INTERIM MVC POLICY FOR DRI REVIEW
2. Water Quality

This policy gives guidance to applicants seeking approval of Developments of Regional Impact (DRIs) by the Martha's Vineyard Commission with respect to water quality. The aim is to ensure that new projects do not cause excessive nitrogen loading and further deterioration of water quality in the Vineyard's fragile coastal ponds. This document describes the procedure to determine the acceptable level of nitrogen loading, how excess levels can be mitigated, and other measures to ensure water quality. It also deals with freshwater ponds, groundwater, and large water withdrawals.

This policy is one of a series prepared to help Applicants and members of the public understand how the Martha's Vineyard Commission evaluates proposed Developments of Regional Impact (DRI), as mandated by its enabling legislation, Chapter 831 of the Acts of 1977 as amended.

The Commission is mandated to weigh the benefits and detriments of certain proposals to determine whether they should be approved, approved with conditions, or denied. Consult the Commission's website (www.mvcommission.org/DRI) or office (508-693-3453) to obtain the other documents. This policy reflects MVC practices in reviewing subdivisions and development over the past generation. It is set forth in order to assist Applicants in preparing proposals that address the Commission's concerns.

The Commission will use this policy during review of the benefits and detriments of the proposal (used a basis for approval or denial) and to formulate conditions that may be attached to the approval of an application. It should therefore be used by the Applicant to help design proposals and could serve as the basis of special provisions, or "offers", to offset anticipated detriments. Applicants are invited to consult the MVC's DRI Coordinator and Commission staff for help in identifying which policies apply to their project.

This policy is generally a good indication of the Commission's concerns and can help the Commission evaluate the merits of a proposal. However, the Commission weighs the overall benefits and detriments of all aspects of each proposal on its own merits. Based on the particular circumstances of each proposal, the Commission could deny a project that respects some or even all of the policy or might approve one that does not meet all parts of the policy. The Commission recognizes that there might be special circumstances whereby deviations from the policy are appropriate.

Table of Contents

Note: Sections 2-5 deal with nitrogen loading from wastewater, stormwater, and landscaping.

The preparation of this policy including related research was funded in part by a Smart Growth Technical Assistance Grant from the Executive Office of Environmental Affairs.

Note: This Draft Policy was prepared by a subcommittee of the Martha's Vineyard Commission created for this purpose. The subcommittee adopted this draft on June 26, 2006 and recommends its adoption by the full Commission after a period of using it on a trial basis in parallel with existing practice. This document is largely a codification of current practice, though it includes proposals to clarify or adjust several elements.

Amended 15 February 2007

Cover: Chilmark Pond

1. INTRODUCTION

The Importance of Coastal Ponds: Martha's Vineyard is ringed by Great Ponds – coastal saltwater ponds larger than 10 acres in area – that are vital to the Island's environment, character and economy. The15 tidal and 8 brackish ponds comprise a total of over 10 square miles of waters.

- The ponds are highly productive of shellfish (e.g. bay scallops, soft-shelled clams, oysters, quahogs) and fin fish (e.g. herring, tautog, Atlantic cod, tomcod and winter flounder), important to our commercial fishing industry.
- They offer a wide range of recreational opportunities, including boating and sport fishing, so important to the Vineyard's visitor-based economy.
- They have over 290 miles of shoreline, important environmental resources, favorite spots for beach activities, prime locations for real estate and viewsheds for many to enjoy.

The future health of our ponds is dependent on maintaining water quality. An excellent indicator of good water quality is the presence of eelgrass beds, which provide an essential habitat for young fish and shellfish.

The Threat of Excess Nitrogen: Over the past generation, increasing nutrient inputs in each watershed – in particular from housing and commercial development – has led to deterioration in the water quality in the Vineyard's coastal ponds. (A pond's watershed is the area of land that drains into the pond, either through runoff or groundwater flow.) Nitrogen is a nutrient that, in limited amounts is important to supporting life in a pond. But when excessive nitrogen is produced in the coastal pond's watershed – from acid rain, septic systems, and fertilizer – it ends up in the pond and can destroy important aquatic life.

In a coastal pond, excess nitrogen has some or all of the following effects:

- Microscopic plants living in the water, called phytoplankton, increase dramatically, causing the water to become cloudy and, in extreme cases, green or brown.
- Slime algae increases on the surfaces of pilings, rocks, and eelgrass blades.
- Drift algae, particularly the bright green types, grow to excess, break loose, and wash into shore, or into eelgrass beds where they collect in unhealthy and unsightly piles.
- The growth of microscopic plants reduces light penetration to plants like eelgrass, which can no longer photosynthesize and therefore decline. The presence of healthy eelgrass is an important indicator of healthy water. In the past 20 years, eelgrass beds have nearly disappeared from Edgartown Great Pond and Sengekontacket Pond, and are in decline in Tashmoo and Lagoon Ponds.
- The excess plant material takes oxygen out of the water, both at night during respiration and as they die and decay. This lack of oxygen leads to stress and death of marine organisms by reducing fish habitat, by killing immobile organisms like quahogs and by causing chemical reactions in the bottom sediment that release more nutrients.

- The pond's ecosystem shifts to one where filter feeders (clams, oysters and scallops) are replaced by organisms that eat decaying plants (worms and snails). Such a transition can destroy recreational and commercial fishing and shell fishing opportunities.

The ultimate result can be an odorous, unattractive pond devoid of valuable fish or shellfish. (For more background information, please consult the MVC's website at www.mvcommission.org, including: "Wrack Algae", "Epiphytes" and "Water Quality and Nutrient Loading")

Existing Department of Environmental Protection regulations are designed to protect human health, and do not adequately protect coastal ponds. Wastewater coming out of a septic field may have a nitrogen level of 35 parts per million (ppm) that is diluted on site to the point that it meets DEP Drinking Water Standards (10 ppm), yet still exceeds the usually lower limit required to protect the health of coastal ponds.

Therefore, the Martha's Vineyard Commission seeks greater nitrogen reduction than required by the towns or the Commonwealth under Board of Health regulations.

Critical Nitrogen-Loading Limits for Vineyard Watersheds: The Martha's Vineyard Commission has calculated interim nitrogen-loading limits for most coastal ponds and watersheds. These limits were calculated using a model developed by the Buzzard's Bay National Estuaries Project. This formula is most effective with tidal ponds with a high degree of flushing. There is no Critical Nitrogen-Loading Limit for those watersheds that flow directly into the ocean.

Table 1: Analysis of Vineyard Watersheds		
	Nitrogen Load Limit *(kilograms per acre per year)*	***Symptoms Associated With Excessive Nitrogen***
Tidal Ponds (Pond area; watershed area in acres)		
Menemsha (665; 1793)	*12.9*	*Eelgrass extensive, TON low (0.33 to 0.39 mg/l), N-load low*
Pocha (210: 863)	*5.4**	*No historical eelgrass, TON high (0.42 to 0.46 mg/l), N load unknown*
Cape Pogue (1520; 708)	*53.4**	*Eelgrass extensive, TON variable (0.34 to 0.56), N-load probably low*
Katama Bay (1700; 2800)	*16.5**	*Eelgrass coverage unknown, TON unknown, N-load unknown*
Tashmoo (269; 2638)	*5.6*	*Eelgrass down 40%, TON high at south end (0.39 to 0.50 mg/l), N-load low*
Sengekontacket (726; 4492)	*4.1*	*Eelgrass no longer present, TON variable (0.34 to 0.56 mg/l), N-load low*
Lagoon (544; 3916)	*3.4*	*Eelgrass down 54%, TON high at south end (0.36 to 0.43 mg/l), N load near limit*
Oak Bluffs Harbor (34; 375)	*8.3*	*Eelgrass history unknown, TON high (0.36 to 0.41), N-load near limit*
Farm (34; 422)	*1.2**	*Eelgrass extensive, TON high (0.53 to 0.61 mg/l), N-load over limit*
Non-Tidal Ponds		
Edgartown Great (720; 4851)	*2.20*	*Eelgrass patchy, TON high (0.49 to 0.61 mg/l), N-load below limit*
Oyster (208; 2656)	*0.4**	*Eelgrass history unknown, TON high (0.53 mg/l), N load unknown*
Tisbury Great (731; 10974)	*0.8*	*No eelgrass, eelgrass history unknown, TON high (0.55 to 0.83 mg/l), N load below limit*
Chilmark (194; 3173)	*0.2*	*No historical eelgrass, TON high (0.58 to 0.76 mg/l), N load high*
Squibnocket (603; 1303)	*0.1*	*No historical eelgrass, TON high (0.72 to 1.12 mg/l), N load high*
James (46; 435)	*0**	*Eelgrass history unknown, no existing eelgrass, TON high (0.81 mg/l), N-load unknown probably too high*
**Note: These limits are estimates and should be applied with caution TON – Total Organic Nitrogen N load – current nitrogen loading*		

The Critical Nitrogen-Loading Limits vary from watershed to watershed because of the varying sizes of ponds, the areas of the watersheds, and the degree of tidal flushing. For example, some ponds such as

Sengekontacket are fully tidal whereas others, such as Oyster Pond, are only opened to the sea for a few weeks each year. The Massachusetts Estuaries Project is conducting a detailed study of most of the Vineyard's coastal ponds, which will likely lead to revision of the interim Nitrogen-Loading Limits used in this policy.

Classification of Vineyard Watersheds: The Martha's Vineyard Commission has also established a classification system for coastal waters based on an analysis of their current water quality as well as the nitrogen concentration in the pond in relation to the Critical Nitrogen-Loading Limits. Several criteria were used to indicate impairment:

- In a pond that historically had eelgrass, the reduction of 25% or more of the extent of eelgrass beds.
- A total organic nitrogen level greater than the threshold concentration (0.38 mg per liter) which compromises the survival of eelgrass and is associated with production of phytoplankton and algae;
- In a tidal pond, a calculated nitrogen load greater than the interim-loading limit for that pond as calculated using the Buzzard's Bay Model.
- Symptoms of water-quality problems associated with excess nitrogen such as a decline of fish or shellfish harvest, turbidity and excessive amounts of wrack or drift algae.

Based on these criteria, the Vineyard's water bodies and their watersheds were classified into four categories.

A. <u>Ocean Watersheds</u>
    - Watersheds that drain directly to the ocean without first passing through a coastal pond.

B. <u>Quality Waters</u>
    - Eelgrass bed coverage is close to historical extent or loss is no more than 25%; and
    - Average organic nitrogen concentration is equal to or less than 0.38 mg per liter; and
    - Current nitrogen-load is well below the Critical Nitrogen-Loading Limit.

C. <u>Compromised Waters</u>

    Tidal ponds with limited tidal action that display symptoms of eutrophication associated with excess nitrogen such as declining fish and shellfish harvests, turbidity, low dissolved oxygen and wrack algae.

    Some of these ponds do not fit precisely into the Buzzard's Bay Model for calculating Critical Nitrogen-Loading Limits. Ponds where we do not yet have enough data to thoroughly assess the condition but which exhibit some symptoms of water quality problems are also included.

D. <u>Impaired Waters</u>
    - Eelgrass coverage has decreased in excess of 25% of past coverage; and/or
    - Total organic nitrogen exceeds the 0.38 mg per liter threshold; and/or
    - The current nitrogen load is close to or exceeds the Critical Nitrogen-Loading Limit.

Table 2: Classification of Vineyard Watersheds				
	Category A: Ocean Waters	***Category B: Quality Waters***	***Category C: Compromised Waters***	***Category D: Impaired Waters***
Ocean Watersheds				
Tidal Ponds				
Menemsha				
Cape Pogue				
Pocha				
Katama Bay				
Tashmoo				
Sengekontacket				
Lagoon				*
Oak Bluffs Harbor				*
Farm				*
Non-Tidal Great Ponds				
Edgartown Great				
Oyster				
Tisbury Great				
Chilmark				
Squibnocket				
James				
** Seriously Impaired Waters*				

2. GOALS AND OBJECTIVES

Goal: The overall goal of the Water Quality Policy is to ensure that new projects do not cause deterioration of water quality in the Vineyard's fragile coastal ponds by calculating a project's nitrogen load and providing guidance toward mitigating excessive nitrogen loading.

Objectives:
The following are general objectives of this policy.

- Ensure that the water quality in our coastal waters continues to provide a sustainable basis for recreational use and for the commercial and recreational harvest of fish and shellfish.
- Maintain eelgrass beds in tidal coastal ponds or re-establish them where those were present in the recent past.
- Ensure that the overall nitrogen loading in each watershed is kept below the critical threshold needed to maintain or restore eelgrass in tidal ponds and to maintain water quality in the brackish ponds.
- Provide nitrogen-loading limits that are appropriate for the seriousness of the impairment in the watershed.

The following actions may be required in order to meet the nitrogen-loading guidance for a watershed.

- Reduce wastewater flow and, where necessary, utilize available technology to reduce the nitrogen concentration.
- Avoid concentration of runoff by discharging stormwater from impervious surfaces into vegetated areas sized to handle the expected flows. Vegetated infiltration areas should be shaped to disperse runoff evenly to allow maximum nutrient uptake.
- Minimize maintained landscape and maximize use of natural vegetation or native and low maintenance plant materials.

.

3. POLICY

A DRI project should respect the following principles.

3.1 Conform to All Existing Regulations

All projects must meet current town and Department of Environmental Protection (DEP) regulations including:

- Board of Health regulations, Title 5 or special regulations adopted by the Town where the project is located;
- DEP regulations for Zone II Areas of Contribution of public supply wells.

3.2 Limit or Mitigate Nitrogen Loading On Site

3.2.1 <u>Overall Policy:</u> Nitrogen from all man-made sources associated with a DRI – including wastewater disposal, stormwater runoff, and landscaping – should be kept within the guidance for the watershed within which the project is located. The nitrogen loading must be limited or mitigated, depending on the project watershed, as follows.

A. <u>Ocean Waters:</u> There is no nitrogen-loading limit on projects in this watershed.

B. <u>Quality Waters:</u> The nitrogen loading from the project must meet the established Nitrogen-Loading Limit for the watershed. For projects with pre-existing nitrogen loads, the total proposed nitrogen loading must meet the Nitrogen-Loading Limit.

C. <u>Compromised Waters:</u> The nitrogen-loading limit for the project is the less restrictive of the following criteria:
   - Meet the Nitrogen-Loading Limit for the watershed, or
   - Implement the Basic Nitrogen-Reduction Techniques (described below).

D. <u>Impaired Waters:</u> The nitrogen-loading limit for the project is the more restrictive of the following criteria:
   - Meet the Nitrogen-Loading Limit for the watershed, or
   - Implement the Basic Nitrogen-Reduction Techniques (described below).

   The nitrogen load on the property should first be reduced using the Basic Nitrogen-Reduction Techniques. If it is not possible to reduce the nitrogen load to the guidance level, the remaining nitrogen load must be offset either with off-site reduction within the same watershed, or the Commission might consider a mitigation contribution to offset nitrogen loads. (The amount of the mitigation contribution, if appropriate, would be determined during the DRI review process.) For projects with pre-existing nitrogen loads, the total proposed nitrogen loading must meet the nitrogen limit.

3.2.2 <u>Basic Nitrogen-Reduction Techniques:</u> Basic Nitrogen-Reduction Techniques require the following measures.

- For residential projects:
    - The maximum number of bedrooms permitted on a property is calculated on the basis of four bedrooms for each main house, and two bedrooms for each guest house, which is allowed on the property according to existing zoning regulations, but in no case more than the equivalent nitrogen loading from 4 bedrooms per acre.
    - The calculation of the number of bedrooms in units of affordable housing (permanently restricted to 80% of Area Median Income) is then increased by 50%.
    - The Commission might consider additional bedrooms beyond these limits provided the nitrogen loading from the additional bedrooms are completely offset using the techniques described in this policy.

Nitrogen loading figures and limitations described are based on the average estimated wastewater flow from water department water meter records. This figure is 167 gallons per day. The nitrogen released from a wastewater denitrifying system at 19 milligrams per liter and 167 gallons per day yields 4.4 kilograms of nitrogen from the average residence.

- For commercial, office and institutional projects, the equivalent of the residential design flow as described above with denitrification of the wastewater.

- For all projects, installation of a wastewater system nitrogen reduction facility or use of other techniques (e.g. composting toilets), to remove at least 40% of the nitrogen, which is the highest amount of nitrogen reduction currently possible with commonly available systems. For all projects, the Commission might consider increasing the nitrogen-loading limit for in-town, smart growth locations by up to 50%. For all projects, implementing the following nitrogen-reduction landscaping practices:
    - Maintained landscape areas (fertilized lawns and gardens) are limited to a maximum area of 10% of the property area up to 4000 square feet.
    - Only slow release, water-insoluble nitrogen source fertilizers are used in the maintenance of landscaping.
    - Impervious surfaces for parking, buildings and other purposes are limited to a maximum of 25% of the site area.
    - Stormwater is dispersed into natural vegetated swales or infiltration areas sized to handle the 25-year, 24-hour storm, unless demonstrably not feasible.

3.3 Mitigate Excess Nitrogen Loading Off Site

If it is not feasible to reduce or eliminate the nitrogen on site to meet the targets outlined in 3.2.1, the Commission may consider excess nitrogen load offset from a project by reducing an equivalent amount on another site within the same watershed.

This can be done by:

- Putting another property into permanent conservation, provided the mitigation site currently contributes no nitrogen and is taken out of development potential by the use of a conservation restriction or other legal instrument that permanently removes the potential nitrogen loading to the watershed; or

- Reducing the nitrogen loading on another site by at least an amount equal to the excess nitrogen from the proposed project by means such as: connecting the site to a sewer system, installing a package treatment plant, or installing a denitrification system.

In both cases:

- The mitigation site must be situated in a location where its nitrogen load enters the pond at a similar location to the proposed project or a point more distant from its inlet; or
- The mitigation site is located within a different sub-watershed of the same pond where the project site lies but is presently experiencing a more severe nitrogen-loading problem as calculated from land use within the sub-watershed or indicated by water quality symptoms.

3.4 Use Monetary Mitigation to Offset Impacts That Cannot Be Adequately Reduced Through Physical Means

If it is not possible to reduce the nitrogen to the levels set in this policy, either on site or on another site, the Commission may consider a monetary contribution of an amount that would offset the excess nitrogen. This contribution shall be made before any occupancy permit is issued for the project. These funds shall be used exclusively for studies or actions that contribute to improving the water quality in the pond in which watershed the project is located, and may be accumulated and used as required.

3.5 Do Not Increase the Nitrogen Loading of Previously Developed Sites Beyond the Limits in this Policy

If there is additional development of an already developed site, the total nitrogen loading of the property shall not exceed the nitrogen-loading limits in this policy.

If the previously developed site already exceeds the nitrogen-loading limits in this policy, the total nitrogen loading of the property shall not be increased.

4. APPLICATION OF THE POLICY

This section describes the keys steps for designing a project in accordance with the Water Quality Policy. Applicants are encouraged to consult the staff of the Martha's Vineyard Commission for assistance in application of the policy to their properties. The steps are:

- Step 1: Calculate the property's Nitrogen Load Limit.
- Step 2: Calculate the Projected Nitrogen Loading of the proposal
- Step 3: Modify the proposal, if necessary, to meet the limits as much as possible.
- Step 4: Offset the excess nitrogen loading either with off-site mitigation or with monetary mitigation.
- Step 5: Obtain a facility maintenance agreement.

Step 1: Calculate the Property's Nitrogen Load Limit

The nitrogen load limit for the property is calculated by multiplying the area of the property by the loading limit per acre of the watershed within which the project is located (see table 1).

Example

- *A 12-acre lot in the Tisbury Great Pond watershed would have a limit of 12 acres x 0.8 kg/acre/year = 9.6kg/year*
- *A 12-acre lot in Lagoon Pond watershed would have a limit of 12 acres x 3.4 kg/acre/year = 40.8 kg/year*

For projects located within the watersheds of Compromised or Impaired Waters, the nitrogen load must also be calculated on the basis of the Basic Nitrogen-Reduction Techniques with respect to the permissible number of bedrooms. The load from a house after nitrogen reduction is 1.1 kilogram/ acre/year for each bedroom (4.4 kg for a four-bedroom house and an additional 2.2 kilograms kg for a two-bedroom guesthouse if allowed under zoning).

Table 3: Calculation of Number of Permissible Bedrooms in Residential Projects

Note: This limit is used for Compromised and Impaired Waters.

1) Calculate the number of main houses and guesthouses allowed on the property under existing zoning regulations, with a maximum of one house per acre.
2) Calculate the number of bedrooms based on four bedrooms for each permitted main house and two bedrooms for each permitted guesthouse.

   Example

   - *A 12-acre lot in an area with 3-acre zoning where one guesthouse is permitted on each lot could have 4 main houses with 4 bedrooms and 4 guesthouses with 2 bedrooms, for a total of 24 bedrooms.*
   - *If this were to be developed as one property, it would have 24 bedrooms available for the main and guesthouse.*

- *The total nitrogen loading limit would be 24 bedrooms x 1.1 kg/year/bedroom = 26.4 kg/year*
- *If it were to be developed under a Comprehensive Permit (40B) as, say, 8 houses, it would still have 24 bedrooms available for use in all the houses, or three bedrooms each. If two of the houses were affordable (permanently restricted to 80% AMI or less) the project would be entitled to three additional bedrooms (six bedrooms x 50%). Additional bedrooms would need to be offset as described in section 3.2.2.*
- *A 4-acre lot in an area with ¼ acre zoning would be calculated on the basis of one 4-bedroom house per acre or a total of 16 bedrooms.*

Note that the calculations in this example are only to illustrate this policy and should not be taken to imply that the Commission or the town boards would approve such projects.

Examples:

- *If the 12-acre property used in the example was located in the Tisbury Great Pond watershed (Compromised Waters), the nitrogen-loading limit would be the greater of the two limits (9.6 and 26.4 kg/year) namely 26.4 kg/year.*
- *If the 12-acre property in the example was located the Lagoon Pond watershed (Impaired Waters), the nitrogen-loading limit would be the lower of the two limits (40.8 and 26.4 kg/year), also 26.4 kg/year.*

Step 2: Calculate the Projected Nitrogen Loading of the Proposal

The projected nitrogen loading from the proposed project is calculated by estimating the likely wastewater and stormwater infiltration volume and the landscaping contribution using the methodology described in table 3.

Table 4: Nitrogen Loading Calculation Methodology for DRIs

Calculate the total of the three components

	All Projects	Commercial Projects	Residential Projects
Wastewater	• *Multiply the total flow by a nitrogen concentration of 35 milligrams of nitrogen per liter (mg/l).* • *If on-site wastewater denitrification is proposed, the nitrogen concentration shall be assumed to be 19 mg/l unless reliable information is provided to demonstrate otherwise.* • *The wastewater component is excluded if a town sewer serves the project.*	• *Calculate the total flow by computing 60% of the design flow as determined by Title 5 methodology. This figure is then converted to an annual nitrogen load by multiplying by the appropriate value from column 1.*	• *Calculate the total annual flow by multiplying the number of houses by 167 gallons of wastewater per day for each dwelling unit to be created. This figure is then converted to an annual nitrogen load by multiplying by the appropriate value from column 1.*
Lawn & Landscape	• *The "landscaped area" is the total area of turf, herbaceous plants and shrubs.* • *Multiply the landscaped area by 1.36 kilograms of nitrogen per 1000 square feet; then multiply by 20% to calculate the nitrogen that will leach to the groundwater.* • *If part of the site is planned and permanently restricted to use exclusively native or low-maintenance varieties of shrubs and trees with no turf, those portions of the landscape are assumed to receive no nitrogen.*	• *The landscaped area is assumed to include the entire property outside the building, parking and other structures' footprint unless clearly designated natural and landscaped areas are identified.* • *These areas are assumed to receive 1.36 kilograms of nitrogen per year per 1000 square feet of area of which 20% will leach to the groundwater*	• *The landscaped area for the project must be clearly indicated on the plans, will form a binding part of the project approval, and may not be subsequently increased without approval of the modification by the Martha's Vineyard Commission.*

Stormwater

- *Stormwater nitrogen sources must be calculated for all commercial projects and for residential projects where the impervious surfaces comprise more than 10%[1] of the property area or the residential area exceeds 10 acres in area. Impervious surfaces are intended to include the footprint of all structures, driveways, parking areas and roads whether paved or not. For small residential projects (development area less than 10 acres) where stormwater runoff will be infiltrated through vegetated areas and will contribute a limited amount of nitrogen to the groundwater, the MVC may assume no additional nitrogen load.*
- *For projects where infiltration of stormwater is proposed through a vegetated area sized to accommodate 25-year storm events, the calculated stormwater volume for all impervious areas (paved and roof) shall be based on 90% of the annual precipitation (90% of 46.9 inches) applied to the impervious area. Runoff volume for roads and parking areas that are surfaced with hardener, gravel or RAP shall be assumed to amount to 65% of the annual precipitation (65% of 46.9 inches) applied to this area. The nitrogen concentration shall be assumed to be 0.75 mg/l for paved areas and 0.38 mg/l for roof water where the runoff is infiltrated in a vegetated area.*
- *For projects with impervious areas utilizing stormwater catch basins and infiltration systems or similar systems, the calculated stormwater flow will be 90% of the annual precipitation (90% of 46.9 inches) and the nitrogen concentration in the recharging water shall be assumed to be 1.5 mg/l for paved areas and 0.75 mg/l for roof areas that are infiltrated using dry wells, infiltrator units or other rapid infiltration technology. If roof water can be infiltrated through vegetated areas, method 2 above shall be used to calculate the nitrogen load.*
- *Alternatively, stormwater volume may be calculated using accepted methodologies such as TR-20 (Computer Program for Project Formulation-Hydrology, USDA SCS 1983), TR-55 (Urban Hydrology for Small Watersheds, USDA SCS, 1986) or TR-55 Microcomputer Program Version 2.0, 1990 or updated versions of these methods. The nitrogen load will then be calculated using this volume and the appropriate nitrogen concentrations as above.*

Nitrogen Attenuation in Fresh-Water Wetlands: Nitrogen loading may be attenuated from projects where a fresh water wetland is situated between the site and the nitrogen limited pond. The attenuation that may be allowed is up to 30% of the calculated project load. The fresh wetland must be clearly situated in the groundwater flow path. If the Applicant or the MVC chooses, a hydrological study may be performed to demonstrate that the nitrogen bearing groundwater will pass through the fresh wetland.

Step 3: Modify the Proposal, if Necessary, to Meet the Guidance as Much as Possible

If the projected nitrogen loading level exceeds the loading limit, the following techniques may be used to reduce the nitrogen loading from the proposal.

1. Reduce the scale of the project.
2. Use additional nitrogen-reduction wastewater technologies beyond the on-site nitrogen reduction (e.g. composting toilets, cluster package plant, connection to municipal sewer), provided they are approved by the local Board of Health and meet the requirements of the Department of Environmental Protection.
3. Reduce the landscaped area of the property (i.e. turf, herbaceous plants and shrubs) and increase the area that remains in native and low-maintenance landscaping.

The nitrogen loading should then be recalculated using the new figures.

Step 4: Offset the Excess Nitrogen Loading Either with Off-site Mitigation or with Monetary Mitigation.

If a project cannot meet the nitrogen-loading limit set forth in this policy on the property of the proposal, the Commission may consider a proposal to offset the nitrogen loading elsewhere within the same watershed as described in Section 3.3 of this policy.

The offset must be in the same watershed as the proposed project in a portion of the watershed that will add nitrogen at a similar location or at a location further removed from the inlet to the pond in question. The offset could also be within a different sub-watershed that is deemed to have an equal or worse water quality condition than the sub-watershed that the project impacts

For projects where offsite mitigation is not possible, the Commission may consider a contribution to a mitigation fund that will be utilized to offset the excess nitrogen loading through cost-effective solutions elsewhere within the watershed.

Step 5: Maintenance of Nitrogen-Reduction Systems:

To assure performance, all nitrogen-reduction systems require ongoing maintenance and monitoring. The applicant must demonstrate to the Commission that a maintenance contract with the manufacturer or a certified treatment plant operator will remain in force over the design life of the system (see Table 5).

Table 5: Maintenance Requirements for Nitrogen Reduction Systems
The applicant should enter into a maintenance contract with the manufacturer or a certified treatment plant operator, to remain in force over the design life of the system, which meets the following requirements. • *Quarterly effluent testing until the system meets the required nitrogen concentration for four consecutive quarters.* • *Annual effluent testing once the required nitrogen concentration has been met. Should an annual test fail to meet the standard, a retest is required. Continued failure to meet the nitrogen concentration standard will require a return to quarterly testing until 4 consecutive tests meet the required concentration.* • *If a system cannot be modified to meet the required standard for nitrogen concentration after four consecutive quarterly test results, it will be deemed to have failed. A failed system must be upgraded with additional system components or replaced with a new system.* • *A copy of the maintenance contract as well as all test results should be provided to the local Board of Health and to the MVC.*

5. FRESH SURFACE WATERS AND GROUNDWATER

The following policies apply to fresh surface waters and groundwater.

5.1 Location of Leaching Systems: No subsurface wastewater disposal systems should be located within 300 feet of the high-pond shoreline.

Setting wastewater leaching systems back from the shore allows increased soil adsorption, which limits phosphorus entering the ponds. The Applicant may demonstrate by a groundwater study that the groundwater flow from the proposed site does not flow to the pond or to a tributary to the pond. Wastewater treatment may be used to remove nutrients from the wastewater if a project must be located within the 300-foot setback. The Commission may require a phosphorus loading evaluation to assure that the project as proposed will not have a detrimental impact on the pond.

Runoff generated by the project must be infiltrated outside the 300 foot set back. Infiltration through vegetated areas is preferred. Necessary topographic survey and design shall be provided to support the capacity of the proposed infiltration area to meet the 25-year, 24-hour storm.

5.2 Groundwater Withdrawal: Ensure that large groundwater withdrawals do not negatively impact the aquifer, the hydrology of nearby fresh surface waters, or wetlands.

Projects that will require in excess of 50% of the annual recharge for their lot over the course of a year or an average amount in excess of 10,000 gallons per day for a period of 30 days or more shall demonstrate by a suitably designed hydrogeologic study that the project as proposed will not adversely affect groundwater levels in existing wells in the vicinity, cause intrusion of saltwater into the aquifer or impact the hydrology of nearby fresh surface waters or wetlands. Groundwater recharge is assumed to be 22.2 inches per year on average as per the USGS.

6. GLOSSARY

Tidal Pond: A costal pond connected to the ocean in which the surface level rises and falls, reflecting the tides.

Great Ponds: South Shore coastal pond that exceeds 10 acres in area and that is periodically open to the ocean allowing tidal circulation for only a portion of the year.

Compromised Waters: The water quality in these ponds displays variability from year to year as well as within the pond system from location to location in a given year. In some years, the Total Organic Nitrogen (TON) content might be at acceptable levels while in other years, it exceeds the threshold.

Total organic nitrogen (TON). A laboratory analyses that includes both dissolved and particulate forms of nitrogen. It is a measure of the organic matter in a water column of a pond that may reduce sunlight penetration and lower dissolved oxygen content. It is a significant indicator of the potential for eelgrass health that is considered an indicator of the health of the pond.

Denitrify or denitrification: A chemical process in which nitrogen is converted to nitrate and then stripped of its oxygen to release the nitrogen to the atmosphere as nitrogen gas.

Nitrogen-Reduction Systems: Wastewater treatment facilities that employ denitrification to reduce the overall nitrogen concentration in wastewater effluent. Current systems reduce levels from 35 parts per million to 19 ppm. Nitrogen-reduction systems can range in size from a single-family system to a full-scale public wastewater treatment facility.

Nitrogen attenuation: The natural processes that take place in wetlands whereby nitrogen in the groundwater is taken up into internal nitrogen cycles of plants and bacteria and effectively removed from the groundwater and therefore from the nitrogen load to a down gradient coastal water. Where the nitrogen load from a proposed project will pass through a fresh water wetland before entering a coastal pond, a portion of the nitrogen load will be attenuated by the wetland system.

Printed on March 1, 2007

MARTHA'S VINEYARD COMMISSION
BOX 1447 OAK BLUFFS MA 02557
PHONE: 508-693-3453 FAX: 508-693-7894
E-MAIL: INFO@MVCOMMISSION.ORG
WEBSITE : WWW.MVCOMMISSION.ORG