

# Six Ponds News

March 2005

An Occasional Publication Of The Six Ponds Improvement Association (www.sixponds.org)

## Contamination from Highway, Road and Driveway Runoff?

By Leighton A. Price

The Six Ponds Association's water quality work continues to identify problems which may require attention and remediation.

Much of our work to date has focused on the nutrient pollutants, phosphate and nitrate, and the concentrations of *E. coli* bacteria in our ponds, but recent analyses of our data have caused us to consider the possible impacts of other contaminants. Specifically, we have found that salts, components of salts, and other winter contaminants often seen in highway, road and driveway runoff are showing up in some of our ponds. Our ponds with the highest concentrations are those closest to paved roadways where storm drains and the roads themselves channel runoff directly into our ponds or onto land close to our ponds.

These results may have implications for road construction, storm drain construction and best management practices (BMPs) for remediation in the vicinity of water bodies. The BMPs recommended for remediating runoff problems are retention systems and these are usually paid for with 604(b) government grants. Six Ponds applied unsuccessfully for a 604(b) grant several years ago, but, given our recent findings, we think it is important to try again.

We have long suspected that stormwater runoff may be affecting our ponds in many ways, but until now we have not had sufficient data for clear patterns to emerge. Statistical processing of the chemical analyses of more than 150 water samples has now revealed interesting and disturbing patterns which strongly suggests that road runoff is having an impact.

With regard to seven chemical parameters suggesting runoff problems, we have found Bloody Pond to have the highest quantities, Little Long Pond to be next highest, Long Pond third, Halfway Pond fourth, Round Pond fifth, and Gallows Pond to have the lowest quantities.

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Racing on Long Pond about 80 years ago

## Sailing at Long Pond

Sailboats and sailboat racing have been a tradition on Long Pond for 80 years. A summer series of sailboat races got started in 1923 when a group of summer folk admired a boat called a pumpkinseed being sailed by Bill Elwell, who lived on the south end of the pond, and decided sailboat racing would help develop good sportsmanship and self-reliance in their children. The boat was called a pumpkinseed, with a shallow draft, a single gaff-rig sail, a removable daggerboard, and a barn-door rudder.

Legend has it that Mr. Elwell's brother shipped the boat to Maine from the Great Lakes and sailed it to Plymouth. The feasibility of this story is open to discussion - the hull shape resembles a sneakbox, which evolved in the marshes of New Jersey as a gunning boat, not any craft found on the Great Lakes. If a pumpkinseed were to be sailed from Maine to Plymouth, it would have been an upwind voyage attempted on only the fairest days with a tight-fitting spray cover, as the boat ships water readily even in the moderate "seas" that can form on Long Pond.

In any event, during the winter of 1923-24 the group, by then calling themselves the Chetolah Yacht Club ("Chetolah" is a Native American word meaning "this peaceful place") had six boats built modeled after Mr. Elwell's pumpkinseed. Straws were drawn to assign hull numbers and all boats were named after birds, a tradition which continues. The first

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## Contamination (cont.)

Plots showing results obtained for each of the seven parameters detected and a discussion of these results can be found on our website under Runoff from Highways, Roads and Driveways. (see [www.plymouthwaterquality.org](http://www.plymouthwaterquality.org))

In the discussion of the results we have tried to understand how the observable characteristics of each pond may contribute to the findings. To that end, we have examined housing and terrain characteristics, the types of roads surrounding each pond, and some of the drainage characteristics which may contribute to runoff problems for each pond. Discussion on the website should clarify why we think the quantities of the seven runoff parameters involved may be related to the stormwater runoff being discharged into our ponds.

Initially, the findings for Bloody Pond surprised us until a site visit revealed that multiple stormdrains from Route 3 and ditches in a wetlands area are shunting stormwater to the pond. This finding has special significance because the pond lies in an officially designated aquifer protection area which also contains a possible location for a Plymouth wellhead.

If you have observations and/or pictures to contribute to this discussion, please e-mail me at [input@plymouthwaterquality.org](mailto:input@plymouthwaterquality.org) or call me at 508-224-3441.

### Six Ponds Loses Long Time members

This year Six Ponds has lost several long time supporters; Carol Hehir, Fritz Steinway and LeBaron Briggs. Our condolences to their families.

### Six Ponds Executive Board

Charlotte Russell (President)	508-224-2007
David Buckman (Vice-President)	508-224-2642
Peggy Briggs (Secretary)	781-740-9736
Walter Morrison (Treasurer)	508-224-8409
Steve Abbott	Aileen Chase
Margie Saunders	Michael McDonough
Doug Post	Roger Monks
Leighton Price	Larry Rosenblum
Judy Savage	

## Cranberry Grower and Conservation at Critical Juncture

(Article reprinted from the Wildlands Trust of Southeastern Massachusetts newsletter)

As we head to press, the status of the A.D. Makepeace lands around Halfway Pond are at a critical juncture. After five years of political, legal, public, and behind the scenes battles to keep the largest cranberry grower and largest private landowner in Massachusetts from developing some of the most environmentally sensitive lands in New England, it appears a key new component of the solution is at hand, a new tool that allows development to proceed while protecting what should be protected because of its wildlife, scenic, and water supply values.

The cornerstone to finding a way to allow the company to get economic value and to save land is a refined Transfer of Development Rights (TDR) zoning amendment passed at the Plymouth Town Meeting at the end of October. A TDR allows a landowner to transfer permitted housing units from one parcel of land-the sending parcel--to another parcel of land-the receiving parcel and to develop the receiving parcel at higher density. A unique and important aspect of the new by-law is that it is value based, rather than only unit based, so that if units are shifted from a parcel with high appraisal value to a parcel of less value, additional housing units are granted. Thus if units are transferred out of a parcel where house lots are valued at \$300,000 to another parcel where units are worth \$150,000, the developer would get two units of housing. After all the units are transferred out of a sending parcel, a conservation restriction must be placed on the parcel.

This bylaw has specific utility in our desire to protect Halfway Pond, our most sacred property, comparable to a National Park in its scenic quality, home to rare and endangered species, and favorite resting spot of bald eagles. It is also the Makepeace company's most developable and highest valued tract. It is our hope and increasingly our expectation that this bylaw will make it worth the company's while to transfer out all or most of the development at Halfway Pond East.

Simultaneously the Southeastern Massachusetts Conservation Partnership appears to be working towards a deal with the Makepeace company for much of the other land identified with our assis-

## Sailing (cont.)

race was held on July 19, 1924, and it was decided to race on Saturdays for the rest of that summer.

Since then, weekends between July 4th and Labor Day have been race days as consistently as the changing of the seasons. Membership in the Club steadily expanded beyond the first seven families. Through boom times and the Depression, then in wartime and peace, in hurricanes, rainstorms, and placid calm days, the pumpkinseeds have been out on the water racing. The fleet has grown, shrunk, and grown again. The great-grandchildren of the founders of the Club are sailing those first six boats today, and in 1981 the Sunfish class was added to the ranks in order to make getting started in racing a little easier for young and old alike.

Pumpkinseed boats have never been available commercially - each time the fleet has increased, existing boats have served as models for local boatbuilders, which have included Nickerson of Plymouth, Tucker of Kingston, Plymouth Marine, Duxbury Marine, and Cape Cod Shipbuilding of Wareham. In the early 1950's Dick Bailey built his own hull #24, and since the early 1970's all new hulls have been built by their owners. Today the highest hull number is #36, and Mr. Elwell would feel right at home in the cockpit, even though bronze, canvas, caulking cotton, and manila have been replaced by stainless steel, dacron, resin, and nylon. Mr. Elwell's hull #1, having been abandoned in the local dump, rescued and re-furbished, still sails the pond today.

The Chetolah Yacht Club is unlike what many people consider a yacht club to be - it is nothing more than a group of area people who wish to sponsor sportsmanship and competition through sailboat races on Long Pond. The Club would welcome anyone in the Six Ponds area who owns or can borrow a boat (such as a Sunfish) and thinks that racing sailboats would be fun. For more information you may email [cyc@mayflowerweb.com](mailto:cyc@mayflowerweb.com).



**Bald eagles**

Area visitors have enjoyed watching two adult and two immature bald eagles that have been seen frequently at Halfway and Long Ponds this winter.

## Makepeace (cont.)

tance five years ago as having high conservation value. There is little doubt that the ultimate deal to protect the most critical Makepeace lands will require the use of the new Transfer of Development Rights bylaw.

But zoning changes are only part of the solution--it will also require give and take on the part of the community, conservation interests, and the company, and a massive fundraising effort, including the Plymouth Community Preservation Committee, the State House, private foundations, and private individuals. In the days ahead, we hope that we can inform you of positive resolution to an issue that has seemed intractable for the past five years and we also hope that we can count on you to help when it is needed.

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## Why do we measure Oxygen levels in the ponds?

Fish and other organisms living in our ponds require a sufficient concentration of dissolved oxygen (DO) for growth and survival. DO is the measure of oxygen molecules dissolved in a given volume of water. There are a number of things that affect these oxygen levels and Six Ponds measures oxygen levels as one of the indicators of the health of our ponds.

Why do oxygen levels vary? Temperature can affect DO levels seasonally as saturation or chemical maximum concentration varies. DO levels fluctuate daily as a result of the interplay of photosynthesis, respiration and exchange with the atmosphere. Just as the case with trees and other terrestrial plants, light driven photosynthesis by pond plants and algae consumes CO<sub>2</sub> and generates oxygen, while respiration affects the opposite. The atmosphere, assisted by wind and waves, exchanges oxygen with the water while attempting to achieve equilibrium. Thus daily oxygen levels in the ponds are generally lowest in early morning on calm cloudy days when respiration has exceeded photosynthesis.

How much oxygen is enough? Many aquatic organisms function well when DO levels are generally above 5 mg/L. Many organisms, especially those that don't move around much (i.e. muscles) will begin to experience stress with DO levels between 3-5 mg/L. At levels between 3 and 0.5 mg/L hypoxia will result in species leaving the area or dying. Levels below 0.5 mg/L are referred to as anoxia and will cause the death of any organism that requires oxygen. The bottoms of many

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## Oxygen (cont.)

deeper ponds are often anoxic but this is not necessarily abnormal. In addition to the absolute level of DO, the duration, timing and frequency of low DO conditions are also important. Many species can tolerate short periods of low oxygen conditions without ill effect. However, if these periods are prolonged, frequent or happen to coincide with vulnerable life cycle stages then effects can be more severe. In extreme cases, the whole ecology of the pond can change. This has happened to a number of ponds elsewhere in Plymouth and we are watching two of our six ponds carefully.

Readers of past newsletters may recall a chart on DO measured one day on Long Pond showing almost zero DO at the bottom and levels less than 2 mg/L from 45 feet to the bottom. Oxygen averaged 10 mg/L but peaked at 12 mg/L at the surface (affected by wind and wave) and again at 32 feet (evidence of photosynthesis from an unseen algae bloom).

How do we at Six Ponds determine oxygen levels? The Town of Plymouth lends us a sophisticated monitoring device called a YSI 6600 sonde. In addition to sampling for dissolved oxygen, it measures pH, temperature, depth, specific conductance, turbidity, chlorophyll and conductivity. The tests we have conducted over a number of years have become a valuable time series that makes trends and clusters of data evident.

How do our ponds stack up? In the case of both Halfway Pond and Little Long Pond it is suspected that human introduction of excess nutrients (phosphates and nitrogen) has promoted a profusion of weed and algae growth and thus, by accelerating the cycling discussed above, it has a recurring detrimental effect on oxygen levels. Our other four ponds are also at risk, particularly shallow Round Pond, but Bloody, Long and Gallows as well as they each attempt to balance both the natural and unnatural demands imposed upon them. As users, fans and stewards of these waters, it is up to us to further educate ourselves about them, to tread lightly on them and promote their healing. There are a number of suggestions on our website ([www.sixponds.org](http://www.sixponds.org)) on how you can help from everyday lifestyle and product selection to volunteering to help monitoring water quality.

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## Dog Doo

Dog waste is a big contributor of pollution via stormwater run-off to our local ponds. Please remember to pick up dog waste and dispose of it properly. It doesn't magically disappear. Leaving it on the ground causes a public health problem by allowing both bacteria and excess nutrients to wash down our paved streets and storm drains and into our water ways and ponds.

## Local Conveniences

Local residents are learning they can pick up items such as milk, juice, bread and eggs at the Longridge Wine and Spirits in the Pinehills. Pinehills also has a Post Office and Federal Express drop.

## Gravel Road Committee

Last Fall, the Board of Selectman, working with Department of Public Works Director George Crombie, created a committee to study the future of gravel roads in Plymouth. This effort is in response to increased pressure from residents in new and older areas of Plymouth to close, pave, realign, or otherwise improve sections of Plymouth's more than 70 miles of gravel roads, most of which are, technically, privately owned.

The committee consists of seven members, including one Selectman and one Planning Board member. The Board of Selectmen is represented by Anthony Schena; the Planning Board by Larry Rosenblum. The other five members are Dr. Sanford Leslie, a Six Ponds resident, Dan O'Neil, Dan Gorman, Donna Admirand, and Bud Holbrook III. All seven members live on gravel roads.

The charge of the committee is to develop a set of criteria that the DPW and Selectmen can use to make decisions about road improvements in Plymouth. The need for such a model has become increasingly clear in recent years as pressure from new development and increased traffic have raised concerns about safety, drainage, traffic volumes, maintenance, and changing community character. Addressing these issues will involve an examination of legal, design, cost, ownership, and a host of other questions

While the goal of the committee is to make recommendations about policy, and not specific road improvements, the condition of specific roads is being discussed. For instance, Ship Pond Road is a gravel road that connects Old Sandwich Road and Route 3A to Long Pond Road. Due to rapid residential growth in recent years, Ship Pond Road has seen a marked increase in traffic, and residents are concerned about excessive speed, pot-holes, and other hazards, like the awkward intersection of Ship Pond Road and Long Pond Road. These are the kinds of concerns the committee will be considering as they develop their recommendations.

The committee will hold public hearings this Spring to get additional community input. They will also be making a progress report to Town Meeting in April. The committee's work will conclude with a formal report and Town Meeting presentation in Spring, 2006.