

Indicator 1.09.

Status of Onsite and Offsite Efforts Focused on Conservation of Genetic Diversity

What is the indicator and why is it important?

This indicator describes the extent of onsite and offsite conservation efforts for native species at the genetic level. Onsite efforts are those conducted in the field, such as efforts to increase populations of endangered species. Offsite efforts are conducted in laboratories, greenhouses, arboreta, seed banks, seed orchards, and similar facilities. Sustainable forest management requires a commitment to conserve locally or regionally adapted populations of native species using a combination of onsite and offsite approaches.

What does the indicator show?

Onsite conservation of genetic diversity is provided by parks and other protected areas, genetic and ecological conservation areas, reserved forest areas, and through planned natural regeneration. Onsite conservation efforts for genetic diversity

of plants and animals vary greatly in spatial extent and intensity of management. Many public forests include genetic conservation for common species as a primary management goal and are managed intensively for species that are rare, threatened, endangered, or of special concern. Some private forests also are managed to conserve genetic diversity. These onsite efforts to conserve genetic diversity largely overlap with efforts to conserve species diversity that are described for Indicator 1.06, and that material is not duplicated here.

Offsite genetic conservation efforts tend to be intensive and are often focused on breeding programs or archival programs. These measures are sometimes undertaken, for example, to ensure that seed used for replanting after harvest has sufficient genetic diversity. Offsite genetic conservation occurs at zoos, seed banks, seed orchards, clonal archives, arboretums, and similar facilities. These are summarized in table 9-1. Institutions

Table 9-1. Summary of agencies, institutions, and organizations that work on conservation of genetic diversity (compiled in 2009).

Category	Number
Arboretums affiliated with the American Public Gardens Association. Arboretums work largely, but not exclusively, with trees and other woody species. The American Public Gardens Association also has 176 affiliated botanical gardens and 14 native plant gardens. Some of these include forest-associated species and some (e.g., Missouri Botanical Garden) work on issues related to global forest diversity sustainability.	91
The Center for Plant Conservation coordinates the national efforts that conserve threatened and endangered species in offsite collections (primarily botanic gardens and arboreta).	36
Zoos accredited by the Association of Zoos and Aquariums. All focus on education, some have active research programs, and many feature forest-associated species from outside the United States.	181
Accredited aquariums. Populations of freshwater and anadromous fish, in particular, are closely tied to forest ecosystems.	37
States that fund forest tree nursery programs with total expenditures of \$37 million. Many have associated seed orchards. Hundreds of private tree nurseries compliment State efforts as do the 58 commercial suppliers of tree and shrub seed.	33
The Federal Government has a number of agencies that actively manage offsite seed stores that conserve much native genetic diversity. These include the Forest Service genetics programs (primarily forest species), the BLM Seeds of Success program (range and forest species) and the National Genetic Resources Program (a small percentage of which is forest species), which is managed by the USDA/ARS. The U.S. Department of Agriculture National Center for Genetic Resources Preservation cooperates in the storage of forest species germplasm. The United States cooperates with other international gene bank programs, including the Consultative Group on International Agriculture Research and the Svalbard Global Seed Vault.	Several
The Plant Conservation Alliance is a consortium of 10 Federal agencies and 270 non-Federal cooperators representing various disciplines within the conservation field. Cooperators include many of the arboretums and botanical gardens mentioned above. Agencies and cooperators work collectively to solve the problems of native plant extinction and native habitat restoration. Federal agencies in the Alliance include the Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management, National Park Service, and U.S. Geological Survey.	280
Native plant societies in the United States. They collect, preserve, and propagate native seed sources for use in restoration projects. Many are associated with the Plant Conservation Alliance.	88
Herbaria in the United States that maintain millions of plants specimens. They document plant biodiversity, serve as a valuable reference for plant taxonomy, and can also serve as sources of DNA. The U.S. National Seed Herbarium is part of the U.S. National Arboretum.	697
Databases such as NatureServe and the U.S. Department of Agriculture Plants database compile information about taxonomy, range, and status of many forest-associated plants and animals. This activity aids in measuring biodiversity.	Several

ARS = Agricultural Research Service. BLM = Bureau of Land Management. DNA = Deoxyribonucleic acid.

differ in the proportion of total effort that is focused on forest species. Some institutions work on global and domestic forest genetic diversity conservation.

What has changed since 2003?

This indicator was not reported in 2003.

Are there important regional differences?

Many broadscale, onsite efforts to conserve genetic diversity are associated with public forest land and protected areas. Much public forest land is managed to conserve species diversity and genetic diversity as part of a multiobjective management strategy. Public forest land and protected forests in all ownerships are concentrated in the Western United States (see Indicators 1.02 and 1.06).

Offsite programs for conservation of genetic diversity are widely dispersed. Zoos, arboretums, and seed banks often work on global and national issues associated with genetic conservation. Facilities such as seed orchards, clonal archives, and provenance tests that grow plant material are constrained by the climate where they are located, but they also can participate in international efforts to conserve genetic material.

Why can't the entire indicator be reported at this time?

Conservation of genetic diversity occurs in many places and many ways. Arboretums, herbaria, seed collections, seed

orchards, zoos, and dedicated breeding programs are intensive approaches (primarily offsite) for conservation of genetic diversity. These are funded by Federal, State, and local governments and by NGOs. Ecologists, botanists, biologists, and foresters at universities across the United States are engaged in projects to conserve genetic diversity of forest plants and animals. State and local native plant societies organize private individuals devoted to both genetic and species conservation. No practical way exists to enumerate all such efforts or the proportion of their efforts that is concentrated on forest associated species.

Extensive (primarily onsite) efforts aimed at genetic conservation take place on public and private lands across the United States. Most management decisions affecting forest land managed by the Forest Service, U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, and Corps of Engineers consider effects on genetic and species diversity, with particular emphasis on species of regional, national, or global conservation concern (see Indicator 1.05). Some State, county, and private forests are managed with emphasis on conservation of species and genetic diversity. So are numerous private lands, including those protected by conservation easements or land trusts. It is not possible to enumerate all such efforts, or to discern the proportion of such efforts that is associated with conservation of genetic diversity of forest-associated species. The quantitative information presented in this indicator does not include many of these efforts and, thus, underestimates the total magnitude of work devoted to the conservation of genetic diversity.