



THE
AMERICAN
CHESTNUT
FOUNDATION

Maryland Chapter

Technical Master Plan

Draft

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August 18, 2007

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Review and Approval Record

The 17 July 2004 draft version of this Technical Master Plan was informally reviewed by members of the MD TACF Board and by Dr. Fred Hebard of TACF's Meadowview Research Farms in 2004. The draft version was made available to the Maryland Chapter's members and was approved in principle at the Annual Meeting in October 2004.

In August 2007, this Technical Master Plan was revised in accordance with comments received and was updated to reflect Maryland Chapter activities. It will be reviewed by the MD TACF Board before distribution to the membership and posting on the Maryland Chapter's Web site, www.mdtacf.org.

MD TACF Technical Master Plan

Introduction

This Master Plan addresses the technical aspects of the projects undertaken on behalf of the Maryland Chapter of The American Chestnut Foundation (TACF). The Technical Master Plan is subject to review and approval by members at the Chapter's Board of Directors. Approved Master Plans are to be reviewed and updated annually and are to be available on our Web site: www.mdtacf.org.

Mission Statement

The Maryland Chapter of The American Chestnut Foundation was formed: 1) to support the efforts of the national organization to restore the American chestnut as a viable forest tree in the eastern United States, 2) to identify and preserve American chestnut survivors in Maryland, and 3) to promote educational and scientific research efforts directed at restoring American chestnuts in Maryland.

Purpose

The purpose of the MD TACF Technical Master Plan is to guide the efforts of the Chapter officers and volunteers, ensuring that these efforts are consistent with our Mission Statement, with the 1999 TACF Strategic Plan (i), and with the Research Objectives of the American Chestnut Foundation, 2004-2014, prepared by Dr. Frederick V. Hebard of Meadowview Research Farms and included herein as Appendix 1.

Objectives

The objectives of the MD TACF Technical Master Plan are 1) to specify how our technical efforts, in each of the research activities listed below, promote the national research programs of TACF, and other researchers, and contribute to their eventual success; and 2) to stipulate the methods, priorities, and selection criteria governing our research activities. The corresponding research objectives assigned to chapters in Dr. Hebard's report, Appendix 1, are discussed under the appropriate research activities in the following section.

Research Activities

Chapter efforts are focused on supporting the TACF backcross breeding strategy while maintaining and exploiting native Maryland American chestnut survivors and their progeny. In addition, the Chapter is committed to supporting student research projects to the mutual benefit of TACF and students.

Current and planned research activities in Maryland are depicted in Table 1, a matrix of activities and locations where they are carried out. In the table, specific research activities are listed in the left column, and locations where activities are taking place are identified in the top row. Entries in the table's cells indicate which activities are being (or will be) conducted at which location.

This Plan deals with the next ten years, in concert with Appendix 1. However, longer-term future activities, such as reforestation and seed orchards, will be introduced and further detailed as our knowledge and experience grows and as we respond over time to direction from TACF researchers.

The current research activities are discussed in the following sections. Their relevance to the TACF research objectives detailed in Appendix 1 is described. Details of the locations of research activities are presented in **Chapter Resources**.

Backcross Breeding

Backcross breeding, defined in Appendix 1 under “Materials and Methods,” and illustrated in Figure 1, is the principal method being used by TACF to develop blight-resistant American chestnut for eventual reforestation in the Appalachians; however, TACF also supports other methods on a smaller scale.

Table 2 Maryland Backcross Lines identifies all of the backcross breeding that has been conducted to date in Maryland. This table will be updated yearly, as appropriate.

Germplasm Agreement – The TACF Germplasm Agreement has been signed by the principals of all current breeding orchard sites listed as a “location” in Table 1. This enables the Chapter to pursue backcross breeding and backcross nut and seedling planting at our orchards.

Controlled pollination – Under the provisions of the Germplasm Agreement, controlled pollination is being pursued at many sites. To date, all of the pollen supplied to Maryland sites by Meadowview Research Farms has been derived from the Clapper source of blight-resistance. In accordance with Objective B-2 of Appendix 1, the Chapter will continue to perform controlled pollination of American chestnuts in Maryland using backcross pollen provided by Meadowview until 20 lines, based on this source of blight-resistance, are growing in Maryland breeding orchards.

In separate guidance from Dr. Hebard, the Chapter understands this to mean that 20 different pollen sources, derived from the Clapper line and provided by Meadowview, will be used to pollinate 20 different American chestnut “mother” trees in Maryland. Only one pollen source will be used on any given American chestnut “mother,” though multiple mothers may be pollinated with a given pollen source, if sufficient progeny cannot be obtained from the original pairing. Sufficient progeny means 100 nuts/seedlings from each of the pairs of 20 American chestnut mothers and 20 pollen source “fathers.”

Backcross nuts planted – This process, conducted over several years as resources are available, will result in roughly 2,000 backcross nuts to be planted in breeding orchards where they will be permitted to grow until mature enough to be inoculated and tested for blight-resistance and for displaying American chestnut characteristics. Only those progeny rated highly on both of these criteria will be allowed to continue growing in the breeding orchards.

Breeding orchards – Multiple breeding orchards are needed in which to grow the 2,000 progeny of the breeding of the Clapper source of resistance, described above.

The criteria to be used in selecting breeding orchard sites include:

- 1) area covered by TACF Germplasm Agreement;
- 2) suitable soil test results;
- 3) full sun;
- 4) well-drained soil;
- 5) soil with a pH in the range 4.5 to 6.5; and
- 6) no American, Chinese, or any other species of chestnut, nor any hybrid of chestnut flowering trees within ½ mile.

When the backcross breeding nuts produce seedlings of sufficient size, at about five years, they will be inoculated and tested to select the ones demonstrating blight-resistance. Other seedlings will be rogued out of the orchards. Remaining blight-resistant seedlings, at least two from each line, will then be permitted to grow to maturity and intercross with each other, producing B3F2 or B4F2 nuts from open pollination. For successful open pollination among these seedlings, no other chestnut flowering trees of any kind can be within a half-mile of the intercross orchard.

The nuts produced from the open pollination intercross orchards (B3F2s or B4F2s) then will in turn be planted in a separate seed orchard for open intercrossing with each other to produce the final BXF3 nuts expected to carry blight resistance from both parents.

Finally, these backcross F3 nuts will be planted in a seed orchard and the seedlings will be allowed to mature and then tested for blight-resistance and for displaying American chestnut growth

characteristics. Once these progeny have been selected on the basis of these criteria, we will have met Objective B-2 for Maryland to complete a line of backcross breeding with the Clapper source of blight-resistance.

New source of resistance line – Additional sources of blight resistance must be introduced into the breeding process to guard against the evolution of blight fungus that could break down the blight-resistance derived from a limited number of sources, according to Dr. Hebard's report, Appendix 1.

Dr. Hebard's report assigns Meadowview the objective of identifying additional sources of blight resistance. Objective B-5 of the report then assigns each Chapter a separate source of blight resistance with which to initiate backcrossing with twenty American chestnut parents.

Musick Chinese line of resistance -- The first backcross chestnuts planted in Maryland were sent from TACF's research farm and planted in 1999. This initial orchard site is on Catocin Mountain on the property of the Merle Thorpe Charitable Trust, also known today as ThorpeWood. The nuts were open pollinated progeny of tree AB229 on the Wagner Farm in Meadowview, Virginia. In addition to making 20 lines to advance the Clapper source of resistance, the best of these trees planted in 1999 are to be advanced by backcrossing to surviving native chestnuts in Maryland. The Musick source of resistance gets its name from the property owner in southwestern Virginia on whose property the Chinese and American grandparents grew.

The heterogeneous seed lot sent from Meadowview for planting in 1999 was derived from what was described by Dr. Fred Hebard as open pollinations with a lot of outcrossing. The male parent and grandparent are not definite for any of the Musick trees at ThorpeWood. Nevertheless, the Musick trees are designated as BC1s until and if any more detailed knowledge of their genetic constitution can be made. Some of them may be intercrosses between F1 and BC1 or BC2 trees, which might explain relatively high levels of blight resistance. The pedigree for Musick trees at ThorpeWood is: AB229 (Musick x opMusick-91) x opAB229-98.

Many of the Musick trees have performed very well at ThorpeWood. This is true both in terms of growth as well as blight resistance, which was evaluated by observations of natural cankering and of paired inoculations made using blight strains EP155 and SG23. While the Chestnut Foundation awaits advanced genetic tools for evaluating the Chinese component of its backcrosses, two individuals from the 2004 inoculations were selected for sufficient resistance and relatively high American character, TW9 and TW50.

In the MDTACF field operations of 2006, both TW 9 and TW50 produced lines of well over a 100 nuts each by controlled pollinations. They were planted in 2007 at the Monocacy DNR orchard north of Sugarloaf Mountain. At least one more Maryland Musick line is intended for planting at this site, and an additional Musick orchard will be established in the Spring of 2008 pending a successful harvest in September of 2007. A total of five lines from each tree should be made to advance the breeding program by crossing to Maryland mother trees.

Native Breeding

Objective A-4 of Appendix 1 assigns responsibility to Meadowview for "...continued breeding of large, surviving American chestnut trees... to determine whether the blight resistance might be increased to a usable level." However, it would appear as if the state chapters, all of which locate and document survivors, would be in an excellent position to participate in this line of research. This being the case, Maryland offers an extensive pool of native American chestnut trees that would be valuable in this research.

Locate survivors – The identification and documenting of surviving American chestnuts is an important part of Chapter activities. The American chestnut Locator Committee is a standing Committee of our Chapter, and its Chair and members are responsible for identifying, certifying and documenting American chestnut trees in Maryland.

Individuals contact volunteers to identify trees they believe to be American chestnuts on their property. A member of the Committee generally visits the site and examines the tree in question. In some

cases, the person finding the tree may send samples of leaves and twigs before a visit is made.

If the volunteer examining the tree believes it to be an American chestnut, samples of leaves and twigs are gathered to send to Meadowview Research Farms for certification. The Chapter conducts breeding activities, such as pollinating, grafting or pollen collection only using trees that have been certified to be American chestnut.

In addition to these *ad hoc* efforts to locate survivors, the Chapter has enlisted the help of the Maryland Department of Natural Resources, Forest Service as a partner in locating, nurturing and growing American chestnuts.

When representatives of the American Chestnut Locator Committee conclude that a tree is an American chestnut, the tree is tagged and measured, and location and growth characteristics are recorded on a data form, shown in Appendix 2.

The American Chestnut Locator Committee is also responsible for maintaining this information in a data base, which is continuously updated as new trees are identified. The information in this data base is used to select “mother” trees for controlled pollination, if the tree is flowering. This data base is also used to select trees from which to cut scions in the winter for spring grafting.

Meadowview Research Farms may request pollen and/or nuts from the certified survivors in Maryland to support their breeding of pure American chestnuts.

Controlled pollination – In accordance with Objective A-4 from Appendix 1, the Chapter conducts controlled pollination of selected Maryland American chestnut survivors using pollen from the Meadowview Research Farms. “Mother” trees are matched with research pollen sources by the Research Committee in consultation with the TACF Northern Appalachian Regional Breeding coordinator. Table 2, Maryland Backcross Lines, describes the lines that have resulted to date from controlled pollination.

Nut collection – As a means of preserving Maryland germplasm and providing a source of American chestnuts for planting in the state, Chapter volunteers collect American chestnuts from nut-bearing survivors. Nuts are processed to prevent weevil damage and are mixed with damp peat moss and put in bags identifying the tree from which the nuts came. The nuts are stored in refrigerators over the winter.

Whenever a new survivor is identified, the property owner is asked if its nuts may be collected, and this permission is recorded on the data form (see page 2 of Appendix 2).

Totals of open pollinated and controlled pollinated nuts harvested each fall are recorded and maintained as part of Chapter records.

These American chestnut nuts are used as controls in the breeding orchards and are planted in the spring along with backcross nuts in a ratio of 10:1. These nuts are also used as an initial planting in a potential orchard location to demonstrate the feasibility of growing chestnuts at that site. Some nuts are also distributed to interested individuals or to schools as a gesture of good will.

Soil testing – Soil testing is performed initially when a site is being considered for an orchard planting. Subsequent soil tests may be repeated at a site, especially if soil amendments were recommended and applied. Soil samples are usually sent to Penn State University for analysis. Results are maintained as part of the Chapter records.

Nut planting – Each spring, the Chapter's Research Committee, in consultation with TACF's Northern Appalachian Regional Breeding Coordinator, assigns the backcross nuts harvested the previous fall to breeding orchards, identified in Table 1. At least 100 nuts are planted to represent each Maryland "line." Controls, consisting of F1's, American chestnut, and Chinese chestnut, are also planted with each backcross line. The positions of backcross nuts and controls are randomized by the Breeding Coordinator and supplied to the Chapter in the form of a color-coded orchard layout. The detailed data bases for each orchard are maintained as part of the Chapter records.

Grafting

Although the research objectives of TACF, as described in Appendix 1, do not include grafting, the Maryland Chapter sponsors both rootstock grafting and nut-grafting. Grafting methods offer the chance to produce clones of American chestnut trees that have continued to thrive in the presence of blight and also apparently “lucky” trees that have not yet been infected with blight. In this manner, these exemplary trees are preserved for future breeding, and their desirable characteristics, including blight resistance, can be retained.

Grafting efforts began in April 2003 using American chestnut scions provided by the American Chestnut Cooperators’ Foundation (ACCF) from American chestnut trees showing, in their opinion, some degree of natural resistance to the blight. “Ragged Mountain” and “NG Mac” scions were grafted onto existing rootstocks in Sugarloaf Mountain’s East Field orchard.

Since January of 2005, the Maryland Chapter has been sponsoring annual nut-grafting clinics presented by Carl Mayfield, an experienced practitioner of this technique. Scions from existing American chestnut trees are collected during the winter and refrigerated until grafting onto an American chestnut nut and, after a series of steps, grown in a pot. When of suitable size, these seedlings may be planted in an outdoor orchard.

Mr. Mayfield’s detailed instructions that accompany his workshops can be found at www.mdtacf.org, and additional information on grafting may be found in *A Guide to Nut Tree Culture in North America, Vol. 1*, edited by Dr. Dennis W. Fulbright. See Reference 2.

Inoculation and Testing

When a sufficient number of trees in a breeding orchard reach a suitable size and vigor, as determined by the TACF Northern Appalachian Breeding Coordinator, they are inoculated with a strong and a weak strain of the blight in order to assess their blight resistance. The inoculated trees are assessed after five months and again after a year and are given a rating from 1 (good) to 5 (poor) that indicates whether they are to be allowed to grow or should

be removed. Blight resistance, as evidenced by the local reactions to the inoculations, and the presence of American-type growth characteristics are the two factors reflected in the rating.

Inoculation and testing began at the backcross orchard at ThorpeWood in May 2004. Inoculations with EP155 fungus (stronger) and SG23 fungus (weaker) were followed up by assessments and the removal of undesirable trees. Additional trees are selected for inoculations and assessments each year. Inoculation and testing at other MD TACF breeding orchards will be conducted as the trees are considered to be ready.

The detailed results of inoculation and testing can be found on our Web site at www.mdtacf.org.

Hypovirulence Treatment

Hypovirulence treatment is a method of blight control in which a compatible virus-infused fungal strain is introduced into a blight canker, weakening the blight fungus itself and interfering with expansion of the canker and reproduction of fungal spores. This treatment is appropriate in preserving the health and reproductive capacity of American chestnut survivors.

Particularly in light of the research Objective A-4 from Appendix 1, in which large native trees are crossed to achieve a significant level of blight-resistance, the ability to treat large, nut-bearing trees and keep them healthy becomes very important.

Special tree treatments -- Hypovirulence treatment began in 2004 when Dr. Donald L. Nuss at the University of Maryland's Center for Biosystems Research agreed to treat cankers on the Montgomery County champion American chestnut tree on Barbara Knapp's property in Germantown. Volunteers sampled six cankers and the research team determined that three vegetative compatibility types of blight fungus were present. Appropriate viruses were introduced into the three types of fungal strains and allowed to grow. These hypovirulent fungal strains were then introduced into the six cankers on the champion tree in April 2004 with the hope that the resulting hypovirulence would prevent the cankers from expanding and harming the tree.

In the fall of 2004, volunteers noted that the cankers were healing and expanding, and they took samples of new cankers that had appeared. Hypovirulent fungal strains were prepared for the new vegetative compatibility types of blight present on the tree, and treatments were repeated in spring 2005. Yearly treatments are proceeding.

In 2006, Mark Double and Dr. William MacDonald at West Virginia University made hypovirulent fungal strains for three cankers found on a specimen American chestnut growing in the Green Ridge State Forest in Flintstone, MD.

Universal treatment – Based on the successful treatment of these special trees, and consultations with Dr. Nuss and Dr. MacDonald in the summer of 2007, volunteers decided to combine the hypovirulent fungal strains into a “soup” with which to treat other surviving American chestnuts in Maryland.

For example, in Sugarloaf’s East and West Research Areas, there are over 300 survivors, some of which are large and nut-bearing. An application of hypovirulent fungal “soup” to selected cankers on these primary trees will possibly shut down the expansion of some cankers.

Subsequent monitoring of the orchards will show how successful the hypovirulent treatment is and may also reveal whether there is secondary hypovirulent infection of the blight in surrounding, untreated trees, carried by wind, birds and small animals.

Support for External Research

In the fall of 2003, at their request, Dr. Frederick V. Hebard of the Meadowview Research Farms, and Dr. Dennis W. Fulbright of Michigan State University, received 50 and 30 nuts, respectively, from tree #830, a native survivor on Sugarloaf Mountain.

In the spring of 1989, Dr. Dennis W. Fulbright inoculated eight trees in the Sugarloaf Mountain West Field with five types of blight fungus. In 1993, he reported positive results and requested that Stronghold, Inc. cut back the sprouts in East and West Field and let the superior trees intercross. Nuts

collected from this experiment were collected in the fall of 1995 and planted in the spring of 1996 at the Michigan State University Tree Improvement Center nursery in East Lansing, Michigan and then moved to field plots in Jackson, Michigan in the fall of 1996. Nuts were collected by Stronghold, Inc. again in 1997 and sent to Dr. Fulbright. Inoculation and testing of these Sugarloaf progeny continues in Michigan.

As an outgrowth of this work, Dr. Fulbright designed an Experimental Orchard that is now in place as part of the Sugarloaf Mountain American Chestnut Research Area – East Field. Progeny from East Field, West Field, Sugarloaf Mountain and American chestnut plantings in Michigan are being compared over a 10-15 year period to determine their relative resistance to the blight, with and without the introduction of hypovirulent fungal strains.

Dr. Douglas H. Boucher received 1,600 nuts from the East and West Field Research Areas of Sugarloaf Mountain in October 2003 for use in a Global Ecology Project that he led with Poolesville High School students.

The Chapter's Research Committee chair sent nuts from the 2006 harvest to Dr. Joe James and Dr. Steve Jeffers at Clemson University to screen them for resistance to *Phytophthora cinnamomi*, which has been found in soil and seedlings samples from Sugarloaf Mountain East Field orchard and Turner Farm orchard. Starting in spring 2007, these Sugarloaf orchards are being regularly treated with SUBDUE MAXX, a fungicide recommended by Dr. Jeffers for the control of *Phytophthora cinnamomi*.

The Chapter will continue to support external American chestnut research activities whenever requests for nuts, seedlings or other resources are received.

Record keeping

Several data collections have been developed and are being maintained to track progress in American chestnut restoration in Maryland:

American Chestnuts in Maryland – This MS Excel database includes American chestnut survivors with tag numbers and characteristics recorded in the field using a data form shown in Appendix 2. This database contains information on every tree that has

been or may be used as a “mother” tree in controlled pollination. This database is the responsibility of the Chair of the Chapter’s American Chestnut Locator Committee.

Because it includes information on locations and landowners, this database is not accessible from the Chapter’s Web site. However, Chapter members may request information from the Committee Chair, as appropriate.

Controlled Pollination – Each controlled pollination breeding effort in the spring of the year is fully described on MS Excel spreadsheets showing the number of bagged containing pollinated flowers, the number of check bags, the identity of the pollen used, the date bagged, and the date pollinated. In the fall, the harvest of burs and nuts are recorded on the same form. Collection and recording of the controlled pollination data are the responsibility of the Chair of the Chapter’s Research Committee.

The completed Pollination Reports, using the form shown in Appendix 4, are submitted to TACF through our Northern Appalachian Regional Breeding Coordinator at Penn State University and are retained as part of the Chapter’s records. A summary of the results of the nut harvest for the year, including nuts obtained from controlled pollination as well as open pollinated nuts, is posted to our Web site: www.mdtacf.org.

Backcross Orchards in Maryland – Each backcross breeding orchard is fully described in MS Excel spreadsheets showing the planting layout and giving origins, tag numbers, planting dates and positions for each backcross tree and each control tree planted. Orchard information is updated yearly. Over time, inoculation and testing data are added to the orchard records, as appropriate. Responsibility for establishing and maintaining the data for each backcross orchard is jointly held by the Chapter President and the Chair of the Chapter’s Research Committee.

This backcross orchard information is maintained as part of the Chapter’s records, some of which are posted to our Web site: www.mdtacf.org. The information is also maintained in TACF files

August 18, 2007

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by our Northern Appalachian Regional Breeding Coordinator at Penn State University.

Student Projects

The education of and involvement of young people in American chestnut restoration is of major importance to the long-term viability of the Chapter and national TACF organization. The Chapter has been fortunate that Mr. Brad Yohe, Science Coordinator for the Carroll County Public Schools in Westminster, approached us in 2003 to be a partner in his development of an American chestnut curriculum for 7th through 12th grades.

This partnership led to development of The Chestnut Tree Lab, which may be requested by high school science teachers as a kit for teaching advanced microbiological techniques along with an introduction to the plight of the American chestnut tree. Our chapter funds multiple kits so that as many Maryland high school science students as possible can have this learning experience.

Officers and volunteers from our chapter work with individual high school, college and graduate students on independent chestnut-related projects, and we actively pursue all opportunities to involve young people in our work

Chapter Resources

The resources of the Maryland Chapter are identified in the columns of Table 1. The features and special characteristics of each of these locations are described in the following paragraphs. The orchards are listed in the order of the establishment of their American chestnut orchards.

The locations of all of the orchards described below may be viewed at <http://www.mdtaf.org/NewsEvents/map2007summary.jpg>.

Orchard maps and spreadsheets with detailed planting data for each of the orchards described below are maintained as part of our Chapter records and are reported to the Northern Appalachian Regional Breeding Coordinator at Penn State University.

ThorpeWood

The Thorpe Foundation maintains the ThorpeWood facility on Catoctin Mountain in Thurmont, in Frederick County, "...to promote and support educational, youth, scientific and environmental groups." In 1999, the first backcross nuts were planted in tree protector tubes at ThorpeWood in support of the Maryland Regional Adaptability Study for TACF. In 2002, the orchard was enclosed with deer fencing. Today, approximately 300 backcross seedlings are growing in the orchard.

Though there is no space to expand the orchard, roguing out blight susceptible trees as a result of the blight inoculations in May 2004 will provide room for additional seedlings.

Sugarloaf Mountain

Sugarloaf Mountain located in Dickerson, in Frederick County, is owned and operated by Stronghold, Inc. for the enjoyment of the public. The property covers 3,000 acres, most of which is naturally wooded forests with hiking and bridle trails maintained by a full-time maintenance staff. At the base of the Mountain there are three American chestnut orchards: East Field, West Field, and Turner Farm.

Sugarloaf Mountain is a monadnock, an isolated mountain of impervious rock in an essentially level area. It is geologically unrelated to the Appalachians. This may mean that wild survivors on Sugarloaf are genetically different from those in the Appalachians where there were once contiguous American chestnuts for hundreds of miles.

The history of Sugarloaf Mountain's involvement with American chestnut restoration and detail maps of the orchards are contained in Reference 4, "A Brief History of the Efforts of Stronghold, Inc. to Restore the American Chestnut – 1969 to the Present.," dated August 2002, and available as part of the Chapter records.

Barbara Knapp property in Germantown

Barbara Knapp has an extensive wooded area within an 8-foot deer fence in which three large survivors and many small seedlings are growing. These seedlings include a few backcross seedlings grown from the controlled pollination nuts collected from one of her trees in the fall of 2003. One of her large survivors is the Montgomery County champion, and it is the one that has been treated with hypovirulence. All three of her large trees flower and produce nuts.

Jim Hill property in Mt. Airy

Jim Hill has a large American chestnut survivor on his property. It is 13.5 inches dbh and 90 feet tall. It is too tall for controlled pollination but pollen from it has been distributed to Meadowview. In addition nuts from it and one smaller tree have been planted on the premises and at ThorpeWood, Fox Haven, Sugarloaf Mountain and other places. There are also some 200 small trees from which scion wood can be collected for grafting.

Fox Haven

Fox Haven Farms is a privately owned, 370+ acre farm near Jefferson, Maryland. The land adjoins Catoctin Creek and the Lewis Mill branch of Catoctin Creek in the Middletown Valley between South Mountain and the Catoctin Mountains. Harriett Crosby, owner of Fox Haven Farms, is committed to creating mutually beneficial partnerships between people and the living earth at Fox Haven. USDA Organic certification has been sought for all parts of the farm. More than 40,000 trees have been planted on approximately one hundred acres of previously farmed land at Fox Haven to re-forest riparian buffer areas. Fox Haven's participation in the Conservation Reserve Enhancement Program (CREP) of Maryland and the U.S. Department of Agriculture has won awards from the local soil conservation district.

Fox Haven land and other facilities at Fox Haven Farms are made available to Fox Haven Center, Inc., a non-profit corporation, for use in carrying out its mission of environmental education. In the spring of 2003, Harriett Crosby signed the TACF Germplasm Agreement. In early 2004, Harriett Crosby and the Maryland Chapter of The American Chestnut Foundation entered into a long-term agreement, which makes approximately three acres of Fox Haven Farms land available for Chapter use as a backcross breeding orchard.

Dickey/Blaxall Farm

This 22-acre property belonging to Martha Blaxall and Joe Dickey is in the rolling hills of Davidsonville, in Anne Arundel County, ten miles south of Annapolis. Three soil samples were taken and analyzed at Penn State which indicated a pH ranging from 5.3 to 5.8 and ideal soil for growing American chestnuts. The area is in full sun, is well-drained, and is fenced to prevent deer browsing. The orchard is fully planted, with four Clapper backcross lines planted in 2005, 2006 and 2007.

Izaak Walton League – Rockville

The Rockville Chapter is part of the Izaak Walton League of America, a national conservation organization with about 300 local chapters and 35,000 members. The chapter owns 53 acres located along Waring Station Road in Germantown. In 2006, the Chapter signed the TACF Germplasm Agreement and agreed to erect a deer fence around a 1/3rd acre plot for a "mother tree" orchard. In 2006 and 2007 the 90 positions in the orchard were planted with nuts from nine surviving Maryland American chestnut trees.

Washington Suburban Sanitary Commission – Tridelphia

The Washington Suburban Sanitary Commission (WSSC) owns 6,000 acres surrounding the Tridelphia and Rocky Gorge Reservoirs in Montgomery, Howard and Prince Georges counties. One of the several known surviving American chestnut trees along the Rocky Gorge Reservoir has been used as a pollen source in the Maryland breeding program. In 2007, the WSSC

signed the TACF Germplasm Agreement and established a one-acre orchard with a deer fence at the intersection of Md Rt 97 and Tridelphia Lake Road. In its first year the orchard was planted with two lines of B4 nuts (264 total nuts), leaving room for one additional line to be planted in the future.

Maryland Department of Natural Resources – Monocacy Orchard

The Monocacy Orchard is located on land belonging to the Maryland Department of Natural Resources (DNR) in Frederick County near the end of Ed Sears Road (off Park Mills Road just north of the Monocacy River bridge). Approximately one acre of gently sloped land is enclosed by non-metal mesh deer fence provided by the Maryland DNR. A Memorandum of Agreement between TACF and the Maryland DNR was executed in April, 2006. A test planting of primarily American chestnut seed was made in the spring of 2006. Two lines of seed from the Musick source of resistance were planted in spring of 2007. There is space for one additional line to be planted. The Myron Horst family, who operate an organic farm on the adjoining farm land, help the Chapter by providing some orchard care. A map, which can be found at:

http://www.dnr.state.md.us/publiclands/central/monocacy_detail.html shows the orchard is within the green (non-hunting) area near the uppermost parking area.

Camp Hashawha

The Hashawha Environmental Center is the Carroll County Public Schools outdoor education center. All Carroll County sixth graders spend a week at Camp Hashawha engaged in hands-on environmental education and service learning experiences. Hashawha is located at Bear Branch Park, which is operated by Carroll County Recreation and Parks, and also includes the Bear Branch Nature Center, offering learning opportunities to public school students.

The Chapter's backcross orchard is a joint project of the Carroll County Public Schools, Hashawha Environmental Center and Carroll County Recreation and Parks. The TACF Germplasm Agreement was signed by the Bureau Chief of Parks on March 22, 2007. Approximately 1.3 acres of gently sloped land was enclosed with woven wire deer fence prior to the

planting of two backcross lines in the spring of 2007. There is space for one additional backcross line. Park and outdoor staff will be responsible for maintenance and will involve students where appropriate. Students from two high school environmental education classes did much of the 2007 planting, with guidance from the Hood College American Chestnut Restoration Research Associate, TACF volunteers and Hashawha staff.

Directions to Hashawha/Bear Branch : In Westminster, travel Route 140 to Route 97N. Travel N on Route 97 for 3 miles. Turn right on John Owings Rd. (next to Carroll County Sports Complex). Travel 1.5 miles to Hashawha Rd. Turn left on Hashawha Rd. The chestnut Orchard is on the left, entered through group camping area. (Bear Branch Nature Center is 1/4 mi ahead on right. The Hashawha Environmental Center is ahead on the left.)

Western Maryland Research and Education Center

The Western Maryland Research and Education Center (WMREC) consists of a single 491 acre facility located in Washington County near Keedysville, MD. Housed at this facility are faculty and staff of the Maryland Cooperative Extension (MCE) and the Maryland Agricultural Experiment Station (MAES) - both components of the University of Maryland, College of Agriculture and Natural Resources. Research projects conducted at the facility support the programs for faculty from the Departments of Entomology, Natural Resource Sciences & Landscape Architecture, and the Maryland Cooperative Extension. In addition, the facility has some cooperative research projects with agricultural industry representatives, United States Department of Agriculture (USDA), and Maryland Department of Agriculture (MDA) scientists, and also hosts tours led by area MCE Educators.

The University of Maryland signed the TACF Germplasm Agreement on April 12, 2007. Approximately 2 acres of space within a large area with deer fencing has been made available to MDTACF for use as a backcross orchard. WMREC has agreed to mow between rows and has applied Roundup using special equipment designed to shield orchard trees. Two backcross lines were planted in the spring of 2007. American chestnut trees grown from seed from a midwestern source on another part of the WMREC facility were used as mother trees in 2007 controlled pollination efforts.

August 18, 2007

DRAFT

Izaak Walton League-Damascus

The Wildlife Achievement Chapter, Inc. is part of the Izaak Walton League of America, a national conservation organization with about 300 local chapters and 35,000 members. The planned orchard will be located near the access road to the Wildlife Achievement Chapter facilities at 26430 Mullinix Mill Rd., Mt Airy, Md. 21771, near Damascus, Maryland. Test planting of American seed was made in spring of 2007. A TACF Germplasm Agreement has not been signed yet.

References

1. TACF Strategic Plan, dated 1999, taken from www.acf.org/Board.htm.
2. *A Guide to Nut Tree Culture in North American, Vol. 1*, Dennis W. Fulbright ed., Northern Nut Growers Association, Inc., 2003.