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RMP Program: Highlands Restoration: Water Deficits
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| <p>Issue Overview</p> | <p>Sustaining the Highlands Region’s water resources is a matter of statewide importance. Increases in human population and changes in land use threaten those water resources by contributing to over-withdrawal of ground water and surface water systems, and a reduction of recharge rates. Growth patterns that deplete aquifers reduce base flows in streams and reduce safe yields of reservoirs. In short, the protection of base flow is critical to maintaining viable aquatic ecosystems and protecting potable water supplies, particularly during periods of drought. Recent droughts, which resulted in historically low stream flows and rapid depletion of reservoir capacity, provide clear evidence that water resources of the Highlands, while large in scale, are also nearing or beyond their capacity. The lapse of four decades since the drought of record hampers public understanding of what would happen during another severe drought.</p> <p>The northern population centers of the state and the Highlands Region itself rely on surface water reservoirs and ground water aquifers, both of which are replenished by waters originating in the Highlands. Given these demands on Highlands water resources, there is a fundamental need to ensure adequate water supplies within the Region and outside the Region while also protecting its important ecological and riparian integrity.</p> <p>Where water supplies are being stressed, management strategies are necessary to reduce and where feasible eliminate deficits, and to ensure that supplies are not depleted further. These strategies should also endeavor, wherever possible, to mitigate existing water demands and ensure that future demands are only granted upon the condition of reduction of water deficits.</p> |
| <p>RMP Policies and Objectives Addressed</p> | <p>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.</p> |

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| | <p>Objective 2.1.2.4.1. <i>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.</i></p> <p>Objective 2.1.2.4.1. <i>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.</i></p> <p>Objective 2.1.2.4.2 <i>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.</i></p> |
| <p>Program Summary</p> | <p>In order to address the requirements and goals of the Highlands Act, the Highlands Council conducted a net water availability analysis, at a HUC14 subwatershed level, to determine the amount of water required to protect aquatic ecological integrity and the amount that is “available” for consumptive and depletive uses. This analysis is at a more local scale than used by the NJ Department of Environmental Protection for its Statewide Water Supply Plan (i.e., HUC11 watersheds), as the Highlands Council is addressing a much smaller area. NJDEP intends to incorporate the Highlands Region analysis in its work to the maximum extent feasible. It also uses more stringent constraints on human water uses, in furtherance of Highlands Act requirements for the protection of the Region’s water resources and aquatic ecosystems.</p> <p>Consumptive and depletive uses are those uses that are not returned to the subwatershed by a discharge back into ground or a stream. They represent a hydrologic “loss” to the system with a corresponding reduction in base flows. The analysis compared these consumptive and depletive demand patterns against water availability to see where water resources are being exceeded.</p> <p>Where a subwatershed’s water use was determined to exceed its availability, it was deemed to be in deficit. The Goals, Policies, and Objectives of the Regional Master Plan (RMP) restrict additional consumptive and depletive uses from that subwatershed so that the deficit is not exacerbated. The RMP also mandates that municipalities, utilities, and other interested stakeholder develop a Water Management Plan. The primary purpose of a Water Management Plan is to reduce and where feasible eliminate deficits; the plan can identify appropriate management strategies that can help ameliorate such water deficits or potential impacts on water supply source areas.</p> <p>The Highlands restoration water deficit program consist of five discrete tasks:</p> <ol style="list-style-type: none"> 1. Identify HUC14 subwatershed that have a deficit of water availability; 2. Verify the net water availability analysis and its associated deficits. 3. Require, as a condition of conformance, development of a Water |

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| | <p>Management Plan for those municipalities or stakeholders whose water supply is located in a deficit subwatershed.</p> <ol style="list-style-type: none"> 4. For complex systems or where the development of deficit reduction plans for multiple subwatersheds is more appropriate, collaborate with NJDEP and affected interests to develop Water Management Plans at a larger scale. 5. Coordination with NJDEP so that water allocation permits support the reduction and elimination of water deficits. |
| <p>Analysis of Net Water Availability</p> | <p>Program Description</p> <p>The Highlands Council conducted a net water availability analysis in the RMP to assess the sustainability of Highlands water resources. Reservoir supplies with approved safe yields were assessed separate from ground water and other surface water supplies, as reservoirs provide storage against drought conditions and therefore are affective in a significantly different manner than other resources.</p> <p>The net water availability analysis was conducted using hydrologic data and annual water use and withdrawal data ranging from years 2000-2005. The data were gathered primarily from NJDEP databases, with some instances of local input. However, much of the information regarding water supply utilities, their service areas, and zone usage rates exists as local knowledge. Enhancing the data in the availability analysis will be a critical component of the water deficit program to ensure the sustainability of water resources.</p> <p>The net water availability analysis is described in the RMP's Water Resources Technical Report. In summary, the analysis consists of the following basic steps:</p> <ol style="list-style-type: none"> 1. Estimate the ground water capacity within each HUC14 subwatershed of the Highlands Region; 2. Determine the threshold percentage of the ground water capacity is necessary to protect aquatic resource integrity and preserve water supply. The thresholds are more stringent in the Protection Zone and least stringent in the Existing Community Zone, but even in the latter case is somewhat more stringent than the NJDEP statewide threshold. Each threshold is multiplied by the ground water capacity; the product is called ground water availability. 3. Compare existing water uses and their associated consumptive/depletive volumes against the ground water availability. The difference is called net water availability; where consumptive and depletive water exceed the available water resources, those subwatersheds are deemed in deficit. <p>Net water availability has been calculated for all 183 HUC14 subwatersheds of the Highlands Region. 110 of these are in deficit, based on the RMP thresholds.</p> |
| <p>Verification of Net Water</p> | <p>Program Description</p> <p>The Highlands Council will continually update and verify the data utilized in</p> |

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| <p>Availability</p> | <p>its capacity assessments. Through the conformance process with municipalities and counties, the Council will obtain local-scale information about water use and water supply from local governments and utilities. The Council will also utilize new annual demand data, as the information is reported and available from a variety of sources.</p> <p>As a more refined understanding of regional and local water resources is developed, the Council will be able to update and verify the net water availability analysis. This process will allow the Council to validate its analytical tools and determine whether initial estimates are correct. Utilizing this information, the Council can evaluate whether each subwatershed is correctly assessed and reevaluate its status as necessary.</p> <p>Following confirmation of deficit status, the Highlands Council will continue to monitor deficit areas for two purposes:</p> <ul style="list-style-type: none"> • To ensure that future demand patterns are representative of previous annual data and not exacerbating deficits; and • To evaluate the effectiveness of mitigation measures defined in Water Management Plans. |
| <p>Strategic Approaches to Mitigating Water Deficits</p> | <p>Program Description</p> <p>Where water deficits within a subwatershed are identified and validated, affected stakeholders will develop a strategic approach to addressing these shortages. These stakeholders will most often consist of municipalities, but may also include water supply utilities, wastewater systems, surrounding municipalities, and counties. Any proposed measures should be prioritized upon feasibility, effectiveness, environmental benefits, and funding issues.</p> <p>Municipal conformance shall include consideration of the availability and viability of water supplies for future development. They should not assume that water will be available, absent a clear demonstration within a Water Management Plan. Stakeholders shall give highest priority to water use efficiency and ground water recharge enhancements within the deficit subwatershed, then to the development of new internal water supplies, and finally to the development of water resources from areas which are not in deficit. Water use efficiency and conservation are discussed further by a related RMP program (see <i>Water Use Efficiency Program</i>). All of these strategies must be detailed and implemented as appropriate and feasible through a Water Management Plan.</p> |
| <p>Development of Municipal Water Management Plans</p> | <p>Program Description</p> <p>Municipalities can rely upon numerous tools for planning at the local level: municipal and county master plans, the State Development and Redevelopment Plan, and wastewater management plans (WMPs).</p> <p>Wastewater management plans require examination of current and future growth patterns to ensure that growth does not exceed the assimilative capacity of surface and ground waters for wastewater treatment. The intent, as with other sound planning practices, is to ensure that carrying capacity and land use are properly integrated. Similar in concept to a WMP, a Water Management Plan is envisioned as a planning tool for using municipal and</p> |

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| | <p>utility data to update and verify water availability models, deficit mitigation methods, and implementation alternatives.</p> <p>Municipalities supplied by, or withdrawing from deficit areas shall, as a requirement of conformance, be required to implement a Water Management Plan. The Regional Master Plan calls for the Water Management Plan to develop mitigation and restoration strategies as discussed previously.</p> <p>The essential components of a Water Management Plan shall include</p> <ul style="list-style-type: none"> • Identification of Water Sources and Uses - To include a water utility profile complete with demand data, service areas, water sources, and wastewater returns. • Analysis of Net Water Availability - To validate or modify prior results using new data regarding consumptive and depletive water uses and the movement of water with HUC14 subwatersheds, leading to more current and defensible net water availability results. The use of more sophisticated water models can also be proposed, but must be at least as protective of the water regime as the Highlands Council approach. • Mitigation Approach - To discuss mitigation strategies and a prioritized approach to reducing deficits. • Funding Opportunities - To address financial mechanisms that reflect the strategic approaches adopted in a water management plan. • Operation and Monitoring - To conduct ongoing monitoring of uses and validation of mitigation. In these cases, affected entities could include counties or multiple affected municipalities at this scale. • Deficit Reduction and Elimination Strategy – To describe, based on the prior analyses, the selected strategies for deficit reduction and elimination, including responsible parties, schedules, funding commitments, etc. The strategies in the Water Management Plan must be implemented as a commitment of RMP Plan Conformance. |
| <p>Development of HUC14 Water Management Strategies</p> | <p>Program Description</p> <p>There will be instances when a deficit subwatershed is a source to multiple municipalities – even if one or more municipality is not located in the subwatershed. There may also be instances where a larger planning entity may wish to develop the Water Management Plan. These entities could include a large water purveyor, county government, or the Highlands Council itself if municipalities are unwilling or unable to develop such a plan. Therefore, the development of a HUC14 Water Management Plan would be more appropriate. Additionally, there will be instances where the hydrologic system is sufficient complex or HUC14 subwatersheds are sufficiently interconnected where development of a multi-subwatershed Water Management Plan is appropriate.</p> <p>The mitigation approaches employed at a HUC14 subwatershed or multi-subwatershed level should be based upon the same priorities required of municipal Water Management Plans: stakeholders shall give water use efficiency and ground water recharge enhancements highest priority , then the</p> |

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| | development of new internal water supplies, and finally to the development of water resources from areas which are not in deficit. |
| Coordination with NJDEP Water Allocation Program | <p>Program Description</p> <p>The Regional Master Plan affects the potential for water use through a combination of land use capacity analysis and the required implementation of Water Management Plans. However, NJDEP’s Water Allocation Program is statutorily tasked with the actual allocation of water resources to those who wish to withdraw more than 100,000 gallons per day in the Planning Area and 50,000 gallons per day in the Preservation Area. To ensure that water resource deficits in HUC14 subwatersheds are not exacerbated and over time are reduced or eliminated, the NJDEP should, to the extent feasible under law, modify water allocation permits in the following manner:</p> <ol style="list-style-type: none"> 1. Prior to Plan Conformance, new water allocation permits should not be approved nor existing water allocation permits increased unless the applicant demonstrates to NJDEP that it will not exacerbate a deficit, that the water use will be conducted at the maximum possible efficiency, and that 125% mitigation of increased consumptive and depletive water uses is ensured in accordance with the RMP policies and objectives and the <i>Water Use Efficiency Program</i>; 2. Prior to Plan Conformance, existing water allocation permits should be reviewed upon renewal and modified as necessary to limit the allocation to reasonably anticipated future needs, as constrained through improved water use efficiency, so that the allocation is limited to the minimum possible consumptive and depletive uses; 3. Subsequent to Plan Conformance, existing water allocation permits should be reviewed upon renewal and modified as necessary to reflect the reasonably anticipated future needs based on conformance with the RMP and implementation of the relevant Water Management Plan; 4. Subsequent to Plan Conformance, new water allocation permits should be approved only if they comply with the relevant Water Management Plan. |