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JON S. CORZINE
Governor

JOHN R. WEINGART
Chairman

EILEEN SWAN
Executive Director

MEETING AGENDA

Thursday, October 18, 2007 - 10:00 a.m.

1. CALL TO ORDER
2. ROLL CALL
3. OPEN PUBLIC MEETINGS ACT
4. PLEDGE OF ALLEGIANCE
5. APPROVAL OF MINUTES – October 4, 2007
6. CHAIRMAN'S REPORT (and Council Member Reports)
7. EXECUTIVE DIRECTOR'S REPORT
8. COMMITTEE REPORTS
   a. TDR Committee - Council Member Whitenack
9. DISCUSSION OF REGIONAL MASTER PLAN ISSUES
   a. UPDATED GOALS, POLICIES, AND OBJECTIVES
   b. PROGRAMS FOR TDR, WATER USE, AND WASTEWATER
   c. TECHNICAL REPORTS ON VERNAL POOLS, SEPTIC DENSITY, AND WASTEWATER SYSTEMS
10. CONSIDERATION OF PROPOSED WATER QUALITY MANAGEMENT PLAN AMENDMENT – HERITAGE VILLAGE 55
11. PUBLIC COMMENTS
12. EXECUTIVE SESSION
13. ADJOURN

NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
MINUTES OF THE MEETING OF OCTOBER 18, 2007

PRESENT

JOHN WEINGART	)	CHAIRMAN
TRACY CARLUCCIO	)	COUNCIL MEMBERS
BILL COGGER	)	
TIM DILLINGHAM	)	
MIMI LETTS	)	
ERIK PETERSON	)	
JACK SCHRIER	)	
GLEN VETRANO	)	
TAHESHA WAY	)	

ABSENT

KURT ALSTEDE	)
ELIABETH CALABRESE	)
JANICE KOVACH	)
DEBBIE PASQUARELLI	)
SCOTT WHITENACK	)

CALL TO ORDER

The Chairman of the Council, John Weingart, called the 56th meeting of the New Jersey Highlands Water Protection and Planning Council to order at 10:15 am.

ROLL CALL

The members of the Council introduced themselves.

OPEN PUBLIC MEETINGS ACT

Chairman Weingart announced that the meeting was called in accordance with the Open Public meetings Act, N.J.S.A. 10:4-6, and that the Highlands Council had sent written notice of the time, date, and location of this meeting to pertinent newspapers or circulation throughout the State and posted on the Highlands Council website.

PLEDGE OF ALLEGIANCE was then recited.

APPROVAL OF MINUTES OF OCTOBER 4, 2007

Mr. Schrier introduced a motion to approve the October 4, 2007 minutes. Mr. Peterson seconded it. Initially, Mr. Vetrano abstained, but Mr. Borden advised that he could vote based on his belief that the minutes were representative of the meeting. The minutes were APPROVED by all members present.

CHAIRMAN'S REPORT

Chairman Weingart announced that Item #10 on the agenda – Consideration of Proposed Water Quality Management Plan Amendment for the applicant Heritage 55 would be

discussed at a future meeting at the request of the applicant's attorney. Council had been advised that the applicant would be submitting a letter responding to the staff recommendation discussed at the Natural Resources Committee on September 20th.

Chairman Weingart then reiterated the process for Council Members to make additional changes to the current draft Regional Master Plan. The Council is receiving proposed draft elements that respond to comments received on the Nov 2006 release and additional information. There are three opportunities for additional comment by Council Members: 1) discussion at meetings, if there is a straw vote and a majority of members support change then staff will make those changes otherwise staff continue as proposed; 2) at the November 19th meeting when there will be a motion introduced to release the plan for public comment, there will be an opportunity for members to introduce motions for formal amendments; and 3) after the public comment period there will be an opportunity to make additional changes.

Mr. Schrier asked that the Council consider that the public comment period be set to include a 60 day comment period rather than a 30 day period given the holiday season. Chairman Weingart asked that the discussion of establishing the public comment period be tabled for a future meeting.

Council Member Way joined the meeting.

Mr. Vetrano raised the issue of the Ballot Question #3 as to whether the Council could do anything more to support the proposed $200 million of funding for open space preservation. Mr. Vetrano introduced a motion that the Council issue a press release in support of Ballot Question #3. Ms. Carluccio seconded it. All members present voted affirmatively and the motion was APPROVED. Staff will prepare a press release. Mr. Dillingham commented that Council members should be able to participate in press conferences on the subject.

Chairman Weingart announced that Mr. Whitenack was absent today due to an urgent project on the Prudential Center and he would not be giving the TDR Committee report and that the discussion on that meeting will be part of the discussion on the TDR topic.

EXECUTIVE DIRECTOR'S REPORT

Ms. Swan gave a summary update on the continuing work on the next generation of the Regional Master Plan. Programs are being advanced to Council for review and Goals, Policies and Objectives are being reviewed to be sure that they are consistent. Capacity analysis work is continuing and will be presented November 1st meeting and septic density will be continuing as well. She then addressed the analysis of exemptions. The analysis reveals that there are **20,914** undeveloped parcels throughout the Highlands Region that have the potential to exercise one of the exemptions for the construction of a single-family dwelling. Significantly, those parcels that are currently zoned residential may be able to exercise the single family dwelling exemptions without having to seek either a zoning change or use variance. Region wide there are **17,900** such parcels comprising **108,198** acres in the Highlands Region. This analysis does not take into account local zoning or specific site conditions that would have to be taken into account to judge if the site were developable or not. The staff will continue the work on the spatial analysis of exemptions.

She also commented that the TDR Committee had met on October 11th and that there had been a request for a workshop which she suggested would be held in December or January.

The LANDS model has been rerun and she noted that it will be discussed on November 1st. The GIS staff and Planning and Science have been working very diligently to complete the LANDS model.

The MOU with the Office of Smart Growth, the State Planning Commission (SPC), and the Highlands Council has been included in Council's packet and is available on the website on the calendar under the Agency Coordination meeting. There has been additional work on the MOU and is slated to be discussed on October 24th meeting of the SPC's Plan Implementation Committee. This matter is not on Council's agenda and will not be until after it has been discussed by the Plan Implementation Committee of the SPC. Ms. Swan anticipated that it would be considered after release of Draft Plan.

Ms Swan report that Greg Della Pia, the recently retained Financial Consultant to the Council, has been in several times and has met with staff and with Bill Cogger.

She introduced Lindsey Interlante as the new Manager of Grants Administration. Lindsey has a Master of Public Administration and a Batchelor of Science in Business Administration. She has valuable experience to add to the Highlands staff. Other new staff include Laura Forrest as a part-time administrative assistant and on Monday, Nancy Benecki will begin as the new Manager of Communications.

The Highlands Council will be presenting at two sessions at the New Jersey League of Municipalities in November, a NJ Future event in December, and the New Jersey Builders Association Convention in April 2008. Tomorrow, Jeff LeJava will represent the Council at the Metro New Jersey Appraisal Institute.

Ms. Swan then described ongoing outreach efforts.

Municipal and County Outreach:

October 9 – Union Twp - Council staff provided an overview of the draft RMP (Council staff Swan and Borden)

October 16 – Somerset County – Council staff provided an overview to 5 municipalities and the county on the progress of the RMP. (Council staff Swan and Borden)

Constituent Outreach

October 10 – Givaudan Fragrances Corp - Council staff (Swan and Borden) met with representatives of Givaudan Fragrances Corp in Mount Olive and the Morris County Economic Development Corporation to discuss the Highlands redevelopment process.

October 15 – Hercules - Council staff met with representatives of Hercules and Roxbury Twp. officials to discuss the Highlands redevelopment process. (Council staff Swan, Borden and Van Abs)

October 19 – Office of Smart Growth Retreat (Swan attending)

Chairman Weingart announced the schedule for the upcoming meetings: November 1st at 4 pm, November 8th at 10 am and November 19th (Monday) at 4 pm. He asked if there were any Council Members on the phone. There were none. Mr. Weingart asked that Ms. Swan and Mr. Siemon initiate the discussion of the Regional Master Plan.

DISCUSION OF THE REGIONAL MASTER PLAN

Mr. Siemon provided an introduction for the Regional Master Plan Issues. He offered that the next generation plan is organized in six elements: I. Introduction; II. Data and Analysis, III. Vision and Needs Assessment; IV. Goals, Policies and Objectives; V. Programs; and VI. Implementation.

Mr. Siemon clarified that the Programs will be primarily organized around substantive areas and Implementation will be organized around implementing authorities e.g. Highlands Council, State Agencies, Counties, and Municipalities. He reiterated that organizing the plan this way creates a more coherent approach. Mr. Siemon introduced policies on carbonate rock.

Subpart 6
Carbonate Rock (Karst) Topography

Mr. Siemon discussed that Karst is a geophysical characteristic of the Highlands Region not called out previously and was identified in response to public comment as one of the subjects that needed additional attention. There are a series of policies and accompanying actions to protect those resources. Ms. Swan commented that in the previous Policies and Issues discussion with the Council, the staff made a commitment to address both issues of Karst and Lake Management to respond to public comments. Mr. Schrier asked why it was called Karst. Ms. Swan asked staff member Chris Ross to provide an explanation. Ms. Ross discussed the issues regarding carbonate rock which is known as Karst and has two major concerns: the direct impact on groundwater water quality; and safety concerns where carbonate rock fractures and sinkholes can damage structures. Dr. Van Abs added that he believed the word to be German after the man who had studied this type of landscape.

Mr. Siemon then discussed the new subpart for Lake Management addressing the special concerns and said that programs are being developed to support these goals, policies and objectives.

Subpart 7
Lake Management

The management of lands surrounding lakes is an important issue for the Highlands Region. Overdeveloped, damaged and poorly managed shoreland areas can result in the degradation of water quality, harm to the lake ecosystem, a decrease of natural aesthetic values, and an overall loss of property values for lake communities. Lakes can be harmed by pollutant sources in the watershed area draining to them. Polluted lakes can, in turn, damage downstream streams and rivers. Most existing lake communities are fully built out, predate modern environmental protection requirements, and have limited potential for major land use changes. Some have sewer systems, but many rely on septic systems (or even cesspools)

on inadequately sized lots, where direct contamination of the lakes is possible. Past NJDEP studies indicate that nearly every public lake (privately-owned lakes were not evaluated) is experiencing unacceptable contamination, often including excessive bacteria and nutrients. In addition, many lake communities have been evolving from summer communities to year-round communities, and many are experiencing greatly intensified land uses as the original buildings are torn down and replaced by much larger structures. Addressing land uses within lake communities allows for potential opportunities to improve community value, to both protect natural resources and to enhance and restore the quality of lake environments in the Region, and in some cases to allow for in-fill development where appropriate.

He continued that management of the water quality of the lakes would be best done on a drainage basis and that the LiDAR data under development for the Council by the United States Army Corps will provide more detailed drainage data to analyze lake communities. He summarized the following goals:

GOAL 1.7.1 PROTECTION OF HIGHLANDS REGION LAKES FROM THE IMPACTS OF PRESENT AND FUTURE DEVELOPMENT
GOAL 1.7.2 PROTECT THE UNIQUE CHARACTER OF HIGHLANDS LAKE COMMUNITIES
GOAL 1.7.3 MAINTAIN PUBLIC AND PRIVATE LAKES, OR RESTORE LAKE BEDS AND DOWNSTREAM AREAS WHEN LAKES ARE DRAINED

Ms. Letts asked about management of dams and it was located in the text.

Mr. Dillingham asked about recognition of lakes being headwaters to river systems. He also asked about restoration plans only applying to public not private lakes. There was a discussion from Mr. Siemon about the jurisdictional issues of ownership in public vs. private lakes. The policies are not intended to preclude management of private lakes and the language will be clarified. Mr. Dillingham asked how to work toward restoration of water quality that is within the private lakes. Dr. Van Abs commented that DEP's TMDL requirements apply on all lands including private lake communities. There was additional discussion regarding the promotion of restoration regardless of private vs. public ownership and the water quality issues. Dr. Van Abs spoke about the different abilities of municipalities to affect private lake communities. There was agreement to clarify the language in Goal 1.7.2 and 1.7.3.

Highlands Transfer of Development Rights Program

Ms. Swan introduced the Highlands Transfer of Development Rights Program (TDR). Mr. Siemon described the agreed upon format for the programs. The suggestion was to go through the format for this program as it is the first time the Council are seeing this approach. He noted that the Highlands Act sets out the structure for the TDR program and that this is a key part of the Act guiding development in appropriate places and also providing a mechanism to provide a measure of compensation for landowners willing to sell development rights. The presentation was a summary of the TDR bank, its creation and function. He continued that there is a handbook underway by the TDR Committee that will be available by plan adoption. Mr. Siemon described that the allocation process is necessarily robust and complex in order to account for the wide variation of land value across the Region.

Mr. Cogger asked if there was a feature that would allow one to reverse these credits. Mr. Siemon said that a covenant should be recorded and that judicial action should be the only vehicle for negating this instrument. He is in favor of creating as many opportunities as possible for use of credits. Mr. Siemon noted that given the voluntary nature of the program that establishing the bank would be an incentive for municipalities. He believes that an essential element to ensure the success of the TDR program is the capitalization of the TDR bank early in the process. Mr. Vetrano asked absent a capitalized credit bank how long the process would take? Mr. Siemon responded that he strongly encourages the bank be funded immediately to be able to initiate transactions and that it could take 2-3 years to have the voluntary private market portion of the program fully functional.

Ms. Letts asked if the formula for TDR credits needed to be tested. Mr. Siemon noted that nothing was final in what was being presented in the TDR committee and anticipated workshops. Mr. LeJava commented that the issue of bonus credits needs further discussion and that the base factor equation is appropriate to include. The specific market and end use factors will continue to be worked on. He noted that the description of the market and end use factors will be in the TDR handbook. Ms. Letts spoke in support of the work that had been done.

Mr. Schrier asked who the members of the TDR bank were. Mr. LeJava commented that the staff is working on a recommendation for the number of members of the bank and what type of person should fill what type of role. That will be provided within a matter of weeks to the Council.

There was a Council discussion about a conforming municipality restricting its TDR sites and whether a community not seeking Plan Conformance should be given an opportunity to establish receiving zones. There was additional discussion with respect to the relationship of exemptions, no build areas, and TDR bonus credits. Mr. Siemon commented that allowing limited transfer of exemptions would be a better policy because it would encourage preservation on large lots. Mr. LeJava stated that an undeveloped property may be entitled to one single family home exemption per lot and that property owners will wait to see how the TDR funding will be working. Mr. Dillingham commented that the landowner would want to know how to maximize his investment.

Ms. Carluccio asked that there be a straw vote on the Designation of Receiving Zones asking that Paragraph #5 that deals with non-conforming municipalities be deleted. There was not a majority of Council members in favor of this change and the language will remain.

Ms. Carluccio asked that there be another straw vote on the Designation of Receiving Zones asking that Paragraph #1 and #4 be removed. There was not a majority who indicated that the change should be made and the language will remain.

Mr. Siemon spoke in support of having landowners have as many opportunities as possible and the municipal conformance process will deal with specific situations.

RMP Program: The Efficient Use of Water

Ms. Swan introduced and provided an overview of the topic. Water is a driving force behind many of the goals and policies of the Highlands Act, and protection of water supplies is a critical focus of the Regional Master Plan. Many Highlands Region subwatersheds presently face shortages of water, as current demands exceed estimated water availability for human and ecological purposes and therefore stresses aquatic ecosystems and puts human needs in jeopardy during droughts. In addition, municipalities served by Highlands reservoirs and some Highlands municipalities face future constraints on their ability to serve customers as water demands increase through redevelopment and development.

Therefore, it is important that New Jersey obtain the maximum benefit from its Highlands water resources through efficient use and, where feasible and appropriate, beneficial reuse and recycling of water. Water use efficiency has been increasing over the last 20 years, as State and Federal requirements for water conserving plumbing fixtures, appliances and irrigation systems affect a greater proportion of total development. Farmers are also becoming more efficient in water use, moving to drip irrigation and other conserving systems instead of high-pressure broadcast spray systems.

However, both the public utility customer base and irrigated farm acreage are increasing, creating more demands that offset improved water use efficiency. For this reason, while some urban areas have seen declining water sales over time (due to both water conservation and the loss of water-intensive industries), other municipalities have seen significant increases in total water use. Further progress in water use efficiency is needed. Many RMP policies and objectives address this need by encouraging general efficiency in water use, providing higher priority to agricultural water uses that employ best management practices, and calling for the use of water conservation, recycling and reuse (among other techniques) to both reduce and eliminate current and future water deficits.

She continued discussing the topic areas: Analysis of Water Use Efficiency for Agriculture and Irrigation, Identification of Water Use Efficiency Metrics and Targets, Implementation of Water Use Efficiency Measures: General and Deficit Areas and Deficit Utilities. Mr. Schrier asked if the recommendations would result in higher water rates. Dr. Van Abs said that today there is an inclining block rate structure so that the rates are tied to additional use; for example, the rates will rise for people who water their lawns when it is raining. These approaches are already in place for the State. Ms. Swan explained that private wells are not included in these fees. Ms. Letts asked that municipal lawn watering restrictions be implemented. Ms. Swan commented that in the conformance process there would be educational outreach on issues such as this..

Ms. Swan commented that the Highlands restoration deficit program is addressed separately from the discussion of deficit areas and deficit utilities. She then went on to introduce the program for Implementation of water use efficiency measures for deficit areas and deficit utilities

Where deficit areas exist, the RMP calls for development of a Water Management Plan to determine how the deficit can be eliminated. Where a water supply utility faces constraints on its ability to supply consumers due to inadequate transmission mains, treatment facilities

or supply sources, the most effective method of avoiding major capital costs is water use efficiency. The same efficiency methods are applicable to both situations.

The following enhanced water use efficiency measures shall be considered, and where feasible, included in Water Management Plans or utility water supply plans to eliminate water availability or utility supply deficits, to the extent that they do not cause or exacerbate other environmental harm. Implementation or a firm commitment for implementation of the selected methods shall be required prior to approval of additional consumptive or depletive water uses or new water supply sources:

1. Incentive programs, up to and including full payment, for replacement of residential and commercial plumbing fixtures, water-using appliances and lawn irrigation systems with water conservation devices;
2. Incentive programs, up to and including full payment, for modification of residential landscaping to forms that require minimal if any artificial irrigation;
3. Incentive programs, up to and including full payment, for retrofitting of existing development with systems that allow for the beneficial reuse of water within the development;
4. Incentive and cost-share programs for replacement of agricultural irrigation and other water uses with water conservation devices;
5. Reduction of water losses within water utility systems to the maximum extent that is technologically feasible;
6. Modification of water rates to enhance financial incentives for water conservation by end users;

In order to ensure implementation of Water Management Plans the following would apply:

1. All implementation measures shall be completed within one year of approval if the amount is less than 100,000 gallons per day in the Planning Area or 50,000 gallons per day in the Preservation Area, on average. Implementation may occur within a longer time period for larger amounts, up to five years from approval;
2. If the implementing entity is a public agency, the commitment must be in the form of a binding resolution or ordinance of the governing body, and the cost of implementation must be bonded to ensure sufficient resources;

If the implementing entity is a private corporation or individual, they must establish either an escrow account or provide bonding to ensure that the commitments are met. A public entity must be named as recipient of the escrow account or bonds in the event of default by the implementing entity, to be used by the public entity to complete implementation.

Mr. Dillingham reiterated his view that continual withdrawal from deficit areas should not be allowed until mitigation is in place. Dr. Van Abs will provide examples of this practice of viability of 125% at a future meeting. He commented that without detailed hydrological models for each site which is very expensive to obtain that it is hard to prove scientifically. Ms. Carluccio asked about the water quality implications of allowing the 125% practice. She also asked about withdrawals affecting ecological systems. There was also discussion about golf courses and Ms. Swan noted that there had been discussions about that issue and that some recommendations would be developed. Dr. Van Abs noted that there is a recommendation for permits to include improvements over time. Mr. Vetrano noted that there is abuse of water for golf courses but also hydrants that are left open in the cities as well. Mr. Siemon commented that water conservation is a key element of the plan. Ms.

Carluccio advocated prohibiting water use from areas that were in deficit. There was no decision to remove that language.

Ms. Swan introduced the next topic.

RMP Program: Wastewater System Maintenance

She reviewed the issue of upgrading and replacement of residential cesspools and other inadequate systems. The replacement of these at the time of system failure was reviewed as well as upgrading to avoid pollution threats. She noted that replacement systems were not intended to encourage development. The specific program for routine maintenance of residential septic systems is as follows:

Municipalities shall, as a requirement of Plan Conformance, adopt municipal or Board of Health programs and ordinances (or participate in regional Board of Health programs) to improve the maintenance of existing and new residential septic systems, based on the most appropriate management model as discussed in RMP Water Resources Technical Report, Watershed and Water Quality, Management of Septic Systems and Other Decentralized Treatment Facilities.

The following maintenance standards apply:

1. Municipalities shall, at a minimum, implement the programs required under the Water Quality Management Planning rules, N.J.A.C. 7:15;
2. Where septic systems exist at a density equal to or lower than the LUCM Zone target, and are not within a Wellhead Protection Area or Highlands Open Water Buffer area, proper O&M shall be encouraged through the annual provision of information to the landowner regarding O&M responsibilities;

For septic systems other than those in Step 2, proper operation shall be encouraged through annual information to the landowner regarding operation responsibilities, and maintenance shall be ensured through a regulatory system requiring proof of proper maintenance, including but not limited to septic system pump-out, methods to prevent solids and grease migration into the distribution system, and no evidence of chemical disposal that disrupts the biological treatment of wastes.

Dr. Van Abs said that some of the approaches are not currently in practice at the State level for example the small system approach for requiring co-permittees was struck down in court. He noted that the Highlands Council has the ability to implement new systems to be managed by someone who is competent as opposed to a homeowner's association.

Concerns were raised about cost to municipalities and homeowner's to replace systems. Ms. Swan responded that establishing funding with entities like NJEIT would help to manage costs. Also that routine maintenance before the problem arises saves money in the long term. Dr. Van Abs noted that trying to amortize these costs over time is important. Dr. Van Abs also commented that in alternative approaches to have a management contract to manage cradle to grave that this was an experimental part of the program. There was also discussion about upgrading septic systems at failure when a zone is identified as very polluted as well as model ordinances being developed.

Mr. Dillingham asked that in Objective 2.4.3.3.3. there be a public health threat added there as well in upgrading of Septic Systems to Address Pollution Threats. Dr. Van Abs noted that the concern ground water pollution if 100 septics on 1/3 acre lots is by definition a problem even if every one is working. The process is similar to the TMDL standards beginning with assessment. Ms. Letts asked that municipal government is not always well financed and that language be removed. It was agreed to do so.

Ms. Swan explained that the technical report addendum on the Management of Septic Systems and Other Decentralized Wastewater Treatment Facilities is a background and basis document for the matter just discussed and therefore not necessary for discussion at the meeting. Council agreed.

There was a break at 12:50pm and the meeting resumed at 1:15 pm.

Ms. Swan introduced the next topic: Vernal Pool Habitat Protection

Vernal Pool Habitat Protection

The Highlands Council received public comments expressing both support for and strong objections to the Draft Regional Master Plan (RMP) policy and mapping methodology of 1,000-foot buffers around NJDEP-confirmed vernal pools in the Highlands Region. The following addendum provides additional analysis of the appropriate resource protection area for these sensitive habitats.

Vernal pools are unique ecosystems that:

- Provide critical breeding habitat for a variety of amphibian and invertebrate species;
- Contribute significantly to local biodiversity by supporting plants, animals, and invertebrates that would otherwise not occur in the landscape; and
- Contribute significant amounts of food to adjacent habitats.

Protecting vernal pools and adjacent habitat are important for maintaining ecological integrity and providing amphibian and invertebrate breeding habitat (Semlitsch 1998, Gibbons 2003). For pool-breeding amphibian species, studies indicate amphibian species travel distances ranging from 400 to 4,000 feet from vernal pools to surrounding terrestrial habitat (Faccio 2003; Petranka 1998; Calhoun and deMaynadier, 2004).

Ms. Swan noted that there will be joint effort with DEP and Highlands Council to examine the buffer requirements if it were determined that the vernal pool was no longer being used for habitat. She also noted that Erin Lynam had done the research. Ms. Swan reviewed several visuals on vernal pools. Slides were shown with vernal pools in varying conditions from pristine pools to those that had buffers that were disturbed by development such as agriculture, residential and recreational. Discussion followed on the merits of considering modified buffers in each case.

Ms. Swan commented that the modification of the buffers using BMPs is one of the recommendations. There was a discussion of suitable habitat for these species reliant on vernal pools. Ms. Carluccio asked whether "new uses" was a Highlands development.. Mr.

Borden said that in the Preservation Area agricultural activities are not subject to the DEP rules. What activities are subject to this section will be clarified. Ms. Swan discussed the coordinated effort necessary in processing modified buffer applications with DEP.

Mr. Dillingham spoke in support of habitat restoration and of having an affirmative program to support that effort. Erin Lynam will be preparing a critical habitat program that will address some of these issues.

Modified buffer and best management practices should be clarified in the document pg. 8 - 2nd paragraph and that language will be added. Additional vernal pools can be nominated to DEP but must be certified by them. Ms. Swan noted that the existing DEP certified vernal pools have been mapped.

Mr. Schrier commented that the 1,000 foot buffer is not being reduced, but the area itself is being modified and his comment was confirmed by Ms. Swan. The actual diameter of the buffer would only change after a species analysis had been performed.

Septic Systems

Ms. Swan reviewed that the report on Septic densities is a draft document and that the numbers included in the Council's packets are examples the LANDS model is being completed and thus when zones are completed the septic numbers will change. She continued with the staff recommendation as follows:

Allowable septic system densities for new development should be tailored to each LUCM zone and recognize the legislative distinction between the Preservation and Planning Areas, and address issues such as lakes communities, brownfields and redevelopment sites where a combination of restoration and alternative treatment technology may be appropriate.

The nitrate target for the Conservation Zone in the Planning Area should recognize that existing nitrate concentrations are elevated in significant part by agricultural practices. There is an opportunity for water quality enhancement through more thorough implementation of agricultural best management practices (BMPs).

In the Conservation and Protection Zone, the RMP will provide septic system yields by zone in each HUC14 sub watershed; municipalities will be able to direct the appropriate locations for such development through the Plan Conformance process, within the constraints of other RMP policies.

The New Jersey Department of Environmental Protection's (NJDEP) Preservation Area rules at N.J.A.C. 7:38-1 et seq. for septic system density would be used within that area.

Within the Planning Area, the NJDEP nitrate dilution model should be used using 2002 drought ground water recharge for each HUC14 sub watershed. The Planning Area median is approximately 9.4 inches per year.

She noted that this approach is more conservative than DEP's approach.

Ms. Swan commented that the critical piece to be received on November 1st is the septic system yield by zone in the HUC 14s. She explained that at a meeting with Somerset County on Wastewater Planning the Highlands staff had been informed that DEP had given the county advice that preserved lands could be included in the analysis for carrying capacity and municipalities could make a choice as to whether or not they included these lands. Thus the Council staff would deliver the analysis to the Council with the results of both approaches. This would be for consideration at the November 1st meeting.

Ms. Swan continued with the following recommended nitrate targets:
Planned Community Zone – 2 mg/L (NJDEP proposed Statewide threshold
Conservation Zone – 1.88 mg/L
Protection Zone – 0.81 mg/L
Clustered Development – 10.0 mg/L). She also commented that this will not exceed the target for the zone.

Mr. Dillingham stated that he does not support allowing degradation of water supply, particularly in higher quality parts of the watershed in the Protection Zone.. Ms. Swan said that the calculations will be available November 1st and Dr. Van Abs clarified that the total yield for the HUC14 would be allocated according to the developable land in each municipality. DEP rules will apply in the Preservation Area and the Regional Master Plan allocation will apply in the Planning Area.

Ms. Carluccio raised additional issues with respect to the approach of the GSR32. She believes this methodology overestimates the water availability. Ms. Swan mentioned that the Council's consultant Demicco stated in a draft letter that was forwarded that this method has limitations, but further research is not currently available and agreed that this was the best method for now.

The median September based flows were discussed in the letter from Demicco by Ms. Carluccio. She asked that the staff compare the use of median September based flow and the drought flow for the impact of that indicator and that the drought flow early years be subtracted. Ms. Swan expressed concern at the consideration of a new approach as staff had invested much time into consideration and testing to find the best approach. Dr. Van Abs noted that time would not allow for that analysis to provide a different approach and that the loading number 10 lbs. per person based on 4 people per household is a conservative approach for usage as it is above the census. He also commented that the September base flows are not in use elsewhere in the State.

Ms. Carluccio spoke about other concerns regarding an additional factor for lawns that are not currently being used in the nitrate model. She asked for other sources of nitrate to be added to the model. She also raised the issue of monitoring of nitrates in wells for new development and a defined management plan that would feed that data back to the Council. She noted her concern about clusters and where they were placed in HUC14. Dr. Van Abs commented that a nitrate dilution model will not answer all questions, but configuration of development in the Goals, Policies and Objectives will address these issues. Ms. Letts spoke regarding clustering with respect to smart growth initiatives. Ms. Carluccio supports the previous staff recommendation not to include preserved lands in the model and to stick to developable lands.

Mr. Dillingham supported Ms. Carluccio's comments on nitrate dilution. Ms. Swan reviewed the issues of considerable study that have brought the issue before the Council. She noted that the science supports these methods and the inputs used that there is a basis and background for this approach. She commented that new ideas can be proposed, but if they have not been used, there will be additional time required to research and develop those. She believes that the model presented is conservative. Dr. Van Abs was asked to take one HUC14 and do the analysis and asked how the drought flow was calculated. He will report on the calculation.

Ms. Way left the meeting. Chairman Weingart announced the next Council Meeting would be held on November 1 at 4 pm and opened the floor to public comments

PUBLIC COMMENT

Robin O'Hearn Skylands Clean
She commented that the Lake Communities were not addressed and was concerned if the Lake Communities were in the planned community zone. She is concerned about the TDR receiving areas and thought they were supposed to be in the Planning Area only. She spoke against splitting the credits. She had other concerns about TDR. She also noted that she thought that TDR receiving zones should not be driving the plan. She asked that vigilance on sprinklers and swimming pools be added to the urban issues raised regarding waste of water.

Julia Somers, NJ Highlands Coalition
She will submit additional comments separately. She supported the exclusion of preservation lands for calculations for nitrate dilution. She recommended that the Council look at nitrate dilution on a zone basis or perhaps on a HUC 14 would be preferable. She also spoke to 10 mg/day for septic in clusters when clusters will be put next to existing sewer service. She believes agricultural use and 10 mg/day will worsen the nitrate problem. She believes that cluster development and sustainable agriculture are mixed together and should be addressed separately.

David Shope, Long Valley
He asked for the Demicco letter and he was advised it will be provided when the issue is finalized after November 1st. He commented on the lack of efficiency of the Elizabethtown Water and that its pipes be fixed according to a DEP permit that he examined. He raised issues about the additional 25% of the 125% and where is comes from. He does not support the HUC14 approach. He said that NJWSA sells 960 million gallons a day to golf courses in the summer. He commented about the practice in Scotland of no irrigation. Best Management Practices should include an economic calculation. He asked which references support the public health benefit of nitrate modeling and asked that it be provided to him. He also noted that having attended TDR meetings that he did not believe that the approach would be easy to deal with.

Monique Purcell, Department of Agriculture
She commended Jeff LeJava, the staff and Integra on the job that was done on the TDR analysis. She asked the Council to keep an open mind in making this program work. She

believes that the TDR program is critical and providing incentives instead of restrictions is an important point. Under the Designation of Receiving Zones, she wants the designation of a municipality to be voluntary.

Amy Hansen, New Jersey Conservation Foundation
She spoke in support of the work on TDR. She reviewed Agricultural Resources policies that were submitted for the record. She expressed concern about non agricultural cluster development being allowed on agricultural lands. She suggested that the TDR from Agricultural lands to receiving areas approved by the Council to ensure that the receiving areas not degrade natural resources. She also spoke in support of farmland preservation be used as well as housing for farm employees should be allowed in cluster development. She asked about the 5% impervious cover limitation and whether it was left out. She wants to encourage forest stewardship not agro forestry.

Scott Olson, Byram Township
He supported Ms. Carluccio's comments on not having Planned Community Zones and TDR receiving zones in Preservation Area. He advocated that private lake communities should also be subject to the same rules and regulations as public lakes. He is disappointed that there are only three zones. He also spoke about the widening of Rt. 206 and the exemption granted by DEP on the basis of safety and the concerns he had with that action.

Mr. Cogger left the meeting.

Helen Heinrich, New Jersey Farm Bureau
She asked about her comments to the TDR Committee. They will be distributed to the Council when the Chair Report is completed. She spoke to the issue of clustering as another way to provide opportunities for landowners. She also spoke to compensating landowners no matter how small or big their property is. She said that exemption is one way to provide compensation. She noted that leaving landowners out is not going to increase open space preservation, it will increase development. She will provide examples used in the Pinelands and elsewhere. She also spoke to the issue of forest landowners needing to have a vehicle to have easements purchased and does not believe that public access is an incentive. She noted that a landowner who does not qualify for farmland preservation and does not want government to acquire their land has no alternatives.

Dave Peifer, ANJEC
He commented that the sale and use of HDCs needs to be clarified. He also asked if the land is acquired in fee that should be addressed – as to whether the credits run with the land.
He also raised what the status is of a HDC with respect to a donation. He also commented that a monitoring and enforcement system should be addressed in the RMP and funding that system should be possible.

He spoke in favor of the restrictions being perpetual. He also noted in the designation of receiving zones that there be a definition of brownfields and a list of them. He also raised whether an HDC could be sold if the property is heavily mortgaged and in that case there would be a subordination agreement. He thanked the Council for the section on Karst.

In the Lakes Communities he asked why the Council chose a 10 acre size. He also noted that water efficiency on golf courses begins with the design of the course. He believes that we need an attitude adjustment on the player's part to be on a non-irrigated landscape. Ms. Letts asked about the issue raised of donation of credits. Mr. Peifer commented that perhaps the credits could be donated elsewhere such as a non-profit.

Wilma Frey, New Jersey Conservation Foundation
She spoke in support of Julia Somers' comments on nitrate dilution. She asked that the Council keep in mind that it is important to protect groundwater and surface water. She spoke against using water in deficit situations. She also spoke against the overall median of the zone and advocated for a more conservative approach. On the issue of Vernal pools, she noted that the chart of individual species be removed on page three. She advocated for a 1,000 foot buffer.

The meeting was adjourned at 2:50 pm.

CERTIFICATION

I hereby certify that the foregoing is a true copy of the minutes of the meeting of the Highlands Water Protection and Planning Council.

Dated: December 19, 2007

Paula M. Dees

Paula M. Dees, Executive Assistant

TRUE COPY

PUBLIC COMMENTS SUBMITTED

Part 3.
Agricultural Resources

Introduction

Agriculture and farmland, especially preserved farmland, is an important part of the essential character of the Highlands Region's culture, landscape, and economy. Farmland is also an important scenic resource in the region. It provides important economic benefits to the Highlands Region in the form of agricultural production and agri-tourism, provides food to area residents using less energy than would be required to import produce forom other regions and helps maintain the Highland's rural character. Residential development pressure has resulted in the loss of farmland and prime agricultural soils, as well as the erosion of the rural character in some parts of the Highlands. Preserving farmland in the Highlands is a top priority.

GOAL 3.1 PROTECTION AND ENHANCEMENT OF THE AGRICULTURAL RESOURCES OF THE HIGHLANDS REGION.

Policy 3.1.1. To create and maintain an inventory of agricultural lands which includes lands which are used for agricultural purposes or which contain soils which are highly suitable for agricultural use and to prioritize these lands for permanent preservation.

Policy 3.1.2. To maintain an inventory of farmland assessed lands in the Highlands Region.

Policy 3.1.3 Within the Agricultural Resource Area, to treat Prime, Statewide Importance, Unique, and Locally Important soils as Important Farmland Soils which are critical agricultural resources of the Highlands Region that should be permanently protected.

Objective 3.1.3.1 Implementation of regulations that prohibit non-agricultural development on agricultural soils so that critical soils are permanently protected in order to ensure the continued viability of Highlands agriculture and local food production.

Policy 3.1.4. To identify Important Farmland Soils as a critical factor in delineating Agricultural Resource Areas in the Highlands Region.

Policy 3.1.5. To promote farmland preservation within the Agricultural Resource Areas and accord priority to the preservation of agricultural lands within Agricultural Priority Areas, through less than fee acquisition, TDR, and other agricultural land conservation techniques.

Policy 3.1.6. To prohibit non-agricultural development on agricultural soils.

Objective 3.1.6.1 Implementation of regulations that prohibit non-agricultural development on farmland so that the essential character of the Highlands Region is permanently preserved.

Policy 3.1.67. To ensure land uses within an Agricultural Resource Area are compatible with and support sustainable agriculture ~~or are compatible with cluster development~~.

Objective 3.1.67.1. Implementation of regulations which limit non-agricultural uses within an Agricultural Resource Area to those uses that support the preservation of farmland and the continued viability of the agricultural industry ~~or are compatible with cluster development~~.

Policy 3.1.78. To permit human development, ~~including~~ for family and farm worker housing in Agricultural Resource Areas which are accessory to and/or supportive of sustainable agriculture, subject to compliance with the resource management programs of the Highlands Regional Master Plan.

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Objective 3.1.78.1. Implementation of regulations which allow for construction of ancillary structures and housing for family and farm workers that are necessary to support farm operations, upon a demonstration that the proposed development is consistent with the resource protection goals of the Plan.

Policy 3.1.9. To establish and implement resource management programs which protect agricultural resources during site plan or subdivision review and approval for construction of ancillary structures and housing for family and farm workers that are necessary to support farm operations.

Objective 3.1.9.1. Implementation of regulations which ensure farm family and agricultural labor land development within an Agricultural Resource Area is compatible with the protection and enhancement of agricultural production, protection of important farmland soils, or other natural resource management and protection requirements.

Objective 3.1.9.2. Implementation of regulations which provide that all farm family and agricultural labor development which is proposed in an Agricultural Resource Area comply with open space design requirements to avoid conflicts between such development and agricultural activities and protect farmland and sensitive environmental resources.

Objective 3.1.9.3. Implementation of regulations which require mandatory clustering for farm family and agricultural labor development in an Agricultural Resource Area such that at least 80% of the parcel proposed for farm family and agricultural labor development is preserved as farmland or natural resource area.

Objective 3.1.9.4. Implementation of regulations which require that all land preserved as farmland or natural resource area as a result of clustering be subject to a conservation easement enforceable by the appropriate municipality and the Highlands Council.

Policy 3.1.10. To preserve farmland by designating it as a Sending Area in the Transfer of Development Rights Program (TDR).

Objective 3.1.10.1. Implementation of TDR that allows farmland to be designated as Sending Areas while those areas that have existing infrastructure and sewer and are deemed appropriate for development by the NJ Highlands Council will be designated as Receiving Areas.

Policy 3.1.811. To encourage the use of ~~agro-forestry best management~~ forest stewardship practices and techniques on cultivated farmland located within the Agricultural Resource Area and the Forest Resource Area.

Objective 3.1.811.1. Implementation of ~~agro-forestry best management~~forest stewardship practices for cultivated
farmland in Agricultural Resource Areas and Forest Resource Area.

Policy 3.1.9-12 To implement programs which encourage owners and operators of farmland with
woodlots within Agricultural Resource Areas to prepare and implement approved Forest Management ~~-Stewardship~~ Plans that conform to the resource protection standards of this Plan.

Objective 3.1.912.1. Coordinate with the State Forester and conservationists to provide guidance for the development of Forest Management Stewardship Plans that improve maintenance of ecosystem and water resource values of the Highlands Region.

~~Policy 3.1.10. To establish and implement resource management programs which protect agricultural resources during site plan or subdivision review and approval.~~

~~Objective 3.1.10.1. Implementation of regulations which ensure non-agricultural land development within an Agricultural Resource Area is compatible with the protection and enhancement of agricultural production, protection of important farmland soils, or other natural resource management and protection requirements.~~

~~Objective 3.1.10.2. Implementation of regulations which provide that all non-agricultural development which is proposed in an Agricultural Resource Area comply with open space design requirements to avoid conflicts between such development and agricultural activities and protect farmland and sensitive environmental resources.~~

~~Objective 3.1.10.3. Implementation of regulations which require mandatory clustering for residential development in a Agricultural Resource Area such that at least 80% of the parcel proposed for residential development is preserved as farmland or natural resource area.~~

~~Objective 3.1.10.4. Implementation of regulations which require that all land preserved as farmland or natural resource area as a result of clustering be subject to a conservation easement enforceable by the appropriate municipality and the Highlands Council.~~

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Policy 3.1.4~~13~~. To require agricultural ~~activities~~ operations which ~~involve~~ incur agricultural impervious surfaces of greater than 3% but less than 9%, to prepare and obtain approval for a Farm Conservation Plan from the USDA Natural Resource Conservation Service.

Policy 3.1.4~~214~~. To require agricultural activities which involve agricultural impervious surfaces of 9% or greater to prepare and obtain approval of a Resource Management System Plan from the USDA Natural Resource Conservation Service in the Planning Area.

Policy 3.1.15. To establish an incentive program for any landowner in the Highlands Region seeking to preserve land under the farmland preservation program who would agree to permanently restrict the amount of impervious coverage, including agricultural impervious surfaces, to a maximum of five percent of the farm's total land area, as called for by the Highlands Act.

Policy 3.1.~~13~~16. To advocate for the amendment of the Farmland Assessment Act to permit the inclusion of credits for the control of invasive species, white-tailed deer reduction programs, and the water value of a well-managed agricultural lands.

GOAL 3.2. PROTECTION AND ENHANCEMENT OF AGRICULTURAL VIABILITY WITHIN THE HIGHLANDS REGION.

Policy 3.2.1. To encourage private and public owners of lands within an Agricultural Resource Area in the Conservation Zones to lease open lands to farmers and/or to manage open space lands in a manner which is compatible with adjoining agricultural uses.

Policy 3.2.2. To promote research and study, and support proposals to enhance the long-term viability of the agriculture industry in the Highlands Region through innovative programs with regard to health care, banking practices, housing, and labor.

Policy 3.2.3. To support proposals to enhance the long-term viability of the agriculture industry in the Highlands Region through innovative programs with regard to sustainable and organic agriculture.

Policy 3.2.~~3~~4. To seek additional funding from any and all state and federal funding programs for agriculture within the Highlands Region.

Policy 3.2.~~4~~5. To coordinate with other municipal, County, state, and federal agencies to ensure to the maximum extent practicable that other agency programs are coordinated with the resource protection requirements of the Highlands Regional Master Plan.

Policy 3.2.5~~.6~~ 6 To promote and enhance innovative agricultural practices including direct marketing, farmers markets, community commercial kitchens for value-added products, road side stands, agro-tourism and community supported agriculture.

GOAL 3.3. LIMITATION OF CONSTRUCTION OF NON-AGRICULTURAL DEVELOPMENT-INDUCING WATER AND WASTEWATER INFRASTRUCTURE IN AGRICULTURAL RESOURCE AREAS.

Policy 3.3.1. To prohibit the development of additional water and wastewater infrastructure in a Agricultural Resource Area within the Protection Zone and the Preservation Area, except where such additional infrastructure is necessary to address an existing public health concern, a redevelopment waiver, or to provide for minimum practical use in the absence of any alternative through issuance of a waiver by NJDEP.

Policy 3.3.2. To prohibit the development of additional water and wastewater infrastructure in a Agricultural Resource Area in a Conservation Zone, except where such additional

infrastructure is necessary to address the needs of an existing public health concern, mandatory clustering, or open space design development for family and farm labor housing or limited agricultural infrastructure, assubject to approved approval by the Highlands Council.

GOAL 3.4. PROTECTION AND ENHANCEMENT OF SURFACE AND GROUND WATER QUALITY IN AGRICULTURAL RESOURCE AREAS.

Policy 3.4.1. To promote the use of appropriate alternative and innovative wastewater treatment systems to provide enhanced protection of surface and ground water quality in the Conservation Zone.

Policy 3.4.2. To promote efforts to increase Integrated Pest Management and Integrated Crop Management programs and other innovative management techniques that reduce pesticide and fertilizer use in conjunction with agricultural activities.

Policy 3.4.3. To identify subwatersheds with elevated nitrate levels, develop management plans for enhancing water quality, and implementing those plans in ways that enhance agricultural viability wherever feasible.

GOAL 3.5. CONFORMING MUNICIPALITIES AND COUNTIES INCLUDE FARMLAND PRESERVATION PLAN ELEMENTS IN THEIR MASTER PLANS AND DEVELOPMENT REGULATIONS.

Policy 3.5.1. To prepare technical guidelines for the preparation of a Farmland Preservation Plan Element for inclusion municipal and county master plans and development regulations.

Policy 3.5.2. To require conforming municipalities and counties to include a Farmland Preservation Plan Element in municipal and county master plans and development regulations.

Policy 3.5.3. To require conforming municipalities and counties to incorporate Right to Farm provisions in their master plans and development regulations.

Notes: 3.1.6. Cluster development does not enhance agricultural resources-should be deleted from this section.

Objective 3.1.7.1. Cluster development is not an agricultural use, nor does it protect the essential character of the Highlands as mandated by the Act-should be deleted.

* * * *

Amy Hansen
Oct 18, 2007
Council Meeting
5 5 PAGES

CHAPTER IV
GOALS, POLICIES, AND OBJECTIVES

PART 1.
NATURAL RESOURCES

Subpart 6
Carbonate Rock (Karst) Topography

Version: 17 October 2007

Introduction

Karst is a type of land surface, or topography, that is formed at the surface of carbonate rock formations (such as limestone and dolomite) when water dissolves the rock over time. This process causes surface depressions and the development of such features as sinkholes, sinking streams, enlarged bedrock fractures, caves, and underground streams. Sinking streams range in size from intermittent streams to perennial rivers. They may sink through a segment of the stream bed or through a discrete opening such as a fracture or cave entrance, and then reappear further downstream. Sinkholes function as funnels, directing surface water runoff into karst aquifers with little or no attenuation of any transported contaminants. Stormwater basins, septic system leaching fields and sewers may also contribute contaminants directly to ground water through karst features. Soils in sinkhole bottoms may be thin or non-existent. In addition to ground water concerns, communities in karst areas must contend with safety concerns as sinkholes can have damaging effects to large manmade objects. The Highlands Region has several large areas with carbonate rock formations, usually valleys such as the Musconetcong, South Branch Raritan and Lamington, and karst features exist in some – but not all – of these areas.

GOAL 1.6.1 PROTECTION OF GROUND WATER QUALITY AND PUBLIC SAFETY REGARDING KARST FEATURES IN THE HIGHLANDS

Policy 1.6.1.1 To map areas of the Highlands Region that are underlain by carbonate rocks to define a Carbonate Rock Area.

Policy 1.6.1.2 To identify and delineate land areas that drain surface water into the Carbonate Rock Area, as changes in the quantity, quality and rate of discharge of surface water runoff from upslope lands can impair ground water resources in the Carbonate Rock Area.

Policy 1.6.1.3 To establish and maintain an inventory of karst features in the Highlands Region.

Policy 1.6.1.4 To ensure that municipalities in, or draining to, the Carbonate Rock Area protect public health and safety and the quality of ground waters from inappropriate land uses and pollutant discharges.

Objective 1.6.1.4.1 *Identification of critical requirements for development ordinances to be adopted by municipalities, with technical guidance.*

Objective 1.6.1.4.2 *Applications for site plan or subdivision approval will include a multi-phased geotechnical site investigation (e.g., test borings, test pits, etc.) to locate any potential karst features and potential hazards to public health and safety, structures and ground water quality.*

Objective 1.6.1.4.3 *Municipal and Highlands Council development reviews and requirements shall ensure that all potential hazards to public health and safety, structures and ground water quality are fully addressed and mitigated in the construction plans and subsequent approval process, with the maximum emphasis on nonstructural measures, including, but not limited to, avoidance of modifications to the karst features.*

Objective 1.6.1.4.4 *Public works projects, including but not limited to water supply, sewerage, stormwater and transportation facilities, shall be constructed and maintained such that the potential for damage from karst features and the contamination of ground water are avoided.*

Subpart 7
Lake Management

Introduction

The management of lands surrounding lakes is an important issue for the Highlands Region. Overdeveloped, damaged and poorly managed shoreland areas can result in the degradation of water quality, harm to the lake ecosystem, a decrease of natural aesthetic values, and an overall loss of property values for lake communities. Lakes can be harmed by pollutant sources in the watershed area draining to them. Polluted lakes can, in turn, damage downstream streams and rivers. Most existing lake communities are fully built out, predate modern environmental protection requirements, and have limited potential for major land use changes. Some have sewer systems, but many rely on septic systems (or even cesspools) on inadequately sized lots, where direct contamination of the lakes is possible. Past NJDEP studies indicate that nearly every public lake (privately-owned lakes were not evaluated) is experiencing unacceptable contamination, often including excessive bacteria and nutrients. In addition, many lake communities have been evolving from summer communities to year-round communities, and many are experiencing greatly intensified land uses as the original buildings are torn down and replaced by much larger structures. Addressing land uses within lake communities allows for potential opportunities to improve community value, to both protect natural resources and to enhance and restore the quality of lake environments in the Region, and in some cases to allow for in-fill development where appropriate.

GOAL 1.7.1 PROTECTION OF HIGHLANDS REGION LAKES FROM THE IMPACTS OF PRESENT AND FUTURE DEVELOPMENT

Policy 1.7.1.1 To establish tiers of lake management appropriate to management strategies that help protect lake water quality and community value from the impacts of present and future development.

Objective 1.7.1.1.1 *Lake management programs shall use the following management tiers around Highlands Region lakes of greater than 10 acres in size:*

- *A shoreland protection tier consisting of an area measured 300-foot perpendicular from the shoreline of the lake;*
- *A water quality management tier consisting of an area measured 1,000-foot perpendicular from the shoreline of the lake, but outside of the shoreland protection tier;*
- *A scenic resources tier consisting of an area measured 300 to 1000-foot perpendicular from the shoreline of the lake, scaled based upon the view distance from the opposite shoreline, and determined through the size and layout of the lake,*

with wider portions of lakes having longer view distances;

- *A lake watershed tier, consisting of the entire land area draining to the lake, through the evaluation of drainage areas using LiDAR topographic analyses or other topographic data where LiDAR data are not available.*

Policy 1.7.1.2. To establish management strategies to help protect lake water quality and ecosystem values from the impacts of present and future development.

Objective 1.7.1.2.1. *Implementation of standards regarding lake ecosystem and water quality in the shoreland protection tier to address direct and proximate impacts upon the lake, including but not limited to **s**horeline modification and development (including limits to the hardscaping of shorelines using bulkheads, rip-rap and walls), docks, piers, boathouses, dredging, vegetation removal, and increased **i**mpervious cover. Pollutant discharges shall also be addressed, **i**ncluding the potential for contamination from septic systems, cesspools and other wastewater management systems within the tier **t**hat are failing or are inadequately designed and constructed. As **s**uch systems fail, landowners should be required to provide upgraded treatment to minimize pollutant movement to the lake.*

Objective 1.7.1.2.2. *Implementation of standards regarding land use compatibility and water quality in the water quality management tier, to prevent or minimize continuous pollutant sources that can contribute pollutants overland or through ground water to the lake from greater distances than the shoreland protection tier.*

Objective 1.7.1.2.3 ***I****mplementation of standards regarding the protection of visual and **s**cenic resources in the scenic resources tier, including but limited to **r**equirements for vegetative screening of buildings, building height **l**imitations, and limits on tree and understory removal for reasons other than public health and safety or as the minimum necessary to make reasonable use of the designated building envelope for the parcel proposed for development.*

Objective 1.7.1.2.4 *Implementation of lake restoration plans to restore, protect and, where possible, enhance lake water quality through management of pollutant sources in the lake watershed tier, including but not limited to the development, adoption and implementation of TMDLs by NJDEP pursuant to the Water Quality Management Planning Rules, N.J.A.C. 7:15.*

Policy 1.7.1.3. To require that conforming municipalities adopt and implement the standards applicable to the shoreland protection, water quality management and scenic resources tiers for application to lakes with public recreational access or ownership (i.e., with shorelines that are not entirely privately-held and managed through a lake association).

Policy 1.7.1.4 To require that conforming municipalities develop and adopt lake restoration plans, with sufficient input from lake community residents and landowners, for each of the municipality's developed lakes with public recreational access or ownership, to include watershed delineation, description of point and nonpoint sources of pollution in the watershed, lake monitoring schedules, existing and proposed in-lake management techniques, and recommended watershed best management practices. TMDLs adopted by the NJDEP to address known pollution problems may be used as lake restoration plans.

Objective 1.7.1.4.1 *Provide Lake Management Plan guidance to municipalities that includes watershed delineation mapping methodology, point and nonpoint source pollution references, example lake monitoring schedule with monitoring goals and methods, existing successful in-lake management techniques, and best management practices. Provide conformance grant funding as necessary to develop plans.*

Objective 1.7.1.4.2 *Replace septic systems and cesspools on small lots in close proximity to lakes with upgraded individual treatment systems, communal septic systems or community-based wastewater systems wherever feasible and cost-effective. Community-based systems should not provide for additional land development capacity except for exempt lots within that existing lake community that are not environmentally constrained, or for lots in a Planned Community Zone that are not environmentally constrained and are contiguous to the existing lake community.*

GOAL 1.7.2 PROTECT THE UNIQUE CHARACTER OF HIGHLANDS LAKE COMMUNITIES

Policy 1..7.2.1 To provide guidance regarding evaluation of and standards for lake character and aesthetics that shall be adopted by municipal ordinance for application to publicly-owned lake communities, or that may be voluntarily adopted by privately-owned lake communities within their by-laws and regulations.

Policy 1.7.2.2 To encourage increased public access to publicly-owned lakes, within the lake's carrying capacity and while maintaining the lake character.

Policy 1.7.2.3 To discourage or control teardowns that result in altered lake community character, and to encourage community-supported limitations in lot coverage and building height for new construction.

Policy 1.7.2.4 To establish and implement performance and development standards for shoreline uses which achieve compatibility among shoreline activities and nearby neighborhoods.

Policy 1.7.2.5 To encourage municipalities to utilize recreational sites as opportunities to educate the public to the ecological value of lake environs.

Policy 1.7.2.6 To encourage municipalities to explore appropriate means to provide public recreation at the shoreline and on the water while ensuring retention of opportunities for passive recreation (e.g., natural areas, open space).

GOAL 1.7.3 MAINTAIN PUBLIC AND PRIVATE LAKES, OR RESTORE LAKE BEDS AND DOWNSTREAM AREAS WHEN LAKES ARE DRAINED

Policy 1.7.3.1 To develop innovative financing and administrative mechanisms for the maintenance and operation of public and private dams and lakes, where those dams and lakes provide a continuing public or private purpose.

Policy 1.7.3.2 To restore appropriate habitats in the lake beds and to prevent, mitigate or restore downstream habitats from damages due to lake drainage, when dams are allowed to fail or are deliberately breached or removed.

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DRAFT – FOR CONSIDERATION AT THE OCTOBER 18, 2007 MEETING OF THE HIGHLANDS COUNCIL

RMP Program: Highlands Development Credits

Version: October 17, 2007

Issue Overview	The Highlands Development Credit ("HDC") Program is a regional transfer of development rights program to further the goals of the Highlands Regional Master Plan.
RMP Policies and Objectives Addressed	Part 7, Landowner Fairness -- Goals 7.1-7.7. Highlands Act, Section 13, N.J.S.A. 13:20-13
Program Summary	The HDC Program guides new growth and development away from lands with little or no capacity to accommodate human development without adversely affecting the integrity of the Highlands ecosystem. This program establishes procedures and standards by which eligible property owners may apply for an allocation of HDCs. The program provides for the designation of receiving zones where HDCs may be transferred and used for development purposes. The program also creates a Highlands Development Credit Bank to serve as the administrator of the Highlands Development Credit program.
Component	**Program Description**
Highlands Development Credit Created.	The Highlands RMP creates a right in the form of a Highland Development Credit ("HDC") which can be used to increase the density or intensity of development in a designated Receiving Zone.
Highlands Development Credit Bank Created.	1. The Highlands RMP provides for the creation of a Highlands Development Credit Bank. 2. The Highlands Development Credit Bank is to serve as a regional clearinghouse for information with regard to the Highlands Development Credit program. 3. The Highlands Development Credit Bank is to serve as the administrator and official recording agency for the Highlands Development Credit program. 4. The Highlands Development Credit Bank is authorized to buy and sell HDCs.
Allocation of Highlands Development	1. The owners of land in the Protection Zone and the Conservation Zone in the Preservation Area, which was zoned for residential use on August 9, 2004 and which satisfy one (1) of the following criteria, are eligible to

Credits.	apply for an allocation of HDCs: - the parcel of land has an area of at least five (5) acres; or the area of the parcel of land is at least three (3) times the minimum lot size in effect on August 9, 2004; - the owner voluntarily chooses not to develop the parcel of land pursuant to one or more of the exemptions under section 28 of the Act; or - the owner demonstrates unique and extenuating financial circumstances such as imminent bankruptcy, extraordinary medical expenses, or loss of job and inability to secure new job within 6 months, which may only be ameliorated through an expedient sale of his Highlands Development Credits. 2. The owners of land in the Protection Zone and the Conservation Zone in the Preservation Area, which was zoned for non-residential uses on August 9, 2004, are eligible to apply for an allocation of HDCs. 3. The owners of eligible parcels of land may apply to the Highlands Council for an allocation of HDCs by submitting an application for an HDC Allocation Determination to the Highlands Council together with the information required for the Council to make an allocation of HDCs. 4. HDCs shall be allocated to individual parcels of land on the basis of the following formula: $(C_B-E_R) \times K_{MA} \times K_{E-U} = \#$ HDCs $\mathbf{C_B}$ = Base Credit – the residential units or residential unit equivalents that could have been developed on the parcel of land on August 9, 2004, taking into consideration all municipal development regulations and applicable state and federal laws and regulations. $\mathbf{E_R}$ = Reserved Exemptions – the number of exemptions reserved by the owner for development of the parcel of land. $\mathbf{K_{MA}}$ = Market Adjustment Factor – an adjustment factor to recognize that per unit value of land varies by location within the Highlands Region. $\mathbf{K_{E-U}}$ = End Use Factor – an adjustment factor to recognize that the value of the land varies according to the end use to which the property can be developed. 5. In the event that a property owner voluntarily chooses not to develop a residentially zoned parcel of land pursuant to one or more exemptions under section 28 of the Act, the Base Credit Number shall be increased as follows: ➢ High Value Conservation or Agricultural Priority Area - 4 bonus credits ➢ Moderate Value Conservation or Agricultural Priority Area - 2 bonus credits ➢ Low Value Conservation or Agricultural Priority Area - 1

	bonus credit. 6. As soon as practicable after the Highlands Council receives a complete Application for an HDC Allocation Determination, the Council will issue a HDC Allocation Letter setting forth the number of HDCs allocated to the parcel of land. 7. An HDC Allocation Letter shall include a specific restriction on the future use of the parcel of land to which HDCs are allocated. 8. If the owner of land disputes the number of HDCs allocated to his or her property, the owner may seek reconsideration by the Highlands Council only on the grounds of specific factual errors. 9. Lands within the Protection Zone and the Conservation Zone within the Planning Area may be made eligible for allocations of HDCs if approved by the Highlands Council through the municipal Plan Conformance process.
Highlands Development Credit Certificates	1. No HDC may be sold, transferred or encumbered until the property owner has obtained a HDC Certificate from the Highlands Development Credit Bank. 2. The Highlands Development Credit Bank will not issue a HDC Certificate until a conservation easement restricting the future use of the parcel of land to which HDCs have been allocated by the Highlands Council has been recorded on the chain of title to the parcel to which the HDCs were allocated. 3. The conservation easement shall restrict the future use of the parcel of land in accordance with the provisions of the Highlands Council's HDC Allocation Letter and shall be enforceable by the municipality in which the parcel of land is located, the New Jersey Department of Environmental Protection, the Highlands Council, and an appropriate non-profit corporation, if applicable.
Sale and Use of HDCs	1. Prior to the sale, transfer or conveyance of HDCs, the holder of an HDC Certificate shall apply to the Highlands Development Credit Bank for the re-issuance of a HDC Certificate in the name of the grantee. 2. An application for re-issuance of an HDC Certificate in conjunction with a sale, transfer or conveyance of HDCs shall include the name(s) of the grantee(s), the name(s) of the grantor(s), the number of HDCs to be sold, transferred or conveyed, the date of the proposed closing of the transaction, written documentation of the interest sold, transferred or conveyed and the consideration for the sale, transfer or conveyance. 3. Prior to the encumbrance of HDCs as collateral or other security, the holder of the HDC Certificate shall notify the Executive Director of the Highlands Development Credit Bank of the name and address of the lender and the date, amount and term of the loan or obligation. 4. In the event a government agency or non-profit or for-profit organization proposes to acquire conservation or agricultural easements which restrict the future use of land in the Protection Zone or the Conservation Zone in

	the Preservation Area and the agency requests a HDC Certificate from the Highlands Development Credit Bank, the Executive Director shall procure an HDC Allocation Letter from the Highlands Council and issue a HDC Certificate to the agency or organization when the easement(s) are recorded. 5. When HDCs are used in conjunction with a development project, the holder of the HDC Certificate shall, within ten (10) days of municipal development approval, notify the Highlands Development Credit Bank of the use of the HDCs and apply for a Certificate of Redemption. 6. An application for redemption of a HDC shall include the name of the holder of the HDC Certificate, the name of the developer who used the HDCs, the municipality where the development using HDCs is located, the legal description of the parcel of land on which the HDCs were used and the date of the municipal approval of the development. 7. In the event that only a portion of the HDCs which are authorized in a HDC Certificate are redeemed, the Highlands Development Credit Bank shall issue a new HDC Certificate for the HDCs which were not used.
Designation of Receiving Zones	1. Parcels of lands in the Planned Community Zone which are appropriate for infill development or redevelopment may be designated as Receiving Zones through municipal plan conformance. 2. Parcels of lands in the Conservation Zone may also be designated as a Receiving Zone upon approval of the Highlands Council, provided that such a receiving zone is consistent with the Highlands RMP, the development is compatible with agriculture, and low impact development techniques will be utilized, including clustering. 3. Municipalities may, through the municipal Plan Conformance process, establish Receiving Zones in the Planned Community Zone which are restricted to transfer and use of HDCs which are allocated to parcels of land located within the municipality and/or county where the Receiving Zone is located through municipal plan conformance. 4. Municipalities may establish brownfields as Receiving Zones through municipal Plan Conformance, provided that the Highlands Council determines that such brownfields can be developed without adversely affecting the Highlands Ecosystem. 5. Municipalities within the Planning Area, which do not petition the Highlands Council for a determination of conformance, may establish Receiving Zones for the use of HDCs for areas which are in the Planned Community Zone or Conservation Zone upon approval of the Highlands Council. 6. Lands which are located within Highlands Counties, but not within the boundaries of the Highlands Region, may be designated as Receiving Zones for the use of Highlands Development Credits upon approval of the Highlands Council.

DRAFT – FOR CONSIDERATION AT THE OCTOBER 18, 2007
MEETING OF THE HIGHLANDS COUNCIL

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RMP Program: The Efficient Use of Water

Version: 17 October 2007

Issue Overview	Water is a driving force behind many of the goals and policies of the Highlands Act, and protection of water supplies is a critical focus of the Regional Master Plan. Many Highlands Region subwatersheds presently face shortages of water, as current demands exceed estimated water availability for human and ecological purposes and therefore stresses aquatic ecosystems and puts human needs in jeopardy during droughts. In addition, municipalities served by Highlands reservoirs and some Highlands municipalities face future constraints on their ability to serve customers as water demands increase through redevelopment and development. Therefore, it is important that New Jersey obtain the maximum benefit from its Highlands water resources through efficient use and, where feasible and appropriate, beneficial reuse and recycling of water. Water use efficiency has been increasing over the last 20 years, as State and Federal requirements for water conserving plumbing fixtures, appliances and irrigation systems affect a greater proportion of total development. Farmers are also becoming more efficient in water use, moving to drip irrigation and other conserving systems instead of high-pressure broadcast spray systems. However, both the public utility customer base and irrigated farm acreage are increasing, creating more demands that offset improved water use efficiency. For this reason, while some urban areas have seen declining water sales over time (due to both water conservation and the loss of water-intensive industries), other municipalities have seen significant increases in total water use. Further progress in water use efficiency is needed. Many RMP policies and objectives address this need by encouraging general efficiency in water use, providing higher priority to agricultural water uses that employ best management practices, and calling for the use of water conservation, recycling and reuse (among other techniques) to both reduce and eliminate current and future water deficits.

RMP Policies and Objectives Addressed	**Policy 2.1.2.4.** To require the development and implementation of Water Management Plans to address any Current Deficit Areas or subwatershed that could become deficit areas based on projected development and water uses, to ensure sustainable water supply, water resource, and ecological value. ***Objective 2.1.2.4.1.*** *Water Management Plans shall include provisions to reduce consumptive and depletive uses of ground and surface waters as necessary to reduce or prevent deficits in Net Water Availability; or to ensure continued stream flows to downstream Current Deficit Areas from Existing Constrained Areas, to the extent practicable within each zone.* ***Objective 2.1.2.4.1.*** *Proposed increases in water use, including consumptive or depletive water uses, within a Current Deficit Area or Existing Constrained Area shall provide mitigation equal to 125% of the proposed new consumptive or depletive water uses within the same HUC14 subwatershed through: a permanent reduction of existing consumptive and depletive water uses; ground water recharge in excess of the requirements of N.J.A.C. 7:8 (Stormwater Management Rules); or other permanent means.* ***Objective 2.1.2.4.2*** *All water users within a Current Deficit Area or Existing Constrained Area shall seek funding and opportunities to prevent exacerbation of and help reduce or eliminate existing deficits to ensure sustainable water supply, water resource and ecological values, emphasizing techniques including, but not limited to water reuse, recycling and conservation.* **Policy 2.1.2.5** To conditionally provide water availability within Current Deficit Area. ***Objective 2.1.2.5.1.*** *Within a Current Deficit Area, a Planned Community Zone shall be assigned a Conditional Net Water Availability of 2 percent of Ground Water Capacity, based on the Low Flow Margin Method, conditioned upon prior implementation or commitment for implementation of the 125% mitigation requirement in Objective 2.1.2.4.1.* ***Objective 2.1.2.5.2.*** *Within a Current Deficit Area, a Protection or Conservation Zone shall be assigned a Conditional Net Water Availability of 1 percent of Ground Water Capacity, based on the Low Flow Margin Method, conditioned upon prior implementation or commitment for implementation of the 125% mitigation requirement in Objective 2.1.2.4.1.* **Policy 2.1.2.6.** To require use of water conservation, recycling, and reuse methods (where appropriate) and devices for any redevelopment or development activity, including renovations to existing residential, institutional, commercial or industrial buildings, to minimize consumptive water use tailored to meet the resource protection and other goals for each zone and considering subwatershed-specific conditions and Net Water Availability status. ***Objective 2.1.2.8.2.*** *Prevent net increases in consumptive and depletive water uses in Current Water Deficit Areas to prevent exacerbation of and help reduce or eliminate the deficit to ensure sustainable water supply, water resource and ecological values, emphasizing techniques including, but not limited to water reuse, recycling and conservation.* ***Objective 2.1.2.8.3.*** *Limit consumptive and depletive water uses in Existing Constrained Areas to 5 percent of the Ground Water Capacity to ensure continued stream flows to downstream Current Deficit Areas, emphasizing techniques including, but not limited to water reuse, recycling and conservation.* ***Objective 2.1.2.9.3.*** *Prevent net increases in consumptive and depletive water uses in Current Water Deficit Areas to prevent exacerbation of and help reduce or eliminate the deficit to ensure sustainable water supply, water resource and ecological values, emphasizing techniques including, but not limited to water reuse, recycling and conservation.* ***Objective 2.1.2.9.4.*** *Limit consumptive and depletive water uses in Existing Constrained Areas to the 2003 consumptive and depletive water use plus 5 percent of the Ground Water Capacity (up to the standard thresholds in Objective 2.2.9.1) to ensure continued stream flows to downstream Current Deficit Areas, emphasizing techniques including, but not limited to, water reuse, recycling and conservation.*

	Objective 2.1.2.9.5. *Give highest priority for the use of Net Water Availability for agricultural and related water uses to those using best management practices for irrigation and other activities, and to Specially Planned Areas or TDR Receiving Areas.* ***Objective 2.1.2.10.3.*** *Prevent net increases in consumptive and depletive water uses in Current Water Deficit Areas to prevent exacerbation of and help reduce or eliminate the deficit, emphasizing techniques including, but not limited to, water reuse, recycling and conservation.* ***Objective 2.1.2.10.4.*** *Limit consumptive and depletive water uses in Existing Constrained Areas to the 2003 consumptive and depletive water use plus 5 percent of the Ground Water Capacity (up to the standard thresholds in Objective 2.2.10.1) to ensure continued stream flows to downstream Current Deficit Areas, emphasizing techniques including, but not limited to, water reuse, recycling and conservation.* ***Objective 2.1.2.10.6.*** *Establish and implement best management practices for recreational, landscape irrigation and other practices through applicable State and federal programs.* ***Objective 2.4.2.8.1.*** *Require maximized feasible water conservation and recycling or any redevelopment or development activity, including renovations to existing single family residences and commercial/industrial buildings.*
Program Summary	Water use efficiency has three basic components. First, water should be used efficiently regardless of water availability. This conservation principle, equivalent to a "good housekeeping" concept, prevents wasteful use of water even when water is plentiful, so that environmental impacts are minimized, infrastructure capacity is not strained, and the water uses do not result in a false sense that new supplies are needed. Second, water should be used even more efficiently to reduce existing water deficits in subwatersheds and watersheds. These deficits indicate stresses on the aquatic ecosystems, and often will indicate stresses on ground water yields and downstream water supply facilities and threats to human use during droughts. Third, water use efficiency should also be enhanced to avoid the need for additional water infrastructure. Delaying the need for new water supply facilities is highly cost-effective; water conservation measures generally cost significantly less per million gallons than new reservoirs, treatment facilities or water mains. There is a fourth component that this program does not address, regarding conservation during drought emergencies; NJDEP already addresses this component fully. Water use efficiency can be achieve in many ways, including: • Supply-side conservation, such as leak detection and control and improved management of water storage facilities; • Demand-side conservation, such as improved plumbing fixtures, appliance selection, irrigation controls, modified landscaping that reduces water needs, and use of car washes instead of hand washing; • Beneficial reuse of water, either within a building structure or in a larger setting, where wastewater is treated and then reused on-site; and • Recycling of water, such as the use of stormwater for irrigation purposes, where no special treatment of the water is required.
Analysis of Water Use Efficiency for Public Water Supplies	**Program Description** Analyzing the efficiency of water use for public water supplies, for all systems using Highlands water resources both within and outside the Highlands Region, requires an understanding of the customer base, affected land uses, leakage and water loss potential, and other factors. Efficient use rates for suburban areas (in gallons per capita per day, or **gpcd**) will be different from the rates for urban areas.

	The Highlands Council will collaborate with NJDEP to determine existing water use rates for all public water systems using Highlands water, categorize the systems for comparison purposes, and assess the relative efficiency of water uses among common classes of public water systems.
Analysis of Water Use Efficiency for Agriculture and Irrigation	**Program Description** The efficiency of water use by agriculture and other forms of self-supplied irrigation must be assessed based on the type of water need, irrigation practices, weather impacts, etc. The Highlands Council will collaborate with NJDEP and the NJ Department of Agriculture to determine existing water use rates for all agricultural and other self-supplied irrigation uses using Highlands water, categorize the uses for comparison purposes, and assess the relative efficiency of water uses among common classes of purposes. As these water users will be highly affected by weather, the assessment must include an analysis of how uses vary by season, year and climate conditions.
Identification of Water Use Efficiency Metrics and Targets	**Program Description** The creation of programs and standards for efficient water use requires an identification of appropriate metrics and targets. The Highlands Council will collaborate with NJDEP for all uses, and the NJ Department of Agriculture regarding agricultural uses, to select the most appropriate metrics for water use efficiency, and either regulatory or normative standards (as appropriate for each type of water use) that should be applied. For public water supply systems, metrics may include per capita water use and water loss ratios by system category. For non-potable uses, metrics will focus more on efficiency of meeting plant needs for specific crops during specific weather conditions.
Implementation of Water Use Efficiency Measures: General	**Program Description** All water uses in the Highlands should be efficient, so that environmental stresses are limited and the ability of water supplies to meet public needs is extended. The following general standards apply: 1. Meet all Uniform Construction Code requirements for the use of water conservation fixtures in new or rehabilitated structures; 2. All new and replacement lawn irrigation systems shall meet State requirements for controls based on soil moisture; 3. Non-potable irrigation water uses shall ensure that only the necessary amounts of water are uses to achieve optimum plant growth, and such uses with Water Allocation permits shall be required to increase water use efficiency over the permit life to the maximum extent practicable; 4. New commercial development shall use internal recycling or beneficial reuse of water to the maximum extent practicable; 5. New development shall rely on stormwater for irrigation purposes to the maximum extent practicable, including but not limited to LEED-approved methods; 6. Water supply utility rates shall encourage end-user conservation; 7. Water supply utilities shall reduce water losses to the maximum extent that is cost-effective; 8. Water supply utilities shall provide routine consumer education to conserve water.

Implementation of Water Use Efficiency Measures: Deficit Areas and Deficit Utilities	**Program Description** The elimination of water supply deficits on a subwatershed or watershed basis is addressed by a separate RMP program (see *Highlands Restoration: Water Deficits*) that give highest priority to water use efficiency and ground water recharge enhancements within the deficit area, then to the development of new internal water supplies, and last to the transfer of water resources from another area. These priorities address both environmental and cost issues. Where deficit areas exist, the RMP calls for development of a Water Management Plan to determine how the deficit can be eliminated. Where a water supply utility faces constraints on its ability to supply consumers due to inadequate transmission mains, treatment facilities or supply sources, the most effective method of avoiding major capital costs is water use efficiency. The same efficiency methods are applicable to both situations. The following enhanced water use efficiency measures shall be considered, and where feasible, included in Water Management Plans or utility water supply plans to eliminate water availability or utility supply deficits, to the extent that they do not cause or exacerbate other environmental harm. Implementation or a firm commitment for implementation of the selected methods shall be required prior to approval of additional consumptive or depletive water uses or new water supply sources: 1. Incentive programs, up to and including full payment, for replacement of residential and commercial plumbing fixtures, water-using appliances and lawn irrigation systems with water conservation devices; 2. Incentive programs, up to and including full payment, for modification of residential landscaping to forms that require minimal if any artificial irrigation; 3. Incentive programs, up to and including full payment, for retrofitting of existing development with systems that allow for the beneficial reuse of water within the development; 4. Incentive and cost-share programs for replacement of agricultural irrigation and other water uses with water conservation devices; 5. Reduction of water losses within water utility systems to the maximum extent that is technologically feasible; 6. Modification of water rates to enhance financial incentives for water conservation by end users; 7. Enhanced consumer education regarding water conservation, including the potential for direct-to-consumer approaches.
Ensuring Implementation of Water Management Plans	**Program Description** Where a water utility or water user chooses to make a commitment to implementation of water use efficiency rather than implementing the measures prior to a new consumptive or depletive use, the following requirements shall apply: 1. All implementation measures shall be completed within one year of approval if the amount is less than 100,000 gallons per day in the Planning Area or 50,000 gallons per day in the Preservation Area, on average. Implementation may occur within a longer time period for larger amounts, up to five years from approval; 2. If the implementing entity is a public agency, the commitment must be in the form of a binding resolution or ordinance of the governing body, and the cost of implementation must be bonded to ensure sufficient resources; 3. If the implementing entity is a private corporation or individual, they must establish either an escrow account or provide bonding to ensure that the

	commitments are met. A public entity must be named as recipient of the escrow account or bonds in the event of default by the implementing entity, to be used by the public entity to complete implementation.

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RMP Program: Wastewater System Maintenance

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Issue Overview	All development requires some form of wastewater treatment system. All forms of wastewater treatment systems require proper operation and maintenance (O&M). Unfortunately, most homeowners do not properly maintain their septic systems and many do not operate them properly, leading to failures that put human health and the environment at risk. Local Health Boards have the authority to require correction of failures, but maintenance is more cost-effective for land owners, municipalities and the environment. NJDEP has proposed that all municipalities have some form of septic system maintenance program, but has no ability to mandate such programs where the municipality decides not to participate in Wastewater Management Plans. Only a few Highlands municipalities currently have such programs, and smaller municipalities will likely need assistance to implement septic system maintenance programs. Finally, in some cases, primarily in older communities, homes do not have modern septic systems but instead rely on cesspools or even less effective discharge methods. In all cases, increased septic system density and proximity to sensitive resources (e.g., wells, surface waters) increase the importance of proper O&M. Community-based systems, such as communal septic systems and small treatment systems, are regulated by NJDEP under the NJPDES program to ensure proper O&M, but not all such system owners are financially and technically capable of ensuring that their systems routinely meet NJDEP requirements through decades of use. Moreover, NJDEP is prohibited from requiring that such facilities have co-permittees to ensure long-term compliance. While NJDEP can take enforcement action regarding its permit conditions, financial failure of the system owner is not easily remedied. Wastewater systems operated by utility authorities and municipal government are generally well-financed through fee-based programs that have a sufficient user base. In addition, NJDEP permitting and enforcement provides sufficient surety of proper O&M. Accordingly, the RMP does not address O&M for these systems.

RMP Policies and Objectives Addressed	***Objective 2.4.3.3.3.*** *(Protection and Conservation Zones) Expansion of wastewater service shall be permitted in areas where there is a pattern of documented failing septic systems located within Existing Areas Served, or adjacent to Existing Areas Served where the failing septic systems cannot reasonably be addressed through rehabilitation or replacement of the existing septic system.* ***Objective 2.4.3.4.3.*** *(Planned Community Zone) Allow the expansion or creation of wastewater collection systems beyond Existing Areas Served to serve lands which are appropriate for infill or redevelopment, or to serve areas identified as public health concerns due to failing septic systems where the failing septic systems cannot reasonably be addressed through rehabilitation or replacement of the existing septic system.* ***Objective 2.4.3.5.1.*** *Allow community-based on-site treatment facilities for those areas located outside Existing Areas Served and have public health concerns due to failing septic systems; these facilities shall only serve existing wastewater and shall not include infrastructure to support future growth.* **Policy 2.4.4.5.** To establish minimum standards for the placement, design, monitoring and maintenance of septic systems necessary to protect, restore, and enhance ground water quality. ***Objective 2.4.5.2.1.*** *Identify innovative technologies that may be appropriate for the design, installation and maintenance of on-site wastewater treatment systems to minimize impairment to ground water or surface water quality due to elevated nitrate concentrations providing the systems meet the minimum standards of N.J.A.C. 7:9A.*
Program Summary	This program helps to ensure that on-site and small community wastewater treatment systems are properly maintained, using methods that complement NJDEP's existing or proposed requirements. It is focused primarily on septic system maintenance and on small community-based systems (e.g., package plants). Regarding septic systems, the primary purposes are: (1) to ensure that their O&M minimizes the potential threat to public health and the environment, and (2) to reduce the potential need for creation or expansion of sewer systems into non-sewered areas. In many cases, the expansion or creation of sewerage to address septic system failures or excessive density is very costly and could increase demand for other development in inappropriate areas. Regarding the community systems, the primary purposes are: (1) to ensure that the systems retain their viability through proper O&M, and (2) to prevent the need for a transfer of system ownership due to fiscal collapse.
Routine Maintenance of Residential Septic Systems	**Program Description** Municipalities shall, as a requirement of Plan Conformance, adopt municipal or Board of Health programs and ordinances (or participate in regional Board of Health programs) to improve the maintenance of existing and new residential septic systems, based on the most appropriate management model as discussed in RMP Water Resources Technical Report, Watershed and Water Quality, Management of Septic Systems and Other Decentralized Treatment Facilities. The following maintenance standards apply: 1. Municipalities shall, at a minimum, implement the programs required under the Water Quality Management Planning rules, N.J.A.C. 7:15;

	2. Where septic systems exist at a density equal to or lower than the LUCM Zone target, and are not within a Wellhead Protection Area or Highlands Open Water Buffer area, proper O&M shall be encouraged through the annual provision of information to the landowner regarding O&M responsibilities; 3. For septic systems other than those in Step 2, proper operation shall be encouraged through annual information to the landowner regarding operation responsibilities, and maintenance shall be ensured through a regulatory system requiring proof of proper maintenance, including but not limited to septic system pump-out, methods to prevent solids and grease migration into the distribution system, and no evidence of chemical disposal that disrupts the biological treatment of wastes.
Lifecycle Maintenance of Residential Septic Systems	**Program Description** Municipalities shall, as a requirement of Plan Conformance, adopt municipal or Board of Health ordinances (or participate in regional Board of Health programs) addressing the long-term maintenance needs of new residential septic systems, by requiring that each developed lot include and specify an area equivalent to 100% of the approved disposal area for future expansion or replacement of the disposal field, including proof of compliance with NJDEP requirements for septic systems under N.J.A.C. 7:9A. All septic system drain fields eventually fail as solids and microbial growth clog the field, and therefore require a replacement field to ensure that the system will not fail without potential for rehabilitation at great cost.
Upgrading & Replacement of Residential Cesspools and Other Inadequate Wastewater Systems	**Program Description** Municipalities shall, as a requirement of Plan Conformance, adopt municipal programs or Board of Health ordinances (or participate in regional Board of Health programs) addressing the upgrade of residential wastewater systems that do not perform in a manner similar to or better than standard septic systems. Specifically, at least at time of system failure or property sale, whichever comes first, residential cesspools and other inadequate systems must be upgraded to meet NJDEP Individual Subsurface Disposal System requirements to the maximum extent feasible given site conditions. Priority shall be placed on such systems that are located in dense development that is dependent on on-site systems, or are within a Wellhead Protection Area or Highlands Open Water Buffer area.
Upgrading of Septic Systems to Address Pollution Threats	**Program Description** For ground water quality, unlike surface water quality, there is no specific program for identifying areas of potential contamination and developing a management plan to restore ground water quality. The Highlands Council shall use its available information on residential development outside of sewer service areas to define locations where existing septic system density significantly exceeds the LUCM Zone or NJDEP nitrate targets, as potential contamination areas related to septic system density. The Highlands Council will rank the areas by size, severity and threat to human health and the environment, and work with municipalities to identify cost-effective methods, where available, to restore ground water quality.

	Methods may include one or more of the following: 1. Upgrade of existing septic systems to alternative on-site treatment systems, at times which maximize cost-effectiveness of the upgrade (e.g., when existing systems fail). Where the alternative systems require special O&M, they should only be implemented if the O&M is ensured; 2. Replacement of individual septic systems with a communal septic system or communal alternative treatment system, with ownership and management in place to ensure O&M; 3. Replacement of individual septic systems with a community-based wastewater treatment system sized to address only the project area, with ownership and management in place to ensure O&M; 4. Extension of public sewerage where it will not have significant secondary effects such as pressures to develop other areas in Conservation and Protection Zone, which are inappropriate for sewerage.
Alternative Management Approaches for New Septic Systems	**Program Description** The traditional approach to septic systems is ownership, operation and maintenance of septic systems by the homeowner. Maintenance is usually not performed, and few homeowners are aware that septic systems have a lifespan and will require replacement, usually at a very high cost. As an optional approach, developers, municipalities, counties and the Highlands Council should consider the establishment of alternative management systems. The following general concepts would ensure that septic systems are managed in a manner more equivalent to other utility services, with proper maintenance and methods to ensure that homeowners do not face major, unanticipated costs: 1. Ownership of the septic system may remain with the homeowner or, similar to other utility services, be placed with a public or investor-owned utility; 2. Where the septic system remains the property of the homeowner, a mandatory condition of development approval would be a requirement that each homeowner have a maintenance contract for the entire life of the septic system and any replacement; 3. The maintenance contract would provide for routine maintenance, repairs and ultimate replacement, with costs spread over the contract life; 4. Where septic system ownership is with the utility, a fee-based system would address life-cycle costs for routine maintenance, repairs and ultimate replacement.
Requirements for New Small-Community Wastewater Systems	**Program Description** Proposals for development in a Planned Community Zone, Council-designated redevelopment or brownfields site, Council-approved cluster development site, or Council-approved replacement of existing septic systems for public health reasons may require the use of a community-based wastewater treatment system. These systems must be addressed through municipal Plan Conformance approval and must meet the following requirements:

	1. The related development must meet all relevant RMP requirements regarding environmental constraints, Zone policies, etc.; 2. The community-based system must be sized such that it only provides capacity for the planned site; 3. The community-based system must be owned and operated by an entity with sufficient financial capacity and operating expertise to ensure proper O&M over the life of the community. Owners may include utility authorities, municipal utilities, State agencies, and investor-owned utilities regulated by the NJ Board of Public Utilities; **4.** The system and proposed service area must be approved by NJDEP as part of an Areawide Water Quality Management Plan or component Wastewater Management Plan, and permitted by NJDEP under the NJPDES program.
Management of Existing Small-Community Wastewater Systems	**Program Description** Where community-based wastewater systems already exist, their continuing financial viability and proper O&M are of concern. All such facilities should already be part of an Areawide Water Quality Management Plan or component Wastewater Management Plan, and permitted by NJDEP under the NJPDES program. Where the owner/operator is a utility authority, municipal utility, State agency, or investor-owned utility regulated by the NJ Board of Public Utilities, no action is needed. Municipalities, counties and the Highlands Council should explore methods by which other facilities can continue to provide sufficient treatment throughout the lifespan of existing communities. Options include: 1. Requirements for annual reports from the system owner/operator discussing revenue, expenditures, reserve funds, O&M issues, etc., to help identify potential concerns that should be addressed; 2. Allowing homeowners associations to transfer ownership of the system to a utility authority, municipal utility, State agency, or investor-owned utility regulated by the NJ Board of Public Utilities, with a fee-based system for future O&M; 3. Establishing a special taxation district to provide funding for system O&M in lieu of homeowner association dues, etc.; **4.** Establishing a regional utility authority to either take ownership of or provide O&M services under contract for multiple community-based systems.

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DRAFT SUMMARY
WATER RESOURCES TECHNICAL REPORT ADDENDUM
VOLUME I – WATERSHED AND WATER QUALITY
OCTOBER 2007
Septic System Densities for the Highlands Region

Version - October 17, 2007

Septic system density is one of various factors used in determining the land use capability of areas in the Highlands Region. The goals, policies and requirements of the Highlands Act provide guidance on Regional Master Plan approaches relating to septic system density; they are prescriptive regarding the Preservation Area but general regarding the Planning Area. The Highlands Council seeks to achieve two related policy objectives – to restrict increased risks to human health from ground water that exceeds 10 milligrams per liter (mg/L) of nitrates, and to restrict increased human health and ecologic impacts from other pollutants that are associated with nitrates – using the following approach:

1. Use the New Jersey Department of Environmental Protection's (NJDEP) Preservation Area rules at N.J.A.C. 7:38-1 et seq. for septic system density within that area. These nitrate targets are based on statutory requirements for nondegradation, and are supported by further analysis using statistical models.
2. Within the Planning Area, the NJDEP nitrate dilution model should be used with the standard factors for nitrate loading per residential household (or commercial equivalent), but using 2002 drought ground water recharge for each HUC14 subwatershed. The Planning Area median is approximately 9.4 inches per year.
3. The nitrate dilution models should be applied only to the privately-owned, undeveloped, non-preserved lands (referred herein as developable lands) within each subwatershed. The following nitrate targets are proposed for the Planning Area. Actual septic system yields will vary by HUC14 subwatershed based on estimated HUC14 recharge; examples are provided here for information purposes:
    a. Planned Community Zone – **2 mg/L** (NJDEP proposed Statewide threshold. This does not affect existing areas served by sewer or the approved expansion of these facilities.
    b. Conservation Zone – **1.88 mg/L*** (estimated median concentration for the Conservation Zone).
    c. Protection Zone – **0.81 mg/L*** (estimated median concentration for the Protection Zone).
    d. Clustered Development – **10.0 mg/L** (NJDEP proposed Statewide threshold). Applied to the developed portion of the cluster, with application of the relevant Highlands Zone target to the entire project area (i.e., both the developed and undeveloped, preserved portions). Clustering to a higher density would require the use of community-based wastewater systems, not septic systems.

4. Septic system yield in the Planned Community Zone will be determined on a project-specific basis, as most development in the zone will be either sewered or exempt. In the Conservation and Protection Zone, the RMP will provide septic system yields by zone in each HUC14 subwatershed; municipalities will be able to direct the appropriate locations for such development through the Plan Conformance process, within the constraints of other RMP policies.
5. Designated redevelopment sites, brownfields and lakes communities that use septic systems in both the Preservation and Planning Areas are most probably impaired and will require water quality restoration, in coordination with NJDEP; in general they should be protected from further degradation.

(* The median nitrate values by Zone will be finalized upon completion of the Land Use Capability Map (LUCM) zones.)

General Findings

The following findings provide the basis for the Highlands Council's septic system policies:

1. The goals and objectives of the Highlands Act require protection of designated water uses (including both human and ecological uses) in all areas of the Highlands Region. Protection can range from natural quality to strict nondegradation to a range of antidegradation approaches. Restoration is for areas that violate standards, and enhancement is appropriate for areas where waters currently meet standards but can be improved through better land use management or pollution control practices.
2. Septic system density is a useful indicator for the water quality impacts of development in areas that lack community sewer systems. Nitrate concentration is a useful surrogate for the many pollutants discharged by properly functioning septic systems. It is critical to note that addressing nitrates alone will not necessarily address the other related contaminants, requiring the use of conservative assumptions.
3. Septic system density controls are useful for regional planning purposes but do not address site-specific or even neighborhood water quality issues. The risk of localized impacts is reduced as septic system densities are reduced, but risks will still exist due to site layout, local geological conditions, well construction, etc. Guidance to municipalities on these issues would be valuable in reducing site-specific risks.
4. Allowable septic system densities for new development should be tailored to each LUCM zone, recognize the legislative distinction between the Preservation and Planning Areas, and address issues such as lakes communities, brownfields and redevelopment sites where a combination of restoration and alternative treatment technology may be appropriate.
5. Allowable septic system densities should be calculated using nitrate dilution models, using NJDEP's factors for nitrate loads from septic systems.
6. Recharge by HUC14 subwatershed should be used as the basis for nitrate dilution, consistent with other RMP analyses. Drought ground water recharge should be used as a conservative factor to address nitrate impacts in smaller watersheds, headwaters areas and aquifers with limited storage capacity, all of which are common in the Highlands Region. Recharge values should be based on 2002 land use/land cover, as the data most closely related to the 2004 adoption of the Highlands Act and the most recent information available to the Council.
7. The models should be applied to privately owned, undeveloped, non-preserved areas only.

8. The nitrate target for the Conservation Zone in the Planning Area should recognize that existing nitrate concentrations are elevated in significant part by agricultural practices. There is an opportunity for water quality enhancement through more thorough implementation of agricultural best management practices (BMPs).
9. The nitrate target for the Protection Zone in the Planning Area should recognize that existing low nitrate concentrations reflect minimal agriculture and development land uses. The impacts of additional development will be more difficult to offset through improvements to existing land management practices.

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MEETING OF THE HIGHLANDS COUNCIL

DRAFT
WATER RESOURCES TECHNICAL REPORT ADDENDUM
VOLUME I – WATERSHED AND WATER QUALITY
OCTOBER 2007

Management of Septic Systems and
Other Decentralized Wastewater Treatment Facilities

Version - October 9, 2007

USEPA DECENTRALIZED WASTEWATER TREATMENT SYSTEMS PROGRAM

The U.S. Environmental Protection Agency (USEPA) has developed a Program Strategy for Decentralized Wastewater Treatment Systems (USEPA, 2005b) to better protect public health and water resources. National statistics indicate that onsite systems serve 25% of the nation's population wastewater needs, making them an integral part of our nation's utility infrastructure. However, these systems have also been identified as the second greatest threat to ground water quality by state water quality program staff nationwide.

USEPA acknowledges the challenges in on-site septic management in terms of placing the responsibility for septic operation and maintenance on often uninformed homeowners who lack the knowledge and support needed to adequately do the job. Compounding this lack of knowledge is the fact that regulations do not normally provide adequate legal authority to hold homeowners, or for that matter, anyone else accountable when septic system failure or misuse results in the pollution of water resources. Neglected, these systems will not function properly, and are known to cause water quality and public health problems. USEPA recommends that state and local governments develop comprehensive strategies to manage septic systems, including location, design, operation and maintenance criteria; inspections; monitoring; and financial support. Ensuring proper legal authority is provided to carry out the requirements of any such program is a key factor in developing a successful septic management program.

In its evaluation of onsite wastewater management, USEPA has identified the potential benefits of a septic management program as:

- Protection of public health and water resources;

- Protection of property values by preventing system failures;
- Conservation of ground water recharge and baseflow to streams;
- Preservation of the local tax base and reducing growth pressures; and
- Life cycle cost savings to homeowners and communities because septic systems will not need repair/replacement as often and high capital cost sewers won't need to be built.

Government action is appropriate for all of these purposes except, perhaps, preventing private costs for septic system repair and replacement. However, achieving the public objectives will result in reduced private costs overall. Septic systems can contribute to sustainable water resource management in terms of both water quality and quantity, through avoidance of water export and depletion, reducing the volume of potable water used to transport waste to centralized plants, promoting water recovery and reuse, preventing discharges from sewer overflows that can harm receiving waters and lower consumption of energy and chemicals needed for sewage treatment.

However, all wastewater treatment, including the use of septic systems must be properly planned and managed as part of a community's comprehensive planning and zoning efforts. This involves setting performance requirements for systems, limiting development in critical natural resource areas and concentrating development within designated growth areas, serviced by sewers wherever possible. This is not an easy challenge, nor is it one many have tackled, much less resolved.

The goals of such a program should be to protect public health and the environment. This includes protecting drinking water supplies, and water resources that support sensitive environmental areas, recreation, and sustainable economic growth. A community also needs to understand the impact that onsite systems can have under both existing and buildout conditions.

Factors that contribute to program success include public and political support, adequate funding, clear regulatory authority, capable staff, clear goals, appropriate guidelines, system monitoring and maintenance, certification and licensing requirements, incentives and enforcement mechanisms and public education and outreach.

In addition, to be effective, the program must consider environmental conditions, ordinances and local codes that allow adaptation to site conditions, water conservation and reuse, and controls on discharges to septic systems, operation and maintenance, and residuals management.

The USEPA Voluntary National Guidelines for Management of Onsite (Decentralized) Wastewater Systems (USEPA, 2003) provide five models that can be tailored to meet local and regional needs. The NJDEP has embraced these Guidelines (Bowers, 2001) and sees onsite wastewater disposal as a valid alternative to public sewers, as they can provide cost-effective treatment and high levels of ground water recharge. However, NJDEP also recognizes that proper design, construction, operation, maintenance and management of septic systems is needed to prevent surface and ground water contamination with nitrate, pathogens and other chemicals.

Key concepts in the USEPA Guidelines include:

- Completion of an existing septic system inventory and performance evaluation
- An increase in management comprehensiveness as the risk and complexity increase
- Requiring operating permits for large systems, clusters of systems or as otherwise deemed appropriate
- Permits for systems discharging to surface water
- Certification and licensing of practitioners
- Elimination of illicit discharges to storm drains and sewers

The following provides a generalized description of each of the five USEPA management models, as defined in the Guidelines. These provide an increasingly comprehensive system management structure as the sensitivity of the natural environment or complexity of the system increases. These models are proposed as the starting point for tailoring the septic management program to conform to the resource protection and other goals of the Regional Master Plan.

Management Model 1 - "Homeowner Awareness" Model: This model involves a minimal level of management where septic systems are owned, operated and maintained by individual property owners in areas where sites are suitable for conventional onsite systems and environmental sensitivity is low. Homeowners are reminded by the homeowner's association, municipality or other responsible entity to perform routine maintenance. The objectives of this model are to ensure all septic systems are sited, designed and constructed in accordance with the applicable ordinance(s), the regulatory authority documents that all systems are inventoried and that homeowners are informed about routine maintenance needs.

Management Model 2 - "Maintenance Contract" Model: To be used in areas of low to moderate environmental sensitivity, where sites may be marginally suitable for onsite systems due to lot sizes, soil conditions or other factors and enhanced system design may be required. Contracts with qualified technicians are needed to ensure proper and timely maintenance. This model helps assure that malfunctions are minimized, as a certified operator is required to maintain the system in accordance with an operation and maintenance manual and the homeowner must submit the operator's maintenance report to the regulatory authority. Minimum performance and alternative site acceptance criteria are established and compliance monitoring performed by the regulatory authority.

Management Model 3 - "Operating Permit" Model: This model is for use in areas of moderate environmental sensitivity (e.g., outer tiers of Wellhead Protection Areas, lake communities) where proper system operation and maintenance are critical to protect public health and natural resources, and for systems treating high strength wastes or having large capacity. Permits that include measurable performance criteria related to environmental sensitivity are issued for a specific time period and can be revoked, as renewals are based on proof of permit compliance. This model includes performance-based system designs. The objective is to ensure that systems continuously meet their performance criteria to protect public health and natural resources.

Management Model 4 - "Responsible Management Entity (RME) Operation and Maintenance" Model: To be used in areas of moderate to high environmental sensitivity, where reliable operation and maintenance is required (e.g., inner tiers of Wellhead Protection Areas, outstanding value resource waters, aquatic habitats) and for areas with large numbers

or clusters of systems. Permits are issued to a RME (e.g., county and local agencies, wastewater management or improvement districts, public authorities, public/private partnerships) to provide and proper maintenance and compliance, with the objective of ensuring systems consistently meet performance criteria to protect water resources and human health. The RME takes on the primary role for operation and maintenance, educating homeowners, developing design and construction criteria, operating and maintaining the systems, and pumping and hauling residual wastes. Permitting, compliance tracking and inspections are done by the regulatory authority.

Management Model 5 - "Responsible Management Entity (RME) Ownership" Model: This model is for use in areas of greatest environmental sensitivity where reliable management is required to protect human health and environmental resources. Permits are issued to a RME to assure proper maintenance and compliance. In addition, ownership and responsibility for the system lies with the RME. The objectives are to provide professional management of the planning, siting, design, construction, operation and maintenance of onsite systems to assure protection of high value water resources, particularly in areas designated for higher density growth. The regulatory authority is responsible for compliance and coordinating the system management program with other planning and water-related programs (e.g., TMDLs and stormwater).

OTHER STATE AND LOCAL GOVERNMENT EXPERIENCE

The NJDEP and USEPA both support the management model framework summarized above. Key to that support is the ability to tailor the model and requirements to the conditions and goals of a specific onsite wastewater management program and water quality criteria.

An example of how the framework can be tailored to specific needs is provided by the State of Massachusetts, which has developed a "Community Septic Management Program". This program includes varied options for compliance with 310 CMR 15, Minimum Requirements for the Subsurface Disposal of Sanitary Sewage, or Title 5. Options under this program include development of a comprehensive community septic management program to be implemented for an entire town or just in areas that are particularly sensitive to the effects of septic effluent or that have failing systems. Funding is available to communities to develop these programs. Loans are available to individual homeowners who upgrade systems that fail Title 5 inspections. Tax credits are also available to homeowners upgrading their individual systems.

There are other considerations included for what are called Nitrogen Sensitive Areas, determined by the Massachusetts DEP to be particularly sensitive to pollution from nitrogen in sewage. Wellhead Protection Areas and areas near public water supplies are identified as Nitrogen Sensitive Areas. Title 5 allows for the designation of Nitrogen Sensitive Areas based on scientific evidence and includes special requirements for repairing failed systems and the construction of new systems in Nitrogen Sensitive Areas.

These Title 5 provisions go beyond what most other states have done, as the Massachusetts program includes compliance with many of the same permitting, inspection, monitoring, setback and other state program requirements discussed below.

Highlights of other state programs include Florida's county-based onsite sewage program, which includes mandatory permitting of new systems, contractor licensing and innovative design and an alternative technology approval process. Alternative systems are required to be monitored and regular maintenance performed. Setbacks from sensitive resources (e.g., potable wells and wetlands) are required. Septage disposal requirements are also included in the management program.

Minnesota's program is largely county and municipality-based, with requirements for septic management ordinances, siting evaluations that include setbacks from floodplains and wellhead protection areas for new systems, scheduled maintenance and the approval, monitoring and mitigation of alternative systems.

North Carolina manages its septic system program through a combination of state, county and local health department activities. The North Carolina Department of Environment and Natural Resources (NCDENR) provides oversight and technical support to local agencies in implementing the septic system management program. Permits to construct new systems first require a site evaluation, performed by a county Environmental Health Specialist.

Any system other than a traditional septic system requires regular maintenance, to be scheduled based on the contents of the tank. NCDENR also provides evaluations of alternative technologies, and the extent of water quality impacts from high density septic systems. The Wastewater Discharge Elimination Program specifically addresses failing septic systems through funding of surveys to identify areas with failing septic systems and mitigate the impacts of these failures through system repairs. South Carolina's program is implemented through state and county health offices. Permitting, inspection, maintenance and setbacks are required.

In Vermont, the state's Department of Environmental Conservation (DEC) has primacy over septic system regulation. DEC issues permits for construction, approves any alternate technology use, requires site evaluations that are conducted by licensed wastewater professionals, and regular tank inspection and maintenance for innovative or larger (greater than 6500 gallons per day) systems.

Fairfax County, Virginia has a septic management program that requires reserve areas on new lots, setting aside land for future expansion or replacement in case of septic system failure. Use of experimental and provisional systems are limited to replacement of existing failed systems and not allowed for new construction, similar to New Jersey. Large homes are required to have a pumping system to manage the larger water volumes; for such homes, the county will restrict depths of shallow placed systems, require hydraulic conductivity testing for shallow placed systems, and limit the amount of backfill to allow for easier routine maintenance.

The potential to tailor the management framework to local and regional needs has been investigated through onsite wastewater management demonstration grant funds provided by USEPA that have supported projects across the country.

Using demonstration funding, Warren, Vermont had a goal of limiting growth and preserving its historic character. The community chose to build an alternative wastewater treatment system sized to meet the treatment needs of its existing Village Center. Extensive public outreach to overcome the idea that a septic management program would be too intrusive and expensive was effective in calming these fears. There were also concerns that

the cost of providing sewers would be prohibitively expensive. Once residents understood the critical need to protect water resources to sustain both potable supply and the natural resources that drive the tourism-based local economy, that the program could be used to control development in line with the residents' vision for the community and they were provided with access to low interest loans to repair septic systems, the program was more readily accepted. A needs analysis was critical in determining both the environmental protection and wastewater treatment needs of the community and planning their wastewater management system based on these needs.

Other New England demonstration projects provided case studies specific to the protection of natural resources, maintaining water quality, directing development to already sewered areas, promotion of tourism, wastewater management ordinances and effective public outreach and education, all with potential application in the Highlands. One demonstration study concluded that the availability of drinking water on Block Island, Rhode Island was directly related to the volume and quality of wastewater effluent discharged by septic systems. Block Island includes a federally-designated Sole Source Aquifer. Approximately 93% of its year round residents are dependent on private wells for drinking water and there are sensitive ecological and water resources.

A New Shoreham, Rhode Island study identified high risk areas, including surface water reservoir watersheds, wellhead protection areas and ecologically sensitive water resources. A build out analysis was used to determine the future risk of pollution resulting from any future development.

USEPA Region 2 has identified Onsite Wastewater Treatment System Management, Nutrient Management, Watershed Management (including water reuse and agricultural water) and animal waste management on small farms as regional water quality initiatives. Coordinating with the onsite wastewater initiative should be considered in developing the Highlands program. The other initiatives also have applicability, as they include elements that are related to overall nitrate and water quality management. Efforts are underway to support implementation of the wastewater management guidelines through research and cooperative efforts with land grant universities through the US Department of Agriculture Cooperative State Research Education and Extension Service (USDA-CSREES) Regional Water Coordination Program (RWCP) (USDA, 2007). RWCP is working with state and local governments to address failing and inadequate septic systems. An action plan that includes developing working partnerships, capacity development, professional training and public education has been prepared. The USEPA and RWCP have also conducted seminars, training and provided support for demonstration projects.

USEPA also supports the National Decentralized Water Resources Capacity Development Project, a cooperative venture with several other industry organizations to improve both training and practice in onsite wastewater management (National Decentralized Water Resources Capacity Development Project, 2007). The project is looking into barriers to the more widespread use of septic systems, including public misperception, inconsistencies in enabling legislation, lack of program coordination and the absence of effective management programs.

The National Onsite Demonstration Program was developed by USEPA and the National Environmental Services Center and has a national demonstration project database. Projects to date have addressed the protection of water quality in limestone formations, impacts of

septic systems on surface sources of drinking water, the performance of alternative treatment technologies, developing a model wastewater management district, and educational program development, all with potential application in the Highlands.

BEST MANAGEMENT PRACTICES FOR ONSITE WASTEWATER TREATMENT

All septic systems have a life cycle and all drain fields will eventually need replacement. Without regular maintenance, septic systems will eventually fail, resulting in human health and ecological threats. Regularly scheduled inspections and pump-outs can help assure proper functioning and use of the system over a longer period of time. How often this should be done varies, with inspections normally recommended every one to three years and pump-out every three to five years, depending on the number of people in the household, amount of wastewater generated, volume of solids in the wastewater, septic tank size and location of water supply wells and other sensitive features.

On a daily basis, the homeowner can take simple steps, including the efficient use of water to reduce the amount of wastewater generated that requires treatment. Fixing leaks and drips, using efficient fixtures and appliances, limiting what goes down the drain (e.g., avoiding bulky items that can clog the system and toxic chemicals that can poison the bacteria in the system), avoiding driving over or draining water to the area of the drain field and careful landscaping all help the septic system work properly. Use of garbage disposal units, water purification systems and hot tubs can contribute large quantities of liquids and/or solids to the system, agitating tank solids and overloading the drain field (ANJEC, 2002; USEPA, 2002).

ALTERNATIVE ONSITE WASTEWATER TREATMENT

Alternative treatment options can be used for either individual onsite or clustered wastewater systems and can be very simple - such as the use of composting toilets - to fairly complex systems requiring trained operators and a high level of maintenance.

Basic variations involve methods to reduce wastewater flows through leak detection and prevention and use of efficient fixtures; drain field configuration or construction to suit the site; trickling filters to treat effluent; vent filters to prevent movement of solids to the distribution box, septage treatment involving land application or delivery to a sewage treatment plant; use of small diameter sewers to collect liquid septic effluent; pretreatment; and use of lagoons, fine bubble aeration or other aerobic treatment, activated sludge treatment, intermittent and recirculating sand filters, peat filter and mound systems, constructed wetlands and other methods as a means of effluent treatment. More complex systems can incorporate sequencing batch reactors, ultraviolet, ozone or chlorine disinfection and other advanced treatment methods. Operational efficiency and water quality results using these systems vary (National Small Flows Clearinghouse, 2007).

Further investigation into the types of alternative treatment suitable for use in the Highlands is required and may need to be evaluated on a site-by-site basis, depending on the potential to impact critical water and other natural resources, site soil, geological and other

characteristics. In addition, approval for use of these alternatives must be coordinated with NJDEP and local Health Boards.

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DRAFT – FOR CONSIDERATION AT THE OCTOBER 18, 2007 MEETING OF THE HIGHLANDS COUNCIL

DRAFT
ECOSYSTEM MANAGEMENT TECHNICAL REPORT ADDENDUM
OCTOBER 2007
Vernal Pool Habitat Protection

Version - October 9, 2007

Overview:
The Highlands Council received public comments expressing both support for and strong objections to the Draft Regional Master Plan (RMP) policy and mapping methodology of 1,000-foot buffers around NJDEP-confirmed vernal pools in the Highlands Region. The following addendum provides additional analysis of the appropriate resource protection area for these sensitive habitats.

Vernal pools are unique ecosystems that:

- Provide critical breeding habitat for a variety of amphibian and invertebrate species;
- Contribute significantly to local biodiversity by supporting plants, animals, and invertebrates that would otherwise not occur in the landscape; and
- Contribute significant amounts of food to adjacent habitats.

Protecting vernal pools and adjacent habitat are important for maintaining ecological integrity and providing amphibian and invertebrate breeding habitat (Semlitsch 1998, Gibbons 2003). For pool-breeding amphibian species, studies indicate amphibian species travel distances ranging from 400 to 4,000 feet from vernal pools to surrounding terrestrial habitat (Faccio 2003; Petranka 1998; Calhoun and deMaynadier, 2004).

The New Jersey Department of Environmental Protection (NJDEP) currently regulates vernal habitat through the Freshwater Wetlands Act Rules at N.J.A.C. 7:7. Unless threatened/endangered (T&E) species habitat is present within the vernal habitat, the Freshwater Wetlands Act Rules classify vernal habitat as intermediate value wetlands. The Freshwater Wetlands Act Rules prescribe a 50-foot transition area adjacent to intermediate value wetlands unless T&E species are identified, at which point the Rules provide for a 150-foot transition area. These protective areas do not provide adequate habitat protection for species dependent upon ephemeral vernal pools.

Semlitsch (1998) summarized the use of terrestrial habitat by pond-breeding salamanders and evaluated whether current laws (as of publication date) adequately protect salamander populations. The author summarized average migration distances for adults of six species (411 feet), and juveniles of two of these species (228 feet) of pond-breeding salamanders respectively. An average migration distance represents a distance encompassing only 50% of the studied populations. A terrestrial buffer encompassing the majority (i.e., upper 95% confidence limits) of the populations would have to encompass the terrestrial habitat 534 feet from a wetland's edge. Semlitsch noted that literature results state that adult and juvenile salamanders were found up to 2,051 feet and 810 feet from the edge of wetlands, respectively. The author stated that all studied salamander migration occurred well beyond federal wetland protection boundaries and that 76% of studied salamanders were found beyond the extended terrestrial buffers provided through Massachusetts and Florida state regulations. It should be noted that the studied populations occurred well beyond the vernal pool transition areas provided by New Jersey's Freshwater Wetlands Act Rules. Results from Semlitsch (1998) indicate that New Jersey's transition areas are inadequate to protect the salamander species potentially utilizing these habitats. The author recommends that the 534 foot buffer encompassing 95% of the studied populations is scientifically defendable and is an appropriate general starting point for initiating legislative change regarding wetland buffers for pond-breeding amphibians.

Rittenhouse and Semlitsch (2007) applied a univariate kernel density estimation to a series of data sets about amphibian migration to reflect an aggregate distribution from wetland breeding habitat to non-breeding upland habitat for all amphibians. Results from the study found that 95% of amphibians occur within 2,179 feet from the wetland edge, and 50% of amphibians occur within 305 feet. Species data included: California tiger salamander, Spotted salamander, Mole salamander, Tiger salamander, Great crested newts, Western toad, Japanese common toad, Spotted frog, Wood frog, and Dusky gopher frog.

Semlitsch and Bodie (2003) reviewed literature related to amphibian and reptile terrestrial habitat requirements around wetlands. They distinguish between core habitat and wetland/riparian buffer zones for amphibians and reptiles. Core habitat is defined as the amount of terrestrial habitat used by a population during migrations to and from wetlands and for foraging. Wetland/riparian buffer zones are typically applied to promote water quality protection, and are often significantly smaller in size than core habitat required by local amphibian and reptile populations.

Using extensive, species-specific data for migration distances from wetlands, the authors compiled a table of mean minimum and maximum core terrestrial habitat for each taxa.

Table 1. Mean Minimum and Maximum Core Terrestrial Habitat for Amphibians and Reptiles*

Group	Mean minimum (ft)*	Mean maximum (ft)*
Frogs	673	1207
Salamanders	384	715
Amphibians	522	951
Snakes	551	997
Turtles	404	941
Reptiles	417	948
Herptofauna	466	948

*Table reproduced from Semlitsch and Bodie (2003)
**Values represent mean linear radii extending outward from the edge of aquatic habitats from summary data.

The data suggest that an appropriate core habitat value could be derived from the maximum value generated by the local taxon with the largest core habitat requirements. It is assumed that utilizing the largest habitat area would encompass all other taxa core habitat requirements. The authors suggest that the maximum value is appropriate for application to public lands, where conserving biodiversity is often a high priority. They state that, on private lands, where sustainable land use is the priority, a tiered protection zone system could minimize impacts to wildlife and support private land uses. The authors propose a tiered system of three terrestrial zones adjacent to core aquatic and wetland habitat:

1. Aquatic Buffer - a first terrestrial zone immediately adjacent to the aquatic habitat which is restricted from use and designed to buffer the aquatic habitat and protect water resources.
2. Core Habitat - a second terrestrial zone that starts at the aquatic habitat edge, overlaps the first terrestrial zone, and extends to encompass the core terrestrial habitat defined by the local taxon.
3. Terrestrial Buffer - a third zone terrestrial zone that extends from the edge of the second terrestrial zone outward to serve as a buffer to protect the core terrestrial habitat from edge effects of surrounding land use.

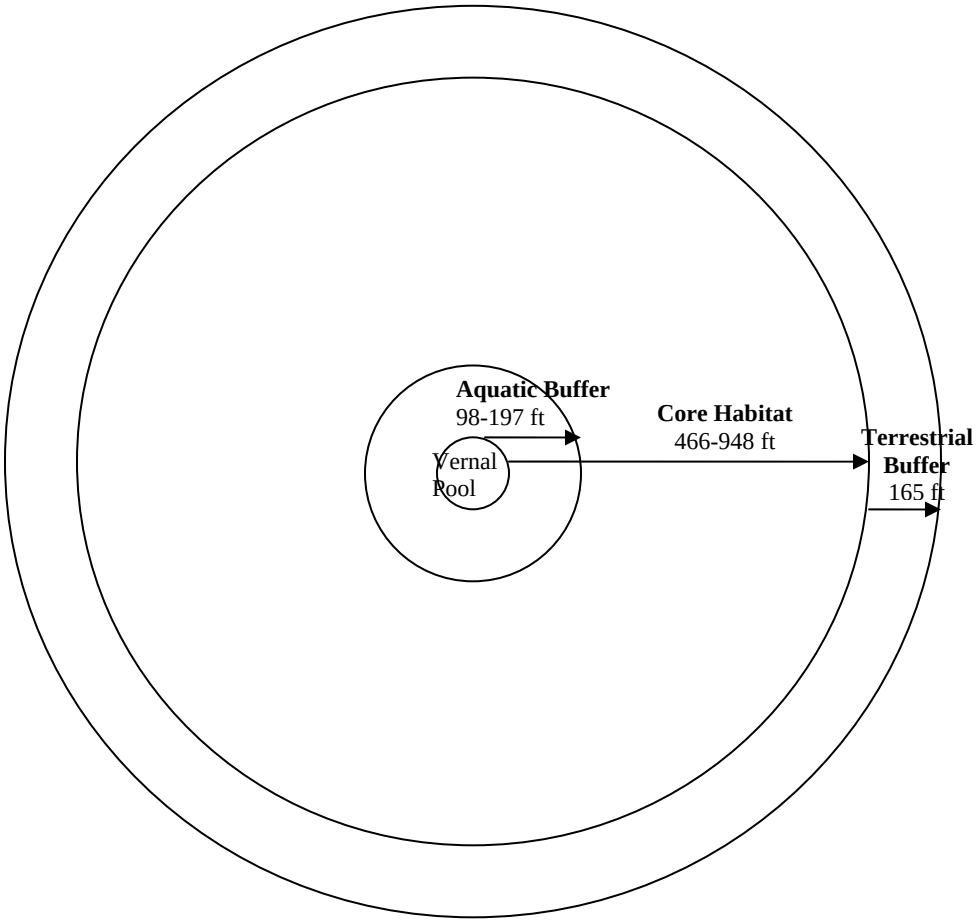

Figure 1. Proposed zones of protection of a vernal pool (reproduced from Semlitsch and Bodie [2003]).

The Highlands Council performed a literature review of migration distances from vernal pools to upland habitat for the species listed by NJDEP as obligate (i.e., dependent upon for survival) and facultative (utilizes for habitat requirements) vernal pool-breeding species in the state. Results from the literature review are included in the following table:

Table 2. New Jersey's Vernal Pool-breeding Amphibians

Species	Vernal Class	State Status	Migration Distance (in feet)**	Literature**
Marbled salamander	Obligate	Special Concern	637 (mean) 0-1,476 (range); 98	Williams (1973) in Semlitsch and Bodie (2003); Douglas and Monroe (1981) in Semlitsch (1998)
Eastern tiger salamander	Obligate	Endangered	197 (mean) 0-938 (range); 532;	Maddison and Farrand (1998) in Semlitsch and Bodie (2003); Semlitsch (1983) in Semlitsch (1998)

Species	Vernal Class	State Status	Migration Distance (in feet)**	Literature**
Spotted salamander	Obligate		387 (mean) 49-689 (range); 656; 220; 339; 211; 492; 630	Madison (1997) in Semlitsch and Bodie (2003); Windmiller, B.S. (1996); In Semlitsch (1998): Wacasey (1961); Wacasey (1961); Williams (1973); Douglas and Monroe (1981); Kleeberger & Werner (1983)
Jefferson salamander	Obligate	Special Concern	827 (mean) 65-2,051 (range); 820; 303	Williams (1973) in Semlitsch and Bodie (2003); Douglass & Monroe (1981) in Semlitsch (1998); Wacasey (1961) in Semlitsch (1998)
Blue-spotted salamander	Obligate	Endangered	570 (mean); 656 (max); >820; impacts occur at 82-114 from an edge	Homan and Windmiller (1999) in MNHESP (2006); Windmiller (1996) in MNHESP (2006); Regosin et al. (in press) in MNHESP (2006); Lannoo (2005)
Wood frog	Obligate		6,561	Berven, and Grudzien (1990)
Eastern spadefoot frog	Obligate		3,000 (max)	Dodd (1996) in Lannoo (2005)
Green frog	Facultative		397 (mean) 1,181 (max)	Lamoureux & Madison (1999) in Semlitsch and Bodie (2003)
Bullfrog	Facultative		1,332(mean)	Ingram & Raney (1943) in Semlitsch and Bodie (2003)
Pickerel frog	Facultative		None found	
Southern leopard frog	Facultative		None found	
Carpenter frog	Facultative	Special Concern	None found	
Northern cricket frog	Facultative		26-72 (range)	O'Neil (2001) in Semlitsch and Bodie (2003)
Northern spring peeper	Facultative		1,000 (max)	Davis (1999)
NJ chorus frog	Facultative		None found	
Upland chorus frog	Facultative		None found	
Northern gray treefrog	Facultative		None found	
Southern gray treefrog	Facultative	Endangered	None found	
Pine Barrens treefrog	Facultative	Threatened	230 (mean) 348 (max); (344)	Freda & Gonzalez (1986) in Semlitsch and Bodie (2003); Freda and Gonzalez (1986) in Lannoo (2005)
Four-toed salamander	Facultative		None found	
Long-tailed salamander	Facultative	Threatened	100 (max)	Anderson & Martino (1966) in Semlitsch and Bodie (2003)
American toad	Facultative		76-1,575 (range)	Oldham (1966) in Semlitsch and Bodie (2003)
Fowler's toad	Facultative	Special Concern	None found	

*Table reproduced from NJDEP-DFW (2007)
**Migration distance added through literature review

For vernal pools located on privately-owned, small parcels of land the Metropolitan Conservation Alliance (Calhoun and Klemens, 2002) recommends three rings of buffers (vernal pool depression, 100-foot protection zone, 750-foot amphibian life zone) around vernal pools in which differing degrees of management activities are recommended. It should be noted that the authors do not reference literature to support the specific recommended distances for either the 100-foot protection zone or the 750-foot life zone. The authors include a recommendation allowing disturbance of up to 25% of the amphibian life zone in the Management Goals and Recommendations Section. This recommendation appears to be based on data from one unpublished study in Massachusetts in which the researcher compared amphibian populations at two vernal pool breeding sites for five years. One site was undisturbed and the other site lost 25% of surrounding forest to residential development within 1,000 feet of the pool. Data from the disturbed site showed a 53% decline in spotted salamander population, a 40% decline in wood frog population, and a 2-year decline in blue-spotted salamander numbers, that recovered the following two years. The authors state that this study indicates that development that removes 25% of surrounding critical terrestrial habitat can harm vernal pool-breeding wildlife. They then recommend that future development footprints be limited to <25% of the area surrounding vernal pools. This recommendation is not scientifically defensible as it assumes that limiting development footprints to <25% will protect vernal pool-breeding wildlife. However, in the one study in which 25% of the surrounding forest was cleared for development, the data shows fairly dramatic declines in amphibian populations at that site. It would seem that more extensive research would be needed to support a recommendation for a percentage of land that may be disturbed without harming existing vernal pool-breeding wildlife populations. In the Specific Issues and Recommendations Section, the authors include literature citations relating to Conservation Issues for amphibians but include very few sources relating to their Management Recommendations.

Similarly, the Metropolitan Conservation Alliance (Calhoun and deMaynadier, 2004) recommends three rings of buffers (vernal pool depression, 100-foot protection zone, 400-foot amphibian life zone) around vernal pools located in "managed" forests (i.e., forest canopy disturbance followed by renewed forest growth and not subject to permanent conversion to development, roads, and associated impervious surfaces) in which differing degrees of management activities are recommended. It should be noted that the authors do not reference literature to support the specific recommended distances for either the 100-foot protection zone or the 400-foot life zone nor for the management goals and recommendations within those zones. They do cite literature sources presenting data for vernal pool-breeding wildlife migration distances away from vernal habitat, and all reported data are larger than the 400-foot life zone recommendation.

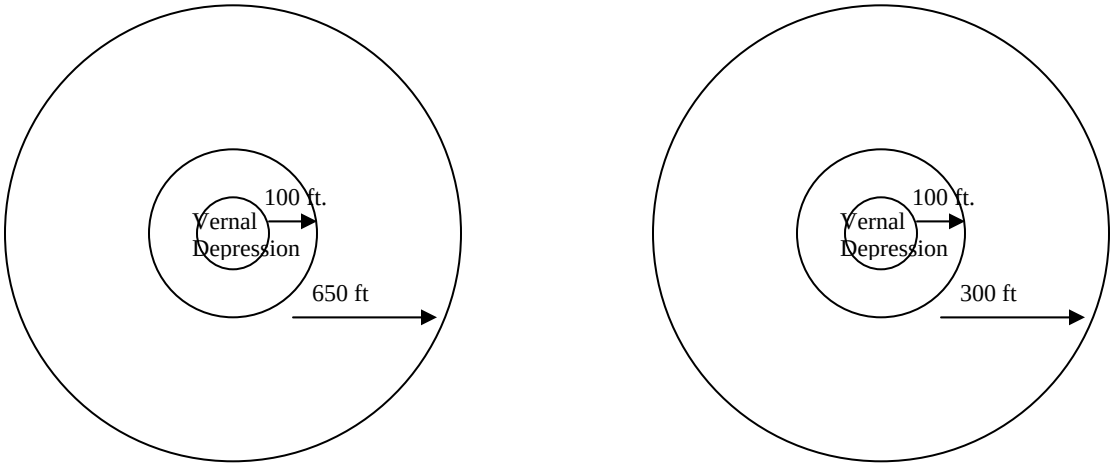

Figure 2. Proposed zones of protection around vernal pools on 1) privately-owned, small land parcels and 2) managed forests respectively (reproduced from Calhoun and Klemens [2002] and Calhoun, A. J. K. and P. deMaynadier [2004]).

Given the lack of scientific defensibility of the management recommendations for activities allowed within the amphibian life zone outlined by Calhoun and Klemens (2002), the Highlands Council is not proposing their tiered management approach for undisturbed vernal pools. Instead, the Council is proposing that a 1,000-foot protective buffer be applied to Highlands Region vernal pools. This size buffer is scientifically robust as evidenced by data in Tables 1 and 2. It also accounts for the three protective buffers recommended by Semlitsch and Bodie (2003) for: 1) water quality protection around the vernal pool, 2) core terrestrial habitat, and 3) terrestrial habitat. The Council is proposing a nomination procedure be to increase vernal pool protection buffers if an applicant can demonstrate, in coordination with the Highlands Council and NJDEP's Endangered and Nongame Species Program, that:

- Existing vernal pool-breeding wildlife require a larger protective buffer.

Similarly, the Council is proposing a procedure to permit decreased vernal pool protection buffers if an applicant can demonstrate, in coordination with the Highlands Council and NJDEP's Endangered and Nongame Species Program, that:

- In an undisturbed wetland, existing vernal pool-breeding wildlife require a smaller protective buffer;
- Existing land uses present a human, natural, or development barrier to vernal pool-breeding wildlife; or
- A need to protect public health and safety, or to provide for minimum practical use with required mitigation, (including a habitat protection buffer in addition to mitigation), in the absence of any alternative through issuance of a waiver by NJDEP.

If an applicant successfully demonstrates the first item listed above, in concert with the Highlands Council and NJDEP's Endangered and Nongame Species Program, migration distances for the specific species identified at the site dictate the protection buffer size, and that protection buffer will remain intact.

If an applicant successfully demonstrates the second item listed above, in concert with the Highlands Council and NJDEP's Endangered and Nongame Species Program**,** then the vernal pool is classified as disturbed. For disturbed vernal pools, the Council propose implementation of a variety of the best management practices (BMPs) for land use outlined in Calhoun and Klemens (2002) that maintain a majority of vernal pool-breeding wildlife habitat.

If an applicant successfully obtains a Highlands Preservation Area Approval with a waiver from NJDEP, the Council recommends a requirement for in-kind mitigation with additional terrestrial habitat protection buffers.

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