**QUESTION F-2**

Require all nonindustrial SPDES permit holders to have annual pumpouts and sampling.

☐ **ANSWER**

There is new, clearer language regarding pumpouts. See pg. 4-2-Problem: "Non-industrial SPDES permit holders are not required to monitor their domestic wastewater discharges for organic chemicals." In addition, certain facilities that are not covered by SPDES permits, such as small commercial establishments and residences housing medical practices, with discharges less than 1,000 gallons per day, may also be contributing to groundwater contamination.

- **RECOMMENDED ACTION**

Within SGPs, require the pump-out and chemical analysis of septic tank wastes according to the following schedule:
- residential facilities with SPDES permits (i.e., multifamily units) — every three years;
- residential systems handling medical and other potentially damaging wastewaters — annually; and
- all commercial facilities — annually.

Where problems are detected, require sampling of leaching pools, and pump-outs and/or groundwater monitoring, if indicated.

**QUESTION F-3&4**

Limits residential development to proposed 5-acre upzoning requirement. We believe the 208 Study recommendations, which have been incorporated into Article 6, are sufficient to allow for continued groundwater protection without significant degradation from residential developments.

Increase minimum lot size to two acres for on-site systems in Hydrogeologic Zone III or in sparsely developed portions of Hydrogeologic Zone I.

☐ **ANSWER**

Article 6 does not reflect the 208 recommendations in their entirety. In the opinion of the LIRPB, Article 6 is helpful but does not afford the level of protection appropriate for an SGPA. For that reason, the report reiterates the 208 recommendation for Zone III (2 acres for onsite systems) and proposes its extension to sparsely developed portions of Zone I that are located within an SGPA.
QUESTION F-5

Recommending Suffolk County establish a dedicated fund for the upgrading of existing sewage treatment plants and for financing inspections and enforcement. This fund would be financed through user fees, activity fees, fines, and surcharges.

☐ ANSWER

This recommendation came from Dr. Andreoli of S. C. Health Services. We do not understand your objection. Those who benefit should pay. The only other option would be to tax everyone.

QUESTION F-6

Recommending sunset provisions to be established for industrial operations and incompatible commercial facilities not sewered, (such as dry cleaners and gas stations). Basically, heretofore permitted businesses would be forced out of business. Over what time period will they have to phase out? Will economic incentives be provided to keep them in the same community? Same town? on Long Island? These questions need answers in order to assess the impact of these potential policies on the economics of the area and Long Island.

☐ ANSWER

Proposed sunset provisions, where applicable, would have to be technically justifiable, clearly related to the stated goal of groundwater protection and equitable. In all likelihood, no business operating in accordance with current regulations would be shut down unless it posed an imminent danger to public health. Businesses regarded as potential sources of contamination might be required to upgrade storage, processing and discharge facilities and practices or cease specific operations after a reasonable period of time.

We probably would need a multi-disciplinary committee of experts, including specialists in hydrogeology, groundwater chemistry, risk assessment and law, to come up with defensible sunset provisions.

QUESTION F-7

Insufficient information has been provided in order to ascertain what percentage of industrially zoned land in each town would be eliminated from future industrial use under this proposal. Clearly, if the percentage in any given town is substantial, such a policy of no industrial development within SGPAs could have a very significant impact on that town's economic well-being. In that case, alternatives must be considered including transfer of development rights, designating and establishing new industrial corridors, etc.

☐ ANSWER

This information will be in the final report. Your observation is a good one. We did give a great amount of planning attention to this issue and recommended a major new industrial area for Brookhaven outside of the SGPA.

QUESTION F-8

We believe the existing network of groundwater monitoring wells is rather extensive, particularly in Nassau County, and that an across-the-board increase in groundwater monitoring wells to facilitate monitoring and pump testing of wells is expensive, time-consuming and not necessary. Additional monitoring wells should only be located in those areas where there is lack of groundwater data, where a contaminant plume exists, or where the potential for a contaminant release is significant.

☐ ANSWER

We thoroughly agree with the LIA. The report does not propose the installation of unnecessary monitoring wells. See p. 4-8 (Watershed Management) for precise language.

- RECOMMENDED ACTION

- Additional monitoring wells should be installed in order to map the source of water to glacial wells, as well as to document existing and potential sources of groundwater contamination. This effort should utilize the existing networks of monitoring wells to the extent possible.

- It is further recommended that a minimum of three wells — one upgradient, two downgradient — be installed for every industrial discharge location. The cost of drilling and monitoring these wells should be borne by the discharger.

Work should be coordinated with the health agencies and DEC to ensure up-to-date water quality data for suppliers. This coordinated effort should allow the regulatory agencies to document existing or potential sources of contamination, while allowing the water suppliers to focus on the source of water to wells.

This would be a very limited program and at the discretion of the water purveyors.

QUESTION F-9

The current law that requires DEC to notify water suppliers of any SPDES violation within three miles of a well is sufficient. We do not see the need to expand this list to include the almost one hundred water purveyors on Long Island.

☐ ANSWER

See pp. 4-8, 4-9 for current language. Report makes the point that DEC is not currently complying with the law,
and suggests a low cost way for it to do so.

Problem: Chapter 662 of the Laws of 1983 requires NY-DEC to notify water suppliers in the Sole Source Aquifer of any SPDES permit violation occurring with 3 miles of their well. This law has not been adequately complied with.

- RECOMMENDED ACTION

DEC should publish a report of any substantive SPDES violations for Region I in the Environmental Notice Bulletin and should send a copy to every water purveyor. If it is published in the ENB it automatically will go to each purveyor at little if any cost increase.

QUESTION F-10

The Plan should give consideration to allowing commercial/industrial activities within SGPA to subject to adequate site-specific engineering controls to prevent contamination of the groundwater.

☐ ANSWER

Commercial/industrial activities are allowed within SGPA.

QUESTION F-11

No consideration is given in the Plan for processing the additional scavenger waste that will be generated from the annual pumpout of nonindustrial SPDES permit holders. Currently, there is inadequate capacity for scavenger waste treatment.

☐ ANSWER

LIA is correct. The report should and will recommend expansion/upgrading of scavenger waste facilities outside the SGPA. Studies are underway at Pilgrim with hook-ups to Southwest Sewer District, and at Yaphank.

QUESTION F-12

The financing of a dedicated fund through user fees, activity fees, fines and surcharges could lead to abuses resulting in exorbitant fees and fines to finance regulatory agencies’ activities.

☐ ANSWER

This is a legitimate and serious concern, particularly in these days of budgetary shortfalls; however, the need to raise proper revenues to carry out essential projects and programs is self-evident. Perhaps a committee of regulators, developers, water purveyors and the LIA environment committee should be established to explore these issues in depth.

QUESTION F-13

The recent DEC decision to ban denitrification systems should be examined in relation to the SGPA plan. The cost of sewage treatment plant construction could drastically alter the conclusion of the study.

☐ ANSWER

The study was completed before the DEC action. The LIA is correct. This must be considered. The issue will be raised before the SGPAAC and addressed in the final report.

CONCLUSION

In closing, we request that the Long Island Planning Board reconsider the proposed SGPA management plan to determine what economically pressured Long Islanders truly need to pay to guarantee an adequate supply of potable water. On page 2-4 of the report you indicate a new flexibility will be required to implement the study. Such flexibility, however, is not to be found in most places in the study.

☐ ANSWER

We understand the LIA concerns. We also are convinced that the LIA is equally aware that protection of the aquifer is essential. Without an inexpensive and quality water supply the entire Island is out of business. It is also important to understand that remediation and treatment at the wellhead — let alone importation of water is far more costly than keeping the water clean in the first instance.

Anti-degradation vs. Non-degradation

CRITICISM

One of the concerns raised by the Group for the South Fork was the use of the term anti-degradation instead of the term non-degradation as cited in the law. Their interpretation was that non was more strict than anti. They further opined that by using anti the plan was therefore illegal.

☐ RESPONSE

A discussion with one of the major drafters of the law elicited the comment that, to his knowledge, no distinction was inferred or understood to exist between the two terms. In fact, neither term is defined in any state law. The lawyer for the Group acknowledged this fact by having to refer to common usage: Websters New Collegiate Dictionary defines degrade as follows.

...to lower in grade, rank, or status: Denote the prefix non is generally defined to mean not.
Simply put, following common usage of the term non-degradation, the plans’ policy could be construed as continuance of the status quo. The plan would therefore be in compliance if existing groundwater quality conditions were maintained.

Another interpretation of non-degradation that is just as valid is that of not exceeding established and regulated standards. Water quality, according to this point of view, does not become degraded until a relevant standard or measure of quality is contravened. For example, the N.Y.S. standard for NO₃-N is 10 mg/l. The LIRPB guideline is 6 mg/l.

The essence of the criticism though should be given consideration beyond semantic interpretation and in terms of what the plan is trying to achieve. The group seeks and recommends:

...that existing pollution sources be severely curtailed in order to offset the pollution caused by additional development. For example, nitrogen and other pollutants introduced into SGPs by a new subdivision would necessitate elimination of the same amount of pollutants from existing pollution sources.

To achieve nondegradation, the remaining undeveloped areas in the SGPs should allow primarily parks, permanent open space and tightly-clustered low-density residential development. Proposed uses which unduly compromise groundwater quality should be located outside SGPs.

Despite permitting only limited uses within SGPs, they still may collectively degrade the aquifer in contravention of the strict nondegradation standard. Therefore, the plan must dramatically diminish existing pollution sources in order to maintain or improve existing overall water quality. Such measures include: refusing to renew SPDES permits where violations have been chronic, returning turfed areas to natural vegetation, upgrading existing sewage treatment plants and systems, requiring more aggressive integrated pest management for existing farm operations, eliminating point sources of pollution and amortizing commercial or industrial practices that are polluting groundwater.

Every one of the above implementation measures is strongly set forth in the plan. Instead of acknowledging that fact, the Group instead chose to fault the plan for term usage and not substance.

The reason the term anti was used in the draft report was that no definition of the prefix non existed. The term anti-degradation however was defined in a memorandum from the Commissioner of DEC received by the Board dated September 9, 1985, which established a policy of antidegradation for his department. This policy applied mainly to surface rather than groundwater — but it was the only expression of policy in existence.

EPA however, has recently questioned New York State’s implementation of antidegradation as defined in the Clean Water Act Amendments of 1987. A reevaluation carried out by DEC resulted in the draft anti-degradation policy of 1990. In 1991 the term was discarded, and the current language is neither anti or non, but Water Quality Enhancement and Protection Policy. As of this writing the new proposed policy has three parts:

- **Discharge Restriction Categories**
  - *Goal:* Protect sensitive waters that cannot assimilate the effects of general discharges or discharges of specified substances.
- **Antidegradation**
  - *Goal:* Maintain the high quality of waters that are cleaner than standards require.
- **Substance Bans**
  - *Goal:* Protect all waters from specific persistent toxic substances.

The only source found that uses the term non-degradation was the 1982 brochure Watershed Planning: The Protection of Long Island’s Groundwater put out privately by a group of environmental organizations in 1982. Their glossary defined the term as:

**Ambient** means the background or existing water quality in the vicinity. In undeveloped areas that have not been subjected to earlier contamination, the ambient water quality may be pristine or less than 1 or 2 mg/l NO₃-N (and, presumably, no organic contamination.) In some portions of the various SGPs the ambient concentrations may be of 5-6 mg/l.

By these definitions the plan should strive to maintain and/or hopefully improve upon existing water quality conditions.

In fact the plan for each SGPA addresses this concern. Whether the term anti or non is used, the intent is the same. The plan has been amended to delete the term anti-degradation except where historical reference warrants its retention.

The significant issue is whether or not the plan, if implemented, will maintain ambient conditions and also improve water quality in those portions of the SGPs that are not currently pristine.

The plan does provide for this objective by calling for the maximum retention of undeveloped privately held lands, in large measure through acquisition and preservation as part of the public domain; and for a host of regulatory and administrative
procedures to improve water quality in already developed and impacted areas within the SGPA.

The Plan's Eleven Requirements:

The coalition against the plan argues that the plan document fails to address the eleven required elements set forth in Article 55 of the Environmental Conservation Law and listed on pages 1-5, 1-8 and 1-9, above. The SGPAAC thoroughly disagrees with this criticism. With one possible exception, every point of the law has been addressed. There is a vast difference between satisfying the critics who may not like the conclusions of the study and the substantiation of their charge that the requirements are not addressed. Table 1-1 on page 1-9 clearly identifies where each of the elements is discussed in the report.

The criticism was valid as respects the eighth requirement calling for the identification of federal, state, and locally financed activities that degrade groundwater. The criticism in particular identified the jet fuel spill that occurred at Westhampton Airport a decade ago.

The subject was considered; but, for several reasons, was omitted from the text. First, the only projects that would conceivably fall within the parameters of this requirement are in the transportation field. This would include highways and airports.

Second, any projects past, present or proposed have either already passed SEQRA review, are currently under SEQRA review or will be under SEQRA review. For already approved projects the issue is moot. For current or proposed projects the time to suggest limits is when all the facts are in and an intelligent decision can be made. The purpose of this plan is not to stop the world, but to enable elected policy makers to make more rational choices based upon as broad an array of alternatives and knowledge of their consequences as possible.

The airport issues involve the Gombrieski County Airport at Westhampton, the U.S. Navy Facility at Calverton, and the Brookhaven Airport at Mastic.

The County airport has been the subject of several comprehensive plans and is in operation. The SGPA plan did change its earlier recommendation for the industrial parcel north of the airport, which now is listed for county acquisition. Past fuel spills are subject to EPA, and DEC regulations and, while using better management and control, the plan does not recommend closing the field or hobbling its ability to operate.

The Brookhaven Airport is under consideration as the site for Dowling College's School of Aviation. Any proposed buildings or improvements are Class 1 actions under SEQRA and will have to comply with proper design, construction, and environmental safeguards. The Plan supports this use and does not recommend limits other than those already contained within the body of the Plan. It must also be noted that the activity as proposed is outside the SGPA.

The Navy facility at Calverton is currently the subject of a feasibility study sponsored by the F.A.A. to determine if joint military/commercial air operations can coexist. The feasibility study will also examine whether or not freight cargo operations would be economically beneficial. Until the study is completed, it is premature to consider limits other than those that would apply to any activities within the SGPA. In other words, the SGPA will be input to the feasibility study.

The LIRPB has been on record for more than a decade that road construction on new rights-of-way within the Pine Barrens be eliminated or severely restricted. The Suffolk County Planning Commission in its annual review of county capital projects has followed this policy, resulting in the elimination of the proposed extension of County Route 111 from the Long Island Expressway to Middle Island.

The only other highway project that is located within the boundaries of the SGPA is the expansion of the Long Island Expressway to four lanes from Exit 30 in Queens to Exit 62 in the Town of Brookhaven. This proposal does not affect Central Suffolk SGPA; it does, however, traverse or abut portions of the North Hills, Oyster Bay and West Hills-Melville SGPA.

The affected segments of the Expressway are located between exit 32 in Lake Success to exit 49 in Melville. The rest of the project is outside of the SGPA.

The SEQRA process has been completed for the segment from exit 49 through exit 57 and the road improvements are under construction. The balance of this project will also receive full EIS evaluation. More to the point, the project is within the existing boundaries of the highway and is adequately designed for road runoff and recharge. The Plan proposes no limits beyond those with which the State of New York is already complying. Since the fourth lane is designed to improve safety and to relieve a highway that in this section is utilized well beyond its original design capacity, this project is expected to reduce congestion without negative impact on the environment.
Cumulative Impact

The fifth required element is:

A resource assessment which determines the amount and type of human development and activity which the ecosystem can sustain while still maintaining existing ground and surface water quality and protecting unique ecological features.

This work item in effect is meant to provide answers to the question of the carrying capacity of the land within the SGPA's to sustain development without compromising the existing quality of the groundwater. The requirement as stated is vague, poorly written and, like much of the law, ambiguous. As a result differing interpretations and expectations have arisen. Some individuals expressed the hope that this element of the study would reinforce their commitments to the preservation of the pine barrens or of other properties in those SGPA's without pine barrens. Some individuals interpreted the language to mean that development could occur, so long as the additional growth would not lower the existing quality of the groundwater. Some other individuals argued that growth could occur if the guideline for NO₃-N that was adopted in the 208 plan was not exceeded. Some argued for the maintenance of ambient conditions with a plan for upgrading existing conditions, even where existing conditions are good, e.g., NO₃-N less than 6 ppm. (6 mg/l).

This debate also raised two other issues; namely, whether or not the plan must follow an anti-degradation policy or non-degradation policy, and what both of these policies mean. Is non-degradation the same as zero degradation? This area of dispute is discussed separately under its own heading.

The authors of the plan postulate that requirement #5 has to refer to two carrying capacities and thus two sets of cumulative impact have to be considered.

The simplistic bumper stickers that say No Pine Trees, No Water is simply not true. At least half of the SGPA's have no pine barrens.

The primary purpose of the study is to develop a plan that will address the protection of the portion of Long Island's aquifers within the SGPA's. The issue of cumulative impact should be limited to the relationship between development and its impact on water quality. The current legal limit for acceptable potable water is the nitrate/nitrogen standard of 10 milligrams per liter. The 208 study, and the subsequent studies, laws and programs since the release of the 208 Report in 1978 have established a tougher guideline of 6 mg/l. The unanswered question during the conduct of this study — and it still remains unresolved — concerns the impact of organic contamination resulting from development. To this day there are few adopted standards and little epidemiological or other data that provide definitive scientific answers. In fact, the Long Island 208 study was the first in the nation to even test for organics. That effort led to the discovery of the ubiquitous nature and presence of Temik (Aldicarb) in the Southold aquifer and the Board supported the Suffolk County Health Services efforts to provide for the installation of carbon filters to treat the water supply to all of the affected homes.

Many organic compounds when tested on rats do induce a variety of tumors. Whether this constitutes proof of a correlation with humans is really not the issue. If even a potential for health impacts exists, then the public must be protected to the maximum extent possible. Therefore the Board commissioned a special study undertaken by the Long Island office of USGS in cooperation with colleagues at Ithaca to develop a probability model that would link varying densities of development and the probable presence of organic contaminants. The evidence thus far shows a correlation between intensity of development and the likelihood of organic contamination.

As one would expect, areas of commercial and industrial land uses and high density residential use are likely to experience organic contamination. Conversely, low density residential areas without any commercial or industrial uses are likely to be free of organic contamination. The low density was one-half acre zoning or 1.8 houses per acre. Simply put, this means that the entire SGPA's could sustain less than one acre residential zoning and not create a problem. In other words, if the density were kept at one house per two acres, the groundwater would be well within water quality standards. Table 5-1 summarizes the land available for development, the current water quality, the allowable density and finally the cumulative impact for each SGPA.

<table>
<thead>
<tr>
<th>Zoning</th>
<th>N-NO₃</th>
<th>Population/Acre</th>
<th>Cumulative Population</th>
<th>Cumulative No. of Dwell. Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 acre</td>
<td>4-6</td>
<td>2.80</td>
<td>148,000</td>
<td>48,000</td>
</tr>
<tr>
<td>5 acre</td>
<td>1-3</td>
<td>0.56</td>
<td>33,600</td>
<td>10,000</td>
</tr>
</tbody>
</table>

5-9
As indicated, the protection of water quality clearly cannot support the plan recommendation calling for five acre zoning for most of the undeveloped tracts. In fact, this is the basis for much of the opposition to the plan from the developers, land owners, and builders who argue that the protection of water does not require such low density.

With the exception of the Project Director, members of the Advisory Council who are health, engineering and planning professionals were in almost total agreement that they could not support five acre zoning based on the need to protect the aquifers. They could not accept more than one or two acre zoning as necessary for water quality protection. In fact, it was the position of the County Health Agencies that one acre could provide the requisite groundwater protection. They did agree to support the plan and a five acre recommendation if the reasons for such low density were other than aquifer protection, and also if the low density did not conflict with other objectives, such as the need for low-cost or affordable housing.

This latter concern was addressed in the plan and in the Commercial Analysis portion of the Board's current comprehensive planning effort. Affordable housing should be provided in established communities where transportation, shopping and community infrastructure exist. There is more than enough vacant commercially zoned parcels along major roads, providing a supply vastly in excess of need. Many of these strip commercial parcels should be rezoned for affordable housing at densities that would keep housing costs down and are also reflective of the value of the commercial land.

From a planning perspective, five acre zoning with clustered development provides increased assurance of watershed protection as well as the opportunity to retain ecologically significant aggregations of undisturbed open space.

Other arguments in support of five acre zoning include the fact that Brookhaven, Southampton and East Hampton have already zoned large portions of the SGPA within their boundaries for five acre use in order to protect the rural character of their communities. This is also true of several Nassau Villages and the issue has been judicially upheld in the Upper Brookville case.

Another argument in favor of five acre zoning is that the scientific evidence is not yet fully available in regard to organic contamination. Therefore, prudence would be a sound planning approach to follow. This issue is more fully discussed in the following pages under the heading of Justification for Five Acre Zoning.

Interestingly enough, the business community is opposed to the recommendation, as expected; but the so-called environmentalists have not shown great support either. The second and separate debate over cumulative impact is specifically related to the pine barrens. This is a particular forest with unique attributes of flora and fauna and one that merit attention even if no aquifer or water issues were present.

Obviously any development in the pine barrens will have a cumulative impact, but not necessarily one related to water.

The major species of pine trees indigenous to the barrens are serotinous. This means that the seeds contained within the pine cones can only be released after the cones have been subjected to intense heat. Unless planned or accidental burnings occur, the forest will not survive as a pine barrens. If preservation of the pine barrens ecosystem is a goal of the Plan, then five acre zoning with clustered development or the transfer of development rights can be justified as a means of supplementing extensive public purchases designed to set aside areas large enough for fire management. The larger the acquisition program and the more extensive the use of large lot zoning, the greater the reduction of the potential cumulative impacts of development.

The problem however is cost. There are over 50,000 acres of undeveloped pine forest tracts within the SGPAs in Suffolk County. If all of the County's open space monies were assigned solely to the pine barrens (which they are not) less than one-fifth of the vacant acres could be permanently preserved. Thus the challenge is multifold. Every tool in the planning arsenal has to be used (see the discussion on Existing Use Zoning); and the efforts should be focused on the preservation of contiguous tracts. Implementation of the plan could achieve permanent preservation of more than 80 percent of all the vacant lands. The developers say this is too much, the preservationists say it isn't enough. The probable outcome will be somewhere in-between.

Industrial Parcel North of Gombrieski County Airport

The section of the plan covering the south-eastern portion of the Central Suffolk SGPA recommended that one third of the industrially zoned and privately owned property directly north of the airport be retained for industrial use. Earlier planning by the County of Suffolk and the Town of Southampton had made such a provision on the basis of compatibility with the airport and the need to generate jobs and tax base for the town and school district.

A portion of the property does contain some dwarf pine forest. The Suffolk County Legislature adopted a resolution calling for the purchase of this property to be added to the County's Open Space Preservation program. Since the overall plan for
Existing Use Zoning

INNOVATIVE LAND USE CONTROLS:

The Open Space Council of Brookhaven commented that the section of the plan concerning land use control techniques for acquisition and/or preservation of lands was too limited and should be expanded. The Council recommended that in addition to purchase, donation, retention of tax default parcels, mandatory clustering, planned unit development (PUD), transfer of development rights (TDR), purchase of development rights (PDR), and upzoning to five acre residential use which the plan calls for, that the LIRPB list EXISTING USE ZONING.

In essence, the Council’s argument is that watershed lands, hunting and fishing preserves, golf courses, forests, and farms are uses; and if currently open lands were zoned for those purposes, it would be possible to protect undeveloped acreage in the SGPAs without having to buy it. From the standpoint of those who do not own the properties it is an idea with some appeal. See Appendix K for model ordinance.

This concept was not recommended in the plan because it is patently unconstitutional. A owner is entitled to a reasonable use of land, meaning some economic benefit, although not necessarily maximum profit. To zone pine barrens as pine barrens, i.e., existing use would deny any economic return and therefore be confiscatory.

The techniques that are recommended in the plan are the result of four decades of study and practice of land use control by the study team, and are the only workable tools available. In the preparation of the open space segment of Long Island’s Comprehensive Regional Development plan every workable and theoretical land use control measure was considered.

It is true that some states - California, Hawaii and Oregon for example - do provide for agricultural and/or forest zoning. It is feasible to some extent in those states because agriculture and timbering are economic activities. More to the point, the industries support the zoning for their own protection. The history of the California Coastal Conservation Commission, which has very broad powers to control land uses, has been a mixed record. When the Commissions actions became confiscatory, it was reined in.
Here, in the State of New York, the judicial actions of other states do not constitute a precedent for support. Even the constitutionally created Catskill and Adirondacks (forever wild) Forest Preserves are zoned for low density residential not forest or existing or watershed use.

If the towns which control zoning, wished to create an agricultural or golf course zone they could do so, because some economic return is possible. At the least the owners would be entitled to a reduction of assessed value commensurate with the loss of development potential. The New York State Agricultural District Law recognizes this approach. However, the land must be set aside for agricultural use by voluntary action of the owner, not a mandate by the governmental mandate.

There are also pragmatic realities that are even more pertinent than the constitutional constraints. Long Island needs a plan that can work; a plan that can be implemented.

The owners of undeveloped lands in the SGPA's did not acquire them with the intention of becoming public benefactors — save for the few who have donated their properties to the County or Nature Conservancy. Most farmers oppose upzon- ing of their lands because the farm serves as collateral in securing the short term bank loans for operational needs. As the land is upzoned and the potential development return reduced, the ability to borrow against the land is similarly reduced. If it is not possible to convince the Town of Riverhead to upzone from one acre to five acres, what likelihood is there of achieving a change from one acre residential to non-development agriculture zoning? If the Open Space Council wishes to pursue the adoption of a model ordinance for open space zoning the Board does not wish to dissuade it from its mission. It must be observed however, that it took those who developed the current laws almost two decades to get clustering accepted, another decade to have it made mandatory at the town’s discretion; three decades to get T.D.R., and a similar more than three decade battle to move from quarter, third and half acre zoning to the current two, three and five acre residential zoning.

Proposed actions must be doable now if the majority of the 60,000 remaining undeveloped lands in the SGPA’s are to be preserved.

Watershed Rules and Regulations:

WELLHEAD PROTECTION vs. WATERSHED PROTECTION

Historically watershed rules and regulations had been proposed for surface waters where it is easy to delineate the drainage area contributing to a lake or reservoir. This process is obviously much more difficult for groundwater. Even here on Long Island where there is extensive information on the hydrology, it is difficult to pin point the location or source of water, for individual wells or wellfields, especially those that tap the deep magothy aquifer. The Federal Government required New York State to prepare a wellhead protection plan based on the concept that it is possible to delineate the zones of contribution to individual wells and to regulate activities within those zones to insure some degree of protection to the water supply that is being derived from those wells. DEC has recognized that a zonal approach with restrictions based upon an arbitrary calculation of a five, ten or twenty year time of travel may not be appropriate in the bi-county region. Here on Long Island, the wellhead protection concept can only be applied to shallow glacial wells where it is possible to simulate the zones of contribution by doing pumping tests and calculating drawdown. There are still many local conditions that might affect the accuracy of the results such as the presence or absence of clay lenses in the area, influences of other public wells in the area and changes in rainfall patterns. Most of the Island’s geologists and water purveyors feel that the concept is not relevant in respect to the delineation of the sources of water for the deep magothy wells. Since 50% of the Island’s wells tap the portion of the aquifer, they feel it would be misleading and an exercise in futility to proceed to develop wellhead protection plans based on a scientifically indefensible formula.

Wellhead protection for Suffolk County does present some specific problems if none other than sheer numbers (over 500 wells on 250 sites). These problems are:

- The hydrogeology of the aquifers require different programs for each aquifer.
- Urbanization has already impacted many existing sites and must be considered for future sites.
- Current groundwater classifications do not reflect present knowledge of the aquifers.
- Enforcement of wellhead protection will be difficult for water suppliers and are described below.

Wellhead protection calls for establishing protective zones around a wellfield. In Suffolk County this may be extremely difficult for some wellfields primarily due to Long Island’s hydrogeology. The two major aquifers (glacial and the Magothy) are used almost equally for Suffolk County water supply. For the glacial aquifer it would be possible to establish site specific protection areas since the quality of this upper aquifer is directly influenced by land activities surrounding each wellsite and hydrogeologic data is available. However, Article 7 of the Suffolk County Sanitary Code has already established an area approximating 1,500 feet upgradient and 500 feet downgradient from a well. Site specific investigations would be necessary on each wellfield if more detail is required. Establishing boundaries for the Magothy Aquifer will be extremely difficult if not impossible for the following reasons. In dealing with the Magothy Aquifer, which in some places may be as thick as
1,000 feet, well screen locations are often referred to as upper, middle, or basal Magothy. The basal (deepest) Magothy water originates from areas closest to the groundwater divide. This can be as distant as 10 miles from a well site. As well screen depth decreases in the Magothy the origin of the well’s water moves away from the groundwater divide (north or south) generally closer to the well. Aquifer properties would make boundary sizes too large.

The Magothy is further complicated by its own geology i.e.; the presence of clay lenses throughout the aquifer. These clays are non-contiguous and site specific and provide any well with additional vertical protection from land activities immediately surrounding the wellfield. Setting practical boundaries of the Magothy wells should not be considered unless further information or improved predictive tools can be made available.

The many groundwater studies mentioned earlier have shown that some aquifer segments are already contaminated. This is especially true in the upper glacial aquifer, where organics and pesticides have been found throughout the county. Wellhead protection must, therefore, look at existing wellfields to examine their contamination potential and then address the location of future sites. For many well site development has occurred around them and they may just be surrounded by the time bombs. Regardless of what protection zones are developed the water suppliers could only control activities on their own well sites. They would have to rely on county or state health departments for enforcement of regulations affecting other properties.

Current standards do not recognize the existing contamination. Present standards classify the Long Island groundwater as Class GA (drinking). This may not be adequate in a portion of Suffolk County where contamination renders the water non-potable. Some consideration should be given to making adjustments in the classifications. For example: A GA classification was given to the Long Island Aquifers in the 1960s, designating the best use as drinking. Since that time, a wealth of knowledge about the Long Island groundwater systems and aquifer contamination has been developed. Different flow regimes were recognized, leading to creation of groundwater management zones; and groundwater protection programs are being actively pursued on a county and town level, through land purchase and local anti-pollution measures, in order to prevent future contamination.

This knowledge should now be applied to the groundwater classifications — specifically by providing additional classifications that can be applied to each aquifer. Long Island has three major water-bearing aquifers, the upper glacial, Magothy and Lloyd. Special state legislation has already been enacted identifying the Lloyd aquifer as sensitive to pollution and withdrawals, and imposing a moratorium on the aquifer’s use. The legislation recognizes special sensitivity for the Lloyd aquifer and, appropriately, this aquifer should have a higher classification than GA, but none exists.

The Magothy Aquifer is recognized as the major water supply source for Nassau and Suffolk Counties, and it will continue to be the prime water supply source for generations, and is appropriately designated as GA.

The upper glacial aquifer is the uppermost water-bearing stratum and receives contamination from the land uses above it. It is known that land uses from certain portions of the glacial aquifer (known as deep recharge areas) impact the Magothy water quality, and conversely, the land use outside deep recharge (discharge areas) does not. This factor should be considered in the classification of the glacial aquifer. For example, in western portions of Suffolk County, the upper glacial aquifer has been found to have the most contamination, and drinking water use would not be recommended. However, in Eastern Suffolk pristine glacial water can still be found, making this water excellent for water supply.

The enforcement of a wellhead protection program or even Watershed Rules and Regulations (WRR) may be difficult for a local water supplier. For example: Watershed Rules and Regulations become part of the State’s sanitary code and for the executive law. However, the water supplier may not be able to gain access to a suspected pollution source (due to the lack of authority) and may also lack the administrative authority to impose penalties or administrative judgements. The enforcement arena may be better left to existing regulators (NYSDEC, NYS DOH, SCDHS).

Conclusions

- Long Island hydrogeology makes it extremely difficult to establish a wellhead protection program.
- Existing glacial well sites should be investigated within the context of a wellhead protection program in order to determine pollution potential.
- Future glacial well sites can be located to provide adequate wellhead protection.
- It is not possible to establish wellhead protection at Magothy well sites beyond well site boundaries. Further research needs to be undertaken. Similar difficulties will be experienced in locating future Magothy sites. The exception to this would be to sites on or near the groundwater divide.
- A great deal of groundwater contamination presently exists in the upper glacial aquifer. The location of new water supply sites in this aquifer would probably require water treatment.
- Existing regulations by DEC and SCDHS are adequate for both wellhead protection and watershed rules and regulations.
• Locating future well sites is complicated by inconsistencies in the present groundwater classifications. More flexibility is needed.

• Enforcement by water suppliers of wellhead protection or watershed rules and regulations will be cumbersome and difficult. Full responsibility should be given to existing regulators.

From our perspective, the entire Island could be considered a watershed since virtually at every point there is water that moves downward towards some portion of the aquifers and recharges them. Obviously, in the coastal areas this water is not going to be withdrawn by any public wells and therefore will end up moving out to coastal waters. For the purpose of the SGPA Study, the entire nine areas should be considered as watershed areas, since they provide recharge to the deepflow portions of the entire aquifer system. The water beneath these areas may not necessarily find its way into a glacial or magmatic well located downgradient. However, to the extent that it is possible to prevent or minimize contaminant entry into the water supply from these points, current and future wells could be assured a quality of water that would meet drinking water standards. The plan recognizes this fact and, for the most part, calls for the location or relocation of potentially contaminating commercial industrial facilities outside of this region. Those recommendations, in addition to the upzoning of the remaining residential land and the clustering of development, offer the maximum protection achievable without outright acquisition, which is not feasible for all of the remaining open space.

Justification for Five Acre Zoning

ORGANICS

There has been a great deal of discussion among the SGPA advisory members as to whether or not it is actually possible to predict various organic loadings to the aquifer based on existing land use. In its latest report to the Regional Planning Board, the USGS has stated that analysis of samples from 90 monitoring wells along the groundwater divide of the Island has indicated that samples from 38 percent of these wells, some of them in high density residential areas of four to ten units per acre, showed evidence of organic contamination. There are a number of assumptions in the USGS study that obviously could be questioned. For example, volatiles, by their very definition, can evaporate before reaching the aquifer system as opposed to other synthetic organic compounds that are both more persistent and possibly more soluble. Pesticides and herbicides for example that are used by many homeowners may be more likely to enter the groundwater system than some volatile organics. Also the proximity of the monitoring wells to actual specific development is not accurately defined nor was there an attempt to look at groundwater flow patterns to insure that the water being analyzed came from a specific identifiable land use. There was an assumption that the land related activities directly above the monitoring well were the most responsible for the water quality being analyzed; but as everyone knows, even along the groundwater divide the tendency to be lateral movement as well as vertical movement especially in response to heavy rainfalls and droughts which tend to shift the location of the groundwater divide both north and south throughout the year. Another shortcoming of this study is the fact that only one sample was taken in one year order to arrive at this conclusion. The Suffolk County Water Authority has a substantial amount of data regarding various contaminants in their wells that shows that the concentrations vary from day to day and, in some instances, are not detected at all although several weeks later they exceed the state limit.

It is doubtful that we are ever going to develop an organ model of such sophistication that it will be able to accurately predict the potential for contamination from a wide range of varying organic compounds to a water table located at various depths throughout the Island. The problems in developing such a model include a wide range of differences in persistence between the various organic compounds, the extremely complicated interactions that occur between each compound and those compounds in conjunction with other compounds both at the point of discharge and throughout the soil column which also changes significantly from one test boring to another; and other variables such as pH, temperature, and rainfall. Cornell University tried to create such a model for particular organic constituent, aldicarb. They did this for a single lens aquifer in Southold and had many variables that had to be plugged into the model to make it work. As different soil profiles, rainfall patterns, and application rates were imputed and as the compound degraded from aldicarb to its metabolites, the visual screen showed both the shape, size and extent of the plume changing as each of these parameters changed. Since there may never be enough verifiable scientific data to support finding that a certain type of residential land use will result in a specific contravention of a certain organic standard, it is more prudent to utilize the approach taken in formulating the SGP Plan. It is known that as density increases, or as land use changes from residential to commercial, and/or industrial use, the likelihood of introducing organic compounds increases, it is more likely that contamination will reach the water supply. Based on that general principle and a number of other planning concepts, including the quality of life, transportation issues, and keeping significant open areas vacant, the plan recommends five acre zoning for much of the area throughput the nine SGPA's.

As previously indicated, the data for nitrate and/or organic contamination associated with residential development cannot justifiy minimum lot size requirements in excess of one to two acres. However, other planning and environmental consider
tions, among them the preservation of community character, the need to protect open space for recharge and for ecosystem viability, a desire to maintain ambient water quality and uncertainty as to the groundwater impacts of current and future activities support the recommendation for five acre zoning.

NITROGEN

Much of Suffolk County's up-zoning as well as S.C. Health Department's Article 6 were based on nitrogen loadings and modeling done as a result of the 208 Program. Cornell created a model which assumed a certain nitrogen loading from cesspools and turf, and thus predicted that the nitrogen standard of 10 mg/L would not be exceeded if every home had a minimum lot size of 1/2 acre. Applying the Pine Barrens Commission's standards of no more than 10% of a lot to be placed into turf, as well as allowing the use of other types of on-site septic systems in Suffolk County, (for example tile fields which the State Health Department estimated can provide a 60% reduction in nitrogen loadings compared to the conventional cesspool used here) could easily invalidate the findings of the model and lead to the conclusion that even developing on 1/4 acre of land or less would not result in the contravention of the nitrogen standard.

Average (mean) values for the inorganic parameters for each of the land use categories are indicated in SCDHS Table 8-3 of Appendix A of the Suffolk County Comprehensive Water Resources Management Plan (1987). Although these values represent current best estimates of the impacts of land use on groundwater quality, they must be interpreted in light of the limited amount of data on which they are based, the ranges of values found during the study, and the methodological problems of selecting representative well locations and depths.

The results from this study indicate that all land uses impact groundwater to some extent. Agricultural activities were found to have significant impacts, producing nitrate and insecticide concentrations near or above drinking water limits, and elevated concentrations of chloride, sulfate, calcium, and magnesium. Industrial and commercial activities were found to result in a wide range of inorganic chemical concentrations, and often significant organic pollution.

The impacts of road salting are reflected in the seasonally high sodium and chloride values for the transportation category. The wells monitoring institutional land use and recreation/open space appear to be picking up contamination originating beyond the land use boundaries; the mean values for these categories, therefore, should be viewed with extra caution. The effects of residential development on groundwater nitrogen concentrations were found to vary directly with housing density, and are discussed in detail in the following paragraphs.

The 208 Study determined an empirical relationship between housing (population) density and average median nitrogen concentrations in water supply wells in unsewered areas of Nassau County. The 208 Study also found that if the average nitrogen concentration of water in a well is 6 ppm, then there is a 10 percent chance that any sample from the well will exceed the drinking water standard of 10 ppm; an average concentration of 4 ppm, on the other hand, will mean that almost no samples will violate the standard. Based on these relationships, Article 6 of the Suffolk Sanitary Code was adopted to limit average groundwater nitrogen concentrations to about 4 ppm in 208 Study Hydrogeologic Zone III (to protect the deep aquifer recharge area) and Zone VI (to protect the ecology of South Shore bays), and about 6 ppm elsewhere.

Recent studies by Cornell University utilizing a computerized mass-balance model referred to as WALRAS indicate that, at the present average turf fertilization rate of 2.5 pounds per year per thousand square feet and turf coverages for residential lots, the average contribution of fertilizer nitrogen in recharge is 4-4.5 ppm, regardless of lot size. This result implies that average groundwater nitrogen concentrations will exceed 4 ppm, even in low density residential areas.

The recharge nitrogen contribution from sewage, on the other hand, was found by the WALRAS model to be directly proportional to population density, and was found to equal the contribution from fertilizers at a housing density of about 2 dwelling units or 6.5 people per acre. Therefore, the WALRAS model predicts groundwater nitrogen concentrations of about 8-9 ppm for half-acre development, assuming a Suffolk County average household size of 3.25. WRMP values for low density residential development were within the range of values predicted by the 208 relationship and WALRAS model, while category means and ranges of well averages were considerably lower than predicted values for medium and intermediate density development. Wells with the highest concentrations in each of the latter two categories, however, were fairly close to 208 study predictions, indicating that the 208 relationship may be used to assess potential worse case conditions on which prudent planning is usually based.

The WALRAS model results, on the other hand, are consistently higher than the nitrogen concentrations found during the SCDHS study. This may be due to a number of factors, including: over-estimation of the amount of fertilizer nitrogen applied to lawns; over-estimation of the percentage of fertilizer nitrogen leached to groundwater; overestimation of the nitrogen content in domestic sewage; and/or, under-estimation of the efficiency of septic tanks and the unsaturated zone below cesspools to reduce leachate nitrogen concentrations.