

Essex Conservation Commission

November 4, 2003 - Minutes

Present: Stephen Gersh, Acting Chairman, Wallace Bruce,  
Philip Caponigro, Samuel Hoar, Shirley Singleton.

Meeting called to order at 7:35 p.m.

A public hearing was held at 7:36 p.m. under the Wetlands Protection Act, M.G.L. Chapter 131, Section 40, on a Notice of Intent filed by William Bruce, 51 Pond Street, for the manual breaching of a beaver dam.

Dave Lash told the Board that the applicant would not be attending the meeting as he had just got out of the hospital. Mr. Lash submitted a letter from the applicant stating that he had given Mr. Lash permission to represent him at the Commission's meeting. John Dick, of Hancock Associates, was also present at the meeting. Mr. Lash submitted a revised project description for the beaver dam breaching. He told the Board that with all of the rain they had had, the Lake level had gone up to the full crest of the dam. There had been some erosion of the dam so that water was running, which he felt indicated that nature was telling them to do a lot of small breaches at a time; once the level was down, then they could move to the channel and remove the debris. Mr. Lash indicated that within the revised project description that he submitted was a good plan for the breaching. He removed any reference to a pipe solution for the breaching. The proposed program for the breaching is as follows:

1. Multiple small breaches will be made along the portion of the dam on the Bruce property. Material will be removed from the top of the dam in stages; at no time will the top of the dam be lowered more than 6 inches below the surface of the upstream water. No individual breach will be more than 24 inches wide.
2. The volume of flow will be adjusted by the total width of breaching. The total width of the multiple breaches is expected to be 12 to 20 feet and not exceeding 30 feet (or less than 10% of the dam length).
3. Breaching on the first two days will be limited to 6-inches in depth and 10-feet in width; the resultant flow will be monitored at the Apple Street bridge; the breaching width will be gradually increased on subsequent days until a safe, maximum volume of discharge is achieved.

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4. Maximum volume shall be defined by two criteria: 1) water should not be deeper than 4-inches above the spillway at the Apple Street bridge, and 2) the lake level should not drop by more than one-inch in a twenty-four hour period.

5. To avoid any possibility of a runaway flow of water, the deep section of the dam at the channel itself will not be breached initially. Instead, the dam at the channel section will be removed in stages after the water level drops, leaving the height of the channel section 1 to 2 inches above the water level.

6. Breaching will shift into a maintenance mode when the water level returns to normal levels - that is, when the water level is at the toe of the dam and the dam is no longer acting as a control structure.

Mr. Lash noted that the Chebacco Lake Association will organize and train volunteers, monitor water levels and discharge rates, and submit a weekly e-mail progress report to the Commission. Damon Boutchie, Superintendent of the Essex D.P.W. has agreed to establish a datum for the lake water level. The current water level will be established near the pumping station where a graduated stick will be installed. A second stick will be located near the breaching area. John Dick, of Hancock Associates, will observe the progress after two weeks and as appropriate thereafter. Mr. Lash said he is not sure how to leave the dam once the breaching has been completed. He mentioned the duration of the time frame for this project, as he does not want to keep re-filing with the Commission. John Dick noted that there is a lot of water behind the dam and attention to the project is necessary. It has got to be handled very carefully. This dam is built between a line of trees, and that is where they want the dam to be.

Samuel Hoar moved to close the public hearing for William Bruce, seconded by Philip Caponigro, with the Board voting unanimously in favor.

Samuel Hoar moved that the Commission adopt in the Order of Conditions the proposed breaching program, Pages 6 to 8, of 'Project Description of Chebacco Lake Beaver Dam Breaching' (attached to Minutes) and that the progress of the proposed breaching be documented to Town Administrator Brendhan Zubricki and will continue with progress documentation for a period of three years, with the first anniversary observed June 30, 2004,

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with a written status of the program needs to be submitted to the Conservation Commission, and a written status of the program needs submitted on June 30, 2005, and June 30, 2006, with the present Order of Conditions expiring November 4, 2006, seconded by Philip Caponigro, with Stephen Gersh, Samuel Hoar, Shirley Singleton, and Philip Caponigro voting in favor; Wallace Bruce abstained from voting.

A building permit application for Mark Minkin, 35 Rocky Hill Road, was submitted to the Board for their review by Jack Gale, Mark Minkin's contractor. Mr. Gale stated the proposed project is for construction of a second floor to the existing garage. There were no wetland issues - the building permit application was signed.

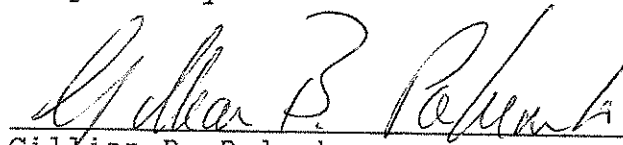
Susanna McLaughlin submitted a building permit application for the Board's review for the installation of a fence on the east side of the property at 40 Lakeshore Drive. The building permit application was signed.

Susanna McLaughlin asked the Board whether there were any regulations prohibiting the use of fertilizer. Stephen Gersh told her the Board could only restrict the use of fertilizer through an Order of Conditions, but there were no Town by-laws governing this.

Samuel Hoar moved to adjourn the meeting, seconded by Philip Caponigro, with the Board voting unanimously in favor.

Meeting adjourned at 8:30 p.m.

Prepared by:



Gillian B. Palumbo  
Administrative Clerk

Attest:

## Proposed Breaching Program

An Order of Conditions is requested for manual breaching of the dam to mitigate spring flooding and provide alewife access.

According to Skip Lisle, breaching is highly successful when done in the early morning. Being nocturnal animals, beavers will typically not engage in dam building/repairing activities until nightfall. Thus, a half day of flow each day can be expected.

Breaching to the toe of the dam (approximately 18 inches) will be gradual over a period of weeks to prevent erosion and downstream flooding. The rate of breaching is proposed to be regulated as follows:

1. Multiple small breaches will be made along the portion of the dam on the Bruce property. Material will be removed from the top of the dam in stages; at no time will the top of the dam be lowered more than 6 inches below the surface of the upstream water. No individual breach will be more than 24 inches wide.
2. The volume of flow will be adjusted by the total width of breaching. The total width of the multiple breaches is expected to be 12 to 20 feet and not exceeding 30 feet (or less than 10% of the dam length).
3. Breaching on the first two days will be limited to 6" in depth and 10 feet in width; the resultant flow will be monitored at the Apple Street bridge; the breaching width will be gradually increased on subsequent days until a safe, maximum volume of discharge is achieved.
4. Maximum volume shall be defined by two criteria: 1) water should not be deeper than 4 inches above the spillway at the Apple Street bridge (typical of the flow a day or two after a substantial but not extreme rainfall, and 2) the lake level should not drop by more than one inch in a twenty-four hour period.
5. To avoid any possibility of a runaway flow of water, the deep section of the dam at the channel itself will not be breached initially. Instead, the dam at the channel section will be removed in stages after the water level drops, leaving the height of the channel section 1 to 2 inches above the water level. (Once the water level is dropped the full 18 inches and the danger of excessive discharge is passed, a work party will remove as much of the dam at the channel as is reachable with hand tools. This will ensure maximum seasonal flow through the channel and maximum passage for alewife.)
6. Breaching will shift into a maintenance mode when the water level returns to normal levels—that is, when the water level is at the toe of the dam and the dam is no longer acting as a control structure.

**Discussion:** The maximum volume noted above is consistent with observed behavior in the lake and Alewife Brook. After a day-long rain, Chebacco Lake typically rises by several inches over the next 24 to 48 hours, then returns to the previous level in 48 to 72 hours. During this cycle, it is quite common to see the lake level change by an inch or more per day and it would appear that Alewife Brook can handle this volume of flow without difficulty or flooding.

On October 31, 2003, Dave Lash and John Dick of Hancock Associates observed ideal discharge conditions. After two weeks of wet weather, the water level at the lake had risen to the crest of the beaver dam. Along the 200 feet of dam on the Bruce property, water was spilling over the dam in eight locations, each cutting a breach of 2 to 6 inches in depth and 1 to 2 feet in width. Water on the down stream side of the dam was pooled approximately 9 inches deep (measured to firm bottom).

Assuming that the unobserved Town of Essex half of the dam had a similar number of breaches, it can be extrapolated that the total width of breaching on this date was approximately 16 to 32 feet (8 breaches observed / 50% of the dam observed x 1-2 feet in width per breach = 16 to 32 feet of total breach).

Downstream flows were also observed at Apple Street and two other culverted crossings. The water passing over the spillway at Apple Street was measured at 3.6 inches in depth. The channel at all three observed locations was handling this rate of flow with ease. Accordingly, the breaching program specified above is designed to replicate the observations made on October 31<sup>st</sup>—a similar number of breaches should yield a similar rate of discharge.

Hancock Associates has indicated that a breach 6 inches deep and 3 feet wide would discharge 0.04 cubic meters per second. Therefore, if we assume 18 feet of total breach width, the rate of flow would be 0.24 cubic meters per second. Salem State measured spring discharge in the brook at 1.66 to 2.46 m<sup>3</sup>/second. Therefore, 18 feet of total breach should generate discharge equal to only 10 to 15% of the spring discharge measured by Salem State.

At a discharge of 0.24 cubic meters per second, the volume discharged during a 10-hour flow period each day would be 8,560 cubic meters. Therefore, 387,000 cubic meters of excess water (see calculations above) would take approximately 45 days to discharge, not counting days added for additional precipitation.

Alternatively, if the observation is accurate that the lake frequently drops an inch in a day, that volume is 19,800 m<sup>3</sup> per day. Over a 24-hour period, the rate of discharge would then be 0.23 m<sup>3</sup>/second—almost exactly the rate of discharge estimated at Apple Street on October 31<sup>th</sup>.

In summary, direct observation of two phenomena—post rainfall discharge rate at Apple Street and the post rainfall drop in lake level—each result in the conclusion that a discharge rate of approximately 0.24 m<sup>3</sup>/second is a regular and frequent occurrence and represents only 10 to 15% of the high spring discharge rates measured by Salem State.

A faster rate of drawdown could be necessary given that November is a historically a wet month when groundwater levels rise. Therefore, November inflows into the lake may contribute to high water levels even though the discharge rate is increased as a result of breaching. If this occurs, ConCom approval will be sought to amend the Order of Conditions to increase the rate of discharge.

## Managing the Program

The Chebacco Lake Association will organize and train volunteers, monitor water levels and discharge rates, and submit weekly email progress reports to the ConCom.

Volunteers will park on Pond Street and walk into the dam across the field at 51 Pond Street. Volunteers will walk along the dam to a designated point near the channel where the breaching will be done. Breaching will be done with a clam rake or “cultivator” hand tool. The Order of Conditions should stipulate that the property owner, CLA volunteers, or a licensed trapper may perform the breaching.

Damon Boutchie, Superintendent of the Essex DPW, has agreed to establish a datum for the lake water level. The current water level will be established near the pumping station where a graduated stick will be installed. A second stick will be located near the breaching area.

Discharge at Apple Street will be monitored frequently to determine the width of the breaching that is appropriate to achieve the desired discharge volume.

John Dick of Hancock Associates will observe the progress after two weeks and as appropriate thereafter.