



Natural Selections

Legacy Program Update

Legacy Resource Management Program Request for FY 2009 Proposals announced: The Legacy Resource Management Program announces a call for pre-proposals focusing on the management, stewardship, and preservation of DoD's natural and cultural resources. The deadline for pre-proposals is 5 September 2008. Visit www.DoDLegacy.org for details.

Now Accepting National Public Lands Day (NPLD) Applications!: Applications for NPLD Legacy funds are available for base-level projects on any Department of Defense site that supports the goals of National Public Lands Day (NPLD) and emphasizes natural and cultural resource management. The deadline for submitting applications is June 15, 2008. For more information visit NPLD website at <http://www.publiclandsday.org> or contact Claudia Kessel, at claudia@neetf.org or Jane Mallory, with the Legacy Program at Jane.Mallory.ctr@osd.mil

Legacy Project Highlight of the Month

Legacy Project 01-69 Population Modeling and Habitat Conservation for the Palos Verdes Blue Butterfly

The Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus paloverdesensis*) was listed as an endangered species in 1980, when the animal was known from only three locations on the Palos Verdes peninsula in California. By 1984, because of urban development and the construction of a ball field at Hesse Park, the species was believed to have become extinct. In 1994, the butterfly was rediscovered at a site managed by the Defense Fuel Support Point (DFSP) in San Pedro, California, south of Los Angeles, renewing hopes for the survival of this species.

The Palos Verdes Blue is possibly restricted to two host plants. The larvae are adapted to the particular balance of nutritional components which this locoweed provides.
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In The News

Birds, Bees, and Bases: How military natural resource managers can help local pollinators and why they should care

By S. Buchmann¹, P. Kevan², L. Adams³, and A. Dalsimer⁴
May 27, 2008

Benefits of Pollinators and Why Diversity Matters

North American forests and meadows are awash in pollinators -- perhaps more than 50,000 flower-visiting flies, beetles, butterflies, moths and wasps that provide essential pollination services for native plants and myriad crops. While some plant species rely on single-species pollination (examples include figs and fig wasps; and yucca moths and yucca plants), it is generally rare for a plant to be pollinated by only one kind of insect.

Most flowering plants from temperate zones rely upon guilds of diverse pollinating insects to move their pollen from plant to plant. Open flowers (e.g., sunflowers) are visited by flies, wasps, beetles, bees and butterflies. More specialized flowers, such as flowers with narrow

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Training

CANCELLED! **Natural Resource Compliance:** The training event June 17-20, 2008 in Crane, Indiana is **CANCELLED!**

There will be future offerings of this training course tentatively scheduled for February and June 2009. Course Description: This course offers instruction in specific natural resource laws, regulations, policies, Executive Orders, DoD Instructions, and other guidance, noting Service-specific requirements. Course addresses stewardship, preservation, and process; fish, game, and wildlife management laws; protection of wetlands, waterways, and other protected ecological areas; forest and land use management laws; and interservice cooperation. Practical exercises and guest speakers are included. This course is approved by the Interservice Environmental Education Review Board (ISEERB). For details visit <https://www.npdc.navy.mil/csfe/cecos/>

NEW! **Buying Green: A Multifunctional Approach to Pollution Prevention:** June 25-26, 2008 in Phoenix, AZ. This workshop provides an overview of Federal pollution prevention initiatives and how they relate to the DoD acquisition process. The workshop demonstrates to Federal employees how, through affirmative procurement (Eco Purchasing), we can create markets for recovered materials and environmentally preferred products and services. The workshop includes a forum to share ideas and success stories. Highlights include: Pollution Prevention (P2) Hierarchy, P2 Executive Orders & Regulations, Affirmative Procurement Program, Environmentally preferred products, Life cycle costing, Acquisition planning, FAR requirements, EPA Eco Purchasing and, Comprehensive procurement guidelines for products containing recovered materials (40 CFR 247). This course helps bridging the communication gap between acquisition and environmental staffs. For more details about this course or to request participation quota visit <https://www.npdc.navy.mil/csfe/cecos/index.cfm?fa=courses.coursedetail>.

Coastal Ecology: June 9-13, 2008 in Monterey, CA This course provides Corps of Engineer personnel with state-of-the-art knowledge and technology in marine and coastal ecology. Students are given an overview of the latest scientific and analytical techniques in the field of coast ecology and related sciences. Through a series of lectures, practical exercises, and field trips, students are introduced to the basic concepts of marine/estuarine ecology (including benthic ecosystems, fisheries, coastal marsh and seagrass ecology), sensitive resources, experimental design, and current marine ecological techniques such as the Benthic Resources Assessment Techniques (BRAT) and the Sediment Profiling (SP) camera. The role and importance of coastal ecosystems will be discussed. Temperate, subtropical, and tropical ecosystems will be covered for the Gulf, Atlantic, and Pacific coasts. Cost \$3,350. Limited seats available, visit <http://pdsc.usace.army.mil/CourseListDetail.aspx?CtrlNbr=263>.

Bat Conservation and Management Workshops – 2008: July 19-24, 2008, California. Bat Conservation International (BCI) offers a series of comprehensive, introductory field workshops to train serious students of bat conservation in current research and management techniques for the study of bats. Following an intensive 6-day, 5-night agenda, BCI biologists and professional colleagues will present a combination of lectures and discussions, field trips to view bat habitat resources and hands-on training to catch and identify bats. Learn species identification, netting, radio-tracking, night-vision observation and habitat assessment while working in extraordinary settings. Limited to 20 people. Departure city: Medford, Oregon. Cost: \$1,395. For additional information, registration forms and scholarship applications, visit <http://www.batcon.org>.

Riparian Zone Ecology Restoration/Management: June 23-27, 2008, in Phoenix, AZ. This course addresses planning and management issues that pertain to riparian (streamside) ecosystems in a variety of ecological and geographical settings. Emphasis is placed on the ecology, restoration and stewardship of riparian habitats associated with Civil Works projects and activities. Students will receive instruction on the functions and ecological importance of riparian zones, conservation needs, and potential impacts resulting from various land use practices, restoration and management techniques that can be applied to maintain or improve riparian systems. For more details please visit <http://pdsc.usace.army.mil/CourseListDetail.aspx?CtrlNbr=281>.

Announcements and Events of Interest

NEW! 2nd Annual National Pollinator Week: June 22-28, 2008, Nationwide.

Due to the enormous success of National Pollinator Week 2007, officially declared by the U.S. Senate (S.Res. 580) and the U.S. Department of Agriculture, the Pollinator Partnership has received requests from all over the continent to expand on this year's festivities and events. You can help spread the pro-pollinator message by planning your own National Pollinator Week event in your state. For a list of events in your state or to publicize your event please visit http://www.pollinator.org/pollinator_week_2008.htm.



CALL FOR PAPERS! Tenth Annual Joint Meeting of the Bird Strike Committee USA/Canada: August 18-21, 2008 in Orlando, FL at the Orlando Marriott Lake Mary. The Bird Strike Committee USA/Canada (www.birdstrike.org) and the American Association of Airport Executives have teamed up again to offer the 10th Annual Joint Meeting of the Bird Strike Committee USA/Canada. This year's meeting, hosted by the Orlando Sanford International Airport, is slated to bring together wildlife experts and airport officials from across the U.S., Canada and abroad. This conference will provide a great opportunity to learn not only what options are available in wildlife management, but also what others in the industry are doing to manage the same dilemma. Moreover, this meeting will be of particular interest to military and civilian personnel responsible for airfield operations, wildlife and wetland resource managers, land-use planners, FAA inspectors, university researchers, engineers, pilots, aviation representatives, waste management operators and anyone interested in mitigating bird strikes. To register as an attendee, you may download a registration form http://www.aaae.org/fs03/meeting_documents/0802reg.pdf and fax it to (703) 820-1395 or register online https://www.aaae.org/products/MtgRegOnLine.html?meeting_ID=80802.

CALL FOR PAPERS! 35th Natural Areas Conference: October 14-17, 2008 at the Doubletree Hotel in Nashville, Tennessee. The 2008 Natural Areas Conference will be a joint conference of the Natural Areas Association (NAA) and the National Association of Exotic Pest Plant Councils (NAEPPC). The conference will kick-off the 30th anniversary celebration of the NAA, and will be an inaugural national conference for NAEPPC. The conference will focus on ecological management themes with an emphasis on invasive exotic species and the effects of climate change. The NAEPPC will bring its invasive species expertise to the conference and the two organizations will provide synergy in organizing an outstanding event. The plenary and concurrent sessions will address the conference theme "Tuning into a Changing Climate and Biological Invasion." Field trips and workshops will provide training opportunities for participants. Join us for an informative and rewarding experience. Call for papers deadline April 22, 2008. For details visit <http://www.naturalarea.org/08Conference>.

Embry-Riddle's Wildlife Hazard Management workshop: July 8-10, 2008, at the Denver International Airport in Denver, Colorado. This workshop is being offered as part of Embry-Riddle Aeronautical University - Worldwide's Professional Education programs. The workshop is acceptable to the FAA Administrator for complying with part of the wildlife hazard management requirements of Title 14, Code of Federal Regulations, Part 139. The workshop is a good fit for those who train airport personnel involved in implementing FAA approved wildlife hazard management plans, as well as anyone directly involved in controlling wildlife hazards on airports. Highlights include discussions on wildlife population management and dispersal techniques, endangered species act compliance, strike reporting, wetlands mitigation, pesticides usage, drafting and implementation of integrated wildlife hazard management programs, and an overview of applicable local, state, and federal laws, regulations, and ordinances. For more information and registration form, please link to: <http://www.erau.edu/ec/soctapd/wildlife-management.html>



Legacy, continued from page 1

This butterfly goes through one generation per year, the adults emerging in early to mid spring, to mate and lay eggs, synchronously with the flowering of the locoweed,. The larvae feed upon the seeds and flowers of the host plant, molting several times, and soon drop to the ground or enter locoweed seedpods to become pupae. During the summer and fall the pupae undergo transformation into adult butterflies and then emerge early the following spring. The males and females of this species are distinguished by a color difference, the males' upper wing surfaces being bluish, those of the female being a darker, almost gray color. The Palos Verdes Blue Butterfly is in the family *Lycaenidae* (gossamer wings). It is a small butterfly with a wingspan between 25 and 30 mm. In the male, dorsal wing surfaces are colored a brilliant silvery-blue and outlined by narrow black borders. The dorsal wing surfaces of the female are brownish-gray in color, with a blue iridescence. In both sexes, the ventral wing surfaces are chalky gray in color, with several round spots highlighted by white rings.



The federally endangered Palos Verdes blue butterfly is one of eleven subspecies of the silvery blue butterfly. It was rediscovered in 1994 on DoD lands after it was thought to be extinct for nearly 10 years. Above, a female Palos Verdes Blue Butterfly on the left with a male Palos Verdes Blue Butterfly on the right hand side.

The Palos Verdes Blue Butterfly is dependent on two known host plants, locoweed (*Astragalus trichopodus* var. *lonchus*, also known as Santa Barbara milkvetch) and common deerweed (*Lotus scoparius*). It has a single adult flight period extending from late January through mid-April. Eggs are normally laid in the flower heads of either deerweed or locoweed, where the caterpillars will feed. When the larvae are mature, they crawl into the leaf litter at or near the base of the food plant to find a place to pupate. They remain as pupae through the summer and winter, emerging as adult butterflies early the following spring.

The Palos Verdes Peninsula, on the coast south of Los Angeles, is a shrinking patch of coastal scrub community that has been under increasing pressure of urban development.

Other factors in the decline of this community, and the locoweed host plant in particular, include weed control, off-road vehicle use, non-native plant invaders, and fire suppression. Competition for host plant space by a related butterfly may also be a factor.

For this project, under the direction of UCLA scientists and in collaboration with the Defense Logistics Agency, studies were conducted to establish a general description of the biological setting, including butterfly populations, host plant abundance, and species diversity. The Palos Verdes Blue Butterfly mating and feeding habits were also studied. Based on the results, an ongoing effort of restoring at least 100 acres of degraded coastal scrub to prime butterfly habitat is underway. A captive butterfly breeding laboratory was established in an old warehouse on the fuel terminal, and a plant nursery was established to provide the native species needed to support the butterfly.

Volunteer workers were recruited to perform the more rigorous restoration tasks. The volunteers include disadvantaged inner-city youths. Removing exotic plants has been a major challenge. Volunteers come to the terminal to pull exotic plants (notably ice plant) and plant native species. The volunteers have contributed over 2,200 hours each year for the past several years. Over 9,700 native plants were planted.

Habitat restoration through gradual elimination of exotic plants and re-establishment of the historic native plant community (non invasive species) has been the predominant factor in the ongoing recovery of the Palos Verdes Blue Butterfly. At the same time the Palos Verdes Blue Butterfly rearing program is being continuously improved to increase the "production" of butterflies.



Want to help bees?

<http://www.helpthehoneybees.com>



Pollinators, continued from page 1

tubular corollas or complex shapes, are visited by highly specialized pollinators (e.g., hummingbirds), while fragrant flowers with deep throats that open at night are visited by hawk moths (*Sphingidae*). In all, thousands of insect species and dozens of bird and bat species provide vital pollination services that maintain our diverse natural and managed ecosystems. Maintaining an abundant diversity of pollinators is therefore crucial.

Pollinator Losses

Around the world, pollinating animals and their host plants are declining, sometimes precipitously and inexplicably. Already, some pollinators have gone extinct while others remain critically imperiled. Anthropogenic causes are largely to blame for pollinator and plant declines. Habitat losses, especially from the conversion of wildlands into agricultural and urban landscapes, have resulted in local pollinator and plant extirpations. Disease organisms (e.g., microsporidian protozoans) have caused populations of certain U.S. bumble bee species to plummet or disappear entirely, and invasive plants and animals have challenged and stressed native pollinators and their floral hosts. Further, toxic chemicals (i.e., insecticides and herbicides) used on farms, lawns and gardens kill pollinators and eliminate “weeds,” including native roadside wildflowers, resulting in degraded habitats with fewer pollinators and less nectar and pollen-yielding plants.

A recent study in the prestigious journal *Science* (July 21, 2006) highlighted pollinator losses over the past several decades in European countries. In the Netherlands and the United Kingdom, populations of flower flies (family *Syrphidae*) and native bees, keystone mutualist pollinators in these countries, have declined as much as 40%-60% since 1981, as have certain flowering plants. In response, the European Union has initiated and funded a comprehensive multi-year continental pollinator survey called ALARM. A recent U.S. National Academy of Sciences study entitled *Status of Pollinators in North America* called for similar baseline studies of plants and their pollinators in the United States, Mexico, and Canada.

In the United States, recent pollinator extinctions include at least seven species of yellow-faced bees in Hawaii, the Franklins' bumble bee in the Pacific Northwest, and several butterflies. Many other U.S. pollinators may be critically imperiled, though scientists lack historic baseline data to demonstrate long-term population trends and substantiate these suspected losses. Anecdotally, in February 2007, U.S. beekeepers in more than 20 states began reporting that many of their honey bee hives were empty, containing only a queen and a few sick bees where once there were thousands of worker bees. The origins and causative agent(s) of this phenomenon, called Chronic Collapse Disorder (CCD), remain unknown. Sadly for pollinators and food eaters alike, the effects of CCD are likely to continue.

International Partners Working Together

Since 1999, a consortium of federal, state, provincial government environmental authorities, NGOs, policy-makers, corporations and individuals have cooperated to preserve and protect pollinators and their host plants. This tri-national (Canada, United States, Mexico) group, known as the North American Pollinator Protection Campaign or NAPPCC, is working hard on the issues of pollinator conservation and restoration and, as a group, offer the main source of pollinator and pollination expertise in North America.

Aside from its science-based efforts, NAPPCC members have worked hard to raise public awareness about pollinators and their plight. In the last two years alone, the group has developed a pollinator curriculum for students in grades 3-6 entitled *Nature's Partners*, secured a special issue stamp from the U.S. Postal Service, and formally established (via the U.S. Senate and Secretary of Agriculture) a national Pollinator Week for the third week in June. This year, National Pollinator Week will be 22-28 June 2008.

Military Installations and Pollinators

Many military installations in the United States are large and protected from unrestricted public access, and many employ wildlife biologists who have environmental stewardship responsibilities mandated by the Sikes Act, and guided by compliance with the Endangered Species Act, Executive Order on Invasive Species, and other federal regulations and DoD policies. The result is greater protection for all native plants and animals on installation lands.

Studies by Buchmann et al. have revealed high alpha diversity of native bees on U.S. military reservations. Specifically, multi-year studies of bees at Yuma Proving Grounds, Arizona, and White Sands Missile Range

(WSMR), New Mexico, have shown pollinator diversity numbering in the hundreds of species present. In these studies, new species of *Atoposmia* mason bees (Yuma) and specialist bees associated with ultrabasic gypsum soils and rare plants (WSMR) were collected utilizing netting at flowers or traps (e.g., pan traps filled with soapy water), thus demonstrating that this technique can be used effectively to monitor native pollinators on military lands.

Simple Things You Can Do

Creating pollinator habitats on installations provides local insect and bird species with nesting and foraging sites, AND builds a living laboratory for base personnel to enjoy and learn from. Because pollinators require relatively small patches of land, creating "pollinator buffers" around buildings, near exercise and parade grounds, and in the "roughs" or out of play areas on golf courses can all make a difference.

Because roadway access and military training field exercises have the greatest impact on native floras and faunas including plants and their pollinators, consider adopting "pollinator friendly practices" such as:

-  Plant for Pollinators. Consider re-vegetation of degraded military lands using native locally-adapted (to soils, climate) native flowering plants. These plants will cost less to maintain than non-native species, and pollinator gardens (for butterflies, birds, bees, bats) can become havens not only for wildlife but for military personnel and their families.
-  Avoid excessive mowing of roadside "weeds." Roadways provide extensive habitat for native annual wildflowers and their pollinators. Ideally, plant native species in these areas, then mow only after they have flowered and set seed.
-  Consider deploying hummingbird feeders and drilled board "bee condominium" nesting boxes for native leafcutter and mason bees. Roadside plantings of local wildflowers will attract many butterflies and native bees to these areas where they can feed and nest.
-  Avoid extensive herbicide spraying of native wildflowers for the same reasons. Additionally, keeping areas of nectar-producing wildflowers at hand provides refuge sites for parasitic wasps that combat pest insect populations.
-  Consider placement of houses for bats and purple martins on poles. Aside from pollination services, bat and martin populations will help reduce pest insects, such as mosquitoes. Similarly, placing bat-friendly "gates" at mine entrances will allow bats to come and go while keeping mine entrances safe for people.

On a personal level, in addition to the actions above, we all can help promote pollinator services with actions as simple as buying locally-grown and organic fruits and vegetables, switching to shade-friendly coffee, purchasing the U.S. Post Office pollinator stamp, planting flower gardens, or participating in an outreach activity during National Pollinator Week, which starts June 22. All these can make a positive difference towards maintaining the pollinators which are so vital to our world. For even more ideas and activities, including a curriculum (Nature's Partners) that can be used at installations, visit the Pollinator Partnership website at www.pollinator.org.

Notes:

- 1 Department of Entomology, University of Arizona
- 2 Dept of Environmental Biology, University of Guelph, Ontario, Canada
- 3 Executive Director, Pollinator Partnership, SF
- 4 Associate, Booz Allen Hamilton, VA

DoD Discusses Birds and Bees at 2008 NMFWA Meeting

Mary Anderson, Peterson USAF Space Command, and Alison Dalsimer, Booz Allen Hamilton.

What do birds, bats, mosquitoes, bees, flies, butterflies and moths, and even monkeys and lemurs have in common? They all are pollinators. That is, they all transmit pollen from plant to plant, thereby ensuring plant reproduction and sustainability. And, what do chocolate, strawberries, watermelon, tea, and tequila all have in common? They all are products that require pollination. In fact, 3 of every 4 mouthfuls of food the average person eats owes thanks to pollination services. From your first cup of java to the berries in your late night pie, pollinators make it possible for us to eat and enjoy a wide assortment of fruits, vegetables, grains, and other products. Even more, pollinators are instrumental in the reproduction of 80% of all flowering plants, making healthy ecosystems possible from grasslands

to forests. Yet pollinators are fast disappearing, and not just in the U.S.

Worldwide, pollinator declines are having profound repercussions. In China, for example, apple growers have begun hand pollinating apple blossom flowers. In the U.S., farmers' added costs result mainly from having to hire and import rental colonies of migratory worker bees—the average cost per hive has increased from an average \$50 to upwards of \$150. The increase is significant when one considers that California almond growers alone require 2 hives per acre for each of the State's 500+ acres of almond groves. Truly, the production services of pollinators cannot be overstated. A study by Cornell University in 2000 found that the pollinator services of the Western honey bee alone resulted in ~\$15 billion/year in U.S. food crop value.¹

But, why are pollinators disappearing? The answers are complex. Disease, parasites, loss of habitats, pesticides and insecticides, and now Colony Collapse Disorder (wherein worker bees leave for the day, never to return to their hives) are all taking their toll. So, what can military natural resource professionals do? First, we can better inform ourselves, which was the impetus behind putting together a training session on pollinators at the 2008 NMFWA meeting in Phoenix, Arizona.

As biologists, we understand the food web that illustrates the connectivity between living organisms. One thing we might overlook is the importance of the pollinators in habitat restoration or survival of native plant populations both through production of viable seed for the next generation and genetic biodiversity. The 2008 NMFWA Pollinator Session was comprised of four presentations.

Mary Anderson, Headquarters Air Force Space Command, who organized the session, opened with an introduction on Pollinators at Risk and a brief summary of how they can be protected. This briefing was previously given to the Natural Resources Committee of the Armed Forces Pest Management Board during discussion on how best to protect pollinators during military pest management activities.

The first invited speaker was Dr. Richard Lance, U.S. Army Engineer Research & Development Center (Richard.F.Lance@usace.army.mil), who discussed a new project to sample the pollination networks of Fort Huachuca grasslands. Examining pollinator networks is a new sampling methodology (species network) here in the United States, but has been used in Europe for a couple of years. The concept is to sample/track which pollinators are visiting which plants, determining behavior (specialists or generalist), and calculate robustness of the native habitats using network analysis tools. The result is a graphical display of pollinator travel patterns.

Laurie Adams, Executive Director of The Pollinator Partnership,² then spoke about the history of pollinators, the decline in native pollinator species, and ongoing education and outreach efforts, such as working with an artist to design an award-winning pollinator stamp design, then having it accepted and published by the Postal Service, all within three years.

The session closed with Dr. Stephen Bachmann,³ who discussed the multitude of projects he has been involved in from the National Academy of Sciences Study: The Status of Pollinators in North America⁴ to his latest book Letters from the Hive. Dr. Bachmann expanded on the loss of native pollinators across the country and how this impacts our land management activities, discussed how Colony Collapse Disorder is affecting the Western honeybee and the majority of the U.S. agriculture production, and provided several reference sites and free publications for use in DoD land management activities and planning. He closed by encouraging DoD to create pollinator habitats on little used lands, such as golf course roughs and in commanders' gardens.⁵ In the end, more attendees had questions than our speakers had time to answer. Clearly there is interest out there, and much DoD can do to help in this arena.

For more information on pollinators and National Pollinator Week, 22-28 June 2008, please visit www.pollinator.org. If you would be interested in attending or helping develop a pollinator workshop at the 2009 NMFWA to clarify "why we should be concerned about pollinators, from tiny hummingbirds to those pesky flying insects, and what we can do to help," or if you have any other questions, please feel free to contact either Alison Dalsimer at dalsimer_alison@bah.com or Mary Anderson at mary.anderson@peterson.af.mil.

Notes:

¹ <http://www.beeeculture.com/content/PollinationReprint07.pdf>

² Formerly known as the Coevolution Institute. See www.pollinator.org for more info

³ The Bee Works (www.thebeeworks.com).

⁴ http://www.nap.edu/catalog.php?record_id=11761

⁵ The DoD Legacy Program sponsored three pollinator demonstration projects in 2001, including two on golf courses, and one in unused areas (e.g., playground) at Dyess AFB. The latter resulted in the discovery of two new species.

DoD Announces Winners of the Secretary of Defense Environmental Awards

U.S. Department of Defense, Office of the Assistant Secretary of Defense (Public Affairs)

The Department of Defense announced the winners of the Fiscal Year 2007 Secretary of Defense Environmental Awards. A panel of judges representing federal and state agencies, academia, and the public has selected the following installations, teams, and individuals as the winners of this year's awards:

Naval Weapons Station, Seal Beach, California
Natural Resources Conservation – Small Installation

Natural Resources Conservation Team, Fort Indiantown Gap Training Center, Pennsylvania
Army National Guard, Pennsylvania
Natural Resources Conservation – Individual/Team

Redstone Arsenal, Alabama
Cultural Resources Management – Installation

Naval Air Engineering Station, Lakehurst, New Jersey
Environmental Quality – Non-Industrial Installation

Hill Air Force Base, Utah
Environmental Quality – Individual/Team

Robins Air Force Base, Georgia
Pollution Prevention – Industrial Installation

Seymour Johnson Air Force Base, North Carolina
Environmental Restoration – Installation

Marine Corps Air Station Cherry Point, Partnering Team, North Carolina
Environmental Restoration – Individual/Team

Fairchild Air Force Base, Washington
Environmental Excellence in Weapon System Acquisition – Individual/Team

Each year since 1962, the Secretary of Defense has recognized outstanding achievement in environmental management by the DoD Components by military and civilian personnel, at both domestic and overseas bases, to sustain military readiness, and training and operational capabilities. Mr. John J. Young Jr., Under Secretary of Defense (Acquisition, Technology and Logistics) will officiate at the ceremony honoring the winners on June 4, 2008 at 3:00 p.m. in the Pentagon Center Courtyard. For more information on the Secretary of Defense Environmental Awards Program and highlights of this year's winners and honorable mentions, please visit:

<https://www.denix.osd.mil/portal/page/portal/denix/environment/awards>



Did You Know?

How small can you go? – Native bees come in all shapes and sizes. Many gardeners are familiar with the large black and yellow bumblebees (*Bombus* spp.) or the equally large, usually all black, carpenter bees (*Xylocopa* spp.). Honeybees (*Apis mellifera*) are much smaller, but they are giants compared to many of our nearly 4,000 species of native bees. One southwestern United States bee is especially petite. *Perdita minima* belong to a diverse genus of approximately 600 species belonging to the family *Andrenidae*. *Perdita minima* are solitary bees, and thus are not classified as social bees as are honeybees. Many bees in this genus are floral specialists and only visit one or a few related species within a single plant genus.

Perdita minima are slightly less than two millimeters long! As a solitary bee, it constructs a diminutive nest in sandy desert soils. Entomologists and naturalists who seek out this tiny pollinator typically look for its passing shadow across the ground rather than the bee itself. This bee is so small that it can easily pass through and escape from the netting fabric mesh of ordinary insect nets.

Perdita minima feed on the nectar and pollen of wildflowers in the spurge family, *Euphorbiaceae*. In the desert southwest, it frequently visits wildflowers such as small white margin sandmat (*Chamaesyce albomarginata*). The tiny white flowers provide the nectar and pollen needed by adults and larvae of these small bees. Although pollen grains seem relatively large for such small bees to pack and carry back to their nests, the hairy legs of this diminutive bee are capable of carrying very large loads of pollen.

Thanks to Steve Buchman, from The Bee Works, for his contributions to this article!

More on pollinators!

This publication **[Pollinators in Natural Areas: A Primer on Habitat Management](#)** by Scott Hoffman Black, Nathan Hodges, Mace Vaughan and, Matthew Shepherd, provides a summary of how land and wildlife managers can provide and protect habitat for bees, butterflies and other pollinators. Specifically, this 8-page booklet reviews the potential impacts of fire, grazing, mowing, herbicides, and insecticides. It then provides a series of recommendations for how land managers can adjust the use of these management actions to benefit pollinators. To download the primer or to purchase a copy please visit: http://www.xerces.org/pubs_merch/Managing_Habitat_for_Pollinators.htm



Taking size comparisons to a new level, this image above shows the world's smallest bee, *Perdita minima*, (which is protected at White Sands Missile Range and Yuma Proving Grounds) "riding" on the head of a female carpenter bee, *Xylocopa varipuncta*, which nests in dead trees. *Perdita minima* is in the family *Andrenidae*, and it has no common name. Scale in bottom left corner of image is 2.0mm long.



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