Organization for the Assabet River

Newsletter May 2009

Assabet Communities Explore Pros and Cons of Dam Removal

Alison Field-Juma

Over the past six months, OAR has been seeking ideas for the next steps to improve the Assabet's water quality and wildlife habitat. We focused on the effects of dams and wastewater treatment plants and what a healthier river would look like.

At eight focus groups held in the fall, 60 interested residents, business owners, municipal officials, and state and federal agency staff identified what questions need to be asked, which ones could be answered now, and which ones will require further study. A representative group of participants helped OAR plan the agenda for workshops to provide information in response to the focus groups' input.

In March, OAR held two community workshops on "Assabet River Restoration: Understanding the Impact of Dams in Your Community," drawing over 100 participants. These workshops provided the historical, scientific, and regulatory context for how the Assabet River's pollution is affected by sediments, dams, and wastewater treatment plants.

Congresswoman Niki Tsongas and Selectman Leigh Emery welcomed participants to the Maynard and Westborough forums, respectively. Both emphasized that the river contributes to the economic viability of the region and its ecological values. It also provides unique educational and recreational opportunities for all who live and work here.

Congresswoman Tsongas described new legislation, The Water Quality Investment Act of 2009, which would renew the federal government's commitment to clean water by authorizing $19.8 billion over the next five years for wastewater infrastructure and other efforts to improve water quality. "If the Senate passes this bill, it will be the first time in 15 years the Clean Water Revolving Fund will be authorized," she said. "I feel fortunate to represent a district in which the rivers are treated as true natural resources--being sustained by organizations, volunteers, and different levels of government that work together to preserve the integrity of these resources."

Congresswoman Niki Tsongas: "The health of the Assabet River should be of concern to everyone in the 5th District."

OAR president Dave Griffin then took us on a fascinating pictorial tour of the river's industrial past, setting the stage for the technical and regulatory information to come. Eight presenters then described the story and the science of the river. OAR's Policy Director, Alison Field-Juma, described how the state's nutrient study (TMDL) provides a roadmap which will lead to a healthy river, and reviewed the improvements already achieved through wastewater treatment. She noted that while some continued improvement in water quality can be expected as upgraded plants come on-line, there is a limit to what can be achieved with current technology because there are so many nutrients in the sediments trapped behind the six old mill dams along the river.

Pros and Cons, *page 4*

Mining Iron on the Assabet River

Dave Griffin

This story begins 11,000 years ago when the last of a series of massive glaciers that carved the landscape we live in today receded to the Arctic Circle. In addition to creating the valley that forms our watershed, the glaciers ground up bedrock, exposing it to the elements.

Everyone is familiar with the classic chemical composition of water, H_20, but you are far more likely to find that compound in a laboratory than anywhere else. In nature, in oceans and rivers, lakes and ponds, in rain and in the water coming out of your tap there is a complex set of minerals and chemicals (both naturally occurring and human-introduced) all mixed in there. For example, oxygen from the atmosphere is also dissolved into the water. Without that dissolved oxygen fish are unable to "breathe" and will die.

As the Assabet River flows through its channel, its water slowly dissolves the sand and rocks that hold it. Meanwhile, rain falls and percolates into the ground. That rainwater also interacts with the earth and disolves various minerals. Some of that "processed" rainwater bubbles back up to the surface and creates many of the tributaries that feed the Assabet.

Mining Iron, *page 6*

Inside This Issue

OAR

The Organization for the Assabet River is a nonprofit organization established in 1986 to protect, preserve, and enhance the natural and recreational features of the Assabet River, its tributaries and watershed.

OAR Newsletter

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Letter from the Executive Director

OAR's Environmental Film Festival in Maynard and the River Restoration Workshops in Westborough and Maynard remind us that there are solutions that lie within our communities, and together we can cause dramatic shifts in the quality of life by embracing our local environment.

Spring is finally here! That means it's time to dust off the boots or the boat and discover the wonders we have right at home. We don't have to drive hours to enjoy the scenic beauty of a wild river. We have a Wild and Scenic River in our own backyard. Come join us on the river this spring in celebration of the 10th anniversary of the designation of the Assabet, Sudbury, and Concord as national Wild and Scenic Rivers.

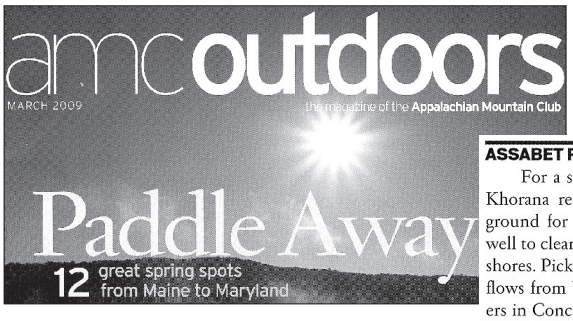
Spring offers marvelous opportunities to watch all kinds of wildlife awakening with activity. Nesting begins for many birds, including ospreys, herons, egrets, and turkey vultures. Red and gray foxes are raising their "kits" and the eastern cottontail, the elusive water shrew and coyotes begin courtship and breeding. Frogs, toads and salamanders begin their magical migration to vernal pools, ponds, streams, and ditches to breed during rainy nights. Snakes and turtles are more active and likely to be seen in yards and gardens. For the fishermen and women out there, OAR, Concord Outfitters, and Trout Unlimited partnered to stock trout on the Assabet in West Concord this spring, so keep on the lookout! If you catch one, please release it and give us a call. We would like to know where you caught it and how big it was! It's a wonderful time to take the family out and explore.

Or perhaps you would like to have a more data-based experience of the river. Soon, OAR volunteers will begin climbing down banks at over 20 sites along the Assabet, Sudbury, and Concord Rivers (and tributaries) to collect water quality samples. For OAR, it all begins here-- our advocacy is based on data we collect. OAR has been largely built and sustained by the hard work and countless hours put in by volunteers. If you would like to help, please call us!

Yours truly,

Amanda Davis

Amanda Davis



ASSABET RIVER, MASS.

For a serene quietwater paddle not too far from Boston, Khorana recommends the Assabet River. Once a dumping ground for nearby industry, the 31-mile river has responded well to cleanup, as evidenced by the birdlife now seen along its shores. Pick one of the countless put-ins on the Assabet, which flows from Westborough into the Concord and Sudbury rivers in Concord, and you're bound to spot herons, red-winged blackbirds, and many painted turtles tanning on the uprooted branches and logs.

INFO *AMC River Guide: Massachusetts, Connecticut, and Rhode Island* (AMC Books).

The Appalachian Mountain Club listed the Assabet River as one of the 12 great paddling spots from Maine to Maryland in their March 2009 magazine. If you are wondering where to canoe or kayak, take a look at OAR's Assabet River Pocket Guide, available for downloading on our website. A list of guide books is also on our website. Visit www.assabetriver.org/river/recreation.

Water Wisdom, One Drop at a Time

OAR's Water Wise Workshops will be back for the 6th season this summer! The workshops foster community stewardship of the Assabet River and its watershed by offering fun and thought-provoking activities for children and their parents at sites near the river, lake, or reservoir in their city or town.

The series of six free outdoor workshops on environmental science and stewardship are designed for children ages 6-12. Through field-work, hands-on activities, and lively group discussions, the young stewards are encourage to explore the facinating world of water and learn new ways of protecting it for all the creatures that depend on it. Topics include:

- **Watersheds & the Water Cycle:** build a watershed and learn how the water cycle works
- **Water Plants & Animals:** discover the plants and animals that live in and around the water and how you can protect them
- **Water Testing & Conservation:** as a junior scientist you will test water and learn how to protect and conserve it.
- **Water Bugs Mystery:** discover and identify water bugs and learn the secret of where they live and what they tell us about water
- **Water Wise Wizards:** putting together all you have learned during the Water Wise Workshops series, you "magically" become a steward of your environment
- **Water Wise Photography:** learn how to photograph our wonderful water-world for display in your community

The summer workshops will be held at Fort Meadow Reservoir in Marlborough, Lake Chauncy in Westborough, and at Lake Boon in Stow. Visit www.assabetriver.org and go to "Projects & Activities" for the most current schedule.

OAR is able to offer these workshops thanks to support from Intel Massachusetts, the Greater Worcester Foundation, and Rohm and Haas.

Seeking Part-time Environmental Education Interns

OAR is accepting applications for high school or first-year college students to assist in the presentation of our Water Wise Workshops this summer. Position will require own transportation and a willingness to work enthusiastically with children and their parents. Internship will run from mid-June through August, at approximately 10 hrs/week. Closing date: June 1, 2009.

Please email resumes to oar@assabetriver.org. For questions about the positions, please email or call our office at (978) 369-3956.

Assabet River Water Quality – A Work in Progress

Sue Flint

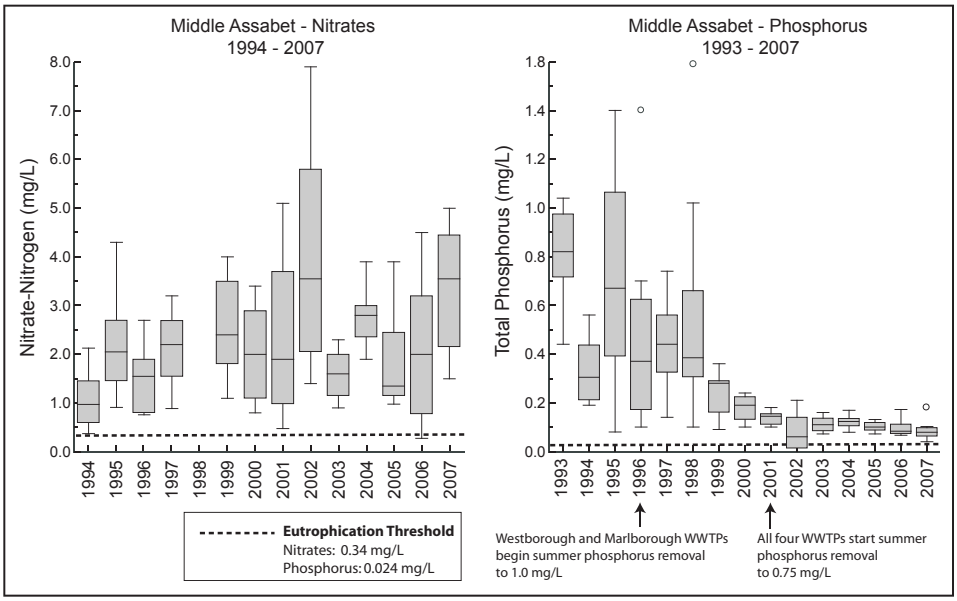
Is the Assabet's water quality improving? Since 1992, OAR staff and our dedicated group of volunteers have collected water quality data on the Assabet. Since 2002, the data have been fully quality controlled, documented, and presented on our website. But what does the data tell us? With more than fifteen years of data we can look at changes over time and we're excited to share the results of this trend analysis.

Focusing just on nutrients, we looked at changes in water quality over the years. We found that since 1993, phosphorus concentrations have decreased, but are still about 2-10 times higher than we need for a healthy river.* At the same time nitrate concentrations have increased, and are currently about 3–10 times higher than would allow for a healthy river.* The graphs below show a sample of our data: total phosphorus and nitrate trends in the middle (Marlborough/Hudson/Stow) section of the river.

Detecting long-term trends in water quality is complicated by a number of things, including variations in the amount of rainfall we get each year. With more rainfall, streamflows are higher and, in the mainstem Assabet, nutrients from the wastewater treatment plants are more diluted.

During cool, wet summers the river looks cleaner—less duckweed and algae cover the surface and the river doesn't smell bad—but the same total load of nutrients from the wastewater treatment plants is still entering the river. With 15 years

Water Quality, *page 7*



Pros and Cons, *page 1*

Fred Ayer of the Low Impact Hydropower Institute and Mark Wamser of Gomez & Sullivan Engineers showed how they determine the feasibility of small-scale hydroelectric plants and assess their ecological impacts. In some cases, licensing a dam for hydroelectric power and maintaining the structure can be more expensive than removing it. However, contaminant removal and disposal can push costs of dam removal up significantly.

Beth Lambert of MA Riverways Program and Brian Graber of American Rivers presented case studies of five dam removals that have been completed in Massachusetts. They showed "before" and "after" images to help the audience visualize a free-flowing river. MA Division of Fisheries and Wildlife staff Todd Richards and Alicia Norris described the fish living in the Assabet, Sudbury and Concord Rivers. Because of the many dams, populations are currently skewed toward pond fish, rather than typical river-dependant fish such as trout. Ken Finkelstein of the National Oceanic and Atmospheric Administration (NOAA) noted that herring and shad, which come up from the ocean to spawn, were likely present in the Assabet in the past. The migratory American eel is still present.

Gary Mercer of Camp Dresser & McKee presented much-anticipated results of a modeling study done for the Army Corps of Engineers. The models were designed to determine how water quality could be improved through a combination of dam removal and wastewater treatment plant upgrades. Although the study has not been released in its final form, Mercer presented the predictive scenarios. These show that removing the largest dams would improve water quality, whereas removing the sediment by dredging and leaving the dams in place would give only short-term (two to three year) benefits. They also found that reducing the amount of phosphorus discharged by treatment plants during the winter would make a significant difference.

After the presenters told their part of the story, audience members participated in answering questions through an interactive process called keypad polling. This new technology, operated by the Metropolitan Area Planning Council (MAPC), provided an instantaneous view of the participants' interests and concerns.

Workshop participants expressed a strong interest in improving the health of the Assabet, rating it as one of their top environmental priorities. They were also very interested in learning more about the trade-offs between stricter wastewater discharge limits and dam removal, including cost and environmental impact.

A lively question and answer session covered diverse topics, such as how to replace fire protection services provided by dams (install cisterns), and whether dam removal would result in mud flats (only for a month or two), or flooding (it is more likely to reduce flooding). Several residents raised questions about who would own the land now under water (difficult legal question: depends on who owns it now). Others expressed concern about whether landowners would be liable for cleaning up contaminants now under water (no more so than now). Many participants expressed the view that upstream communities had a responsibility to treat their wastewater so that it would not negatively impact downstream communities. It was noted that the final decision about whether to remove a dam almost always resides with the owner.

The workshops are part of OAR's effort to provide watershed residents with sound background information about the river's ecosystem in advance of the release of the Army Corps of Engineers' "Sediment and Dam Removal Feasibility Study" expected later this year. This study will present the positive and negative impacts of removing some or all of the six old mill dams along the Assabet. The modeling portion of the study, already released, concludes that dam removal would improve water quality.

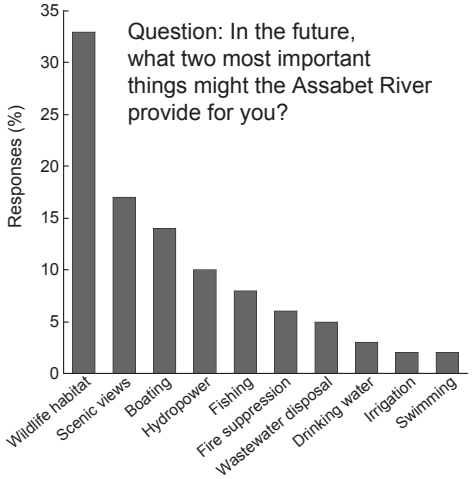
OAR greatly benefited from working with Patrick Field of the Consensus-Building Institute who facilitated the focus groups and forums. The project was funded by the Sudbury, Assabet, and Concord Wild & Scenic River Stewardship Council, with additional assistance from EPA's New England-based Alternative Dispute Resolution (ADR) Program. Contributions were made by the MAPC for keypad polling, and by Clock Tower Place and the Town of Westborough which provided the venues. OAR volunteers provided invaluable assistance at the workshops.

The presentations and a multimedia podcast "Voices About the River" are at www.assabetriver.org/projects/education/river-restoration. Stay tuned for news about the Army Corps Sediment and Dam Study and meetings to present it to the public.

Workshops use Keypad Polling

Keypad polling is a wireless voting technology used to encourage participation and to bring focus to discussion and decision-making at an event. A number of hand-held keypads communicate to a laptop computer. The result of a group vote is displayed on a projection screen within seconds.

Keypad polling provided an opportunity for workshop participants to know each other better and to hear from everyone present. At the Maynard workshop, we learned that 32% of the participants were from Stow and 22% from Maynard. When asked about their top two priorities for future personal use of the river, wildlife habitat topped the list.



Remembering a Friend

Julia Blatt

When Bill Sullivan died last October, both OAR and the Assabet River lost a good friend.

I met Bill in 1987. I was an aide to Congressman Chet Atkins. Responding to a constituent's request to add the Sudbury and Concord Rivers to the national Wild and Scenic River system, our office had organized a series of meetings to talk to residents in our district about this possibility.

We soon learned that OAR – at the time a very small, but rather feisty organization – thought the Assabet should be included as well. We also learned that Bill Sullivan, a selectman in town, owned a converted mill along the Assabet. Betsy Stokey, OAR's representative at the Wild and Scenic meetings, assured us that Bill cared about the river and would want it protected; he just needed to understand what the proposed designation would do, and how it would affect the Assabet. Just a few feet from the riverbank, Bill's building may be Concord's closest inhabited structure to the river. Bill lived and worked in Damonmill, and from both his home and his office Bill could see the Assabet flowing by.

Despite his tenure on the Concord Board of Selectmen and many other civic and voluntary activities, it was clear that Bill disliked meetings. He had little patience for long-winded speeches or pretension of any kind, and did not gladly suffer fools. A man of few words, Bill also appeared to

have little interest in making speeches of his own. He was a good listener, however; especially if you got right to the point. He listened to Betsy's case for the Assabet and concluded that Wild and Scenic designation would be a good thing and that he would give it his support.

I'm not sure if any of us could have anticipated the kind of support the Wild and Scenic effort would eventually ask of Bill. Once on board with the idea, Bill gamely supported it from his seat on the Board of Selectmen, where it promptly ran into trouble with an anti-environmental, anti-federal town resident who organized some vocal opposition. In meeting after meeting, Bill brought credibility to the cause. Known and respected as a practical, yet civic-minded businessman – rather than as an environmentalist – Bill mostly listened, but quietly weighed in at key points, always in support of river protection. When the Wild and Scenic effort started to founder in neighboring Bedford, again Bill came to the rescue, talking to skittish selectmen in this community downstream. Finally, when we needed someone to testify before a congressional subcommittee in favor of our legislation, Bill – now an expert on the subject - agreed to travel to Washington. Bill politely refused my offer of speechwriting help, preferring to speak in his own words. I had no idea what he would say (since he often didn't say much), and was startled by the eloquence and passion of this pragmatic, quiet man.

When I came to work for OAR in 1998, Bill was (and had been for many years) OAR's landlord. The organization worked (and still works) out of donated space in Damonmill. Bill never wanted public recognition for his generosity – and waved me away when I tried to thank him for that gift and so many others. We succeeded in putting him on the OAR board for a few years, but I really think that despite his love of the river and the organization, meetings really were for him a form of exquisite torture. He always seemed much happier puttering around Damonmill's giant garage, attending to the operation of his building. Still, he always made time for me – especially if I came right to the point with my request– and he nearly always said yes.

Bill eventually left Concord to restore another old mill, this time in Amesbury, and this past October, at just 63, Bill was gone for good...far too soon. I don't know where any of us go next, but I am sure that wherever Bill is now, he's quietly fixing the place up. I just hope they appreciate him as much as we did.

Welcome New Members!

Anonymous (2)
Kathryn J. Adams
Dorothy Shamonsky and Andrew M. Bennett
Jane Bertolami
Narendra Bhushan
Joan Boyd
Kathy Campbell
Neal and Nancy Chisholm
Jeff Clements
Jennifer A Coogan
John and Janet Dunbar
Mary Jo Fernandez
Pam and Dudley Goar
Erik Hansen
Tom Kennedy
Paul Kramer
EJ Labb
Antoinette O'Connell
Dan Rossignol
Michael L. Stephens
Linda Stevenson
studio-e
Kris van Naersson
Lisa Verrochi
Bonwen Wirta
Michael and Jennie Woods

Donations in Memory of Bill Sullivan

Julia Blatt and Ken Siskind
Peter and Patricia Boeing
John and Mary Ann Boynton
Allison Dubay (Alternative Resources, Inc.)
Thomas and Simonne Duggan
Corina and Mario Favorito
Arthur and Diane Fulman
Ruth A. Hayward
Judy and Jonathan Keyes
Leslie Klaidman
Tom and Tonya Largy
The Mandrioli Family (The West Concord Supermarket)
Diana Metro
Margaret Niple
Bette Pounders
T. and K. Rothermel
Peter and Joyce Smith
Valerie Smith
Betsy Stokey and Ron McAdow
Judy and Jim Walpole
Richard and Patricia Whipple
Heather Gilbert and Robert Wofchuck

Mining Iron, *page 1*

In a number of places along the river and in nearby ponds you will find swampy areas where the water and the land mix and, together with mosses and other plants growing and dying over many years, they create a bog. Beneath the surface of a bog the amount of dissolved oxygen in the water drops to near zero and creates a niche for a variety of bacteria that don't need oxygen to survive. Some of these anaerobic bacteria, in conjunction with other chemical reactions occurring in those layers of muck, pull the iron out of the water and create layers and chunks of crystallized iron ore called "bog iron." (Like iron ore found within the earth, the iron is not pure - it is mixed with other minerals that mostly detract from its utility as a metal.)

This natural process has been known for thousands of years and, if the demand is moderate, it is completely sustainable as a bog can generate harvestable iron in as little as 20-30 years. Indeed, a local prospector, Uriah Leonard, had hoped that "the time may come when it will be easy and as common to raise a bed of bog ore as a bed of carrots".

Now we fast forward the clock to the 1600's and the European colonization of America -- specifically the Massachusetts Bay Colony. A decade after the famous arrival of the Pilgrims in 1620, religious conditions in England launched a great migration of colonists into Massachusetts. The ships did not just bring people, their holds provided a constant flow of supplies. By 1640 the number of new arrivals began to drop off and suddenly Massachusetts had to become more self-sufficient. In 1641 the General Court of the Massachusetts Bay Colony enacted laws that gave exclusive rights for 21 years to anyone finding mineral deposits in the colony. Iron, needed for building ships and "the customary purposes of life," became potentially quite profitable.

This caught the attention of the governor's son, John Winthrop Jr., who found a group of investors in England and created a "Company of Undertakers of the Iron Works of New England". In 1646 the company established the first Massachusetts ironworks on the west bank of the Saugus River in Lynn. (You can visit a reconstruction of this early foundry in Saugus as today it is part of the National Park system.)

The ironworks in Saugus, seeking additional sources of iron ore, found a suitable bog "mine" on the shores of the Assabet River in Concord. In 1658 the company purchased 1600 acres of land that lie within the current boundaries of Concord, Acton, and Sudbury. A forge was set up more or less where OAR's office is today, at Damonmill in West Concord. Called "Iron Works Farm", it included a smelting furnace, forge, and housing for the employees -- all of whom were trained at the Saugus Iron Works.

The mining and processing of bog iron ore was a resource- and labor- intensive activity. The 1600 acres were not all swampland-- a good portion of it was forest, which was cut down and burned to create charcoal, one of the materials used in the smelting process. The ore itself had to be gathered from the bogs: essentially people spent all day in a swamp pawing through layers of muck looking for the chunks of ore.

If we assume that our Assabet ironworks were a smaller scale version of the Saugus factory, there would be a large stone furnace that operated 24 hours a day. The ore, charcoal, and limestone (called "flux"), which helps purify the iron ore, are dumped into the furnace which then rises to a temperature of 3,000 degrees. Large bellows, powered by the river, provide the blasts of air needed to get the furnace to these high temperatures. The liquid metal sank to the bottom of the furnace as a layer of impurities called slag floated to the top. It was removed (and likely dumped into the river) and the molten iron was then poured into a series of trenches pressed into sand. One large trench gave way to a series of smaller ones -- the arrangement looked like a mother pig feeding her piglets, so the larger bar was called a "sow" and the smaller ones "pigs" (and now you know where the expression "pig iron" comes from). The molten or "cast" iron was also poured into other molds to create items like iron pots.

This cast pig iron still had a fair number of impurities it it and so it was rather brittle. To make it malleable enough to create tools and implements required multiple trips to the forge, where the iron was heated, pounded with a hammer, and then cooled... several times. The result was called a "merchant bar": 3 inches wide, 1.5 inches thick, and 4 feet long. It was this iron that was wrought by blacksmiths into plow blades, nails, and shovels, whatever was needed. The forge was staffed by men and boys who worked under very difficult conditions and were most likely made deaf by the noise of the large, water-powered forge hammer constantly pounding away day after day.

The "pig iron" bars produced at the Assabet furnace were placed on boats and shipped down the river and then down the Concord and Merrimack. The iron was sold to blacksmith shops that sprang up along the rivers and the coastline.

While bog iron is a potentially renewable resource, the Concord ironworks extracted all of the available ore by 1694. After closing, the Iron Works Farm was sold to Lot Conant, a farmer from Beverly who built a house that stands today. That house would eventually become a boarding home and today is an inn known as the Colonel Roger Brown House on Main Street in Concord.

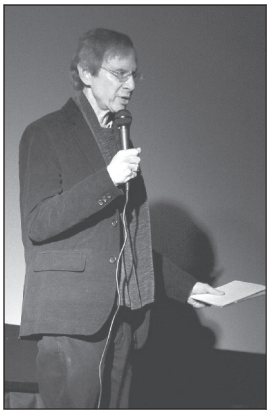
Concord was not the only bog iron foundry on the Assabet. Starting in 1782 and operating for a decade, Jonathan and Ephraim Cobb ran a bog iron works on the shores of the Assabet River in Northborough.

The ironworks of the Assabet were relatively small compared to others in the state. Many towns closer to the coastline owe their existence to that early iron industry. Eventually these ironworks shut down due to a combination of exhausted supplies (of ore or trees) and the availability of cheaper iron ore from mines in Pennsylvania. Today thriving cranberry farms occupy many of the bogs that once provided the raw materials used to create the tools and building materials that changed the landscape of Massachusetts.

If you would like to learn more about the colonial iron industry the National Park Service operates a National Historical Site at the Saugus Iron Works. The site is open from April through October. Admission is free and less than an hour's drive from our watershed.

Wild and Scenic Environmental Film Festival was Amazing

The evening of March 4 brought a standing-room only audience to Maynard's Fine Arts Theatre for the screening of engaging films from the nation's largest environmental film festival. Ranging from 1 to 30 minutes, the films left the audience inspired and motivated to go out and make a difference! Film information and links to their trailers can be found on our website at http:/ www.assabetriver.org/projects/recent-events.



From l-r: Wine and beer were enjoyed by festival goers.
Maynard's own rap artist EJ Labb entertained us.
Raffle with 27 great prizes.
Filmmaker Marty Ostrow spoke about his film Renewal.

Hats off to the Fine Arts Theatre for making the evening possible. Thank you to our supporting sponsors Kangas & Arnold, P.C. and Studio-e. Local sponsors included Town of Maynard Selectmen and Police, EMS, Patagonia, ZOAR Outdoor, REI, Concord Acton Squash Club, Concord Outfitters, Nashoba Brook Bakery, Dunia, Cast Iron Kitchen, West Concord Liquor Store, Colonial Spirits, and Wyman's Liquors. Our national sponsors were the South Yuba River Citizens League, Patagonia, Tom's of Maine, Clif Bar, and Sierra Nevada Brewing Company. Many thanks to our emcee EJ Labb, technical crew Dan LaChapelle and Brian Poole, and special guest, Renewal filmmaker Marty Ostrow. OAR is grateful for the support of the many volunteers and organizations who helped make the evening a huge success.Please join us next year for our Second Annual Wild & Scenic Environmental Film Festival!

Water Quality, *page 3*

worth of data collected at consistent sampling sites, we were able to use statistical methods to factor out weather variations to see whether changes in water quality are significant.

What affects phosphorus and nitrate concentrations in the river? The main source of phosphorus and nitrates in the Assabet is the wastewater discharged from the four municipal wastewater treatment plants. While we'll have to do more data crunching to assess trends in the amount of nutrients coming directly from the wastewater treatment plants, we know that there have been improvements in phosphorus removal over the time that OAR has been sampling. Nitrate concentrations are not regulated in the treatment plants' discharge permits and the total amount of nitrogen entering the river is likely increasing as the amount of wastewater being treated increases.

Before 1993, the wastewater treatment plants in the Assabet basin were not required to remove phosphorus. In 1993, summer-time phosphorus limits of 1.0mg/L were set at the Westborough and Marlborough Westerly treatment plants; phosphorus removal began between 1994 and 1997. New phosphorus limits of 0.75mg/L were set in 2000 and all four treatment plants were meeting these limits by 2001. In 2005, following the state's Total Maximum Daily Load (TMDL) study, much lower summer-time limits were set at all of the treatment plants and winter limits were added (see table below). All treatment plants began meeting winter limits in 2008/2009 and are expected to begin meeting the lower summer-time limits starting in 2010 and 2011. With increased development in the watershed, increasing loads of both phosphorus and nitrogen can also come from "non-point sources" such as erosion, fertilizer, and septic systems.

As phosphorus concentrations in the river improve, we hope to see a blue—rather than green—river in the summers. At the same time we need to assess the impacts of increasing nitrogen concentrations on the river and continue monitoring on the Assabet's tributary streams to assess the impact of non-point pollution. The Assabet River is improving, but it remains a work in progress.

** EPA's 2000 Recommended Nutrient Criteria for Rivers and Streams in Ecoregion 14 "eutrophication thresholds" are: 0.024mg/L total phosphorus and 0.34mg/L nitrate/nitrite.*

Assabet NPDES Permits and Phosphorus Limits

Permit Year	Town/Wastewater Treatment Plant	Total Phosphorus Limits
1970's	Westborough, Shrewsbury, Marlborough, Hudson, Maynard	No P limit (primary treatment only)
1988	Marlborough Westerly, Hudson, Maynard	No P limit
1993	Westborough	1.0 mg/L (May 15-Sept 15)
	Marlborough Westerly (permit modified 1995)	1.0 mg/L (May 15-Sept 15)
	Hudson	No P limit
2000	Westborough, Marlborough Westerly, Hudson, Maynard	0.75 mg/L (Apr-Oct) Report winter P-discharges
2005	Westborough, Marlborough Westerly, Hudson, Maynard	0.1 mg/L (Apr 1-Oct 31) 1.0 mg/L (Nov 1 - Mar 31)

OAR

Organization for the Assabet River
9 Damonmill Square, Suite 1E
Concord, MA 01742

Non-profit Organization
US Postage
PAID
Permit No 7
Maynard, MA 01754

Return service requested

OAR

Yes, I'd like to help the Assabet River and its watershed!

Name: _____

Address: _____

_____

Phone: _____

Email: _____

- ☐ Leadership Circle:
  - ☐ Benefactor $2500
  - ☐ Steward $1000
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