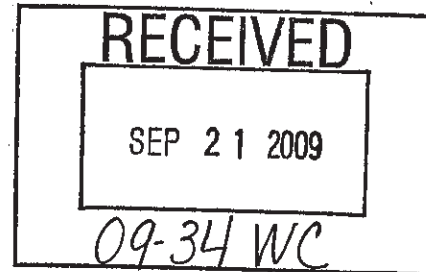

Ashuelot
Pond
Association

16C Harrison St.
Keene, NH 03431

Tom Cross (603) 355-1498
TECross@myfairpoint.net

September 16, 2009

Ms. Alormade (Amy) Samson
Water Council NHDES
29 Hazen Drive
Concord, NH 03302-0095



RE: Appeal of Notice of Decision on Determination of Lake Level

Dear Ms. Samson:

Enclosed you will find 20 copies of our Appeal, plus the original to your attention. We have also sent copies to Mr. Thomas Burack, Commissioner, Mr. Harry T. Stewart, Director – Water Division and Mr. James W. Gallagher, Chief Water Resources Engineer & Administrator.

We believe we have followed the Environmental Fact Sheet (C07) and Page 10 of the New Hampshire Code of Administrative Rules. As I expressed on the phone on Tuesday 9/15/09, if we have missed anything, would you please advise.

Sincerely,

COPY

Thomas E. Cross
President

cc: Mr. Thomas Burack
Mr. Harry T. Stewart
Mr. James W. Gallagher
APA Files

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF ENVIRONMENTAL SERVICES
WATER COUNCIL
NOTICE OF DECISION DATED AUGUST 28, 2009
ON DETERMINATION OF LAKE LEVEL

NOTICE OF APPEAL

This is an appeal by the Ashuelot Pond Association (APA) of the decision by the Department of Environmental Services (DES) dated August 28, 2009.

Appellant Is an Intervenor

Ashuelot Pond Association, 16C Harrison Street; Keene, NH 03431

Appellant's Representative

Thomas E. Cross, President, APA, 16C Harrison Street; Keene, NH 03431, 603-495-3775 - tecross@myfairpoint.net

Other Members:

1. Frank Brown - 1st Vice President, APA, 53 Francestown Turnpike; Mont Vernon, NH 03057, 603-673-6503 – chris.brown@fmr.com
2. Nicholas Zaharias - 2nd Vice President, APA, #140 Ashuelot Pond, mailing address: PO Box 636 Marlow, NH 03456, 978-252-5174 – nickza@comcast.net
3. Mary Ann Turner – Secretary, APA, 7 Meadow Road, Enfield, CT 06082, 860-745-4649 – maryannturner@cox.net

Statement of Facts

- On August 28, 2009, the DES issued a Notice of Decision on Determination of Lake Level, signed by Harry T. Stewart, PE.
- Paragraph E.4 – the new content does not address the closing of the dam in a timely manner after dam inspection, dam repairs, and maintenance of shore front improvements have been completed in deep drawdown year pond is emptied.
- Previous order stated the dam shall return to not greater than 3.5 feet by January 1 after a deep drawdown.
- Dam inspection – There are commonly used alternatives to draining the pond and not negatively affecting the ecology; such as coffer dam. [APA Letter, July 30, 2009 to DES – copy attached]. This question was asked of DES and we have not received a reply. The lowering of the pond by 3.5 feet allows for the face of the dam to be inspected every year.
- The DES has not addressed fire protection during a deep drawdown year – and an open date of dam closure only exasperates this concern.
- Fire protection – Approximately 25 homes are without any fire protection during a deep drawdown year. Many of the homes and cottages are accessed by water only (no autos). A property owner cannot protect his or her residence without easily accessible water. With the water out, the only public boat launch on Ashulet Pond becomes useless, and neither fire department can respond to the water only access homes in case of fire or medical emergency.

- PH Problems and Issues for Ashuelot Pond

Any drawdown is ecologically unfriendly. [per article by Keene State College Professor, Patrick M. Eggleston – attached]

Additional Study Facts

DES Study – Spring 2008 – Ashuelot Pond

Page 2-1 Ashuelot Pond Morphology and Trophic State

Ashuelot Pond, located in Washington, New Hampshire, is classified as a moderately shallow (mean depth=6.6 feet, maximum depth=29 feet), mesotrophic pond.

The impact of a drawdown every year of 3.5 feet, is 54% of Ashuelot Pond is drained every year – with the Pond being “emptied” on the fifth year.

Page 3-3 PH

The acidity of a system can also be affected as an indirect result of drawdowns. According to Norton (1989), dissolved organic matter from the decay of vegetation contributes to the acidity of lakes, but it is particularly important in lakes with short residence times (i.e., lakes that flush quickly), *such as Ashuelot Pond*. [emphasis added] See Patrick M. Eggleston article referenced above.

Page 6.8 Fire Safety and Water Supply

Fire safety was also addressed in the survey with respect to landowners and their properties at Ashuelot Pond to determine how significant a source of fire-fighting water the pond provides. Only 7% of landowners at Ashuelot have indicated that there is no road access for fire trucks to reach their property in case of a fire emergency situation, so they would need to rely on lake water to fight a fire. The remaining 93% of landowners have sufficient road access for fire trucks to reach their properties (Figure 6-11). Also, 62% of residents responded that they would use the pond as their primary source of water to extinguish a fire in case of emergency (Figure 6-12). Overall, 20% of the residents of Ashuelot pond properties indicated that the drawdown of the pond would impact fire safety or their abilities to fight a fire.

Page 7-5 Recommendations

Because the data collected from this study show that there is no statistically significant benefit from the deep drawdown, in terms of overall plant reduction, or even reduction in the target bladderwort species, a deep drawdown is not scientifically warranted for Ashuelot Pond. Deep drawdowns should be conducted when there is a specific need for such a drastic water withdrawal, such as flood control purposes, dock or shoreline repair, or other valid and documented circumstance. The request for such a deep drawdown should be directed to the DES Dam Bureau for their consideration based on their scientific and engineering experience with drawdowns. Based on observations made during this study, it is concluded that there is no biological benefit of deep drawdown for plant control in Ashuelot Pond, and no specific benefit of regularly scheduled deep drawdowns for plant control purposes.

Statement of Relief Sought

- Why is a deep drawdown every five years and a shallow drawdown every year necessary?
- Since 3.5 ft draw downs are done every year –the face of the dam can be inspected every year, and the DES [per their own study] provides documentation that Ashuelot Pond is a shallow pond, the need for deep draw downs are not necessary for the reasons stated in the DES Notice of Decision. If a deep drawdown is necessary then a coffer dam should be used to avoid emptying the pond and thus provide fire protection.
- Return a specific ending date to the new order to be sure the water is back in time for recreational fall/winter use. Per a letter from APDVD [APDVD to DES, July 19, 2009 – copy attached] it states by the end of November is a reasonable request. We ask DES to consider the end of November as a date of closure, on a permanent basis, if a deep drawdown is necessary.
- DES to address fire protection during a deep drawdown – and an open ended date of dam closure only exasperates the danger of fire for property and personal safety concerns. The Washington and Marlow Fire Departments need to be requested to provide written a fire protection plan during a deep drawdown. Marlow, because they are the first line of defense to the south-side of Ashuelot Pond and Washington Fire Department because they are our town department. This becomes a State responsibility issue, as DES is authorizing the deep drawdown.

The DES needs to address the exact length of time the pond can be at deep drawdown. The boards are to be put back into place the day following dam inspection and dam inspection and the inspection must take place within 10 days of the pond being at deep drawdown. Cottage and home water access taxpayers must be able to make provisions for this denial of their property. Again, this becomes a State responsibility issue, as DES is authorizing the deep drawdown.

Applicable Statutes and Regulations

The statutes and law applicable to this appeal include:

Any and all RSA regarding the water level, inclusive of:

RSA Chapter 482-A;

RSA Chapter 541-A;

And the Clean Water Act, 33 U.S.C. § 1251et seq.

Appellant Satisfied Standing Requirements

APA satisfies the standing requirements to bring this appeal because it was one of the original parties of the 1991 decision. APA currently has approximately 50 members, on a voluntary basis, and serves the property owners on the northwest, west and southern shores of Ashuelot Pond. The homes and cottages in the southwest corner, and the southern shore, have access only by boat and snowmobile. Road access does not exist, and there is not a public walking trail to these properties.

APA members and non members will suffer direct injury both economic and potential financial, not to mention, harm. That harm to the environment will defeat the work/study done by DES to preserve the shore lands in their natural state and protect water quality in Ashuelot Pond.

The abutting property owners, who are members of APA, will suffer diminution in the values of their shore front property and the loss of natural beauty and views, which they enjoy from their homes and recreational properties. In addition, the abutters have standing as taxpayers in the Town of Washington and will suffer as they pay taxes year round and cannot get to their property year round.

Ashuelot Pond is a public body of water (greater than 10 acres) and a deep drawdown denies the use of this body of water for recreational use – fishing, hunting, winter sports – which includes visitors to the area beyond the shoreline owners.

WHEREFORE, for the foregoing reasons, Appellant respectfully request that the Water Council determine that the Notice of Decision is deficient and unreasonable and should be remanded to DES for further proceedings in accordance with the law and the written decision of the Council.

Respectfully submitted,

Thomas E. Cross, President

Ashuelot Pond Association (APA)

16C Harrison Street

Keene, NH 03431

Date:

By:



Thomas E. Cross, President APA

Attachments:

Ashuelot Pond Dam Village District (APDVD); July 19, 2009 letter to DES - One Page

Ashuelot Pond Draw Down Study (DES); Final Report, Spring 2008 – Limited Pages

Patrick M. Eggleston Article on Ashuelot River PH, August 2009 - Three Pages

Patrick M. Eggleston Editorial on Ashuelot River, September, 2009 - Two Pages

Letter to Attorney General, Nicholas Zaharias, September 16, 2009 – Two Pages

Ashuelot Pond Dam Village District
P.O. Box 105
Washington, NH

**NOTICE OF DECISION ON
DETERMINATION OF LAKE LEVEL**

In re: Ashuelot Pond Dam
Washington, NH
Dam # 245.05

Summary of Decision

Based on a review of the Spring 2008 Report of the Drawdown Study of Ashuelot Pond, Washington, New Hampshire, prepared by the Department of Environmental Services (DES), as well as a review of the testimony from interested parties submitted in response to this report, I have concluded that the Notice of Decision, Determination of Lake Level issued in September 1991 (the 1991 Order), with the modifications specified in this Notice of Decision, strikes a proper balance between competing public interests to achieve the maximum public benefit. Accordingly, the owners of the dam at the outlet of Ashuelot Pond shall operate the dam in accordance with the 1991 Order, modified as follows:

Paragraph E.4 is modified by striking the existing paragraph and replacing it, in its entirety, with the following: "Drawdowns below 3.5 feet may be conducted once every five years for the purpose of Dam inspection, Dam repairs, and maintenance of shorefront improvements. These deep drawdowns may begin prior to Columbus Day provided that the Dam Owner gives notification by certified mail, receipt requested, to the Department of Environmental Services and the Town of Washington, and posts the notification in a place for public viewing no less than 30 days in advance.

Paragraph E.7 is modified by adding the following sentences to the end of the existing paragraph: "Emergency means that a potentially hazardous situation has developed or is likely to develop that, if not addressed, could affect the structural integrity or safe operation of the dam; could cause flooding either upstream or downstream of the dam; or could otherwise endanger public health, safety, or the environment. Weed control shall not be considered an emergency."

Background

Ashuelot Pond ("the Pond") is a natural waterbody of approximately 390 acres located in Washington. The lake level in the Pond is controlled by the dam at the outlet, which is now owned and operated by the Ashuelot Pond Dam Village District (APDVD).

There are two associations affiliated with the Pond, the Lake Ashuelot Estates, Inc. (LAE) and the Ashuelot Pond Association (APA). There are several property owners who are not affiliated with either

organization. The LAE members reside primarily on the northeast side of the Pond and the APA members primarily on the southwest side.

RSA 482:79, Investigation of Levels of Inland Waters, states in part that "the department may.... upon complaint of not less than 10 owners of property on any inland public water in the state, make a preliminary investigation of conditions affecting the use and enjoyment of any such public water whenever it shall be of the opinion that such investigation would be in the public interest.....If, as a result of such further investigation after public hearing, the department shall be of the opinion that such management and control is lawful, but that changes in the manner of the exercise of the right of management and control would be of benefit to others, without undue injury to the owner of the outlet, it shall direct such changes as in its opinion would be of benefit to the public and private interests concerned." DES has been involved in the management of the level of Ashuelot Pond, under the authority of RSA 482:79, since 1990, as described below:

- On October 16, 1990, 107 petitioners, principally individuals with property interests on the southwest side of the Pond, petitioned DES, requesting that the department hold a lake level hearing in accordance with RSA 482:79, regarding the drawdown of the Pond. At that time, the owner of the dam on Ashuelot Pond was the LAE. In their petition, the petitioners claimed that the Pond was being drawn down in September and refilled late the following spring. They claimed that this practice resulted in the loss of fire protection to the property owners on that side of the Pond, eliminated access to (at the time) 25-cabins and homes that did not have road access and needed to be accessed by water, and may have negatively impacted the quality of the water in the Pond as well as the aquatic species that inhabit the Pond. The petitioners also claimed that the previous owners of the dam never lowered the level of the Pond more than three feet; and the petitioners requested that this drawdown limit be reestablished.
- In July 1991, DES conducted a hearing in accordance with RSA 482:79 and issued the Order. (*Attachment A*). In the Order, DES granted the dam owner an annual drawdown of the Pond to a depth of 3.5 feet to begin no earlier than Columbus Day, with a drawdown below 3.5 feet every fifth year to conduct aquatic weed control, to conduct shorefront improvements, and to inspect and repair the dam. In accordance with Paragraph E.4 of the Order, these deep drawdowns below 3.5 feet may begin prior to Columbus Day provided that notification is given by certified mail, return receipt requested, to DES and the Town of Washington, and is posted in a place for public viewing no less than 30 days in advance.
- On June 14, 1999, members of the LAE submitted a petition to DES under RSA 482:79 for a lake level investigation of the Pond and a request for the rescission or modification of the Order. LAE claimed that the use and enjoyment of Ashuelot Pond had been adversely impacted by the Order and that LAE and property owners who use the Pond had been injured and harmed as a result. LAE maintained that the Order unduly restricts it by limiting the frequency, depth, and timing of a deep drawdown. Of primary concern to LAE was the extent to which, in their opinion, aquatic weeds have grown in the pond, and the limitations, under the 1991 Order, to control the growth by drawing down the pond in the winter to dry and freeze the weeds.
- DES agreed to conduct another lake level investigation, and held a public hearing in July of 2000. Based on the updated information and testimony collected during the investigation including numerous follow-up meetings and communications with the interested parties, DES concluded that there was not sufficient clear, convincing, scientific and objective evidence regarding the ecological impacts and effectiveness of deep drawdowns to control vegetation. To collect this information, DES volunteered the time and expertise of its staff to develop and implement a study of the Ashuelot Pond system. The purpose of this study was to document and measure any changes in the ecology or quality of Ashuelot

Pond as a result of a drawdown cycle (three years of no deep drawdown, and one year immediately following a deep drawdown), including documenting changes to the plant community in the system and how it was affected by deep drawdown. DES then issued a Notice of Decision on Determination of Lake Level at Ashuelot Pond on June 6, 2001 ("the 2001 Decision") denying the request of LAE to rescind the 1991 Order. However, the 2001 Decision provided that DES, in cooperation with LAE, APA and other interested parties, would conduct a detailed study of the weed growth and the overall ecology of the pond over a four-year period. In so doing, the Decision modified the 1991 Order by allowing additional deep drawdowns with prior approval from DES as necessary for the implementation of the DES study as described in the *Project Proposal for the Evaluation of Drawdown on the Aquatic Flora and Fauna of Ashuelot Pond ("the Pond")*, Washington dated March 28, 2001.

- Since the 2001 Order did not rescind the 1991 Order, LAE appealed the 2001 Decision to the New Hampshire Water Council ("the Water Council") on July 3, 2001, pursuant to RSA 541:31, V and Env-WC 203.10. The Water Council issued a denial of the Appeal on May 6, 2003.

Findings

In accordance with the 2001 Decision, DES performed a detailed study of the water quality, plants, insects, amphibians and fish in Ashuelot Pond, from the summer of 2000 through the summer of 2005, to document and measure any changes in the ecology or quality of Ashuelot Pond as a result of a drawdown cycle (three years of no deep drawdown, and one year immediately following a deep drawdown). In addition, with input from LAE and APA, DES developed a survey of the users of Ashuelot Pond to determine if deep drawdowns impacted the landowner's or the visitor's use or perception of the Pond. The work was performed in accordance with the *Project Proposal for the Evaluation of Drawdown on the Aquatic Flora and Fauna of Ashuelot Pond ("the Pond")*, Washington dated March 28, 2001.

The results of this study were documented by DES in the Draft Final Report, Ashuelot Pond Washington, New Hampshire Drawdown Study, dated Spring 2008. The report was provided to LAE and other interested parties for review and comment. In addition, to ensure that all interested parties were informed of the availability of the report, DES held a public meeting on August 24, 2008, in the town of Washington. At this meeting the results of the study were presented, and an opportunity for public comment was provided. DES has also extended the deadline for public comments to January 2009, to ensure that all those interested in providing comment have the opportunity to do so. In addition, DES submitted the report for review to two independent scientists who are nationally recognized and highly regarded in the field of limnology.

The findings of the report, pertaining to each of the areas studied, are summarized below:

Water Chemistry

There do not appear to be any marked changes in water quality as a result of deep drawdowns in Ashuelot Pond.

Macrophytes (Plants)

On a lakewide basis, the overall percent of plant cover within Ashuelot Pond did not show a statistically significant change as a result of the deep drawdown in fall 2004. Data collected during the 2005 summer season were analyzed for statistically significant differences from the data set of non-deep drawdown years (2002-2004). On a plant-by-plant basis, most of the genera represented

in the pond showed no change, while only a few showed weakly significant changes (decreases or increases) as a result of deep drawdown, and only one showed a definitive statistical decrease (pondweed) in the pond. In the river, there was a small but overall statistically significant increase in plant cover in 2005 as compared with data sets from 2002-2004. The data indicate that plant percent cover increased overall, with arrowhead showing strong statistical increases in the river. Subtle increases in other species were also likely to account for this change.

Macroinvertebrates (Insects)

There were no statistically significant differences in the overall number of organisms found between the non deep drawdown years, and the deep drawdown year. While deep drawdown did not appear to affect the total number of organisms, it did have an impact on the diversity of the macroinvertebrates. In years before the deep drawdown, Dipterans were the dominant organisms; after the deep drawdown in 2005, Dipterans declined to only 18% of the organisms present, and Amphipods showed a statistically significant increase to 72% of the overall population.

Amphibians (Frogs)

It is not evident that frog populations were negatively impacted by deep drawdowns in Ashuelot Pond. Based on the data presented, frog populations are fairly stable in Ashuelot Pond, and frogs are reproducing as adult frogs are present, and egg masses are observed throughout the system each year.

Fish

Data from the fishery analysis in Ashuelot Pond suggest that there is instability in the sportfishery (bass) population in the lake. Mean relative abundance values for largemouth bass in Ashuelot Pond from all years sampled were at least 32% lower than statewide values calculated for 1997-2005. No significant differences in relative abundance estimates of non-bass species among years were found, although pumpkinseed showed decreases in years (2001 and 2005) following deep drawdowns.

Perception Survey

The user perception survey included questions on a number of categories relative to Ashuelot Pond. Most of the questions were asked to gauge the overall perception of the pond in the eyes of the nearshore residents. In general, more than half of the survey respondents indicated that Ashuelot Pond was in good condition (53%). Of the problems they did perceive, 'aquatic plants' was a common reply, with 57% of the respondents citing this as the primary problem. Many residents indicated that they noted that plants wash upon the shoreline on a daily basis (55%), and most noted that the most problematic area was in the river segment of the study area. Forty-eight percent of the respondents indicated that plants pose an impact to their recreational use of the pond. Changes to the fishery or wildlife over time do not appear to be a problem to the majority of survey respondents, as most respondents indicated that there was no change in the number of fish caught in the pond (75%).

Deep drawdowns have been occurring at Ashuelot Pond for decades. Thus, it is not possible to establish a baseline of the ecological condition of Ashuelot Pond had drawdowns never occurred; but, based on the findings in the report, deep drawdowns on a cycle of once every five years do not cause major impacts to the ecology of the Pond. However, the results of the study indicate that deep drawdowns have no significant effect on plant cover in the Pond. There were no dramatic declines in plant abundance in

any of the plant genera represented in the Pond to suggest that drawdown is a successful tool in reducing overall plant cover in the Pond. Though anecdotal information suggests certain plant genera decline as a result of deep drawdown, this scientific and objective study of the Pond, followed by a statistical analysis of the data, does not support that claim.

Whorled bladderwort has been cited by LAE as the most problematic plant in the Pond. Bladderwort is a free-floating aquatic plant that can achieve stem lengths of one to eight feet. The general habit of bladderwort is to start out the growing season as a turion in the lake sediments. The vegetative material elongates from the turion and floats in the water column with wind and wave activity. Generally, bladderwort forms inter-tangled mats of growth that float to the pond surface. These growths are most often observed drifting in the shallows of Ashuelot Pond, and floating onto the shoreline of waterfront properties. At its level of abundance, bladderwort is not posing any ecological harm to Ashuelot Pond, but shorefront property owners may be aggrieved by the abundance of those plants. However, as documented in the Drawdown Study, there is no statistically significant benefit from the deep drawdown, in terms of overall plant reduction, or even reduction in the target bladderwort species.

While not necessary for weed control, periodic deep drawdowns are important for inspecting the upstream face of the dam and monitoring the safety of the dam. DES records indicate the Dam is more than 135 years old, and active seepage is occurring through the dam as evidenced by seeps exiting the downstream face of the dam. Periodic inspection of the upstream face of the dam is needed to determine if voids are forming in the upstream face of the dam, which could threaten the safety of the dam. The Dam Owner has had the dam inspected by divers in the past, but voids in the upstream face of the dam cannot be reliably determined during dive inspections because of limited visibility. The 5-year schedule of deep drawdowns provided in the 1991 Order provides an opportunity for a detailed inspection of the upstream face of the dam.

The 1991 Order specifies that annual drawdowns begin no earlier than Columbus Day. However, in accordance with paragraph E.4 of the 1991 Order, the deep drawdowns, which can occur once every 5 years, can begin earlier. Ashuelot Pond has a drainage area of more than 25 square miles. Based on flow records from stream gages operated by the U.S. Geological Survey (USGS) in the Ashuelot River watershed, the average flows into Ashuelot Pond from this drainage area are nearly three times greater in October and November than they are in September. In addition, within this drainage area are four other lakes controlled by dams: Long Pond in Lempster, Sand Pond in Marlow, and May Pond and Millen Lake in Washington. The owners of three of these dams conduct drawdowns at these dams during the fall. Drawdowns are not performed at Long Pond, and May Pond is drawdown in late November. However, Sand Pond and Millen Lake are drawdown at or around Columbus Day, which adds more inflow, above the typically higher October river flows, into Ashuelot Pond. These higher inflows can equal or exceed the capacity of the discharge gates in the Ashuelot Pond Dam. To ensure that attempts at a deep drawdown are limited to only once every five years, the 1991 Order allows for the deep drawdowns to begin before Columbus Day. DES has determined that this provision remains appropriate.

Decision

The 1991 Order, with the modifications specified below, strikes a proper balance between competing public interests to achieve the maximum public benefit. Accordingly, the owners of the dam at the outlet of Ashuelot Pond shall operate the dam in accordance with the 1991 Order, modified as follows:

Paragraph E.4 is modified by striking the existing paragraph and replacing it, in its entirety, with the following: "Drawdowns below 3.5 feet may be conducted once every five years for the purpose of Dam inspection, Dam repairs, and maintenance of shorefront improvements. These deep drawdowns may begin prior to Columbus Day provided that the Dam Owner gives

notification by certified mail, receipt requested, to the Department of Environmental Services and the Town of Washington, and posts the notification in a place for public viewing no less than 30 days in advance.

Paragraph E.7 is modified by adding the following sentences to the end of the existing paragraph: "Emergency means that a potentially hazardous situation has developed or is likely to develop that, if not addressed, could affect the structural integrity or safe operation of the dam; could cause flooding either upstream or downstream of the dam; or could otherwise endanger public health, safety, or the environment. Weed control shall not be considered an emergency."

Appeals

This Decision may be appealed to the New Hampshire Water Council ("Water Council") by filing an appeal to the Water Council that meets the requirements specified in the Procedural Rules of the Water Council, Env-WC 200, within 30 days of the date of this Decision. Copies of the rules are available from the DES Public Information Center at (603) 271-2975 or at <http://www.state.nh.us/desadmin.htm>.

Date:

August 28, 2009

S. Ordered

COPY

Harry T. Stewart
Harry T. Stewart, P.E.
Director, Water Division
Department of Environmental Services

Attachments

- A. September 1991 Notice of Decision, Determination of Lake Level

ATTACHMENT A

NOTICE OF DECISION ON
DETERMINATION OF LAKE LEVEL
ISSUED IN SEPTEMBER 1991



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
WATER RESOURCES DIVISION

FILED

64 North Main Street
Post Office Box 2008
Concord, NH 03301-2008
603-271-3406

ROBERT W. VARNEY
COMMISSIONER
DELBERT F. DOWNING
DIRECTOR

TTY/TDD 225-4033
Relay Service for Deaf/Speech Impaired

Lake Ashuelot Estates Association)
P.O. Box 105)
Washington, NH 03280)

NOTICE OF DECISION
Determination of Lake Level
Date: September 13, 1991

Re: Ashuelot Pond Dam)
Washington, NH)
Dam #245.05)

A. INTRODUCTION

This Determination of Lake Level is issued by the Department of Environmental Services, Water Resources Division ("Division") to the Lake Ashuelot Estates Association (Owner), pursuant to authority vested in the Division by RSA 482:79.

B. PARTIES

1. The Department of Environmental Services, Water Resources Division is a duly constituted administrative agency having a mailing address of P.O. Box 2008, 64 North Main Street, Concord, N.H. 03302-2008, and a telephone number of (603) 271-3406.

2. The Lake Ashuelot Estates Association is an association of homeowners and has a mailing address of P.O. Box 105, Washington, N.H. 03280.

C. STATEMENT OF FACTS AND LAW

1. The Lake Ashuelot Estates Association is the owner of the Ashuelot Pond Dam ("the Dam") in Washington, N.H., N.H. Dam #245.05 in the State dam inventory.

2. On October 16, 1990, the Division received a petition for lake level investigation of Ashuelot Pond in the Town of Washington ("the Petition").
3. In response to the Petition, the Division conducted a preliminary investigation of conditions affecting the use and enjoyment of Ashuelot Pond, and determined that a public hearing should be held.
4. The Division gave notice of the hearing as required by NH Code of Admin. Rules Env-Wr 208.03, and conducted the public hearing on July 12, 1991, ("the Hearing").
5. Ashuelot Pond is a "great pond" raised by damming. A great pond is defined as a fresh water waterbody of more than ten acres in its natural condition.
6. The State of New Hampshire claims ownership of the land and flowage rights to a point of 3.5 feet below the elevation of the two overflow spillways associated with the Dam at the pond's outlet.
7. The Lake Ashuelot Estates Association retains the flowage rights from a point 3.5 feet below the elevation of the two overflow spillways to the pin in the large boulder just upstream of the Dam.
8. The annual drawdowns, which have been conducted since the Lake Ashuelot Estates Association obtained ownership of the Dam and flowage rights, have reduced the amount of aquatic vegetation present in the pond.
9. The 1983 repairs to the stone spillways consisted of remortaring the voids between and beneath the stones. The repairs did not act to raise the spillway elevation.
10. Sand Pond in Marlow and Millen Lake in Washington, both located upstream of Ashuelot Pond, have annual fall drawdowns. Sand Pond's 15" drawdown begins the week after Columbus Day. Millen Pond's 30" drawdown begins the week before Columbus Day.
11. The Dam is registered with the Department of Environmental Services Water Resources Division.
12. The flowage rights of the Dam are as follows:

The upper limit extends to the uppermost pin in the large boulder (historical marker) which is approximately 75 feet upstream of the Dam. This translates to 1.3 feet above the crests of the overflow spillways. The lower limit of the flowage rights extend to a point 3.5 feet below the overflow spillways.

D. DETERMINATIONS

1. Large drawdowns infringe on the ability of those who must use the spillway crests or boats to access their property.
2. The management and control of Ashuelot Pond is lawful and in the public interest, but changes in the manner of the exercise of the right of management and control would be of benefit to others without undue injury to the owner of the outlet.
3. Changes in the management and control of the outlet would not deprive the owner of the outlet or others of rights which they are lawfully entitled.

E. ORDER

Based on the Division's independent investigation and the testimony received at the Hearing, as summarized above, the Lake Ashuelot Estates Association is hereby ordered as follows:

1. The annual drawdown of Ashuelot Pond may begin no earlier than Columbus Day.
2. The drawdown may not exceed two feet below the elevation of the overflow spillways prior to November 1.
3. The total drawdown depth thereafter may not exceed 3.5 feet below the elevation of the overflow spillways.
4. Drawdowns below 3.5 feet may be conducted once every five years for the purpose of Dam repairs, aquatic weed control and maintenance of shorefront improvements. These deep drawdowns may begin prior to Columbus Day provided that notification is given by certified mail, return receipt requested, to the Division and the Town of Washington, and is posted in a place for public viewing no less than 30 days in advance. The first major drawdown shall begin in the Fall of 1991. Deep drawdowns for weed control and shorefront improvements shall be returned to not greater than 3.5 feet by January 1.
5. The boulder upstream of the Dam which is the reference for water rights shall and not be disturbed for any reason including Dam repairs or navigational improvements, (see attached photographs).
6. The pond shall be returned to normal operating level not later than June 1.
7. Notwithstanding Item E.4 above, unplanned drawdowns may be conducted at a greater depth or frequency should an emergency condition exist. The emergency shall be determined by the Department of Environmental Services, Water Resources Division based upon evidence provided by the Dam owner or upon its own investigation.

**Ashuelot Pond Dam Village District
PO Box 105
Washington, NH 03280-0105**

July 19, 2009

Mr. James Gallagher
Department of Environmental Services
PO Box 95
29 Hazen Drive
Concord, NH 03302-0095

RE: Ashuelot Pond Dam #245.05, Washington

Dear Mr. Gallagher:

The Commissioners received a copy of a letter dated July 13, 2009 written to you by LAE, Inc. requesting a deep draw down for purposes of "dam inspection, weed control and shoreline clean-up. This request seems to be in accordance with the Lake Level Management Plan Project Study being conducted by DES, and the Notice of Decision dated September 16, 1991, E. 4. The drawdown will be conducted, as stated in the order, for the purpose of "Dam repairs, aquatic weed control and maintenance of shorefront improvements." You have previously indicated that, although the Lake Level Determination was originally applicable to LAE, Inc., it also applies to the Village District.

Therefore, assuming that you grant the request in accordance with the Lake Level Determination, this is to advise you that the Ashuelot Pond Dam Village District, owner of the Ashuelot Pond Dam, will conduct a drawdown this fall in excess of the normal 3-½ foot lowering for spring run-off flood control.

This deep draw down will begin on or about Saturday, September 26, 2009. During the month of September, the upper gate may be opened periodically to keep the Pond level from rising excessively as a result of dams upstream lowering their levels. The lower gate will be closed on or about November 30th, leaving the upper gate open, which will permit the pond level to be raised to normal winter level prior to winter recreational activities on the pond.

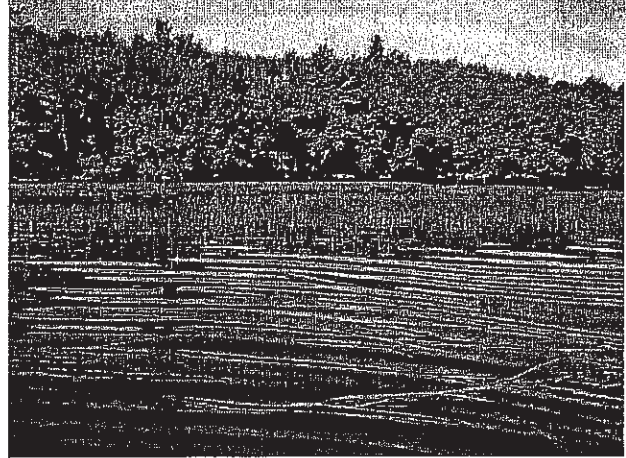
Sincerely,

COPY COPY COPY

 Robert W. Thompson Commissioner	 Thomas Bart Commissioner	 Robert Dearborn Commissioner
---	--	---

Cc. Board of Selectmen, Town of Washington
Ashuelot Pond Association
Ashuelot Pond Association bulletin board
Lake Ashuelot Estates Inc
Lake Ashuelot Estates Inc. bulletin board

Ashuelot Pond Washington, New Hampshire



Drawdown Study

Prepared By:



DRAFT Final Report
Spring 2008

DRAFT
Ashuelot Pond, Washington, New Hampshire
Drawdown Study
2002-2005

Prepared By:

Amy P. Smagula, Limnologist
and
Jody Connor, Limnology Center Director

New Hampshire Department of Environmental Services
Water Division, Watershed Management Bureau
29 Hazen Drive
Concord, New Hampshire 03301
(603)271-3503
www.des.nh.gov



Thomas S. Burack
Commissioner

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CHAPTER 1 INTRODUCTION

Deep fall/winter drawdowns have been used since the mid-1980s by the Ashuelot Pond Dam owner to attempt to control native aquatic vegetation in Ashuelot Pond. Per an Order issued by the Department of Environmental Services (DES) in 1991, annual drawdowns of Ashuelot Pond were limited to a total depth of 3.5 feet below the elevation of the two overflow spillways. Drawdowns were to begin no earlier than Columbus Day. The only exception to this is that every fifth year (1996, 2001, etc.), the dam owners may conduct a deep drawdown, greater than 3.5 ft below the two overflow spillways, at a time designated by the DES Dam Bureau for dam inspection and repairs, shoreline improvements, and for aquatic weed control. A copy of the 1991 Order can be found in Appendix A.

A deep drawdown was accomplished in 1992 to repair the dam and to install new operating gates. This deep drawdown was actually scheduled and attempted the previous year, but was unsuccessful because the amount of inflow in 1991 was too high to allow Ashuelot Pond to drain. DES authorized deep drawdowns in 1996 and 2000 pursuant to the provisions of the 1991 Order. Another deep drawdown was conducted in the fall/winter of 2004 as part of this study.

The purpose of the Ashuelot Pond Drawdown Study was to determine the effects of these drawdowns on pond ecology, and the impacts that drawdowns may have on nearshore and watershed residents surrounding Ashuelot Pond. As part of the study, the pond was monitored for a period of four years from the summer of 2002 through the summer of 2005. Normal 3.5 foot drawdowns were conducted in the fall of 2002 and 2003, and then a deep drawdown was conducted in the fall of 2004. The pond was monitored for another summer (2005) after the fall 2004 deep drawdown for comparison to previous years.

A work plan for this project was prepared by DES in March of 2002 that detailed the scope of the study (see Appendix B). In the plan, DES proposed to perform an assessment of the chemical, biological, and ecological conditions of Ashuelot Pond through a deep drawdown cycle to determine if any statistically significant changes could be observed from these conditions.

Each chapter of this report provides the evaluation of an element of the pond system that was monitored as part of this study to determine changes that may have resulted from the deep

drawdown in fall/winter 2004. In Chapter 7, Conclusions and Recommendations, the data are assimilated and recommendations are provided for plant management and drawdown cycles.

EXECUTIVE SUMMARY

Deep fall/winter drawdowns have been used since the mid-1980s by the Ashuelot Pond Dam owner to attempt to control native aquatic vegetation in Ashuelot Pond in Washington, New Hampshire. Per an Order issued by the Department of Environmental Services (DES) in 1991, annual drawdowns of Ashuelot Pond were limited to a total depth of 3.5 feet below the elevation of the two overflow spillways. The only exception to this is that every fifth year (1996, 2001, etc.), the dam owners may conduct a deep drawdown, greater than 3.5 ft below the two overflow spillways, at a time designated by the DES Dam Bureau for dam inspection and repairs, shoreline improvements, and for aquatic weed control.

The purpose of the Ashuelot Pond Drawdown Study was to determine the possible benefits of deep drawdown for aquatic plant control, and the effects of deep drawdowns on pond ecology and on nearshore and watershed residents surrounding Ashuelot Pond. As part of the study, the pond was monitored for a period of four years from the summer of 2002 through the summer of 2005. Normal 3.5 foot drawdowns for flood control purposes were conducted in the fall of 2002 and 2003, and then a deep drawdown (6 feet) was conducted in the fall of 2004. The pond was monitored for another summer (2005) after this deep drawdown of fall 2004 for comparison to previous years.

Water Quality

Ashuelot Pond water quality is monitored by two DES programs: the DES Lake Assessment Program and the Volunteer Lake Assessment Program. According to data from these two programs, Ashuelot Pond can be classified as a moderately acidic waterbody, with no buffering capacity against acid inputs (such as from acid precipitation). The waters are slightly tea colored, yielding a brownish/reddish appearance to the pond, likely attributable to the decomposition of aquatic vegetation derived from the river, associated wetlands, and the pond itself. Specific conductivity is in the low range, and much lower than the state mean. Total phosphorus is within the mid-range, but acceptable for mesotrophic waterbodies. Concentrations of various forms of nitrogen are low, which is not uncommon for lakes and ponds in New Hampshire where phosphorus tends to be the limiting nutrient for growth. Algal biomass, measured by chlorophyll-a concentration, falls within the moderate category. The clarity, measured by Secchi disk, was 12.9 feet, which is slightly above the state average. Dissolved

Overall there were no statistically significant differences in the overall number of macroinvertebrates found between the non deep drawdown years, and the deep drawdown year. While deep drawdown did not appear to affect the total number of macroinvertebrates, it did have an apparent impact on species diversity in the total population of the macroinvertebrates. In years before the deep drawdown, Dipterans were the dominant specie, whereas after the deep drawdown in 2005, Dipterans declined to only 18% of the organisms present, and Amphipods increased to 72% of the overall population, suggesting that Amphipods were positively impacted by the deep drawdowns.

Based on observations during this study, frog populations were fairly stable in Ashuelot Pond. Adult frogs were present and egg masses were observed throughout the system each year. Based on both side-by-side comparisons and statistical analyses of the data, frog populations were not negatively impacted by deep drawdowns in Ashuelot Pond.

Ashuelot Pond has a varied warmwater fishery, with common species observed each year of the study. The age class of largemouth bass hatched during years of deep drawdowns (2000 and 2004) was either not captured in the following year's sample or was captured in low numbers. No significant differences in relative weight were found for largemouth bass before and after deep drawdown, suggesting that drawdowns were not directly impacting largemouth bass mass. However, negative relationships between bass total length and relative weight were found for all years and were significant in 1999 and 2003, according to NH Fish and Game Department data. Significant differences were also found for relative abundance of all sizes of largemouth bass combined, and for bass less than stock size. Overall, mean relative abundance values for largemouth bass in Ashuelot Pond from all years sampled were at least 32% lower than statewide values calculated for 1997-2005. No significant differences in relative abundance for non-bass species among years were found.

Largemouth bass growth was categorized as "fast" (2005 data representing age classes from 1999-2004) when compared to statewide values, and mean relative weight values were generally higher than statewide values. It is likely that fast largemouth bass growth and high relative weights in Ashuelot Pond was due to limited competition as a result of relatively low numbers of bass.

The user perception survey that was conducted of Ashuelot Pond shoreline owners and watershed residents included questions on a number of categories relative to Ashuelot Pond. Most of the questions were asked to gauge the overall perception of the pond in the eyes of the

nearshore residents. In general, more than half of the survey respondents indicated that Ashuelot Pond was in good condition (53%). Of the problems they did perceive, 'aquatic plants' was a common reply, with 57% of the respondents citing this as the primary problem. Many residents indicated that they noted that plants wash upon the shoreline on a daily basis (55%), and most noted that the most problematic area was in the river segment of the study area. Forty-eight percent of the respondents indicated that plants pose an impact to their recreational use of the pond. Changes to the fishery or wildlife over time do not appear to be a problem to survey respondents, as most respondents indicated that there was no change in the number of fish caught in the pond (75%).

Overall Summary

No overall negative impacts to water quality or amphibians were observed between times of no deep drawdown and the year immediately following deep drawdown. Some negative impacts to macroinvertebrates and fish were observed as a result of deep drawdowns. No statistically significant benefit was observed from the deep drawdown in terms of overall plant reduction or in the reduction of the target bladderwort species. On the basis of these conclusions, a deep drawdown for plant control is not scientifically warranted for Ashuelot Pond.

An alternative control strategy for the target bladderwort species could include diver-assisted suction harvesting to remove abundant growths of the plant, with little to no impact to non-target species.

CHAPTER 2 ASHUELOT POND AND WATERSHED DESCRIPTION

2.1 Ashuelot Pond Morphology and Trophic State

Ashuelot Pond, located in Washington, New Hampshire, is classified as a moderately shallow (mean depth=6.6 feet, maximum depth=29 feet), mesotrophic pond. Figure 2-1 provides a map of the pond and its watershed. The watershed drainage area to the pond outlet is 25.3 square miles, with the pond itself covering an area of approximately 0.6 square miles (375 acres).

The Ashuelot Pond watershed is primarily forested, with rural residential development sparsely scattered through the watershed. The shoreline of the pond and river is moderately developed with seasonal cottages along the southern and western shorelines, and more year-round dwellings on the northeastern shorelines.

Figure 2-2 provides a bathymetric map showing the bottom contours of Ashuelot Pond. Roughly 74 percent of the pond is 10 feet deep or less. Approximately 24 percent of the pond is between 10 feet and 20 feet deep and about 2 percent of the pond is between 20 feet and 23 feet deep. The average depth of the pond is 6 feet. The littoral zone (the nearshore areas of a waterbody where sunlight penetrates to the bottom sediments) of Ashuelot Pond is quite extensive, providing shallow shelves that are ideal for plant growth. The littoral zone is typically the zone of rooted macrophyte growth in a waterbody. With an average depth of only 6 feet, sunlight can easily penetrate the bottom of much of the pond, providing conditions that are quite suitable for plant growth. The mean transparency for the summer of 2002, when this study began, was over 9 feet (VLAP, 2002); therefore, 74% of the pond (those areas with depths less than 10 feet) receives adequate sunlight for plant growth.

The pond bathymetry also reveals that approximately 60% of the lake bottom area is exposed during deep drawdown conditions when the lake level is lowered 6 feet.

2.2 Ashuelot Pond Dam

The Ashuelot Pond Dam (Dam #245.05) controls the outlet of Ashuelot Pond. At the start of the study the dam was owned by the Lake Ashuelot Estates Association, but ownership has since been transferred to the Ashuelot Village District. The 190-foot long, thirteen-foot high dam was first built in 1872, and was most recently repaired during a deep drawdown in 1992. The water level is maintained through the manipulation of an upper and lower gate in the gatehouse (constructed in 1992).

through 2004, which are considered the pre-deep drawdown years for this study, and the 2005 data are used to show conditions during the growing season immediately following a deep drawdown in fall/winter 2004/2005. All available pond data will be used to evaluate water quality trends over time.

3.3.1 pH

pH is the measure of how acid or basic a substance is. The pH scale is logarithmic, and covers a range of 0-14 units. Substances with a pH of 0 to 6 are considered acidic, those with a pH of 8 to 14 are considered basic or alkaline, while a pH of 7 is neutral. Surface waters in New Hampshire have a median pH of 6.0 and are generally acidic.

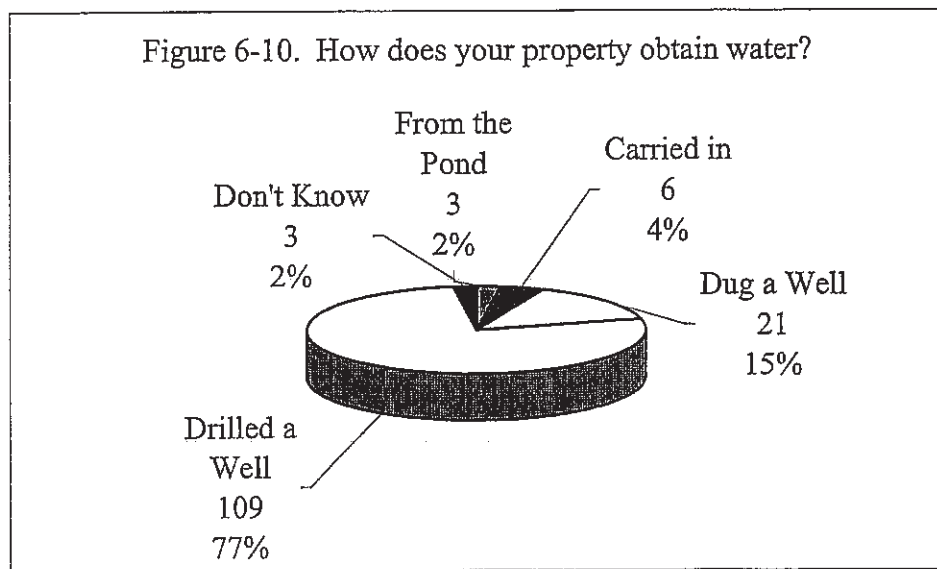
The pH level in Ashuelot Pond, and in surrounding ponds of the region, is low compared to the state mean (6.5 units). Throughout the pond's VLAP history, the epilimnetic (upper layer) pH values have ranged from a low of 4.80 units to a high of 5.81 units. The hypolimnetic (lower layer) pH has ranged from 5.14 units to 5.65 units. Using the DES classification system, a lake with a pH range between 5.5-6.0 units is classified as 'Endangered', between 5.0 and 5.4 units the lake is in a 'Critical' condition, and below a pH of 5 units the lake is considered "Acidified." As the pH decreases to between 5 and 6 units, many fish and other aquatic organisms become stressed and some disappear. Little or no fish life may occur when the pH falls below 5 units. The acidity of a system can also be affected as an indirect result of drawdowns. According to Norton (1989), dissolved organic matter from the decay of vegetation contributes to the acidity of lakes, but it is particularly important in lakes with short residence times (i.e., lakes that flush quickly), such as Ashuelot Pond.

Figure 3-1 illustrates the trends in epilimnetic and hypolimnetic pH in Ashuelot Pond as far back as 1977, when the pond was first surveyed by the DES Lake Assessment Program. Even though the Ashuelot Pond field data collection was completed in 2005, we have included 2006 data that were available from the volunteer monitoring program.

When examining these graphs, it should be noted that deep drawdowns occurred in the fall of 1986, 1991 (failed, as explained in Chapter 1), 1992, 1996, 2000, and 2004.

In general, there are no consistent discernable trends in pH data that can be tied to the deep drawdown years. The pH of Ashuelot Pond ranged from a low of near 5.0 units in some

Figure 6-10. How does your property obtain water?



6.5 Fire Safety and Water Supply

Fire safety was also addressed in the survey with respect to landowners and their properties at Ashuelot Pond to determine how significant a source of fire-fighting water the pond provides. Only 7% of landowners at Ashuelot have indicated that there is no road access for fire trucks to reach their property in case of a fire emergency situation, so they would need to rely on lake water to fight a fire. The remaining 93% of landowners have sufficient road access for fire trucks to reach their properties (Figure 6-11). Also, 62% of residents responded that they would use the pond as their primary source of water to extinguish a fire in case of emergency (Figure 6-12).

Overall, 20% of the residents of Ashuelot pond properties indicated that the drawdown of the pond would impact fire safety or their abilities to fight a fire. The other 80% of landowners responded that the drawdown would have no impact on their safety (Figure 6-13).

		populations may be thinned by this control technique.
Biological Control	Not Recommended	There are no known biological controls for bladderwort.
No Control	Recommended	At this point in time, Ashuelot Pond is not plagued with growths of exotic aquatic plants like variable milfoil or other invasive plants. The native plant community is diverse and the relative abundance of plants is typical of that for a waterbody with the characteristics of Ashuelot Pond, and is not at a level that would warrant radical management practices. A no control option is therefore reasonable for consideration here.

At this point in time, if further control of bladderwort populations is desired, DES recommends that the plants be selectively controlled by experienced divers using a Diver-Assisted Suction Harvesting (DASH) device. This is a labor-intensive strategy, but one that provides the most realistic, selective, longer-term, and environmentally sound management strategy for the waterbody.

It is important to note that bladderwort is not currently posing any ecological harm at its current abundance level. Ashuelot Pond is a relatively shallow waterbody where sunlight can penetrate to nearly three-quarters of the bottom sediments. Given the nutrient levels and the substrate types in the pond, aquatic plants will naturally achieve an expanded coverage on the bottom. It is also understandable that shorefront property owners may be aggrieved by the abundance of those plants, and may chose to pursue control actions to reduce the plant abundance in the lake.

Because the data collected from this study show that there is no statistically significant benefit from the deep drawdown, in terms of overall plant reduction, or even reduction in the target bladderwort species, a deep drawdown is not scientifically warranted for Ashuelot Pond. Deep drawdowns should be conducted when there is a specific need for such a drastic water withdrawal, such as flood control purposes, dock or shoreline repair, or other valid and documented circumstance. The request for such a deep drawdown should be directed to the DES Dam Bureau for their consideration based on their scientific and engineering experience with drawdowns. Based on observations made during this study, it is concluded that there is no biological benefit of deep drawdown for plant control in Ashuelot Pond, and no specific benefit of regularly scheduled deep drawdowns for plant control purposes.



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Professor warns of Ashuelot's falling pH

By Anika Clark
Sentinel Staff

Published: Monday, August 31, 2009

Patrick M. Eggleston's studies of the Ashuelot River feel straight out of a science-fiction flick.

The movie poster would advertise the story hook — a tranquil New England river concealing danger within. And Eggleston — a Keene State College biology professor whose computer desktop displays a photo of a unicellular organism — would be the academic protagonist sounding the alarm bells. But Eggleston says his findings about the rising acidity of the Ashuelot's upstream waters could have real implications for portions of the river's health.

"The state does some monitoring of the river, but looking at their data it was obvious there were huge chunks of the river they weren't looking at," Eggleston said about why local studies ramped up in 2001. "One thing they were ignoring pretty much, was the upstream area — the headwaters."

Eggleston's conducted tests on everything from E. coli to conductivity on several sites along the river. The effort of the Ashuelot River Local Advisory Committee, with help from state-trained volunteers. In addition Swanzey residents Stephen J. Stepenuck and Barbara A. Skuly — the advisory committee's chairman — ti lifeblood.

"I felt that to really understand the river, we needed to kind of look as much as we can at the whole river downstream areas," Eggleston said.

He was shocked by what he found.

Within his several years of data, Eccleston's spotted a trend of rising acidity, particularly evident in upstre and Gilsum. This movement is also seen in locations near Pillsbury State Park in Washington and at Moun miles downstream.



Keene State College Professor Patri the Ashuelot River near the Stone A Street, one of the many sites alone t being tested.

358-2579

A substance's acidity or basicity is measured on the 14-point pH scale, with declining pH values indicating increasing acidity. A pH value of 7 denotes a neutral pH, whereas anything with a pH above 7 is basic.

When water gets too acidic, it can endanger the organisms that live in and around it, according to Eggleston.

"I've done enough work with this to realize that if you just look at pH for the whole river, you don't see any trends," he said. But comparing data from a single sample location, taken during a single month, over the study's nine years, tells a very different story.

Eggleston performs a rigorous scientific test on his data called a "regression analysis." This allows him to create a line, charting trends in what might otherwise appear to be points scattered randomly across a graph.

Through this analysis, he's also been able to prove that many of the patterns he's found are statistically significant.

A regression line for data taken at the Marlow site shows a pH drop of 1.08 — from 6.30 to 5.22 — from 2008. A similar analysis of data collected in May of those years near Pillsbury State Park shows a 1.93 u to 4.47. "This, to a biologist, is very worrisome that the pH is changing so rapidly," he said. "This is something to worry about."

Not dramatic enough for a movie? Consider this:

The pH scale is logarithmic, meaning each point represents an exponent of 10. Water with a pH that's 10 times as acidic. So water that drops from 6.4 to 4.4 is about 100 times as acidic as it once was.

Dropping pH levels affect organisms at different rates, according to Eggleston. Insects like water striders are falling pH since they simply walk on the water's surface with wax-covered legs. Freshwater mussels, by contrast, are fragile; when acidity gets too high, it eats holes in their shells and they die.

Scott R. Decker, inland fisheries program supervisor for the N.H. Fish and Game Department, described how acid rain can threaten fish. The acidity itself can interfere with their cellular processes, he said. And acid rain can leach a large amount of aluminum — a toxic metal, especially to gill-breathing animals — leached from soils and rocks. Decker said, "There would be food-chain impacts overall, too."

The potentially devastating effects of even small pH declines was illustrated in a long-term study, in the Lake Umbagog.

Over a number of years, researchers gradually dropped the pH level in half the lake, according to Eggleston.

At a pH of 5.4, pictures show fairly healthy-looking lake trout.

But at 5.1, "they were obviously starved."

Robert H. Estabrook, chief aquatic biologist for the N.H. Department of Environmental Services, wasn't fully convinced of Eggleston's findings. But after hearing a summary of some of his data, he said, "It sounds like a big drop."

With reductions in acid rain-causing emissions, he said, "If anything, (the pH) should be going in the other direction. If not, it sounds like something else is going on."

This is precisely what Eggleston's trying to figure out. But he has some theories in mind.

In 1990, changes to the federal Clean Air Act set emissions limits for sulfur dioxide and nitrogen oxides, from power plants along with other sources and are involved in atmospheric reactions that produce acid rain.

Among the provisions established in 1990 was that sulfur dioxide emissions in American power plants be



about 50 percent of their levels in 1980.

However, Eggleston said, "half was sort of a guess as to whether it would be enough. ... Our rain is still New Hampshire precipitation carries a pH between 4 and 5 — typically, about 4.5, according Estabrook, environmental services.

While emissions have been cut, Eggleston said, the presence of acid rain may have depleted compounds or carbonates that can serve as buffers to the acid.

Eggleston said he thinks this may be evident in Pillsbury State Park's pH levels from May 2001 to May 21 the pH dropping sharply between 2001 and 2002 and then appearing to plateau for three years — poten through a buffer source — before continuing to fall.

According to Eggleston, natural sources, such as evergreen needles or sphagnum bogs, can also increas acidity.

But, he said, "It's just dropping way too fast to be something that's natural.

"Nine years is nothing," he explained. "To have it even showing at all is a surprise."

So if a river represents a continuous flow of water, why does the acidity seem to drop as it heads downs

This isn't universally the case.

Regression line comparisons of data taken from a site near Swanzey's Thompson Bridge from July 2001 example, shows a 1.27 drop in pH.

The dips evident in many other downstream samples have been much more subtle. Downstream sites hi a tendency for a greater jumpiness in their pH data, back and forth, Eggleston said.

Eggleston theorizes this could all be due to the fact these areas have large human populations that may greater amount of chemically basic substances into the water. These discharges could be tied to activitie dishwashing to farming, which he said could be the reason for the data fluctuations.

Donna L. Hanscom, Keene's assistant public works director, said permitting rules require anyone dischar surface water to keep their discharges at a pH of at least 6.5.

River pH could also be raised, she said, by runoff. Anything with soap represents a higher pH, she said, might be used in farming.

"Downstream, I think we are having pollutants that they may do damage in one area, but they're helpin neutralizing the acids," Eggleston said, whereas upstream, "We get very little manmade effect."

As Eggleston continues to try to decipher what his data's telling him, he said he intends to speak with st findings.

In particular, he said he'd like to see what data the state has about other rivers. As for the Ashuelot, he important to know whether we used to have fish species that are upstream that are gone today."

In the meantime, he said, some colleagues have raised doubts about some of his data and findings.

But, he described this as the normal flow of academic research.

"We each look at data. We try to make sense of it" and then argue, he said.

"That's the way science makes progress."

Anika Clark can be reached at 352-1234, extension 1432, or aclark@keenesentinel.com.

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SENTINEL EDITORIAL: A Keene State College profesor f acidity in the upper Ashuelot

Published: Wednesday, September 02, 2009

The Ashuelot River, which is as much a fixture of the western side of the Monadnock Region as the namesake mountain, certainly looks cleaner than it did decades ago. Credit environmental law enforcement and citizen action.

But not all pollutants are visible to the naked eye, nor are all of their early-stage consequences obvious. That's why nearly nine years' worth of river water quality testing by a Keene State College biology professor deserves notice.

In 2001 Patrick M. Eggleston suggested to his fellow members of a state-sponsored river advisory committee that the upper reaches of the Ashuelot get some attention; the main focus had traditionally been the downstream sections close to people and businesses.

A sampling program was started, and, over time, some startling information turned up. As was recently reported by The Sentinel's Anika Clark, acidity levels of some parts of the river in Marlow and Gilsum were found to be steadily rising.

Precisely why isn't clear. Despite environmental restrictions on sulfur dioxide emissions from power plants, acid rain still falls here. And there may be some natural factors. But there's little to explain the remarkable rise in these upstream acidity readings, and little to dampen worries that the river's waters may be getting out of whack.

The phenomenon isn't visible. But, if the acidification continues, the vegetation and inhabitants in the river affected. Eggleston plans to show his data to state authorities to see whether they've noticed population c species upstream.

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There's still more to learn about the acidity in the water, but Eggleston's testing has already established Just because average readings for an entire river show nothing out of line, pockets of the Ashuelot can't it's in those little noticed pockets that glimmers of the broad future for the river might be seen.

SENTINEL EDITORIAL: New Hampshire's sta
help_jol

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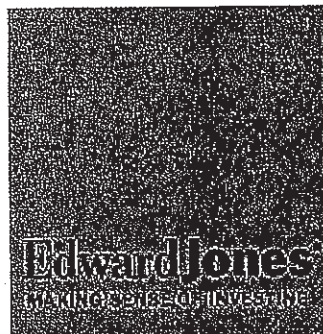
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September 18, 2009

State of New Hampshire
Office of the Attorney General
State House Annex, 33 Capitol Street
Concord, NH 03301-6397

To Whom it May Concern,

The members and homeowners of the Ashuelot Pond Association (APA), in Washington, New Hampshire, seek the help, guidance and support of your office. I write today on behalf of our Association.

For decades, we have been appealing decisions by the State of New Hampshire's DES in regards to deep drawdowns of our pond; these drawdowns prevent 25 of our families from reaching their water-access residences. We figured we would bring your office into this loop, since our public safety and access to our personal property is at stake whenever this occurs.

Let me attempt to outline the situation (and we can deliver volumes of materials when and if you would like):

1. Ashuelot Pond has 25 seasonal homes on the west and south shores which can **ONLY** be easily accessed by boat via the public boat ramp, or by snowmobile or hiking the ice in the winter. There is **no** road around the perimeter of the lake on these two shores, and private property ownership **prevents** hiking the shoreline;
2. For these 25 homes on the water's edge, water from the lake via bucket or pump is the *only* defense for us in case of fire. Per the Washington and Marlow Fire Departments we are "on our own" in case of such a fire emergency, thus every 5 years, we are "out of luck" if the worst occurs;
3. For decades, the powers that be who control our dam, backed by DES, have conducted "deep drawdowns" of the pond for "weed control purposes." During these years, the pond is almost totally emptied to "clean the weeds." Ashuelot Pond is classified as a moderately shallow (mean depth=6.6 feet, maximum depth=29 feet), mesotrophic pond. The impact of the regular drawdown every year of 3.5 feet, is 54% of Ashuelot Pond is drained each year – with the Pond being virtually "emptied" on the fifth year via these DES-approved deep drawdowns. These deep drawdowns close the only public boat ramp on the "great pond", and leave a small puddle in the middle of the 360 acre waterbody (please see the attached photos);
4. With only a puddle left in the middle of the pond (see attached photo), our only mode of "fire protection" is moved more than 600' away from our homes, and it is a tough hike through the mud and muck to even reach the water's edge. Any sort of emergency medical response by boat is no longer available;
5. DES commissioned a multi-year study of the effects of deep drawdowns, and *just* completed the study, and those results are attached. In a nutshell, their study admitted that deep drawdowns do *nothing* for controlling weeds, but instead, have numerous harmful long term effects on the ecology of the pond;
6. Much to our surprise, and in contradiction to their own study, DES also just recommended that the once every five year deep drawdown should be *continued and allowed*. However, no longer for

“weed control”, but now for “visual dam inspection purposes”, irregardless of whether there is a problem or not with the dam;

7. DES, in said recent decision, has also removed the “date for refill”, so now not only can the pond be totally emptied every five years, but this public New Hampshire water body can remain empty as long as the dam operators see fit. DES has fully removed the date and/or timeframe to close the dam for pond refill;
8. If the only remaining issue is dam inspection, why not use a coffer dam system, or divers, as most other lakes and ponds in New Hampshire do, rather than keeping New Hampshire families from their properties, closing the *only* public boat ramp on Ashuelot Pond, closing the pond to recreation for all, and putting families at personal risk for months, in order to take a 30 minute inspection of the face of the dam?;
9. The long term ecological impact of emptying the pond is documented by DES themselves, as well as the ph study also enclosed for you. The State of New Hampshire is condoning the negative ecological impacts, *and* simultaneously denying families from their properties, *and* removing the only fire and safety protection we have.

For decades, we have been tread upon by what seemed like political decisions and apparent “back room politics.” Some folks in town have wanted the small “camps” and the seasonal folks in the APA to just “go away”, and quite frankly, we see DES’s shocking recent decision as another blow to us being able to enjoy and simply access our homes. We believe there is much more than “meets the eye” here. After reading the attached materials, we sure hope someone in your office can help us once and for all. For some of the families, like mine, this is our primary and *only* residence, so this is *not* just a vacation home issue. We are frustrated, as *for decades*, there always seems to be a “reason to empty the pond”, but the rational never seems to make sense to us APA members, and is not even based on State of New Hampshire study results (as we had hoped.) It just does not make sense.

We ask your office to review this information and the study, and the attachments. We are glad to travel into Concord with any Ashuelot Pond Association’s Board Members anytime to discuss further, with anyone who can help or guide us with next steps. We really don’t want to cause a big scene or any sort of public relations nightmare for New Hampshire, but the fact that the State of New Hampshire is denying access to personal property, affecting the ecology and creating liability for itself by emptying the Ashuelot Pond every five years is a serious matter.

Many thanks for listening. We do hope to hear from you soon. DES has just informed us that the lake will be virtually emptied yet again on September 26th. We understand it’s probably too late for you to help this year, but we are hoping you can review the policies and decisions before we are faced with the loss of Ashuelot Pond again in the fall of 2014.

Sincerely,

COPY

Nicholas Zaharias
APA Association Board Member and Executive Officer

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CC: Ashuelot Pond Association Members