

## Massachusetts

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### Who We Are

Inspired by a shared passion for conservation, NRCS collaborates with farmers, ranchers, communities and other individuals and groups to protect natural resources on private lands.

Working side-by-side with these customers, we identify natural resource concerns, such as water quality and quantity issues, soil erosion, air quality, wetlands and wildlife habitat, and develop unique conservation plans for restoring and protecting resources. Funds to implement these plans are made available in Farm Bill programs that share the cost of conservation for the benefit of the farm, the watershed and the community. Conservation easement programs, also in the Farm Bill, provide long-term options.

NRCS helps Massachusetts and the Nation balance economic goals with the needs of the environment—ensuring sustainably productive lands that supply food, fiber, forest products and energy for all citizens.



Thermal screens, a horizontal air flow system and alternate fuels are among the energy upgrades made by this greenhouse operation in Whately, Mass. with the help of the Massachusetts Farm Energy Program and EQIP funding.

### Clean and Streamlined: On-farm Energy Efficiency and Production Help Farms to Thrive

New Englanders pay up to 56 percent more for energy than the U.S. average, directly impacting the viability of our farms. By adopting energy efficiency measures and producing clean, renewable energy, Massachusetts farms are improving air quality, and keeping their doors open and their land in agriculture by lowering operating costs. A win-win-win solution!

NRCS Massachusetts has been a pioneer in using Farm Bill programs to encourage energy efficiency. A Conservation Innovation Grant helped start the Massachusetts Farm Energy Program and air quality practices available through the Environmental Quality Incentives Program are increasing energy efficiency and replacing fossil fuel-based energy with renewable alternatives.

During 2009 and 2010, NRCS Massachusetts played an important role in:

- completing 31 energy efficiency projects, saving each farm an average of \$12,300 in energy costs annually.\*
- completing 19 renewable energy projects, saving each farm an average of \$4,800 in energy costs annually.\*
- conducting 86 energy audits, including public utility audits and renewable energy assessments. Energy audits are the first line of defense against high energy costs and waste, as they identify waste and recommend ways to use energy efficiently.
- helping 39 farms to remain productive and profitable, providing our communities with healthy food and jobs and helping to keep almost 900 acres in agriculture.
- injecting \$4 million into the local economy through these projects, using primarily Massachusetts labor for the installation work.
- preventing 3,200 tons of CO<sub>2</sub>—the equivalent of removing about 550 cars from the road—from entering our atmosphere through these projects.

Now that the agency has designated energy as a natural resource concern, the future is brighter—and cleaner—for farms across Massachusetts and the United States.

\*Based on 0.15 kWh electricity, \$2.00 gal. propane, \$1.10 therm gas, \$2.50 gal. #2 oil, and \$250 cord of wood.

## Water Quality and Aquaculture Viability

**Issue:** Restore natural tidal flow to salt marshes, repair fish passages and prevent polluted storm water runoff from reaching shellfish beds.

**What NRCS Massachusetts is doing:**

In a state with about 1,980 miles of shoreline, protecting our water is critical. All along our beautiful Cape Cod shores, aquaculture, recreation, tourism and wildlife habitat are threatened by poor water quality and obstructed waterways. Native herring cannot reach their breeding grounds due to obstacles in streams, shellfish farms must close when polluted stormwater runoff contaminates oyster and mussel beds, and salt marsh ecosystems choke when the natural tidal flow is restricted by undersized culverts.

The Cape Cod Water Resources Restoration Project will restore degraded salt marshes, improve fish access to spawning habitat and improve water quality at almost 80 sites spread across all 15 Cape Cod towns. Not only will the Cape's ecosystems benefit, but the local economy will benefit, as well, through the protection of shellfish beds and creation of short-term jobs. Funded in part through the American Recovery and Reinvestment Act, the estimated \$30 million "Cape Project" is a success story in the making.

Program used: (WFPO)



Photo: Catherine Ulitsky, NRCS

Barnstable County, Massachusetts—also known as Cape Cod—is a coastal area where ecosystems have been compromised by urban development. Water quality is a major concern, particularly as it affects the ground water aquifer, salt marshes, shellfish beds and herring runs.

## Energy, Air Quality and Climate

**Issue:** Simplify landowner access to energy efficiency and renewable energy production incentive programs and technology.

**What NRCS Massachusetts is doing:**

The Massachusetts Farm Energy Program (MFEP) is a one-stop-shop for energy planning, audits and fund-leveraging assistance, including financial incentives up to \$5,000 based on energy saving upgrades and certain renewable projects. Initial findings show that this approach had a remarkable impact on energy savings and reduction of CO<sub>2</sub> emissions—exceeding the project target by nearly 600 percent.

The MFEP has helped NRCS Massachusetts to develop and pilot energy efficiency and renewable standards, now in use in other states. It has also been instrumental in developing protocols for assisting Northeast farmers with NRCS' national on-farm energy audit and implementation initiative.

In 2010, The American Council for an Energy-Efficient Economy (ACEEE) recognized the Massachusetts Farm Energy Program as one of the exceptional state-led energy-efficiency programs in the United States. In addition, the MFEP was recognized for technical assistance provided to help start the Connecticut Farm Energy Program.

Programs used: (RC&D) and (EQIP)



Photo: Diane Pettit, NRCS

The MFEP has developed specific technical guidance for energy efficiency and renewable energy projects for several agriculture sectors in the Northeast region including: greenhouse and nursery, dairy, vegetables, fruits and maple syrup.

## Healthy, Productive Forests

**Issue:** Promote voluntary stewardship on privately owned forest land

**What NRCS Massachusetts is doing:**

Forests across New England and New York define the region's character, are integral to its economy and sustain many of its communities. NRCS Massachusetts has helped to craft the New England/New York Forestry Initiative, which created a blueprint for protecting the region's forest land base. It is now being implemented on more than 47 million acres across the seven state region.

NRCS Massachusetts helped to develop the Massachusetts Forest Stewardship Program, which has provided funding for 208 new Forest Stewardship Plans and 40 Green Certifications totaling over 28,000 acres. Some 67 percent of new Forest Stewardship Program landowners also enrolled their Stewardship property in regulatory "current use" programs with tax advantages, protecting that land from development for the next 10 years.

Programs used: (EQIP), (WHIP) and (RC&D)



Photo: Steve Rejniak, NRCS

Private forest land ownership accounts for 75 percent of the forest in Massachusetts—the eighth most forested state in the country.

# Conservation Technical Assistance (CTA)

*is the core approach NRCS has used successfully for 75 years to reach out to all American farmers and ranchers. Through CTA, America invests in Conservation by investing in American farmers and ranchers, and the technical assistance they need to care for the 70+ percent of our land, water and other natural resources that are in their hands.*

*CTA is simply about helping people. NRCS employees provide conservation options, recommendations, planning, and engineering assistance to individual farmers, ranchers, local governments, and urban landowners. This prepares the way for using Farm Bill and other conservation funding by providing—*

## Technical Planning and Design:

- Agronomy
- Soils
- Engineering
- Rangeland
- Forestry
- Wetlands

## Project Coordination:

- State environmental regulation
- Archeological permits
- Necessary environmental consultations
- Professional coordination

### Cost Share Programs for Working Lands:

#### **Environmental Quality Incentives Program (EQIP)**

—assistance for a broad spectrum of conservation practices that promotes agricultural production, forest management and environmental quality as compatible national goals.

#### **Agricultural Water Enhancement Program (AWEP)**

—a subprogram of EQIP specific to water conservation and quality through partnered efforts.

#### **Cooperative Conservation Partnership Initiative (CCPI)**

—a partnered program that uses six percent of EQIP, WHIP and CSP funds for an integrative, focused approach.

#### **Wildlife Habitat Incentive Program (WHIP)**

—improves wildlife habitat on private agricultural, forest and Tribal lands.

### Easement and Long-Term Rental:

#### **Farm and Ranch Lands Protection Program (FRPP)**

—helps keep farm and ranch land in agriculture.

#### **Wetlands Reserve Program (WRP)**

—restores wetlands and wetland habitat on marginal agricultural land.

#### **Grassland Reserve Program (GRP)**

—helps landowners restore and protect grassland, rangeland and pastureland, and maintain viable ranching operations.

#### **Healthy Forests Reserve Program (HFRP)**

—restores and enhances forest ecosystems for biodiversity and more.

#### **Conservation Reserve Program (CRP)**

—pays farmers to plant trees, grass and brush on highly erodible/environmentally sensitive cropland. NRCS provides technical assistance only.

### Stewardship:

#### **Conservation Stewardship Program (CSP)**

—encourages producers to embrace long-term comprehensive conservation, maintaining and improving existing practices.

### Watershed/Community-Wide Programs:

#### **Watershed Protection and Flood Prevention Operations (WFPO)**

—provides conservation measures and flood retarding structures in authorized watersheds.

#### **Emergency Watershed Protection Program (EWP)**

—undertakes emergency measures on watersheds damaged by fire, flood and other natural calamities to prevent erosion and runoff that could endanger lives and property.

#### **Resource Conservation and Development (RC&D)**

—improves economics and quality of life in an area through prudent use and conservation of natural resources.



# CONSERVATION SHOWCASE

## Forestry practice leads to a surprising discovery

Jack Lochhead, Forest Land Owner | Conway, Massachusetts

When Jack Lochhead first looked into a federal government program to help him manage his forest land in rural Conway, Massachusetts, he had no idea that it would lead to a surprising discovery deep in the forest.

Lochhead, a retired math and physics educator who taught at the University of Massachusetts, Amherst and institutions in New York City and Boston, moved into his home in the early 1970s. Soon thereafter, he set out to buy the land surrounding the house because he didn't want someone else building a house next to his.

“We're pleased about how it worked out visually. There are a lot of oak seedlings coming up only a year after the cut.”

Once he accomplished that goal, he realized that he needed to figure out what to do with the 250 acres of woodland. A forester in town approached Lochhead and asked if he had thought about forest management on his land.

“At that time there were government programs that paid for thinning cuts,” explains Lochhead. “So we've had our land under active forest management plans since sometime in the 1980s.”

More recently, Lochhead learned from forester Mary Wigmore about the Wildlife Habitat Incentive Program (WHIP)

available through the USDA Natural Resources Conservation Service (NRCS), which could provide him with technical and financial assistance for forestry practices.

“People from the NRCS office in Greenfield came out and we walked the land looking for potential sites for oak regeneration,” says Lochhead, referring to a conservation practice that calls for land around existing oak trees to be cleared to allow new oaks to take hold.

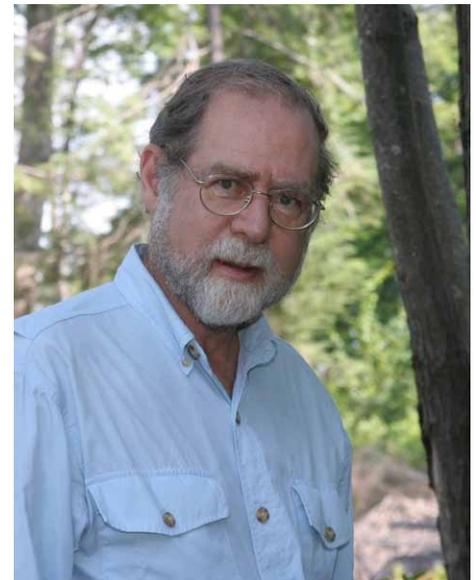
Oak regeneration is practiced in parts of Massachusetts because, historically, land was cleared for farming and timber harvesting, which led to the dominance of other species when the forest began to grow back.

“Oak regeneration is not quite as drastic as a clear cut because each big oak should have its trunk shielded from the afternoon sun and if there are enough big oaks, you get these clumps of trees that are left,” explains Lochhead.

“We put [the project site] deep in the forest so if it didn't look good, we knew it would grow back soon enough. We're pleased about how it worked out visually. There are a lot of oak seedlings coming up only a year after the cut,” says Lochhead.

That decision to put the four acre oak regeneration project deep in the woods lead to a startling discovery.

“Prior to the cut, we had been walking through the woods with a friend of ours,” remembers Lochhead. “She looked down at the ground and said ‘You've got chestnuts here.’ It was in the fall and the nuts had just fallen.”



Jack Lochhead's 250 acres of forest land in Conway, Massachusetts has been in active forest management for nearly 30 years. He recently discovered a lone American chestnut tree deep in the woods near his oak regeneration project site.

What Lochhead's friend had discovered was a lone American Chestnut tree, a large, deciduous tree species of the beech family that was one of the most important forest trees in eastern North America before it was devastated by the chestnut blight, a fungal disease.

Lochhead's forester recommended that he call Brian Clark of Ashfield, the local representative for The American Chestnut Foundaton (TACF). “He came out right away, within a few hours of when I called him. We walked up and took a look. He said ‘Yeah, that's an American Chestnut and it's in good health,’” recalls Lochhead.

Lochhead asked the logger who was clearing the land for oak regeneration to ensure that the chestnut tree didn't get cut down or hurt in the operation. Clark





**Brian Clark (left), a local representative of the American Chestnut Foundation, shows Jack Lochhead the special bag used to pollinate American chestnut trees.**

told Lochhead that clearing the area next to the chestnut was the right thing to do.

“Because it’s right on the edge of the clear cut, it’s really opening up to a lot more light than it got before, so it’s a much more vigorous tree now,” says Lochhead.

Due to the rarity of American Chestnut trees, TACF has a breeding program to pollinate and collect chestnuts from surviving trees.

“The trees that we use in the breeding program, we refer to as ‘mother’ trees,” explains Clark. “Many of the trees we use as mother trees are the size of Jack’s. We do a controlled pollination with pollen that we get from TACF.”

“You put bags over the female flowers before they become receptive to being pollinated. The normal process is that every tenth bag, you don’t pollinate, that way, if there are viable nuts, you know whether there was any wild pollen present,” says Clark.

“We want to make sure that the nuts that are harvested in the fall are the ones that are pollinated by our pollen source and not some other tree on the odd chance there might be another chestnut around somewhere,” says Clark.

The tree was pollinated with a mixed strain of Chinese Chestnut, which is

resistant to the blight, and American Chestnut. The goal is to produce a tree that is more like the American Chestnut than the Chinese because the Chinese is more like a bush.

The pollination bag is a special bag made of heavy waxed paper for this purpose and will survive the summer on the tree. The bag is twisted and secured with a wire twist tie.



**Chestnuts have burrs that make them impervious to predators. The spines can go through heavy leather gloves. Predators generally leave the nuts alone until they open.**

The nuts are harvested, then planted in a small area. As the seedlings come up, they’re deliberately infected with the blight. Those that stay healthy will be transplanted into an orchard where they’ll grow to full size.

The problem with pollinating Lochhead’s tree is that getting to the location requires a four-wheel drive vehicle. A 50 foot crane is needed to reach the chestnuts.

TACF has arrangements with utility companies that lend bucket trucks to help fertilize chestnut trees. The typical bucket truck, however, is designed for use on the road and wouldn’t be able to get up the hill to Lochhead’s site.

Clark eventually found a company in Vermont that has a bucket on a crawler.

“The chestnut, as I understand it, was a far more important food source to wildlife than the acorn,” explains Lochhead. “There are theories that some wildlife were wiped out by lack of the chestnut. Prey species that ate chestnuts were diminished in numbers until the point where predators like the lynx didn’t have enough food and disappeared.”

“If the chestnut can be brought back, it will have a tremendous impact on the wood industry and it will very likely change the nature of wildlife in the forest,” says Lochhead, noting that TACF believes that they’re within 10 years of having saplings that they can start producing in numbers that will be blight resistant.

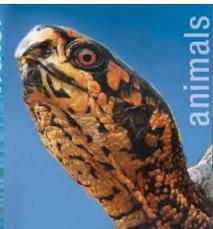
Lochhead, who is also receiving assistance through WHIP for removal of invasive barberry, honeysuckle, winged euonymus and multiflora rose on 240 acres, has enjoyed his experience working with the NRCS Greenfield staff. Now he’s trying to get other landowners along the South River interested in doing similar work.

“If they can see a concrete example of what a neighbor has done, that’s very interesting to them,” says Lochhead. 💧



**Oak saplings began to appear within one year after the oak regeneration project began.**

For more information on the American Chestnut Foundation’s efforts to restore the American chestnut tree, visit [www.acf.org](http://www.acf.org).





# CONSERVATION SHOWCASE

## Self-sufficiency and feeding people are her goals

Paula Packard | Hemlock Hill Farm | Ashby, Massachusetts

Paula Packard lost a lot of sleep buying her farm in Ashby, Massachusetts. “It took me two and a half years to buy it, to work out the deal. I think it took 20 years off my life. It’s been hard but we pulled it off,” says Paula Packard who, along with her husband Jeffrey, has owned the scenic 150 acre – formerly run-down – farm since 2006.

Today, the whole property, except the land around the house and barn, is protected under a conservation restriction.

“The conservation plan helps you look at your environmentally sensitive areas and gives you ideas of what to do and what not to do. It’s worked out great for me.”

“All the forest and all the fields, the whole place is protected. I hate any land being developed, especially if you have prime soils. It would be a shame to put houses on these fields,” says Packard who, with three children, is also protecting the farm for future generations.

“We have prime soils, so we don’t want any of those to wash away,” says Packard whose land is predominantly Paxton soils, the official Massachusetts state soil. That’s one reason why she started working with the USDA Natural Resources Conservation Service (NRCS).

Packard works full time as a biologist for the state Department of Conservation and Recreation (DCR), and teaches biology, environmental science and ecology at several colleges. With her animal science background, Packard previously served as DCR’s agriculture specialist at the Wachusett Reservoir.

“I was the only one on staff with a farming background, so if a farmer in the watershed was doing something that we were worried about, I would ask them to do BMPs,” says Packard, referring to agricultural Best Management Practices.

That’s how she became familiar with programs offered by the Massachusetts Department of Agricultural Resources (MDAR) and NRCS.

Packard told District Conservationist Dan Lenthall of NRCS’s Westford, Massachusetts field office that she was buying the place and needed a conservation plan.

She also talked to Liz McGuire, a conservation planner with the Accelerated Conservation Planning Partnership, a collaborative effort of Massachusetts Association of Conservation Districts, MDAR and NRCS to provide conservation planning assistance to support state and federal programs.

“They came up and gave me pointers. I found out about the technical and financial assistance from NRCS. One thing led to another, but it started with a conservation plan,” says Packard.



Paula Packard raises goats for meat and goat milk soap. She also produces pumpkins, pigs, ducks and eggs on her diversified operation in Ashby, Mass.

“They looked at everything, and the beauty of it is they could see past the mess. You get overwhelmed by a place if it’s run down. The conservation plan helps you look at your environmentally sensitive areas and gives you ideas of what to do and what not to do. It’s worked out great for me. I wouldn’t have been able to do it without these two.”

“We do hay, a few pumpkins – but we haven’t had much luck with those – goats for meat and goat milk soap. We’ve been selling a lot of those for meat and milking some of them. I’ve been selling beef and a few horses – they’re registered thoroughbreds – and some pigs, a few ducks and some eggs,” says Packard, describing her diversified operation.





**Paxton soils are predominant on Hemlock Hill Farm. Paxton fine sandy loam is the official Massachusetts state soil.**

All Packard's marketing is by word of mouth. "We can't keep up. Everything is sold all the time. I always have a waiting list because people want to eat closer to home. We're going to try growing more pumpkins and garlic, keep making the soap and produce more meat."

Packard wants to do more rotational grazing. To get help with that, she's participating in the Environmental Quality Incentives Program or EQIP, a voluntary program that provides technical and financial assistance to agricultural producers and forest land owners who want to improve and protect soil, water, air, plants and animals.

"I'm doing a lot of fencing, nutrient management, lime and soil tests. Basically it makes you do what you should be doing in a timely manner. I'm getting reimbursed for everything I really need to do. Once I get the fences up, pasturing gets easier and easier," explained Packard.

"I'm definitely passionate about conservation. We're in a headwaters so we have to be very careful not to let any manure or other contaminants affect water quality. We have a lot of wildlife like woodcock and bobolinks. We try to not impact them; we make it easy for them to stay," said Packard.

"I want to be self-sufficient and I'm getting there," said Packard of her long term goals. "I don't want to buy grain. I'm always willing to buy lime but don't want to have to buy fertilizer. I want to put manure on the fields. I don't want to buy any hay. I want to be self-sufficient and keep on producing. We already produce a lot of our food. That's the goal: be self-sufficient and feed a lot of people."

"We need to eat closer to home; that's what I think. The more we can do here the happier I'll be. I might even cut back on some of my other jobs," said Packard, chuckling. 💧

## Massachusetts' State Soil: Paxton fine sandy loam

In 1991, the Massachusetts State Legislature designated the Paxton series as the Official State Soil of the Commonwealth. The series was established in Worcester County Massachusetts in 1922, and is named for the town of Paxton where it was first described and mapped.

Paxton soils occur on about 400,000 acres of the 5.3 million acres in Massachusetts, predominantly throughout the state but exclude the Cape Cod area as well as Martha's Vineyard and Nantucket islands. They are also mapped throughout southern New England and include portions of New Hampshire, New York and Vermont.

The Paxton series consists of very deep, well drained loamy soils on glacial till uplands and are derived mostly from schist, gneiss, and granite. These soils formed in friable glacial till overlying firm, dense till, which is the outstanding characteristic of the Paxton series.



**Packard (left) reviews her conservation plan with NRCS District Conservationist Dan Lenthall and ACP Planner Liz McGuire.**





# CONSERVATION SHOWCASE

## Redesigning a cranberry bog for the next century

Gary Randall, Cranberry Grower | Carver, Massachusetts

Gary Randall believes that his 13.2 acre cranberry bog in Carver, Massachusetts, is about 100 years old. He also believes that the improvements he's making to his bogs with the help of the USDA Natural Resources Conservation Service (NRCS) and the Plymouth County Conservation District (PCCD) will ensure that it will be in production for another century.

"When I bought my bog in 2003, it needed a lot of work," says Randall. "So I came in and got a farm plan. [PCCD planner] Bill Kane and I came up with the final design, which included the by-pass canal. That was when I got my first NRCS contract for the by-pass canal."

“The more experience I get with the conservation practices that we use in agriculture, the more I understand how much it helps.”

Randall's bog was in tough shape; it needed a complete overhaul. The bog had been out of production for several years because the cranberry market had dropped and the bog wasn't producing enough berries to be profitable.

Randall's background is in construction. He owns heavy equipment and was doing site work and earth removal for the construction of cranberry bogs and realized that he was interested in farming himself.

"I think it's a natural tendency that once you're into the building of bogs, you end up wanting to be a farmer," says Randall. "It's hard work, it's outside and it's good clean work...well maybe good dirty work," he adds with a smile.

"I tried to farm it for four years, and then three years ago I renovated it," says Randall, who transformed his bog from an old flow-through bog to a modern configuration. According to Randall, the old style bogs had ditches running through the center so that farmers could easily flood the bog for frost protection.

"In the past, cranberry growers didn't run pumps for frost protection, they only flooded," explains Randall. According to Randall, that limits berry production because vines growing close to water aren't as productive and it jeopardizes water quality because the water is running through the bogs where pesticides and fertilizer have been applied.

Randall received financial and technical assistance from NRCS to construct a by-pass canal, which sends water around his property rather than through it. The canal preserves water quality because it doesn't go through cranberry bogs that have been treated with fertilizer and pesticides.

Much of Randall's renovation work was done with a grant he received from the state Department of Agricultural Resources under a program administered by the Cape Cod Cranberry Growers Association.

Because of the renovation, Randall will have been out of production for nearly three years.



This by-pass canal sends water around Gary Randall's 13 acre cranberry bog in Carver, Mass. instead of through it, thereby protecting water quality.

"It's a huge consideration and it's one of the biggest drawbacks to why people don't do it," he says, adding, "You have to have a long range plan."

The new bog configuration is two long, narrow runway bogs that have been laser graded. The bogs used to be three feet out of grade; now they are maybe one or two inches out of grade. Acre feet of water are saved every time the bogs are flooded. Due to the construction of the by-pass canal, water can now be held on the bog for the prescribed period of time when applying pesticides, thus protecting water quality.

A new irrigation system has been installed that conserves and protects water because it's more efficient, applying pesticides and water in a uniform manner.



Photo credits, top: Red-winged blackbird ©Axel Hildebrandt; Dufourea novaeangliae by Michael Veit



**Randall's new irrigation system conserves and protects water because it applies water efficiently and uniformly.**

The irrigation systems are outfitted with pop up heads that conserve water. The lines remain sealed and the heads are not removed in the winter. The old style irrigation heads would leak due to wear from removing and reinstalling them year after year.

"I've put a new pump house in with a fuel efficient pump and automation. That will save a tremendous amount of energy and water," says Randall. "It will also help reduce greenhouse gasses because the sprinkler system's run time during frost season is drastically reduced."

During frost season the grower sets the tolerance temperature so that the system will turn on only when the bog needs frost protection. Formerly, growers would just turn the system on if there was a frost warning and it would run all night. The new automated system might only run two or three hours, or how ever long it's needed.

All the dikes around Randall's bogs were straightened and new dikes were constructed. Straightening the dikes makes picking and management activities more efficient, it also minimizes the need to turn equipment.

Randall grows Stevens variety cranberries on 13.2 acres of bog and has another 17 acres of upland. His berries are destined for juice, sauce and other processed products

as he will only wet harvest his berries.

The cranberry is a Native American wetland fruit that grows on trailing vines like a strawberry. The vines thrive on the special combination of soils and water properties found in wetlands.

Cranberries grow in beds layered with sand, peat and gravel. These beds, commonly known as bogs or marshes, were originally formed as a result of glacial deposits.

Cranberries can be either dry harvested or wet harvested. Dry harvesting uses walk-behind machines to comb the berries off the vines into burlap bags. Berries are then removed from the bogs by either bog vehicles or helicopters. Dry harvested cranberries are used to supply the fresh fruit market. These cranberries are most often used for cooking and baking.

In wet harvesting, the bogs are flooded. Cranberries have pockets of air inside so they float. Water reels are used to stir up the water in the bogs dislodging the fruit from the vine. Wooden or plastic "booms" are used to round up the berries, which are then lifted by conveyor or pumped into a truck to take them to the receiving station for cleaning.

More than 90 percent of the crop is wet harvested. Wet harvested cranberries are used for juices, sauces, sweetened dried cranberries, or as an ingredient in other processed foods.

Randall says that working with NRCS was an enjoyable experience. "Coming into it I was apprehensive as to what to expect. I might have thought it was a regulatory agency rather than an agency that helps," said Randall, who heard about NRCS programs and services from other growers by word of mouth.

"I came in and got my farm plan. We went over the resources and environmental concerns that I have on my property. That lead to my first EQIP contract," explained Randall, referring to the Environmental Quality Incentives Program or EQIP, a voluntary program that provides technical and financial assistance to agricultural producers and forest land owners who want to improve and protect soil, water, air, plants and animals.

"My long term plan is to finish the renovation, then continue operating the farm into the future. I don't plan on any more expansion."

Randall is now Chair of the Plymouth County Conservation District. "After I did my by-pass canal in 2006, there was a vacancy on the board of supervisors and I was recruited," said Randall. "It's been educational. I understand now how the relationship between NRCS and the districts works. It's a well thought out partnership that's much needed."

"The more experience I get with the conservation practices that we use in agriculture, the more I understand how much it helps. I just really believe in it and that I'm helping the environment." 💧



**The sprinkler system incorporates all main lines with pop up heads that conserve water.**



soil



water



animals



plants



air



# CONSERVATION SHOWCASE

## It started with a farm plan

Matthew Rhodes, Cranberry Grower | Edgewood Bogs | Carver, Massachusetts

When Matt Rhodes purchased Edgewood Bogs in 2005, fruit prices were down. He knew that meant the time was ripe to renovate his bogs. By planting hybrid varieties and restructuring the bogs into shapes that are more efficient to manage, Rhodes could increase production, while conserving important natural resources.

He got in touch with the USDA Natural Resources Conservation Service (NRCS) office in West Wareham, Massachusetts and the Plymouth County Conservation District (PCCD) for help.

“Since we farm in a wetland environment, we’re always trying to conserve whether it’s water or the surrounding environment.”

“It started with a farm plan, just an overall picture of what we had here, where we could expand, what would be the best way to add on to the bogs,” explains Rhodes. “Because the pricing was still low on fruit we didn’t have a whole lot of money but we used the program funding to start to renovate the bogs.”

Rhodes received technical and financial assistance from NRCS through the Environmental Quality Incentives Program (EQIP). EQIP is a voluntary program that helps agricultural producers and forest land owners to improve and protect soil, water, air, plants and wildlife habitat.

PCCD’s farm planners helped Rhodes develop a comprehensive, customized farm plan that defined his land use and suggested best management practices for his property in a simple, easy to understand manner.

“We did everything from state-of-the-art spacing on the sprinkler heads and pop-up sprinklers, to automation, new pumps and tailwater recovery. We had one of the first farm plans for tailwater recovery in the state.”

Tailwater recovery is the capture and reuse of irrigation water.

“Since we farm in a wetland environment, we’re always trying to conserve, whether it’s water or the surrounding environment,” says Rhodes. “Through NRCS, the Cape Cod Cranberry Growers Association and UMass Extension, growers have been educated about natural resources and how to make improvements.”

The cranberry is a Native American wetland fruit that grows on trailing vines like a strawberry. The vines thrive on the special combination of soils and water properties found in wetlands. Cranberries grow in beds layered with sand, peat and gravel. These beds, commonly known as bogs or marshes, were originally formed as a result of glacial deposits.

Cranberries can be either dry harvested or wet harvested. Dry harvesting uses walk-behind machines to comb the berries off the vines into burlap bags. Berries are then removed from the bogs by either bog vehicles or helicopters. Dry harvested cranberries are used to supply the fresh fruit market. These cranberries are most often used for cooking and baking.



**Matt Rhodes has increased production while conserving natural resources by making management of his Carver, Mass. cranberry bogs more efficient.**

In wet harvesting, the bogs are flooded. Cranberries have pockets of air inside so they float. Water reels are used to stir up the water in the bogs, dislodging the fruit from the vine. Wooden or plastic “booms” are used to round up the berries, which are then lifted by conveyor or pumped into a truck to take them to the receiving station for cleaning. More than 90 percent of the crop is wet harvested. Wet harvested cranberries are used for juices, sauces, sweetened dried cranberries, or as an ingredient in other processed foods.

“The more uniform the bogs are, the easier it is to get a good application pattern down,” says Rhodes. “The sprinklers are laid out more evenly. When we go to harvest, the picking machines are only going straight up and down; there’s no extra cornering.”

Photo credits, top: Red-winged blackbird ©Axel Hildebrandt; Dufourea novaeangliae by Michael Veit





**More uniform bogs make ground applications and harvesting more efficient because cornering with equipment is easier.**

“Cornering is one of the hardest things to do, whether you’re making ground applications or harvesting or applying fertilizer with a helicopter. So the longer and straighter the bogs are, the quicker and more efficient everything is.”

“We do a lot of dry harvest and it’s especially hard to make corners with a dry harvester, so once the machines are going straight, they just stay straight for a long time,” says Rhodes who farms more than 400 acres in Rochester, Plymouth, Carver, Hanson and Wareham.

Because NRCS funds automation equipment, water can be conserved on frost nights, when sprinklers are run to warm the bogs up. The system can be programmed to shut itself on and off instead of growers just turning the pump on at night when it’s cold then waiting until the next morning to shut it off.

With the help of NRCS, Rhodes also built a bypass canal around his entire property. The canal ties in to a pumping station that pumps the water a half mile back up underground through a pipe system that is completely enclosed now. All the water used by the operation is recirculated.

Rhodes’s bogs are all laser-leveled to minimize water usage. Less water is required to flood a bog during harvest and since they’re built with a one foot

differential, once one bog is flooded, the same water can be applied to the next bog and continue down the line, creating efficiencies.

“Although we have a large reservoir that we can draw for harvest, during the season we typically just keep recirculating the water, using it over and over again,” says Rhodes.

Southeastern Massachusetts is the heart of the Bay State’s cranberry growing region. Urbanization is probably one of the top challenges in this coastal area just south of Boston. Summer cottages have become year-round residences for Boston commuters.

“We work very hard at neighbor issues. We notify every single neighbor on everything we do. We set up a phone tree to notify neighbors when we were fertilize or spray,” explains Rhodes. “It’s so densely populated, there’s no way to prevent people from walking the property. So we continue to notify people so they feel better about what we’re doing.”

“We want to protect the water. It’s the biggest key resource,” says Rhodes. “You have to protect the quality and volume of the water that’s necessary to grow cranberries. Since this area is developed, there’s competition for water because everyone uses it.”

Sand resources are also important to cranberry growers. Cranberry operations require a lot of sand to rebuild existing bogs and plant new bogs.

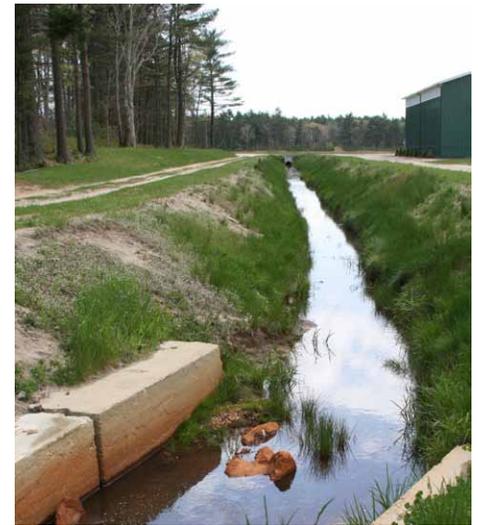
Massachusetts cranberry growers also flood their bogs in the winter to protect the cranberry vines from the frigid temperatures and drying winds. The cold temperatures turn the floodwater into ice, allowing cranberry growers to access their bogs with equipment to spread sand, which stimulates vine growth.

Rhodes points out that sand is very expensive. Since it’s used for septic systems and by asphalt plants, development drives the cost of sand up. Once a grower runs out of sand, he or she has to buy a parcel of land with sand on it or buy from someone who processes sand. Trucking in sand is extremely expensive.

“Open space is important to the public and to us,” says Rhodes. “We support a lot of open space. For every acre of cranberry bog, at least three acres of support land are maintained.”

Rhodes can’t say enough about the technical advice he gets from NRCS. “That’s part of our farm plan and you can’t put a price tag on it. It’s huge to know that I can pick up the phone and call NRCS. It’s a great resource.”

“The West Wareham [Field Office] staff have been very helpful, very supportive and provided a lot of guidance. I feel like I can go there and ask questions and they’re going to tell me straight up. If they don’t know the answer, they get the answer. I’d say I’m in touch with the NRCS office at least twice a week. It’s always been a good experience.”



**The by-pass canal built with NRCS assistance routes water around Rhodes’ entire property. All the water used is recirculated.**



soil



water



animals



plants



air

## Massachusetts in the National Landscape

### Dam removal applauded by both fish and people

The Briggsville Dam —15 feet high and 145 feet long—has been removed to improve wildlife habitat, restore natural river functions, eliminate the threat of dam failure to the downstream properties, reduce the risk of upstream flooding and save jobs by eliminating the need for costly repairs.

The project, in the Berkshire County town of Clarksburg, also involves stabilizing and vegetating banks, protecting an upstream bridge, and restoring native stream and riparian habitat in the North Branch of the Hoosic River. The restoration will improve over 30 miles of high quality headwater streams and exemplary trout habitat, and will benefit native river species, including Eastern brook trout, slimy sculpin, longnose sucker and other native fish species. The longnose sucker is a state-listed species of concern.

### Cranberry bogs become rare wetland habitat

Well-functioning wetlands help to improve water quality, reduce flood impact, protect shorelines and provide critical habitat for plants and animals. Massachusetts’ wetlands are diverse, including coastal salt marshes, wet meadows, forested wetlands and cranberry bogs, where agricultural production is carefully balanced with concern for water quality and quantity.

The Eel River Headwaters Preserve restoration project, now well underway, is the first large scale restoration in Massachusetts of an Atlantic white cedar swamp, a rare wetland type. About 40 acres of retired cranberry bogs are now growing back into a white cedar swamp. When completed, over 24,000 plants including more than 17,000 Atlantic white cedar trees will be planted. More than \$300,000 in federal funding for the Eel River Preserve was provided through the NRCS Wetland Reserve Program.

### Hmong farmers harvest environmental and financial benefits from pilot project

Eight Hmong farmers are protecting natural resources while extending the growing season for their specialty produce raised at the Flats Mentor Farm in Lancaster. Thanks to NRCS funding, seasonal high tunnels — also known as hoop house — have been installed on the farm.

The 70 -acre farm assists small farmers of diverse ethnic backgrounds with the land, infrastructure and marketing assistance needed to promote successful and sustainable farming enterprises.

Massachusetts is one of 38 states participating in this three-year pilot project that will verify if high tunnels are effective in reducing pesticide use, keeping vital nutrients in the soil and conserving water while extending the growing season and increasing yields for growers.



Photo: courtesy Flats Mentor Farm

The Flats Mentor Farm growers are among 17 Massachusetts farmers that have received technical help and financial assistance from NRCS for high tunnels.

### 2010 Farm Bill Program Funding\*

NRCS Program	Dollars Obligated	Number of Contracts/Easements
Agricultural Management Assistance Program (AMA)	\$223,538	13
Conservation Stewardship Program (CSP)	\$58,135	11
Environmental Quality Incentives Program (EQIP)	\$6,703,395	249
Farm and Ranch Lands Protection Program (FRPP)	\$8,653,800	20
Wetland Reserve Program (WRP)	\$2,788,231	5
Wildlife Habitat Incentive Program (WHIP)	\$790,872	42

\*The numbers reflect Financial Assistance (FA) that is provided directly to landowners. Technical Assistance (TA) funding was also received by the Agency for professional planning and expertise to help carry out the conservation activities.