Ruggiero M & Healy M 2002 The US Federal Conservation Agency's Interest in Saving Wild Pollinators. IN: Kevan P & Imperatriz Fonseca VL (eds) - Pollinating Bees - The Conservation Link Between Agriculture and Nature - Ministry of Environment / Brasília. p.29-35.

THE US FEDERAL CONSERVATION AGENCY'S INTEREST IN SAVING WILD POLLINATORS

Michael Ruggiero and Meghan

ABSTRACT

Management, monitoring, research, education and co-operation combine to illustrate the approach of the United States Department of Interior in pollinator conservation. A listing provides descriptions of selected relevant projects.

INTRODUCTION

Although the agricultural community has focused much attention on the decline of honeybees, an equal or greater threat may be posed by the loss of other pollinators including native bees, butterflies, birds, bats, and other animals. The latter provide, naturally, a major ecological service to nature that is without cost and that is directly dependent upon biological diversity. Insects, birds, or bats pollinate two-thirds of the world's flowering plants. Insects and other animals pollinate more than three-fourths of the world's crop plants. Many rare, threatened, or endangered plants are dependent on native pollinators. Globally, the economic benefit of pollination has been estimated to be as high as $117 billion. Despite this importance, large declines in pollinators have been reported in Europe, Russia, Canada, and Latin America.

Major threats to pollinators in the U.S. include habitat loss and alteration, alien species, and pesticides. Habitat loss along "nectar corridors" threatens migratory bats and hummingbirds. Native plant and habitat restoration cannot succeed without restoration of pollinators as well. Predatory, parasitic, and competitive alien species threaten pollinators directly, while alien pollinators threaten plant genetic diversity. Pesticides do not usually discriminate between pests and pollinators. These threats together can cause major disruption of an essential ecological service that benefits natural ecosystems, rare species, and agriculture. Despite its involvement in many national and international conservation issues, the United States Department of the Interior (DOI) has been only minimally involved in the issue of pollinator decline.

The Department of the Interior is the largest conservation agency in the United States. It is responsible for more than 300 million hectares of federal lands administered by the Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service, representing most North American ecosystem types. The Department has a strong biological research program in the U.S. Geological Survey and is also responsible for the implementation and enforcement of the Endangered Species and Migratory Bird Management Acts. It also leads participation in the CITES, RAMSAR, and Migratory Bird Conventions and is an active observer of the Convention on Biological Diversity. The problem of pollinators should be an important consideration in our discussions of environmental policy, particularly in relation to endangered species, biological diversity, agriculture, and ecosystem management and restoration.

TABLE 1 provides a compilation of selected pollinator-related activities taking place on DOI lands or through DOI programs.

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TABLE 1. SELECTED POLLINATOR PROJECTS AT THE DEPARTMENT OF THE INTERIOR

Location	Project/Activity Description
Alabama	Pollination Biology of Alabama leather flower. Alabama leather flower, *Clematis socialis,* is a critically endangered plant known from only four localities in northeastern Alabama. Objectives of project are to survey floral visitors to determine visitation frequency of insect species; pollination efficiency of floral visitors; describe floral rewards offered by *C. socialis*; and document seasonal timing of flower and achene production. (Boyd)
Alabama, Georgia, North Carolina	Pollination biology of the green pitcher plant, *Sarracenia oreophila.* The revised recovery plan for the species noted the need for pollination studies such as this in order to further recovery of the species. Pollinators include only queens of the genus *Bombus*. (Folkerts)
Arizona (Organ Pipe National Park)	Management and studies of lesser long-nosed bat. The endangered lesser long-nosed bat is a primary pollinator of saguaro and organ pipe cactus and several species of agave. The largest known maternity colony in the U.S. is in the park. The colony is protected from human disturbance and monitored on a regular basis. Research focuses on pollination effectiveness of the bat and other life history attributes. NPS co-operates with AZ, BLM, FWS, and Mexico to co-ordinate activities. (Rowlands)
	Monitoring Africanized honeybees. AHB colonies when found in the park are destroyed. Effects of AHB are not understood. (Rowlands)
	Moth pollinators of cacti. Park contains the only known population of the Cereus cactus in the U.S. The senita moth is it chief pollinator. The pollinator populations may be affected by pesticide drift from neighbouring lands. (Rowlands)
California (Pinnacles National Monument)	Study of bee fauna and pollen sources. More than 400 species of bees and wasps have been identified. Have interpretative programs and planning a display. (Griswold)
	Study of pollination of Indian warrior, *Pedicularia densiflora*. Study of pollination biology of Indian warrior, *Pedicularia densiflora*, is planned for the coming year. (Fesnock)
	Pollen sampling from bees and wasps at Pinnacles National Monument. Pollen sampled from bees, wasps, and plants. Results will improve understanding of bee-plant associations. (Griswold)
California (Cache Creek Watershed)	Restoring pollinator habitat for native plant communities and agriculture. Document links of wildland habitat, pollinators, and pollinator services. (Kremen)
California and	Franklin's bumble bee. Study of distribution and abundance of endemic

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Oregon (Grizzly Peak and Kenney Meadows NRA)	bumblebee on FWS, BLM, and FS lands. (Thorpe)
Georgia (Okefenokee Swamp)	Pollinator limitation, pollination processes, and the biology of reproduction in *Sarracenia minor* and *S. psittacitina.* Studies of pollinator and plant distribution and interactions. (Folkerts)
Hawaii (Haleakala National Park)	Argentine ants and silversword pollinators. The alien predatory Argentine ant threatens native bee and moth pollinators of the threatened Haleakala silversword in Hawaii. The ant also imperils the silversword, due to the plants dependence on insect pollinators. Bait trials (Maxforce) are being conducted in Cupertino with the Clorox Technical Center. University of Arizona researchers are studying interactions between native and alien pollinators of silversword. (Loope)
	Mechanisms of invasion of intact Hawaiian rain forest by non-native plant species. Efforts are aimed at understanding growth rates phenology, breeding systems and pollination, seed predation, seed bank size and longevity, and factors necessary for seedling establishment of the following invasive alien species: Kahili ginger (*Hedychium gardnerianum*), clidemia (*Clidemia hirta*), and strawberry guava (*Psidium cattleianum*). (Loope)
	Endangered honeycreeper pollinates and depends on nectar from imperilled Hawaiian plants. Study of relationship among honeycreeper, Ohia-lehiua, and threats by pigs. (Pratt)
Indiana, Michigan, Wisconsin	Karner Blue butterfly studies. Study of habitat availability and host plant distribution and use by the butterfly. (Grundel)
Indiana (Indiana Dune National Lakeshore)	Study of plant guilds and pollinators. Study of plant guilds and pollinators in isolated prairie parks.
	Pollination of Pitcher's thistle study. Study of pollination of threatened or endangered Pitcher's thistle is ongoing.
Maine (Acadia National Park)	Changes in pollinator diversity. Park has an extensive collection of insects, spanning 30 years, from early 20th Century by Johnson and Procter. Preliminary planning has been done to compare current and historical diversity. (Ginsberg)

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Maryland (Chesapeake & Ohio Canal National Historic Park)	Native plant and pollinators initiative. Survey and monitoring of native plant pollinators and design of management and recovery plans. (Southard)
Mississippi (Gulf Islands National Seashore)	A new monolectic coastal bee, *Hesperapis oraria* Snelling and Stage (Hymenoptera: Melittidae), with a review of desert disjuncts in the southeastern U.S. Study of rare bee (new species) and host plant. (Cane)
Mississippi (Mississippi Sandhill Crane National Wildlife Refuge)	Pollination in pitcher plant communities. Study of hybridisation and relationship with *Bombus, Apis,* and megachilids. (Folkerts)
New Jersey, New York (Gateway National Recreation Area)	Native habitat restoration for pollinators. Fifteen years of restoration and management to provide and enhance habitats for invertebrate species, especially Lepidoptera (butterflies and moths) and Odonata (dragon- and damselflies). This involves special mowing regimes, planting nectar and pollen sources, and providing cover for overwintering species. Butterflies are monitored in Cupertino with the New York City Butterfly Club and the North American Butterfly Association. (Reipe)
New Mexico, Texas	Status and reproductive biology of *Lepidospartum burgessii.* *Lepidospartum burgessii* (Burgess broomscrub or gypsum scalebroom) was identified by FWS as a species of concern. Mode of pollination is not known. This project will provide FWS and BLM information on the basic biology of the species, including reproduction. Specific studies have included assessment of habitat conditions, insect visitors, and flowering of the plant on BLM land.
North Dakota (Theodore Roosevelt National Park)	Effect of leafy spurge infestation on native flowering plants in hardwood draws of Theodore Roosevelt National Park. Study of the effect of leafy spurge on native plant pollination and subsequent seed set in hardwood draws in the park. (Larson)
Oregon (Crater Lake National Park)	Inventory of *Bombus.* Monitoring of distribution and abundance of *Bombus* spp. (Ferguson)
Pennsylvania (Valley Forge	Tallgrass meadows program. Park manages 700 acres as tallgrass meadows to mimic historic landscape. Meadow management regime

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National Historic Park)	favours use by pollinator species. (Lambert)
Southwestern U.S.	Bat population data. Synthesis of population data for three pollinator species of bat populations. (O'Shea)
	Bat pollinators in the southwestern U.S. Distribution and abundance of three bat species, *Leptonycteris* (2 spp.) and *Choeronycteris mexicana* in southwestern U.S. (Bogan)
Western U.S.	Reproductive characteristics of 32 species of rare plants. Study of pollinator/pollination systems for rare plants on various DOI lands. (Tepedino)
	Long-term monitoring of pollinators on DOI lands. Study of vernal pool habitats and pollinators. Permanent plots to study native and introduced bee interactions. (Thorpe, Frankie)
U.S.	Butterfly inventories of national parks and wildlife refuges. Surveys and intensive studies butterflies, moths, and pollinators in selected national parks and wildlife refuges. (Opler)
U.S., Mexico	Protection of migratory bats. Many trans-border species including Mexican free-tailed bats *(Tadarida brasiliensis),* long-nosed bats *(Leptonycteris curasoae, Leptonycteris nivalis),* Mexican long tongued bats *(Choeronycteris mexicana)* and hoary bats *(Lasiurus cinereus)* have all experienced drastic population declines. BCI and FWS are collaborating in the implementation of a long-term program to educate the public about the value of bats and how to differentiate vampire bats from other bats such as the long-nosed bats important to pollination. (FWS)
U.S., Canada, Mexico	Protection of monarch butterflies. Although not considered an endangered species, the Monarch Butterfly's *(Danaus plexippus)* largest population is particularly vulnerable because of its lengthy migration, dependency on nectar sources along the way and especially its need to hibernate in massive numbers in very few places in the central highlands of Mexico where their habitat is vulnerable to survival needs of the local inhabitants, outsider exploitation of natural resources and of course, natural and often extreme fluctuations in the weather. Since 1995 the Borderlands Program has collaborated with Mexican non-governmental organisations that work to protect the Monarch Butterfly, providing $140,450 in funding support. One organisation, PROFAUNA, A.C., implements a tri-national environmental education program inviting teachers and students along the Monarch's migratory route from Canada to Mexico to report sightings and other important information. Another organisation, Alternare, A.C., works with the inhabitants of the Monarch Butterfly Reserve in central Mexico teaching them how to better manage the natural resources in the Reserve--the Monarch's

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	winter habitat--including alternatives to overexploitation of the forest. (FWS)

The Department is beginning an organised effort to address the pollinator issue at the national level. It hopes to develop highly visible demonstration projects at our national parks, wildlife refuges, and other Interior lands to publicise our commitment to pollinator conservation. Several actions are proposed in the areas of management, monitoring, research, education, and Cupertino.

1. Management: Review, assess, and revise DOI policies and practices to minimise impacts on pollinators and maximise their conservation. For example, review pesticide use, mowing and maintenance, fire management, and other practices. Review species recovery plans and make sure that we're not forgetting to restore ecological relationships like pollination as well as species.
2. Monitoring: Develop local and regional inventory and monitoring programs to assess the status and trends of pollinators on lands, as well as regional and national trends.
3. Research: Determine important relationships between pollinators and rare, threatened, and endangered species. Determine effects of land management practices on pollinator conservation. Determine contribution of native pollinators on DOI lands to surrounding agricultural and other lands. Assess effects of surrounding land management practices to native pollinators on DOI lands. Develop joint research strategies among conservation and agricultural agencies.
4. Education: Train DOI land and resource managers on the importance of pollinator conservation. Educate the public on the importance of pollinator conservation. Develop highly visible demonstration projects to publicise DOI approach.
5. Cupertino: Work with other national, international, regional, and local pollinator conservation programs. Raise issue at national and international forums.

Protection of wild pollinators and the services they provide will take a concerted effort by both the conservation and agricultural communities, public and private. Protecting wild pollinators will ensure the continuation of the services they provide to nature, agriculture, and society.