

# A Sustainable Chesapeake

BETTER MODELS FOR CONSERVATION

*Edited by David G. Burke and Joel E. Dunn*

THE CONSERVATION FUND



The case study you have downloaded is highlighted below. Other case studies from this Chapter of *A Sustainable Chesapeake: Better Models for Conservation* can be individually downloaded. The editors encourage readers to explore the entire Chapter to understand the context and sustainability principles involved with this and other featured case studies. The full publication contains 6 Chapters in total: Climate Change Solutions, Stream Restoration, Green Infrastructure, Incentive Driven Conservation, Watershed Protection and Stewardship.

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# Fox Haven Organic Farm

## *Restoring and Regenerating the Land for Food Production and Watershed Protection*

Landowners who seek to restore overworked farmlands, find alternatives to commercial fertilizer applications and enhance biodiversity on their farmlands can learn a lot from how farm operations are handled at Fox Haven Farm.

### CASE STUDY SUMMARY

Fox Haven Organic Farm rests comfortably in the rolling landscape of Catoctin Valley near Jefferson, Maryland. A large stream meander bend of Catoctin Creek moves gracefully through the property with the steep slopes and upper agricultural fields offering stunning distant views of the picturesque South Mountain and Catoctin Mountains.

The obvious beauty of Fox Haven Farm masks a more important need, recognized by owner Harriett Crosby, to heal the land from years of agricultural use, as well as repeated logging and erosion that affected nearby Catoctin Creek and the surrounding watershed. Crosby, her farm manager Dick Bittner, and a host of advisors, including the adept consulting team of Regenes Group, Inc., have thoughtfully considered a long-term path to rejuvenating the eroding, spent soils of Fox Haven and providing a model for other land owners concerned about watershed restoration and sound land stewardship.

With 409 contiguous acres to manage, Crosby retained Regenes to develop a detailed stewardship plan for the property that was remarkably

comprehensive in scope and vision. An ardent protector of wildlife, Crosby has initiated a number of actions to increase biodiversity on her land. Bittner raises a variety of locally consumed crops and vegetables without the use of commercial fertilizers, herbicides, or pesticides. One-third of the soil used for crop production is set aside and renourished with “green manure” through an array of legumes for one full growing season before it returns to production.

To spread the word about the “living systems” approach used at Fox Haven, Crosby and Bittner are frequently engaged in outreach efforts—hosting demonstration tours and informative workshops on topics like beekeeping, the importance of pollinators to agriculture, and organic farming practices. The farm operates on a philosophy of “living local solutions to global problems” and ultimately hopes to create a legacy of community-minded stewards and “eco-preneurial” businesses that can earn a living off the land and continue a genuine ethic of sustainability for generations to come. The management team at Fox Haven believes in using an adaptive management

approach: carefully observing what is happening on the land and directing a continuously adjusting course of action to benefit the farm and the Catoctin Creek watershed, and nurturing living ecosystems to perform at an optimal, self-regulating level in perpetuity.

### RESOURCE MANAGEMENT CHALLENGE

By 1739, the land that now comprises Fox Haven was initially within the “Anchor and Hope” land grant made to Roger Touchstone, a Monocacy Valley landowner. After the land was settled, it has likely been logged three or four times—within the last 30-40 years. The only surviving large tree species are along inaccessible steep slopes or fence rows. Before Crosby acquired the eleven tracts that comprise Fox Haven, farming and grazing had occurred for generations on much of the site, including areas where slopes are in excess of 8%. This long-standing practice produced a number of resource management challenges.

Soils on the flatter, upper portions of the property that would ordinarily be more productive were compacted



*Fox Haven farm looking toward South Mountain.*

and severely eroded. The steeper slopes and draws found on the property have suffered years of erosion and several watercourses have deeply incised channels. Similar soil erosion and sediment transport problems on other farmlands affect nearby Catoctin and Lewis creeks and are a water quality concern throughout the watershed. Catoctin Creek quickly turns brown even after a short rain storm. Myersville, Fauquier, and Catoctin soils inhibit the practice of annual agriculture due to inherent limitations, and thin and/or spent soil profiles. All of the soils found on the site require amendment to raise their pH to a level that accommodates annual plants and they will need careful regenerative management practices for the foreseeable future to bring them back to full productivity.

A substantial amount of reforestation and habitat enhancement is needed to address soil erosion and

sediment transport issues; to enhance groundwater infiltration and nutrient reduction by natural means; and to return a diversity of wildlife to the farm.

### **CONSERVATION VISION**

In 1980, when Crosby began to acquire her Fox Haven holdings, she bought it with the three-fold vision of protecting the land from development, conserving its resources, and repairing the damage that had been inflicted over generations of misuse. As the years have passed, her vision has become increasingly comprehensive and complex—extending beyond the physical care of the land itself to the creation of a broader ethic of sustainability nurtured by a community of like-minded thinkers that aspire to more deeply understand and support the care and maintenance of interconnected, living systems. This conservation vision has been built in “layers” as she and her farm manager

Dick Bittner accumulate the advice and counsel of experts from government and private sector organizations and learn through experience with their own conservation efforts. An excerpt from the Fox Haven mission statement (see sidebar) gives insight into the multi-faceted nature of conservation at the farm.

### **IMPLEMENTATION RESOURCES**

**Sound Farm Management:** In 1997, Crosby retained Bittner to assume responsibility for day-to-day farm management and long-term planning for restoration and regeneration of the land. Fox Haven land management practices are loosely organized around the principles of “permaculture,” which relies on a systems design approach to achieve, in part, sustainable agricultural operations with minimal amounts of energy. In line with this thinking, a conscious decision was made to reduce the



amount of equipment needed to run the farm. Bittner believes lower energy and equipment costs yield greater profits and reduce environmental impacts. Only one 50-horse-power tractor performs various maintenance tasks at Fox Haven. He has also eliminated fertilizer and herbicide costs through innovative natural weed suppression techniques and the use of legumes in rotation with production crops to replenish the soil and fix atmospheric nitrogen.

### **ECO-PRENEURIAL AND CONSERVATION PARTNERS**

Crosby hopes to engage an increasing number of interested organizations and eco-preneurial businesses to help sustain, in perpetuity, the core permaculture values and practices envisioned for the farm.

One example of this is a cooperative agreement with a neighboring farmer who bales and then purchases all of

Fox Haven's organically grown hay for his nearby organic dairy farm operation. The agreement includes the purchase of manure from his cows to nourish the fields.

Another eco-preneurial enterprise involves renting a three acre garden to Bittner for a community supported agriculture (CSA) organic produce operation. To supply water to Bittner's vegetable plot, Crosby paid \$7,000 to install an irrigation and solar panel system that moves water from a nearby well; stores it in two 2,400 gallon holding tanks; and feeds it to the garden via a gravity-powered drip irrigation system.

To help offset income lost by setting aside former erosion-prone cropland for conservation practices, Crosby has gained approval of more than 100 acres of forest mitigation banking sites for the potential sale of credits needed by others to fulfill mandated forest conservation requirements. She has also loaned a portion of her land to the American Chestnut Foundation to grow a blight resistant strain of chestnut tree from the crossing and back crossing of Chinese and American chestnut species.

### **Technical and Financial Assistance:**

Cost-sharing funds from the U.S. Department of Agriculture (USDA) Conservation Reserve Enhancement Program (CREP) and Wildlife Habitat Incentives Program (WHIP) paid for the massive tree plantings at the farm (see Conservation Strategy below). Annual rent payments to the landowner for the USDA conservation programs range from \$94 to \$164 per acre. USDA's Natural Resource Conservation Service (NRCS) and Catoclin Soil Conservation District provided technical assistance to produce Conservation and Nutrient Management Plans that now guide farm operations. Bittner relied on Maryland Department of Agriculture staff to help explain the requirements and practices involved in becoming a state certified organic farm operation. The Maryland Department of Natural Resources' State Forest Service furnished technical support to create a Forest Stewardship Plan for the farm. Federal cost sharing funds (the lesser of \$75/acre or 50% of the total cost) from the Forest Land Enhancement Program (FLEP) were also obtained through the Department of Natural Resources and used to control invasive species in established plant

### **FOX HAVEN MISSION STATEMENT**

....Our intention is to do no harm as we discover how to balance the needs of the land: its water, soil, plant, and animal life, including its human community. The entire farm is organic, practicing permaculture, working with the natural flows of energy, wind, water, sun, slopes, regenerating the life force of the land, using nature to heal nature. The farm fields, tree plantings, rain gardens, composting toilets, solar pumps, drip irrigation in the organic garden, chicken tractors, mixed forests, and creeks are laboratories for learning the complex lessons of nature and discussing how to apply these learnings to our work lives.

Fox Haven serves the environmental community by offering a safe haven for meetings and solo retreats. Its meandering streams, nature trails, rolling hills, and spectacular mountain vistas provide a sanctuary for true dialogue and personal transformation.

stands at Fox Haven. Finally, Crosby retained a private consulting firm to address a broad array of issues as discussed below.

### CONSERVATION STRATEGY

**Studying the Land:** In addition to discussing conservation strategies with government advisors, Crosby sought the assistance of the Regenes Group, Inc., from Santa Fe, New Mexico, to assess the full array of resource opportunities and constraints affecting Fox Haven. From April of 1999 through September of 2000, Regenes collaborated with local residents to perform an ecological and cultural inventory and assessment of Fox Haven. They produced a comprehensive report entitled *Fox Haven: Voices of the Land*.<sup>1</sup> The report also contained a summary of earlier recommendations made to the owner that divided the farm into five zones with suggested management practices. Predominant themes running through the Regenes report are the interconnected nature of living systems; the forces of nature that affect the farm; and the ways in which future stewardship actions can contribute to regenerating the vitality of the farm in a holistic manner.

The consultants examined the historical, geological, and watershed context of the farm to convey how Fox Haven was shaped by its physical and cultural setting. A detailed analysis of the “energetic” context of the farm examined how slope, water drainage patterns, cold air movement, solar aspect, wind patterns, fire influences, noise, and light act together to continually shape the natural environment and human uses of the site. A final chapter summarized how the physiographic sectors of the farm—upper terraces, slopes, and bottom lands—could be managed in relation to future infrastructure improvements, livestock management, crop production, and resource management practices. The consultant provided examples of how landscape form and related elements interact with potential management scenarios. For example, excess biomass production and livestock fertilizer in one area of the farm can be used to regenerate depleted soils in another area. Regenes also cited an example of how livestock shelter facilities, the movement patterns of the livestock, and their living and reproductive needs can be in complementary alignment with landscape and resource management goals. The emphasis rests on the many interac-

tions between living systems that must be considered and thoughtfully acted upon to achieve a better balance between ecological systems and human influences. The discussion and relationships cited by the consultant are complex and demanding of most reading audiences.

**Management Zones:** The principles discussed in the Fox Haven report were preceded by a more intuitive set of recommendations offered by the Regenes Group. A brief description of some recommended management zone strategies are presented below. The zone concept could be deployed in other farm settings with goals similar to those envisioned at Fox Haven.

**Annual Farm Zone:** This zone designates an area with the most productive soils that is recommended for organic farming practices and regeneration of the soil. This entails minimal inversion of the soil layers through practices such as: keyline plowing (a cultivation pattern that directs water to and increases soil moisture absorption on hill ridges and reduces the concentration of runoff and attendant erosion problems in valleys); low tillage practices; and successional seeding in undisturbed beds. Soil-building measures included:

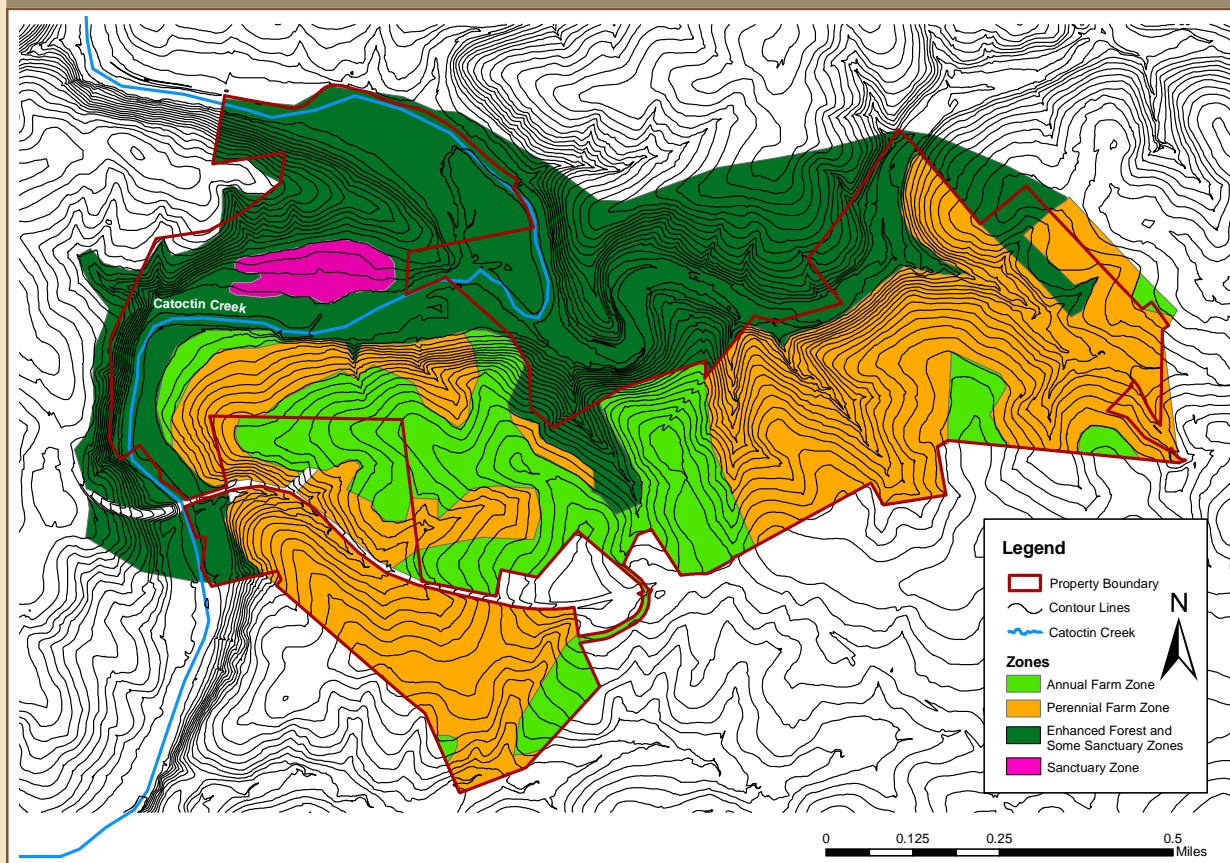
- Restricting export of organic material (such as baling and selling hay from an entire field) to less than 15% of a season’s yield
- Generating nutrient inputs on-site and finding cost-effective ways to distribute them. Examples are turkey or chicken tractoring and using grazing animals to reincorporate organic material.

**Perennial Farm Zone:** This zone designates areas where virtually no tillage is acceptable due to potentially high erosion and poor soil profiles. Sample recommendations include:



*Red fox, a common sight at Fox Haven farm.*

## ► Fox Haven Farm Generalized Farm Zones



- Create a multistory, stacked perennial farm—a food forest. Use higher-grade cultivars and more costly plants in this area.
- Group orchard and nursery on the near reaches of this zone, closest to the farm center.
- Create a successional wave across the landscape: rotate through grasses and wildflowers (becoming pasture), then nut and berry shrubs, then orchard, then return to grasses and wildflowers.
- A slope ranging from 8 to 12 percent may be suited for perennial pasture.

**Enhanced Forest Zone:** This zone designates development-free areas for an enhanced heritage hardwood forest complex that stabilizes the landscape, adds diversity, and has the

potential for providing a wild gene pool for other parts of the watershed. Some recommendations are:

- Possible reintroduction of the keystone chestnut, when blight-resistant chestnuts are fully developed and available
- The planting of cultivars that have enhanced value, disease resistance, and commercial qualities
- The extension of existing vegetation and tree plantings to create guilds of high-value heritage hardwood nut and timber trees, interplanted with guilds of nut and berry shrubs
- The selective harvest of valuable timber, once a solid canopy has been achieved, to create openings and glades in the canopy. Begin the cycle again in the clearings, creating a multi-age forest complex.

- Eventual succession into Perennial Farm Zone, if desired.

**Sanctuary Zone:** This zone designates the most remote and least disturbed area on the property, with the best existing wildlife habitat that should be minimally disturbed. An abbreviated list of recommendations includes:

- Perhaps once in every 10 years create glades by sustainably harvesting timber in small areas. Harvest intensively to simulate the effects of natural catastrophic events such as fire.
- Inoculate with fungi and introduce a broader diversity of berries to edges.
- Transition the summer grasses meadow to a more diverse native prairie system.

## RESULTS

With a well considered set of conservation strategies in hand, restoration efforts on Fox Haven Farm moved into high gear starting in the year 2000. Approximately 65,000 trees were planted under the Conservation Reserve Enhancement Program (CREP) and the Wildlife Habitat Incentives Program (WHIP). Several species of trees were selected, including red oak, swamp oak, willow oak, white oak, pin oak, walnut, sycamore, locust, dogwood, red bud, red cedar, pitch pin and Virginia spruce. In addition to the tree plantings, a significant amount of acreage was devoted to warm and cool season grasses for erosion control and wildlife habitat enhancement. Also, Fox Haven Farm was expanded with the purchase of neighboring Spring Manor Farm (149 acres), bringing the total holdings to approximately 550 acres. New CREP plantings were quickly established on this property early in 2009, adding a remarkable 14,000 trees and shrubs and more than five acres of warm and cool season grasses.

The table below summarizes the government cost share practices installed at Fox Haven (not including Spring Manor Farm).

Beyond the impressive installation of numerous conservation practices, Bittner makes it a point to emphasize the benefits of his “green manure”

program. Bittner explains that the legumes he uses—such as hairy vetch, soy beans, crimson clover, and buckwheat—replenish the soil on a third of the crop production areas each year and provide enough nutrients to produce abundant, healthy crops. Bittner has also worked out his own methods to control weeds without using herbicides. Through a combination of mowing, and planting orchard grass and other clover mixtures, he naturally discourages weeds and invasive plants from crowding out young tree plantings. Bittner also conducts experiments in plots around the farm to observe how natural succession is proceeding in selected areas and how invasive species control techniques are or are not working. Crosby has installed a number of blue bird boxes around the property, and maintains a small chicken house to ensure a supply of organic eggs for her neighbors and friends.

Based on the extensive planning efforts and years of experience managing Fox Haven, Crosby and Bittner have established a basic set of farming practices they expect to live by until they learn from their mistakes better ways of doing things. The practices could benefit any farm owner looking to improve water quality, soil productivity, and watershed health. The practices include:

- Use “crop fencing” in preference

to wire as a means of pest control. Feed the deer before they find the “money crops”!

- Create buffer strips around property lines to absorb genetic and pesticide drift from neighboring fields.
- Use no-till or low-till practices where practical and possible. Keeping the soil covered with plants or mulch helps prevent compaction from wind and rain.
- Grow cover crops (preferably legumes) on one-third of all cropland at all times. Use crop rotation to establish a “two-year rebuild and four-year crop” cycle while providing beneficial weed control.
- Minimize practices that suffocate soil. Discarded material such as plastics and lumber, as well as unnecessary off-road vehicular use will leave marks of suffocation followed by emergence of unwanted vegetation like thistle, Johnson grass and burdock.
- Minimize the time that the earth is exposed without a beneficial cover crop. Unattended exposed soils create unwanted vegetation.
- Maximize the practice of planting on contour elevations or “key lines.” Erosion control, water retention, and ease of maintenance are natural benefits.
- Use companion planting practices to enhance insect and pest control.

**Cost-Share Conservation Practices Installed at Fox Haven Organic Farm**

Practice	Fund Source	Acreage
Trees and Shrubs	Conservation Reserve Enhancement Program	118
Warm Season Grasses	Conservation Reserve Enhancement Program	9.5
Cool Season Grasses	Conservation Reserve Enhancement Program	9.1
Trees and Shrubs	Wildlife Habitat Incentives Program	20.3
Warm Season Grasses	Wildlife Habitat Incentives Program	9.8
Invasive Species Control	Forest Land Enhancement Program	150
Total Acreage Affected: 306.9		

- Control undesired seed-producing plants prior to their maturity by mowing. Use desirable ground covers and frequent mowing to avoid and eradicate.
- Encourage diversity of plants where practical and possible. Avoid patterns of uni-cropping.
- Use native plants whenever possible to support native wildlife, including pollinators.
- Learn to recognize and control these invasive plants: Ailanthus (Tree of Heaven), Johnson grass, Canadian thistle, Japanese hops, and multi-floral rose.
- Conduct forest assessments on a periodic basis and perform soils tests on two-year cycles.
- Maintain an ongoing nutrient management program that includes soils tests, water quality tests, sediment control assessments, and forest assessments.
- Minimize practice of taking bio-mass away from farm where practical. Hay sales conflict with this practice, but spreading manure from the cows on the fields offsets.
- Limit vehicular traffic to designated areas. "Walk and learn" will become standard practice.
- Choose seeds and plants that conform to the Maryland Department of Agriculture Organic Certification Department's standards.
- Avoid any use of chemicals or synthesized fertilizers unless they

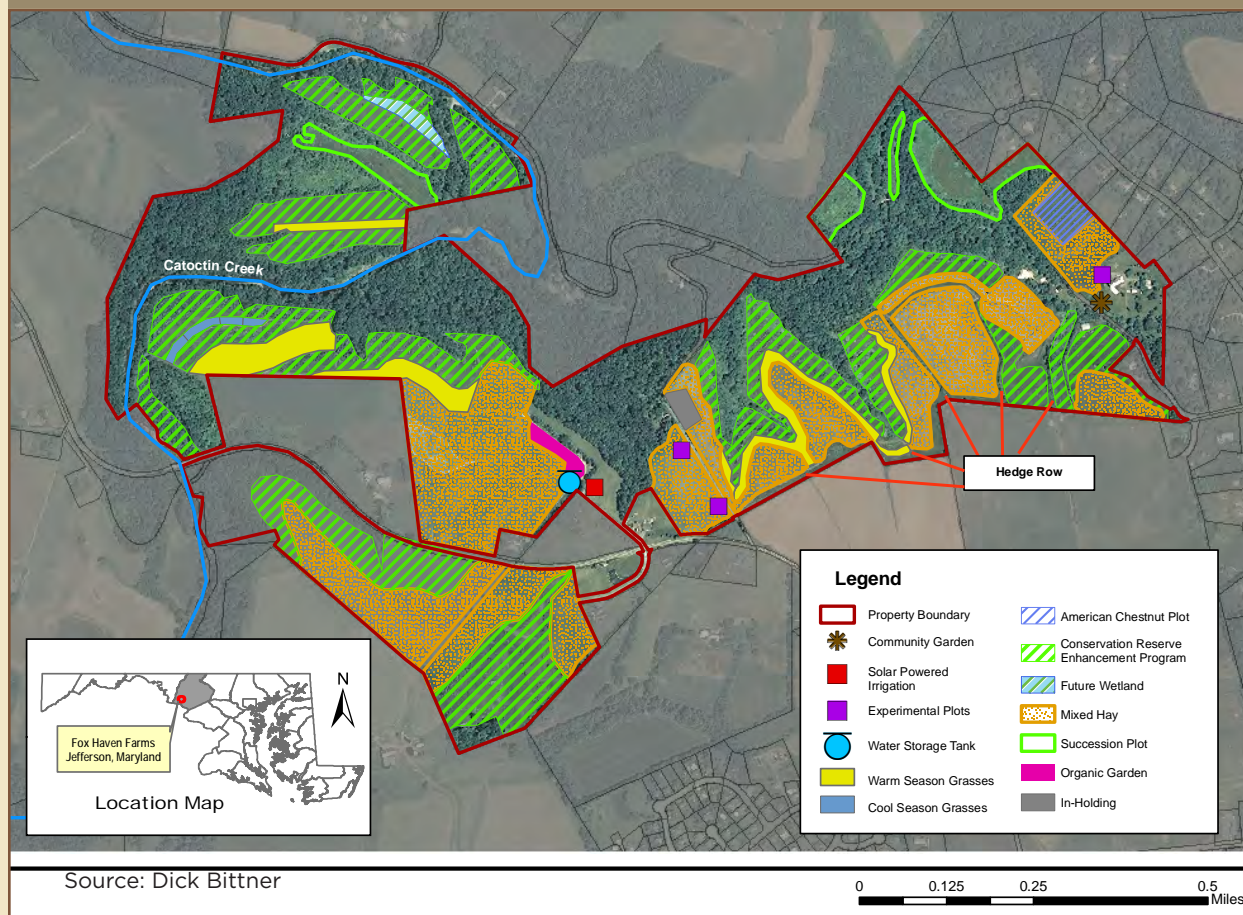
conform to Organic Certification Standards. Initiate a trial plot and incorporate "green manure" (legume cover crops) to achieve replacement for all synthesized fertilizers.

### KEYS TO SUCCESS

Crosby and Bittner offered the following advice for replicating their success at Fox Haven:

- Develop a deep understanding of the land and its natural occupants, potential opportunities, and inherent limitations of your property, and strive to become a land steward with a sustainable farm operation that benefits you and the broader community.

## ➤ Fox Haven Farm Conservation Plan







LEFT: CREP forest planting at Fox Haven Farm.  
RIGHT: Cotocotin Creek.

- Formulate a comprehensive resource management and farm plan that considers near- and long-term planning horizons. Use an adaptive management approach to continually observe and adjust your operations to improve performance.
- Make use of government and private sector expertise and funding for conservation practices.
- Be aware of the amount of energy and resources consumed

to manage the farm and do your best to apply the most appropriate technology or low-tech solutions to achieve an economically and environmentally sustainable farm.

#### PHOTOS AND FIGURES

Page 229-230: Photos, David Burke  
Page 232: Photo, Harriett Crosby  
Page 233: Figure, Burke Environmental Associates/The Conservation Fund, adapted from Regenesis Group, Inc., 2003

Page 235: Figure, Burke Environmental Associates/The Conservation Fund, using NAIP image  
Page 236: Photo (left), Dick Bittner; photo (right), David Burke

#### REFERENCES

<sup>1</sup>Regenesis Group, Inc. 2003. Fox Haven: Voices of the Land. Regenesis Group, Inc., Santa Fe, NM. Excerpts available online at: <http://www.regenesisgroup.com/pdf/Innem.pdf>.



#### FOR MORE INFORMATION

**Project Contact:**

Dick Bittner  
8 Geoley Court Thurmont, MD 21788  
Phone: (301) 271-2558 | E-Mail: [dickbittner@verizon.net](mailto:dickbittner@verizon.net)