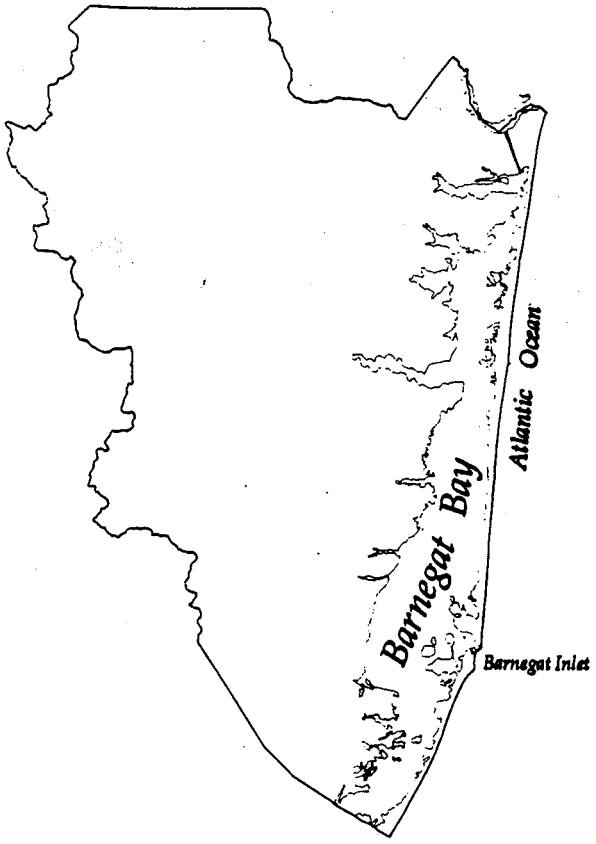
Management Recommendations for the Barnegat Bay



Final Report

Prepared for the

Barnegat Bay Study Group

by

Rogers, Golden & Halpern, Inc.

August 1990

THE BARNEGAT BAY STUDY GROUP

October 15, 1990

Commissioner Judith A. Yaskin
State of New Jersey
Department of Environmental Protection
CN 402
Trenton, New Jersey 08625

Dear Commissioner Yaskin:

Please allow this letter to serve as our transmittal to you of the final report of the Barnegat Bay Study Group. This report, prepared by Rogers, Golden and Halpern, Inc., under the guidance of the Study Group, consists of two parts: Profile of the Barnegat Bay; and Recommendations of the Barnegat Bay.

The mission of the Barnegat Bay Study Group was to undertake an examination of the quality of Barnegat Bay and to identify the problems of the bay region in order that we may help assure its future, as required in P.L. 1987, Chapter 397. Barnegat Bay is one of New Jersey's most critical environmental resources and each of us is committed to its preservation, protection and enhancement.

This final report reflects a three pronged input from the Study Group, a Citizens Advisory Committee and a Technical Advisory Committee and provides a good framework for a comprehensive bay management program. It also makes a series of recommendations which have varying degrees of merit, some of which are worthwhile. Nonetheless, we disagree with some of the potential management recommendations, especially those dealing with revenues. The management recommendations refer to funding mechanisms, taxes, impact fees and various other issues related to revenues, which in our view these management recommendations reach beyond the scope of the Barnegat Bay Study Group project and are areas of responsibility of the New Jersey Legislature and the Governor. Additionally, the final report refers to a number of the recommendations which may not be feasible, and in our opinion need additional study.

We do trust that this report will serve to enlighten citizens on some of the environmental stresses on Barnegat Bay and that it will lead to continuing discussions as to how its future environmental health may be preserved. We hope the State does not lose any momentum developed by the Study Group, citizens and technical advisory groups on this issue.

It is our privilege to serve as members of the Barnegat Bay Study Group, and please be assured that our County and local governments shall continue to work with your department for our mutual goal of a better environmental future for Barnegat Bay.

Sincerely,

James J. Mancini
Ocean County Freeholder

Carl W. Block
Mayor, Stafford Township

John A. Peterson, Jr.
Mayor, Borough of Seaside Park

Kenneth J. Leake
Mayor, Berkeley Township

Robert A. Tudor
Chairman

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Management Recommendations for the Barnegat Bay

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1. Introduction

This report represents the second part of a two-part study of the Barnegat Bay. The first part of the study, the Profile of the Barnegat Bay, was a characterization of conditions and trends in Bay water quality, ecosystem vitality, and human activities that rely on or affect the Bay. This second part of the study, an assessment of alternatives for managing the Bay, is based on the results of the Profile and on issues of importance to the public.

The Profile of the Barnegat Bay found that water quality in the Bay is being degraded by nonpoint sources of pollution. The primary cause of this pollution is development on land and the activities associated with development (e.g., vehicle use, lawn and garden maintenance, septic systems), although other sources, such as boats and wildlife populations, are also contributors to the pollution problem. Current conditions in the Bay reflect excessive nutrient inputs, resulting in high levels of phytoplankton growth and turbidity. These conditions in turn can upset the natural balance of the Bay ecosystem. Coliform pollution is also evident in the Bay, as indicated by water quality monitoring and shellfish bed restrictions. Coliform pollution has resulted in direct impairment of human use of the Bay by restricting swimming and shellfish harvesting. Metal contaminants were found in sediments in several locations, although the extent of this and other forms of pollution is not known due to limitations in the amount of monitoring data available.

Nonpoint source pollution in Barnegat Bay is the cumulative result of numerous, small pollutant inputs that result from the actions of individuals. Because it is difficult to predict the amount of pollution that will be caused by one individual action, regulators have been hesitant to enact land use regulations designed to prevent these impacts, especially when the regulations must limit where and how individuals may use land that they own. Controlling the use of water, which is viewed as belonging to

everyone, is even more difficult. Nevertheless, controls on individual actions, both on land and on water, are the only way that cumulative impacts to the Bay can be prevented. Moreover, correction of ongoing problems must occur if trends in degradation are to be reversed. A two-pronged approach - remediation of existing pollution sources and prevention of new sources - is necessary if we are to reclaim Barnegat Bay for everyone's use and enjoyment. This report defines a path toward this ultimate goal.

The management strategies contained in this paper are organized into seven topics:

Sensitive area protection (Chapter 3) - these management strategies are aimed at defining and protecting the resources that are most significant from an ecosystem and food chain perspective.

Watershed management for existing development (Chapter 4) - these recommended actions address control of pollution from current nonpoint sources.

Watershed management for new development (Chapter 5) - these recommended actions are ways to control pollution from future land development. There are 3 types of watershed management actions in this paper: (1) those geared toward controlling the amount of new development that occurs, (2) those geared toward controlling the overall development form (i.e., the development pattern) within the watershed; and (3) those geared toward the performance of development (i.e., standards for new development).

Boating and boat use (Chapter 6) - these recommendations address the issue of excessive boat traffic on the Bay.

Fishery resource use (Chapter 7) - these recommendations address the issues of fishery resource quality and quantity.

Additional management issues (Chapter 8) - included in this category are other issues identified during the Barnegat Bay study.

Implementation (Chapter 9) - these recommendations define an institutional approach for making the technical recommendations work in the Bay watershed.

Chapters 3 through 7, in addition to recommended actions, contain a section entitled "The First Step". Actions identified as "the first step" are recommended as direction for NJDEP to move most quickly and directly toward preparing a comprehensive management plan for the Bay watershed.

Chapter 10, Summary of Management Recommendations, is an overview of the recommendations in Chapters 3 through 9. It also defines the action priorities within each topic based on an estimate of the best (i.e., most cost-effective) use of resources to address issues within the topic.

The Appendix to this report describes the citizen participation process that supported development of the management strategies.

One caveat should be noted. The Profile of the Barnegat Bay was limited geographically to that portion of the Bay watershed located within Ocean County north of Route 72. This limited scope was imposed primarily for financial reasons. However, the management recommendations contained in this report are intended for application to the entire Bay watershed, and should be implemented on that basis.

2. Driving Factors for Managing the Bay

Options for managing Barnegat Bay are driven by several factors:

Public Law 1987, Chapter 397 - This law, which mandated the study of the Bay and its watershed, specifies that a management options paper accomplish the following:

(1) "Assess whether land development in the bay area has reached such a level that further growth could not be accommodated without a significant effect upon the water quality of Barnegat Bay or the general vitality of the bay area ecosystem, and, if that level has not yet been reached, determine the extent to which further growth can be so accommodated;

(2) Assess the navigability of Barnegat Bay and make recommendations as to how it may be improved;

(3) Assess whether boat traffic on Barnegat Bay has reached such a level that additional traffic could not be accommodated without a significant effect upon the water quality of Barnegat Bay or the general vitality of the bay area ecosystem, or threat to the public health and safety, and, if that level has not yet been reached, determine the extent to which additional traffic can be so accommodated; and

(4) Develop appropriate standards and controls and institutional alternatives to be considered for adoption and application by all levels of government in those circumstances, if any, where additional growth may be permitted in the bay area."

NJ Department of Environmental Protection (NJDEP) - As required by Public Law 1987, Chapter 397, NJDEP developed the scope for the consultant's (Rogers, Golden & Halpern's) study. In addition to the items specified by law, the management options must:

Assess the need for buffer strips to environmentally sensitive areas and along the perimeter of the Bay.

Identify research needs, information gaps and monitoring program requirements for the future.

Identify areas that warrant classification as Category I water pursuant to the New Jersey Surface Water Quality Standards.

Citizen Advisory Panel - A citizen advisory panel worked with Rogers, Golden & Halpern to define the goals and objectives most important to citizens of the Barnegat Bay watershed. Details of the citizen participation process are described in Appendix A to this report. The goals and objectives derived from this process are listed below:

(1) Maintain Shoreline Open Space

Identify and protect significant waterfront habitats.

Require development designs that minimize impacts to natural habitats and maintain wildlife corridors.

Allow only water dependent uses at the water's edge.

Cluster waterfront uses to minimize open space consumption. Clustering should be permitted only if supported by existing infrastructure.

(2) Maintain and Enhance the Recreational Fishing, Waterfowl Hunting and Trapping and Commercial Fishing Potential of the Bay

Provide opportunities for shoreline access for the non-boating, fishing public at well planned intervals.

Provide adequate infrastructure including parking facilities.

Restore and maintain water quality at levels to sustain directly harvestable and consumable shellfish (bivalve) populations.

Protect water's edge wetlands and submerged aquatic vegetation.

Ensure that harvests do not exceed sustainable yields.

Ensure that opportunities are provided for both recreational and commercial fishing.

(3) Provide Opportunities for Boating and Water Contact Sports

Provide adequate infrastructure at access points including parking facilities and pump out stations.

Ensure that boat use does not exceed the carrying capacity of the Bay.

Ensure that opportunities are provided for both motorboating and sailing.

Ensure safe boating conditions.

Ensure that boat use does not conflict with water contact sports.

Minimize water quality impacts associated with boating.

Ensure that water quality does not limit water contact sports.

The management options discussed in this paper are organized by type of management option, rather than by the specific requirements that drive the options. This approach is taken to simplify the discussion of options; in many cases one control measure will be responsive to several requirements or driving factors. A matrix is provided as Figure 1-1 to demonstrate the relationship between management options and requirements. Figure 1-1 indicates the section(s) of this report in which the requirement is addressed.

Figure 1-1. Relationship between Management Recommendations and Requirements

REQUIREMENTS	RECOMMENDATIONS: Sensitive Area Protection	Watershed Management	Boating and Boat Use	Fishery Resource Use	Additional Management Issues	Implementation
Public Law 1987, Chapter 397						
Assess land development		●				
Assess navigability	●		●		●	
Assess boat traffic			●			
Develop standards, controls and institutional alternatives	●	●				●
NJDEP						
Assess need for buffers	●	●				
Identify research needs		●	●	●	●	
Identify Category I waters	●					
Citizen Advisory Panel						
Maintain Shoreline Open Space						
Protect significant habitats	●	●				
Minimize development impacts	●	●				
Only water dependent uses at water's edge		●				
Cluster waterfront uses		●				
Maintain/Enhance Bay's Fishing, Hunting and Trapping Potential						
Shoreline access for fishing					●	
Provide infrastructure at access					●	
Sustain directly harvestable/consumable shellfish	●	●	●	●	●	
Protect water's edge wetlands and SAVs	●					
Do not exceed sustainable yields				●		
Provide for recreational and commercial fishing				●		
Provide Opportunities for Boating and Water Contact Sports						
Provide infrastructure at access					●	
Do not exceed carrying capacity			●		●	
Provide for both motorboating and sailing			●			
Ensure safe conditions			●			
Prevent conflicts between boats and water contact sports			●			
Minimize water quality impacts of boating	●		●			
Maintain water quality for water contact sports		●	●		●	

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3. Sensitive Area Protection

The general approach to sensitive area protection is to: (1) identify the areas to be protected, (2) define the protection requirements (i.e., degree of protection, timing of protection, exceptions, mitigation), and (3) implement protection measures (i.e, modify existing or create new programs). Implementation is discussed in Chapter 9 of this report. Sensitive area identification and protection are discussed below.

Identification of Known Sensitive Areas

The following Barnegat Bay resources are recommended as defined sensitive resources:

A: Important Aquatic Habitats
- Shoreline wetlands
- Submerged aquatic vegetation (SAV) beds
- Marine fishery spawning and nursery areas and migratory pathways.

B: Sensitive Resources
- Colonial waterbird nesting sites
- Bay-associated priority sites for threatened and endangered species
- Waterfowl staging areas

C: Clam beds (high and moderate density)

In a broad sense, the entire Barnegat Bay can be considered a sensitive resource. The Bay's sensitivity and importance have already been recognized by NJDEP as evidenced by its designation of the Bay as a Category I water. This designation prevents the state from taking any action that will result in degradation of Bay water quality.

Protection of Known Sensitive Areas

The following are recommended sensitive area protection requirements:

1. Protect from direct land use encroachment (i.e., no development).

If wetland disturbance is allowed for a water-dependent use, wetland re-creation must be along a shoreline, and must not occur at the expense of other important natural areas. SAV disturbances due to shading or direct disruption are to be subject to the same degree of scrutiny as wetland disturbances (i.e., no reasonable alternative; mitigation required).

2. Protect from land-based indirect disturbance (e.g., runoff, ground water drawdown) and human encroachment.

Buffers must be used to protect sensitive areas. Buffer widths must be no less than the minimum required for water quality renovation or, in the case of wetlands, for protection against human intrusion and ground water drawdown. Buffer widths for priority sites, nesting sites and staging areas should be based on individual species needs. Buffer widths for shoreline SAVs and clam beds should be as required for water quality renovation based on the landward boundary of the sensitive area.

3. Protect from disruption due to propellers, noise, wake, and discharges from boats.

Boat protection measures to be considered include designation of "No Wake" zones, signage, seasonal use restrictions, and designation of boat use restriction zones. Waste discharge control programs (i.e., ensuring the availability and use of pumpout facilities) are also important for protecting sensitive areas.

4. Protect from dredging.

Where dredging is required due to presence of marinas or other related facilities, other solutions to shoaling problems must be considered (e.g., control of sediment sources) and implemented where feasible. Surface sediment quality data should be required to support dredging applications (highly contaminated surface sediments would be a factor in favor of dredging approval, to prevent excessive sediment disturbance due to propeller turbulence or direct churning).

5. Establish as priorities for NPS remediation.

When public agencies are making decisions on how to spend limited financial resources for remediation projects, priority should be assigned to efforts that will improve sediment or water quality in the vicinity of sensitive areas.

The First Step

Since maps of most sensitive areas were prepared for the Profile of the Barnegat Bay, they can readily be incorporated into the management plan for the Bay watershed. Therefore, the next steps for this topic can involve working out the details of how existing map information can support an ongoing Bay resource protection program.

Make available, at a scale of 1":2000', maps of each sensitive area.

Except for marine fishery spawning and nursery areas and migratory pathways, maps at this scale were entered into the NJDEP Geographic Information System (GIS). Marine fishery spawning and nursery areas and migratory pathways must be added to the GIS database. Maps of sensitive areas should be

available to regulatory agencies at all levels of government who wish to immediately implement protection measures based on the recommendations in this report.

Develop quantitative (i.e., measurable) protection standards based on the recommended protection requirements.

Examples can include speed limits, buffer widths, and seasonal limitations on dredging or other activities. The standards should be based on the specific protection needs of each type of sensitive area.

4. Watershed Management Recommendations for Existing Development

As shown in the Profile of Barnegat Bay, the pattern of water quality decline in the Bay has followed the pattern of watershed development. Action is urgently needed to correct the problems that currently exist. Correction of existing problems while controlling future growth (and thus preventing additional problems) should be given the highest priority in the management of the Bay watershed.

The current problems in the Bay should be tackled at a regional and at an individual level. A regional approach is warranted to correct the problems caused by regional or community infrastructure systems, such as stormwater management systems and highways. In some locations, stormwater conveyance systems and highway runoff are significant contributors of pollutants to the Bay. At an individual level, water quality problems are caused by on-site stormwater management as well as less-obvious activities such as home maintenance and personal habits.

Based on the pattern of Bay pollution following rainfall, it is clear that corrective action to stormwater management systems at both the regional and local levels is crucial, and must receive priority attention.

Many people view the lack of funding for maintenance and enforcement as a major cause of the nonpoint source problems in the Bay. Detailed evaluation of the funding alternatives described below, and of any additional funding options, must be a key component of any realistic program for managing the Bay watershed.

Community-Level Management

The Sewage Infrastructure Improvement Act promises to be an important mechanism for identifying problematic storm sewer outfalls. Through this act, funding is provided for mapping and monitoring outfalls discharging to salt water, and for correcting identified nonpoint source problems. At this time, initial mapping efforts are in progress. Because the results of this process will not be seen for several years, this Act must be considered a long-term "fix" for Barnegat Bay.

The importance of carrying out the intent of this act cannot be understated. However, there is some concern that funding for the Act may not be sufficient to implement the envisioned intent of correcting storm sewer problems. If in fact funding is delayed, alternative funding mechanisms at either the state or local level should be pursued by public officials. Options that should be considered include dedicated tax revenues, bonds, and fees for related services (i.e., impact fees). As a mechanism for implementing impact fees, the feasibility of creating a stormwater utility authority should be explored. Such an authority should be empowered to collect fees from the government agencies responsible for roadway maintenance, as well as from commercial, industrial and residential users.

Although the primary intent of the Sewage Infrastructure Improvement Act is to eliminate the discharge of sewage via storm sewers, metals and hydrocarbons are likely to be significant components of stormwater discharge in developed areas where car use is high. For this reason, a statewide dedicated gasoline tax for use in controlling stormwater quality may be an appropriate alternative to the impact fee concept.

For the near-term, actions are available to local communities that will reduce nonpoint source pollution to the Bay. Maintenance of existing stormwater basins, installation of oil and grit separators at storm drain inlets, and other actions directed toward ensuring optimal performance of existing systems are important components of a community's stormwater management program. Again, consideration must be given to alternative funding mechanisms.

If it is not politically feasible to impose an assessment on those individuals served by the storm systems, voting members of the public may in fact be willing to impose an assessment on themselves. As indicated by the recent upsurge in environmental activism, many individuals are willing to take responsibility for the problems caused by past actions of society as a whole.

Individual-Level Management

Much of the nonpoint source pollution affecting the Bay comes from the activities of everyday living, such as motor vehicle use and maintenance, house, lawn and garden maintenance, waste disposal, and pet care. A successful program to reduce current loadings to the Bay will require a reduction of the pollutants generated by individuals within the Bay watershed. In other words, basic lifestyle changes are necessary to protect the quality of the Bay. Each person must be provided the opportunity to learn about and understand his or her responsibilities regarding protection of the Bay, and the impacts that Bay degradation has on the individual, the community, and the region.

In addition to pollutant source reduction through behavior modification, corrective actions can be taken at the individual level to minimize to flow of pollutants to the Bay. Any situation in which a permit or approval is required offers an opportunity for the municipality to impose corrective action requirements to protect water quality. For example, Stafford Township has a model ordinance requiring on-site recharge of runoff. Although easier to impose on new development, a similar requirement could be imposed as part of the approval process for substantial home renovations, especially for conversion of summer homes for year-round occupancy. Redevelopment in built-up areas also provides an opportunity to correct past problems. Stormwater controls should be required to reduce pollutant loadings below the level of pollution on the site prior to redevelopment. Where stormwater cannot be adequately controlled, or where runoff quality cannot be improved, offsets should be required. Offsets can consist of correcting a water

quality problem elsewhere (e.g., planting trees along an unwooded shoreline to create an effective buffer in a developed area), or making a payment to a dedicated fund to be used for water quality improvements elsewhere in the watershed. Offsets should provide a level of protection equivalent to a reduction to pre-development pollutant loadings from the redevelopment site.

Making water quality improvements a condition of a permit approval is a relatively simple way to address the problem at the individual level. More problematic are the vast majority of homes that are not involved in a regulatory process. Stormwater management efforts at the community level will do much to correct the problems to which these individuals contribute. For the near term, the following actions should be required. These will complement the longer-term community-based and behavior modification approaches, and will control problems that a community stormwater management system is not designed to handle.

1. Define a "buffer zone" adjacent to all water features.

Although typically thought of as an area within which new development is excluded, a buffer is also a means of alerting "grandfathered" residents (i.e., pre-existing development in a newly-established buffer) of the need to act in ways that will not degrade water quality.

2. Control activities in the buffer.

Examples of activities that should be prohibited in the buffer are: use of fertilizers and pesticides, release of animal and other wastes, construction or placement of new impervious surfaces (including plastic liners under landscaped or unvegetated areas) and storage of waste and toxic materials. To the extent possible, motor vehicles should not be parked or used within the buffer.

3. Develop a functional buffer.

Buffers, especially wooded buffers, protect water quality by removing pollutants carried in surface and subsurface runoff. Where feasible, and to the maximum width possible, the water's edge should be permitted to revert to a natural vegetated state. The planting of native trees, especially between developed portions of the lot and the water's edge, should be encouraged.

The First Step

Continue to focus efforts on the identification and correction of storm sewer outfall problems.

These efforts must receive the highest priority in the Bay watershed management plan. Innovative mechanisms for funding these efforts must be explored, and secure funding must be ensured. Because each municipality has a unique set of nonpoint source problems, it may be appropriate to have each develop a nonpoint source management program that meets its needs. The management plan developed by NJDEP should establish minimum standards and recommended technologies for municipal programs.

5. Watershed Management Options for New Development

While it is of utmost importance to correct the problems caused by past development of the Bay watershed, the question of what to do about future development is equally important. Much of the degradation of the Bay has resulted from the cumulative effects of numerous, individual actions, no one of which can be pointed to as the cause of a specific effect. This pattern of cumulative impacts can be altered (but not necessarily eliminated) by adjusting one or more of the following development characteristics: **amount, form,** and **function**. The **amount** of development is simply a question of quantity - how much new growth can occur. The **form** of development considers the pattern, density and location of development, while the **function** of development considers standards to apply to development such that impacts to the environment are minimized (these are typically referred to as development standards or performance standards). Each of these topics is addressed below.

Controlling the Amount of New Development

Development in the Bay watershed has led to degradation of the Bay and its resources. All factors being equal, it is clear that more development will lead to more degradation. As stated in the Profile of the Barnegat Bay, approximately 34,000 dwelling units were built in the Barnegat Bay study area between 1972 and 1986. At least 65,000 additional units can be accommodated based on current zoning and development constraints such as wetlands and floodplains. In fact, the Profile shows that the rate of degradation is likely to exceed the rate of development, given the pattern of low-density, segregated-use development that current zoning in the watershed encourages. It is therefore crucial that the total amount of development be controlled while improved forms and functions of development are sought.

Action 1. Develop a growth allocation program to limit the amount of new development that occurs.

Growth allocation is a mechanism for restricting the amount of new development, and therefore the pollutant loadings that occur. With this approach, some predetermined amount of growth would be allocated to each geographic (or political) area. Growth allocation programs provide flexibility to local jurisdictions by allowing each to tailor a program suited to its own needs.

Examples of ways to allocate growth are:

Option A. Allocate development based on vacant developable land (e.g., some percent of vacant land can be developed.) This approach would require definition and delineation of "vacant developable land."

Advantages: The primary advantage to this approach is that it is easy to calculate and, therefore, to administer. It can provide some flexibility to the extent that there is more demand than allocation available. In this case, the administering agency could select the "best" proposals based on environmental or other criteria, or could dispense the allocation on a first come, first served basis.

Disadvantages: Unless development proposals must compete for limited allocation based on their water quality "performance", there would be no incentive to control pollutant loadings from new development (although loadings could be reduced through use of development standards). This approach may result in degradation - there is no way to know if the amount of development permitted is too high - unless monitoring is also required to determine whether water or resource quality is affected by additional development. If adverse effects are found, a moratorium should be imposed until such time as corrective action can be taken.

Option B. Allocate additional pollutant loading by watershed or municipality based on actual [or calculated] pollutant loading (e.g., allow some percent increase over current total loadings, or some percent increase over pollutant loading from undeveloped land).

Advantages: This option provides incentives for approval of "non-polluting" development forms and technologies (the "cleaner" the development, the more growth can occur). The growth allocation can be used as a total pollutant budget; successful nonpoint source remediation efforts associated with existing development could be "traded" for new development as long as there is no increase in pollutant loading.

Disadvantages: As with Option A, this may result in resource degradation unless impacts are monitored. This type of program will be difficult to support on technically quantifiable grounds; some level of generalization and "rules of thumb" will have to be accepted by the regulatory and regulated communities. Implementation would be more complicated that an allocation program based on developable land. It may be difficult to incorporate consideration of aerial deposition, which is a significant component of pollutant loadings in some locations.

Recommendation: The more simple approach of Option A is recommended because it has a higher probability of being successfully implemented, especially if implementation occurs at the municipal level. However, Option B has a great deal to recommend it, due to its potential to encourage both good quality development and the cleanup of old problems. Its use is encouraged if and when a program can be designed to make it work.

Two aspects of the growth allocation program are key to its success. First, it must be tied closely to a monitoring program designed to detect changes in Bay quality resulting from development in the watershed. A monitoring component could be a requirement for a developer who receives a growth allocation. Second, the allocation must be small enough that the implementation agency can, if desired, have the option of defining an

allocation program that rewards innovation and sound design based on water quality and resource protection criteria, or on other factors deemed appropriate.

A phased approach to allocating growth in the watershed may be appropriate. For example, a small initial allocation can be available for some set period of time, with an option for increase at some point in the future if certain standards have been met or water quality goals achieved.

Action 2. Develop a research program to determine pollutant loading capacity and current loading rates.

Implementation of future land use controls based on the results of this program should be a long-term goal. The program should be aimed at measuring or otherwise determining (e.g., through modelling):

(1) The actual loading rates of pollutants to the Bay (including inputs via surface and groundwater discharges, aerial deposition, sediment releases, and direct inputs from human and natural sources),

(2) The ability of the Bay to assimilate pollutants (i.e., the pollutant loading capacity) without adverse impacts to Bay resources and uses, and

(3) The amount and location of additional development (if any) that can be accommodated in the Bay watershed without exceeding the Bay's pollutant loading capacity. This analysis should consider potential loadings from sewered and unsewered development.

The rationale for this research is that it will provide a technical basis for more targeted land use controls in the future. Remediation efforts could also be targeted such that funds are expended on the most significant (or the most remediable) pollutant sources. The results of such a study would be useful for estuary protection efforts underway in other areas of New Jersey, and in other states.

Other Options Considered

During the process of developing management recommendations for new development in the Bay watershed, a variety of options were considered. Although not recommended to the Barnegat Bay Study Group, these options are presented here for the interested reader.

Impose a development moratorium until results of a comprehensive research program are available.

Advantages: Prevents further degradation due to new development.

Disadvantages: Not clearly justified for entire study area based on available information on impacts. Likely to result in widespread economic impacts. Due to the complexities of Bay processes and land use patterns, it is not clear that a research program will quickly result in a quantifiable determination of watershed development capacity.

Possible variations:

Limit the duration of the moratorium and, at the same time, tie the research schedule to the moratorium schedule.

Define a portion or portions of the Barnegat Bay watershed within which there would be a development moratorium. Examples of locations within which a moratorium could be imposed include:

A 1,000 foot wide band around the Bay and along tributaries to head of tide. This would have the effect of removing new development from the area that is most directly draining to the Bay. However, because current pollutant loading rates and sources are not well understood, it is not clear that restrictions in this area will be sufficient to prevent impacts to Bay water quality.

Sub-watersheds that drain directly to water areas having restricted shellfish harvesting due to water quality degradation. This would have the effect of preventing additional degradation of these resources due to new development. On one hand, improvements due to remediation may result in upgrading these resources. Conversely, if remediation cannot result in upgrading (an unanswerable question at this time), it may be desirable to target growth to these already degraded areas.

Sub-watersheds immediately adjacent to sub-watersheds that drain to restricted harvest areas as described above. These sub-watersheds may be the areas to which development is likely to spread and may therefore be most at risk of degradation.

Combination - Moratorium/Growth Allocation

Under this option, a moratorium could be imposed in areas where closed shellfish beds or bathing beaches have been attributed to development impacts on water quality. Moratoria can be lifted following demonstration that problems have been corrected as indicated by re-opening of beds or absence of beach closures. In non-moratorium areas, a growth allocation procedure would be followed.

This option is in fact quite reasonable, and is worthy of further consideration. However, in the interest of moving quickly toward solving the problems of the Bay, a "selected area" moratorium was not recommended due to the probable difficulties and delays that would be associated with delineating moratoria locations.

Controlling the Form of New Development

Controlling the form of development is a means of reducing impacts to the Bay and its watershed. While the relationship between development form and Bay impacts has not been quantified, the Barnegat Bay Profile has shown that different development densities result in different potential pollutant

loadings. Options to reverse the development trends that have been occurring, and the basis for each, are described below. Development form restrictions should be applied in addition to controls on the amount of development permitted.

Action 1. Maintain buffers adjacent to all water features.

Designation of a buffer around the Bay and its tributaries is one of the most important actions that can be taken to protect the Bay and, at the same time, one of the easiest and least expensive to implement. Buffers protect both water quality and wildlife habitat. Where development is located away from surface water (i.e., beyond a buffer), runoff quality renovation can occur through natural processes. Buffers are the defense of last resort against the failure of sediment and erosion control requirements and can supplement stormwater management systems. Buffers also provide wildlife habitat by functioning as a continuous open space corridor, and they protect surface water habitat by providing water temperature control and a food source for detritus-feeders. Although wetlands are protected by buffers, surface waters that do not have adjacent wetlands are not similarly protected.

Given the fact that the Bay is classified as a Category I body of water, buffers around the Bay and its wetland should be 300 feet in width. This width is based on the Wetland Buffer Delineation Method (NJDEP-CR, 1988). For consistency with the Freshwater Wetlands Protection Act (1987), buffers around other surface water features in the watershed should be 150 feet, unless a narrower width can be justified based on the Wetland Buffer Delineation Method.

Grandfather provisions to protect the rights of current landowners should be designed to accomplish the intent of the buffer requirement, if strict compliance with the requirement is not possible.

Within the buffer, only water dependent uses should be permitted. Because the water's edge presents the shortest pathway for nonpoint source pollutants to reach the Bay, development of any type should be prohibited unless location elsewhere is functionally impossible.

Action 2. Concentrate development near existing development.

One method for doing this is to map existing development areas, then define a growth boundary within which development will be allowed, and beyond which development will not be allowed. In areas beyond the growth boundary, only very low densities (e.g., minimum 40 acre lots) would be permitted. This approach could be combined with a growth allocation approach, such that any growth allowed could only occur adjacent to developed areas; or the location of proposed developments could be a factor in selecting between several proposals.

Water quality protection would result through a reduction in impervious surface, especially that associated with new roadway construction, and more significantly, in the number and length of vehicle trips required. Use of impervious surfaces (i.e., roads) by automobiles results in release and accumulation of a variety of toxic materials which can degrade the Bay system. Minimizing the number and length of car trips will minimize this source of pollution. This approach is most effective where development areas are designated for mixed uses, thus increasing the opportunities for trip destinations (e.g., work, services, schools) to be located in proximity to residences.

Habitat loss would be minimized by halting the trend toward scattered development, which destroys effective habitat through direct destruction and indirectly, through habitat fragmentation.

An issue associated with significant down-zoning is the economic impact to property owners in the down-zoned areas and the designated growth areas. Transfer of development rights (TDR) is one mechanism for implementing this

approach and distributing the economic costs and benefits more equitably. Under a TDR program, development rights are treated as a commodity that can be transferred from one location (the "sending area") to another (the "receiving area"). Land adjacent to developed areas where growth is desired due to proximity to infrastructure (especially available highway and sewer capacity) and services (especially common trip destinations such as work-places and commercial establishments) would be designated as receiving areas. After purchase of development rights from land in the sending area, developers would be permitted to build at densities greater than would otherwise be allowed in the receiving area. Thus, TDR concentrates development to decrease nonpoint pollution generation and distribute the financial gain among sending and receiving area landowners.

TDR has been successfully used in Montgomery County, Maryland and is beginning to pick up, after a slow start, in the Pinelands. The following characteristics are necessary for a successful TDR program:

There is a resource whose protection is a community goal.

There is a demand for housing.

There is infrastructure available to accommodate TDR densities within the receiving area.

There are strict standards to ensure receiving area compatibility with nearby land uses.

The method of transfer is simple and grounded in existing procedures.

There are more opportunities to use TDRs in the receiving area than the number of TDRs allocated to sending area landowners.

TDRs allocated to sending area landowners reflect reasonable development expectations.

Purchase of TDRs must be the only way to obtain densities higher than zoned.

There is a strong education program to acquaint the public with TDRs.

There is a strong commitment by local officials to resource protection and the more efficient delivery of government infrastructure and services that TDR densities allow.

Standards for New Development

Development standards are another means of protecting water quality and wildlife habitat. Most of the standards listed below are relatively inexpensive and easy to implement through the subdivision review and approval process, and are recommended as actions that should be implemented immediately. The standards should apply to all development.

Cluster development (i.e., transfer density within a parcel such that all development occurs in only a portion of the parcel, and other areas remain permanently undeveloped). Clustering should be permitted only if supported by existing infrastructure. A uniform method for calculating net available acreage should be implemented throughout the watershed.

Establish and protect wildlife corridors that link forested areas within and adjacent to the development site.

Require afforestation of wetland buffers and surface water buffers where not currently forested.

Apply clearing limitations and open space requirements. Clearing should be limited as much as possible, and limitations should be enforced with strict replacement requirements where clearing limits are exceeded.

Require the use of Best Management Practices (BMPs) to control the quality of stormwater runoff.

Require no net change in the quality and quantity of site runoff. Where new pollutant loadings cannot be reduced to an acceptable level, offsets should be required.

Where practicable, use native vegetation in landscaping.

Prohibit the use of fertilizers and pesticides, and prohibit solid waste storage and animal wastes in the buffer. Use of fertilizers and pesticides should be limited elsewhere in the watershed.

Control accidental and intentional releases of trash. Much of the trash found in the Bay is clearly derived from land-based rather than boating activities.

The First Step

Map the buffer and "developed" areas of the watershed.

This is an important first step because these areas will be the basis and organizing elements for the watershed management plan. The amount of allowable new development will be based on the amount of land mapped as undeveloped. Future development that does occur will need to be directed into or adjacent to developed areas. And in some cases, protection standards (e.g., clearing limitations) should be tailored to meet the current or anticipated conditions within the developed (or undeveloped) areas.

An objective set of mapping rules will be needed to accomplish this step. Mapping should be more closely tied to actual on-the-ground conditions than are the development, extension, and limited growth regions mapped under CAFRA. It may be desirable to define several types of developed areas (e.g., high, medium and low density), and tailor development and resource protection standards to each.

6. Boating and Boat Use

Weekend boaters will attest to the crowded conditions that can be found in some areas of Barnegat Bay. The Profile of the Barnegat Bay found that, based on minimum spatial and depth requirements for boating, the capacity for Barnegat Bay overall is about 6,000 boats at one time, which is is well below the estimated 53,200 boats that were used on Barnegat Bay in 1988. Undoubtedly, these boats were not all in use on the Bay at the same time. However, there are several areas, notably in the northern portions of the Bay, where boat use does exceed the local carrying capacity for boating. In light of this problem, the following actions are recommended:

Action 1. **Impose speed limitations on boats in the Bay, or in specific areas of the Bay.**

Speed limits have been recommended as a means of protecting sensitive areas (see Chapter 3). However, speed limits should be considered more broadly as a means for accomplishing additional Bay use objectives, such as preventing boat congestion and conflicts between different user groups. Although lowering the speed of boats will restrict uses that require large water surface areas due to high speed, the result would be an increase the effective capacity of the Bay for boat use.

Speed limits should be geographically defined based on local objectives, be they environmental protection or boater safety. At a minimum, consideration should be given to establishing a near-shore speed zone.

Action 2. **Allocate boat access to the Bay such that boat use congestion is not worsened.**

Construction of boating access to the Bay can contribute to existing problems if traffic impacts are not considered in the decision process. This

action is intended to address both public and private access to the Bay, although control of private access will be complicated. Access siting and restrictions should be based on a preliminary assessment of priority traffic congestion problems, pending the results of Action 3.

As a corollary to this action, no approvals should be granted for construction projects that will further restrict the use and navigability of the Bay. An example of this would be the construction of piers that extend far into the Bay. To the extent that these projects may contribute to boat use congestion, they should be addressed by an overall program for managing boat use on the Bay.

An unanswered question at this time is the impact of through-traffic on Bay congestion. It is left to the implementing agency to determine whether control of boat access should be broader in geographic or technical scope than described here.

Action 3. **Develop a data collection program to determine geographic and temporal boat use patterns. Use the results of the data collection to develop a comprehensive boat use management program for the Bay.**

The data collection program should be aimed at measuring or otherwise determining:

(1) Seasonal average and peak boat use rates (by boat type, origin, and destination) within sub-regions of the Bay;

(2) Locations where boat use exceeds boat use carrying capacity;

(3) Locations where conflicts between motorboating and sailing, and between boating and water contact sports occur;

(4) Locations where unsafe boating conditions occur.

The goal of the data collection program will be to develop information upon which a comprehensive boat use management program can be based. Localized control efforts can be targeted to the most significant problem areas. Boat use management efforts can be partially implemented or reinforced by existing programs (e.g., approval or limitation of dredging and access development). The results of this study will also be useful in refining the geographic scope of Actions 1 and 2.

Given the limited amount of data needed, development of a comprehensive program based on this study can be considered a short-term goal (e.g., 2-3 years). However, developing solutions to defined problems will be complicated by the numerous factors that affect boat use and boat use capacity.

Action 4. Implement strict enforcement of restrictions on overboard disposal of sewage.

Measures to encourage the use of pumpouts have been considered by NJDEP with suppport from the Sea Grant Marine Advisory Service. These efforts should be fully supported. In particular, education of boaters is an area where attention should be focused to ensure that boaters are fully aware of the requirement and need for using available pumpout facilities.

The First Step

Identify locations where speed limitations should be applied.

These locations will be sensitive areas (as defined in Chapter 3), locations where conflicts between boaters and other Bay users occur), and locations where congestion is causing unsafe or undesirable boating conditions. The outcome of this step will be a map that will be used to develop the management plan for the Bay watershed.

7. Fishery Resource Use

Long-time residents of the Bay watershed have witnessed a disturbing decline in shellfish and other fishery resources in Barnegat Bay. As a result, maintaining and enhancing the Bay's fisheries is a priority for many Bay area residents. This priority is based on human health considerations, regional economics, and the value of fishery resources as an indicator of overall ecosystem vitality.

Fishery resource quality is highly dependent on water quality, which can affect the health and bioaccumulation of toxics in fish and in organisms that serve as food sources for important fishery species. Recommendations for watershed management (chapters 4 and 5), boat use (chapter 6) and dredging (chapter 8) are specifically aimed at water quality maintenance and improvement. Implementation of these recommendations will do much to maintain fishery resources. In addition, important fishery habitats - shoreline wetlands, submerged aquatic vegetation, clam beds, and marine fishery spawning and nursery areas and migratory pathways - have been designated as sensitive areas (chapter 3). These areas will be targeted for special protection in the Bay management program.

The following actions are recommended in addition to those contained in other chapters of this report:

Action 1. **Designate key fishery resources (e.g., blue crab, bluefish, striped bass, flounder) and develop management plans for each.**

Barnegat Bay management plans should be coordinated with the plans of the Mid-Atlantic Fisheries Management Council. The plans should be directed toward maintaining spawning stock, minimizing conflicts between user groups, promoting protection, encouraging the development of aquaculture facilities that would enhance populations of indigenous species, determining standards

for maintenance of environmental quality, and collecting the kinds of economic, social and fisheries data required to effectively manage the resource.

Given the paucity of available data, the plan should assess methods for funding the research needed for a fisheries management program. Funding options can include user fees, license fees, taxes on fuels for boats using the Bay, and fees for privately funded dredging. In general, those who use the Bay or benefit from its resources can contribute to the preservation of its quality. In addition, compensation should be required from those entities deemed responsible for the destruction of fishery resources (e.g., fishkills due to power plant discharges or spills of fuel or hazardous substances). These funds should be used to support resource mitigation or enhancement efforts.

Action 2. Develop a data collection program to characterize Barnegat Bay fishery resource quality and quantity.

It is important to monitor populations of commercially, recreationally, and ecologically valuable species to ensure sustained, viable stocks in Barnegat Bay. A data collection program should be aimed at measuring or otherwise determining:

(1) The suitability of fishery resources for unrestricted human consumption and, if problems are identified, the probable source of the problem.

In the case of hard clams, sufficient data are available to determine where resource quality is unsuitable for direct human consumption due to potential bacterial or viral contamination. Clam beds have been identified as sensitive areas (see Chapter 3), and will be targeted for protection and remediation.

(2) Suitable locations for reintroduction of formerly common species.

(3) Current Bay harvests, by species and by type of collection (e.g., commercial vs. recreational; collection method used).

(4) Sustainable yields for important fishery populations.

(5) The need for new or revised methods for ensuring spawning success (e.g., size limits for individual species) and for enforcing restrictions.

The First Step

Define geographic locations that will be important to the management of key species.

Many important habitat areas will be protected as sensitive areas (see Chapter 3). Other significant fishery areas should be identified as input for the management plan for the Bay watershed. Examples of other fishery areas include the Swan Point Relay and productive fishing areas.

8. Additional Management Issues

Good quality access to the Bay is an issue of concern to members of the Citizen Advisory Panel. The topic of access was not included in the original Barnegat Bay study, although it has obvious implications for Bay use, water quality, and habitat alteration. An assessment of access needs and impacts is recommended, with the goal of developing an access plan that addresses the following objectives defined by the Citizen Advisory Panel:

1. Provide opportunities for shoreline access for the non-boating, fishing public at well-planned intervals.

2. Provide adequate infrastructure at access points. Adequate infrastructure includes parking facilities and, at boat access locations, pump out stations.

As indicated in the Profile of the Barnegat Bay, there remain numerous gaps in our understanding of the Bay and its use. Many of these gaps are discussed in the preceding sections of this report. Additional data collection needs to complete the Profile of the Bay are listed below:

Develop a data base of privately-funded dredging (location, frequency, and quantity).

Identify locations in the Bay where surficial sediment quality is toxic (these may be potential locations for remediation, depending on such factors as nearby resources and uses).

9. Implementation

A key component of the Management Plan for Barnegat Bay will be the Implementation Plan - the document that explains how the Bay management plan will be made to work. Implementation of any new environmental management program is complicated by the overlapping responsibilities within and among the various levels of government. As a first step toward developing an implementation plan, it is important to understand these responsibilities and how they relate to Bay management.

Existing Management Framework

A detailed implementation plan should take advantage of the expertise and resources available from a wide range of agencies and institutions, and identify actions needed to accomplish the broader purpose of protecting the Bay and its resources. As is evident from the following description of agency responsibilities, there is essentially a matrix of programs now in effect that control, to some degree, one or more aspects of what happens on land and water in the Barnegat Bay study area. Each program is designed to accomplish one or more goals which may include some aspect of Bay protection, but none of the programs are broadly designed to manage the full range of potential uses of and impacts to the Bay. For example, under the Coastal Resources program, shoreline wetlands and SAV beds are protected from development, but the program is more reactive than proactive; it responds to development proposals, but does not have a detailed master plan that can be used to protect the Bay against cumulative impacts. None of the existing management programs are designed to control the total amount of development that can occur within the Bay watershed. Instead, most programs are geared toward directing development within the watershed to the least sensitive areas. This approach has not been sufficient to protect the Bay.

Based on the failure of the existing management framework to protect the Bay, it is strongly recommended that consideration be given to establishment of a different type of management entity, one with a focus specifically on the conditions and issues germaine to the Barnegat Bay watershed. Such an entity could be responsible for the land use planning needed to protect Bay quality, and could also be responsible for ensuring that plans and protection standards are implemented, either by reviewing proposals directly, or by assisting local municipalities in the development and use of appropriate implementation tools. If TDR is determined to be the appropriate tool for implementing growth management, this new entity would be a logical choice for management of that program as well.

Creation of a management entity to protect a valued resource is not a new concept. In many locations, entities created to focus on a specific regional land use program have been highly successful at meeting resource protection goals. Key to the success of these programs is the delegation of adequate authority to develop and, most important, to implement land use plans.

Noteworthy (and nearby) examples of successful management entities include the New Jersey Pinelands Commission and the Maryland Chesapeake Bay Critical Area Commission, each created to protect resources having regional, statewide, and national significance. The Pinelands Commission very successfully developed and implemented a plan for managing land uses in the Pinelands. This plan is implemented through the cooperative efforts of the Commission and local municipalities. The Critical Area Commission accomplished a similar result by developing protection standards and requiring local jurisdictions to develop land use plans and ordinances that achieve these minimum levels of protection.

The following summary identifies relevant responsibilities of agencies that are now, in some way, primarily responsible for managing the Barnegat Bay study area. This summary is not intended to be comprehensive, or to identify gaps or shortcomings in existing programs. Instead, the intent is to identify responsibilities and functions that are most relevant to topics

addressed by the Management Recommendations for Barnegat Bay. These are responsibilities and functions that must be considered when preparing a coordinated and well-integrated plan for managing the Bay.

Local Programs

Zoning and master plans

These are the tools by which municipalities define the potential form, type and density of development. Municipalities review development proposals for compliance with these documents. In developing an implementation plan, consideration should be given to using local expertise to define locations and forms of growth, and to control the amount of growth that occurs.

Subdivision regulations

These are the tools by which municipalities establish standards for the on-site layout, design and performance for new development. Municipalities review development proposals for compliance with these regulations. In developing an implementation plan, consideration should be given to using local expertise to define and review compliance with standards for new development.

Regional Programs

While local agencies such as planning boards and environmental commissions are most knowledgeable about local conditions and needs, effective Bay management requires a coordinated approach to decision-making on activities that can affect the Bay. This type of coordination demands involvement of agencies whose jurisdictions encompass a broader geographic area than is covered by local agencies.

Ocean County

The County provides coordinated review among county agencies with responsibility for environmental and public health, flood hazard area control, soil erosion and sediment control, solid waste and wastewater management, and flood control facilities. The Planning Board reviews most land development applications; approval is required for development that will affect County transportation and drainage facilities. In developing an implementation plan, consideration should be given to using county expertise to review compliance with standards for the form and performance of new development.

Pinelands Commission

The Commission provides development standards for municipalities to implement, and provides technical review for development within the Pinelands boundary. The program includes standards for location and density of development, and for development design and performance. In developing an implementation plan, consideration should be given to using this expertise to establish standards for the form and performance of new development.

State Programs

By definition, programs at the State level are broader in geographic scope that those at the regional and local levels. State programs have the benefit of a wide range of technical resources, and the responsibility for addressing the statewide implications of local policies and decisions. Conversely, State programs can be inefficient at managing the day-to-day activities required for implementing a management program, and state personnel may not have an in-depth understanding of local conditions and needs.

NJDEP - Coastal Resources

This Division of NJDEP is the permitting authority for large-scale land development in the coastal zone, all development within the waterfront area (i.e., up to the first property line from mean high water (MHW) or the landward boundary of beaches, dunes, or wetlands, but not less than 100 or greater than 1,000 feet from these benchmarks), and activities in tidal and navigable waters and wetlands. The Coastal Resources program also has responsibilities related to dredging, shoreline erosion control, and navigational aids. In developing an implementation plan, consideration should be given to using this expertise to establish and review compliance with standards for the form and performance of new development, and for addressing boating and boat use issues.

NJDEP - Water Resources

This Division has planning responsibility related to water quality management, stormwater management, and nonpoint source pollution control, and is also responsible for coastal monitoring. In developing an implementation plan, consideration should be given to using this expertise to determine pollutant loadings to the Bay, and to monitor changes due to development.

NJDEP - Fish, Game and Wildlife

Provides technical information and recommendations related to the management of threatened and endangered species, marine fish and shellfish, freshwater fish, and habitat. In developing an implementation plan, consideration should be given to using this expertise to determine requirements for sensitive area protection, and in issues related to fishery resources.

NJDEP - Science and Research

Provides technical information and coordinates complex, cross-media issues. In developing an implementation plan, consideration should be given to using this expertise to determine the Bay's pollutant loading capacity.

Implementation Scenarios

At this broad level of implementation analysis, recommendations for implementing Bay management address the question of who should bear primary responsibility for managing the Bay. A discussion of the various implementation scenarios is presented, followed by recommendations for effective program implementation.

Scenario 1: NJDEP prepares a Barnegat Bay Management Plan as required by law; municipalities and other responsible agencies are free to adopt and implement the plan or not.

Advantages: Provides the type of guidance needed by local authorities that wish to take actions to protect the Bay. Maintains local flexibility in responding to regional needs in a manner appropriate to local conditions and resources.

Disadvantages: No mechanism for the coordinated action required to protect the Bay. Unlikely to protect the Bay due to probable absence of some minimum level of protection. Lack of action by some jurisdictions may discourage action by others.

Scenario 2: NJDEP prepares a management plan as required by law, and a watershed management entity (or some other centralized authority at a state or regional level) becomes the agent responsible for implementing the plan, preferrably through an act of legislation.

This option is comparable to what has been done to protect Biscayne Bay. In Dade County Florida, a county Shoreline Development Review Committee has been established to review and approve all development within a designated shoreline area. A similar approach now occurs in the defined waterfront area of New Jersey, although the legal defensibility of New Jersey's program is in dispute.

CAFRA provides another example. Under that law, NJDEP was given permitting authority for certain development proposals within a designated land area. As currently written and implemented, however, CAFRA cannot accomplish comprehensive management of the Bay.

As an alternative to NJDEP implementation, a watershed management authority should be created to have full jurisdiction over the issues addressed in this report. This would facilitate a comprehensive approach to watershed planning, and could provide a mechanism for eliminating some of the loopholes and overlap of responsibilities that now occur. An important component of creating a new authority would be the selective delegation of jurisdiction from NJDEP (especially from the Division of Coastal Resources) and other agencies to the watershed management authority.

Advantages: Will apply a uniform minimum level of protection to the Bay, which will increase the probability of successful Bay management. Improves uniformity in decision-making. Improves likelihood that reviewers will have the technical expertise required to review plans and proposals. Can be accomplished by expanding existing jurisdictional responsibilities, or by creation of an agency designated to provide planning and implementation functions.

Disadvantages: Removes some authority from local governing bodies. Will place an additional workload upon the review and approval authority if an existing agency is designated for implementation. May create an additional bureaucratic layer if responsibilities are not carefully reallocated.

Scenario 3: NJDEP prepares a management plan as required by law; a centralized authority becomes the agent responsible for implementing the plan by establishing detailed standards and requirements, and providing technical resources and back-up review expertise; municipalities and other agencies are required by law to develop management plans (including revisions to existing regulatory programs) consistent with standards and requirements. Each municipality and other responsible agency must implement its own plan.

This option is comparable to the approach taken for protecting the Pinelands. Other examples include:

Maryland's Chesapeake Bay Program. The state General Assembly passed a law establishing the Chesapeake Bay Critical Area Commission. The Commission was required to (and did) issue criteria establishing standards for land use and resource protection. Each municipality is required to limit the amount of development that could occur (by delineating development zones), and to modify local regulations and programs to implement the Bay protection program.

Adirondack Park Program. The Adirondack Park Agency establishes gross development densities and environmental protection standards. Where municipalities have modified local regulations to comply with Agency standards, the municipality reviews and approves all development. The state agency also reviews and approves large developments, and must review and approve all development in municipalities that do not have mechanisms for requiring compliance with the state's standards.

Advantages: Ensures a uniform minimum level of protection and improves uniformity in decision-making, which will increase the probability of successful Bay management. Allows local plans to be tailored to local circumstances and needs.

Advantages: This approach may require a longer time for initial program implementation. Funding at the municipal level is limited.

Implementation Recommendations

Scenario 3, described in the previous section, provides maximum assurance of Bay protection and is recommended as the model to be followed for Barnegat Bay protection. The following actions should be taken:

Action 1: NJDEP should prepare a Barnegat Bay watershed management plan.

To facilitate the resolution of conflicts between Bay protection and Bay use, NJDEP should maintain ongoing interaction with the Citizen Advisory Panel and Technical Advisory Committee that were established for development of the Bay Profile and management recommendations. These two advisory groups should be relied upon for input and review for interim and draft work products developed by NJDEP. The results of the citizen participation process to date (see Appendix A) should be incorporated into the plan to the extent possible. Municipal representatives should also be relied on for input to the plan.

As a long term goal for managing Barnegat Bay, the Barnegat Bay watershed management plan should be summarized as a map showing land and Bay use zones. This should be accomplished by NJDEP if sufficient time and resources are available, or by the plan implementation authority (see Action 3). The map summarizing the watershed management plan should be based on the "first steps" described in each chapter of this report. Restrictions on activities within the zones defined on each map should be based on maintaining designated uses in these zones

(restrictions within resource protection zones are described in Chapter 3 of this report). Within each use zone, restrictions on the presence or performance (i.e., impacts) of non-designated uses would be applied to maintain the designated use. In some areas, restrictions on designated uses will also be needed to protect environmental resources. Boundaries of use zones would include land, water, or both.

Once the individual maps for each topic are prepared, conflicts and discrepencies among the maps will need to be resolved. For example, there are likely to be overlaps between sensitive areas and important Bay use areas. These inherent conflicts must be resolved in ways that ensure that overall Bay vitality is not compromised. The result of this process will be the comprehensive management plan for the Bay watershed.

Any realistic plan for maintaining and enhancing water quality in the Bay will involve significant implementation cost. Chapter 4 of this report addresses some options for program funding. These should be considered within the Bay watershed management plan.

Action 2: All agencies, at all levels of government, should be required to review and, where necessary, revise ongoing and pending programs to ensure consistency with the Barnegat Bay watershed management plan developed by NJDEP.

Coordination among regulatory agencies is crucial to the success of the program. This action should occur immediately upon development of the plan, with revisions occurring at all levels of government. This action should be considered interim in nature, until the more detailed program requirements are developed by the designated authority. The consistency review should be mandated by law, to ensure uniform action by all responsible agencies. In particular, funding approvals by the Green Acres program for projects in the Bay watershed should require a determination of project consistency with the Barnegat Bay watershed management plan.

Action 3: A watershed management authority should be created with planning and implementation authority over the Barnegat Bay watershed.

Consideration should be given to whether in fact this new entity should be a commission, an authority, or some other appropriate type of management unit. This body should have responsibility for developing program standards and criteria, for ensuring program implementation, and for revising the management plan as data become available and additional needs arise.

Action 4: Upon completion of the management plan by NJDEP, the New Jersey legislature should act to ensure the plan's implementation.

The legislature should pass a law creating a watershed management authority, and requiring the newly-designated authority to map out the detailed standards and requirements for Barnegat Bay protection. The standards and requirements must address sensitive area protection, existing and new development, boat use, fisheries, and access. The law should mandate local compliance with the authority's standards and requirements.

Action 5: Each municipality should develop and implement a management program consistent with the minimum standards and requirements established by the watershed management authority.

Allowing municipalities to develop management programs provides the opportunity for municipal authorities to inject program variations suited to local conditions and needs. Demonstration of local program adequacy must include revisions to local regulatory tools such as zoning and environmental control ordinances. Failure to develop a program would result in municipal program development by the watershed management authority.

The watershed management authority should be prepared to provide technical support to municipalities in the form of model ordinances, program review, and assistance in review of technical compliance for proposed actions.

Action 6: An integrated program of data collection and data management must be implemented by the watershed management authority.

Municipalities and other agencies will require a uniform, up-to-date geographic data base if they are to implement a Bay management program based on geographic features. The NJDEP GIS should be relied on to serve this function initially, and an open data exchange among Bay area jurisdictions should be assured. Ongoing monitoring will also be important to obtain information about the effectiveness of the Bay management program, so that management efforts can be directed as the need becomes apparent. As part of this program, an official Barnegat Bay Watcher should be designated. This individual or organization should be designated to serve as a Bay "watchdog", and official point of contact and coordination for activities related to Barnegat Bay. The Bay Watcher should live or work in the Barnegat Bay watershed. The function of the Bay Watcher should be to provide information to interested parties, and to alert officials to problems in Bay quality and use as they arise. A similar program is now in place for the Delaware Bay.

10. Summary of Management Recommendations

The recommendations contained elsewhere in this report are summarized here for easy reference. Because the resources available to fund these efforts are limited, the relative priority of the recommendations is also indicated. The sequence of topics addressed in this chapter is also a reflection of the relative priority of the topic.

Priority is based on the relative significance of the recommendations for achieving the overall goal of protecting the Bay and its resources, as well as the relative ease (in terms of time and cost) with which the recommendation could be implemented. In other words, recommendations that are relatively simple to implement, and recommendations that will have the greatest results in protecting the Bay should receive attention first.

IMPLEMENTATION

Recommendations:

NJDEP should prepare a Barnegat Bay watershed management plan.

The Barnegat Bay watershed management plan should be summarized as a map showing land and Bay use zones.

Options for program funding should be considered within the Bay watershed management plan.

All agencies, at all levels of government, should be required to ensure consistency with the Barnegat Bay watershed management plan.

A watershed management authority should be created with planning and implementation authority over the Barnegat Bay watershed.

The New Jersey legislature should act to ensure the plan's implementation.

Each municipality should develop and implement a management program consistent with the minimum standards and requirements established by the watershed management authority.

An integrated program of data collection and data management must be implemented.

Action Priority:

Action on each of these recommendations should begin as soon as feasible. Each of these actions is essential to the ultimate success of the Bay management program.

WATERSHED MANAGEMENT - EXISTING DEVELOPMENT

Recommendations:

Actively pursue alternative funding mechanisms for existing programs (e.g., the Sewage Infrastructure Improvement Act, maintenance and improvement of existing nonpoint source control systems).

Provide the information needed by individuals so they can chose lifestyles that reduce generation of nonpoint source pollution.

Require corrective actions at the time that construction permits or approvals are required.

Define a "buffer zone" adjacent to all water features, and control activities that can occur in the buffer.

Action Priority:

Pursuit of alternative funding is the highest priority action of any in this report. It will require additional effort, but is essential to the ultimate goal of protecting the Bay and its resources.

WATERSHED MANAGEMENT - NEW DEVELOPMENT

Recommendations:

Control the amount of new development through a growth allocation and monitoring program. Conduct research to develop a technical basis for more targeted development limits.

Control the form of new development by maintaining buffers adjacent to all water features, and by concentrating development near existing development. Explore the use of TDR as a mechanism for achieving concentrated development.

Apply the following general standards to new development:

Cluster development if supported by existing infrastructure.

Establish and protect wildlife corridors.

Require afforestation of buffers.

Apply clearing limitations and open space requirements.

Require the use of Best Management Practices (BMPs).

Require no net change in the quality and quantity of site runoff

Use native vegetation for landscaping.

Prohibit use of fertilizers and pesticides, solid waste storage and animal wastes in the buffer.

Control accidental and intentional releases of trash.

Action Priority:

The most important of these recommendations is the establishment of buffers adjacent to water features, and the restriction of uses and activities within those buffers. This recommendation should be implemented immediately. Restricting the amount and form of new development is also very important, but it must be recognized that some time and analysis will be required to put such a program in place. Development standards that can be applied in their current form should be applied immediately, as little implementation cost will be entailed. However, to some extent these

standards should be tailored to the ultimate development plan for the Bay (e.g., less restrictive in designated growth zones, very restrictive in low growth areas). Further definition of these standards should be coordinated with the development of the plan for the watershed.

PROTECTION OF SENSITIVE RESOURCES

Recommendations:

The following areas should be targeted for special protection:

Shoreline wetlands.

Submerged aquatic vegetation beds.

Marine fishery spawning and nursery areas and migratory pathways.

Colonial waterbird nesting sites.

Bay-associated priority sites for threatened and endangered species.

Waterfowl staging areas.

Clam beds (high and moderate density).

The following protection measures should be imposed:

Protect from direct land use encroachment (i.e., no development).

Protect from land-based indirect disturbance (e.g., runoff, ground water drawdown) and human encroachment.

Protect from disruption due to propellers, noise, wake, and discharges from boats.

Protect from dredging (not applicable to migratory pathways).

Establish as priorities for NPS remediation.

Action Priority:

Methods to identify these resources, and confirmation that the protection standards are met should be immediately incorporated into development, dredging, and remediation review and approval processes. Restrictions on boat use will require further analysis to determine mechanisms for imposing protection standards.

BOATING AND BOAT USE

Recommendations:

Impose speed limitations to prevent congestion and conflicts.

Allocate boat access such that congestion is not worsened.

Do not allow construction projects that restrict the use and navigability of the Bay.

Develop a data collection program to determine geographic and temporal boat use patterns. Use the results of the data collection to develop a comprehensive boat use management program for the Bay.

Implement strict enforcement of restrictions on overboard disposal of sewage.

Action Priority:

Consideration of boat traffic impacts should immediately be incorporated into decisions on proposed projects. Development and implementation of speed limits will require additional effort and coordination with efforts to protect sensitive areas.

FISHERY RESOURCE USE

Recommendations:

Designate key fishery resources and develop management plans for each.

Develop a data collection program to determine:

The suitability of fishery resources (other than clams) for unrestricted human consumption.

Suitable locations for reintroduction of formerly common species.

Current Bay harvests by species and type of collection.

Sustainable yields for important fishery populations.

Locations where conflicts between recreational and commercial fishing, or between fishing and other Bay use activities occur.

Action Priority:

Data collection related to resource consumption is a high priority, and has long term value toward evaluating the success of Bay management efforts.

ADDITIONAL MANAGEMENT ISSUES

Recommendations:

Assess access needs and impacts.

Develop a data base of privately-funded dredging.

Identify locations in the Bay where surficial sediment quality is toxic.

Action Priority:

Collection and evaluation of data on sediment quality and dredging should occur immediately, as part of an ongoing effort of data collection, updating and integration for the Barnegat Bay watershed. Evaluation of access needs and impacts should be incorporated into the overall process of developing a plan for the watershed.

Appendix A

Appendix A

Citizen Participation in the Development of a Management Plan for Barnegat Bay

As part of the process of developing management recommendations for Barnegat Bay, Rogers, Golden & Halpern Inc. (RGH) solicited input from interested citizens who live or work in the Bay watershed. Citizen participation in the process was formalized through the designation of a Citizen Advisory Panel (CAP), which met throughout the duration of RGH's involvement to provide guidance and comments on RGH's work.

Based on observations made during the citizen participation process, several facts became apparent. These are presented for the benefit of those who may be in the position of using a similar process to support the development of other environmental management programs.

1. At the risk of stating the obvious, the most significant fact that became apparent during the process was that citizens interested enough to become involved in the process possess a wealth of knowledge about local environmental, economic and institutional conditions. The major challenge is to design a process whereby this knowledge can be channeled meaningfully into a management program. Incorporating this knowledge into an environmental management program will ultimately strengthen the program's effectiveness and acceptability.

2. As is apparent from the results of the CAP meetings, members of the CAP have a strong sense of the myriad details that should be incorporated into a comprehensive Bay management program. Many of these details cannot be addressed in the initial stage of program development that is represented by the broad management recommendations contained in this report. For this reason, an ongoing process for citizen participation is needed.

3. A serious committment to the citizen participation process must be made, and must be backed by staff and resources. The process must be well planned, with appropriate materials provided well before scheduled meetings. Due to numerous schedule changes and sporadic information flow, attendance at Barnegat Bay CAP meetings was inconsistent, even for the most interested participants. The result was a loss of valuable perspective and input.

The initial success of the Barnegat Bay citizen participation process demonstrates the desirability and need for bringing interested citizens into the environmental management arena. As regulators grapple with the nonpoint source pollution problem, the need for local responses to environmental problems will become more apparent and the role of citizen action will continue to grow. The success of these local programs will ultimately depend on grass roots involvement and support.

Summary of the Barnegat Bay
Citizen Advisory Panel Meetings

Meeting #1

On June 22, 1989, a public meeting was held to explain the Barnegat Bay study and to solicit applicants to serve on the Citizen Advisory Panel. Applications for panel membership were distributed. The intent was to select a panel that represented each municipality in the Bay area as well as a variety of interests including land development, recreation, environment, farming, fishing, boating, homeowners, business and industry.

Meeting #2

On July 25, 1989, a meeting of all applicants was held to select members of the Citizen Advisory Panel. Following a discussion of alternatives for selecting members, it was determined that all those in attendance had a strong interest in the study, and should therefore serve on the panel. Moreover, meetings would be open to everyone interested in attending. A list of panel members based on attendance at this and subsequent meetings is provided as Exhibit 1.

Meeting #3

The first working meeting of the Citizen Advisory Panel was held on August 15, 1989. The purpose of the meeting was to begin the two way educational process: information was presented to the Panel on point and non-point pollution sources; and the Panel identified to RGH the variety of water and land based activities related to the Bay and the problems currently occuring in the Bay. Bay uses, bay-dependent uses and bay-enhanced uses were identified, recorded and discussed. A variety of environmental and socially oriented problems associated with the Bay were also identified and discussed (see Exhibit 2).

Exhibit 1

Members of the Barnegat Bay Citizen Advisory Panel

Robert Anstett
Theresa Barry
Thomas Barry
Richard Beer
Ian M. Borden
Jeff Daum
William deCamp, Jr.
William DeVries
David Dipaolo
Marion W. Figley
Thomas Fote
Charles R. Gallant
Garrett Gardi
Dick Gerdes
Selma Gerdes
Eleanor B. Graff
Robert H. Griffin
Michael Giuliano
Bill Hammarstrom
Ed Harrison
Joseph M. Hogan
Anne Hruza
Denis Hruza
Charles M. Jessup
Karen Kiss
Richard C. Kunze
John G. LaMacchia
James J. Mackie
Charles M.D. Miller
Scott W. Morrison
Albert J. Nelke
John Palombi
Paul P. Perkins
Constance Pilling
Arthur E. Richmond
Kaete Regan Roche
Lorraine Sansone
Lizabeth Santomauro
Raymond R. Schramm
Jean Schroth
Kenneth J. Smith
Evan R. Spalt
John R. Spodofora
Robert A. Symanski
A. Jerome Walnut
Brick Wenzel
Karen Winter
Kenneth Winter

Exhibit 2
Summary of Issues Identified at the August 15, 1989 Meeting

1. **Use-Related Issues**

Development (All Types)

- Eel grass disposal
- Excessive litter in Bay on trash collection day and from residential construction
- Existing development has caused problems (e.g., storm drains to bay)
- Impact of bulkheading; viable alternatives
- Large vs. small developers/builders
- Litter
- New vs. existing development
- Should not allow any runoff into the Bay
- Too much fertilizer use

Residential Development

- Control of pets (scoop laws; eliminate pets in certain areas)
- Need to determine "carrying capacity" for population growth

Industrial Development

- Aquifer pollution from Superfund site
- CEIBA - GEIGY discharge (need to consider low bay turn-over)
- Impacts from waste-to-energy facility

Boating and Associated Uses

- Dredge disposal
- Excessive speed
- Intentional boat sinking (abandoned boats) and associated release of pollutants
- Mantoloking Bridge to the canal should be "no wake"
- Need mandatory licensing of boaters (all ages) and a point system for tickets
- Offshore racers (don't belong in the Bay)
- Overflow from "topping off" gas tanks isn't captured
- Propeller impacts
- Restrict boats based on size and speed
- Too many boats

Navigation

- Too many channel markers

Crabbing

Need to know the number of traps being used
Problem with "ghost pots"
Should have 4-5 feet of water "overhead" for crab traps
Too many markers

Clamming

Too many markers for lease sites

Fishing (general)

Give Bay use priority to harvesters (clams, crabtraps), not boaters
Need dedicated harvest areas

Open Space

Loss of open space
Need to identify sensitive areas ("Tier 7") and legislate them

2. **General Environmental Management**

Difficulty of addressing cumulative impacts locally
Need to give preference to existing/traditional uses
Recognize slow exchange rate for Bay water
Reevaluate areas of equal environmental/development potential
"Taking" without compensation

3. **Implementation**

Inadequate expertise on planning/zoning boards (educate individuals and keep the reviews local)
Lack of cohesion/consistency among communities
Lack of coordination among various viewpoints in development proposals
Lack of education among new residents, old residents, and school children
Legal loopholes
Maintenance of storm systems (very expensive)
Powerboat (safety) education is needed
Preferential zoning
Redefine CAFRA to 2 units
Regional approach - Coastal Commission
Require upgrade of existing storm systems when repairs are needed
Upgrade codes/laws
Use environmental commissions more in local decision-making

4. **Enforcement**

Selective enforcement
Sewage and other pipes - lack of inspection

Meeting #4

The second working meeting of the Citizen Advisory Panel was held on September 26, 1989. The purpose of the meeting was to establish priorities for use of the Bay and the waterfront along the Bay and its tributaries. The tool used to facilitate the establishment of these priorities was the Nominal Group Technique.

Nominal Group Technique

The Nominal Group Technique (NGT) is a structured decision making methodology which allows groups to focus on many issues during a prolonged period of discussion and deliberation. The NGT process was used in this meeting to allow the Citizen Advisory Panel to establish a ranking of priorities for use of the Bay and the waterfront along the Bay and its tributaries. A list of 15 categories of Bay uses was developed from the Committee's discussion on bay uses, issues and concerns at the previous meeting.

ROUND ONE: The Committee began the NGT process by discussing all of the Bay use categories identified during meeting #3 and their definitions. During this discussion several revisions and additions were made.

At the conclusion of this discussion there were 17 Bay use categories (see Exhibit 3). When the Committee felt comfortable with the definitions of the Bay uses, they assigned a weight to each category using a relative scale of zero to 100. The highest priority use was to receive a 100 and the lowest priority could receive a zero with other uses falling somewhere in between the highest and lowest priority. It was possible for several uses to receive the same weight.

Each participant recorded his or her weights on an individual tally sheet and these numbers were immediately entered into a computer by RGH personnel. The ranking of Bay uses was calculated and a statistical analysis of the results was made available to the Committee for discussion.

Exhibit 3
Barnegat Bay Uses

1. **Open space** (land and water-based) - natural parks; flyway; bird nesting; birdwatching; wildlife propagation; habitat for threatened and endangered species; food chain; hunting; fish nursery/hatchery (natural and artificial)

2. **Recreational fishing** - crabbing; clam harvesting; finfishing; ice fishing

3. **Water-contact recreation** - scuba; swimming; wind surfing

4. **Commercial fishing** - clam relay; crabbing; clam harvesting; finfishing

5. **Sailboating** - sailing; ice boating; transportation (Intracoastal Waterway)

6. **Other bay resource harvesting** - eel grass harvesting; salt hay harvesting; aquaculture

7. **Parkland/active recreation** - parks involving paved surfaces and constructed facilities

8. **Motorboating** - powerboats; jet-skis; transportation (Intracoastal Waterway)

9. **Marinas**

10. **Other commercial and non-commercial boat-related services** - boat building; boat rentals; "Seatow"

11. **Residential** - houses; condos

12. **Forestry** - cedar harvesting; other tree harvesting

13. **Restaurants** - floating restaurants; other restaurants

14. **Motels and hotels**

15. Industrial water-dependent uses - saline treatment plant, seafood processing

16. **Other non-water dependent commercial uses** - shops, galleries

17. **Non-water dependent industrial uses** - manufacturing, other

Note: Numbers reflect relative ranking of Bay and Bay waterfront uses by the Citizen Advisory Panel.

Cross-Cutting Uses

Cross-cutting uses are defined here as activities and functions that may be associated with or affected by several Bay uses. They were not assigned priorities because they do not stand on their own (for example, aesthetic uses are based on open space, boat use, or whatever else someone may find aesthetically pleasing).

Aesthetics
Artistic; crafts
Dredging
Economic spinoffs
Education
Erosion control
Flood control
Piers
Pile driving
Storm buffer
Stormwater collection
Tourism
Water source for fire protection

The round one weighting resulted in Open Space (defined as natural areas by the Panel) being ranked first, followed by Water-Contact Recreation, Sailboating, Recreational Fishing and Parkland/Active Recreation. Open Space was separated from the second ranked use of Water-Contact Recreation by 323 points. This was the greatest separation of use categories, making it the clear top ranked priority for use of the Bay, its waterfront and tributaries.

Clustered at the bottom of the ranking were uses less directly related to the bay such as: Restaurants, Motels and Hotels, Other Non-Water Dependent Uses, Industrial Waste Dependendent Uses, and Non-Water Dependent Industrial Uses.

ROUND TWO: Following the Round One weighting, the Committee discussed each of the use categories in preparation for a second round of weighting. This discussion was an opportunity for each individual to share how he or she interpreted the use definitions and assigned weights accordingly. During this discussion, the following points were made:

Forestry: It was pointed out that good forestry practices are a good management tool. Selection, rather than clearcutting should be allowed. Timber harvesting that occurs under an approved Forest Management Plan results in sustainable harvests. Managing forests by removing old and diseased trees, and by replanting should be a goal.

Throughout the discussion of resource-based uses, the concept of sustainable use was the focus.

Another thread that ran through much of the discussion was protection of water quality as a means of protecting many uses of the Bay.

We should think about protection of potable water supplies. Use of potable water for purposes such as pile driving should not be allowed (it was pointed out that the Ocean County Utilities Authority was beginning to address this issue).

It was difficult to characterize uses as "good" or "bad". Many uses would be acceptable if good management standards were followed.

After Panel members felt the Bay use categories had been discussed completely, they reassigned their weights using the same relative scale used in Round One. Following the same procedure as Round One, the ranking was calculated and the results were made available to the Panel.

The ranking of the top five uses changed, although Open Space (natural areas) remained the top ranked use. It was followed by the second ranked use of Recreational Fishing, then by Water-Contact Recreation, Commercial Fishing and Sailboating. Sailboating moved from the third ranked priority to the fifth ranked priority and Commercial Fishing moved from number six to number four. Open Space remained as the clearest priority.

The clustering of the bottom five ranked uses grew even more distinct in Round Two. Non-Water Dependendent Industrial Uses remained at the bottom of the list.

ISSUES SUMMARY: The issues summary (Exhibit 2) was reviewed, and the following items were added:

Grandfathering (rights of current owners should be protected).

Transportation (especially new bridges) can impact the Bay.

Conflict of interest (DEP officials going to work for "the opposition") is a problem.

The cost of enforcement must be considered.

The consultant was asked to reflect within its second report (management recommendations) the recommendation of the Citizen Advisory Panel that the study be expanded to include the Bay watershed south of Route 72.

Meeting #5

The third working meeting of the Citizen Advisory Panel was held on November 14, 1989. At the meeting the top five priorities identified during the second meeting were restated as goals for the management of Barnegat Bay. The purpose of this meeting was to define the broad objectives that need to be accomplished to meet the stated goals. During a period of open discussion moderated by RGH, Panel members identified a series of objectives related to the achievement of these management goals. The final set of goals and objectives, with additional information raised at the meeting, was as follows:

The overall goal stated by the Citizen Advisory Panel is to maintain environmental quality. There are several specific goals within this general statement. They are as follows:

1. The shoreline should be maintained as open space.

2. The Bay should support recreational fishing, waterfowl hunting and trapping.

3. The Bay should be usable for water contact sports, commercial fishing and sailing.

Goal 1: Maintain Shoreline Open Space

<u>Ecosystems:</u>

Identify and protect significant waterfront habitats.

Require development designs that minimize impacts to natural habitats and maintain wildlife corridors.

Development:

Allow only water dependent uses at the water's edge.

Cluster waterfront uses to minimize open space consumption. Clustering should be permitted only if supported by existing infrastructure.

Goal 2: Maintain and Enhance the Recreational Fishing, Waterfowl Hunting and Trapping and Commercial Fishing Potential of the Bay

Bay Access:

Provide opportunities for shoreline access for the non-boating, fishing public at well planned intervals.

Provide adequate infrastructure including parking facilities.

Resource Quality:

Restore and maintain water quality at levels to sustain directly harvestable and consumable shellfish (bivalve) populations.

Resource Quantity:

Protect water's edge wetlands and submerged aquatic vegetation.

Ensure that harvests do not exceed sustainable yields.

Ensure that opportunities are provided for both recreational and commercial fishing.

Goal 3: Provide Opportunities for Boating and Water Contact Sports.

Bay Access:

Provide adequate infrastructure at access points including parking facilities and pump out stations.

Boater-Boater Conflicts:

Ensure that boat use does not exceed carrying capacity of the Bay.

Ensure that opportunities are provided for both motorboating and sailing.

Ensure safe boating conditions.

Boater-Water Contact Sport Conflicts:

Ensure that boat use does not conflict with water contact sports.

Water Quality Impacts:

Minimize water quality impacts associated with boating.

Water Quality Protection:

Ensure that water quality does not limit water contact sports.

General Discussion:

There were several points of discussion by the Panel related to the identification of objectives for specific goals. For the goal of maintaining shoreline open space, several Panel members observed that a uniform method must be developed to calculate gross acreage for determining allowable density of clustering and other forms of development. Also, the question of total allowable development must be addressed. Funding sources need to be identified to allow governmental units to purchase land for open space and economic compensation should be provided for those economically impacted by land use restrictions.

For the goal of maintaining and enhancing the recreational fishing, waterfowl hunting, trapping and commercial fishing potential of the Bay, panel members emphasized the need to define sustainable yields for particular species, such as crabs. To accomplish this, more accurate information on current levels of harvest will be needed. Also, the allocation of sustainable yields between commercial and recreational interests will have to be established if current levels of harvest are approaching sustainable yields.

Water quality impacts were discussed generally under the goal of providing opportunities for boating and water contact sports. Specific suggestions for improvement included controlling gas tank overflow, providing free pump-out service, enforcing sanitation regulations on boats through new enabling legislation, and perhaps creating a specific labor force for enforcing sanitation laws. The need to reduce marine litter in the form of fish carcasses and garbage from boats was discussed as well as investigating ways to increase water circulation to stagnant areas of the Bay. It was generally observed that safer boating conditions were needed and suggestions toward this end included the use of speed restrictions in certain areas and increasing boater education. Additionally, it was observed that a simpler method of enforcing muffler laws might reduce noise impacts in the Bay.

Meeting #6

The fourth working meeting was scheduled for March 29, 1990. At that meeting, Panel members elected to reschedule the meeting to April 10, 1990 to give everyone enough time to review the preliminary draft management options report. Although the March 29th gathering was not officially "a meeting", the following items were discussed and agreed to:

1. The Citizen Advisory Panel should continue to serve an advisory role through the next phase of the Barnegat Project, during which NJDEP will prepare a management plan for the Bay.

2. The management options report should describe the results of the Citizen Advisory Panel meetings. If the information is too detailed for the management recommendations, it will be useful during the development or implementation of the Bay management plan.

Meeting #7

The purpose of the April 10th meeting was to discuss the preliminary draft of the management report, which was distributed in the form of an options paper. The following points were made:

The tone of the report was that there is nothing that can be done to correct the problems in the Bay. Instead, the report should clearly convey the message that there are solutions to the problems. The report should also clearly convey the message that the management options presented apply to the entire watershed, including the area south of Route 72.

The Citizen Advisory Panel does not recognize the No Action alternatives as viable. This should be stated clearly in the text, or the No Action alternatives should be eliminated. In addition, the report should make it more clear that the options presented can (and should) be applied in combination, and are not mutually exclusive.

In general, priorities need to be clearly stated - what are the most significant problems, what are the most important solutions, what should be done first, etc. Focus on the actions that get "the biggest bang for the buck".

There is a shortage of pumpout facilities; more are needed, and people need better information on the availability and need to use those now in existence.

Re-creation of wetlands should not be permitted to occur at the expense of important natural habitat.

Clustering may be a problem due to inconsistencies in gross acreage calculations.

The report should recognize point sources of pollution.

Another option is needed under Fishery Resource Use - prevent over-use of the resource (e.g., no expansion of harvests, no new licenses). Consideration should be given to spawning viability based on size, and the lack of size limit enforcement.

There should be mention of the need for on-site runoff recharge. The Stafford ordinance is a good example of this requirement. Some paved waterfront parks created by Green Acres, and the use of plastic under landscaping rock are examples of situations that lead to excessive site runoff. Use of oil and grit separators at storm drain inlets would be appropriate; stormwater controls should be required as part of renovation approvals. The need for non-structural stormwater controls should be emphasized.

Financial aspects of Bay management were discussed, including funding mechanisms (e.g., dedicated tax revenues, fees to allow the filling of low quality wetlands) tax credits, cost-sharing among municipalities (either independently or via a stormwater management authority). It should be made clear that existing development is the cause of the current problems, and the cost should be borne accordingly.

At the conclusion of the meeting, panel members decided that the final meeting with RGH would focus on recording the "vote" of the panel on the options presented.

Meeting #8

The purpose of the May 22nd meeting was to obtain citizen reaction to the management recommendations contained in the draft report. Some time was also spent discussing broader issues related to the future of the Bay program. The discussion is summarized below.

Report Overall

The report represents a good start, but much more work is needed.

There is a need to clearly identify short-term initiatives (i.e., "do these now") vs. long-term recommendations.

There was no discussion of Chapters 1 and 2.

Chapter 3 - Sensitive Area Protection

There were no objections to this chapter.

Chapter 4 - Watershed Management Recommendations for Existing Development

There should be a ban on new impervious cover within the buffer, including the use of plastic under stone (to prevent weed growth).

Implementation of water quality protection measures could be required as a condition of sale for existing houses.

Chapter 5 - Watershed Management Options for New Development

This section should be presented for comment to the Ocean County Growth Management Task Force at some future date.

Amount of New Development

There was some discussion about whether to recommend a growth allocation program that would limit growth, or a finite moratorium that would prevent growth until a defensible carrying capacity for the watershed could be developed. There was some concern about whether the monitoring program (needed as part of a growth allocation program) could in fact

detect development impacts early enough for action to be taken. The CAP would like an opportunity to meet with the Technical Advisory Committee at some point in time to get a better sense of whether this is technically feasible.

Most CAP members felt that the growth allocation approach was more feasible, and therefore the more realistic recommendation. However, there was some reluctance to completely forego consideration of a limited moratorium, which could be used as a means of forcing the results of a research program. When asked to vote for one option, 15 voted for growth allocation, 1 voted for a limited moratorium, 1 voted for a combination of the two options, and several abstained.

Form of New Development

There were no objections to this section.

Standards for New Development

There were concerns about the use of clustering, especially if it resulted in isolated clusters randomly located throughout the watershed. A requirement for clustering should be carefully applied.

Chapter 6 - Boating and Boat Use

There were objection to instituting a boat access development moratorium for several reasons. A moratorium would create a rush to develop prior to the moratorium; it would not accomplish anything in the way of alleviating problems; and the word "moratorium" would doom the recommendation anyway. In addition, some clarification of definitions would be needed; for example, bulkheading for shoreline erosion should still be feasible, even if bulkheading for private boat access is not. It was recommended, as an alternative to a moratorium, that access be allocated such that congestion is not worsened. It was also suggested that the options be re-ordered to relect their feasibility.

The CAP agreed with recommending a data collection program. However, funding for the program should not be overlooked.

The CAP agreed with use of speed limits. However, the limits should relate directly to the purpose for the limits. For example, if control of environmental impacts is the intent, there may be some situations where slower is not necessarily better.

Education will be an important factor in controlling how boats are used on the Bay.

Chapter 7 - Fishery Resource Use

There is no recognition given in the report to the decline of the shellfish industry in the Bay, especially to those segments of the industry that are no longer viable (e.g., scallops). Members of the CAP had expected to see more substantive recommendations in this section.

Chapter 8 - Additional Management Issues

There were no objections to this chapter.

Chapter 9 - Implementation

In general, the CAP did not advocate a top-down approach. It is important that citizens be involved in program implementation.

Related to this concern, members felt that the implementing agency should have a narrow focus.

In addition to the technical and citizen groups, DEP should work with a group representing each municipality while it develops its watershed management plan (the plan should address the entire watershed, not just the study area).

Cost is an important issue for implementation.

The final program should not be considered etched in stone. There should be continual program review and revision.

There has not been enough emphasis on education and citizen involvement.

Appendix

Exhibit 3 should list Bay Uses in the order that resulted from the Nominal Group Technique.