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**NH Lakes Management Advisory Committee
and
NH Rivers Management Advisory Committee**

COMPREHENSIVE SURFACE WATER RESOURCE MANAGEMENT

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BACKGROUND

The goal of water resource management is to balance competing demands between users and uses of water. Two of the programs defined by the New Hampshire legislature to manage and protect surface water resources for natural and human uses are the Rivers Management and Protection Program¹ and the Lakes Management and Protection Program,² which were created to protect surface water resources and promote their management for natural and human uses. A component of the Rivers Management and Protection Program, the Instream Flow Pilot Program has the potential to affect lake operations in its management of stream flows and conversely, lake level management can impact stream flows. Committee members from these two programs recognized that conflicts will arise when management to improve conditions for one waterbody may negatively impact another waterbody. This document provides recommendations to balance the management effects on surface waters of the state.

"Public waters" in New Hampshire are prescribed by common law as great ponds (natural waterbodies of 10 acres or more in size), tidal waters, and public rivers. These common law public waters are held by the State in trust for the people of New Hampshire. The fundamental goals of the Rivers Management and Protection Program and the Lakes Management and Protection Program are to protect the quality and appropriate uses of New Hampshire's rivers and lakes. Withdrawal and use of water resources, lake management, as well as land use changes and development may result in altering the natural fluctuations in water levels in lakes and shifting flow patterns in rivers. These alterations have been shown to diminish water quality in lakes and rivers.³ Continued and expanded demand for water requires holistic planning and management to remediate and mitigate the effects of altered flow and lake level conditions in order to protect water resources.

The Clean Water Act and state water quality rules require that Surface Water Quality Standards be met for both rivers and lakes. Effective water resources management requires coordinated management of the lakes and rivers within a watershed. Currently, rivers and lakes are managed separately as individual waterbodies or river segments and with differing criteria. The result is a patchwork of protection within a watershed, conflicting outcomes and inconsistent public participation. These recommendations are intended to guide DES in resolving conflicts between lake and river water quality and quantity needs.

¹ New Hampshire Rivers Management and Protection Program, <http://www.gencourt.state.nh.us/rsa/html/L/483/483-mrg.htm>.

² New Hampshire Lakes Management and Protection Program, <http://www.gencourt.state.nh.us/rsa/html/L/483-A/483-A-mrg.htm>.

³ http://www.vtwaterquality.org/wqd_mgtplan/stressor_flowalt.htm

Applicable Regulatory Authority

Water quality and Designated Uses are maintained and protected through the Water Quality Standards, which include RSA 485A:8, Classification of Water, and Env-Wq 1700, Surface Water Quality Regulations. The Rivers and Lakes Management and Protection Programs, in RSA 483 and RSA 483-A respectively, reinforce the obligation to protect water quality in these waterbodies. Relevant sections of these regulations may be found in the Appendix.

Surface Water Quality Standards

RSA 485A:8⁴ establishes that all New Hampshire surface waters must be classified as either Class A or Class B waters, and establishes certain minimum surface water quality criteria for each classification. The Surface Water Quality Regulations in Env-Wq 1700⁵ provide further direction to safeguard New Hampshire's waters through protection criteria for: 1) Designated Uses; 2) Antidegradation provisions; and 3) the establishment of additional water quality criteria, including both numeric and narrative water quality standards.

Designated Uses⁶ represent the uses that a waterbody should support. The Designated Uses for New Hampshire waters are:

1. Aquatic life
2. Fish and shellfish consumption
3. Drinking water supply
4. Primary and secondary contact recreation (swimming and boating)
5. Wildlife

Surface Water Quality Regulations describe numeric and narrative water quality standards. The water quality criteria include water quality and water quantity conditions necessary to protect the biological and aquatic community in surface waters. Narrative criteria for stream flow and water levels must be defined numerically. Numeric criteria are being developed for river flows under the Instream Flow Pilot Program and draft guidance for evaluating lake level fluctuation limits are being developed as described below.

Antidegradation provisions protect and maintain the quality of state surface waters by establishing a process for review and justification of proposed activities that would increase pollutant loads, degrade water quality, or otherwise adversely affect the uses of a waterbody. Any activity that is proposed and would potentially result in significant lowering of water quality must show that the activity is necessary for important economic or social development in the area where the waterbody is located.⁷

Rivers

The Rivers Management and Protection Program Act identifies protections for Designated Rivers under the Rivers Program. The Program's intent is to support water quality laws which include maintaining the levels adequate to protect Designated Uses.

⁴ <http://www.gencourt.state.nh.us/rsa/html/L/485-A/485-A-8.htm>

⁵ <http://des.nh.gov/organization/commissioner/legal/rules/documents/env-wq1700.pdf>

⁶ NH's Designated Uses are described in the NH Consolidated Assessment and Listing Methodology <http://des.nh.gov/organization/divisions/water/wmb/swqa/documents/calm.pdf>

⁷ DES Fact Sheet - What is Antidegradation? <http://des.nh.gov/organization/commissioner/pip/factsheets/wmb/documents/wmb-23.pdf>

The Act also describes an Instream Flow Program to be applied to certain designated rivers. RSA 483:9c of the Rivers Management and Protection Act⁸ requires development of criteria to establish protected instream flows along with a management plan to implement those flows. A protected instream flow is the amount of water needed to support the instream human and natural uses that depend on the river. The Instream Flow Program translates the narrative standards in the Surface Water Quality Regulations into numeric thresholds.

Instream Flow Rules adopted in 2003⁹ describe the methods for applying flow management including requirements for conservation and water use changes by water users and for management of impoundments by dam owners. Flow criteria are developed from site specific studies of river resources and characteristics to generate numerical flow standards. These rules did not include guidance for management of lakes other than management would be negotiated with the dam owner, although other stakeholders' input must be considered during the development of the process and the specific management plans. Stakeholders include the NH Department of Fish and Game and the Department of Resources and Economic Development, among others. No specific process was described for protection of lake interests under the Instream Flow Rules. However, the Lakes Management and Protection Program Act and the Surface Water Quality Rules apply to all aspects of the Instream Flow management.

Lakes

The intent of the Lakes Management and Protection Program Act (RSA 483-A) is to identify management measures to enhance the environmental, biological, social and economic assets as well as the public health and recreational enjoyment of lakes. The Program strives to recommend lake protection activities, provide technical assistance, and support water quality laws. Some of these laws include provisions for maintaining adequate lake levels to protect Designated Uses.

At this time there are no numerical water quality criteria for managing impoundment and lake levels, but draft guidance has been developed.¹⁰ Under the draft lake fluctuation guidance the range of variability of natural lake levels is used as one of the guidelines for management. The natural variability represents the range of conditions that are known to support the natural ecosystem. Assessments of other uses of the lake, such as recreation, are also part of developing a lake's management. The final management plan balances these components to meet water quality standards and support existing uses.

The draft guidance is being developed for evaluating lake level fluctuations to meet biological and aquatic community integrity when determining whether to issue or deny Water Quality Certification for proposed water withdrawals and hydrologic modifications per RSA 485-A:12, III and IV. This draft guidance describes an assessment process for evaluating the effect of changes to lake levels when a change to lake management is proposed. The assessment process evaluates the proposed changes in comparison with the range of natural water level changes and with the limits of antidegradation provisions. Using the natural range of variability for management of lake levels parallels the proposed New Hampshire protected instream flow management criteria for rivers.

The concept of natural lake level fluctuations is being used in other states. For example, Chapter 587 of Maine law requires the natural variation of water level as a permit condition. "Water level requirements take into account natural variation of water levels that occur in Maine lakes and ponds, and the uses and

⁸ RSA 483:9-c Establishment of Protected Instream Flows - <http://www.gencourt.state.nh.us/rsa/html/l/483/483-9-c.htm>. The RMPP Act was modified in Chapter 278, Laws of 2002, creating a pilot program to apply instream flow protection initially only to the Lamprey and Souhegan Designated Rivers.

⁹ Chapter Env-Wq 1900 Rules For The Protection Of Instream Flow On Designated Rivers; readopted in 2011 with amendment; <http://des.nh.gov/organization/commissioner/legal/rules/documents/env-wq1900.pdf>

¹⁰ Draft lake level fluctuation assessment process is called "Process for Determining Appropriate Water Level Fluctuations in Impoundments for Water Quality Certifications"; current version revised July 17, 2012.

characteristics assigned by the water quality classification program. Water level is managed to provide variation that takes into account expected seasonal levels shown to protect aquatic resources and other water quality standards. Flows or water levels established by regulatory permit shall be based on the results of a site-specific flow or water level study, taking into account the need for natural variation of flow and natural variation of water level.”¹¹

Approach

The fundamental goal of water management is to attain Surface Water Quality Standards in all surface waterbodies while providing sufficient water to support a variety of appropriate uses. Attaining standards includes restoring surface waterbodies to maintain physical, chemical and biological integrity¹² such that Designated Uses are protected. Supporting biological integrity in rivers means maintaining flows that mimic the natural patterns to which an ecosystem is adapted.¹³ Similarly, lake level changes that are maintained within the range of natural variation will be most supportive of ecological needs and water quality criteria.

These recommendations establish guidelines for applying instream flow protections to rivers together with management for lake level protections such that each may be supported. Management must balance water quality standards on both lakes and rivers with existing uses. These recommendations take into account and accept that the water level of most waterbodies in New Hampshire has been altered by damming and results in new baseline conditions. In such scenarios where the dam will remain, these new reference water levels will be considered when proposing management changes. Thus, while lake levels are not generally managed within a range of natural variation, as management plans are developed they should strive to use a natural lake level variability as a framework to represent universal water quality protections.

Implementation of these concepts may require the development, on a site-specific basis, of numeric thresholds for lake levels or river flows that indicate attainment of Water Quality Standards. In addition, site-specific conditions may be further evaluated under the Antidegradation provisions of the Surface Water Quality Regulations in order to maintain existing high quality conditions.

Water is a finite, but reusable and renewable, resource. Fortunately, water may be used many times as it moves from its headwaters to the sea. Sustainable water management can take advantage of this because most water use is not consumptive. Water that is used and returned to be used again provides for more sustainable use. However, upgrades and repairs to aging infrastructure must be designed to return the used water as close as possible to the withdrawal site in order to reduce losses and leakage, and to support the reuse of water within a watershed.

¹¹ Maine Department of Environmental Protection, Chapter 587: IN-STREAM FLOWS AND LAKE AND POND WATER LEVELS, <http://water.epa.gov/scitech/swguidance/standards/wqslibrary/upload/06-096-CMR-587-2011-06.pdf>.

¹² Env-Wq 1703.01(b)

¹³ Poff, N. L. et al. 1997. The Natural Flow Regime. *BioScience* Vol. 47, No. 11: pp. 769-784. http://www.fs.fed.us/stream/Poffetal_1997.pdf

GUIDING PRINCIPLES

Together, the New Hampshire Lakes and Rivers Management Advisory Committees recommend the following principles for DES evaluation of water resource management decisions. The committees believe these principles should be followed because adherence to these principles will ensure balanced and sustainable water use and attainment of water quality standards for river flows and lake levels. These Guiding Principles are intended to be applied simultaneously and their order below does not represent a hierarchy.

1) Support Designated Uses in all surface waters.

Water resource management should result in the maintenance and restoration of Designated Uses of all surface waters. Attainment of water quality standards requires protection of Designated Uses, which are affected by both water quality and water quantity. Standards include the requirement to restore both river flows and lake levels to maintain chemical, physical, and biological integrity. Where surface water quality will be degraded, this degradation shall not exceed the limits of the Antidegradation provisions. Under Antidegradation provisions, water quality should be maintained well above the minimum standards that support Designated Uses. Thus, all parties should strive to maximize the water quality and quantity conditions and Designated Uses of all water resources.

2) Water resources management includes all waters and uses.

All lakes, impoundments, rivers, and water withdrawals and water returns in a watershed should be included in a comprehensive water resources management program. Water bodies and water uses all occur within the context of a larger watershed-wide water resource. Management of lakes has the capacity to deprive or to supply water to the downstream river. Balancing the roles of both rivers and lakes in the management of the water resource is necessary to meet water quality goals. Management must not unduly damage one resource to protect or enhance another. Watershed plans should be developed, and where they exist, should address attaining water quality standards by including lakes, impoundments, rivers, water withdrawals and water returns as interrelated management components, not as independent entities.

3) Imitate natural water conditions to meet Surface Water Quality Standards.

Imitating natural water level conditions in lakes and river flow conditions in rivers is the most appropriate way to ensure Water Quality Standards for aquatic life are protected. Naturally, neither river flows nor lake levels are static over time. Most organisms cannot adapt and survive as quickly as changes, such as alteration of river flows and lake levels, are made to their essential habitats. It takes many centuries or longer for fish and other aquatic organisms to genetically adapt to the natural range of variation in such conditions. However, water levels and flows in almost all lakes and rivers in the state have become managed to some extent. Maintenance of physical and biological integrity in rivers is supported by flows that mimic the natural variation of flows described with components of timing, magnitude, frequency, duration and rate of change. Similarly, natural lake level fluctuations that can be expected to maintain biological integrity should follow patterns of natural variability. Management should be applied that adequately mimics a more natural hydrologic condition of flow and water level variability such that water quality standards of the affected waterbodies are not compromised.

4) Watershed-specific evaluations are necessary.

Watershed-specific evaluations are necessary to take into account varying lake and river conditions as well as stakeholder concerns. Lake water quality conditions range from low-nutrient, coldwater lakes to nutrient-rich, warmwater lakes. In addition, lakes show varied shoreline, littoral and benthic conditions which can affect

ecosystem values. Lakes are also managed for a variety of societal purposes that include, but are not limited to, water supply, hydropower generation, recreation and other interests. Similarly, rivers have varying aspects that encourage or dissuade various activities. Management actions must be based on the site-specific ecological uses and societal values in order to protect the Designated Uses.

5) Use infrastructure to support sustainable water use.

Well designed and implemented water infrastructure construction can provide a higher level of sustainable water use. Sustainable water use requires planning and investment that support current and future infrastructure needs in order to return water to the environment locally, reduce losses, and enable reuse of the resource water. Water is lost from a watershed when it is exported to another watershed, evaporated or returned to a location downstream from where it was withdrawn. These losses comprise consumptive uses that can be reduced by retaining water within the watershed, reusing water, or both. In addition, loss of water as a result of leaks and infrastructure breakage represent water that is displaced. Planning for infrastructure improvements in much of the water supply distribution network and water treatment systems provides an opportunity to incorporate upgrades that will ensure greater long-term sustainability of water resources. Infrastructure decisions should be made that support non-consumptive use by improving systems' abilities to treat and return water locally, conserve water, repair leaks to reduce losses, and increase the reuse of water.

6) Base water management on the public trust and riparian rights doctrines.

Water resources management decisions should be based on the public trust and riparian rights doctrines¹⁴ (also known as the 'reasonable use doctrine') rather than establishing specific allocations of water for specific users. These doctrines allow riparian owners to make any reasonable use of water that does not unduly interfere with the competing rights and interests of other riparian owners or the public trust. The reasonable use doctrine as it exists in New Hampshire recognizes that water availability is finite and that all riparian and littoral land owners, along with the general public, have a right to share the available water. The water in excess of the volume and flow necessary to meet the Water Quality Standards may be used by these land owners so long as they respect the needs of downstream users by sharing what is available. Increased demand for water will require balancing usage among all existing and new users to sustain their riparian rights under the reasonable use doctrine.

7) Follow water resource emergencies by developing avoidance strategies.

Emergency conditions¹⁵ that endanger human health and safety will be managed to protect life and property. Meeting emergency conditions may require violating Water Quality Standards for periods of time. However, following the emergency, steps should be taken to avoid repetition of these emergency conditions. Adaptive management plans must address the cause or the frequency, or both, of future emergencies. General concepts for avoiding emergency water supply conditions or water quality impairments include, but are not limited to, identification and development of alternate water supplies, storage of water through artificial recharge or impoundments, conservation of water, and water reuse technologies.

¹⁴ <http://xml2.des.state.nh.us/blogs/lmac/wp-content/uploads/2010/11/20101112.FINAL-Public-Trust-Doctrine-and-Lake-Management-in-New-Hampshire3.pdf> See also Appendix under Re: Riparian Rights.

¹⁵ RSA 4:45 and RSA 483:9-c, IV

APPENDIX – Excerpts from Relevant NH Statutes and Regulations

Surface Water Quality Regulations Excerpts

Env-Wq 1701.02 Applicability.

- (a) These rules shall apply to all surface waters.
- (b) These rules shall apply to any person who causes point or nonpoint source discharge(s) of pollutants to surface waters, or who undertakes hydrologic modifications, such as dam construction or water withdrawals, or who undertakes any other activity that affects the beneficial uses or the level of water quality of surface waters.

Env-Wq 1703.01 Water Use Classifications.

- (b) All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.
- (c) All surface waters shall provide, wherever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters
- (d) Unless the flows are caused by naturally occurring conditions, surface water quantity shall be maintained at levels adequate to protect existing and designated uses.

Env-Wq1703.19 Biological and Aquatic Community Integrity:

- (a) The surface waters shall support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
- (b) Differences from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function.

Env-Wq 1702.07 “Biological integrity” means the ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.

Env-Wq 1708.02 Applicability. Antidegradation shall apply to:

- (c) Any increase in flow alteration over an existing alteration; and
- (d) Any hydrologic modifications, such as dam construction and water withdrawals.

Rivers Law Excerpts

RSA 483 Rivers Management and Protection Act

483:1 Statement of Policy. – . . .The state shall . . . regulate the quantity and quality of instream flow along certain protected rivers or segments of rivers to conserve and protect outstanding characteristics including recreational, fisheries, wildlife, environmental, hydropower, cultural, historical, archaeological, scientific, ecological, aesthetic, community significance, agricultural, and public water supply so that these valued characteristics shall endure as part of the river uses to be enjoyed by New Hampshire people. If conflicts arise in the attempt to protect all valued characteristics within a river or stream, priority shall be given to those characteristics that are necessary to meet state water quality standards.

483:2 Program Established; Intent. – There is established within the department of environmental services the New Hampshire rivers management and protection program.

It is the intent of the legislature that the New Hampshire rivers management and protection program shall complement and reinforce existing state and federal water quality laws, and that in-stream flows are maintained along protected rivers, or segments thereof, in a manner that will enhance or not diminish the enjoyment of outstanding river characteristics. . . .

Lakes Law Excerpts

RSA 483-A Lakes Management and Protection Act

483-A:1 Statement of Policy. – New Hampshire's lakes are one of its most important natural resources; vital to wildlife, fisheries, recreation, tourism, and the quality of life of its citizens. It is the policy of the state to insure the continued vitality of New Hampshire lakes as key biological, social, and economic assets, while providing that public health is ensured for the benefit of present and future generations. The state shall encourage and assist in the development of management plans for the waters as well as the shoreland to conserve and protect valued characteristics, including recreational, aesthetic, and those of community significance, so that these valued characteristics shall endure as part of lake uses to be enjoyed by the citizens of New Hampshire. If conflicts arise in the attempt to protect the valued characteristics of a lake, priority shall be given to those characteristics that are necessary to meet state water quality standards.

483-A:3 Program Established; Intent. – There is established the New Hampshire lakes management and protection program within the department of environmental services. It is the intent of the legislature that the New Hampshire lakes management and protection program shall complement and reinforce existing state and federal water quality laws. It is also the intent of the legislature that, through said program, the scenic beauty and recreational potential of lakes shall be maintained or enhanced, that wildlife habitat shall be protected, that opportunity for public enjoyment of lake uses be ensured, and that littoral interests shall be respected.

Riparian Rights

The riparian rights doctrine is a common law theory that states “a riparian owner has a right to the beneficial use of the water of a river or a stream passing through or adjacent to his land. . . . An upstream riparian owner may divert water from its channel for any lawful use, so long as he returns it to the channel above the land of the next downstream riparian owner in substantially the same condition as when it reached the upstream riparian owner’s land.” *Wisniewski v. Gemmill*, 123 N.H. 701,705 (1983).

New Hampshire holds in trust its lakes, large natural ponds, navigable rivers and tidal waters for the use and benefit of the people of the State. *State v. Sunapee Dam Co.*, 70 N.H. 458, 460 (1900). The uses and benefits subject to the public trust are not limited to navigation and fishery, but include other benefits. Various cases have held that the public trust encompasses “all useful and lawful purposes”, “what justice and reason require”, and “to boat, bathe, fish, fowl, skate and cut ice.” See *Opinion of the Justices*, 139 N.H. at 90-91.