

Concept Paper:

Ecological Restoration on a Global Scale: Harnessing the Power of the World's Botanic Gardens, Arboreta and Seed Banks

Our Initiative: We will restore 100 places representing the world's damaged, degraded or destroyed ecosystems. These projects will be conducted on six continents, drawing on the unique knowledge, capacity and experience of allied botanic gardens, arboreta and seed banks. The places we will target include the full array of terrestrial ecosystems that are under threat and are no longer able to provide essential services and resources for sustaining human livelihoods and biodiversity. We will build global capacity for pragmatic yet well-informed ecological restoration by emphasizing a science-based approach that incorporates the human context of each place. The lessons learned from these flagship projects will be applied to other places, enhancing the contribution of restoration to achieving a healthy and sustainable planet. We will train a new generation of practitioners and guide industry, government and other stakeholders toward best practices for land restoration. This 20 year initiative, developed by botanic gardens and facilitated by Botanic Gardens Conservation International (BGCI), responds to an urgent global need as expressed in both the Millennium Development Goals and the Convention on Biological Diversity.

Background and Justification: The science and practice of restoration ecology can secure the future of a diverse, functioning planet by maintaining the genetic, species and ecosystem resources supplied by plants "in the wild". The world's botanic gardens, arboreta and seed banks (collectively referred to herein as 'botanic gardens') contribute knowledge, collections and expertise that support and perform restoration ecology for the benefit of nature and for improving the quality of human life.

Unfortunately, terrestrial ecosystems and their component species are being degraded and used unsustainably worldwide, and are at risk of further degradation or imminent loss. Forty percent of the world's forests have been completely destroyed and much of what is left is fragmented. In many of the more seriously affected places, remaining habitats are not adequate for biodiversity conservation nor do they provide sufficient protection of the ecosystem services that supply economic benefits and contribute to poverty alleviation. Efforts to mitigate such damage have often overlooked the need to use appropriate species in a given context and have neglected ecological functions, goods and services. Even with the best intentions, the lack of facilities, expertise and native plant materials often limit the quality and extent of outcomes.

In 2008, representatives from botanic gardens around the world met at the Royal Botanic Gardens, Kew to assess their contributions to ecological restoration and how these activities could be expanded and further developed (Hardwick et al. 2011). As a follow up to this meeting, an informal steering committee was convened at the New York Botanical Garden in March 2011 to consider a global initiative with ambitious long term goals. The steering committee called for botanic gardens to form a new alliance to restore ecosystems worldwide and requested that BGCI communicate this exciting new initiative to all botanic gardens and to play a coordinating role in its development.

Botanic gardens are uniquely positioned to help address the issues relevant to recovering ecosystems as they provide professional expertise in plant taxonomy, horticulture, biodiversity inventory, conservation biology, restoration ecology and ethnobotany. Botanic gardens are also collectively a global repository for documented plant material with at least one-third of all flowering plants maintained in living collections or seed banks. Utilizing knowledge gained from their collections, herbaria and libraries, and

combined with landscape knowledge from field surveys and ecological research, botanic gardens bring the understanding necessary to ensure that restoration achieves adequate taxonomic diversity and incorporates appropriate genetic provenance. Botanic gardens can restore places so that they are both diverse and ecologically resilient, avoiding the pitfalls associated with growing inappropriate plants in the wrong environment. They have proven record of forming strong partnerships with other organizations that have complementary skills in the long-term restoration of ecosystems. Botanic gardens are uniquely placed to inspire, inform and educate different groups of society.

At all levels, from local to global, botanic gardens work collaboratively to deliver outcomes in support of the Global Strategy for Plant Conservation (GSPC) of the Convention on Biological Diversity. One particular focus has been on GSPC Target 8, which calls for “At least 75 percent of threatened plant species in *ex situ* collections, preferably in the country of origin, and at least 20 percent available for recovery and restoration programmes”. Actions toward achieving this GSPC target directly support Target 15 of the CBD’s strategic plan relating to ecological restoration.

Our Perspective and Unique Contributions to Ecological Restoration: According to the Society for Ecological Restoration (SER): *Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.* (SER 2004).

The ultimate goal of ecological restoration, according to the SER Primer, is to recover resilient ecosystems that are not only self-sustaining with respect to structure, species composition, and functionality but are also integrated into larger landscapes and are compatible with sustainable human activities that require or draw on the flow of ecosystem services.

Experience gained by botanic gardens has shown that successful ecological restoration of a place must be based upon a thorough understanding of the native vegetation, which provides the structural and functional framework for all other ecosystem components. That understanding in turn is based on knowledge and collections compiled, maintained and used by botanic gardens. Individual botanical gardens play a critical scientific role in ecological restoration and an alliance across countries and continents will thus provide global leadership. Botanic gardens also value the knowledge and tradition of local inhabitants who depend on ecosystem services for their well-being and livelihoods, and involve them as stakeholders in restoration activities.

Botanic Gardens are already making substantive contributions to ecological restoration in the following ways:

- Emphasizing science-based approaches including adaptive management
- Using well-documented living plant collections, seed collections and herbaria to understand native vegetation and provide restoration materials
- Generating additional knowledge and know-how regarding the genetic, physiological, horticultural and ecological characteristics of plants
- Acting as stewards for rare and threatened species
- Leveraging our expertise for teaching, training and outreach
- Collaborating through a global network (BGCI) that has operated effectively for decades

Programme Structure: Our goal of restoring 100 places and building capacity around the globe will be achieved by a programme that includes:

1) Sponsorship of 100 long-term restoration projects. Botanic gardens will select valuable but degraded ecosystems for restoration. Given the global distribution of self-identified restoration gardens (Figure 2 in Hardwick et al. 2011), these “flagship projects” will be distributed across six continents and will include numerous biodiversity “hot-spots”. In some cases the ecosystem will be in a locality near the botanic garden perhaps even a natural area persisting within its boundary. In other cases the ecosystem will be in a distant place, even overseas, but one where the botanic garden has the requisite experience and expertise with the local flora. All projects will emphasize application of existing know-how to assess, design and implement the restoration. Returning keystone plant species to the ecosystem will be a priority in order to establish the native ‘framework’ for the eventual restoration of “diversity components”. There will also be strong guidelines for seeking and including the views and aspirations of local people so that valued economic and educational benefits are generated from the restoration project. Training restoration practitioners, as employed locals and/or students, will be a central feature of the initiative. Project evaluation will take place at regular intervals to ensure quality restoration outcomes over a 10 to 20 year period depending on ecosystem complexity. Identifying key outcomes and milestones in these projects will reduce the uncertainty for sponsors in funding long-term activities and thus improve the overall success of this initiative.

2) Facilitation of global restoration capacity by collaboration. No single botanic garden has all of the expertise, experience and facilities needed to accomplish ecological restoration on a global scale. This initiative will catalyze collaboration between botanic gardens large and small, between gardens and other conservation organizations, and between gardens and those industries and government agencies that manage or use places that should be restored. We will seek to strengthen the existing network of gardens through collaboration on flagship projects; initiatives funded externally by industries; training workshops and capacity building generally; database sharing, and “catalytic visitations” that bring people together to discuss, evaluate and improve restoration practice. We are especially interested in funding exchanges that build capacity in botanic gardens and their local communities in less economically developed countries.

3) Improvements to research. Applied research in ecological restoration is woefully underfunded by governments, economic operators and other stakeholders that most require it. Some botanic gardens have facilities and staff for conducting research but lack “seed money” to jump start an innovative idea or develop a protocol. Other gardens need new or improved facilities (e.g. greenhouses, seed labs) or equipment (seed cleaners, field gear) in order to address basic questions about restoring a target ecosystem. This initiative will increase research capacity at botanic gardens large and small, emphasizing the removal of critical obstacles to applied work, rather than the funding of theoretical research or efforts to address intractable problems. In some cases an overarching research question may be addressed such as the critical minimum size of a self-sustaining, restored ecosystem, but the value of the outcome to target projects must be demonstrable and direct.

4) Dissemination and advocacy of restoration knowledge. The 100 flagship projects will generate a large body of knowledge about how best to restore our planet’s ecosystems. This initiative will leverage that knowledge, the newly trained restorationists, the improved research capacity and the strengthened network of collaborating gardens to restore even more ecosystems, heal more places, and improve the health and well-being of more people. Publication of manuals, technical papers and pamphlets in many languages will ensure that knowledge is amplified and used to advocate better practices for industry, government and all stakeholders, thus addressing global environmental problems on a broad and

significant scale. We will also fund public education demonstrations of ecological restoration tailored for the estimated 200 million visitors that come to botanic gardens each year.

Our Strategy: This initiative calls for actions that restore nature using the expertise of the world's botanic gardens. Our institutions have a long history of commitment to science, public engagement and collaboration all of which are required for a robust, global effort (Hardwick et al. 2011). We thus have in place an integrated network of highly skilled practitioners who are positioned to take on the challenges of delivering immediate and longer-term ecological restoration on a global scale.

The Next Steps: The need for ecological restoration is clear and the time for action is now. The steering committee with representatives from botanic gardens around the world and working under the auspices of BGCI has established a new alliance for ecological restoration. Working with BGCI, the steering committee is coordinating fundraising action. A second planning meeting was held in Nairobi in late 2011 to develop the 20 year vision, the funding strategy and the memorandum of understanding. We are set to launch the new and ambitious global restoration initiative in May 2012, leading to a significant improvement in restoration outcomes in the world's most damaged, degraded or destroyed ecosystems.

Reference

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