

New Vectors Going Forward: Some Reflections for Visioning Session

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For the first four decades of TACF's existence, our organization focused on a critical antecedent—developing a population of genetically diverse American chestnut (AC) with resistance to blight and phytophthora. This is a huge effort, including people, investments, operations, communications and fundraising focused on research to create that population. With the developments and discoveries in genomics, Darling 58, and less than hoped for but still meaningful progress in backcrossing, we are at a critical transition point, one with great promise. And this could necessitate a shift or rebalancing for our next great challenge—building a sustained and long-term restoration program.

This is my version of a **Walkabout** in advance of the visioning sessions. I'd like to challenge assumptions, point out critical issues, and raise questions for our visioning session. Readers are advised that this is **purposely provocative** and intended to **elicit discussion and debate** on where we are, where we need to be, and how we could get there. We do not need to address every issue or question; rather we should be **prioritizing** what the **group sees as important and relevant**. This also is **NOT a criticism** of where we are or how we got here. I did not spend a lot of time to cushion/qualify/wordsmith to create reader comfort! **TACF has done amazing work with the resources we've had available.**

Please do not distribute this beyond the visioning group.

Please note that when I use the term "tree-R&D", I am referring to the development of American chestnut with resistant qualities.

Let's Begin

For context, let's start at the 'roots' of TACF...mission and vision, and how we market ourselves. There is a common theme front and center: **The other 'R' word...("Restoration", in addition to 'Research')**

Vision: *"Our Vision is a robust eastern forest **restored** to its splendor. Our Mission is to **return** the iconic American chestnut to its native range."* TACF's current Strategic Plan

TACF Donation WebPage lead: *"Your support helps bring the American chestnut back from the brink of extinction. You are **restoring an entire ecosystem** and leaving our world a better place than we found it."*

First page of TACF brochure: *"**Restore** the American chestnut—Join the American Chestnut Foundation"*

Michael Doochin, quoted on TACF website: *"TACF is **committed to restoring** the American chestnut tree to our eastern woodlands to benefit our environment, our wildlife, and our*

*society...TACF's mission is not about preventing environmental loss or preserving what we already have. The concept of our mission is much bolder and more powerful. It's about **restoration of an entire ecosystem** and making our world a much better place than we found it."*

Key Issues/Possible Gaps

Here are some issues we could tackle in addition to the Science discussions as we look ahead. I've organized this into 'small bites' so that you can take them in one at a time or all at once. I know my head hurts after walking-about, yet being with you all as colleagues is a great inspiration!

Issue: R&D Funding is Not Forever; Restoration is Science Too.

1. Unless an R&D organization can develop intellectual property that can be commercialized, or find a long-term source of funding (e.g., royalty stream, large endowment, long-term large-scale donors), it **must inevitably produce a tangible product** or die.
2. 35 plus years is a long time to a solution for humankind. From a nature perspective, it is a nano-blip. Yet few businesses or non-profits would pursue a 30-year research agenda for one product. Typically long term research is performed at universities and is funded by grants, primarily from the federal government.
3. Donors, talent, members, chapters can lose interest over time. Loss of momentum is a huge risk as time progresses, particularly given the average age of our donor base.
4. We are now much closer to 'getting to market' with the development of Darling 58.
5. Many factors are pushing against 'getting to market.' Regulatory approvals, advance of new and old diseases (e.g. recently discovered Chestnut brown rot; phytophthora moving north); need for more clarity as to the path forward, need for a common integrated approach with ESF; clarity on 'here's what happens when regulatory approval is granted'; need for intellectual property plan and branding strategy.

Some key questions:

1. Is our R&D agenda for each program--tree development **and** restoration clearly defined?
2. What is the 'go to market' plan for transgenic chestnuts? When we get a plan, does it need to align with ESF's?
3. When do we make a shift from tree-R&D towards an emphasis on restoration?
4. Do we have a clear commitment to a restoration program, with goals, objectives, funding and defined projects across the former range of chestnut?
5. Should the restoration program be using the 'best of best' from the backcross program, wild-type American chestnut, or a combination?
6. Can we ramp up our restoration programs, and if so, how, where and when?

7. Given how often we use 'restoration' in our vision and goals and messaging, is our restoration agenda clear to our members and donors? How are we using our chapters to extend our restoration footprint?

Issue: How Could We Achieve a Greater Share of NSF Funding? Should We Pursue This and If So, How?

Over the past 20 years, NSF has granted over **\$60 Billion** to universities, industry and small businesses. In 2020 alone, NSF funding was **\$7 billion**.

Let's look at chestnut-related research over the past two decades. A search of all grants using search term 'castanea', 'American chestnut' and 'cryphonectria parasitica' revealed 11 chestnut-related grants since 2000: A total of **\$12,500,000** was granted by NSF for these projects (on average, less than \$625,000 per year).

A search of coral reef restoration indicated there were 30 grants over \$1 million, totaling north of \$50 million! Coral reef restoration funding is well in excess of \$100 million.

Some key questions:

1. Why are there so few grants for chestnut?
2. Why are there so few chestnut related grants to universities where chestnut research is typically performed?
3. What does coral reef restoration have that attracts so much funding? Can we create demand for funding for chestnut?
4. What are the opportunities for TACF to encourage/incent/support the pursuit of NSF grants for our research network?
5. Does TACF in fact have a research network, where scientific goals are defined, potential researchers are identified, and we systematically pursue grants to achieve the scientific goals we defined?
6. Could our future genomic discoveries be funded through NSF grants?
7. Could our restoration programs be funded through NSF?

Issue: There is a gap between TACF's current capabilities and what is required to do large scale restoration. How and when do we close the gap?

1. TACF is primarily an R&D-driven organization focused on tree development, with an effective outreach, communication and education function. TACF is focused on learning from genomic research (including sequencing), growing trees in orchards, testing for blight resistance and fitness, tracking results, compiling and generating data, encouraging others to deeply explore science related to this species, and seek solutions to destructive diseases of chestnut. To fund R&D, and gain wider support, TACF promotes and supports research, educates the public, creates alliances and relationships (e.g., ESF and grantors), and engages with donors, members and volunteers.
2. TACF has major investments in nursery operations/orchards that operate in support of our R&D programs. Most of these orchards are either focused on wild-type chestnuts or backcross breeding-oriented while a select few are doing transgenic research.
3. TACF has not focused on production, (including growing at large scale; systematic and consistent restoration projects); almost all of our resources and capabilities are tree-R&D oriented.
4. Restoration at scale will require new competencies. There are R&D aspects (e.g., continuous improvement), yet restoration is fundamentally a production process (growing, planting, sustaining, tracking) requiring competencies that are different than R&D.
5. At some point we will need to transition (timing is very open to debate, as well as finding the right balance) from tree-R&D-driven to production/restoration-driven. This will require different skills, organizational relationships and investment. We should not be tasking R&D to design or to 'own' these production processes. It is going to require talent from outside TACF to design, build and sustain a production/restoration operation.

Some key questions

1. What is the right balance between tree-R&D and restoration? From multiple perspectives—people, chapter focus, fundraising, marketing?
2. Should we ramp up restoration initiatives, and if so, do it with wild-type AC or backcross material?
3. Do we have a plan for how we will start restoration with D-58 when/if regulatory approvals are cleared?
4. What will it take to ramp up production of pollen and seedlings? Should this be done nationally, or at the state level, and/or outsourced under contracts?
5. What is the arrangement with ESF for pollen production, nut and seedling distribution?
6. Should we develop a TACF 'brand' or a certification for transgenic trees?

7. Do we know what organizations we would partner with to ramp up production of pollen/nuts/seedlings? Do we have the relationships in place? Should we be making friends before we need them?
8. What land should we restore first? Mountain-tops along the Appalachians? Local parks? State forests? This matters....for example, remote areas require professional crews rather than volunteers.
9. How will state chapters be involved in restoration programs? What level of involvement should they have in deciding where to plant?

Issue: How We Get 'Stuff' Done--Committees vs. Task Forces vs. Project Teams

1. **Committees** are formal organizations that serve specific functions within organizations, often having no fixed endpoint. Usually, committees are defined in organizational by-laws, charters, and have a defined role, often as a subset of boards or the organization's leadership. While expertise is required, often the members represent constituencies or organizational units.
2. **Task forces** are groups comprising diverse experts and resources brought together to accomplish a specific objective over a defined time period. The expectation is that the group will disband when the objective has been completed.
3. **Teams** are small numbers of people with complementary skills committed to a common purpose. Usually, teams are composed of experts and doers, and work together toward a collective, consensus driven work product over a short duration.
4. Task Forces and Teams can be formed by committees, or created by foundation leadership, to accomplish specific tasks.
5. We've all served on these types of organizations and understand the differences.
6. Unless the committees are exceptionally well led, or have urgent, critical tasks, they have tended to bog down rather than advance the organization.
7. Many of our committees have lacked an ability to sustain their operations and produce deliverables.
8. We are not alone in this. Many non-profit boards are suffering the same malaise affecting corporations (e.g. employee burnout). Corporate burnout is also affecting members of the management teams...and that's finding its way over to non profits.

Some key questions:

1. When should we use committees, task forces and teams, and how should we differentiate the issues they address?
2. How do we restore urgency and participation in groups to get the work of TACF done?
3. Do we need to redefine committee roles and assignments?

Issue: What will generate more donor interest and more funds in the future— tree R&D or restoration? Where should our emphasis be?

1. Is the tree-R&D program closer to its ending or its beginning? We've had some false starts (e.g. Restoration 1.0) and continue to work through the consequences.
2. A word search of all of the public comments provided during the Darling 58/USDA public comment period was illuminating: The word "Restoration" was cited 1,308 times. This was by far the most highly used technical word within all of the comments to USDA. What does this say about where the public interest resides?
3. Is our Restoration agenda clearly defined for members and donors? Is our agenda as clear as organizations that specifically are focused on restoration?
4. Where is our five minute video explaining our restoration program for the public?
5. Should we consider allying with organizations such as The Nature Conservancy?

Addendum: For illustration and learning purposes, there are examples from organizations who clearly have a restoration focus:

- a. **Clear Restoration Mission: Coral Restoration Foundation**, Coral Gables FL. (\$3 million revenues; \$1.3 m in grants).
 - i. "We are actively restoring coral reefs on a massive scale, educating others on the importance of our oceans, and using science to further coral research and coral reef monitoring techniques.
 - ii. We work to support the reefs' natural recovery processes through the large-scale cultivation, outplanting, and monitoring of genetically diverse, reef-building corals.
 - iii. We engage and empower the community to join us to save our planet's coral reefs with dive programs, educational activities, scientific collaborations, and outreach."
- b. **Community Connections:** Coral Reef Alliance, Oakland CA. (\$4.5 million revenues; .5 m in grants) "CORAL works with communities to identify and solve local conservation challenges that undermine reef health by integrating ecosystem management, sustainable tourism and community partnerships."
 - i. CORAL collaborates with world-class researchers to fill critical gaps in our scientific knowledge about coral adaptation....a key aspect is building a suite of powerful mathematical models to simulate effects..."
 - ii. Annual revenues \$4.5 million; .5 million in grants
- c. **Corporate Collaboration with non-profits:** "The Nature Conservancy and SHEBA® brand (cat food; owned by Mars) are joining forces to **protect and restore** the long-term health of coral reef ecosystems. The brand has created [The Channel that Grows Coral](#) where every video viewed on the channel will result in a donation to TNC to support its [coral reef restoration](#)

[initiatives](#). This is the first time that 100% of the funds from a YouTube channel have been monetized to support sustainability efforts.” (Since 2008, Sheba has donated over \$10 million to this program.

- d. **Networking for Resilience:** The Nature Conservancy (TNC) program: Reef Resilience Network includes “Radical Collaboration Can Save Coral Reefs: We've already lost half the ocean's reefs—now the fate of the other half depends on **governments, local communities** and the **private sector**”

TNC’s goal is to protect **30 percent of the world’s coral reefs by 2030** and to restore critical source reefs that provide the essential larvae to support natural reef recovery. ([Investing in the Future of Coral Reefs \(nature.org\)](#))

- e. **Government-sponsored networking, Group collaboration:** NOAA has created The Coral Restoration Consortium (CRC), a community of practice comprised of scientists, managers, coral restoration practitioners, and educators dedicated to enabling coral reef ecosystems to survive the 21st century and beyond. The CRC’s mission is to **foster collaboration and technology transfer among participants, and to facilitate scientific and practical ingenuity to demonstrate that restoration can achieve meaningful results at scales relevant to reefs** in their roles of protecting coastlines, supporting fisheries, and serving as economic engines for coastal communities. It holds annual events and uses Working Groups to move the agenda forward. ([Coral Restoration Consortium | Reef Resilience](#))

Their top 5 year priorities are:

- i. Develop and promote the use of standardized terms and metrics for coral reef restoration.
- ii. Increase restoration efficiency, focusing on scale and cost-effectiveness of deployment.
- iii. Scale-up larval propagation for its effective integration in coral restoration efforts, with an emphasis on recruit health, growth and survival.
- iv. Develop guidance that promotes a holistic approach to coral reef ecosystem restoration.
- v. Develop guidance to ensure restoration of threatened coral species takes place within a comprehensive population genetics management context.
- vi. Develop new, and synthesize existing, resources to guide and support coral reef restoration practitioners working in diverse geographic locations.

Issue: Does Darling 58 and subsequent iterations mean we scrap the backcross program?

TACF has spent millions on the Backcross program and there are results. Some portion of the BC program will be used to breed phytophthora-resistant trees with transgenics; some BC trees will be used in TG diversification, and some BC populations (may) have proven blight resistance and physical traits that are 'good enough' to be planted for restoration projects.

Some key questions:

1. Do we have any consensus on what that material is, how it should be used, and whether it is 'good enough' to get to market?
2. Can we develop a workable plan and decide when where and how our BC material can be deployed for specific restoration projects?
3. Or, should we emphasize growing wild-type American chestnut 'mother trees' for future pollination with TG pollen?

Issue: Our Chapters are part of the essential ‘Shoots’ of TACF and need a stake in restoration.

1. Chapters have extensive orchards, plantings and experience in growing chestnut.
2. Chapters have people who know how to plant, protect, and sustain trees; as well as finding suitable sites, and have local and state contacts and partner organization relationships.
3. Restoration is a group activity and needs to occur across the range of the American chestnut.
4. Chapters could be one of the primary players in future restoration projects.

Some key questions:

1. What ‘distribution channels’ will we use to do restoration?
2. Should we encourage chapters to develop their own pollen and seedling production facilities for in-state distribution?
3. Should we mandate that pollen, seeds and seedlings stay within the state of origin?
4. How will we discourage chapter competition and cross border forays by chapters?
5. Will there be ‘national’ restoration programs and ‘chapter’ restoration programs? What will be the difference?

Issue: Large scale funding on a national and global scale is coming for carbon capture. And tree cover and reforestation is a big part of these initiatives.

1. A National Academy of Sciences study found that reforestation is the most scalable, deployable form of technology to fight climate change today.
2. Planting trees on a large-scale would reduce the rise in global temperature by 10%.
3. Reforestation outperformed other mitigation options such as natural forest management, improved tree plantations, and even fire management.
4. Reforestation slows climate change; improves water quality, stabilizes soil erosion, creates new wildlife habitat, improves air quality and creates economic development/new jobs.
5. Reforestation is fundamentally Restoration!
6. Organizations such as Arbor Day Foundation, working in concert with the Greentrees Reforestation Project, are soliciting funding for carbon offsets. Essentially consumers and business can pay for tree planting projects that are monitored and measured annually and certified by independent organizations.
7. Such arrangements are in their infancy and are voluntary. What will they look like, how will they operate and will they be government mandated in the future?

Some key questions:

1. Do (or should) we understand the direction, the players and assess the opportunities and risks of not being involved with carbon capture and plant one billion tree initiative?
2. Is there are role for TACF to play?
3. Could we partner with organizations like Greentrees to include chestnut in these programs?
4. Could land and forest preservation (e.g. easements, compensation arrangements) for purposes of restoration projects be part of TACF's restoration programs?

Issue: Federal funding for infrastructure and stimulus is at a new order of magnitude; Trillions.

1. If the reaction to the pandemic by the Federal government is an indication, massive economic stimulus and infrastructure investment is likely to continue well beyond today.
2. The Federal government does things 'at scale.' Small projects may get funded as one-off earmarks, but when trillions of dollars are being appropriated, projects may need to be in the scale of 10's and 100's of millions to get attention.
3. We have some, but relatively low visibility in Washington within the legislative and executive branches. Compared to many other conservation organizations, we have no organizational presence in Washington.
4. The footprint of our public persona, through exposure to major media outlets such as NYT, WP, NPR and other outlets is higher than our governmental visibility and impact.
5. We do not have a defined national policy agenda, a network of legislative contacts, knowledge of contacts within the organization, nor a strategy to pursue our agenda at the national level.
6. Chapters are located in diverse states, each with two senators, and members are in Congressional districts. How can we build grassroots programs to reach out and influence legislation, funding, etc.?

Some key questions:

1. Should we be joining in coalitions to advocate chestnut funding in the next farm bill?
2. Or should we be prioritizing NSF funding? Could we create a network and incentives for universities to team with us to obtain grants?
3. Do we need a presence in Washington? What would it look like?
4. What would an effective grassroots program look like? How could we engage our membership and use the power of the chapters to achieve our goals?