

Biodiversity Conservation

Generational Goal: Conserve, restore and sustain historically rich diversity and abundance of native species and ecosystem processes that are connected and interacting around the globe.

Objective 1- Public Awareness. Americans remember and respect the diversity and abundance of species and ecosystems in our local, regional, and national communities, acknowledge our responsibility to minimize the harm we do, and strive to do better in the future.

Strategies/ Tasks:

1. Label major consumer products with impact information about whether key resources used in production and transport of the product are being extracted faster than they can reproduce themselves, whether wastes involved in production and disposal are being emitted faster than they can be absorbed, and what ecosystems and endangered species are affected. Potential ways to achieve this could include:
 - Establishing an eco-certification system for major consumer products, verified by one or more objective third parties, following the example of programs like Seafood Watch (<http://www.mbayaq.org/cr/seafoodwatch.asp>) or the Forest Stewardship Council (http://www.fsc.org/en/how_fsc_works/policy_standards/princ_criteria), etc.
 - Provision of a Web link on labels to a statement of what positive actions the company is taking to reduce waste, pollution and ecosystem impact.
 - Use developed sustainability reporting frameworks, such as the one developed by the Global Reporting Initiative (see <http://www.globalreporting.org>).
2. Establish a national “ecosystem services” tax on consumer products and/or ecosystem services offset, being sure to state the restoration or prevention activities that will be funded with the monies raised.
3. Incorporate biodiversity and its history into educational curricula from elementary through college. At the university level, incorporate biodiversity into multiple disciplines (planning, creative writing, political science, business, etc.) in order to spread thinking throughout professions.
4. Establish a “Natural World StoryCorps” (modeled after the “StoryCorps: Recording America” project; see <http://www.npr.org/templates/story/story.php?storyId=4516989>) to enable individuals and communities to record: observations of (positive or negative) changes in local biodiversity over time in order to build a record of baseline data; the role of people and communities in affecting these changes; and conservation and restoration opportunities.
5. Work with the non-governmental organizations and local, county, state and regional governmental planning bodies to incorporate biodiversity conservation and enhancement into land-use planning.
6. Develop and widely disseminate a multi-faceted public relations campaign about the many services provided to humans by the ecosystem. Identify charismatic, symbolic species that can tell the story of human interconnectedness and dependence on seemingly unrelated, “other” species. Include information about the impacts of each person’s individual fertility choices, both in population growth and consumption, on biodiversity.
7. Talk with Al Gore (or his producer, Laurie David) about a following up on “An Inconvenient Truth” with a movie and education campaign focusing on threats to biodiversity—or use this as a model and find another celebrity spokesperson/campaigner.

Objective 2- Connectivity. Species who must move between different habitats during different seasons and years will be assured intact pathways and landscapes that will support them in populations that are viable over centuries.

The Earth has long been home to many species. The more that people are familiar with the needs of particular species who must move around in the landscape (e.g., whales, polar bears, Monarch butterflies), and the more they are provided with support for helping those species find essential habitat, the greater the chance these species will remain with us as partners on Earth.

Strategies/Tasks:

1. Provide free contraception and education regarding the fragmentation of natural ecosystem connectivity by continued increases in population growth.
2. Universities and schools form a national consortium to present accessible, visual images on the trends and movements of populations of diverse migratory and climate change-displaced species on land and in the oceans. Specific universities and schools take the responsibility for contributing accounts of particular species.
3. Establish a Green Conservation Corps funded by state and federal governments and colleges such that 1 year of Green Conservation Corps work will fund one year of college education.
4. Establish large ocean preserves and connect preserves through cooperative fishing agreements and financial support for fishing industry restoration efforts [Karen: Give a couple best examples?]
5. Develop via federal, state and local governments and non-governmental organizations a national public/private conservation plan for conservation easements and habitat restoration of corridors essential for species who must move between habitats.
6. Subsidize people restoring ecosystems for other species within peopled/working landscapes for their efforts on behalf of future generations (see Objective #4: Economic Instruments).
7. Ensure public web access to all publicly-funded biodiversity conservation data (e.g., caribou migrations).

Objective 3- Invasive Species. Reduce introduced, non-native species from the second greatest threat to biodiversity and resilient, functioning ecosystems in the United States to a minimal threat within 15 years.

Context: Introduced, non-native species are one of the greatest threats to biodiversity, second only to habitat destruction. Introduced species with an ability to generalize and spread widely can change an entire habitat, replacing native species and placing the complexity and resiliency of ecosystems at risk. They can also threaten human health and welfare. Introduced species that generalize and spread widely into new habitats cost an estimated \$137 million per year to the U.S. economy. Sources:

<http://www.actionbioscience.org/biodiversity/simberloff.html> (2000);

<http://www.beyondpesticides.org/weeds/index.htm>

Strategies/Tasks:

1. Fund research and development of methods to prevent entry of new introduced, non-native species into the U.S. and to prevent the export of introduced species outside of the U.S., as prevention is the most cost-effective and efficient way to approach the problem
2. In a precautionary manner, take actions to prevent the entry of new introduced, non-native species into the U.S. lands and waterways and the export of such species from the U.S. to other countries

and eco-regions in order to preserve the greatest number of cost-effective options to approach the problem.

3. Fund research and development of nontoxic, non-chemical strategies to effectively limit the spread of introduced, non-native species that reduce ecosystems' resiliency and ability to function. These could include mechanical methods, use of "weeds" as food sources for humans or livestock, or careful use of biological control agents.
4. Establish standard, precautionary protocols to monitor the major conduits that allow/support entry of introduced species into resilient or recovering ecosystems.
5. In a precautionary manner, reduce the negative impact of introduced, non-native species on high-priority habitats and connected pathways identified as critical to biodiversity (see connectivity objective).
6. Fund research, development and implementation of precautionary methods to restore ecosystems whose biodiversity and functionality are threatened by or already adversely affected by introduced, non-native species. Restoration of native biodiversity is necessary to increase resilience and resistance to introduced species.

Potential Indicators:

- The number of new introduced, non-native species that reduce ecosystems' resiliency and ability to function becoming established (as compared to now).
- Can we encourage development of a "resiliency index" to help measure the functionality of ecosystems? This could help in the connectivity objective as well.

Examples:

Sources: <http://nas.er.usgs.gov/queries/FactSheet.asp?SpeciesID=190#imagemap>,
<http://www.natureserve.org/library/americasleastwanted2003.pdf>

- West Nile virus is a mosquito-borne illness that first appeared in New York State in 1999, probably on legally or illegally imported birds. Since that time, it has spread explosively across 46 states, Canada, Mexico, and Caribbean islands. Over 12,000 cases of human illness have been documented along with more than 500 deaths. Documented bird deaths, among more than one hundred species, are in the tens of thousands with actual mortality likely to be far higher. Other wildlife and horses are also affected and many species are extremely susceptible to the virus. Its long-term impact on human and animal populations is not known. West Nile Virus is threatening the threatened sage grouse population. *Source:*
http://necis.typepad.com/necis/files/fsnew_invaders_0204.pdf
- Cheat grass was introduced to the United States in the mid-1800s, most likely through contaminated seed but also through intentional planting in some areas, including Washington state. Cheat grass has now invaded native grass and forest ecosystems all 50 states. It negatively impacts grazing by injuring cattle, horses and other grazing animals when the grass dries out and seeds, and greatly reduces wheat crop yields in infested fields. Cheat grass also creates a major wildfire hazard by altering the fire regime from an average interval of 60-110 years to 0-3 years. *Sources:*
http://www.columbia.edu/itc/cerc/danoffburg/invasion_bio/inv_spp_summ/Bromus_tectorum.html;
<http://www.cirrusimage.com/invasive.htm>

- The European green crab threatens shellfish fisheries on the Pacific and eastern seaboard. It is estimated to have arrived in the eastern U.S. in the early 1800s, and then was introduced to the Pacific coast in algae used to package lobster or live bait or in ballast water in the late 1980s. The green crab decimates populations of clams, oysters, and crabs by eating them, and harms other crab, bird, or fish populations by out-competing them for food. The green crab has significant negative impact on shellfish harvested for subsistence by American Indians, as well as commercial, and recreational use.

Objective 4- Economic Instruments. Economic instruments can help us achieve a given goal at the lowest possible cost, or get the most benefit from a given expenditure. Economic instruments should therefore provide incentives for activities that restore or protect ecosystems and the biodiversity they contain, and disincentives for activities that degrade ecosystems and the biodiversity they contain. The latter can, in many cases, provide funding for the former. We must recognize however that economic instruments only work when there is room for flexibility—they do not work when we have to halt an activity (e.g. unacceptable pollution or habitat conversion) completely, or have to protect all that remains of an ecosystem.

Strategies/Tasks:

1. Improve economic efficiency by ending all subsidies for activities that have significant negative impacts on biodiversity.
Economic subsidies that promote harmful activities are known as perverse subsidies. Examples include subsidies to chemical intensive agro-industry, fossil fuel production, biofuels, polluting industries, fishing and timber industries and so on. We do not mean to imply that such industries are inherently bad, but rather that subsidies are likely to encourage production beyond the point that the costs of continued production begin to outweigh the benefits. Rather than subsidizing such activities, we should tax or otherwise penalize their negative impacts (see 3 and 4 below.)
2. Improve economic efficiency by subsidizing activities that enhance or protect biodiversity.
Biodiversity provides a number of public goods, for which markets provide no direct compensation. Subsidies for the provision of public goods and other positive externalities increase economic efficiency.
3. Establish economic incentives to curb biodiversity loss and promote its recovery.
4. Landowners frequently have explicit rights to alter habitat on their properties as they wish. When this is true, it is possible to pay them to conserve habitat. In Australia, for example, “BushTender is a voluntary tender-based incentive program designed to help improve management and protection of native vegetation on private land. Under BushTender, landholders competitively tender for contracts to better protect and improve native vegetation. Successful bids are those that offer the best vegetation outcomes for the investment, with successful landholders receiving periodic payments for management activities conducted under signed agreements.” The landowners have an incentive to offer the lowest bid they find acceptable, as otherwise the conservation contract is likely to go to a different landowners. (see [http://www.dse.vic.gov.au/CA256F310024B628/0/821F6898C0661023CA257325001ECE96/\\$File/BT2007+Inforamtion+sheet+1+-+general.pdf](http://www.dse.vic.gov.au/CA256F310024B628/0/821F6898C0661023CA257325001ECE96/$File/BT2007+Inforamtion+sheet+1+-+general.pdf) for details). Another option is to simply pay anyone who agrees to abide by a legal contract to conserve habitat. For example, in Costa Rica, landowners are paid about \$50/ha/year to conserve native forest, about as much money as they would make converting the forest to pasture. The payments can be annual, or a one time purchase of conservation easements.

5. Improve economic efficiency by making producers pay the full cost of pollution and other activities with negative impacts on ecosystems and biodiversity.

One option is to taxes, e.g. a pollution tax, in which case price will determine the quantity of pollution emitted. Another option is to cap the total amount allowed of pollution, deforestation, fish harvest or other activity affecting biodiversity, then auction off tradable quotas to industry, in which case the quantity of pollution (or other activity) allowed determines price. When there is danger of crossing critical ecological thresholds (e.g. minimum habitat required for viable population), a quota set safely below the threshold is preferable to a tax. Such policies increase economic efficiency by forcing the producer to better account for the full costs of production. Revenue from such policies can fund other policies, such as 2) and 3) above and 6) and 7) below.

6. Fund uncertain potential mitigation and repair costs from human/industrial activities by requiring financial environmental assurance bonds. When an activity has an uncertain impact on ecosystems or biodiversity (e.g. a mine that might contaminate the environment with heavy metals and acid if an accident occurs or a tanker that might spill oil) those engaged in the activity should post a financial assurance bond sufficient to repair any damage caused. If no harm is done, the bond is returned. If harm is done, the bond is used to repair the damage. The bond should be high enough to cover a worst case scenario. If the risk of such a scenario is minimal, then bonding or insurance agencies can offer even very large bonds at a low cost. If the risk of such a scenario is too high, assurance bonds would prevent the activity from taking place.

7. Purchase, restore and improve conservation areas using money from taxes and/or auctions.

8. Enhance government investments in technologies that will help protect biodiversity then make those technologies freely available to all. Examples of such technologies include non-polluting energy, organic agriculture, erosion and drought resistant agriculture (e.g. perennial grains), non-ozone depleting compounds, alternatives to trawl fishing, devices that reduce by-catch in fisheries and so on. As the benefits of biodiversity are public goods, markets tend to allocate too few resources to technologies that protect it, and government funding helps correct this market failure.

9. Promote population control by ending subsidies for having children, and by subsidizing birth control and sex education.

Many countries, including the US, offer tax incentives for having children. Such incentives should be ended.